ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE) PROGRAM CITY OF HOLYOKE, MASSACHUSETTS

MAY 2023

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A Report Prepared for:

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ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE) PROGRAM
CITY OF HOLYOKE, MASSACHUSETTS

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TABLE OF CONTENTS

1 ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE) PROGRAM

1.1 INTRODUCTION

1.1.1 Municipal Separate Storm Sewer System (MS4) Program

This document serves as a written plan for Illicit Discharge Detection and Elimination (IDDE) for the City of Holyoke, hereafter referred to as "the City" or "Holyoke," and Veolia (the City's current contracted wastewater operator) to address the requirements of the United States Environmental Protection Agency's (U.S. EPA) and the Massachusetts Department of Environmental Protection (MassDEP) *General Permits for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts*, effective July 1st, 2018, hereinafter referred to as the "2016 MS4 Permit" or "MS4 Permit", and the 2023 MS4 Consent Decree, hereinafter referred to as the "Consent Decree".

The MS4 Permit requires regulated communities to address six Minimum Control Measures (MCM) including:

1. Public Education and Outreach;
2. Public Involvement and Participation;
3. Illicit Discharge Detection and Elimination Program (IDDE);
4. Construction Site Stormwater Runoff Control;
5. Post-construction Stormwater Management in New Development and Redevelopment; and
6. Good Housekeeping and Pollution Prevention for Permittee Owned Operations.

Under MCM 3, the City and Veolia are required to implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its MS4 and implement procedures to prevent such discharges. The IDDE program must be recorded in a written (hardcopy or electronic) document. This IDDE Program has been prepared to address this requirement.

The City of Holyoke negotiated a Consent Decree, which was finalized in 2023 and defined the terms that the City shall take to reach compliance with the MS4 program. Table 1 links sections of this IDDE Program to requirements outlined in the Consent Decree.

Table 1: Consent Decree Requirements Included in the IDDE Program

Consent Decree Section	Description of Requirement	IDDE Section
11-11e	Apply new IDDE screening thresholds to all MS4 outfalls and any MS4 discharges to other municipal MS4s or non-City owned outfalls	Table 10 Sampling Parameters and Analysis Methods
12a	Current MS4 Catchment area map with boundaries of each catchment area and all associated outfalls or interconnections	Figure 1 Holyoke MS4 Urbanized Areas
12b	Identification of all combined manholes within MS4 catchment areas	Appendix A MS4 Outfall and Interconnection Prioritization
12c	Schedule to inspect all identified combined manholes	Table 3 IDDE Program Implementation Timeline
12d	Schedule to repair or eliminate the identified combined manholes	Table 3 IDDE Program Implementation Timeline
12e	A prioritization of all Catchment areas based on EPA monitoring results, City monitoring results, applicable TMDLs for impaired waterbodies, and a schedule for completion of catchment investigations	Appendix A MS4 Outfall and Interconnection Prioritization
13	Dry-Weather Sampling	Section 6.0 Dry Weather Outfall Interconnection Screening and Sampling; Section 7.1 Dry Weather Manhole Inspections
14	Wet-Weather Sampling	Section 7.2 Wet Weather Outfall Sampling
15a-15c	Identification and Elimination of Illicit Discharges to MS4 area with schedule for actions	To be provided at a later date as required
17	Semi-annual Consent Decree compliance report relating to implementation of IDDE Plan (Due 1/31/2024)	To be provided at a later date as required

1.1.2 Geographical Scope of IDDE Program

The MS4 Permit requires municipalities to implement the IDDE program for those portions of the MS4 that are located either fully or partially within the Urbanized Area (based on 2010 U.S. Census) or located in a geographical area designated by U.S.EPA as requiring a permit. Figure 1 depicts the urbanized areas for Holyoke.

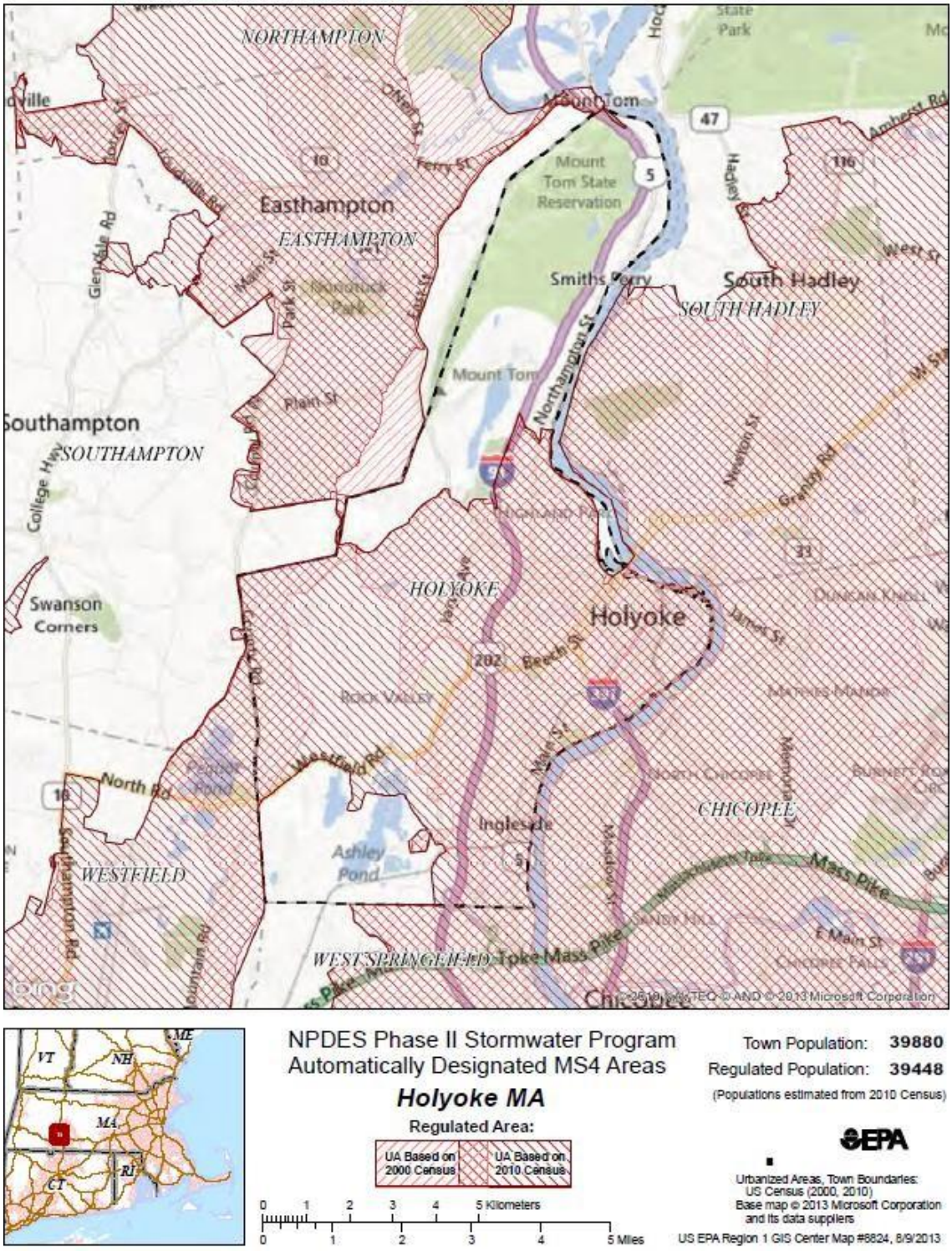


Figure 1: Holyoke Ms4 Urbanized Areas Illicit Discharges

(Consent Decree Term #12a)

An illicit discharge is any discharge to an MS4 that is not composed entirely of stormwater, except for site- specific NPDES permitted discharges and discharges resulting from firefighting activities and allowable non-stormwater discharges as outlined in Section 1.4.

Illicit discharges may enter the drainage system through direct or indirect connections and may be intentional or unintentional. Direct connections include cross-connections of sewer services to the storm drain system. Indirect illicit discharges may be more difficult to detect and may include failing septic systems that discharge untreated sewage to a storm ditch or swale that is part of an MS4, or a sump pump that discharges contaminated water to storm drains intermittently.

Some illicit discharges are intentional, such as dumping used oil into catch basins, seasonal dumping of swimming pool water, or illegally connecting a new sewer lateral into a storm drainpipe. Unintentional illicit discharges include breakouts from failing septic systems that enter the MS4, or disposal of floor wash water to a floor drain in an old building where the drain is thought to connect to a sewer line but connects to a storm drain instead.

When not addressed, illicit discharges can contribute high levels of pollutants such as metals, toxics, oil, grease, solvents, nutrients, and bacteria to surface waters.

1.1.3 Allowable Non-Stormwater Discharges

The following non-stormwater discharges are allowed under the MS4 Permit unless the permittee, U.S.EPA, or MassDEP finds the discharge to be a significant contributor of pollutants to the MS4:

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground water
- Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20))
- Uncontaminated pumped groundwater
- Discharge from potable water sources
- Foundation drains
- Air conditioning condensation

- Irrigation water, springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual resident car washing
- De-chlorinated swimming pool discharges
- Street wash waters
- Residential building wash waters without detergents

If any of the above discharges are identified as significant contributors of pollution to the MS4, they will be considered “illicit discharges” and addressed in the IDDE program.

1.1.4 Receiving Waters and Impairments

Impaired waters are water bodies that do not meet water quality standards for one or more designated use(s) such as recreation or aquatic habitat. Table 2 is a list of the impaired waters that are within the boundaries of Holyoke’s regulated area based on the 2018/2020 Massachusetts Integrated List of Waters, produced by the MassDEP. The most recent Draft 2022 List is consistent with the 2018/2020 List.

Because Holyoke is in the watershed of Long Island Sound (LIS), which has an approved total maximum daily load (TMDL) for nitrogen, the City is required to meet additional requirements in the MS4 Permit with respect for nitrogen discharges (MAR041000, Appendix B part B1).

Table 2: Impaired Waters

Water Body Name	Segment ID	Category[1]	Impairment	Comments
Connecticut River	MA34-04	5	*Escherichia coli*, PCB in fish tissue, Non-Native aquatic plants (Water Chestnut)	Confluence with Deerfield River, Greenfield/Deerfield to Holyoke Dam (NATID: MA00973), Holyoke/South Hadley.
Connecticut River	MA34-05	5	*Escherichia coli*, PCB in fish tissue	Holyoke Dam (NATID: MA00973), Holyoke/South Hadley to Massachusetts/Connecticut border, Longmeadow.
Log Pond Cove	MA34124	5	Non-Native aquatic plants (Water Chestnut), PCB in fish tissue	Part of Connecticut River
Pequot Pond	MA32055	5	Eurasian milfoil, chlorophyll-a, Non- Native aquatic plants, *Enterococcus*, dissolved oxygen, Total Phosphorus	Located in Southampton Urban Area. Outfalls from Holyoke drain to a tributary of the Pond

[1] Category 5: Impaired or threatened for one or more uses and requiring a TMDL.

1.1.5 IDDE Program Objectives, Requirements, and Timeline

The objective of the IDDE Program is to systematically find and eliminate sources of non-stormwater discharges to the MS4 and implement procedures to prevent such discharges. The IDDE Program must include the following:

- Legal authority to prohibit and investigate suspected illicit discharges, eliminate, and remove illicit discharges, and enforce the IDDE Program.
- MS4 mapping.
- Sanitary Sewer Overflow (SSO) inventory, reporting, and mitigation.
- Screening of catchments[1], manholes, and outfalls during wet and dry weather conditions.
- Sampling procedures.
- Priority ranking of outfalls and interconnections - preliminary and follow up (post catchment investigation).

[1] *Catchment: the area that drains to an individual outfall or interconnection. Catchments are typically delineated based on topographic contours and mapped drainage infrastructure where available.*

- Follow-up screening.
- Employee training.
- IDDE program evaluation.

Figure 2 (on the following page) shows the IDDE investigation procedure, Table 3 shows the IDDE implementation timeline, and Table 4 shows the Catchment Investigation and Dry & Wet Weather Screening timeline.

Table 3: IDDE Program Implementation Timeline
(Consent Decree Term #12c and #12d)

IDDE Program Requirement	Target Completion Date					
	Completed in 2019		5/31/23	6/30/24	6/30/25	6/30/27
Written IDDE Program Plan			X			
SSO Inventory	X					
Preliminary Ranking of Outfalls and interconnections	X					
Written Catchment Investigation Procedure		X				
IDDE Regulatory Mechanism or By-law (if not already in place)			X			
Dry Weather Outfall Screening			X			
Follow-up Ranking of Outfalls and Interconnections				X		
Catchment Investigations – Problem Outfalls			Start		Finish	
Catchment Investigations – of High and Low Priority Outfalls			Start			Finish

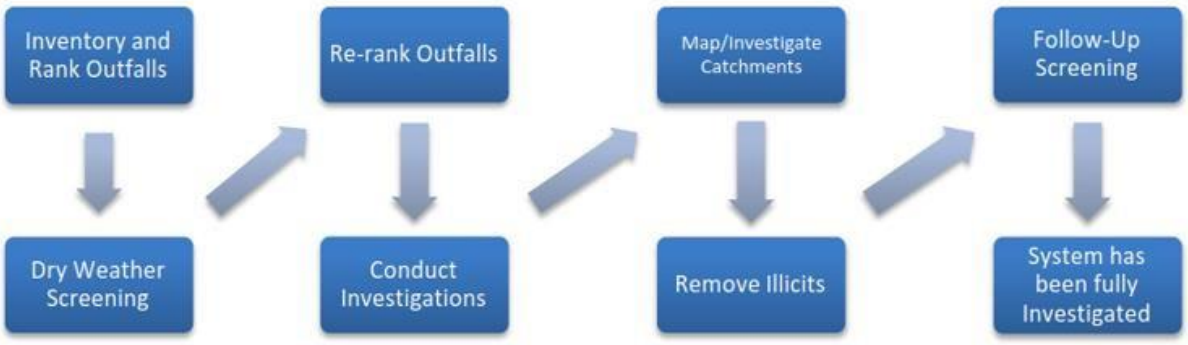


Figure 2: IDDE Investigation Procedure[2]

Table 4: Investigation and Screening Timeline

Tasks	Years to Complete		Year 1	Year 2	Year 3	Year 4 - Year 5
Catchment Investigation	5	Days per Year	7	22	22	34
Dry Weather Screening	1	Days per Year	13			
Wet Weather Screening	once every 3 years	Days per Year	20	20	20	40

This timeline assumes each task type will be performed on separate field days. However, it is anticipated that multiple tasks can be combined on same field day(s). Based on this, all tasks in a given year will take approximately one (1) month to complete.

Wet weather screening must be completely once every three (3) years; however, it may be staggered over the three (3) years to make the total number of screenings required more manageable. Each set of outfalls to be screened per year must be the same outfalls when screened three (3) years later.

[2] Illicit Discharge Detection and Elimination (IDDE) Plan template, June 30, 2016 for Central Massachusetts Regional Stormwater Coalition

2 STORMWATER SYSTEM MAPPING

Holyoke's MS4 system maps are used to identify key stormwater infrastructure, factors influencing proper system operation, and the potential for illicit sanitary discharges. The City of Holyoke developed an updated stormwater map to begin addressing mapping requirements of the 2016 MS4 Permit and the Consent Decree Term 21. Copies of the system maps are included in Appendix C. The City is actively updating the current mapping to include West Holyoke. This part of the City will have an estimated 15-20 additional outfalls. In addition to outfalls, the updated mapping will include interconnections, receiving water bodies, catchment delineations, and other municipally owned stormwater treatment structures.

The City used both desktop analysis and field verification to further improve the accuracy of the existing GIS mapping data. This resulted in a total count of 67 identified MS4 outfalls, as well as preliminary catchment area delineations. The inventory and ranking will be updated as additional information from the outfall screening and catchment investigations become available. The screening and catchment investigations are discussed in Section 5.0.

Updated maps reflecting newly developed and/or discovered information, corrections, and modifications will be submitted in conjunction with compliance reports semi-annually. In compliance with the MS4 Permit and Consent Decree Term 21, the following information and features will be included on the MS4 map:

- Base Map containing municipal property information.
- Water Resources and Topographic Features.
- Stormwater Infrastructure.
- Collection System (outside MS4)
- Investigations, remediation, and capital projects completed for the City's MS4 and collection system.

2.1 MAPPING NEXT STEPS

Existing gaps in Holyoke's current GIS data are addressed in this IDDE Plan; updates to the mapping will occur as field information from ongoing investigations, which will get input to the database. Updates will be focused on addressing the listed requirements in the Consent Decree Term 21.

3 SANITARY SEWER OVERFLOWS (SSOS)

The MS4 permit requires municipalities to prohibit illicit discharges, including sanitary sewer overflows (SSOs) to the MS4. An SSO is a discharge of untreated sanitary wastewater from a municipal sanitary sewer that can contaminate surface waters, cause serious water quality problems and property damage, and threaten public health. SSOs can be caused by blockages, line breaks, sewer system bypasses that allow stormwater and groundwater to overload the system, power failures, and human error.

3.1 SSO INVENTORY

As part of its Stormwater Management Plan (SWMP), the City maintains an SSO inventory that includes the following information:

- Location (approximate street crossing/address and receiving water, if any).
- A clear statement of whether the discharge entered a surface water directly or entered the MS4.
- Date(s) and time(s) of each known SSO occurrence.
- Estimated volume(s) of the occurrence.
- Description of the occurrence including known or suspected cause(s).
- Mitigation and corrective actions and completion dates as well as planned corrective measures and their implementation schedule.

The SSO inventory is updated annually and is included in the Annual Report. The SSO inventory is summarized in Table 5.

3.2 REMOVAL AND NOTIFICATION

Upon detecting or receiving notice of an SSO, the City shall eliminate it as soon as possible and take interim mitigation steps to minimize the discharge of pollutants to the MS4 until the SSO is eliminated. Holyoke must provide oral notification to the U.S.EPA within 24 hours of becoming aware of an SSO, as well as written notification within 5 days of becoming aware of an SSO.

The City is required to issue public advisory notifications within 2 hours of discovery of the SSO, posting public advisory notifications to the City's website and reporting into the MassDEP's online data system.

MassDEP Contact
Western Region (413) 784-1100
436 Dwight Street
Springfield, MA 01103
24-hour Emergency Line 1-888-304-1133

U.S. EPA Contact
New England (888) 372-7341
5 Post Office Square
Boston, MA 02109

Table 5: **MS4 SSO Inventory**

SSO Location[1]	Discharge Statement[2]	Date	Duration	Volume (gals)[3]	Description[4]	Mitigation Steps[5]	Date Completed[6]
Leary Dr.	Day Brook	4/3/2018	30 mins.	105	Debris/Rags	Removed blockage of rags. Jet cleaned the neighborhood. Put on quarterly cleaning schedule.	4/3/2018
72 Old Jarvis Ave.	Ground	5/11/2018	30 mins.	90	Rags	Removed blockage. Jet cleaned the main.	5/11/2018
Tokeneke & Holy family Rd.	Tannery Brook	6/11/2018	45 mins.	225	Grease & Rags	Removed blockage. Jet cleaned/degreased the City sewer main.	6/12/2018
River Terrace (Highland Inter)	Conn. River	11/5/2018	56 hrs.	1,344,000	Interceptor/ Manhole failure	Repaired Highland Interceptor. Made emergency repair to the interceptor.	11/7/2018
Rt 5 near Smith's Ferry P. S.	Ground	12/5/2018	2 hrs.	25	Roots	Removed blockage of roots. Jet cleaned & CCTV sewer main.to verify root mass was cleared.	12/5/2018
50 Holy Family Rd.	Tannery Brook	1/24/2019	1.5 hrs.	2,250	Grease & Rags	Removed blockage. Jet cleaned sewer main.	12/08/2019
75 Reservation Rd. 200 Whiting Farms Rd.	Ground Tannery brook	4/24/2019 7/23/2019	2 hrs. 1.5hrs.	30 >10,000	Debris & Rocks Grease & Rags	Removed blockage. Sewer main will be jet cleaned Removed blockage Main was put on Bi-monthly cleaning list.	summer 2019 7/23/2019
20 Easthampton Rd.	Green Brook	1/13/2020	1hr	300	Grease	Removed blockage. De greased sewer main.	1/13/2020
63 Canal St.	Ct. River	4/26/2022	36 mins.	225	Debris	Removed blockage. Jet cleaned main.	4/26/2022
Whiting Reservoir	CT. River	06/07/2022	3.15 hrs.	900	Grease & debris	Removed blockage. Jet cleaned main.	06/07/2022
Yale St.	Ground	8/23/2022	Unknown	300-500	Unbolted man hole	Replaced missing bolts on manhole.	8/26/2022
50 Holy Family Rd.	Tannery Brook	12/08/2022	1.25 hrs.	1,500	Grease & Rags	Removed blockage. Jet cleaned sewer main.	12/08/2022
Highland Park Pump Station	Ct. River	3/17/2023	3.25hrs.	600	Force main failure	Setup bypass and shut station down. Replaced failed section of main.	3/27/2023

Notes:

1 Location (approximate street crossing/address and receiving water, if any)

2 A clear statement of whether the discharge entered a surface water directly or entered the MS4

3 Estimated volume(s) of the occurrence

4 Description of the occurrence indicating known or suspected cause(s)

5 Mitigation and corrective measures taken or planned

6 Date mitigation and corrective measures completed

4 OBJECTIVE, AUTHORITY AND IDDE RESPONSIBILITIES

The objective of the IDDE program is to systematically find and eliminate illicit discharges to Holyoke's MS4 and prevent them from happening in the future.

4.1 LEGAL AUTHORITY

Holyoke's Stormwater Ordinance was adopted by City Council on May 17th, 2010, and revised on September 1st, 2021. Specifically, Holyoke's Stormwater Ordinance grants the City the authority to:

- Prohibit illicit discharges.

The City plans to update regulations or ordinances to grant the City authority to:

- Investigate suspected illicit discharges;
- Eliminate illicit discharges, including discharges from properties not owned by or controlled by the City that discharge into the MS4; and
- Implement appropriate enforcement procedures and actions.

Draft ordinance language, proposed by the Pioneer Valley Planning Commission (PVPC), can be found in Appendix D. Copies of bylaws and additional relevant ordinance sections can also be found in Appendix D.

4.2 IDDE PROGRAM RESPONSIBILITIES

As owner and operator of the MS4, the City and Veolia hold joint responsibility for implementing the IDDE program. The City Department of Public Works (DPW) is the lead municipal agency that works with Veolia and other departments to administer various aspects of the program. Specific IDDE Program responsibilities and responsible parties are listed in Table 6. The organizational structure of responsible parties is shown in Figure 3.

Table 6: IDDE Responsibilities

Responsible Party	IDDE Responsibilities
City Engineer	• Enforcement of ID procedures and actions
VEOLIA Project Manager; City Engineer	• Catchment Investigations; identifying system vulnerability factors (SVF), manhole inspections and isolation to confirm sources of ID • Catchment prioritization • Dry weather outfall screens/inspections and outfall sample collection • Rank/Prioritize and reprioritize outfalls and interconnections • Wet and dry weather data review, tracking, collection, and annual reporting • IDDE Program Progress Annual Report (SSOs, IDs identified and removed; # and % total outfall catchments evaluated; dry and wet weather screening results; volume of sewage removed
VEOLIA Project Manager	• Illicit Discharge (ID) Investigations; removal, and removal confirmations • SSOs Investigations and Maintenance of SSO Inventory • Field checks and documentation of new / updated MS4 infrastructure; outfalls and interconnections; update MS4 maps • Wet weather outfall screens/inspections and outfall sample collection • Track and provide annual report of Illicit discharge removal • Confirmatory outfall and interconnection screening after ID has been removed • IDDE training frequency and type in annual report

Veolia Project Manager
Michael Williams
Project Manager
Veolia
(413) 534-2222

City Engineer
Kris Baker
Holyoke City Engineer
Public Works (DPW)
(413) 322-5605

City Department of Public Works Director
Carl Rossi
Director
Public Works (DPW)
(413) 322-5645

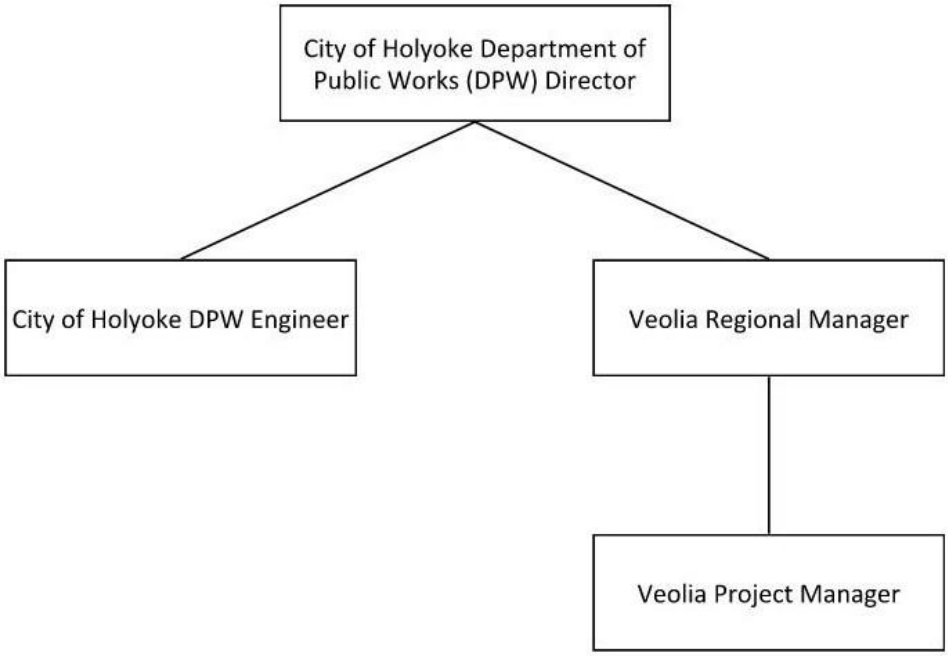


Figure 3: Organizational Structure

5 ASSESSMENT AND PRIORITY RANKING OF CATCHMENTS AND OUTFALLS

The MS4 permit requires Holyoke to assess and rank outfalls and interconnections based on their illicit discharge potential and the significance of the potential public health issues associated with such discharges. The rankings are used to prioritize the order of screening outfalls and interconnections and the order of conducting catchment investigations for evidence of illicit discharges and SSOs. The rankings are also used to track progress towards meeting permit milestones.

Outfalls and Interconnections are defined as follows as per the 2016 Massachusetts Small MS4 General Permit:

- Outfall (40 CFR § 122.2): the point where the MS4 discharges to waters of the United States. Outfalls do not include open conveyances that connect two MS4s or pipes, tunnels and other conveyances that connect segments of the same stream or waters or are used to convey waters of the United States. Culverts longer than a simple road crossing are considered outfalls unless it is confirmed that they are free of any connections and simply convey waters of the United States.[3]
- Interconnection**:** the point (excluding sheet flow over impervious surfaces) where the permittee's MS4 discharges to another MS4 or other storm sewer system, through which the discharge is conveyed to waters of the United States or to another storm sewer system and eventually to a water of the United States.[4]

5.1 OUTFALL/INTERCONNECTION INVENTORY AND RANKING

The City maintains an inventory of each outfall and interconnection that discharges from the MS4. Currently, Veolia has identified 67 public outfalls within its MS4 area. The inventory includes the outfall and interconnection locations as well as a means of tracking all inspections, screenings, samplings, and other activities covered by the IDDE program.

[3] *United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal –US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf*

[4] *United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal .–US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf*

There are a number of MS4 catchment systems located in West Holyoke that have not been included in the current inventory. The City estimates approximately 15-20 outfalls that are not included currently, but mapping efforts are ongoing, and these outfalls will be identified and inspected during future field investigations. Both the MS4 map (Appendix C) and the Outfall and Interconnection Prioritization and Ranking Table (Appendix A) will be expanded upon and updated accordingly. The current inventory was given a preliminary ranking prior to future dry weather screening based on whether an outfall drained directly to a water body and whether the EPA completed sampling at select outfalls on May 7-8, 2019 and July 7, 2019. The City uses a point system to determine rank and priority for each outfall; one (1) point is granted to an outfall if it drains directly into a water body, and one (1) point is given to an outfall if it has been previously sampled by the EPA. Any outfall with one or more points is considered high priority. This ranked list is included as Appendix A. Rankings will be updated and presented in future reports once dry weather screening has been completed (as described in Section 6.4).

Outfalls and interconnections included in the IDDE Program are classified as follows:

1. Problem Outfalls and Interconnections: have known or suspected contributions of illicit discharges and include outfalls/interconnections where previous screening indicates likely sewer input.
2. High Priority Outfalls: discharge to area of concern to public health due to their proximity to public beaches, recreational areas, or drinking water supplies; or are considered by Holyoke to be high priority based on their environmental attributes.
3. Low Priority Outfalls: are considered by Holyoke to be low priority based on existing land uses and their proximity to high priority environmental areas (e.g. densely developed areas that are not proximate to areas with identified environmental attributes).
4. Excluded outfalls: have no potential for illicit discharges and are excluded from the IDDE program. This category is limited to roadway drainage in undeveloped areas with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments that neither cross nor are in proximity to sanitary sewer alignments through undeveloped land.

5.2 OUTFALL CATCHMENT DELINEATIONS

A catchment is the area that drains to an outfall or interconnection. Catchment delineations define the contributing areas for investigations of potential sources of illicit discharges. Delineations are based on topographic maps (USGS Springfield North Quadrangle, Massachusetts, 7.5 minute, 2018 and Mount Tom Quadrangle, Massachusetts, 7.5 minute, 2018) and mapped drainage infrastructure. Initial catchment delineations are complete and can be found in Appendix C. Further refined delineations will be completed by June 30, 2024.

6 DRY WEATHER OUTFALL AND INTERCONNECTION SCREENING AND SAMPLING

(Consent Decree Term #13)

Outfalls can be in the form of pipes or ditches and are the final point of discharge into a body of water for an engineered storm drain system. Current and pending regulations require that all outfalls in the storm drain system be inspected and that their water quality be analyzed under dry and wet weather conditions. This section discusses the objectives of dry weather outfall inspections. Section 7.3 Wet Weather Sampling covers the objectives for wet weather outfall inspections.

Dry weather flow is a common indicator of potential illicit connections. Veolia inspects and screens outfalls and interconnections in accordance with their priority ranking and the IDDE Program Timeline (Table 3-). The proper identification of any potential source(s) of an illicit discharge is further described in Section 7.4 - Illicit Discharge Identification, Source Isolation, and Confirmation.

6.1 WEATHER CONDITIONS

To ensure that sampling occurs during dry weather conditions, screening and sampling takes place when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period, or 48-hour period when possible, and during times when there is no significant snow melt.

6.2 SCREENING REQUIREMENTS

Screening data is included in the outfall/ interconnection inventory and is used to set and update priority rankings for future screenings. For every outfall and interconnection, the following data is collected and entered into the digital inventory:

- Unique identifier.
- Receiving water.
- Date of most recent inspection.
- Dimensions and shape.
- Material (concrete, PVC).
- Spatial location (latitude and longitude within +/- 30 feet).
- Physical condition (vegetation and damage to outfall structures).
- Visual/olfactory evidence of non-stormwater discharge (evidence of flow, odor, color, turbidity, floatables (suds, toilet paper, or sanitary products), deposits, oil sheen.

6.2.1 Access

As per the 2016 Massachusetts Small MS4 General Permit, if an outfall/interconnection is inaccessible or submerged, the permittee shall proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results.

6.2.2 Identification of Illicit Discharge

Any flow observed during dry weather conditions at a stormwater outfall or manhole is a strong indicator of illicit discharges, though it is important to inspect within and around the outfall or manhole for other indicators of the type of discharge. If no flow is observed, there may be other visual or olfactory indicators that past flow existed, which are shown in Table 7[5].

[5] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

Table 7: Visual Condition Assessment

Indicator	Possible Source
Foam	upstream vehicle washing activities or illicit discharge
Oil Sheen	leak or spill
Cloudiness	suspended solids (i.e. dust, ash, powdered chemicals, ground up materials, etc.)
Color or Odor	raw materials, chemicals, or sewage
Excessive Sediment	disturbed earth of unpaved areas lacking adequate erosion control measures
Sanitary Waste/ Optical Enhancers*	illicit discharge
Orange Staining	high mineral concentrations

* Fluorescent dyes added to laundry detergent and some toilet paper

While many of the indicators listed in Table 7 would indicate an illicit discharge, some indicators may occur naturally. For example, orange staining could be the result of naturally occurring iron. Foam can also be naturally occurring or caused by a pollutant; however, it may be difficult to determine the difference between natural foam and foam caused by pollution. Natural foam can typically be found in water with high organic content such as bog lakes, streams that originate from bog lakes, productive lakes, wetlands, or woody areas. As per the Central Massachusetts Regional Stormwater Coalition, it is important to consider the factors listed in Table 8 when determining if the source of foam present at a stormwater outfall is natural or not[5, 6].

Table 8: Conditional and Qualitative Considerations of Foam

Factors	Explanation
Wind Direction or Turbulence	Natural foam occurrences of the beach coincide with onshore winds. Often, foam can be found along a shoreline and/or on open waters during windy days. Natural occurrences in rivers can be found downstream of a turbulent site.
Proximity to Potential Pollution Source	Some entities including the textile industry, paper production facilities, oil industries, and firefighting activities work with materials that cause foaming in water. If these materials are released to a water body in large quantities, they can cause foaming. The presence of silt in water, such as from a construction site can cause foam.
Physical Feeling	Natural foam is typically persistent, light, not slimy to the touch.
Visual Observation	Prescence of decomposing plants or organic material in the water.

[6] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

In addition to foam, both bacteria and petroleum can create a sheen on the water surface. Differentiating the two can be as simple as disturbing the "sheen" with a pole, stick, or similar object. A sheen caused by oil will remain intact and move in a swirl pattern while a sheen caused by bacteria will separate into several smaller patches and appear "blocky." In addition, bacteria or naturally occurring sheens are usually silver or dull in color. While bacterial sheen is not a pollutant, it should be noted when describing the discharge5[7].

Optical enhancers, however, can be visible to the naked eye when found in high enough concentrations and will appear as a bluish-purple haze. If a visual observation is unable to confirm the presence of this pollutant, a quantitative test can be used. To perform this test, a clean, white, cotton pad should be placed, either directly in, or within a sample of, the discharge for several days. After soaking, the cotton pad should be dried and then viewed under a fluorometer. If the cotton pad fluoresces, optical enhancers are assumed to be the pollutant . The magnitude of the fluorescence, as measured in fluorescent units, can be used to determine the concentration of optical enhancers within the sample. Often a visual observation is enough. It is not typical that this analysis is required. If evidence of illicit flow exists, a sample should be taken and observations should be recorded.

6.2.3 Sample Collection and Testing

At least one (1) sample from each catchment during dry weather flow conditions is collected and analyzed for: ammonia, chlorine, conductivity, salinity, surfactants (such as MBAS), and temperature. E. Coli bacteria samples should be taken only if:

a. outfalls identified by EPA in sampling results previously supplied to the City on May 7-8, 2019 and July 7, 2019 based on field test kit screening;

b. olfactory or visual evidence of sewage;

c. an exceedance of a bacterial threshold concurrent with meeting or exceeding of both the surfactant and ammonia thresholds;

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.

[7] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

A discrete manual or grab sample will be collected for dry weather outfall inspections due to the time-sensitive nature of the process. Grab samples classify water at a distinct point in time and are used primarily when the water quality of the discharge is expected to be homogenous, or unchanging, in nature. A flow-weighted composite sample captures water quality over a measured period of time and is used when the water quality of discharge is expected to be heterogenous, or fluctuating, in nature[5].[8]

Protocols for collecting a grab sample, as per the Central Massachusetts Regional Stormwater Coalition, are as follows:

1. Fill out sample information on sample bottles and field sheets (see Attachment 4 for example field sheets).
2. Do not eat, drink, or smoke during sample collection and processing.
3. Do not collect or process samples near a running vehicle.
4. Do not park vehicles in the immediate sample collection area, including both running and non-running vehicles.
5. Always wear clean, powder-free nitrile gloves when handling sample containers and lids.
6. Never touch the inside surface of a sample container or lid, even with gloved hands.
7. Never allow the inner surface of a sample container or lid to be contacted by any material other than the sample water.
8. Collect samples with a dipper or directly into sample containers. If possible, collect water while facing upstream of the flow into the sample bottles to not disturb water or sediments in the outfall pipe or ditch.
9. Do not overfill sample containers, and do not dump any liquid in them. Liquids are often added to sample containers intentionally by the analytical laboratory as a preservative or for pH adjustment.
10. Slowly lower the bottle into the water to avoid bottom disturbance and stirring up sediment.
11. Do not allow any object or material to fall into or contact the collected water sample.
12. Replace and tighten sample container lids immediately after sample collection.
13. Place laboratory samples on ice for analysis of bacteria and pollutants of concern.

[8] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

14. Accurately label the sample with the time and location.
15. Document on the Dry Weather Outfall Inspection Survey that analytical samples were collected, specify parameters, and note the sample time on an Inspection Survey (see Attachment 2 and 3 for examples). This creates a reference point for samples.
16. Fill out chain-of-custody form for laboratory samples.
17. If using a dipper or other device, triple rinse the device with distilled water and then in water to be sampled, except for bacteria sampling.
18. Store used test strips and test kit waste/ampules properly in a 5-gallon bucket with a cover. Storage and disposal shall be coordinated with the City.
19. Decontaminate all testing personnel and equipment.

Samples that are unable to be analyzed for parameters using field instrumentation require laboratory analysis. Coordination with the laboratory, including the pick-up and/or dropping off of samples, is the responsibility of the City. The laboratory requires that a chain-of-custody form be filled out and accompany any samples that require analysis. The laboratory will also provide additional details regarding how samples should be collected based on the sample containers and/or specific analytes.

Table 9 includes field equipment commonly used for outfall screening and sampling. Table 10 summarizes tests performed for each analyte and indicates whether they are done in the field or sent to an outside laboratory.

Table 9: Field Equipment

Equipment	Purpose
Covered Metal Clipboard	For organization/ protection of field sheets and writing surface
Field Sheets or Tablet for Electronic Forms	Field sheets for both dry weather inspection and Dry weather sampling should be available with extra copies
Chain of Custody Forms	To ensure proper handling of all samples
Pens/Pencils/Permanent Markers	For proper labeling
Nitrile Gloves	To protect the sampler and prevent contamination of samples
Flashlight/headlamp w/batteries	For inspecting outfalls or manholes
Cooler with Ice	For transporting samples to the laboratory (see sample holding requirements)
Digital Camera	For documenting field conditions at time of inspection
Personal Protective Equipment (PPE)	Reflective vest, safety glasses, nitrile gloves and boots, steel toed shoes
Insect/Plant Repellant and Sunscreen	Protection from environmental conditions
GPS Receiver	For recording spatial location data
Distilled Water/Calibration Standards	For use with test kits and water quality meters; cleaning equipment and calibration
Water Quality Meter(s)	Handheld meters for testing various water quality parameters such as ammonia, surfactants, and chlorine
Test Kits	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
Label Tape	For labeling sample containers
Sample Containers	Make sure all sample containers are clean and keep extra sample containers on hand at all times. Confirm sample containers are appropriate for what is being sampled for (i.e., sterile containers for bacteria).
Pry Bar. Shovel, or Pick	For opening catch basins and manholes
Sandbags	For damming low flows to collect water for sampling
Small Mallet or Hammer	To free stuck manhole and catch basin covers
Utility Knife	Multiple uses
Measuring Tape	Measuring distances and depth of flow
Safety Cones	To clearly mark areas where samplers are present
Hand Sanitizer	To disinfect hands and nitrile gloves especially prior to collecting samples for bacterial analysis
Zip Ties/Duct Tape	For making field repairs
Rubber Boots/Waders	For accessing shallow streams/areas
Sampling Pole/Dipper/Sampling Cage	For accessing hard to reach outfalls and manholes
5-Gallon Bucket w/ Cover	Disposal of chemical waste
Confined Space Entry Equipment (if needed)	DBI Sali Tripod and retrieval wench; MSA Tripod, rescue wench and material/personal wench; full body harness; 10’ ladder; waders; hard hat; air monitoring equipment (Ventis 4 gas meter)

Table 10: Sampling Parameters and Analysis Methods

Analyte/Indicator	Threshold Limits in a Single Field Sample	Instrumentation	Max. Hold Time	Preservatives
E. Coli	≥ 410 cfu/100 ml	Laboratory via approved method	8 hours	Cool ≤10°C, 0.0008% Na2S2O3
Enterococci	≥ 130 cfu/100 ml	Laboratory via approved method		
Surfactants	≥ 0.25 mg/l	MBAS Field Test Kit (e.g. CHEMetrics K-9400)	48 hours	Cool ≤6°C
	≥ 0.1 mg/l	Laboratory via approved method		
Ammonia (NH_3)	≥ 0.5 mg/l	Ammonia Field Test Strips (e.g. Hach Brand)	28 days	Cool ≤6°C, H2SO4 to pH <2, No preservative required if analyzed immediately
	≥ 0.1 mg/l	Laboratory via approved method		
Chlorine	≥ 0.02 mg/l	Field Meter (e.g. Hach Pocket Colorimeter II)	Analyze within 15 minutes	None Required
Temperature	N/A	Field Meter (e.g. YSI Model 30)	Immediate	None Required
Conductivity	N/A	Field Meter (e.g. YSI Model 30)	28 days	Cool ≤6°C
Salinity	N/A	Field Meter (e.g. YSI Model 30)	28 days	Cool ≤6°C

Notes:
Where water is being discharged directly into an impaired water body subject to an approved TMDL, the sample must be analyzed for the pollutant(s) of concern identified as the cause of the water quality impairment.

According to the 2016 MS4 Permit and Consent Decree, all analyses, except for indicator bacteria and pollutants of concern, can be performed with field tests or field instrumentation and are not subject to 40 CFR part 136 requirements. Sampling for bacteria and pollutants of concern shall be conducted using the analytical methods found in 40 CFR § 136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR § 136[9].

The City, facilitated by Kleinfelder, is responsible for selecting a laboratory or field kits intended for measuring each analyte. When selecting field kits, Kleinfelder will review the detection range for each field kit and ensure it corresponds to the threshold limits for each analyte of interest, as listed in Table 10-. These limits will be communicated to the laboratory so that the laboratory's instrumentation can be properly calibrated to account for the threshold concentrations. In addition, each analyte has a

[9] *United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal .–US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf*

corresponding analytical method, as per Appendix G of the 2016 MS4 General Permit[10], that each field kit and laboratory analysis shall utilize to ensure compliance. Lastly, as per 40 CFR § 136[11], maximum holding times and preservation requirements should be communicated to the laboratory. This is not applicable for field kits since samples are analyzed instantaneously after sample collection. Table 10 summarizes this information, which should be shared with the selected laboratory to ensure compliance with the Consent Decree.

Testing for indicator bacteria and any pollutants of concern must be conducted using analytical methods and procedures found in 40 CFR §136. Samples for laboratory analysis must be stored and preserved in accordance with procedures found in 40 CFR §136. Table 10 is a list of analytical methods, detection limits, hold times, and preservatives for laboratory analysis of dry weather sampling parameters.

6.3 INTERPRETING OUTFALL SAMPLING RESULTS

Outfall analytical data from dry weather sampling can be used to help identify the major type or source of discharge. Screening values that exceed these benchmarks indicate the presence of pollution and/or illicit discharges.

Evaluation of sample data can show positive results due to sources other than human wastewater and false negative results due to chemical reactions or interferences. For example, elevated ammonia readings are common in the New England region due to sampling near historically filled tidal wetlands where the breakdown of biological organic material can skew sample results. The same elevated ammonia readings can also be triggered by discharge from a nearby landfill. In addition, elevated surfactant readings caused by salinity levels greater than one (1) part per thousand can be triggered by the presence of oil. Inconclusive surfactant readings, where the indicator ampule turns green instead of a shade of blue, can often be caused by fine suspended particulate matter being present in the sample being tested. Finally, very low bacteria concentrations can often be the result of elevated chlorine from leaking drinking water infrastructure inhibiting bacterial growth. As such, any detection of chlorine above the instrument Reporting Limit should be noted.

[10] *United States Environmental Protection Agency (EPA). (n.d.). Appendix G Massachusetts Small MS4 Permit Monitoring Requirements For Discharges into Impaired Waters – Parameters and Methods. Retrieved January 30, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/appendix-g-2016-ma-sms4-gp.pdf.*

[11] *The Federal Register. Federal Register. (n.d.). Retrieved January 30, 2023, from https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-136?toc=1.*

6.4 FOLLOW-UP RANKING OF OUTFALLS AND INTERCONNECTIONS

The City updates its outfall and interconnection priority rankings (see Appendix A) based on information gathered during dry weather screening. Outfalls or interconnections are placed at the top of the priority list when investigations or sampling results indicate there is a high likelihood that illicit discharges from sanitary sources are entering stormwater.

7 CATCHMENT INVESTIGATIONS

This section of the IDDE describes the catchment investigation procedure to investigate outfall catchments to trace the source of potential illicit discharges. The MS4 Permit requires catchment investigations for outfalls and/or interconnections to begin no later than June 30, 2020, and that all catchments affiliated with problem outfalls be investigated by June 30, 2025. Catchment investigations affiliated with all the other high and low priority outfalls must be completed by June 30, 2028. Catchment investigation techniques include, but are not limited to, reviewing maps, historic plans, and records. Data collected during catchment investigations will be recorded and reported in each annual report. Infrastructure information gathered during catchment investigations will be incorporated into the MS4 maps.

7.1 DRY WEATHER MANHOLE INSPECTIONS (Consent Decree Term #13)

A key step in catchment investigations is dry weather investigations of the manholes in the storm drain network. Investigations involve systematically and progressively observing, sampling, and evaluating key junction manholes, defined as follows:

- **Junction Manhole** is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets that are only from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.
- **Key Junction Manholes** can represent one or more junction manhole. Adequate implementation of the IDDE 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. Veolia may exclude a junction manhole located upstream and in the immediate vicinity from another manhole, or one that serves a drainage alignment that has no potential for illicit connections.

For all catchments requiring investigation during dry weather, Veolia systematically inspects key junction manholes for evidence of illicit discharges. The program requires progressive inspection and sampling at manholes to find evidence of illicit discharges and to isolate and eliminate them.

Prior to manhole inspections property owners will be notified and the storm drain system will be cleaned, catchment investigations can begin. Veolia's inspections are conducted in one of two ways (or a combination of both):

- Working progressively up from an outfall and inspecting key junction manholes along the way ("Bottom Up"), and/or
- Working progressively down from the upper parts of the catchment towards the outfall ("Top Down").

The decision to work bottom up or top down depends on the nature of the drainage system, the land use, and the availability of information on the catchment and drainage system. A bottom-up approach can begin immediately when an illicit discharge is detected at an outfall, and only a map of the storm drain system is required. A top-down approach requires more advance preparation and reliable drainage system information on the upstream segments of the storm drain system but may be more efficient if the sources of illicit discharged are believed to be located in the upstream portions of the catchment area.

Once an inspection direction has been chosen, the investigation can then begin with key junction manholes and mainline manholes. From there, the inspection can continue towards junction manholes and other manholes, if needed, with the purpose to isolate any illicit discharges. The specific steps are as follows:

1. Manholes are opened and inspected for visual and olfactory evidence of illicit connections during dry weather. Visual evidence may include toilet paper, gray filamentous bacterial growth, sanitary products, sewage, soap, food, or other indications of anything other than stormwater. Olfactory evidence may include sewage, soap, laundry, bleach, or other odors not typical of stormwater. Sample outfall and manhole inspection forms are in Appendix E.
2. When possible, condition information and measured elevation of the manhole rim as well as the invert depth should be recorded.
3. If flows are observed, the inlet and outlet direction of the flow should be recorded.
4. If no flow is observed, record whether the manhole is dry or has standing water and move on to the next manhole upstream or downstream.
5. As the investigation follows the catchment upstream or downstream, only the most upstream manhole with flow should be sampled. For example, if flow is observed at an outfall, as well as

at the next three (3) manholes upstream, then only sample and test at the third manhole upstream. Testing should include chlorine, ammonia, surfactants, conductivity, salinity, and temperature. Refer to Section 6.2.3 Sample Collection and Testing for information on when to take E. Coli bacteria samples. Refer to Table 10 for threshold limits for each analyte.

6. If sampling results or visual or olfactory observations indicate potential illicit discharges or SSOs, Veolia flags the area draining to the junction manhole for further upstream investigation and/or isolation and confirmation of sources.
7. Additional key junction manhole inspections will proceed until the location of the suspected illicit discharge(s) or SSO(s) are located and isolated to a pipe segment between two manholes.
8. If no evidence of an illicit discharge is found, the catchment investigation is complete upon completion of key junction manhole sampling.

7.2 WET WEATHER OUTFALL SAMPLING (Consent Decree Term #14)

Catchments that have a minimum of one (1) system vulnerability factor (SVF) are screened during wet weather conditions. These catchments are sampled and inspected to the extent necessary to determine whether wet weather-induced high flows in sanitary sewers or high groundwater in areas served by septic systems-results in discharges of sanitary flows to the MS4. Catchment investigations are not considered complete until wet weather inspections are done.

Wet weather sampling events are scheduled to occur during the spring (March to June) when groundwater levels are high, and timed to avoid sampling during the first flush of a wet weather event.

At least one (1) wet weather sample is collected and analyzed for: ammonia, chlorine, conductivity, salinity, E. coli, surfactants (such as MBAS), and pollutants of concern (nitrogen, if discharge directly flows to the Connecticut River).

7.3 ILLICIT DISCHARGE IDENTIFICATION, SOURCE ISOLATION, AND CONFIRMATION

Once the source of an illicit discharge is approximated between two manholes, a range of techniques can be used to isolate and confirm the source of the discharge that may include:

- Sandbagging
- Smoke Testing
- Dye Testing
- Video Inspections
- Optical Brightener Monitoring

These methods are described in further detail below.

7.3.1 Sandbagging

This technique is used to identify and isolate intermittent sources of illicit discharge or sources having little perceptible flow. Sandbagging involves placing sandbags or other temporary barriers (caulking, weirs/plates, etc.) within outlets to manholes to form a temporary dam that collects any intermittent flows that may occur. The bags and barriers are only deployed during dry weather conditions and typically left in place for 48 hours. If water collects behind the barrier 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 intermittent discharge.

7.3.2 Smoke Testing

Smoke testing is used on short sections of pipes or pipes with small diameters. It is used to trace illegal connections from buildings to the sewer. Smoke testing involves injecting non-toxic smoke into drain lines and the emergence of smoke from sanitary sewer vents in or from cracks and leaks in the system. Typically, a smoke bomb or smoke generator is used to inject smoke into a catch basin or manhole.

Before conducting any smoke testing, area residents, business owners, and local police and fire departments are notified. Smoke can cause minor irritation of respiratory passages. Residents with respiratory conditions may need to be monitored or evacuated from the testing area to ensure safety.

7.3.3 Dye Testing

Dye testing involves flushing non-toxic dye into plumbing fixtures (toilets, showers, sinks) and observers standby at nearby storm drains, sewer manholes, and outfalls. Dye testing is done by a team of two or more with one person stationed inside the building, while others are stationed at the appropriate storm sewer and sanitary sewer manhole and/or outfall. The person inside the building adds dye into a plumbing fixture (sink or toilet) and runs water to move the dye through the system. Employees stationed outside are notified that the dye has been dropped and watch for the dye in the storm sewer and sanitary sewer.

Dye testing is best used when the likely source of an illicit discharge has been narrowed down to a few specific houses or businesses. Before dye testing is done, affected residents, business owners, the local police and fire departments, and public health staff are notified.

7.3.4 Video Inspections

Video inspections use mobile video cameras that are guided remotely through the stormwater drain lines to observe possible illicit discharges.

7.3.5 Optical Brightener Monitoring

Optical brighteners are fluorescent dyes that are used in detergents and paper products. The presence of optical brighteners in surface waters or dry weather discharges indicates a possible illicit discharge or insufficient wastewater treatment at nearby septic systems or wastewater treatment plants. Optical brightener monitoring involves placing a cotton pad in a wire cage and securing the cage in a pipe, manhole, catch basin, or inlet to capture intermittent dry weather flows. The pad is collected and viewed with a UV light or with a fluorometer to determine the presence or absence of brighteners. Additional instructions and Standard Operating Procedures (SOPs) for these methods are in Appendix F.

7.4 ILLICIT DISCHARGE REMOVAL

Once an illicit source is identified, the Veolia Project Manager contacts the City Engineer of Public Works. The City Engineer, in accordance with legal authorities, notifies all responsible parties and requires immediate cessation of improper disposal practices. The City and Veolia take appropriate steps to eliminate the illicit discharge as expeditiously as possible. While the illicit discharge is being eliminated, all reasonable and prudent steps to minimize the discharge of pollutants to the MS4 are taken.

When an illicit discharge cannot be removed within 60 days of being identified, the City creates a schedule for elimination and reports dates and schedules for removal in the annual report.

For each confirmed source, Holyoke documents the following information in its Annual Report:

- Location of ID and its source(s);
- A description of the discharge;
- The method of discovery;
- The date of discovery;
- The date of elimination, mitigation or enforcement action or planned corrective measure and a schedule for completing the ID removal; and
- The estimate of the volume of flow removed.

7.4.1 Confirmatory Outfall or Interconnection Screening

Within one (1) year of removal of all identified illicit discharges within a catchment area, confirmatory outfall or interconnection screening shall be conducted. If confirmatory screening indicates evidence of additional illicit discharges, the catchment shall be scheduled for additional investigation. Catchments investigations are considered complete upon confirmation of all illicit sources.

7.4.2 Ongoing Screening

Once catchment investigations are completed and illicit discharges eliminated and confirmed, each outfall or interconnection will be reprioritized for screening once every five years. Ongoing screening consists of dry weather screening and sampling, and wet weather screening and sampling for all outfalls.

Additional instructions and Standard Operating Procedures (SOPs) for these methods are in Appendix F.

8 TRAINING

Veolia provides annual IDDE training to all employees involved in the IDDE program. At a minimum, training includes how to identify illicit discharges and SSOs. Training records, including the frequency and type, are recorded on a form included in Appendix G and included in the annual report.

9 ANNUAL REPORT

Holyoke and Veolia evaluate the progress of their IDDE Program annually. This evaluation is documented in the annual report and includes:

- Number of SSOs and Illicit discharges identified and removed;
- Number and percent of total outfall catchments served by the MS4 that have been evaluated using the catchment investigation procedure;
- Number of dry weather outfall inspections/screenings;
- Number of wet weather outfall inspections/sampling events;
- Number of enforcement notices issued;
- All dry weather and wet weather screening and sampling results;
- Estimates of the volume of stormwater removed; and
- Number of employees trained annually.

APPENDIX A
OUTFALL AND INTERCONNECTION PRIORITIZATION AND RANKING

MS4 OUTFALL AND INTERCONNECTION PRIORITIZATION TABLE

Outfall ID	Location	Receiving Water Body	EPA Sample Site	Dry Weather Ammonia	Dry Weather Surfactant	Dry Weather Chlorine	Dry Weather Enterococci	Wet Weather Ammonia	Wet Weather Surfactant	Wet Weather Chlorine	Wet Weather Enterococci	Ranking	Priority
		Water Body = 1; None = 0	*Yes = 1; No = 0*	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1		
OUTFALL-00001	TBD*	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00002	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00003	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00004	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00005	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00006	TBD*	Pequot Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00007	TBD*	Pequot Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00008	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00009	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00010	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00011	Whiting Reservoir area	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00012	Whiting Reservoir area	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00013	SUMMIT AVE	Connecticut River	1	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	2	HIGH
OUTFALL-00014	Whiting Reservoir area	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00015	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00016	TBD*	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH

Outfall ID	Location	Receiving Water Body	EPA Sample Site	Dry Weather Ammonia	Dry Weather Surfactant	Dry Weather Chlorine	Dry Weather Enterococci	Wet Weather Ammonia	Wet Weather Surfactant	Wet Weather Chlorine	Wet Weather Enterococci	Ranking	Priority
		Water Body = 1; None = 0	*Yes = 1; No = 0*	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1		
OUTFALL-00017	TBD*	Ashley Cutoff	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00018	16 HOLLY MEADOW RD	Pequot Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00019	22 HOLLY MEADOW RD	Pequot Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00020	BOBALA RD	Schoolhouse Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00021	HOMESTEAV AVE	Wright Pond	1	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	2	HIGH
OUTFALL-00022	MAIN ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00023	MAIN ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00024	WHITNEY AVE	North RailRoad Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00025	BOBALA RD	North RailRoad Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00026	WHITNEY AVENUE	North RailRoad Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00027	LOWER WESTFIELD RD	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00028	EASTHAMPTON RD	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00029	JARVIS AVE	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00030	EASTHAMPTON RD	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00031	EASTHAMPTON RD	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00032	LINDOR ST	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH

Outfall ID	Location	Receiving Water Body	EPA Sample Site	Dry Weather Ammonia	Dry Weather Surfactant	Dry Weather Chlorine	Dry Weather Enterococci	Wet Weather Ammonia	Wet Weather Surfactant	Wet Weather Chlorine	Wet Weather Enterococci	Ranking	Priority
		Water Body = 1; None = 0	*Yes = 1; No = 0*	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1		
OUTFALL-00033	2ND LEVEL CANAL CABOT ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00034	MAIN ST 3RD LEVEL CANAL	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00035	2ND LEVEL CANAL RACE ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00036	LONGFELLOW RD	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00037	BOBALA RD	Schoolhouse Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00038	LOWER WESTFIELD RD	Ashley Cutoff	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00039	LOWER WESTFIELD RD	Ashley Cutoff	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00040	WHITING FARMS RD	Connecticut River	1	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	2	HIGH
OUTFALL-00041	WHITING FARMS RD	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00042	MAIN ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00043	MAIN ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00044	MAIN ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00045	BOBALA ROAD	Schoolhouse Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00046	KNOLLWOOD CIRCLE	Wright Pond	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00047	EASTHAMPTON RD	Broad Brook	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00048	MOSHER ST	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00049	Jones Ferry Pump Station	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH

Outfall ID	Location	Receiving Water Body	EPA Sample Site	Dry Weather Ammonia	Dry Weather Surfactant	Dry Weather Chlorine	Dry Weather Enterococci	Wet Weather Ammonia	Wet Weather Surfactant	Wet Weather Chlorine	Wet Weather Enterococci	Ranking	Priority
		Water Body = 1; None = 0	*Yes = 1; No = 0*	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1		
OUTFALL-00050	TBD*	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00051	TBD*	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00052	TBD*	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00053	TBD*	Connecticut River	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	1	HIGH
OUTFALL-00054	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00055	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00056	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00057	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00058	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00059	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00060	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00061	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00062	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00063	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00064	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00065	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00066	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW
OUTFALL-00067	TBD*	TBD*	0	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	0	LOW

Outfall ID	Location	Receiving Water Body	EPA Sample Site	Dry Weather Ammonia	Dry Weather Surfactant	Dry Weather Chlorine	Dry Weather Enterococci	Wet Weather Ammonia	Wet Weather Surfactant	Wet Weather Chlorine	Wet Weather Enterococci	Ranking	Priority
		Water Body = 1; None = 0	*Yes = 1; No = 0*	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1	Max: 0.1		
OUTFALL-00068 – OUTFALL-000XX	West Holyoke	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*	TBD*

Notes:

1. TBD* - Will be updated with information gathered from future outfall investigation and mapping efforts
2. Previous screening results indicate likely sewer input if any of the following are true:
   - Outfalls identified by the EPA in sampling results previously supplied to the City on May 7-8, 2019 and July 7, 2019 based on field test kit screening,
   - Olfactory or visual evidence of sewage,
   - Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water,
   - Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine, or
   - Any exceedance of a bacteria threshold and any detectable level of ammonia below its threshold
3. Outfalls and interconnections discharging to or in the vicinity of any of the following: public beaches, recreational areas, or drinking water supplies.
4. Receiving water quality based on latest version of MassDEP Integrated List of Waters;
   - Poor = Waters with approved TMDLs (Category 4a Waters) where illicit discharges have the potential to contain the pollutant identified as the cause of the impairment; also, waters exceeding the water quality standards for bacteria; ammonia >0.5 mg/L; surfactants ≥0.25 mg/L
   - Fair = Water quality limited waterbodies that receive a discharge from the MS4 (Category 5 Waters)
   - Good = No water quality impairments
5. Generating sites are institutional, municipal, commercial, or industrial sites with a potential to generate pollutants that could contribute to illicit discharges (e.g., car dealers, car washes, gas stations, garden centers, and industrial manufacturing areas).
6. Age of development and infrastructure: High = developments with stormwater and sewer infrastructure > 40 years old; medium = developments with infrastructure 20-40 years old; Low = developments with infrastructure <20 years old.
7. Historic Combined Sewers or Septic: Yes = Areas once served by combined sewers that have been separated, or areas once served by septic that have converted to sanitary sewers.
8. Aging septic systems: Yes = septic systems 30 years or older in residential areas.
9. Local Priority due to Environmental Qualities of the area and land use development.
10. Any river or stream that is culverted for distance greater than a simple roadway crossing.

APPENDIX B
EPA SAMPLING REPORT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region I – New England Regional Laboratory
Laboratory Services and Applied Science Division
11 Technology Drive, North Chelmsford, MA 01863

Drafted Date: September 30, 2019
Finalized Date: October 4, 2019

Subject: Holyoke Stormwater
City of Holyoke, MA
Compliance Sampling Inspection Report

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

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

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

CC: Douglas Koopman, Inspector, ECAD-EWC

I. Facility Information

A. Facility Name:	City of Holyoke
B. Facility Location:	Holyoke, MA
C. Facility Contact:	Michael McManus, General Superintendent Phone: (413)322-5645, Email: mcmanusm@holyoke.org
D. NPDES MS4 Permit#:	MAR041011
E. NPDES CSO Permit#:	MA0101630

II. Background Information

A. Date/Start time of inspection:	September 24, 2019 @ 0730 HRS
B. USEPA Representatives:	Michelle Coombs and William Sommer
C. Federally Enforceable Requirements Investigated:	40 CFR Part 122.26
D. Pollutants Sampled:	E. Coli, Enterococci, Pharmaceuticals and Personal Care Products (PPCPs), Surfactants, Ammonia, and Total Chlorine

III. Disclaimer:

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

IV. Type and Purpose of Inspection

The purpose of the compliance sampling inspection was to identify illicit connections or illegal discharges within the City of Holyoke, MA Municipal Separate Storm Sewer System (MS4) and/or Combined Sewer System (CSS) that may adversely impact the water quality in the Connecticut River. Samples were collected from eight (8) locations in accordance with the FSB Investigations Team Stormwater Program Plan.

V. Inspection Summary

On September 24, 2019, EPA employees Michelle Coombs and William Sommer ("the EPA Inspection Team") conducted a compliance sampling inspection of the stormwater system within the City of Holyoke, MA at the locations described in Section VI. They were not accompanied by any city or state representatives.

The inspection started in the northern, residential area of the city, at approximately 0730 HRS. At the time of the inspection, the weather was sunny with an ambient temperature of approximately 60°F. According to The National Weather Service for the Westfield-Barnes Municipal Airport, the last amount of recorded precipitation was 0.20 inches on September 14, 2019.

The City of Holyoke, MA was issued NPDES Permit MAR041011 under the National Pollutant Discharge Elimination System (NPDES) MS4 General Permit Program. The City of Holyoke, MA is a regulated small MS4 according to the Stormwater Phase II Rule, which was promulgated and is administered by EPA. The City of Holyoke is authorized to discharge at 11 Combined Sewer Overflow (CSO) locations under the NPDES Permit MA0101630, issued October 1, 2015.

The applicable sampling locations described in Section VI below were field screened using test kits for ammonia, surfactants, and chlorine and in-situ measurements for specific conductivity, salinity, and temperature were also collected and recorded using a YSI meter (those not field screened/measured are noted as NA). All samples were analyzed for E. Coli and Enterococcus at Alpha Analytical in Westborough, MA and Pharmaceutical and Personal Care Products (PPCPs) at the EPA New England Regional Laboratory (NERL) in North Chelmsford, MA. The following table(s) summarize the findings: Table 1: Summary of Sampling and Analytical Data.

VI. Description of Sampling Locations

Photographs of each location can be found in the photo log (Attachment A).

- **29Long:** A single concrete, circular outfall approximately 24 inches in diameter with an estimated flow of 5 gallons per minute (gpm). MA-DEP File Number 186-0255. Long, dark brown filamentous bacteria growth downstream. Outfall is located on the eastern side of Longfellow Road.
- **CSO018:** A single concrete rectangular culvert approximately 60 inches in diameter with very little flow and standing water from the pool downstream. The color of the water was an opaque gray. Outfall is CSO 18 off of St. Kolbe Drive.
- **CommField:** A single concrete, circular outfall approximately 60 inches in diameter with an estimated flow of 7 gpm. The pool at the mouth of the outfall is a milky, gray color and there was dark filamentous bacteria growth downstream of the outfall. Outfall is adjacent to the entrance to the walking trail in Community Field Park.
- **Summit2:** A single, circular, green PVC outfall approximately 12 inches in diameter with a trickling flow. A slight musty odor was detected, and dark green filamentous bacteria growth was observed in the pipe and on the rocks below the outfall. An orange precipitate was also observed in the pool and on the pipe. Outfall is located on the eastern side of Community Field Park, discharging toward Concord Avenue.
- **Homestead:** A single concrete, circular outfall approximately 24 inches in diameter with an estimated flow of 10 gpm. The outfall was mostly submerged underwater and the pool downstream was a slight milky color. The outfall was inaccessible, so the sample was collected approximately 25 feet downstream. Outfall is located on Homestead Avenue, in between the Holyoke Fire Station #6 and the Holyoke Mini Mall.
- **JPRest:** A set of twin, concrete elliptical outfalls approximately 60 inches in length. The sample was taken at the leftmost outfall (looking downstream). The right facing outfall was dry at the time of collection. Estimated flow was 8 gpm. Bricks and trash were observed downstream. Sewage and chlorine odors were detected. Outfall is located across the street from JP's Restaurant on Whiting Farms Road.
- **Avis:** A single concrete, circular outfall approximately 24 inches in diameter with an estimated flow of 20 gpm. Outfall is located on the left side of the Rte. 5 bridge culvert (looking downstream), approximately 20 feet from the end of the concrete flooring. Outfall flows into Tannery Brook near the Avis car rental building.
- **Tannery:** In-stream sample of Tannery Brook collected at the overflow point from the 12 ft. by 12 ft. square culvert under the Rte. 5 bridge, downstream of "Avis".

Map of Sample Locations

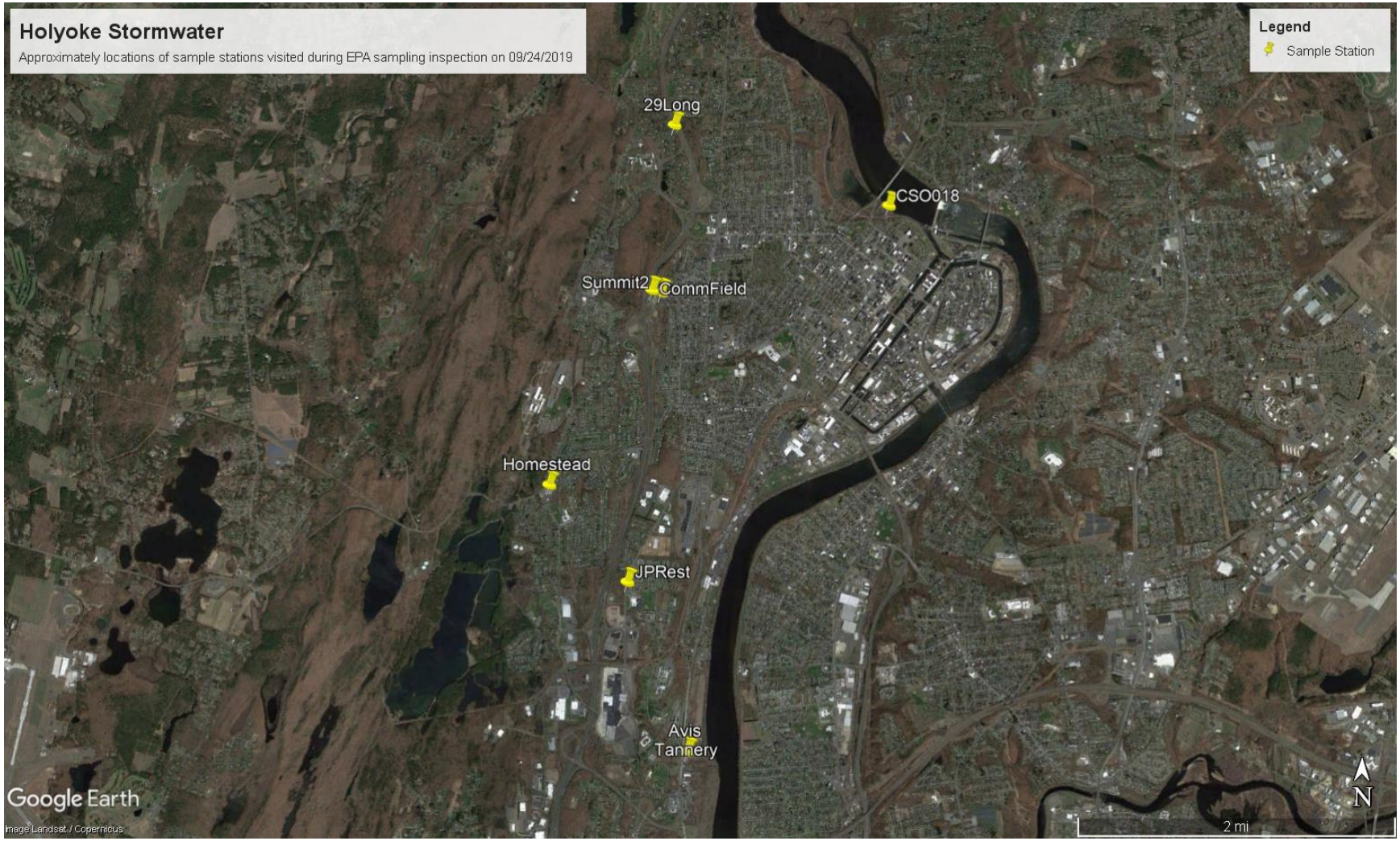


Table 1: Summary of Sampling and Analytical Data

	Site ID	29Long	CSO018	CommField	Summit2	Homestead	JPRest	Avis	Tannery
Location	**Sample Time**	7:40	8:15	9:20	9:50	10:30	11:09	11:43	11:45
	Sample Date	09/24/2019	09/24/2019	09/24/2019	09/24/2019	09/24/2019	09/24/2019	09/24/2019	09/24/2019
Coordinates	**North**	42.219930	42.212892	42.204429	42.204267	42.186310	42.177575	42.162306	42.162303
	West	-72.635849	-72.608700	-72.638261	-72.637113	-72.650480	-72.640585	-72.632826	-72.632724
YSI Meter	**Salinity, ppt.**	0.4	0.2	0.5	0.9	0.2	0.0	0.9	0.8
	Temperature, ºC	18.1	19.0	16.6	19.3	14.3	16.5	15.7	15.8
	Conductivity, µS/cm	892	406.1	1034	1867	447.4	93.1	1816	1571
Field Test Kits (mg/L)	**Ammonia**	0.0	0.50	0.25	0.0	0.0	0.25	0.30	NA
	Chlorine	0.02	0.02	0.05	0.03	0.0	0.14	0.05	NA
	Surfactants	0.35	0.10	0.25	0.50	0.25	0.15	0.60	NA
Bacteria (MPN/100mL)	**E. coli**	95.86	816.41	151	<1	39.5	<1	6,178	58.76
	Enterococcus	209.82	195.1	172.6	770.1	86.24	<1	1,732.89	116.02
Pharmaceutical and Personal Care Products (ng/L)	**Cotinine**	2.4	9.4	ND	1.21	ND	0.431	7.13	ND
	Acetaminophen	ND	58	ND	ND	ND	ND	844	ND
	Paraxanthine	ND	20	ND	ND	ND	ND	101	ND
	Atenolol	ND	8	ND	ND	ND	ND	22.1	ND
	Caffeine	5	130	3.4	ND	ND	22.7	363	ND
	Metoprolol	ND	62	ND	ND	ND	ND	8.25	ND
	Diphenhydramine	ND	8.4	ND	ND	ND	ND	4.23	ND
	Carbamazepine	ND	36	ND	ND	ND	ND	9.45	ND

Abbreviations and Notes:
ND: Not Detected Above Reporting Limit
E. Coli: Red ≥ 400col/100ml, Orange ≥ 200 col/100ml, Yellow ≥ 50 col/100ml, Black < 50 col/100ml
Entero: Red ≥ 1000 col/100ml, Orange ≥ 350 col/100mL, Yellow ≥ 54 col/100ml, Black <54 col/100ml
NH_3: Red ≥ 6 mg/L, Orange ≥ 0.5 mg/L, Yellow ≥ 0.25 mg/L, Black < 0.25 mg/L
Cl_2: 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)
PPCP: 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

VII. Attachments

Attachment A: Photo Log
Attachment B: Laboratory Report for Pharmaceuticals and Personal Care Products (Source Tracking) Analysis
Attachment C: Laboratory Report for E. coli and Enterococcus Analysis

End of Report

APPENDIX C
MS4 MAPS

Legend

Drainage Outfalls
- MS4 (67)
- Non-MS4 (88)
- Drainage Manholes
- Drainage Pipes
- Combined GravityMain
- Sanitary Sewer Manholes
- Sewer GravityMain
- Stormwater Catchment

Impaired Rivers (2018)

Category
- 5

Impaired Lakes & Ponds (2018)

Category
- 3
- 4C
- 5
- Holyoke Town Boundary
- MS4 Urbanized area

NORTHAMPTON
HADLEY
SOUTH HADLEY
SOUTHAMPTON
WESTFIELD
WEST SPRINGFIELD
CHICOPEE
HOLYOKE
Lake Bray
Whiting Street Reservoir
Connecticut River
Log Pond Cove
Clear Pond
Wright Pond
Mclean Reservoir
Ashley Cutoff
Ashley Pond
North Railroad Pond
Connor Reservoir

KLEINFELDER
Bright People. Right Solutions.

N

0 4,000 8,000
Feet

PROJECT NO. 20233959.001A
CREATED: 5/22/2023
CREATED BY: STKhan

Storm System Map

City of Holyoke
Holyoke, MA

APPENDIX D
LEGAL AUTHORITY

MODEL

ILLICIT CONNECTIONS AND DISCHARGES ORDINANCE

Pioneer Valley Planning Commission

City of Holyoke

Illicit Connections and Discharges To
The Municipal Storm Drain System Ordinance

SECTION _1. PURPOSE

The purpose of this ordinance is to regulate illicit connections and discharges to the storm drain system, which is necessary for the protection of the City of Holyoke's water bodies, wetlands, and groundwater, and to safeguard the public health, safety, welfare and the environment.

The objectives of this ordinance are:

(1) To prevent pollutants from entering the municipal separate storm sewer system;
(2) To prohibit illicit connections and unauthorized discharges to the stormwater system;
(3) To require the removal of all such illicit connections;
(4) To comply with state and federal statutes and regulations relating to stormwater discharges;
(5) To establish the legal authority to ensure compliance with the provisions of this ordinance through inspection, monitoring, and enforcement.

Increased and contaminated stormwater runoff are major causes of:

(1) Impairment of water quality and flow in lakes, ponds, streams, rivers, wetlands and groundwater;
(2) Contamination of drinking water supplies;
(3) Alteration or destruction of aquatic and wildlife habitat; and
(4) Local flooding.

SECTION _2. DEFINITIONS

For the purposes of this ordinance, the following shall mean:

Active Groundwater Dewatering (AGD) Device: Any active device used to transport groundwater, i.e. a sump pump.

Authorized Enforcement Agency: The Director of the Department of Public Works or designated representative**,** its employees or agents designated to enforce this ordinance.

Best Management Practice (BMP): An activity, procedure, restraint, or structural improvement that helps to reduce the quantity or improve the quality of stormwater runoff. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

Clean Water Act: The Federal Water Pollution Control Act (33 U.S.C. § 1251 *et seq*.) as hereafter amended.

Discharge of Pollutants: The addition from any source of any pollutant or combination of pollutants into the municipal storm drain system or into the waters of the United States or Commonwealth from any source.

Grandfathered: Exempt from new legislation, restrictions, or requirements.

Groundwater: All water beneath the surface of the ground.

Illegal Discharge: Any direct or indirect non-stormwater discharge to the municipal storm drain system, except as specifically exempted in Section 7 of this ordinance. The term does not include a discharge in compliance with an NPDES Storm Water Discharge Permit or resulting from fire fighting activities exempted pursuant to Section 7 of this ordinance.

Illicit Connection: Any surface or subsurface drain or conveyance, which allows an illegal discharge into the municipal storm drain system. Illicit connections include conveyances which allow a non-stormwater discharge to the municipal storm drain system, including: sewage, process wastewater or wash water and any connections from indoor drainages sinks, or toilets, regardless of whether said connection was previously allowed, permitted, or approved before the effective date of this ordinance.

Impervious Surface: Any material or structure on or above the ground that prevents water from infiltrating the underlying soil. Impervious surface includes, without limitation, roads, paved parking lots, sidewalks, and roof tops.

Municipal separate storm sewer system (MS4) or municipal storm drain system: The system of conveyances designed or used for collecting or conveying stormwater, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drain system owned or operated by the City of Holyoke.

National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permit: A permit issued by United States Environmental Protection Agency or jointly with the State that authorizes the discharge of pollutants to waters of the United States.

Non-Stormwater Discharge: Any discharge to the municipal storm drain system not composed entirely of stormwater.

Person: Any individual, partnership, association, firm, company, trust, corporation, and, any agency, authority, department or political subdivision of the Commonwealth or the federal government, to the extent permitted by-law, and any officer, employee, or agent of such person.

Pollutant: Any element or property of sewage, agricultural, industrial or commercial waste, runoff, leachate, heated effluent, or other matter whether originating at a point or nonpoint source, that is or may be introduced into any sewage treatment works or waters of the Commonwealth. Pollutants shall include**:**

(1) paints, varnishes, and solvents;

(2) oil and other automotive fluids;

(3) liquid and solid wastes and yard wastes;

(4) refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordnances, accumulations and floatables;

(5) pesticides, herbicides, and fertilizers;

(6) hazardous materials and wastes; sewage, fecal coliform and pathogens;

(7) dissolved and particulate metals;

(8) animal wastes;

(9) rock; sand; salt, soils;

(10) construction wastes and residues;

(11) and noxious or offensive matter of any kind.

Process wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any material, intermediate product, finished product, or waste product.

Recharge: The process by which groundwater is replenished by precipitation through the percolation of runoff and surface water through the soil.

Storm Drain System: The system of conveyance designed or used for collecting or conveying stormwater, including any road with a drainage system, street, gutter, curb, inlet, piped storm drain, pumping facility, retention, or detention basin, natural or man-made or altered drainage channel, reservoir, and other drainage structure that together comprise the storm drain system on public or private ways within the City of Holyoke.

Stormwater: Runoff from precipitation or snow melt.

Toxic or Hazardous Material or Waste: Any material, which because of its quantity, concentration, chemical, corrosive, flammable, reactive, toxic, infectious or radioactive characteristics, either separately or in combination with any substance or substances, constitutes a present or potential threat to human health, safety, welfare, or to the environment. Toxic or hazardous materials include any synthetic organic chemical, petroleum product, heavy metal, radioactive or infectious waste, acid and alkali, and any substance defined as Toxic or Hazardous under M.G.L. Ch.21C and Ch.21E, and the regulations at 310 CMR 30.000 and 310 CMR 40.0000.

Wastewater: any sanitary waste, sludge, or septic tank or cesspool overflow, and water that during manufacturing, cleaning or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct or waste product.

Watercourses: A natural or man-made channel through which water flows or a stream of water, including a river, brook or underground stream.

Waters of the Commonwealth: all waters within the jurisdiction of the Commonwealth, including, without limitation, rivers, streams, lakes, ponds, springs, impoundments, estuaries, wetlands, costal waters, and groundwater.

SECTION _3. APPLICABILITY

This ordinance shall apply to all flows entering the storm drain system owned and operated by the City of Holyoke.

SECTION _4. AUTHORITY

This bylaw/ordinance is adopted under the authority granted by the Home Rule Amendment of the Massachusetts Constitution and the Home Rule Procedures Act, and pursuant to the regulations of the federal Clean Water Act found at 40 CFR 122:34.

SECTION _5. RESPONSIBILITY FOR ADMINISTRATION

The Director of the Department of Public Works or designated representative shall administer, implement and enforce this ordinance. Any powers granted to or duties imposed upon the Director of the Department of Public Works may be delegated in writing by the Director of the Department of Public Works to employees or agents of the Department of Public Works.

SECTION _6. REGULATIONS

The Director of the Department of Public Works may promulgate rules and regulations to effectuate the purposes of this ordinance. Failure by the Director of the Department of Public Works to promulgate such rules and regulations shall not have the effect of suspending or invalidating this ordinance.

SECTION _7. PROHIBITED ACTIVITIES

1. Illegal Discharges

   No person shall dump, discharge, cause or allow to be discharged any pollutant or non-stormwater discharge into any storm drain system, watercourse, or into the waters of the Commonwealth. Emergency pumping performed by the Fire Department must utilize appropriate best management practices (BMPs) and follow hazardous materials disposal guidelines to prevent contamination of the municipal storm drain system with hazardous materials. If hazardous materials are observed within the flooded area from the activities noted above, or are suspected to be contained therein, a qualified hazmat technician and applicable state and local agencies must be consulted. These agencies will be responsible for implementing the BMPs to the contamination of nearby water ways and the municipal storm drain system.

2. Illicit Connections

   No person shall construct, use, allow, maintain or continue any illicit connection to the municipal storm drain system, regardless of whether the connection was permissible under applicable law, regulation or custom at the time of connection. No grandfathering is permitted.

3. Obstruction of the Municipal Storm Drain System

No person shall obstruct or interfere with the normal flow of stormwater into or out of the storm drain system without prior approval from the Director of the Department of Public Works or designated representative. No person shall dump or dispose of yard waste (leaves, grass clippings, etc.) into the MS4, or into open watercourses (swales, brooks and streams).

Could add the following to elaborate if desired:

a. Drains – No one shall tie any pump, cellar, yard, roof or area drain directly into the storm drain system without approval from the Applicable Authority.

b. Catch Basins – No Person shall directly or indirectly dump, discharge or cause or allow to be discharged into any catch basin, any solid waste, construction debris, paint or paint product, antifreeze, hazardous waste, oil, gasoline, grease and all other automotive and petroleum products, solvents and degreasers, drain cleaners, commercial or household cleaners, soap, detergent, ammonia, food and food waste, grease or yard waste, animal feces, dirt, sand gravel or other pollutant. Any person determined by the applicable authority to be responsible for the discharge of any of the above substances to a catch basin may be held responsible for cleaning the catch basin and any other portions of the storm water system impacted according to City/Town standards and requirements or paying the cost for such cleaning. In addition, the Person shall be responsible for paying any penalties assessed by the City/Town.

c. Septage – No person shall discharge or cause or allow to be discharged any septage, or septage tank or cesspool overflow into the City/Town's storm drain system.

d. Storage & Disposal of Hazardous Material – No one shall dispose of anything other than clear water into the City/Town's storm drain system. The disposal of waste, gasoline or any other hazardous material into the storm drain system is strictly prohibited and is in violation of state and federal pollution laws.

e. Private drainage systems – It is prohibited for anyone with a private drainage system from tying into the public storm drain system without written approval from the Applicable Authority. The maintenance of any and all private drainage systems shall be the responsibility of the owners.

4. Exemptions

This section shall not apply to any of the following non-stormwater discharges or flows provided that the source is not a significant contributor of a pollutant to the storm drain system.

(a.) Discharges or flows resulting from fire fighting activities;

(b) Municipal waterline flushing

(c) Discharges from landscape irrigation or lawn watering

(d) Diverted stream flows

(e) Rising groundwater

(f) Uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), or uncontaminated pumped groundwater

(g) Flows from potable water sources

(h) Water from exterior foundation drains, footing drains (not including active groundwater dewatering systems)

(i) Irrigation water, springs

(j) Water from crawl space pumps

(k) Water from individual residential car washing

(l) Natural flows from riparian habitats and wetlands

(m) Discharges from de-chlorinated swimming pool water provided it is allowed to stand for one week prior to draining, or tested for chlorine levels with a pool test kit prior to draining (less than one parts per million chlorine), and the pool is drained in such a way as not to cause a nuisance;

(n) Discharges from street sweepers of minor amounts of water during operation and other storm drain system maintenance;

(o) Dye testing, provided notification is given to the Director of the Department of Public Works or designated representative prior to the time of the test;

(p) Non-stormwater discharges permitted under an 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 permit, waiver, or order and applicable laws and regulations;

(q) Discharges for which advanced written approval is received from the Director of the Department of Public Works or designated representative if necessary to protect public health, safety, welfare or the environment.

(r) Emergency repairs to either the municipal storm drain system, or any stormwater management structure or practice that poses a threat to public health or safety, or as deemed necessary by the Town.

SECTION 8. EMERGENCY SUSPENSION OF STORM DRAIN SYSTEM ACCESS

The Director of the Department of Public Works or designated representative may suspend storm drain system access to any person or property without prior written notice when such suspension is necessary to stop an actual or threatened illegal discharge that presents or may present imminent risk of harm to the public health, safety, welfare or the environment. In the event any person fails to comply with an emergency suspension order, the Director of the

Department of Public Works or designated representative may take all reasonable steps to prevent or minimize harm to the public health, safety, welfare or the environment.

Not required by MS4 permit, but may be useful addition in some municipalities:

SECTION ___. WATERCOURSE PROTECTION

Every person owning property through which a watercourse passes, or such person's lessee, shall keep and maintain that part of the watercourse within the property free of trash, debris, and other obstacles that would pollute, contaminate, or significantly retard the flow of water through the watercourse. In addition, the owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse.

Failure by the property owner to maintain the watercourse does not constitute an obligation on the part of the Town to assume this responsibility.

SECTION 9. NOTIFICATION OF SPILLS

Notwithstanding any other requirements of local, state or federal law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials at that facility operation which is resulting or may result in illegal discharge of pollutants that person shall take all necessary steps to ensure containment, and cleanup of the release. In the event of a release of oil or hazardous materials, the person shall immediately notify the municipal fire and police departments, the Director of the Department of Public Works or designated representative, and the Massachusetts Department of Environmental Protection (if release is reportable as defined by 310 CMR 40.00). In the event of a release of non-hazardous material, said person shall notify the Director of the Department of Public Works or designated representative no later than the next business day. Written confirmation of all telephone, facsimile or in person notifications shall be provided to the Director of the Department of Public Works or designated representative within three business days thereafter. If the discharge of prohibited materials is from a commercial or industrial facility, the facility owner or operator of the facility shall retain on-site a written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

SECTION 10. ENFORCEMENT

1. The Director of the Department of Public Works or an authorized agent of the Department of Public Works shall enforce this ordinance, and the regulations promulgated thereunder, as well as the terms and conditions of all permits, notices, and orders, and may pursue all civil and criminal remedies for such violations.

2. <u>Orders</u>

   The Director of the Department of Public Works or designated representative may issue a written order to enforce the provisions of this ordinance or the regulations thereunder, which include, but are not limited to:

   (a) Elimination of illicit connections or discharges to the storm drain system;
   (b) Termination of access to the storm drain system;

(c) Performance of monitoring, analyses, and reporting;
(d) Cessation of unlawful discharges, practices, or operations;
(e) Remediation of contamination in connection therewith.
(f) Implementation of source control or treatment BMPs

If the Director of the Department of Public Works or designated representative determines that abatement or remediation of contamination is required, the order shall set forth a deadline for completion of the abatement or remediation. Said order shall further advise that, should the violator or property owner fail to abate or perform remediation within the specified deadline, the City of Holyoke may, at its option, undertake such work and expenses thereof shall be charged to the violator or property owner.

Within thirty (30) days after completing all measures necessary to abate the violation or to perform remediation, the violator and the property owner will be notified of the costs incurred by the City of Holyoke, including administrative costs for which payment is due to the City of Holyoke. The violator or property owner may file a written protest or appeal objecting to the amount or basis of costs with the City Council within thirty (30) days of receipt of the notification of the costs incurred. If the amount due is not received by the expiration of the time in which to file a protest or within thirty (30) days following a decision of the City Council or designated representative affirming or reducing the costs, or from a final decision of a court of competent jurisdiction, the costs shall become a special assessment against the property owner and shall constitute a lien on the owner's property for the amount of said costs pursuant to MGL Ch. 40, §58. Interest shall begin to accrue on any unpaid costs at the statutory rate provided in M.G.L. Ch. 59, §57 after the thirty-first day at which the costs first become due.

3. Equitable Remedy

If anyone violates the provisions of this ordinance, regulations, permit, notice, or order issued thereunder, the Director of the Department of Public Works or designated representative may seek injunctive relief in a court of competent jurisdiction to restrain the person from activities which would create further violations or compelling the person to abate or remediate the violation.

4. Criminal penalty

Any person who violates any provision of this Bylaw/Ordinance, regulation, order or written approval issued thereunder, shall be punished by a fine not to exceed $300 per violation. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

5. Non-Criminal Disposition

As an alternative to criminal prosecution or civil action, the City of Holyoke may elect to utilize the non-criminal disposition procedure set forth in M.G.L. Chapter 40, §21D. The Director of the Department of Public Works or designated representative shall be the enforcing person. The penalty for the 1st violation shall be up to $100. The penalty for the 2nd violation shall be $200. The penalty for the 3rd and subsequent violations shall be $300.00. Each day or part thereof that such violation occurs or continues shall constitute a separate offense.

6. Right-of-Entry

To the extent permitted by state law, or if authorized by the owner or other party in control of the property, the Director of the Department of Public Works or designated representative, its agents, officers, and employees may enter upon privately owned property for the purpose of performing their duties under this ordinance and regulations and may make or cause to be made such examinations, surveys or sampling as the Director of the Department of Public Works or designated representative deems reasonably necessary

Be advised that any entry without express permission of the owner should be by warrant. Generally, the 4th Amendment to the U.S. Constitution prohibits entry onto private property without the express consent of the owner or person in charge, a warrant or exigent circumstances. Although there are similar provisions in regulations concerning commercial uses, residential property is generally afforded greater protections. Because private property rights are generally afforded rigid protections by Massachusetts courts, use of this provision may expose the Town to liability. Therefore, if you are going to include this provision, I recommend that it be used sparingly.

Recommendation to Town of Belchertown by Koppleman & Paige

7. Appeals

The decisions or orders of the Director of the Department of Public Works shall be final. Further relief shall be to a court of competent jurisdiction.

8. Remedies Not Exclusive

The remedies listed in this ordinance are not exclusive of any other remedies available under any applicable federal, state or local law.

SECTION _11. SEVERABILITY

If any provision, paragraph, sentence, or clause, of this Bylaw/Ordinance or the application thereof to any person, establishment, or circumstances, shall be held invalid for any reason, such invalidity shall not affect any other provisions or applications of this Bylaw, and shall continue in full force and effect.

SECTION _12. TRANSITIONAL PROVISIONS

Property owners shall have _____ days from the effective date of the ordinance to comply with its provisions provided good cause is shown for the failure to comply with the ordinance during that period unless local, state, or federal agencies deem that immediate actions are warranted

APPENDIX E
FIELD INSPECTION FORMS

Manhole Inspection Report

MH#

Catchment Area: _____

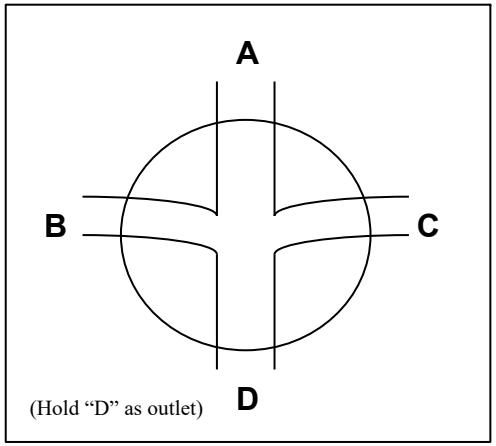
Inspector: _____

Date/Time: _____

Weather: _____

Street/Location: _____

General Comments: _____



Structural Information:

Cover Size: 24" 30" Other: _____

MH Size: 4' 5' Other: _____

MH Sump: Y / N Sump Depth: _____

MH Channel: Y / N

Weir: Y / N Rim to Top of Weir: _____

Internal Drop: Y / N

Depth to Wet Ring from Rim: _____

General Information:

Manhole Type:	Sanitary ☐	Storm ☐	Combined ☐	Common ☐							
Location of MH:	Roadway ☐	Sidewalk ☐	Roadside ☐	Alley ☐	Easement ☐	Other ☐					
Manhole Material:	Brick ☐	Clay Block ☐	Poured Concrete ☐		Manhole Block ☐	Precast Concrete ☐	Other ☐				
Paved Area Around MH:	Satisfactory ☐		Cracked ☐	☐	Missing Pavement ☐	Vegetation Growth					
Unpaved Area Around MH:	Satisfactory ☐		Eroded ☐								
Odors:											
Recommendations:	No Action ☐	Rebuild ☐	Line Manhole Wall ☐		Reset Frame ☐	Clean / Remove debris from Invert ☐					

Field Test Kit Results:

Pipe (A-F):						
Ammonia, mg/L (Compliant ≤ 0.5 mg/L)						
Surfactants, mg/L (Compliant ≤ 0.25 mg/L)						
Chlorine, mg/L (Compliant < 0.02 mg/L)						

Pipe Information:

	Pipe Size	Material	From / To MH#	Invert Depth (from Rim)	Flow Depth (from Invert)	Debris Depth (from Invert)	Condition	Flow	Clarity of Flow
A.									
B.									
C.									
D.									
E.									
F.									

OUTFALL INVENTORY FIELD SHEET

Section 1: Background Data

City/Town:	Street:	Tax Map #:	Outfall ID: OF-
Owner: ☐ City ☐ State ☐ Private ☐ Other: _____		Nearest House/Utility Pole #:	
Today's date:		Time (Military):	
Investigators:		Form completed by:	
Temperature (°F):	Rainfall (in.): Last 24 hours:	Last 48 hours:	
Northing:	Easting:	GPS Unit:	GPS LMK #:
Rim Elevation:		Invert Elevation:	
Elevation Datum:		Receiving Water:	
Camera:		Photo #s: -- Take 1 Upstream (head on) and 1 Downstream view	

Land Use in Drainage Area (Check all that apply):

☐ Industrial ☐ Open Space

☐ Urban Residential ☐ Institutional

☐ Suburban Residential Other: _____

☐ Commercial Known Industries: _____

Notes (e.g.., origin of outfall, if known):

Section 2: Outfall Description

TYPE	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☐ Closed Pipe	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☐ Circular ☐ Elliptical ☐ Box ☐ Other: _____	☐ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: _____	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Pavement/Scupper ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
Flow Present?	☐ Yes ☐ No	***If No, Skip to Section 3. If Yes, Notify Town and continue field reconnaissance.***			
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial			Flow Direction (If Present):	

Section 3: Sketch

Outfall Inventory Field Sheet

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ☐ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in outfall flow	☐ 2 – Clearly visible in outfall flow	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ☐ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Potential for Illicit Discharge

☐ Unlikely ☐ Potential (presence of two or more indicators) ☐ Suspect (one or more indicators with a severity of 3) ☐ Obvious

Section 7: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

Illicit Discharge Incident Tracking Sheet

Incident ID:				
Responder Information (for Citizen-Reported issues)				
Call Taken By:		Call Date:		
Call Time:		Precipitation (inches) in past 24-48 hours:		
Observer Information				
Date and Time of Observation:		Observed During Regular Maintenance or Inspections? ☐ Yes ☐ No		
Caller Contact Information (optional) or Municipal Employee Information:				
Observation Location: (complete one or more below)				
Latitude and Longitude:				
Stream Address or Outfall #:				
Closest Street Address:				
Nearby Landmark:				
Primary Location Description		**Secondary Location Description:**		
☐Stream Corridor (In or adjacent to stream)		☐Outfall	☐In-stream Flow	☐Along Banks
☐Upland Area (Land not adjacent to stream)		☐Near Storm Drain	☐Near other water source (stormwater pond, wetland, ect.):	
Narrative description of location:				
Upland Problem Indicator Description				
☐Dumping	☐Oil/Solvents/Chemicals		☐Sewage	
☐Detergent, suds, etc.	☐Other:_____			
Stream Corridor Problem Indicator Description				
Odor	☐None	☐Sewage	☐Rancid/Sour	☐Petroleum (gas)
	☐Sulfide (rotten eggs); natural gas	☐Other: Describe in "Narrative" section		
Appearance	☐"Normal"	☐Oil Sheen	☐Cloudy	☐Foam
	☐Optical enhancers	☐ Discolored		
	☐Other: Describe in "Narrative" section			
Floatables	☐None	☐Sewage (toilet paper, etc)	☐Algae	☐Trash or debris
	☐Other: Describe in "Narrative" section			
Narrative description of problem indicators:				
Suspected Source (name, personal or vehicle description, license plate #, address, etc.):				

CMRSWC

APPENDIX F
INSTRUCTIONS, MANUALS, AND SOPS

SOP 1: Dry Weather Outfall Inspection

Introduction

Outfalls can be in the form of pipes or ditches and is the final point of discharge into a body of water for an engineered storm drain system. Current and pending regulations require that all outfalls, that are part of the storm drain system, be inspected, and that the water quality at these outfalls be analyzed under both dry and wet weather conditions. "SOP 2: Wet Weather Outfall Inspection," covers the objectives for wet weather outfall inspections. This SOP discusses the objectives of dry weather outfall inspections.[1]

During a dry weather period, it is expected that minimal flow will be observed, if at all, at any stormwater outfall. As such, the objective of dry weather outfall inspections is to analyze the presence of any flow at each stormwater outfall and identify any potential source(s) of an illicit discharge further described in "SOP 3: Locating Illicit Discharges."

As per the Consent Decree, by May 31st, 2023, the City of Holyoke (the City) shall submit to the EPA for review an Illicit Discharge Detection and Elimination (IDDE) Plan which includes screening and monitoring all known MS4 outfalls and interconnections under dry weather conditions. As defined in the Consent Decree, the City shall conduct dry-weather inspections only when no more than 0.1 inches of rainfall or significant snowmelt has occurred in the preceding 24 hours, but 48 hours when possible.[2] Unlike wet weather sampling, dry weather inspections are not intended to capture a "first flush" event, but rather identify any discharge that may be present at a stormwater outfall during a period without recorded rain or snowmelt in order to facilitate the detection of an illicit discharge.

Catchment Investigations

In order to determine the approximate location of suspected illicit discharges, the first step is to complete an investigation of the storm drain system under dry weather conditions. This includes systematically and progressively observing, sampling, and evaluating key junction manholes and sump manholes within the City. The City's DPW is responsible for completing catchment investigations, incorporating updates to the City's infrastructure into their storm system maps, and refining catchment delineations based on field investigations.

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1 *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

2 *Civil Action No. 19-CV-10332-MGM: Final Consent Decree." United States District Court for the District of Massachusetts, United States and Massachusetts v. City of Holyoke, September 27, 2022.*

As per the 2016 Massachusetts Small MS4 General Permit, the following definitions of important terms related to the dry weather manhole inspection program are as follows[3]:

- **Junction Manhole** is a manhole or structure with two or more inlets accepting flow from two or more 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. 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. A pictorial example of junction manholes and how they relate to key junction manholes can be found in Figure 1 below.

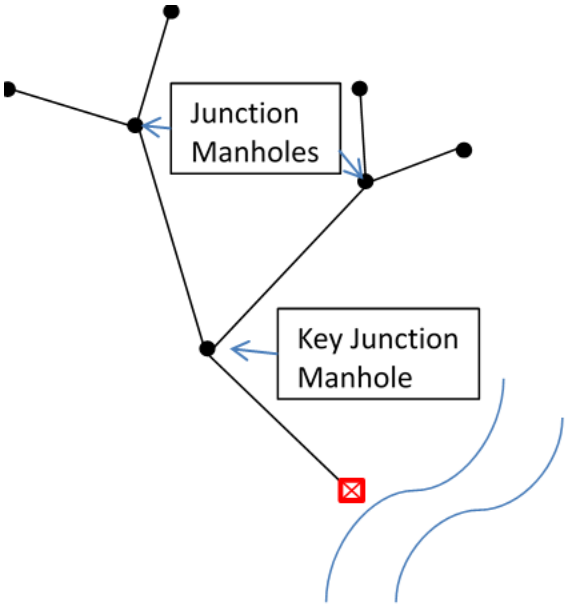

Figure 1 – Junction vs. Key Junction Manholes

- **Common Manholes** have connections to both the sewer and drain system and therefore provide a potential for cross-contamination.

In addition to the manhole types identified above, sump manholes may also be located in the City's system. These structures have a significant difference in elevation between the bottom of the structure and bottom of the outlet pipe. This difference in elevation, also known as a sump, could potentially allow illicit discharges to collect and, as a result, not flow downstream. In preparation for field inspections, the City's DPW should identify all key junction manholes, mainline sump manholes, as well as any potential connections to other catchments such as weirs or overflows. These structures will then systematically be inspected for evidence of illicit discharges, and if found, eventual isolation and elimination.

Prior to field investigations, the City shall notify property owners of upcoming investigations via flyers and/or door hangers. Ideally, storm drains and sump manholes should be cleaned prior to investigations, but it is not required. Specifically, any known problem areas or areas with known blockages should be prioritized for cleaning.

[3] *United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal … –US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf*

Once property owners have been notified and cleaning of the storm drain system has occurred, catchment investigations can begin. This can occur in one of two ways, or via a combination of both:

(1) By working progressively down from the upper parts of the catchment toward the outfall ("Top Down") or
(2) By working progressively up from the outfall and inspecting key junction manholes along the way ("Bottom-Up").

Both methods have their advantages. Starting upstream can be more efficient, whereas starting downstream works well for small catchments that aren't influenced by receiving water bodies. As such, inspection direction can depend on the nature of the drainage system (e.g. size, receiving water influence) and also the completeness and accuracy of the City's GIS mapping. This can also depend on whether or not most outfalls are partially or totally submerged. In the event that manholes are partially or completely submerged, samples should not be collected. Rather these structures should be investigated furthered via building inspections, dye testing, or even bypass pumping so as to remove flow from the structure so it can be further visually inspected.

Once an inspection direction has been chosen, the investigation can then begin with key junction manholes and mainline sump manholes. From here, the inspection can continue towards junction manholes and other manholes, as needed, with the purpose to isolate any illicit discharges. The specific steps shall be as follows:

1. Manholes will be opened and inspected for visual and olfactory evidence of illicit connections during dry weather. A sample manhole inspection report is provided in Attachment 1. Visual evidence may include toilet paper, sanitary products, sewage, soap, food, or other indications of anything other than stormwater. Olfactory evidence may include sewage, soap, laundry, bleach, or other odors not typical of stormwater.
2. Where possible, condition information and measured elevation of the manhole rim as well as the invert depth should be recorded.
3. If flow is observed, a sample shall be collected and analyzed in accordance with the procedures outlined in the following sections.
4. If no flow is observed, the inlet or outlets to the manholes may be partially blocked using sandbags or similar barriers. More details associated with this method can be found in "SOP 3: Locating Illicit Discharges."
5. Where sampling results or visual or olfactory evidence indicate potential illicit discharges, the area draining to the manhole should be flagged for further upstream manhole investigation and/or isolation and confirmation of sources.
6. Subsequent manhole inspections shall proceed until the location of the suspected illicit discharges can be isolated to a pipe segment between two manholes.
7. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completed of key junction manhole sampling.

Condition Assessment

If any flow is observed during dry weather conditions at a stormwater outfall, a sample shall be taken after a visual observation of the discharge is complete. If any pollution or signs of potential illicit connections are observed, they should be noted and investigated further. As per the Central Massachusetts Regional Stormwater Coalition, the following visual indicators shown in Table 1 may be the result of the following sources listed in Table 1.[4]

[4] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

Table 1 – Visual Condition Assessment

Indicator	Possible Source
Foam	upstream vehicle washing activities or illicit discharge
Oil Sheen	leak or spill
Cloudiness	suspended solids (i.e. dust, ash, powdered chemicals, ground up materials, etc.)
Color or Odor	raw materials, chemicals, or sewage
Excessive Sediment	disturbed earth of unpaved areas lacking adequate erosion control measures
Sanitary Waste/ Optical Enhancers*	illicit discharge
Orange Staining	high mineral concentrations

* Fluorescent dyes added to laundry detergent and some toilet paper

While many of the indicators listed in Table 1 would indicate an illicit discharge, some indicators may occur naturally. For example, orange staining could be the result of naturally occurring iron. However, it may be difficult to determine the difference between natural foam and foam caused by pollution. Natural foam can typically be found in water with high organic content such as bog lakes, streams that originate from bog lakes, productive lakes, wetlands, or woody areas. As per the Central Massachusetts Regional Stormwater Coalition, it's important to consider the following factors listed in Table 2 when determining if the source of foam present at a stormwater outfall is natural or not.[5]

Table 2 – Conditional and Qualitative Considerations of Foam

Factors	Explanation
Wind Direction or Turbulence	Natural foam occurrences of the beach coincide with onshore winds. Often, foam can be found along a shoreline and/or on open waters during windy days. Natural occurrences in rivers can be found downstream of a turbulent site.
Proximity to Potential Pollution Source	Some entities including the textile industry, paper production facilities, oil industries, and fire fighting activities work with materials that cause foaming in water. If these materials are released to a water body in large quantities, they can cause foaming. The presence of silt in water, such as from a construction site can cause foam.
Physical Feeling	Natural foam is typically persistent, light, not slimy to the touch.
Visual Observation	Prescence of decomposing plants or organic material in the water.

In addition to foam, both bacteria and petroleum can create a sheen on the water surface. Differentiating the two can be as simple as disturbing the "sheen" with a pole, stick, or similar object. A sheen caused by oil will remain intact and move in a swirl pattern while a sheen caused by bacteria will separate into a number of smaller patches and appear "blocky." In addition, bacteria or naturally occurring sheens are usually silver or dull in color. While bacterial sheen is not a pollutant, it should be noted when describing the discharge.[6]

[5] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

[6] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

Optical enhancers on the other hand can be visible to the naked eye when found in high enough concentrations and will appear as a bluish-purple haze. If a visual observation is unable to confirm the presence of this pollutant, a quantitative test can be used. In order to perform this test, a clean, white, cotton pad should be placed, either directly in, or within a sample of, the discharge for several days. After soaking, the cotton pad should be dried and then viewed under a fluorometer. If the cotton pad fluoresces, optical enhancers are assumed to be the pollutant and present. The magnitude of the fluorescence, as measured in fluorescent units, can be used to determine the concentration of optical enhancers within the sample. Often a visual observation is enough as it is not typical that this analysis is required.

Sample Collection

Table 3 lists the field equipment commonly used for dry weather outfall screening and sampling.

Table 3 – Field Equipment for Dry Weather Outfall Screening and Sampling

Equipment	Use/Notes
Clipboard	For organization of field sheets and writing surface
Field Forms or Tablet for Electronic Forms	Field sheets for both dry weather inspection and dry weather sampling should be available, with extra sheets included
Chain of Custody Forms	To ensure proper handling of all samples
Pens/Pencils/Permanent Markers	For proper labeling
Nitrile Gloves	To protect the sampler as well as the sample from contamination
Flashlight/Headlamp w/ Batteries	For looking in outfalls or manholes, helpful in early mornings as well
Cooler with Ice	For transporting samples to the laboratory
Digital Camera	For documenting field conditions at time of inspection
Personal Protective Equipment (PPE)	Reflective vest, safety glasses, hard hats, and boots at a minimum. Work gloves, long pants, and sleeves for protection from environmental conditions such as brush, insects, and poisonous plants.
Insect/Plant Repellant and Sunscreen	For protection from environmental conditions.
GPS Receiver	For taking spatial location data
Distilled water	For use with test kits and water quality meters
Water Quality Meters	Hand-held meters for testing various water quality parameters.
Field Test Kits	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
Rinse Water/Calibration standards	Cleaning equipment and calibration
Label Tape	For labeling sample containers
Sample Containers	Make sure all sample containers are clean.
	Keep extra sample containers on hand at all times.
	Make sure there are proper sample containers for what is being sampled for (i.e., bacteria and total phosphorus analysis require sterile containers and preservatives).
	Telescopic Sampling Pole/Dipper for hard to reach locations.
Cooler with Ice	Laboratory sample submittals

Equipment	Use/Notes
Pry Bar, Pick, and/or Shovel	For opening catch basins and manholes when necessary
Sandbags	For damming low flows in order to take samples
Small Mallet or Hammer	Helping to free stuck manhole and catch basin covers
Utility Knife	Multiple uses
Measuring Tape	Measuring distances and depth of flow
Traffic Cones	Safety
Hand Sanitizer	Disinfectant/decontaminant
Machete/Clippers	Accessing overgrown infrastructure
Flashlight with batteries	For looking in outfalls, manholes, and catch basins
Zip Ties/Duct Tape	For making field repairs
Rubber Boots/Waders	For accessing shallow streams/areas
Sampling Pole/Dipper/Sampling Cage	For accessing hard-to-reach outfalls and manholes
5-gallon Bucket w/ Cover	Disposal of chemical waste
Confined Space Entry Equipment (if needed)	DBI Sali Tripod and retrieval wench; MSA Tripod, rescue wench and material/personal wench; full body harness; 10' ladder; waders; hard hat; air monitoring equipment (Ventis 4 gas meter)

As per the 2016 Massachusetts Small MS4 General Permit, where dry weather flow is found at an outfall/interconnection, at least one (1) sample shall be collected.[7] A discrete manual or grab sample shall be collected for dry weather outfall inspections due to the time-sensitive nature of the process. Grab samples classify water at a distinct point in time and are used primarily when the water quality of the discharge is expected to be homogenous, or unchanging, in nature. A flow-weighted composite sample classifies water quality over a measured period of time and are used when the water quality of discharge is expected to be heterogenous, or fluctuating, in nature.[8]

Protocols for collecting a grab sample as per the Central Massachusetts Regional Stormwater Coalition are as follows:

1. Fill out sample information on sample bottles and field sheets (see Attachment 4 for example field sheets).
2. Do not eat, drink, or smoke during sample collection and processing.
3. Do not collect or process samples near a running vehicle.
4. Do not park vehicles in the immediate sample collection area, including both running and non-running vehicles.
5. Always wear clean, powder-free nitrile gloves when handling sample containers and lids.
6. Never touch the inside surface of a sample container or lid, even with gloved hands.
7. Never allow the inner surface of a sample container or lid to be contacted by any material other than the sample water.

[7] *United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal ... – US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf*

[8] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

8. Collect sample with dipper or directly into sample containers. If possible, collect water while facing upstream of the flow into the sample bottles so as to not to disturb water or sediments in the outfall pipe or ditch.
9. Do not overfill sample containers, and do not dump out any liquid in them. Liquids are often added to sample containers intentionally by the analytical laboratory as a preservative or for pH adjustment.
10. Slowly lower the bottle into the water to avoid bottom disturbance and stirring up sediment.
11. Do not allow any object or material to fall into or contact the collected water sample.
12. Do not allow rainwater to drip from rain gear or other surfaces into sample containers.
13. Replace and tighten sample container lids immediately after sample collection.
14. Place laboratory samples on ice for analysis of bacteria and pollutants of concern.
15. Accurately label the sample with the time and location.
16. Document on the Dry Weather Outfall Inspection Survey that analytical samples were collected, specify parameters, and note the sample time on an Inspection Survey (see Attachment 2 and 3 for examples). This creates a reference point for samples.
17. Fill out chain-of-custody form for laboratory samples.
18. If using a dipper or other device, triple rinse the device with distilled water and then in water to be sampled, except for bacteria sampling.
19. Store used test strips and test kit waste/ampules properly in a 5-gallon bucket with a cover. Storage and disposal shall be coordinated with the City.
20. Decontaminate all testing personnel and equipment.

Samples that are unable to be analyzed for parameters using field instrumentation require laboratory analysis. Coordination with the laboratory, including the pick-up and/or dropping off, of samples, is the responsibility of the City. The laboratory requires that a chain-of-custody form be filled out and accompany any samples that require analysis. The laboratory will also provide additional details regarding how samples should be collected based on the sample containers and/or specific analytes.

Parameter Analysis

As per the Consent Decree, the City shall utilize the following IDDE screening thresholds shown in Table 4 as guidelines for its analysis of the data generated for each outfall and interconnection discharge sample.[9] In addition, each outfall and interconnection discharge sample shall be concurrently analyzed for all the parameters shown using laboratory analysis or field instrumentation defined in Table 4 as per EPA's Region 1's "EPA New England Bacteria Source Tracking Protocol," January 2012 Draft.[10]

Table 4 – Freshwater Water Quality Criteria, Threshold Limits, and Example Instrumentation[1]

Analyte/Indicator	Threshold Limits/ Single Sample[3]	Instrumentation
E. coli [2]	≥ 410 cfu/100ml	Laboratory via approved method
Enterococci [2]	≥ 130 cfu/100ml	Laboratory via approved method
Surfactants (as MBAS)	≥ 0.25 mg/l	MBAS Field Test Kit (e.g. CHEMetrics K-9400)
	≥ 0.1 mg/l	Laboratory via approved method
Ammonia (NH_3)	≥ 0.5 mg/l	Ammonia Field Test Strips (e.g. Hach Brand)
	≥ 0.1 mg/l	Laboratory via approved method
Chlorine	≥ 0.02 mg/l	Field Meter (e.g. Hach Pocket Colorimeter II)
Temperature	N/A	Field Meter (e.g. YSI Model 30)
Conductivity	N/A	Field Meter (e.g. YSI Model 30)
Salinity	N/A	Field Meter (e.g. YSI Model 30)

[A] The mention of trade names or commercial products does not constitute endorsement or recommendation for use by the U.S. EPA

[B] Class A or B Waters

[C] Levels that may be indicative of potential wastewater or washwater contamination

As per the 2016 Massachusetts Small MS4 General Permit and Consent Decree, all analyses, with the exception of indicator bacteria and pollutants of concern, can be performed with field tests or field instrumentation and are not subject to 40 CFR part 136 requirements. Sampling for bacteria and pollutants of concern shall be conducted using the analytical methods found in 40 CFR § 136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR § 136.[11]

The City is responsible for selecting a laboratory or field kits intended for measuring each analyte. When selecting field kits, review the detection range for each field kit and ensure it corresponds to the threshold limits for each analyte of interest, as listed in Table 4. These limits should be communicated to the laboratory so that the laboratory's instrumentation can be properly calibrated to account for the threshold concentrations. In addition, each analyte has a corresponding analytical method as per Appendix G of the 2016 Massachusetts Small MS4

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[9] *Civil Action No. 19-CV-10332-MGM: Final Consent Decree." United States District Court for the District of Massachusetts, United States and Massachusetts v. City of Holyoke, September 27, 2022.*

[9] *United States Environmental Protection Agency (EPA). (n.d.). EPA New England Bacterial Source Tracking Protocol Purpose. EPA New England Bacterial Source Tracking Protocol. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2014AppendixI.pdf*

[10] *United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal ...–US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf*

General Permit[12], that each field kit and laboratory analysis shall utilize to ensure compliance. Lastly, as per 40 CFR § 136[13], maximum holding times and preservation requirements should be communicated to the laboratory. This is not applicable for field kits since samples are analyzed instantaneously after sample collection. Table 5 summarizes this information and it should be shared with the selected laboratory to ensure compliance with the Consent Decree.

Table 5 – Analytical Methods, Hold Times, and Preservatives for Laboratory Analysis

Analyte or Parameter	EPA or Approved Method No.[1]	Max. Hold Time[2]	Preservation[2]
E. coli	**EPA**: 1103.1; 1603	8 hours	Cool ≤10°C, 0.0008% $Na_2S_2O_3$
	Other: Colilert ®, Colilert-18®, mColiBlue-24®		
Enterococcus	**EPA**: 1106.1; 1600	8 hours	Cool ≤10°C, 0.0008% Na2S2O3
	Other: Enterolert ® 12 22.		
Surfactants[3]	**SM**: 5540-C	48 hours	Cool ≤6°C
Ammonia[3]	**EPA**: 350.1	28 days	Cool ≤6°C, H_2SO_4 to pH <2

SM = Standard Methods

[1]EPA or Approved Method No. obtained from Appendix G of the MA Small MS4 Permit, except for Surfactants obtained from 40 CFR Part 136

[2]Max Holding Time and Preservation obtained from 40 CFR Part 136

[3]Ammonia and Surfactants can be analyzed in the field. Samples are sent to the lab to confirm field results if desired (not required to meet 40 CFR Part 136).

Evaluation of sample data can show positive results due to sources other than human wastewater and false negative results due to chemical reactions or interferences. For example, elevated ammonia readings are common in the New England region due to sampling near historically filled tidal wetlands where the breakdown of biological organic material can skew sample results. The same elevated ammonia readings can also be triggered by discharge from a nearby landfill. In addition, elevated surfactant readings caused by salinity levels greater than one (1) part per thousand can be triggered by the presence of oil. Inconclusive surfactant readings, where the indicator ampule turns green instead of a shade of blue, can often be caused by fine suspended particulate matter being present in the sample being tested. Finally, very low bacteria concentrations can often be the result of elevated chlorine from

[12] *United States Environmental Protection Agency (EPA). (n.d.). Appendix G Massachusetts Small MS4 Permit Monitoring Requirements For Discharges into Impaired Waters – Parameters and Methods. Retrieved January 30, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/appendix-g-2016-ma-sms4-gp.pdf*

[13] *The Federal Register. Federal Register. (n.d.). Retrieved January 30, 2023, from https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-136?toc=1*

leaking drinking water infrastructure inhibiting bacterial growth. As such, any detection of chlorine above the instrument Reporting Limit should be noted.[14]

Inspection Reporting

The City shall maintain detailed and accurate records of outfall and interconnection discharge samples that includes the following information:

- Date and time that sampling was conducted
- Weather conditions both during, and in the 48 hours prior to, each sampling event
- Unique identifier
- Receiving water
- Date of most recent inspection
- Dimensions
- Shape
- Material (concrete, PVC, etc.)
- Spatial location (latitude and longitude with a minimum accuracy of +/-30 feet
- Physical condition
- Indicators of potential non-stormwater discharges (including presence or evidence of suspect flow and sensory observations such as odor, color, turbidity, floatable, or oil sheen)

The Dry Weather Outfall Inspection Survey (Attachment 2) developed by the Central Massachusetts Regional Stormwater Coalition and Outfall Inventory Field Sheet (Attachment 4) are templates that can be used for documenting the listed observations related to both quantitative and qualitative characteristics of any/all flows conveyed by the structure.[15]

As per the 2016 Massachusetts Small MS4 General Permit, if an outfall/interconnection is inaccessible or submerged, the permittee shall proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results. In addition, if no flow is observed, but evidence of illicit flow exists (see SOP 3 Locating Illicit Discharges), the City shall revisit the outfall during dry weather within one week of the initial observation, if practicable, to perform a second dry weather screening and sample any observed flow.[16]

Attachments

1. Manhole Inspection Report
2. Dry Weather Outfall Inspection Survey developed by the Central Massachusetts Regional Stormwater Coalition
3. Field Data Collection Sheet
4. Outfall Inventory Field Sheet

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[14] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

[15] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

[13] *United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal ...–US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf*

Related Standard Operating Procedures

1. SOP 2: Wet Weather Outfall Inspection
2. SOP 3: Locating Illicit Discharges

SOP 2: Wet Weather Outfall Inspection

Introduction

Outfalls can be in the form of pipes or ditches and is the final point of discharge into a body of water for an engineered storm drain system. Current and pending regulations require that all outfalls, that are part of the storm drain system, be inspected, and that the water quality at these outfalls be analyzed under both dry and wet weather conditions. "SOP 1: Dry Weather Outfall Inspection," covers the objectives for dry weather outfall inspections. This SOP discusses the objectives of wet weather outfall inspections.

The objective of wet weather inspections is to determine whether wet weather-induced high flows in sanitary sewers, or high groundwater in areas served by septic systems, results in discharges of sanitary flow to the MS4. As per the Consent Decree, by May 31st, 2023, the City of Holyoke (the City) shall submit to the EPA for review an Illicit Discharge Detection and Elimination (IDDE) Plan which includes screening and monitoring all known MS4 outfalls and interconnections in wet weather conditions. As defined in the Consent Decree, the City shall conduct wet-weather inspections once every three years when at least 0.25-inches of rain has occurred over a 24-hour period prior to sampling. However, precipitation events that produce enough flow from outfalls or interconnections to be sampled, will also be acceptable.[1]

Condition Assessment

Typical practice is to prepare for a wet weather inspection event when weather forecasts show a 40% chance of rain or greater. Early preparation is key to sampling first flush which is within the first 30 minutes of discharge to and reflects the maximum pollutant load. In some watersheds, increased discharge from an outfall may not occur with the required 0.25-inches of rain due to the amount of impervious surface present. Therefore, as more inspections occur, and the City understands how their outfalls respond to rain events, this precipitation amount can be modified. [2]

Dry weather sampling is required at any outfall or interconnection where *any* flow is observed under dry weather conditions, but sampling during wet weather conditions is required at *all* outfalls. Particularly, any outfalls that did not have any observed flow during dry weather conditions or those with dry weather flow that passed screening thresholds. Unlike dry weather conditions, wet weather conditions can help to identify a number of situations that would otherwise go unnoticed during dry weather. For example, wet weather can help identify locations where elevated groundwater exists and is causing an exchange of wastewater between cracked or broken sanitary sewers, failed septic systems, underdrains, or storm drains. Wet weather can also help to identify instances when there's an increase in sewer volume and sewage may be entering the storm drain system at common manholes or directly-piped connections to storm drains. Finally, wet weather can also help to identify locations subject to capacity-related SSO discharges or illicit connections that are not carried through the storm drain system during dry weather conditions.[3]

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[1] *Civil Action No. 19-CV-10332-MGM: Final Consent Decree." United States District Court for the District of Massachusetts, United States and Massachusetts v. City of Holyoke, September 27, 2022.*

[2] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

[3] *United States Environmental Protection Agency (EPA). (n.d.). EPA New England Bacterial Source Tracking Protocol Purpose. EPA New England Bacterial Source Tracking Protocol. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2014AppendixI.pdf*

Prior to samples being taken, a visual observation of the discharge should occur. During this observation, the presence of any pollution should be noted and further investigated. As per the Central Massachusetts Regional Stormwater Coalition, the following visual indicators shown in Table 1 may be the result of the following.[4]

Table 1 – Visual Condition Assessment

Indicator	Possible Source
Foam	upstream vehicle washing activities or illicit discharge
Oil Sheen	leak or spill
Cloudiness	suspended solids (i.e. dust, ash, powdered chemicals, ground up materials, etc.)
Color or Odor	raw materials, chemicals, or sewage
Excessive Sediment	disturbed earth of unpaved areas lacking adequate erosion control measures
Sanitary Waste/ Optical Enhancers*	illicit discharge
Orange Staining	high mineral concentrations

* Fluorescent dyes added to laundry detergent and some toilet paper

While many of the indicators listed in Table 1 would indicate an illicit discharge, some indicators may occur naturally. For example, orange staining could be the result of naturally occurring iron. However, it may be more difficult to determine the difference between natural foam and foam caused by pollution. Natural foam can typically be found in water with high organic content such as bog lakes, streams that originate from bog lakes, productive lakes, wetlands, or woody areas. As per the Central Massachusetts Regional Stormwater Coalition, it's important to consider the following factors listed in Table 2 when determining if the source of foam present at a stormwater outfall is natural or not.[5]

Table 2 – Conditional and Qualitative Considerations of Foam

Factors	Explanation
Wind Direction or Turbulence	Natural foam occurrences of the beach coincide with onshore winds. Often, foam can be found along a shoreline and/or on open waters during windy days. Natural occurrences in rivers can be found downstream of a turbulent site.
Proximity to Potential Pollution Source	Some entities including the textile industry, paper production facilities, oil industries, and fire fighting activities work with materials that cause foaming in water. If these materials are released to a water body in large quantities, they can cause foaming. The presence of silt in water, such as from a construction site can cause foam.
Physical Feeling	Natural foam is typically persistent, light, not slimy to the touch.
Visual Observation	Prescence of decomposing plants or organic material in the water.

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In addition to foam, both bacteria and petroleum can create a sheen on the water surface. Differentiating the two can be as simple as disturbing the "sheen" with a pole, stick, or similar object. A sheen caused by oil will remain intact and move in a swirl pattern while a sheen caused by bacteria will separate into a number of smaller patches and appear "blocky." In addition, bacteria or naturally occurring sheens are usually silver or dull in color. While bacterial sheen is not a pollutant, it should be noted when describing the discharge.[6]

Optical enhancers on the other hand can be visible to the naked eye when found in high enough concentrations and will appear as a bluish-purple haze. If a visual observation is unable to confirm the presence of this pollutant, a quantitative test can be used. In order to perform this test, a clean, white, cotton pad should be placed, either directly in, or within a sample of, the discharge for several days. After soaking, the cotton pad should be dried and then viewed under a fluorometer. If the cotton pad fluoresces, optical enhancers are assumed to be the pollutant and present. The magnitude of the fluorescence, as measured in fluorescent units, can be used to determine the concentration of optical enhancers within the sample. Often a visual observation is enough. It's not typical that this analysis is required.

Sample Collection

Table 3 lists the field equipment commonly used for wet weather outfall screening and sampling.

Table 3 – Field Equipment for Wet Weather Outfall Screening and Sampling

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Clipboard	For organization of field sheets and writing surface
Field Forms or Tablet for Electronic Forms	Field sheets for both dry weather inspection and dry weather sampling should be available, with extra sheets included
Chain of Custody Forms	To ensure proper handling of all samples
Pens/Pencils/Permanent Markers	For proper labeling
Nitrile Gloves	To protect the sampler as well as the sample from contamination
Flashlight/Headlamp w/ Batteries	For looking in outfalls or manholes, helpful in early mornings as well
Cooler with Ice	For transporting samples to the laboratory
Digital Camera	For documenting field conditions at time of inspection
Personal Protective Equipment (PPE)	Reflective vest, safety glasses, hard hats, and boots at a minimum. Work gloves, long pants, and sleeves for protection from environmental conditions such as brush, insects, and poisonous plants.
Insect/Plant Repellant and Sunscreen	For protection from environmental conditions.
GPS Receiver	For taking spatial location data
Distilled water	For use with test kits and water quality meters
Water Quality Meters	Hand-held meters for testing various water quality parameters.
Field Test Kits	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day

[6] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

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Equipment	Use/Notes
Rinse Water/Calibration standards	Cleaning equipment and calibration
Label Tape	For labeling sample containers
Sample Containers	Make sure all sample containers are clean.
	Keep extra sample containers on hand at all times.
	Make sure there are proper sample containers for what is being sampled for (i.e., bacteria and total phosphorus analysis require sterile containers and preservatives).
	Telescopic Sampling Pole/Dipper for hard to reach locations.
Cooler with Ice	Laboratory sample submittals
Pry Bar, Pick, and/or Shovel	For opening catch basins and manholes when necessary
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6. Never touch the inside surface of a sample container or lid, even with gloved hands.

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7. Never allow the inner surface of a sample container or lid to be contacted by any material other than the sample water.
8. Collect sample with dipper or directly into sample containers. If possible, collect water while facing upstream of the flow into the sample bottles so as to not to disturb water or sediments in the outfall pipe or ditch.
9. Do not overfill sample containers, and do not dump out any liquid in them. Liquids are often added to sample containers intentionally by the analytical laboratory as a preservative or for pH adjustment.
10. Slowly lower the bottle into the water to avoid bottom disturbance and stirring up sediment.
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As per the Consent Decree, the City shall utilize the following IDDE screening thresholds shown in Table 4 as guidelines for its analysis of the data generated for each outfall and interconnection discharge sample.[8] In addition, each outfall and interconnection discharge sample shall be concurrently analyzed for all the parameters shown using laboratory analysis or field instrumentation defined in Table 4 as per EPA's Region 1's "EPA New England Bacteria Source Tracking Protocol," January 2012 Draft.[9]

Table 4 – Freshwater Water Quality Criteria, Threshold Limits, and Example Instrumentation[1]

Analyte/Indicator	Threshold Limits/ Single Sample[3]	Instrumentation
E. coli [2]	≥ 410 cfu/100ml	Laboratory via approved method
Enterococci [2]	≥ 130 cfu/100ml	Laboratory via approved method

[8] *Civil Action No. 19-CV-10332-MGM: Final Consent Decree." United States District Court for the District of Massachusetts, United States and Massachusetts v. City of Holyoke, September 27, 2022.*

[9] *United States Environmental Protection Agency (EPA). (n.d.). EPA New England Bacterial Source Tracking Protocol Purpose. EPA New England Bacterial Source Tracking Protocol. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2014AppendixI.pdf*

Analyte/Indicator	Threshold Limits/ Single Sample[3]	Instrumentation
Surfactants (as MBAS)	≥ 0.25 mg/l	MBAS Field Test Kit (e.g. CHEMetrics K-9400)
	≥ 0.1 mg/l	Laboratory via approved method
Ammonia (NH_3)	≥ 0.5 mg/l	Ammonida Field Test Strips (e.g. Hach Brand)
	≥ 0.1 mg/l	Laboratory via approved method
Chlorine	≥ 0.02 mg/l	Field Meter (e.g. Hach Pocket Colorimeter II)
Temperature	N/A	Field Meter (e.g. YSI Model 30)
Conductivity	N/A	Field Meter (e.g. YSI Model 30)
Salinity	N/A	Field Meter (e.g. YSI Model 30)

[A] The mention of trade names or commercial products does not constitute endorsement or recommendation for use by the U.S. EPA

[B] Class A or B Waters

[C] Levels that may be indicative of potential wastewater or washwater contamination

As per the 2016 Massachusetts Small MS4 General Permit and Consent Decree, all analyses, with the exception of indicator bacteria and pollutants of concern, can be performed with field tests or field instrumentation and are not subject to 40 CFR part 136 requirements. Sampling for bacteria and pollutants of concern shall be conducted using the analytical methods found in 40 CFR § 136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR § 136.[10]

The City is responsible for selecting a laboratory, or field kits for measuring each analyte. When selecting field kits, review the detection range for each field kit and ensure that it corresponds to the threshold limits for each analyte of interest, as listed in Table 4. These limits should be communicated to the laboratory so that the laboratory's instrumentation can be properly calibrated to account for the threshold concentrations. In addition, each analyte has a corresponding analytical method as per Appendix G of the 2016 Massachusetts Small MS4 General Permit[11], that each field kit and laboratory analysis shall utilize to ensure compliance. Lastly, as per 40 CFR § 136[12], maximum holding times and preservation requirements should be communicated to the laboratory. This is not applicable for field kits since samples are analyzed instantaneously after sample collection. Table 5 summarizes this information and it should be shared with the selected laboratory to ensure compliance with the Consent Decree.

[10] *United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal ...–US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf*

[11] *United States Environmental Protection Agency (EPA). (n.d.). Appendix G Massachusetts Small MS4 Permit Monitoring Requirements For Discharges into Impaired Waters – Parameters and Methods. Retrieved January 30, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/appendix-g-2016-ma-sms4-gp.pdf*

[12] *The Federal Register. Federal Register. (n.d.). Retrieved January 30, 2023, from https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-136?toc=1*

Table 5 – Analytical Methods, Hold Times, and Preservatives for Laboratory Analysis

Analyte or Parameter	EPA or Approved Method No.[1]	Max. Hold Time[2]	Preservation[2]
E. coli	**EPA**: 1103.1; 1603	8 hours	Cool ≤10°C, 0.0008% $Na_2S_2O_3$
	Other: Colilert ®, Colilert-18®, mColiBlue-24®		
Enterococcus	**EPA**: 1106.1; 1600	8 hours	Cool ≤10°C, 0.0008% Na2S2O3
	Other: Enterolert ® 12 22.		
Surfactants[3]	**SM**: 5540-C	48 hours	Cool ≤6°C
Ammonia[3]	**EPA**: 350.1	28 days	Cool ≤6°C, H_2SO_4 to pH <2

SM = Standard Methods

[1]EPA or Approved Method No. obtained from Appendix G of the MA Small MS4 Permit, except for Surfactants obtained from 40 CFR Part 136

[2]Max Holding Time and Preservation obtained from 40 CFR Part 136

[3]Ammonia and Surfactants can be analyzed in the field. Samples are sent to the lab to confirm field results if desired (not required to meet 40 CFR Part 136).

Evaluation of sample data can show positive results due to sources other than human wastewater and false negative results due to chemical reactions or interferences. For example, elevated ammonia readings are common in the New England region due to sampling near historically filled tidal wetlands where the breakdown of biological organic material can skew sample results. The same elevated ammonia readings can also be triggered by discharge from a nearby landfill. In addition, elevated surfactant readings caused by salinity levels greater than one (1) part per thousand can be triggered by the presence of oil. Inconclusive surfactant readings, where the indicator ampule turns green instead of a shade of blue, can often be caused by fine suspended particulate matter being present in the sample being tested. Finally, very low bacteria concentrations can often be the result of elevated chlorine from leaking drinking water infrastructure inhibiting bacterial growth. As such, any detection of chlorine above the instrument Reporting Limit should be noted.[13]

[13] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

Inspection Reporting

The City shall maintain detailed and accurate records of outfall and interconnection discharge samples that includes the following information:

- Date and time that sampling was conducted
- Weather conditions both during, and in the 24 hours prior to, each sampling event
- Unique identifier
- Receiving water
- Date of most recent inspection
- Dimensions
- Shape
- Material (concrete, PVC, etc.)
- Spatial location (latitude and longitude with a minimum accuracy of +/-30 feet
- Physical condition
- Indicators of potential non-stormwater discharges (including presence or evidence of suspect flow and sensory observations such as odor, color, turbidity, floatable, or oil sheen)

The Wet Weather Outfall Inspection Survey (Attachment 1) developed by the Central Massachusetts Regional Stormwater Coalition and the Outfall Inventory Field Sheet (Attachment 3) are templates that can be used for documenting the listed observations related to both quantitative and qualitative characteristics of any flows conveyed by the structure..[14]

Attachments

1. Wet Weather Outfall Inspection Survey developed by the Central Massachusetts Regional Stormwater Coalition
2. Field Data Collection Sheet
3. Outfall Inventory Field Sheet

Related Standard Operating Procedures

1. SOP 2: Wet Weather Outfall Inspection
2. SOP 3: Locating Illicit Discharges

[14] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

SOP 3: Locating Illicit Discharges

Introduction

An "illicit discharge" is any discharge to an engineered storm drain system that is not composed entirely of stormwater. Exceptions for allowable non-stormwater discharge are detailed in the Massachusetts MS4 Permit and are as follows[1]:

a. Water line flushing
b. Landscape irrigation
c. Diverted stream flows
d. Rising ground water
e. Uncontaminated ground water infiltration (as defined at 40 CFR § 35.2005(20))
f. Uncontaminated pumped ground water
g. Discharge from potable water sources
h. Foundation drains
i. Air conditioning condensation
j. Irrigation water, springs
k. Water from crawl space pumps
l. Footing drains
m. Lawn watering
n. Individual resident car washing
o. Flows from riparian habitats and wetlands
p. De-chlorinated swimming pool discharges
q. Street wash waters
r. Residential building wash waters without detergents

Illicit discharges can enter an engineered storm drain system via direct and indirect connections. These connections can include: cross-connections of sewer services to storm drain systems; leaking septic systems; intentional discharge of pollutants to catch basins; combined sewer overflows; connected floor drains; and sump pumps connected to storm drain systems. As such, the discharges from these illicit connections can contribute high levels of pollutants, including heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to the receiving body of water.[2]

The City of Holyoke's (City) Stormwater Ordinance, adopted by the City Council on May 17th, 2017, grants the City the authority to prohibit illicit discharges, investigate suspected illicit discharges, eliminate illicit discharges (including discharges from properties not owned by or controlled by the MS4 that discharge into the MS4), and implement appropriate enforcement procedures and actions.

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[1] *United States Environmental Protection Agency (EPA). (n.d.). General Permits for stormwater discharges from small municipal ...–US EPA. Massachusetts Small MS4 General Permit. Retrieved January 16, 2023, from https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf*

[2] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

Identifying Illicit Discharges

Illicit discharges can be located be several methods, including routine dry weather outfall inspections (as described in detail in "SOP 1: Dry Weather Outfall Inspection") and citizen reports. As per the Central Massachusetts Regional Stormwater Coalition, the following indicators shown in Table 1 may be the result of an illicit discharge.[3]

Table 1 – Visual Condition Assessment

Indicator	Possible Source
Foam	upstream vehicle washing activities or illicit discharge
Oil Sheen	leak or spill
Cloudiness	suspended solids (i.e. dust, ash, powdered chemicals, ground up materials, etc.)
Color or Odor	raw materials, chemicals, or sewage
Excessive Sediment	disturbed earth of unpaved areas lacking adequate erosion control measures
Sanitary Waste/ Optical Enhancers*	illicit discharge
Orange Staining	high mineral concentrations

* Fluorescent dyes added to laundry detergent and some toilet paper

While many of the indicators listed in Table 1 would indicate an illicit discharge, some indicators may occur naturally. For example, orange staining could be the result of naturally occurring iron. However, it may be difficult to determine the difference between natural foam and foam caused by pollution. Natural foam can typically be found in water with high organic content such as bog lakes, streams that originate from bog lakes, productive lakes, wetlands, or woody areas. As per the Central Massachusetts Regional Stormwater Coalition, it's important to consider the following factors listed in Table 2 when determining if the source of foam present at a stormwater outfall is natural or not.[4]

Table 2 – Conditional and Qualitative Considerations of Foam

Factors	Explanation
Wind Direction or Turbulence	Natural foam occurrences of the beach coincide with onshore winds. Often, foam can be found along a shoreline and/or on open waters during windy days. Natural occurrences in rivers can be found downstream of a turbulent site.
Proximity to Potential Pollution Source	Some entities including the textile industry, paper production facilities, oil industries, and fire fighting activities work with materials that cause foaming in water. If these materials are released to a water body in large quantities, they can cause foaming. The presence of silt in water, such as from a construction site can cause foam.
Physical Feeling	Natural foam is typically persistent, light, not slimy to the touch.
Visual Observation	Prescence of decomposing plants or organic material in the water.

[3] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

[4] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

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In addition to foam, both bacteria and petroleum can create a sheen on the water surface. Differentiating the two can be as simple as disturbing the "sheen" with a pole, stick, or similar object. A sheen caused by oil will remain intact and move in a swirl pattern while a sheen caused by bacteria will separate into a number of smaller patches and appear "blocky." In addition, bacteria or naturally occurring sheens are usually silver or dull in color. While bacterial sheen is not a pollutant, it should be noted when describing the discharge.[5]

Optical enhancers on the other hand can be visible to the naked eye when found in high enough concentrations and will appear as a bluish-purple haze. If a visual observation is unable to confirm the presence of this pollutant, a quantitative test can be used. In order to perform this test, a clean, white, cotton pad should be placed, either directly in, or within a sample of, the discharge for several days. After soaking, the cotton pad should be dried and then viewed under a fluorometer. If the cotton pad fluoresces, optical enhancers are assumed to be the pollutant and present. The magnitude of the fluorescence, as measured in fluorescent units, can be used to determine the concentration of optical enhancers within the sample. Often a visual observation is enough. It's not typical that this analysis is required.

Citizen Reports

Reports by residents and other users can be effective tools in helping the City to identify illicit discharges. The City's Department of Public Works (DPW) set up a phone hotline for this purpose, the phone number is (413) 534-2222. In addition, DPW should also provide guidance to the local City police department(s) and dispatch centers on how to manage data reported if residents should decide to report an illicit discharge with the police. An example Incident Tracking Sheet, provided by the Central Massachusetts Regional Stormwater Coalition, is included as Attachment 1 and can be used as an example that guides the responder to ensure that all pertinent details about the reported discharge are accurately documented. Reported illicit discharges should be communicated with the DPW.

Tracing Illicit Discharges

Once identified, suspected illicit connections must then be confirmed by the City. If confirmed, but the source is unidentified, the following additional procedures, as per the Central Massachusetts Regional Stormwater Coalition, should be completed[6]:

1. Review and consider information collected when an illicit discharge was initially identified, including, but not limited to, the time of day and the weather conditions for the previous 72 hours. Also review past reports or investigations of similar illicit discharges in the area.
2. Obtain storm drain mapping for the area of the reported illicit discharge. If possible, use a tracking system that can be linked to the City's GIS.
3. Document current conditions at the location of the observed illicit discharge point, including odors, water appearance, estimated flow, presence of floatables, and other pertinent information. Photograph relevant evidence.
4. If there continues to be evidence of the illicit discharge, collect water quality data using the methods described in "SOP 1: Dry Weather Outfall Inspection" and "SOP 2: Wet Weather Outfall Inspection". This may include using field test kits or instrumentation or collecting analytical samples for full laboratory analysis.

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[5] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

[6] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

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5. Move upstream from the point of observation to identify the source of the discharge, using the system mapping to determine infrastructure, tributary pipes, and drainage areas that contribute. At each point, survey the general area and surrounding properties to identify potential sources of the illicit discharge. Document observations at each point on an Incident Tracking Sheet (Attachment 1) as well as with photographs.
6. Continue this process until the illicit discharge is no longer observed, which will define the boundaries of the likely source. For example, if the illicit discharge is present in catch basin 137 but not the next upstream catch basin, 138, the source of the illicit discharge is between these two structures.

If the source of an illicit discharge cannot be determined via the procedures listed above, additional methods, such as sandbagging, dye testing, smoke testing, and/or closed-circuit television inspection (CCTV) may need to be utilized. Descriptions for these four (4) methods are listed below[7].

Sandbagging

Sandbagging can be particularly useful when attempting to isolate intermittent or illicit discharges with very little perceptible flow. This technique involves placing sandbags, caulking, weirs/plates, or other temporary barriers within the outlets of a manhole to form a temporary dam. Sandbags and other barriers should only be installed when dry weather is forecasted and are typically left in place for 48 hours. If flow is present after 48 hours behind the sandbags/barriers, this would allow the inspector to properly observe and sample the flow, however, if no flow collects behind the sandbags/barriers, the upstream pipe network can be ruled out as a source of the intermittent discharge. Unlike the other three (3) methods described subsequently, this method can be quite time-consuming.

Dye Testing

Dye testing consists of discharging or flushing non-toxic dye into a suspended plumbing fixture and observing a nearby storm drain structure and/or sanitary sewer manhole for the presence of the same dye downstream. Fixtures, such as sinks, toilets, and sump pumps can all be tested with dye, but should be tested separately. This test should ideally be conducted with a team of two or more people, with one person adding the dye to the fixture of interest, while the other person watches for the presence or absence of dye near the source. Unlike the other methods mentioned, dye testing is relatively quick, effective, and inexpensive. This method is best used when the source of the illicit discharge has been relatively narrowed down. Dye testing can be done by the City or a third-party contractor and requires the City to receive permission prior to accessing any sites that may contain the suspected fixtures. Residents, business owners, police, fire, and local public health staff shall be notified prior to testing in preparation for responding to citizen phone calls concerning the dye and their presence in local surface waters.

Smoke Testing

Unlike dye testing, smoke testing is a useful method to utilize if the source of an illicit discharge is not as obvious. Smoke testing often works best when trying to locate an illicit discharge along short sections of pipe and, more specifically, along small diameters pipes. This method involves injecting a non-toxic smoke with the use of a smoke bomb or smoke generator. When added to the storm drain system, smoke will emerge in connected locations, allowing for an inspector to locate a less obvious source of an illicit discharge. Similar to dye testing, this testing activity can be performed by a third-party contractor. Proper notifications to residents, business owners, local police, and fire departments that may be in the area of interest is critical. Smoke may cause minor irritation for residents with respiratory conditions. These individuals should be monitored or evacuated from the area of testing.

[7] *Standard Operating Procedures. Central Massachusetts Regional Stormwater Coalition. (n.d.). Retrieved January 16, 2023, from https://www.centralmastormwater.org/toolbox/pages/standard-operating-procedures*

Closed Circuit Television Inspection (CCTV)

In CCTV inspections, cameras are used to record the interior of storm drain pipes. These cameras can be manually pushed with a stiff cable or guided remotely on treads or wheels. Video can be watched live, or reviewed as a recording, to locate illicit connections and infiltration from sanitary sewers into the storm drain. Again, this testing activity can be performed by a third-party contractor.

If the source of an illicit discharge still cannot be located, further investigation in a future program is necessary. Figure 1 below, from the Central Massachusetts Regional Stormwater Coalition shows a pictorial summary of this section.

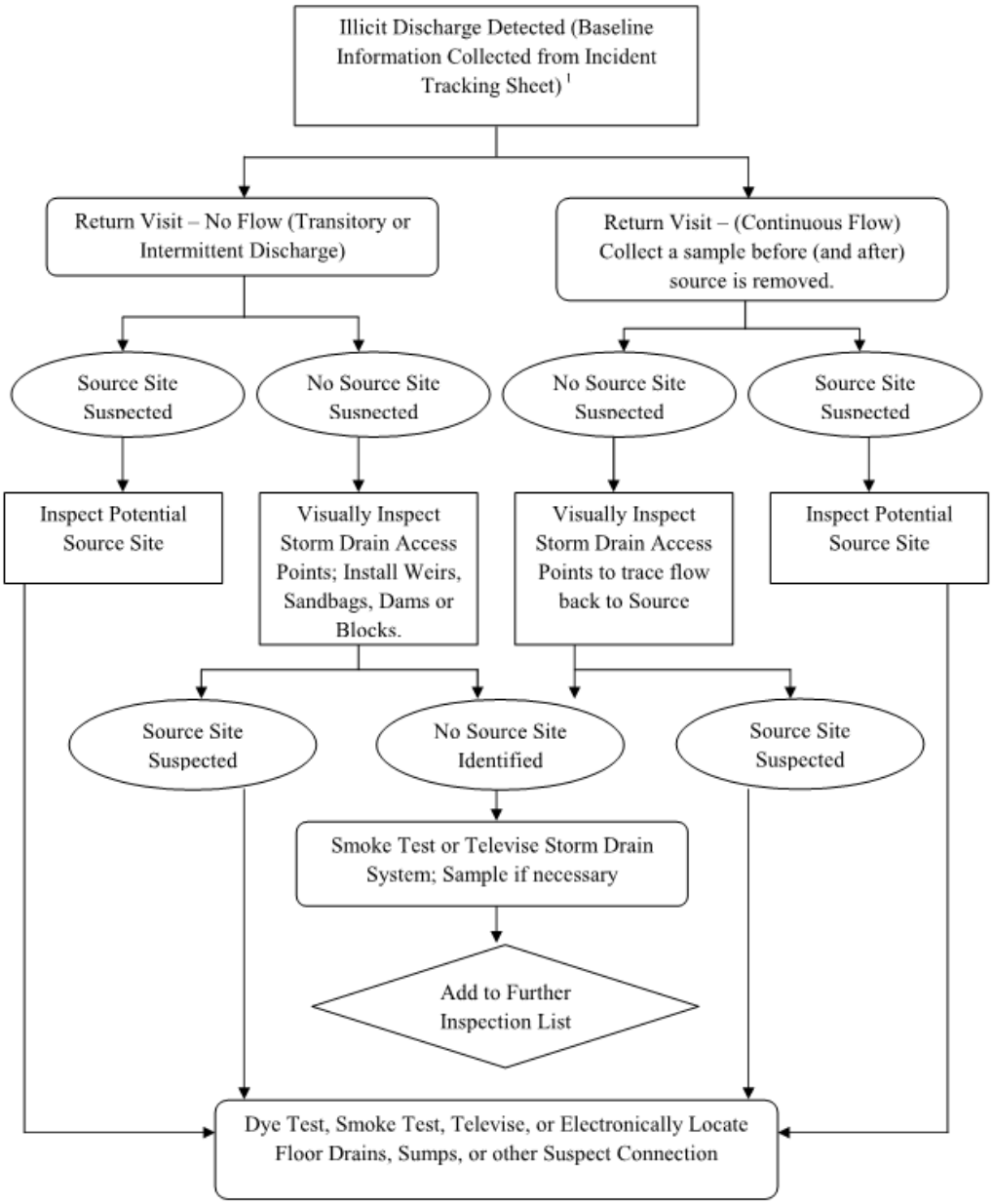

Figure 1 – Steps for Tracing Illicit Discharges

Removal and Abatement of Illicit Discharges

As per the Consent Decree, the "date of verification" of an illicit discharge shall be the date on which the City has identified a point of entry of an illicit discharge from a specific location, or address, that contributes wastewater flow to the MS4. Figure 2 summarizes the steps the City shall take upon identification of an illicit source.[8]

[8] *Civil Action No. 19-CV-10332-MGM: Final Consent Decree." United States District Court for the District of Massachusetts, United States and Massachusetts v. City of Holyoke, September 27, 2022.*

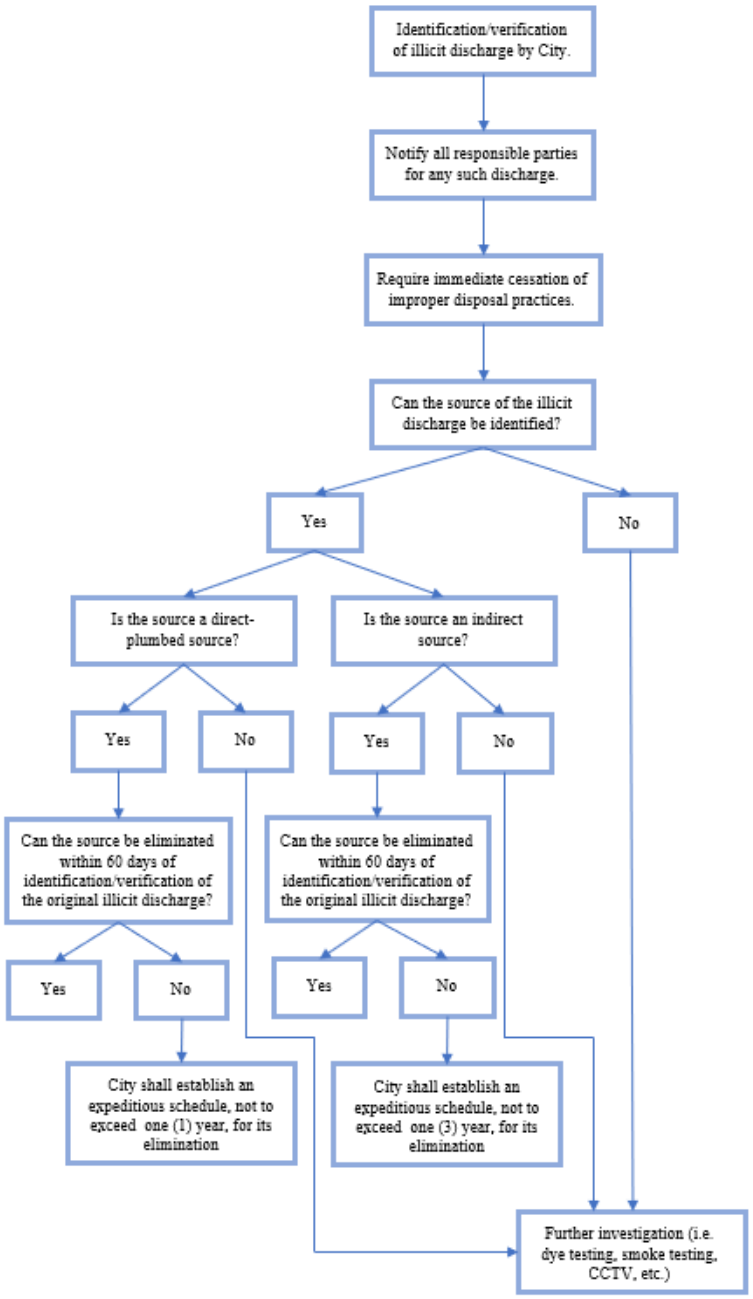

Figure 2 – Steps to Eliminate Illicit Discharge as per Consent Decree

If the source of an illicit discharge is located, proper removal ensures that it does not recur. This includes documenting any repairs, installation of new sanitary sewer connections, or any other corrective actions on an Incident Tracking Sheet (Attachment 1). This should include, but is not limited to, the following information:

- The location of the discharge and its source(s)
- A description of the discharge
- The method of discovery
- Date of discovery
- Date of elimination, mitigation or enforcement action OR planned corrective measures and a schedule for completing the illicit discharge removal
- Estimate of the volume of flow removed

A final inspection is required to confirm the illicit connection has been removed. As per the Consent Decree, within one year following the removal of a verified illicit discharge, the City shall conduct additional dry and wet weather (see SOP's 1 and 2) monitoring to confirm that the illicit discharge has been eliminated. If confirmatory screening indicates evidence of a continued potential illicit discharge, additional investigation of the catchment shall be scheduled and removal of the illicit discharge is required.

Table 3 - Illicit Discharge Enforcement Summary

Source Identified	Enforcement Authority	Procedure to Follow
One-time illicit discharge (e.g. spill, dumping, etc.)	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Contact Owner • Issue Notice of Violation • Issue fine
Intermittent or continuous illicit discharge from legal connection	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Contact Owner • Issue Notice of Violation • Determine schedule for removal • Confirm removal
Intermittent or continuous illicit discharge from illegal connection or indirect (e.g. infiltration or failed septic)	Plumbing Inspector or ordinance enforcement authority	• Notify Plumbing Inspector or ordinance enforcement authority
Intermittent or continuous illicit discharge from illegal connection or indirect (e.g. failed sewer line)	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Issue work order • Schedule removal • Remove connection • Confirm removal
Any	USEPA	• Notify exempt third party and USEPA of illicit discharge

Attachments

1. Incident Tracking Sheet

Related Standard Operating Procedures

1. SOP 1: Dry Weather Outfall Inspection
2. SOP 2: Wet Weather Outfall Inspection

APPENDIX G
IDDE EMPLOYEE TRAINING RECORD

HR-001 Training Documentation Form

Please complete the form in its entirety. All participant names on the Training Documentation Form must be entered into the Talent Up system for accurate employee attendance tracking. All hard copies of the completed Training Documentation Forms must be kept on site for a minimum of five years.

Title of Training Session	Training Course # (if applicable):	Training BU/Project Location (please include address if applicable):
Name of BU/Project Training Coordinator:	Date of Training:	Time (e.g. 2pm-4pm): Duration (hours):
Training Instructor: ☐ Internal ☐ External Instructor Name:		Vendor/Consultant Name and Company (if applicable):
CEU (if applicable):	Reason for Training (check all that apply): ☐ New Information ☐ Recertification ☐ Skill Development ☐ Regulatory Requirement ☐ Refresher ☐ Tailgate Training	
Training Materials and Outline Used (i.e. Powerpoint, Hands On, Youtube Video, etc.):		

Participants

	Veolia Employee ID	City Employee ID	Employee Name	Employee Signature	Date
1					
2					
3					
4					
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	Veolia Employee ID	City Employee ID	Employee Name	Employee Signature	Date
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