Illicit Discharge Detection and Elimination (IDDE) Program

Lowell Regional Wastewater Utility

Submission Date: December 31, 2023

ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM (IDDE)

CERTIFICATION STATEMENT

I certify under penalty of perjury that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I have no personal knowledge that the information submitted is other than true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Aaron Fox
Executive Director
Lowell Regional Wastewater Utility

12/31/2023
Date

Document Revision Table

Date	IDDE Section	Change	Reason	Author / Approval
12/29/23	Full Document Update	Document Submission	Consent Decree	Author: G. Bergeron Approval: A. Fox

TABLE OF CONTENTS

TABLES AND FIGURES

1 INTRODUCTION

The Illicit Discharge Detection and Elimination (IDDE) Program establishes a plan to identify and eliminate illicit discharges and connections to the municipal separate storm sewer system (MS4). This program includes a plan for dry-weather outfall screening, mapping and investigating all known MS4 catchment areas and outfalls, wet weather outfall sampling, and a protocol for the identification and removal of illicit discharges to the MS4 system.

The Lowell Regional Wastewater Utility (Lowell Wastewater, the Utility) has started mapping the upstream drainage systems tributary to the MS4 outfalls, conducting dry/wet weather outfall screenings and samplings, and identifying potential illicit connections. The Utility will update the IDDE Program, as needed, to modify its investigation approaches and/or to comply with any future regulatory requirement.

1.1 REGULATORY BACKGROUND

On May 1, 2003, U.S. Environmental Protection Agency (EPA) Region 1 issued its Final General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (2003 Small MS4 Permit) consistent with the Phase II Rule (1999, Phase II Rule Fact Sheet). The 2003 Small MS4 permit covers "traditional" (i.e., cities and towns) and "non-traditional" (i.e., Federal and state agencies) MS4 Operators located in the Commonwealth of Massachusetts and the State of New Hampshire. These two New England states do not have regulatory primacy and the EPA issues the regulations and permits.

The City of Lowell (City) submitted the Notice of Intent (NOI) on July 30, 2003 and it is posted on the EPA website (Lowell NOI). Authorization to discharge under the 2003 Permit was granted by the EPA on October 3, 2004. Lowell maintains authorization to discharge under the 2003 Permit. In compliance with the 2003 Permit, the City submitted a full outfall inventory, annual reporting updates, and a draft SWMP.

This permit expired on May 1, 2008 but remained in effect until operators were authorized under the 2016 MS4 general permit, which became effective on July 1, 2018. Communities were able to challenge the 2016 MS4 general permit and negotiate a modified individual MS4 permit with the regulators. The City submitted this request for an individual MS4 permit.

Until recently, the City was operating solely under the 2003 Small MS4 General Permit. In June 2022, federal and state agencies initiated Consent Decree (CD) negotiations with the City. Throughout the process, the City negotiated with the agencies' legal and technical teams to reach an agreement in December 2023. The final CD will be submitted to Federal Court in 2024. In accordance with the CD, the City shall remain under the 2003 MS4 permit with additional requirements stipulated per the CD.

With respect to IDDE, these additional stipulations require the Utility to complete the following:

1. Develop a storm sewer system map. At a minimum, the map must show the location of all outfalls and the names of all waters that receive discharges from those outfalls. Additional elements may

be included on the map, such as locations of catch basins, manholes, and pipes within the system. Initial mapping should be based on all existing information available to the City including project plans, City records and drainage maps. Field surveys may be necessary to verify existing records and locate all outfalls.

2. Establish or update existing ordinances to effectively prohibit illicit discharges into the MS4 system and adopt appropriate enforcement procedures and actions.

3. Develop and implement an Illicit Discharge Detection and Elimination Program (IDDE) to detect and address illicit discharges, including illegal dumping, into the system. The illicit discharge program must contain the following elements:
    a. Procedures to identify priority areas. This includes areas suspected of having illicit discharges, for example: older areas of the City, areas of high public complaints and areas of high recreational value or high environmental value such as beaches and drinking water sources.
    b. Procedures for visual screening and sampling of outfalls for discharges.
    c. Procedures for locating the source of the discharge and procedures for the removal of the source.
    d. Procedures for documenting actions and evaluating impacts on the storm sewer system subsequent to the removal.

4. The City must inform users of the system and the general public of hazards associated with illegal discharges and improper waste disposal. The City must train field inspectors to recognize illicit discharges.

5. Illicit discharges are to be addressed if they are identified as being significant contributors of pollutants.

1.2 ILLICIT DISCHARGES

An illicit discharge is any discharge to a MS4 that is not composed entirely of stormwater, except for non-stormwater discharges are allowable under the MS4 General Permit and under the City's Stormwater Ordinance. A list of allowable discharges is included in **Section 1.3**.

Illicit discharges can enter the MS4 in many ways, including through direct connections (wastewater piping connect to the stormwater system mistakenly or deliberately) or indirect connections (illegal dumping, spills, etc.). These sources may not always be obvious, and can be continuous, periodic, or irregular. Common sources of illicit discharges include wastewater leaking from damaged main line or lateral pipes, sewer surcharges and overflows, and improper disposal of pet wastes. Some illicit discharges are intentional, such as dumping used oil (or other pollutant) into catch basins, and/or a resident or contractor illegally tapping a new sewer lateral into the MS4.

Illicit discharges can also be related to existing older infrastructure or drain connections that are no longer suitable in the modern regulatory environment. Examples of illicit discharges in this category include floor drains in old buildings connected to the drain system, as well as sanitary sewer overflows that may directly

or indirectly enter the drainage system via design systems (such as sewer underdrains or shared/combined manholes). Sump pumps legally connected to the storm drain system may be used inappropriately, such as for the disposal of contaminated floor wash water or old household products, which, in many cases, may occur due to a lack of understanding on the part of the homeowner.

Elimination of illicit discharges may require substantial costs and efforts, such as funding and designing a project to reconnect sanitary sewer laterals. Others, such as improving self-policing of dog waste management, can be accomplished by public outreach and education in conjunction with the minimal additional cost of dog waste bins and the municipal commitment to disposal of collected materials on a regular basis.

Regardless of the intention, illicit discharges can contribute to high levels of pollutants, such as heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to surface waters.

1.3 ALLOWABLE NON-STORMWATER DISCHARGES

The following categories of non-stormwater discharges are allowable under the MS4 General Permit and under the City's Stormwater Ordinance:

a. waterline flushing;
b. landscape irrigation;
c. diverted stream flow;
d. pumped or infiltrated uncontaminated groundwater (as defined in 40 CFR § 35.2005(20));
e. discharge from potable water sources;
f. foundation drains, footing drains, air conditioning condensation, water from crawl space pumps;
g. spring irrigation water;
h. lawn watering;
i. individual resident car washing;
j. natural flows from riparian habitats and wetlands;
k. de-chlorinated swimming pool discharges (less than one ppm chlorine);
l. street wash waters;
m. residential wash waters without detergents; and
n. non-stormwater discharge permitted under a NPDES permit, waiver, or waste discharge order administered under the authority of the United States, Environmental Protection Agency, provided that the discharge is in full compliance with the requirements of the approved NPDES permit, waiver or order.

Discharges or flows from firefighting activities are allowed under the City's Stormwater Ordinance unless they are identified as significant sources of pollutants to Watercourses, or Waters of the Commonwealth. Discharges associated with dye testing are also allowed under the City's Stormwater Ordinance, however this activity requires notification to the Enforcement Authority prior to the time of the test.

If these discharges are identified as or become significant contributors to the MS4, they may be considered an "illicit discharge" and should addressed in the IDDE Program (i.e., implement controls so that these sources no longer significant contributors of pollutants and/or eliminate them entirely).

1.4 MS4 RECEIVING WATERS

In 2004, the Utility completed an outfall inspection program that involved walking the banks of each water body in the City to identify the visible outfalls and to obtain dry-weather flow samples of each. A map of the outfalls was created at that time; since then, the City has continued to update the map of City owned MS4 outfalls as additional information is discovered.

An overview of Lowell's MS4 receiving waterbodies, and the number of known municipal outfalls located in each, are included in **Table 1-1**, below.

Table 1-1: Outfall Locations by Waterbodies in Lowell

Waterbody Name	# of Known Municipal Outfalls
Beaver Brook	4
Black Brook	14
Concord River	15
Lowell Canals	7
Merrimack River	95
River Meadow Brook	15
Clay Pit Brook	15
Flaggy Meadow Brook	4
Marginal Brook	5
Other (i.e., swamp, drainage swales, wetlands etc.)	102

1.5 IDDE PROGRAM GOALS, FRAMEWORK, AND TIMELINE

There are generally two forms of substantial impact brought on by stormwater runoff resulting from urban development activities: an increase in the total rate/volume of stormwater runoff, and an increase in the quantity of pollutants in stormwater runoff. These impacts have the potential to cause:

- Impairment of water quality,
- Contamination of drinking water supplies,
- Erosion of stream channels, and
- Alteration or destruction of aquatic and wildlife habitat.

Accordingly, regulation and control of stormwater discharges to the MS4 is essential to protect and safeguard public health, safety, welfare, and the environment.

The goals of the IDDE Program are to find and eliminate illicit discharges to the MS4 and to prevent illicit discharges in the future. The program consists of the following major components:

- IDDE responsibilities, including legal authority and regulatory mechanism to prohibit illicit discharges and enforce this prohibition,
- Storm system mapping,
- Inventory and ranking of outfalls,
- Dry weather outfall screening,
- Catchment investigations,
- Identification/confirmation of illicit sources,
- Illicit discharge removal,
- Follow-up screening, and
- Employee training.

The timeline for implementing the IDDE program is shown in **Table 1-2**.

Table 1-2: IDDE Program Implementation Timeline

IDDE Program Requirement	IDDE Program Timeline							
	2023	2024	2025	2026	…	2031	2032	Ongoing
Written IDDE Program	X							
SSO Inventory	X							X
Written Catchment Investigation Procedure		X						
Initial IDDE Mapping Requirements		X						
IDDE Mapping Updates								X
Update IDDE Regulatory Mechanism or By-law		X						
Dry Weather Outfall Screening			X					X
Wet Weather Outfall Screening						X		X
Follow-up Ranking of Outfalls and Interconnections								X
Catchment Investigations – Potential Illicit Discharge								X

1.6 PROGRESS REPORTING

The progress and success of the IDDE program will be evaluated on a semi-annual basis and documented in these reports, including the following indicators of program progress during the reporting term:

- # of SSOs (including dates),
- # of catchments investigated,
- # of key drainage structures mapped,
- # of dry/wet weather outfall inspections/ sampling events,
- # of illicit discharges (including a narrative description) eliminated,
- List of training events (including dates and # of participants), and
- All dry weather and wet weather screening and sampling results obtained.

2 IDDE RESPONSIBILITIES

The Utility owns and operates the stormwater drainage system alongside the City's combined and sanitary sewer system and is the primary department responsible for the implementation of this IDDE Program. This formal responsibility and authorization is being adopted in new stormwater ordinances as discussed below.

2.1 LEGAL AUTHORITY

In July 2018, the City established a Stormwater Ordinance in the "Code of the City of Lowell, Massachusetts" as Chapter 272 Part 6, entitled, "Management of Stormwater". Specifically, § 272-110.B. of the ordinance establishes legal authority to "maintain, manage, operate, and regulate the City's stormwater system".

Currently, the Utility is amending the City's Stormwater Ordinance to better manage the impacts brought on by urban stormwater and these are expected to be adopted by the City in January 2024. With respect to IDDE controls, § 272-110.E. of the ordinance establishes a prohibition of illicit discharges and illicit connections to the MS4. Additionally, the amended stormwater ordinance establishes the Utility as the proper Enforcement Authority able to complete inspections, enforce the removal and elimination of illicit discharges and connections, issue written orders of suspension and enforcement, and issue penalties, including fines. The Lowell Stormwater Ordinance can be found on the City Website (Lowell Stormwater Ordinance) and is updated as changed are adopted by the City

The objectives of the Stormwater Ordinance with respect to IDDE are:

- To effectively prohibit non-stormwater discharges to its MS4;
- To implement appropriate enforcement procedures and actions;
- To require removal of all such illicit connections;
- To comply with State and Federal statutes and regulations relating to stormwater discharges; and
- To establish the City's legal authority to ensure compliance with the provisions of this chapter through permitting, inspection, monitoring, and enforcement.

2.2 ENFORCEMENT AUTHORITY

§ 272-109 of the City's amended Stormwater Ordinance (adoption expected in January 2024) defines the term "Enforcement Authority" as "the Executive Director of Lowell Regional Wastewater Utility, or his or her duly authorized representative agents, assistants, or designees, or other authorized City entities such as plumbing inspectors or the City Engineer". In accordance with this definition, the Utility is the primary department in charge of implementing the IDDE program.

Within the Utility, three staff engineers comprise the Stormwater Management Program Team (SWMP Team), who by authorization of the Executive Director of the Lowell Regional Wastewater Utility, form

the core team responsible for implementing the SWMP. Of the three staff engineers, one is designated as the SWMP Coordinator and the other two staff provide essential field support. The Utility will be supported in this effort through interdepartmental coordination with authorized representatives from other departments within the City, including the City Clerk, Neighborhood Services, Department of Planning and Development, Public Schools, Department of Public Works, Parks Department, Solid Waste & Recycling Office, City Engineering Department and the local Conservation Commission.

More information pertaining to the structure and responsibilities of the Stormwater Management Team can be found in **Section 4** of the City's SWMP.

2.3 ADDITIONAL MS4 DISCHARGES IN LOWELL

Per the Consent Decree, as part of the IDDE program, the City will inspect and sample its MS4 outfalls, and MS4 discharges to other municipalities' MS4s or non-City owned outfalls.

There are other MS4 permitees with drainage systems and outfalls located in Lowell. These permitees include the Massachusetts Department of Transportation (MassDOT), the Massachusetts Department of Conservation & Recreation (DCR), and the University of Massachusetts, Lowell (UMass Lowell). The City is not responsible for sampling discharges from other MS4 permitee outfalls or performing IDDE, unless the City's discharges impact these separate MS4 systems.

If the City's municipal drainage system connects to and discharges from another MS4 permitee's outfall, the City shall inspect and sample the municipal drainage system at the point of connection with the private system. If evidence of an illicit discharge is observed or detected at another MS4 permitee's outfall and it is not municipally sourced, the City shall inform the responsible MS4 permitee who will address the compliance requirement.

Additionally, private drainage systems and outfalls that are owned and operated by non-MS4 permitees can be found in Lowell. These systems and outfalls typically serve commercial properties and apartment complexes bordering wetlands and waterways. The City is not responsible for sampling discharges from these private non-MS4 permitee outfalls. If the City's municipal drainage system connects to and discharges from a non-MS4 permitee's outfall, the City shall inspect and sample the municipal drainage system at the point of connection with the private system.

3 CITY OF LOWELL STORMWATER MAPPING

The Utility originally developed mapping of its stormwater system in 2004, using GIS, to meet the mapping requirements of the 2003 MS4 Permit. This GIS platform is still actively maintained and serves as the most complete representation of the collection system. Updates to the GIS system are continuously being made by engineering staff and field personnel, as field information from ongoing investigations is collected and processed into the City's database. Many of the IDDE mapping requirements listed below have already been incorporated in the GIS system and have therefore already been met.

On August 31, 2022, the City submitted to EPA and MassDEP in electronic format the current version of the City's stormwater collection system GIS map. A copy of the existing municipal drainage map can be found in **Figure 3-1**.

3.1 IDDE MAPPING REQUIREMENTS

By April 30, 2024, and on each April 30th thereafter, the City shall submit to EPA updated maps reflecting newly developed and/or discovered information, corrections, and modifications. Mapping elements are depicted in **Section 3.1.1**.

Per the Consent Decree, by September 30, 2024, the City shall update and submit to EPA and MassDEP in electronic format an updated version of the City's stormwater collection system GIS map to include the following information:

a. Outfalls and receiving waters;
b. Open channel conveyances;
c. Interconnections with other MS4s and other storm sewer systems;
d. Municipally owned stormwater treatment structures;
e. Waterbodies identified by name and indication of all use impairments; and
f. Initial catchment delineations identifying the area that drains to each individual outfall or interconnection.

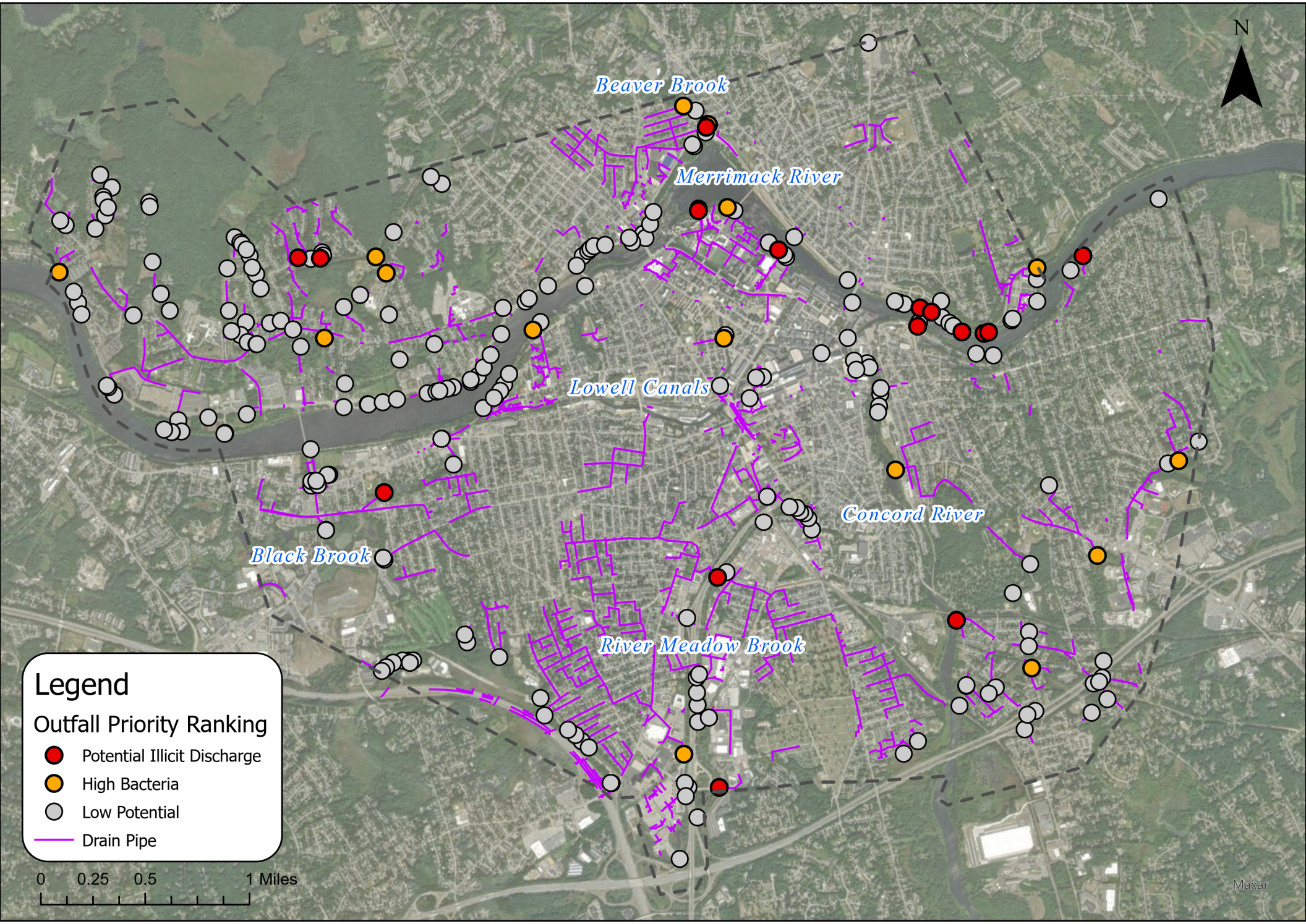
3.1.1 Mapping Elements

The following information and features shall, at a minimum, be included in the mapping:

a. Base Map
    i. Municipal boundaries;
    ii. Street names; and
    iii. Private property delineations;
b. Water Resources and Topographic Features
    i. Water bodies and watercourses identified by name and all use impairments identified in Massachusetts' most recent Integrated List of Waters prepared to fulfill reporting requirements of Section 303(d) of the Clean Water Act; and
    ii. Topography;

c. Infrastructure
    i. MS4:
        1. Outfalls;
        2. Pipes (including size and material);
        3. Open channel conveyances (*e.g.*, swales, ditches);
        4. Catch basins;
        5. Manholes;
        6. Inter-municipal connections;
        7. Municipally-owned stormwater treatment structures (*e.g.*, detention and retention basins, infiltration systems, bioretention areas, water quality swales, gross particle separators, oil/water separators, and other proprietary systems); and
        8. Delineation of Catchment areas for each outfall;
    ii. Collection System:
        1. Pipes (including size, material, and approximate age);
        2. Flow type (e.g., pressure, vacuum, gravity);
        3. Manholes;
        4. Pump stations (public and private), and other key sewer Appurtenances;
        5. Locations of interceptor sewers;
        6. Delineation of Sewershed areas for each connection to the interceptor sewer:
        7. Sewersheds or sewer alignments experiencing inadequate level of service (with indication of reason(s));
        8. Common/twin-invert manholes or structures (i.e., structures serving or housing both separate storm and sanitary sewers);
        9. Collection System alignments served by known or suspected underdrain systems; and
        10. Sewer alignments with common trench construction and major crossings representing high potential for communication during high groundwater conditions;
    iii. Investigations, remediation, and capital projects completed for the City's MS4 and Collection System in accordance with this Consent Decree, including:
        1. Alignments, dates, and thematic representation of work completed (with legend) of past investigations (e.g., flow isolation, dye testing, closed-circuit television, etc.);
        2. Locations of suspected, confirmed, and eliminated illicit discharges (with dates and flow estimates) to the City's MS4;
        3. Alignments and dates of past and planned infrastructure remediation projects; and
        4. Planned Collection System and MS4 capital projects; and
        5. Proposed phasing of future capital projects.

Figure 3-1 Municipal Drainage Map



4 SANITARY SEWER OVERFLOWS (SSOs)

Sanitary sewer overflows (SSOs) are discharges of sewage and wastewaters from a municipal sewer system that can contaminate surface waters, cause water quality problems and property damage, and threaten public health. Possible causes of SSOs include blockages, line breaks, sewer defects that allow stormwater and groundwater to overload the system, power failures, improper sewer design, and vandalism.

Lowell Wastewater follows the reporting procedures for SSOs that discharge to a waterbody in compliance with 314 CMR 16.00. Initial notification is sent to all required and registered users via email and text alert within two hours of the overflow start time or discovery. Update notifications are issued every eight hours to inform whether or not the overflow event is still ongoing, or if it has ceased. The City website is updated within one business day detailing the overflow event. An initial overflow report is uploaded to MassDEP's website within eighteen hours of the start of the event. Detailed reports verifying the overflow event are uploaded to MassDEP's website on a monthly basis. More details on the reporting procedures can be found on the City Website under the Lowell Combined Sewer Overflow Final Public Notification Plan.

In the event that an SSO does not discharge to a waterbody, and 314 CMR 16.00 regulations are not in effect, Lowell Wastewater will notify MassDEP and USEPA of the overflow within 24 hours of discovery. A follow-up email detailing the overflow, including a completed copy of MassDEP's Sanitary Sewer Overflow (SSO)/Bypass Notification Form is submitted within 5 days of becoming aware of the event.

The Utility has completed an inventory of SSOs that have discharged to the MS4 since 2020. This inventory can be found in Appendix A. The inventory will be updated by the City as new SSOs are detected and reported in the Annual Report.

5 ASSESSMENT AND PRIORTIY RANKING OF OUTFALLS

Outfall ranking using existing information helps to prioritize the order for performing IDDE investigations.

5.1 OUTFALL CATCHMENT DELINEATIONS

A catchment is the area that drains to an individual outfall or interconnection. The catchments for each of the MS4 outfalls will be delineated to define contributing areas for investigation of potential sources of illicit discharges. Catchments are typically delineated based on topographic contours and mapped drainage infrastructure. Refined catchment delineations will be completed as part of ongoing IDDE related mapping efforts to reflect information collected during catchment investigations.

5.2 OUTFALL AND INTERCONNECTION INVENTORY AND INITIAL RANKING

The Utility has completed an initial outfall and interconnection inventory and priority ranking to assess illicit discharge potential based on existing information. This ranking will be used to guide the initial dry-weather outfall screening program.

Based on the dry- and wet-weather sampling data, the ranking will be updated to reflect current information on the water quality of wet-weather and any dry-weather flow from the outfall. This data will then be used to prioritize the future catchment investigations as part of the IDDE program.

An updated inventory and ranking will be provided in each semi-annual report thereafter. The inventory will be updated semi-annually to include data collected in connection with dry and wet weather screening and other relevant inspections. The initial outfall inventory and priority ranking matrix for screened outfalls can be found in Appendix B.

5.2.1 Outfall Ranking Categories

Outfalls and interconnections can be classified into one of the following categories and are ordered in priority level:

1. **Potential Illicit Discharges**: Outfalls/interconnections with known or suspected "Potential Illicit Discharge" based on existing information shall be designated as Problem Outfalls. This shall include any outfalls/interconnections where previous screening indicates likely sewer input. Likely sewer input indicators are any of the following:
    a. Outfalls identified by EPA in sampling results previously supplied to Lowell on October 23, 2019 and October 29, 2020 based on analytical testing, such as EPA's testing for pharmaceuticals and personal care products ("PPCPs");
    b. Olfactory or visual evidence of sewage;

c. An exceedance of a bacterial threshold concurrent with exceeding both the surfactant and ammonia threshold;
d. An exceedance of both the surfactant and ammonia thresholds concurrent with any detectable level of chlorine; and
e. An exceedance of a bacterial threshold concurrent with any detectable level of ammonia below its threshold.

2. **High Bacteria Discharges**: Outfalls/interconnections that have not been classified as Potential Illicit Discharges and that:
   a. Have an exceedance of E. coli: equal to or greater than 410 colony forming units /100 milliliters ("cfu/100 mL") and/or Enterococcus: equal to or greater than 130 cfu/100 mL.
3. **Low Potential Illicit Discharges**: Outfalls/interconnections that have not been classified as Potential Illicit Discharges or Priority Outfalls.

The number of outfalls and interconnections classified in each category are shown in **Table 5-1**.

Table 5-1 Outfall Ranking

Category	Criteria	# of Known Municipal Outfalls
Potential Illicit	a. Identified through EPA screening/sampling	5
	b. Olfactory or visual evidence of sewage	1
	c. > 410 cfu/mL *E. coli* and/or > 130 cfu/mL *Enterococcus* AND >0.25 mg/L surfactants AND >0.5 mg/L ammonia	2
	d. >0.25 mg/L surfactants AND >0.5 mg/L ammonia AND detectable chlorine	2
	e. > 410 cfu/mL *E. coli* and/or > 130 cfu/mL *Enterococcus* AND detectable ammonia	7
High Bacteria	> 410 cfu/mL *E. coli* and/or > 130 cfu/mL Enterococcus	7
Low Potential Illicit	Sampling and screening results do not meet any of the above criteria	246

6 MS4 OUTFALL SCREENING AND SAMPLING

While dry-weather flow at an outfall is a potential indicator of illicit connections, it could readily be groundwater leaking into the drain system, an allowable non-stormwater discharge, or a surface water entering the system from some upstream point. Accordingly, dry-weather screening and sampling is an important tool to identify the potential for illicit connections.

Wet-weather flow has the potential to reveal illicit discharges and connections that could have otherwise been undetectable and gone unnoticed during dry weather flow testing alone. The MS4 Permit and Consent Decree require all known MS4 outfalls and interconnections to be screened and monitored in both dry and wet weather conditions and that dry and wet weather flows be sampled and analyzed for the screening thresholds discussed in **Section 2** of this document.

The Utility is responsible for conducting dry weather outfall screening in the general priority order based on the initial priority rankings described in **Section 4** of this document. However, the ability to complete dry-weather outfall sampling is driven by the availability of timely dry-weather conditions. For example, the City intended to complete dry-weather outfall screening by the end of 2023 but this year was very wet, with this year being the rainiest summer the City has experienced in 120 years. These sequential storm events voided the antecedent dry weather requirements (see below). In 2023, the Utility was able to complete 57 outfall screening during dry weather conditions. The City has re-established a goal of completing inspections and sampling of the remaining outfalls during dry-weather conditions by December 31, 2025 (weather dependent).

The City is required to complete wet-weather sampling of all MS4 outfalls and interconnections by June 15, 2031. Wet weather sampling is logistically challenging and to maximize the number of outfalls that can be completed per rain event, the Utility will select outfalls in close proximity to each other. In 2023, the City completed 55 outfall sampling during wet weather conditions. **Figure 6-1** shows the locations of dry and weather outfall screening and sampling completed in 2023.

Figure 6-1 Wet and Dry Weather Screening and Sampling

6.1 APPROPRIATE WEATHER CONDITIONS

For the purposes of establishing dry and wet weather conditions, precipitation data collected hourly from three rain gages located across Lowell will be used. The City shall maintain detailed and accurate records of the weather conditions both during, and in the 48 hours prior to, each sampling event.

6.1.1 Dry Weather Conditions

Dry weather conditions, as defined by the Consent Decree, are met when there has been "less than 0.1 inches of rain in the preceding 24 hours (but 48 hours when possible) and no significant snowmelt".

6.1.2 Wet Weather Conditions

Dry weather conditions, as defined by the Consent Decree, "should consist of at least 0.25-inches of rain over the 24-hour period prior to sampling … however, precipitation events sufficient to produce any flow in outfalls or interconnections to be sampled will also be acceptable."

6.2 FIELD PROTOCOLS

This section outlines the dry and wet weather screening and sampling protocols for MS4 outfalls and interconnections, consistent with EPA Region 1's "EPA New England Bacterial Source Tracking Protocol," January 2012 Draft.

6.2.1 General Procedure

The outfall inspection and sampling procedure consists of the following general steps 1 through 6. This procedure is the same under both dry and wet weather conditions.

1. Identify outfall(s) to be screened/sampled based on initial outfall inventory and priority ranking.
2. Acquire the necessary staff, mapping, and field equipment (see **Table 6-1** for list of potential field equipment).
3. Conduct the outfall inspection during appropriate weather conditions:
    a. Label and photograph the outfall;
    b. Record the inspection information and outfall characteristics (using paper forms or digital form using a tablet or similar device) (see form in Appendix C);
    c. Look for and record visual/olfactory evidence of pollutants in stormwater discharge from outfalls and deposits and stains, vegetation, and damage to outfall structures (as listed in **Table 6-2**).
4. If flow is observed, sample and analyze the flow following the procedures described in **Section 6.2.4.**
    a. If no dry weather flow is observed, but evidence of an illicit discharge exists (illicit discharges are often intermittent or transitory), revisit the outfall during dry weather

within one week (if practicable) of the initial observation to perform a second dry weather screening.

5. Input results from screening and sampling into spreadsheet/database. Include pertinent information in the outfall/interconnection inventory and priority ranking.
6. Include all screening data in applicable compliance reports.

6.2.2 Field Equipment

Table 6-1 lists field equipment commonly used for dry weather outfall screening and sampling.

Table 6-1: Screening and Sampling Equipment List

Category	Equipment	Use/Notes
Record Keeping	Clipboard	For organization of field sheets and writing surface
	Field Sheets	Field sheets for inspections and sampling
	Tablet	For recording inspections and sampling results
	Digital Camera	For documenting field conditions
	Chain of Custody Forms	To ensure proper handling of all samples
	Pens/Pencils/ Permanent Markers	For proper labeling
Personal Protective Equipment (PPE)	Nitrile Gloves	To protect the sampler and samples from contamination
	Rubber Boots/Waders	For accessing shallow streams/areas
	Protective Clothing	Reflective vest, long pants/sleeves, and boots at a minimum
	Safety Cones	For safety
	Hand Sanitizer	Disinfectant/decontaminant
Outfall Screening Tools	Flashlight	For looking in outfalls or manholes
	Pry Bar or Pick	For opening catch basins and manholes
	Sledgehammer	For opening catch basins and manholes
	Machete	For accessing overgrown areas
	Measuring Tape	For measuring distances and depth of flow
	Zip Ties/Duct Tape	For making field repairs
	GPS Receiver	For recording spatial location data
Outfall Sampling Tools	Water Quality Sonde	For analyzing water quality parameters
	Water Quality Meter	For analyzing water quality parameters
	Test Kits	For analyzing water quality parameters
	Label Tape	For labeling sample containers
	Sample Containers	For collecting samples for analysis
	Waste Container	For proper disposal of waste generated during field work
	Sampling Pole/Dipper	For accessing difficult to reach outfalls and manholes
	Cooler with ice	For transporting samples

6.2.3 Outfall Assessment – Visual and Olfactory Conditions

During the inspections and sampling programs, outfalls should be assessed for any visual or olfactory evidence of an illicit discharge. Noteworthy indicators to look out for include the following listed in **Table 6-2**, below.

Table 6-2: Potential Illicit Discharge Parameters and Sources

Parameter	Observations	Possible Reason/Source
Odor	Sewage	SSO, potential cross-connection with sewer
	Sulfur (rotten eggs)	Decaying organic materials, "high-sulfur" fuels
	Rancid-sour	Food preparation facilities (restaurants, hotels, etc.)
	Oil and gas	Vehicle maintenance, petroleum product storage
	Chlorine	Residential pools, potable water
Color	Yellow	Chemical plants, textile and tanning plants
	Brown	Metal fabrication, fertilizers, petroleum
	Green	Chemical plants, textile facilities
	Red	Metal fabrication
	Gray	Dairies, and sewage
Turbidity	Cloudy	Sanitary wastewater, fertilizers, automotive activities
	Opaque	Chemical plants
Floatable Matter	Oil sheen, grease	Petroleum storage, vehicle service facilities, restaurants
	Sewage	Sanitary wastewater
	Soap/bubbles	Sanitary wastewater, decaying organic materials
Deposits and Stains	Sediment	Construction site erosion
	Oily	Petroleum storage, vehicle service facilities
Vegetation	Excessive Growth	Fertilizers
	Inhibited Growth	High flows, vehicle service facilities chemicals
Structural Damage	Concrete cracking	Industrial flows, chemicals
	Concrete spalling	Industrial flows, chemicals
	Metal corrosion	Industrial flows, chemicals

6.2.4 Outfall Sample Collection and Analysis

The general procedure for collection of outfall samples is as follows:

1. Fill out all sample information on sample bottles and field sheets.
2. Put on protective gloves (nitrile/latex/other) before sampling.
3. Collect sample with dipper or directly in sample containers. If possible, collect water from the flow directly in the sample bottle. Be careful not to disturb sediments.
4. Use test strips, test kits, and field meters for in-field analysis of most parameters (see **Table 6-3**).
5. Place laboratory samples on ice for analysis of bacteria and pollutants of concern.
6. Dispose of used test strips and test kit ampules properly.
7. Decontaminate all testing personnel and equipment.
8. Fill out chain-of-custody form for laboratory samples.
9. Coordinate sample collection with appropriate lab for analysis of bacteria and pollutants of concern.

If an outfall is either partially or completely submerged, or inaccessible, field staff will proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results. Field staff will continue to the next upstream structure until there is no longer an influence from the receiving water on the visual inspection or sampling. Each outfall and interconnection discharge sample shall be concurrently analyzed for the following parameters: E. coli bacteria, surfactants, ammonia, total residual chlorine, temperature, conductivity, and salinity. For flows that discharge or are tributary to the Merrimack River, total phosphorous will analyzed as well. An overview of these parameters can be found in **Table 6-3**. The Utility owns and maintains its own water quality testing equipment for in-situ parameter analysis and has an onsite laboratory where E. coli samples can be analyzed. Total Phosphorus analyses will be contracted to an outside laboratory.

Table 6-3: Sampling Parameters and Analysis Methodology

Analysis Location	Analyte or Parameter	Portable Meter/Testing Procedure
In-situ	Ammonia	Ammonia Test Strips
	Surfactants (Detergents)	CHEMetrics I-2017
	Chlorine	CHEMetrics K-2513
	Conductivity	YSI EXO1 Sonde w/ Probe
	Temperature	YSI EXO1 Sonde w/ Probe
	Salinity	YSI EXO1 Sonde w/ Probe
Utility Lab	E.coli	IDEXX Colilert Test
Contracted Lab	Total Phosphorous	EPA certified laboratory procedure (40 CFR § 136)

6.3 INTERPRETING OUTFALL SAMPLING RESULTS

Analytical data from dry and wet weather sampling can be used to help identify the major type or source of illicit discharge. The City shall utilize the following IDDE screening thresholds as guidelines for its analysis of the data generated for each field sample to include:

- Bacteria: Class A or B waters – E. coli: equal to or greater than 410 colony forming units /100 milliliters ("cfu/100 mL") and/or Enterococcus: equal to or greater than 130 cfu/100 mL;
- Surfactants: equal to or greater than 0.25 milligrams per liter ("mg/L") via field kits or 0.1 mg/L via laboratory analysis;
- Ammonia: equal to or greater than 0.5 mg/L via field kits or 0.1 mg/L via laboratory analysis; and
- Chlorine: equal to or greater than 0.02 mg/L.

The following sampling results shall constitute the detection of what the City refers to as a "Potential Illicit Discharge" and shall be used to prioritize the investigation of the catchment areas associated with the outfalls and interconnections:

1. Olfactory or visual evidence of sewage;
2. An exceedance of a bacterial threshold concurrent with exceeding both the surfactant and ammonia threshold;
3. An exceedance of both the surfactant and ammonia thresholds concurrent with any detectable level of chlorine; and
4. An exceedance of a bacterial threshold concurrent with any detectable level of ammonia below its threshold.

Screening values that exceed these benchmarks may be indicative of pollution and/or illicit discharges. An exceedance of a bacterial threshold without meeting an indicator described above may also indicate an illicit discharge that shall, at a minimum, be addressed by "Best Management Practices" as specified in the Consent Decree.

6.4 FOLLOW-UP RANKING OF OUTFALLS AND INTERCONNECTIONS

The Utility will update and re-prioritize the initial outfall and interconnection rankings, as described in **Section 5.2.1**, based on information gathered during dry and wet weather screening. The rankings will be updated periodically as dry and wet weather screening and sampling information becomes available.

7 CATCHMENT INVESTIGATIONS

Once stormwater outfalls have been screened and sampled for dry and wet weather flows, if evidence of illicit discharges has been identified, various methods can be used to trace the source of the potential discharge within the outfall catchment area.

Catchment investigation techniques include but are not limited to review of maps, historic plans, and records; manhole observation; dry and wet weather sampling; video inspection; and dye testing. This section outlines a systematic procedure to investigate drainage catchments to locate and eliminate the source of an identified potential illicit discharge. Data collected as part of these catchment investigations will be recorded and included in each applicable report.

7.1 WRITTEN PROCEDURES

Catchment investigations include historic records review, field inspections, and field confirmation. Every catchment associated with a municipal MS4 outfall or interconnection will be investigated after an illicit discharge is suspected. A written catchment investigation procedure was developed that:

- Identifies maps, historic plans, known septic systems, and records and other sources of data
- Includes a manhole inspection methodology
- Establishes procedures to isolate, confirm and remove sources of illicit discharges

7.1.1 Records Review

The City will review available municipal drainage records. These records may include:

- Maps,
- Known septic systems (Appendix D),
- Construction plans for storm drain or sanitary sewer networks,
- Storm drain or sanitary sewer repair or upgrade information, and
- Complaint records related to SSOs, sewer surcharges, septic system failures, or instream impacts associated with MS4 outfalls.

7.2 DRY WEATHER MANHOLE INSPECTIONS

The Utility will implement a dry weather storm drain network investigation that involves systematically and progressively observing, sampling and evaluating key junction manholes in the MS4 to determine the approximate location of potential illicit discharges. The Utility is responsible for implementing the dry weather manhole inspection program and making updates as necessary. Infrastructure information will be incorporated into the storm system map, and catchment delineations will be refined based on the field investigation, as uncovered.

Two important terms pertinent to the dry weather manhole inspection program are as follows:

- **Junction Manholes** are manholes or structures with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.
- **Key Junction Manholes** are those junction manholes that can represent one or more junction manholes without compromising adequate implementation of the illicit discharge program. Adequate implementation of the illicit discharge program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the permittee's ability to determine the possible presence of an upstream illicit discharge. A permittee may exclude a junction manhole located upstream from another located in the immediate vicinity or that is serving a drainage alignment with no potential for illicit connections.

For all catchments identified for investigation, during dry weather, field crews will systematically inspect *key junction manholes* for evidence of illicit discharges. This program involves progressive inspection and sampling at select manholes in the storm drain network to isolate and address illicit discharges.

The manhole inspection methodology will be conducted in one of two ways (or a combination of both):

1. By working progressively up from the outfall and inspecting key junction manholes along the way, and/or
2. By working progressively down from the upper parts of the catchment toward the outfall.

For most catchments, manhole inspections will proceed from the outfall moving up into the system. Once a manhole inspection methodology has been selected, investigations will continue systematically through the catchment until the source is identified.

Inspection of key junction manholes will proceed as follows:

1. Manholes will be opened and inspected for visual and olfactory evidence of illicit connections. Links to sample field inspection forms are provided in Appendix C.
2. If flow is observed, the flow will be followed to subsequent upstream structures. Subsequent key junction manhole inspections will proceed until the location of suspected illicit discharge can be isolated to a pipe segment between two structures.
3. When a presumed source is located, a sample will be collected and analyzed at a minimum for ammonia, chlorine, and surfactants. Field kits can be used for these analyses. Sampling and analysis will be in accordance with the procedure outlined in **Section 6**. Additional indicator sampling may be used to assist in determining potential sources.
4. If no evidence of illicit discharge is found, catchment investigation will be considered complete.

7.3 SOURCE ISOLATION AND CONFIRMATION

After a potential source of an illicit discharge is identified, and the location is approximated to a pipe segment, the City will use more advanced techniques to isolate and confirm the source. There are many methods that the City may use in isolating and confirming the source of an illicit discharge, including:

- Sandbagging
- Dye Testing

- CCTV/Video Inspections

Any homeowners or businesses that will be impacted by these investigations will be notified accordingly.

7.3.1 Sandbagging

This technique can be particularly useful when attempting to isolate intermittent illicit discharges or those with very little perceptible flow. The technique involves placing sandbags or similar barriers (e.g., caulking, weirs/plates, or other temporary barriers) within outlets to manholes to form a temporary dam that collects any intermittent flows that may occur. Sandbags are typically left in place for 48 hours, and should only be installed when dry weather is forecast. If flow has collected behind the sandbags/barriers after 48 hours it can be assessed using visual observations or by sampling. If no flow collects behind the sandbag, the upstream pipe network can be ruled out as a source of the intermittent discharge. Finding appropriate durations of dry weather and the need for multiple trips to each manhole makes this method both time-consuming and somewhat limiting.

7.3.2 Dye Testing

Dye testing involves flushing non-toxic dye into any connected infrastructure, plumbing fixtures such as toilets, showers, and sinks and observing nearby storm drains and sewer manholes as well as stormwater outfalls for the presence of the dye. It is important to inform local residents and business owners before dye testing is performed. Police, fire, and local public health staff should also be notified prior to testing in preparation for responding to citizen phone calls concerning the dye and their presence in local surface waters.

A team of two or more people is needed to perform dye testing (ideally, all with two-way radios). One person is inside the building, while the others are stationed at the appropriate storm sewer and sanitary sewer manholes (which should be opened) and/or outfalls. The person inside the building adds dye into a plumbing fixture (i.e., toilet or sink) and runs a sufficient amount of water to move the dye through the plumbing system. The person inside the building then radios to the outside crew that the dye has been dropped, and the outside crew watches for the dye in the storm sewer and sanitary sewer, recording the presence or absence of the dye.

The test can be relatively quick (about 30 minutes per test), effective (results are usually definitive), and inexpensive. Dye testing is best used when the likely source of an illicit discharge has been narrowed down to a few specific houses or businesses.

7.3.3 CCTV Inspections

Another method of source isolation involves the use of mobile video cameras that are guided remotely through stormwater drain lines to observe possible illicit discharges. IDDE program staff can review the videos and note any visible illicit discharges. While this tool is both effective and usually definitive, it can be costly and time consuming when compared to other source isolation techniques.

7.4 ILLICIT DISCHARGE REMOVAL

Upon the detection of a potential illicit discharge, the City shall locate, identify, and eliminate the illicit discharge as expeditiously as possible. The City shall notify all responsible parties for any such discharge and require immediate cessation of improper disposal practices in accordance with the Stromwater Ordinance and protocols, upon identification of the illicit source. Where elimination of a direct-plumbed source(s) of an illicit discharge within 60 days of its identification as the source is not possible, the City shall establish an expeditious schedule, not to exceed one year, for its elimination. If elimination of other identified source(s) (including indirect sources(s)) of an illicit discharge within 60 days of its identification as the source is not possible, the City shall establish an expeditious schedule, not to exceed three years, for its elimination. Discharges from the MS4 that are mixed with an illicit discharge are not authorized and remain unlawful until eliminated. The City will rely on its existing ordinances to the extent possible to enforce illicit discharge removal.

Within one year following the removal of a verified illicit discharge, the City will conduct additional dry- and wet-weather monitoring to confirm that the illicit discharge has been eliminated. If confirmatory screening indicates evidence of a continued potential illicit discharge, the catchment will be scheduled for additional investigation and illicit discharge removal. In the event EPA informs the City that illicit discharges have not been eliminated from a particular outfall based upon City data or EPA data (including EPA's PPCP data), the Catchment will be scheduled for additional investigation and illicit discharge removal.

If it is found that a combined manhole is contributing to contamination within the MS4 the City will establish an expeditious schedule for its elimination, and report the dates of identification and schedules for removal in the City's Compliance Report.

If the City identifies a source of pollution to the City's MS4 whose elimination requires implementation of one or more BMPs, the City will include recommendations for implementing Green Infrastructure ("GI")/Low Impact Development ("LID") BMPs to address the MS4 pollutant discharge. Where GI/LID BMPs are not recommended for implementation, the City will provide a reason why such GI/LID BMP implementation is not being recommended for each particular location and will include such explanation in the annual reports required.

8 EMPLOYEE TRAINING

Annual IDDE training will be made available to all employees involved in the IDDE program. This training will at a minimum include information on how to identify illicit discharges and SSOs and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program.

APPENDIX A SSO INVENTORY

SSO Location	Discharge Statement	Date	Duration	Estimated Volume	Description	Mitigation Steps	Mitigation Planned
Marshall Avenue	Discharge from Sanitary Sewer Manhole to ground	5/24/2021	Unknown	500 gallons	Pipe blockage due to root intrusion	Sewer line cleaned by jetting and affected area was cleaned and disinfected. Roots have since been removed.	
Varnum Avenue	Discharge from backup into property to basement	10/28/2022	Unknown	Unknown	Pipe blockage due to root intrusion	Sewer line cleared by jetting and affected area was cleaned and disinfected. Roots have since been removed.	
35 Eagle Court	Discharge from Sanitary Sewer Manhole to receiving water	6/26/2023	14 minutes	Unknown	Rain event	Impacted area was cleaned.	Planned to inspect the gravity sewer mains and assess the catch basins.
35 Eagle Court	Discharge from Sanitary Sewer Manhole to receiving water	6/27/2023	3 minutes	Unknown	Rain event	Impacted area was cleaned.	Planned to inspect the gravity sewer mains and assess the catch basins.
35 Windward Road	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	6/27/2023	6 minutes	Unknown	Rain event	Impacted area was cleaned.	Planned to inspect the gravity sewer mains and assess the catch basins.
401 Lakeview Avenue	Discharge from Sanitary Sewer Manhole to ground surface	6/26/2023	14 minutes	Unknown	Rain event		Planned to inspect the gravity sewer mains and assess the catch basins.
67 Payne Street	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	6/26/2023	16 minutes	Unknown	Rain event		Planned to inspect the gravity sewer mains and assess the catch basins.
67 Payne Street	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	6/27/2023	6 minutes	Unknown	Rain event		Planned to inspect the gravity sewer mains and assess the catch basins.
35 Windward Road	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	6/28/2023	62 minutes	Unknown	Rain event	Impacted area was cleaned.	Planned to inspect the gravity sewer mains and assess the catch basins.
35 Windward Road	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	7/3/2023	10 minutes	1600 gallons	Rain event	Impacted area was cleaned.	Planned to inspect the gravity sewer mains and assess the catch basins.

SSO Location	Discharge Statement	Date	Duration	Estimated Volume	Description	Mitigation Steps	Mitigation Planned
657 Middlesex Street	Discharge from Sanitary Sewer Manhole to receiving water	7/14/2023	13 minutes	450 gallons	Rain event		Planned to inspect the gravity sewer mains and assess the catch basins.
67 Payne Street	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	7/14/2023	15 minutes	410 gallons	Rain event		Planned to inspect the gravity sewer mains and assess the catch basins.
67 Payne Street	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	7/16/2023	4 minutes	10 gallons	Rain event	Impacted area was cleaned.	Planned to inspect the gravity sewer mains and assess the catch basins.
17 Lura Street	Combined sewer line Backup into Property	7/21/2023	Unknown	Unknown	Rain event	Impacted area was cleaned.	
47 Birch Street	Combined sewer line Backup into Property Basement	7/21/2023	Unknown	Unknown	Rain event	Impacted area was cleaned.	
88 Elliot Street	Combined sewer line Backup into Property	7/21/2023	Unknown	Unknown	Rain event	Impacted area was cleaned.	
112 Corbett Street	Combined sewer line Backup into Property Basement	7/21/2023	Unknown	Unknown	Rain event & Downstream Pipe blockage due to root intrusion	Sewer line cleaned by jetting and affected area was cleaned and disinfected. Roots have since been removed.	This section of the sewer main has been added as a candidate to the Utility's CIPP lining list.
138 Rea Street	Combined sewer line Backup into Property Basement	7/21/2023	Unknown	Unknown	Rain event & Downstream Pipe blockage due to root intrusion	Sewer line cleaned by jetting and affected area was cleaned and disinfected. Roots have since been removed.	This section of the sewer main has been added as a candidate to the Utility's CIPP lining list.
150 Rea Street	Combined sewer line Backup into Property Basement	7/21/2023	Unknown	Unknown	Rain event & Downstream Pipe blockage due to root intrusion	Sewer line cleaned by jetting and affected area was cleaned and disinfected. Roots have since been removed.	This section of the sewer main has been added as a candidate to the Utility's CIPP lining list.
190 Lawrence Street	Discharge from Sanitary Sewer Manhole to receiving water	7/21/2023	Unknown	Unknown	Rain event	Impacted area was cleaned.	
199 Crawford Street	Combined sewer line Backup into Property	7/21/2023	Unknown	Unknown	Rain event	Impacted area was cleaned.	
657 Middlesex Street	Discharge from Sanitary Sewer Manhole to receiving water	7/21/2023	36 minutes	1440.9 gallons	Rain event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.
67 Payne Street	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	7/21/2023	1 minute	30.51 gallons	Rain event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.
Raven Road & Broadview Road intersection, by 246 Raven Road	Discharge from Sanitary Sewer Manhole to ground surface	7/21/2023	2 minutes	46.72 gallons	Rain event & Pipe blockage due to root intrusion	Impacted area was cleaned.	

SSO Location	Discharge Statement	Date	Duration	Estimated Volume	Description	Mitigation Steps	Mitigation Planned
Windward/Douglas Road	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	7/21/2023	64 minutes	13416.15 gallons	Rain event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.
59 Charles Street	Combined sewer line Backup into Property	7/29/2023	Unknown	Unknown	Rain event	Impacted area was cleaned.	
239 Princeton Boulevard	Combined sewer line Backup into Property	7/29/2023	Unknown	Unknown	Rain event	Impacted area was cleaned.	
330 Douglas Road	Combined sewer line Backup into Property	7/29/2023	Unknown	Unknown	Rain event	Impacted area was cleaned.	
340 Douglas Road	Combined sewer line Backup into Property	7/29/2023	Unknown	Unknown	Rain event	Impacted area was cleaned.	
657 Middlesex Street	Discharge from Sanitary Sewer Manhole to receiving water	7/29/2023	30 minutes	1366.6 gallons	Rain event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.
67 Payne Street	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	7/29/2023	28 minutes	1806.9 gallons	Rain event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.
Windward/Douglas Road	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	7/29/2023	30 minutes	5548.7 gallons	Rain event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.
47 Birch Street	Combined sewer line Backup into Property	8/8/2023	6 minutes	Unknown	Rain event	Impacted area was cleaned.	
64 Foster Street	Combined sewer line Backup into Property	8/8/2023	6 minutes	Unknown	Rain event	Impacted area was cleaned.	
67 Payne Street	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	8/8/2023	5 minutes	400 gallons	Rain event	Impacted area was cleaned.	
88 Elliot Street	Combined sewer line Backup into Property	8/8/2023	9 minutes	Unknown	Rain event	Impacted area was cleaned.	
239 Industrial Avenue	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	8/8/2023	6 minutes	Unknown	Rain event	Impacted area was cleaned.	
657 Middlesex Street	Discharge from Sanitary Sewer Manhole to receiving water	8/8/2023	5 minutes	130 gallons	Rain event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.
Windward/Douglas Road	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	8/8/2023	6 minutes	1560 gallons	Rain event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.
67 Payne Street	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	8/10/2023	2 minutes	320 gallons	Rain event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.
657 Middlesex Street	Discharge from Sanitary Sewer Manhole to receiving water	8/10/2023	3 minutes	170 gallons	Rain event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.

SSO Location	Discharge Statement	Date	Duration	Estimated Volume	Description	Mitigation Steps	Mitigation Planned
Windward/Douglas Road	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	8/10/2023	61 minutes	1230 gallons	Rain event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.
12 Concord Road	Discharge from Sanitary Sewer Manhole to ground surface	8/18/2023	11 minutes	Unknown	Rain event	Impacted area was cleaned.	Planned to inspect the gravity sewer mains and assess the catch basins.
Windward/Douglas Road	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	8/18/2023	50 minutes	1480 gallons	Rain event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.
657 Middlesex Street	Discharge from Sanitary Sewer Manhole to receiving water	8/18/2023	12 minutes	883 gallons	Rain event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.
67 Payne Street	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	8/18/2023	6 minutes	826 gallons	Rain event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.
15 Donald Terrace	Discharge from Sanitary Sewer Manhole to ground surface	8/23/2023	25 minutes	Unknown	Sewer System blockage by Grease	Sewer line cleaned by jetting and affected area was cleaned and disinfected.	
67 Payne Street	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	9/11/2023	14 minutes	828 gallons	Rain Event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.
657 Middlesex Street	Discharge from Sanitary Sewer Manhole to receiving water	9/11/2023	11 minutes	330 gallons	Rain Event	Impacted area was cleaned.	The area and alternative solutions are being evaluated as part of the Phase 3 PDR.
Barasford CSO Station	Discharge from Sanitary Sewer Manhole to Catch Basin to receiving water	11/22/2023	131 minutes	1.82 MG	Rain event and operational error	Impacted area was cleaned.	Updates to the SCADA logic and head operator training
131 Bellevue Street	Discharge from Sanitary Sewer Manhole to ground	11/27/2023	52 minutes	Unknown	Pipe blockage due to grease	Sewer line cleaned by jetting and affected area was cleaned and disinfected. Grease blockages has since been removed.	
350 Adams Street	Discharge from Sanitary Sewer Manhole to ground	12/15/2023	30 minutes	Unknown	Pipe blockage due to grease	Sewer line cleaned by jetting and affected area was cleaned and disinfected. Grease blockages has since been removed.	

APPENDIX B INITIAL OUTFALL RANKING AND PRIORITY

Outfall ID	Field Conditions	Active Flow	Odor	Surfactants (mg/L)	Ammonia (mg/L)	Chlorine (mg/L)	E.coli (cfu/100 mL)	Ranking
OUTGPS-000026								Potential Illicit(A)
OUTGPS-000043								Potential Illicit(A)
OUTGPS-000298								Potential Illicit(A)
OUTGPS-000330								Potential Illicit(A)
OUTGPS-000382								Potential Illicit(A)
OUTGPS-000352	Dry Weather	Yes - Dry Weather Flow	Yes	0.36	0	0.09		Potential Illicit(B)
OUTGPS-000096	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.26	0.5	0.9	2420	Potential Illicit(C)
OUTGPS-000097	Wet Weather	Yes - Dry Weather Flow		0.27	0.5	0.89	1986	Potential Illicit(C)
OUTGPS-000268	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.35	0.5	0.24	5	Potential Illicit(D)
OUTGPS-000310	Dry Weather	Yes - Dry Weather Flow	No - Scentless	0.4	0.5	0.12	0	Potential Illicit(D)
OUTGPS-000194	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.39	0.25	1.31	2420	Potential Illicit(E)
OUTGPS-000382	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.25	0.25	0.14	2420	Potential Illicit(E)
OUTGPS-000184	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.24	0.25	0.71	2420	Potential Illicit(E)
OUTGPS-000145	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.22	0.25	0.13	1414	Potential Illicit(E)
OUTGPS-000388	Dry Weather	Yes - Dry Weather Flow	No - Scentless	0.07	0.25	0.17	961	Potential Illicit(E)
OUTGPS-000360	Dry Weather	Yes - Dry Weather Flow	No - Scentless	0.2	0.25	0.04	649	Potential Illicit(E)
OUTGPS-000195	Dry Weather	Yes - Dry Weather Flow	No - Scentless	0.06	0.5	0.1	548	Potential Illicit(E)
OUTGPS-000326	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.27	0	0.13	2420	High Bacteria
OUTGPS-000031	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.25	0	0.13	2420	High Bacteria
OUTGPS-000236	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.23	0	0.15	2420	High Bacteria
OUTGPS-000275	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.22	0	0.17	2420	High Bacteria
OUTGPS-000436	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.2	0	0.2	2420	High Bacteria
OUTGPS-000195	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.19	0	0.15	2420	High Bacteria
OUTGPS-000370	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.22	0	0.3	1553	High Bacteria

Outfall ID	Field Conditions	Active Flow	Odor	Surfactants (mg/L)	Ammonia (mg/L)	Chlorine (mg/L)	E.coli (cfu/100 mL)	Ranking
OUTGPS-000134	Wet Weather	Yes - Wet Weather Flow		0.17	0	0.03	313	Low Potential Illicit
OUTGPS-000093	Wet Weather	Yes - Dry Weather Flow	No - Scentless	0.31	0	0.16	308	Low Potential Illicit
OUTGPS-000331	Wet Weather	Yes - Wet Weather Flow		0.17	0	0.03	272	Low Potential Illicit
OUTGPS-000145	Dry Weather	Yes - Dry Weather Flow		0.14	0	0.01	172	Low Potential Illicit
OUTGPS-000314	Wet Weather	Yes - Wet Weather Flow		0.14	0	0.02	125	Low Potential Illicit
OUTGPS-000382	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.02	0.25	0.19	111	Low Potential Illicit
OUTGPS-000145	Dry Weather	Yes - Dry Weather Flow	No - Scentless	0.1	0	0.35	107	Low Potential Illicit
OUTGPS-000354	Dry Weather	Yes - Dry Weather Flow		0.1	0	0.06	102	Low Potential Illicit
OUTGPS-000383	Wet Weather	Yes - Wet Weather Flow		0.24	0.25	0.09	81	Low Potential Illicit
OUTGPS-000283	Wet Weather	Yes - Wet Weather Flow		0	0	0.04	74	Low Potential Illicit
OUTGPS-000310	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.46	0	0.24	16	Low Potential Illicit
OUTGPS-000193	Dry Weather	Yes - Dry Weather Flow	No - Scentless	0.14	2.5	0.05	7.2	Low Potential Illicit
OUTGPS-000093	Dry Weather	Yes - Dry Weather Flow	No - Scentless	0.06	0	0	6.1	Low Potential Illicit
OUTGPS-000382	Dry Weather	Yes - Dry Weather Flow	No - Scentless	0.07	0.25	0.09	3	Low Potential Illicit
OUTGPS-000275	Dry Weather	Yes - Dry Weather Flow	No - Scentless	0.07	0	0.16	3	Low Potential Illicit
OUTGPS-000331	Dry Weather	Yes - Dry Weather Flow	No - Scentless	0.23	0	0	2	Low Potential Illicit
OUTGPS-000043	Dry Weather	Yes - Dry Weather Flow	No - Scentless	0.1	0	0.08	0	Low Potential Illicit
OUTGPS-000398	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.41	0	0		Low Potential Illicit
OUTGPS-000250	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.29	0	0.45		Low Potential Illicit
OUTGPS-000253	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.25	0	0		Low Potential Illicit
OUTGPS-000252	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.24	0	0		Low Potential Illicit
OUTGPS-000248	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.22	0	0.2		Low Potential Illicit
OUTGPS-000400	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.22	0	0.02		Low Potential Illicit
OUTGPS-000143	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.19	0	0.24		Low Potential Illicit

Outfall ID	Field Conditions	Active Flow	Odor	Surfactants (mg/L)	Ammonia (mg/L)	Chlorine (mg/L)	E.coli (cfu/100 mL)	Ranking
OUTGPS-000249	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.16	0	0.15		Low Potential Illicit
OUTGPS-000399	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.14	0	0.02		Low Potential Illicit
OUTGPS-000342	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.12	0	0.09		Low Potential Illicit
OUTGPS-000096	Dry Weather	Yes - Dry Weather Flow	No - Scentless	0.12	0	0.13		Low Potential Illicit
OUTGPS-000329	Dry Weather	Yes - Dry Weather Flow	No - Scentless	0.12	0	0.06		Low Potential Illicit
OUTGPS-000400	Dry Weather	Yes - Dry Weather Flow		0.12	0	0.07		Low Potential Illicit
OUTGPS-000228	Wet Weather	Yes - Wet Weather Flow	No - Scentless	0.06	0	0.11		Low Potential Illicit
OUTGPS-000360	Wet Weather	Yes - Wet Weather Flow						Low Potential Illicit
OUTGPS-000097	Dry Weather	Yes - Dry Weather Flow						Low Potential Illicit
OUTGPS-000007	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000031	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000031	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000043	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000087	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000088	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000088	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000089	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000091	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000093	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000094	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000094	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000095	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000095	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000111	Dry Weather	No Flow						Low Potential Illicit

Outfall ID	Field Conditions	Active Flow	Odor	Surfactants (mg/L)	Ammonia (mg/L)	Chlorine (mg/L)	E.coli (cfu/100 mL)	Ranking
OUTGPS-000184	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000192	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000192	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000193	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000193	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000194	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000194	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000195	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000229	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000230	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000231	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000232	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000234	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000236	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000236	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000239	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000239	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000240	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000251	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000252	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000253	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000254	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000273	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000274	Dry Weather	No Flow						Low Potential Illicit

Outfall ID	Field Conditions	Active Flow	Odor	Surfactants (mg/L)	Ammonia (mg/L)	Chlorine (mg/L)	E.coli (cfu/100 mL)	Ranking
OUTGPS-000327	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000330	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000359	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000367	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000369	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000370	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000386	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000387	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000387	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000400	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000401	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000401	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000401	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000412	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000413	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000414	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000427	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000427	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000432	Wet Weather	No Flow						Low Potential Illicit
OUTGPS-000432	Dry Weather	No Flow						Low Potential Illicit
OUTGPS-000436	Wet Weather	No Flow						Low Potential Illicit

APPENDIX C INSPECTION FIELD FORM

Link to Lowell's Outfall Inspection and IDDE Screening Survey:

Lowell Outfall Inspection and IDDE Screening Survey (arcgis.com)

APPENDIX D KNOWN SEPTIC SYSTEMS

Account	Parcel	Address	Status
L14785	L14785	52 ACROPOLIS RD	SEPTIC
L14645	L14645	54 ACROPOLIS RD	SEPTIC
M22425	M22425	56 ACROPOLIS RD	SEPTIC
B11590	B11590	277 AIKEN AVE	SEPTIC
A90611	A90611	12 BALDWIN ST	SEPTIC
G07660	G07660	379 BOYLSTON ST	SEPTIC
S01320	S01320	386 BOYLSTON ST	SEPTIC
O02190	O02190	389 BOYLSTON ST	SEPTIC
S04630	S04630	482 BOYLSTON ST	SEPTIC
W00810	W00810	502 BOYLSTON ST	SEPTIC
N01390	N01390	524 BOYLSTON ST	SEPTIC
A01590	A01590	530 BOYLSTON ST	SEPTIC
A04645	A04645	136 CHASE AVE	SEPTIC
R03620	R03620	349 CLARK RD	SEPTIC
R03610	R03610	361 CLARK RD	SEPTIC
L03580	L03580	3 COMMONWEALTH AVE	SEPTIC
M01160	M01160	9 COMMONWEALTH AVE	SEPTIC
R08850	R08850	19 COMMONWEALTH AVE	SEPTIC
W05835	W05835	14 CONSTANCE DR	SEPTIC
DRA010	DRA010	0 E SIXTH ST	SEPTIC
DRA037	DRA037	88 E SIXTH ST	SEPTIC
L05880	L05880	35 EDWARDS ST	SEPTIC
T00270	T00270	100 ELM AVE	SEPTIC
T04440	T04440	228 FIRST ST	SEPTIC
D1213501	D12135	256 FIRST ST	SEPTIC
P07284	P07284	23 FRECHETTE ST	SEPTIC
C16460	C16460	177 FREDA LANE	SEPTIC
C16305	C16305	191 FREDA LANE	SEPTIC
CHE014	CHE014	7 GORHAM ST	SEPTIC
S12500	S12500	57 HAMPSTEAD ST	SEPTIC
F90695	F90695	0 INDUSTRIAL AVE EAST	SEPTIC
D00810	D00810	16 JEANNE D ARC ST	SEPTIC
N01910	N01910	17 JEANNE D ARC ST	SEPTIC
M15310	M15310	92 MT HOPE ST	SEPTIC

Account	Parcel	Address	Status
M10430A	M10430	71 N BILLERICA RD	SEPTIC
P04050	P04050	115 NEWHALL ST	SEPTIC
G11555	G11555	5 OSTRANDER AVE	SEPTIC
M09770	M09770	21 OSTRANDER AVE	SEPTIC
H08620	H08620	16 PEMBERTON ST	SEPTIC
L14240	L14240	24 PEMBERTON ST	SEPTIC
K02440	K02440	31 PEMBERTON ST	SEPTIC
G11470	G11470	32 PEMBERTON ST	SEPTIC
D04170	D04170	33 PEMBERTON ST	SEPTIC
G11475	G11475	40 PEMBERTON ST	SEPTIC
D03800	D03800	47 PEMBERTON ST	SEPTIC
DRA030	DRA030	50 PEMBERTON ST	SEPTIC
C03883	C03883	151 PERRY ST	SEPTIC
B01800	B01800	522 PRINCETON BLVD	SEPTIC
A02375	A02375	15 RITA ST	SEPTIC
C16115	C16115	111 RIVERCLIFF RD	SEPTIC
V01780	V01780	108 SARATOGA ST	SEPTIC
L02080	L02080	80 SEVENTH AVE	SEPTIC
L05300	L05300	55 SPRAGUE AVE	SEPTIC
W03210	W03210	65 SPRAGUE AVE	SEPTIC
N00560	N00560	85 SPRAGUE AVE	SEPTIC
S07850	S07850	120 SPRAGUE AVE	SEPTIC
N03135	N03135	124 SPRAGUE AVE	SEPTIC
P05040	P05040	5 SPRING AVE	SEPTIC
L14250	L14250	24 STEDMAN ST	SEPTIC
H01100	H01100	102 STEDMAN ST	SEPTIC
CHE011	CHE011	136 STEDMAN ST	SEPTIC
CHE009	CHE009	147 STEDMAN ST	SEPTIC
D12010	D12010	173 STEDMAN ST	SEPTIC
K00745	K00745	306 TENTH ST	SEPTIC
A02230	A02230	1577 VARNUM AV	SEPTIC
E01110	E01110	1595 VARNUM AV	SEPTIC
G11085	G11085	1614 VARNUM AV	SEPTIC
E01115	E01115	1619 VARNUM AV	SEPTIC

Account	Parcel	Address	Status
M06610	M06610	1582 VARNUM AVE	SEPTIC
G04670	G04670	1558 VARNUM AVE	SEPTIC
T07370	T07370	1578 VARNUM AVE	SEPTIC
S07690	S07690	26 VARNUM TERR	SEPTIC
G09160	G09160	35 VARNUM TERR	SEPTIC
T00940	T00940	38 VARNUM TERR	SEPTIC
V01010	V01010	55 VARNUM TERR	SEPTIC
T04600	T04600	12 VAUGHAN ST	SEPTIC
P10150	P10150	934 WESTFORD ST	SEPTIC
N03305	N03305	1184 WESTFORD ST	SEPTIC
T09025	T09025	50 WIGHTMAN ST	SEPTIC
L04130	L04130	55 WIGHTMAN ST	SEPTIC
T08885	T08885	56 WIGHTMAN ST	SEPTIC
R08360	R08360	86 WIGHTMAN ST	SEPTIC
W02305	W02305	40 WILBUR ST	SEPTIC
H00470	H00470	44 WILBUR ST	SEPTIC
M17340	M17340	47 WILBUR ST	SEPTIC
V02150	V02150	50 WILBUR ST	SEPTIC
TEW003	TEW003	410 WOBURN ST	SEPTIC
W00150	W00150	150 WOOD ST	SEPTIC
L15095	L15095	70 WILBUR ST NO.1	SEPTIC
L15100	L15100	70 WILBUR ST NO.2	SEPTIC
L15105	L15105	70 WILBUR ST NO.3	SEPTIC
L15110	L15110	70 WILBUR ST NO.4	SEPTIC
L15120	L15120	70 WILBUR ST NO.6	SEPTIC