

Town of Upton, MA

Stormwater Management Program (SWMP):

Volume 2

NPDES Phase II Small MS4 General Permit
June 2021

ILLICIT DISCHARGE DETECTION & ELIMINATION (IDDE) PLAN



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ILLICIT DISCHARGE DETECTION & ELIMINATION (IDDE) PLAN

Prepared by: **BETA GROUP, INC.**

Prepared for: Town of Upton, Massachusetts

June 2021

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1.0 INTRODUCTION

This Illicit Discharge Detection and Elimination (IDDE) Plan has been developed by the Town of Upton (the Town) to address the IDDE program requirements of the United States Environmental Protection Agency's (USEPA's) 2016 National Pollution Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereinafter referred to as the Permit. The Permit requires a Stormwater Management Program (SWMP), which is comprised of four volumes. This IDDE Plan is Volume 2 of 4.

- SWMP Volume 1: Stormwater Management Program
- **SWMP Volume 2: Illicit Discharge Detection and Elimination (IDDE) Plan**
- SWMP Volume 3: Good Housekeeping and Pollution Prevention (O&M) Plan
- SWMP Volume 4: Annual Reports

2.0 OBJECTIVE

The objective of this IDDE program is to systematically find and eliminate sources of non-stormwater discharges to the municipal separate storm sewer system and implement procedures to prevent such discharges. The required timeline for implementing the IDDE program per the Permit is shown in Table 2.1.

Table 2-1 IDDE Program Implementation Timeline

IDDE Program Requirements	Completion Date from Effective Date of Permit					
	1 Year	1.5 Years	2 Years	3 Years	7 Years	10 Years
Written IDDE Program Plan	→					
SSO Inventory	→					
Written Catchment Investigation Procedure	→	→				
Phase I Mapping	→	→	→			
Phase II Mapping	→	→	→	→	→	→
Dry Weather Outfall Screening & Sampling	→	→	→	→		
Follow-up Ranking of Outfalls and Interconnections	→	→	→	→		
Catchment Investigations – Problem Outfalls	→	→	→	→	→	
Catchment Investigations – all Problem, High and Low Priority Outfalls	→	→	→	→	→	→
Training for All IDDE Staff	Annually					

3.0 LEGAL AUTHORITY AND STATEMENT OF RESPONSIBILITIES

The Town of Upton Stormwater Bylaw adopted on April 25, 2012, provides legal 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 system; and implement appropriate enforcement procedures and actions.

The Department of Public Works is the lead municipal department responsible for implementing the IDDE program. The DPW has primary responsibility for mapping, screening and sampling, catchment investigations, illicit discharge removal, training and annual reporting components of the program in addition to overall implementation and coordination. There are other departments that assist in operating, managing, and inspecting the sanitary sewer and storm drain and/or review plans for proposed construction and inspecting new construction that connect to these systems. These departments have key roles in implementing the IDDE program effectively. They are listed below with roles and responsibilities identified that support planning and administrative efforts of the IDDE program:

- **Department of Public Works** – Maintenance of Stormwater Systems, IDDE Detection and Reporting, Record Keeping, Inspection and Maintenance of Sewer Systems; Respond to SSOs; IDDE Investigation, Detection, Elimination and Record Keeping
- **Building and Plumbing Inspector(s)** – Education, Sewer Inspection, Reporting, Enforcement, Record Keeping
- **Board of Health** – Education (Pet waste & Septic maintenance), Septic Inspection & Plan Review, Reporting, Enforcement, Record Keeping
- **Conservation Commission** - Education, Plan Review, Construction Inspection, Enforcement, Stormwater Management O& M Record Keeping
- **Planning Board**– Education, Plan Review, Construction Inspection, Enforcement, Stormwater Management O& M Record Keeping, Bylaw compliance, Authorized Enforcement Agency for discharges to the MS4

The Department of Public Works will conduct meetings involving persons with key roles from the departments listed above to review the responsibilities and coordinate IDDE efforts between the departments. The meetings will educate the different departments about IDDE and the roles of each in identifying and resolving illicit discharges.

4.0 DEFINITIONS

The following definitions are provided for terms used in this IDDE Plan.

A **catchment** is the area that drains to an individual outfall or interconnection.

A **sanitary sewer overflow (SSO)** is a discharge of untreated sanitary wastewater from a municipal sanitary sewer.

An **illicit discharge** is any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from firefighting activities.

An **interconnection** is 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.

Key junction is a manhole or structure that can represent one or more junction manholes without compromising adequate implementation of the IDDE program. 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 ability to determine possible presence of an upstream illicit discharge.

The **MATRIX** is the Outfall/Interconnection Data and Priority Ranking Matrix.

MS4 is a municipal separate stormwater system.

An **outfall** is a point source as defined by 40 CFR § 122.2 as the point where the municipal separate storm sewer discharges to waters of the United States. An outfall does not include open conveyances connecting two municipal separate storm sewers or pipes, tunnels or other conveyances that connect segments of the same stream or other waters of the United States and that are used to convey waters of the United States. (40 CFR § 122.26(b)(9)).

5.0 PROHIBITIONS AND REQUIRED ACTIONS

Illicit discharges and sanitary sewer overflows (SSOs) to the MS4 are prohibited.

Upon detection of an illicit discharge or SSO, the Town will commence action to locate, identify and eliminate the illicit discharge as expeditiously as possible. Upon identification of the illicit source the Town will notify all parties responsible for any such discharge and require immediate cessation of improper disposal practices in accordance with its legal authorities. Where elimination of an illicit discharge within 60 days of its identification as an illicit discharge is not possible, an expeditious schedule will be established for its elimination and the dates of identification and schedules for removal will be included in annual reports. In the interim, the Town will take all reasonable and prudent measures to minimize the discharge of pollutants to and from its MS4.

6.0 NON-STORMWATER DISCHARGES

The following categories of non-stormwater discharges are allowed under the Permit unless the Town, EPA, or the MassDEP identifies any category or individual discharge of non-stormwater discharge listed below as a significant contributor of pollutants to the MS4, in which case that category or individual discharge is not allowed, and is to be deemed an “illicit discharge” and treated as part of the IDDE Program.

- 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 ground water
- 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
- Flows from riparian habitats and wetlands
- De-chlorinated swimming pool discharges
- Street wash waters
- Residential building wash waters without detergents

Discharges or flows from firefighting activities are allowed under the Permit and need only be addressed where they are identified as significant sources of pollutants to waters of the United States.

7.0 SANITARY SEWER OVERFLOWS

The Town does not have any known locations where SSOs have discharged to the MS4 within the previous five (5) years. This includes SSOs resulting, during dry or wet weather, from inadequate conveyance capacities, or where interconnectivity of the storm and sanitary sewer infrastructure allows for communication of flow between the systems. The Town will continue to monitor and identify SSOs. The inventory of all future identified SSOs will include the following information, if available:

- Location (approximate street crossing/address and receiving water, if any);
- A statement of whether the discharge entered a surface water directly or entered the MS4;
- Date(s) and time(s) of each known SSO occurrence (i.e., beginning and end of any known discharge);
- Estimated volume(s) of the occurrence;
- Description of the occurrence indicating known or suspected cause(s);
- Mitigation and corrective measures completed with dates implemented; and
- Mitigation and corrective measures planned with implementation schedules.

See **Appendix G** for the SSO inventory.

In accordance with Paragraph B.12 of Appendix B of the Permit, upon becoming aware of an SSO to the MS4, the Town will provide oral notice to EPA within 24 hours. Additionally, written notice will be provided to EPA and MassDEP within five (5) days of becoming aware of the SSO occurrence and will include the information in the updated inventory. The notice will contain all of the information listed in part 2.3.4.4.b. Where common notification requirements for SSOs are included in multiple NPDES permits issued to a Town, a single notification may be made to EPA as directed in the Town's wastewater or combined sewer overflow (CSO) NPDES permit and constitutes compliance with this part.

An updated SSO inventory will be included in annual reporting, including the status of mitigation and corrective measures implemented to address each SSO identified pursuant to this part.

It is understood that the period between detection and elimination of a discharge from the SSO to the MS4 is not a grace period. Discharges from an MS4 that are mixed with an SSO are not authorized by the Permit and remain unlawful until eliminated.

8.0 SYSTEM MAPPING

Mapping of the Town's separate storm sewer system is required to facilitate the identification of key infrastructure, factors influencing proper system operation, and the potential for illicit sanitary sewer discharges. The following information, outlined by phase, is required as described in the Permit:

Phase I: System mapping required within two (2) years of the permit effective date:

- Outfalls and receiving waters (required by MS4-2003 permit)
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- Municipally-owned stormwater treatment structures (e.g., detention and retention basins, infiltration systems, bioretention areas, water quality swales, gross particle separators, oil/water separators, or other proprietary systems)
- Waterbodies identified by name and indication of all use impairments as identified on the most recent EPA approved Massachusetts Integrated List of waters report pursuant to Clean Water Act section 303(d) and 305(b)
- Initial catchment delineations developed from available system data and topographic information.

Phase II: Information that must be included in the map for all outfalls with ten (10) years of the permit effective date, and updated as information becomes available during implementation of catchment investigations:

- Outfall spatial location (latitude and longitude with a minimum accuracy of ± 30 feet)
- Pipes
- Manholes
- Catch basins
- Refined catchment delineations based on new information collected during catchment investigations
- Municipal sanitary sewer system.

The following information is to be included in the system map as information becomes available:

- Storm sewer material, size (pipe diameter) and age
- Sanitary sewer system material, size (pipe diameter) and age
- Privately-owned stormwater treatment structures
- Where a municipal sanitary sewer system exists, properties known or suspected to be served by a septic system, especially in high-density urban areas
- Area where the Town of Bridgewater's MS4 has received or could receive flow from septic system discharges (e.g., areas with poor soils, or high ground water elevations unsuitable for conventional subsurface disposal systems)

- Seasonal high water table elevations impacting sanitary alignments
- Topography
- Orthophotography
- Alignments, dates and representation of work completed (with legend) of past illicit discharge investigations (e.g., flow isolation, dye testing, CCTV)
- Locations of suspected, confirmed and corrected illicit discharges (with dates and flow estimates).

The existing system map can be found in **Appendix B**. The Town will update the mapping as necessary to reflect newly discovered information and required corrections or modifications and will report on the progress towards the completion of the system map in each annual report.

9.0 OUTFALL AND INTERCONNECTION INVENTORY

The outfall and interconnection inventory identifies each outfall and interconnection discharging from the MS4, including its location and condition based on existing information. The inventory is recorded in the MATRIX, which provides documentation for tracking data, inspections, screenings and other IDDE program activities.

The MATRIX will be updated annually to include data collected in connection with the dry weather screening and other relevant inspections conducted as part of the IDDE program. See **Appendix A** for the MATRIX.

10.0 INITIAL RANKING OF OUTFALLS AND INTERCONNECTIONS

The Town investigated, and recorded in the MATRIX found in **Appendix A**, the catchment area characteristics of each outfall and interconnection where information is available. This includes waterbodies with limited water quality that receive a discharge from the MS4 or waters with approved total maximum daily loads (TMDLs), where illicit discharges have the potential to contain the pollutant identified as the cause of the water quality impairment.

Due to the limited number of outfalls and interconnections, the Town decided to screen and sample all known outfalls during dry weather. Based on the contaminants identified while sampling and the information above, the outfalls were classified into one of the following categories.

- Past discharge complaints and reports
- Poor receiving water quality- the following guidelines are recommended to identify waters as having a high illicit discharge potential: exceeding water quality standards for bacteria; ammonia levels above 0.5 mg/l; surfactants levels greater than or equal to 0.25 mg/l.
- Density of generating sites- Generating sites are those places, including institutional, municipal, commercial, or industrial sites, with a potential to generate pollutants that could contribute to illicit discharges. Examples of these sites include, but are not limited to, car dealers; car washes; gas stations; garden centers; and industrial manufacturing areas.
- Age of development and infrastructure – Industrial areas greater than 40 years old and areas where the sanitary sewer system is more than 40 years old will probably have a high illicit discharge potential. Developments 20 years or younger will probably have a low illicit discharge potential.
- Sewer conversion – contributing catchment areas that were once serviced by septic systems, but have been converted to sewer connections may have a high illicit discharge potential.
- Historic combined sewer systems – contributing areas that were once serviced by a combined sewer system, but have been separated may have a high illicit discharge potential.
- Surrounding density of aging septic systems – Septic systems thirty years or older in residential land use areas are prone to have failures and may have a high illicit discharge potential.
- Culverted streams – any river or stream that is culverted for distances greater than a simple roadway crossing may have a high illicit discharge potential.
- Water quality limited waterbodies that receive a discharge from the MS4 or waters with approved total maximum daily loads (TMDLs) applicable to Upton, where illicit discharges have the potential to contain the pollutant identified as the cause of the water quality impairment.

Based on the information above, the outfalls were classified into one of the following categories and recorded in the MATRIX:

Problem outfalls: Outfalls/interconnections with known or suspected contributions of illicit discharges based on existing information will be designated as Problem outfalls. This will include any outfalls/interconnections where previous screening indicates likely sewer input. According to the Permit, likely sewer input indicators are any of the following:

- 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, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine

Problem outfalls need not be screened pursuant to part 2.3.4.7.b of the Permit.

Very High Priority outfalls: Outfalls/interconnections that were not previously classified as Problem outfalls and in field sampling indicated likely sewer input.

High Priority outfalls: Outfalls/interconnections that have not been classified as Problem outfalls and that are:

- discharging to an area of concern to public health due to proximity of public beaches, recreational areas, drinking water supplies or shellfish beds;
- determined by the permittee as high priority based on the characteristics listed above or other available information;
- discharging to any waterbody impaired for bacteria or pathogens.

Low Priority outfalls: Outfalls/interconnections with no known or suspected illicit discharges, no likely sewer input indicators, and are not discharging to an area of concern to the public.

Excluded outfalls: Outfalls/interconnections that have no potential for illicit discharges. 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.

The Outfall and Interconnection Ranking Map, located in **Appendix B**, shows the locations of Problem, Very High Priority, High Priority, and Low Priority structures.

11.0 DRY WEATHER OUTFALL & INTERCONNECT SCREENING & SAMPLING

All outfalls/interconnections (excluding Problem and Excluded outfalls) will be inspected for the presence of dry weather flow and sampled as required within three (3) years of the permit effective date. The Town will screen all High and Low Priority outfalls in accordance with their initial ranking developed as part of the outfall/interconnection inventory and initial ranking.

Dry weather screening and sampling will proceed only when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and no significant snow melt is occurring.

The following information is to be recorded and included in the summary report for outfall screening:

- unique identifier,
- receiving water,
- date of most recent inspection,
- dimensions,
- shape,
- material (concrete, PVC),
- 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, floatables, or oil sheen).

If an outfall/interconnection is inaccessible or submerged, proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results.

If no flow is observed, but evidence of illicit flow exists, the outfall will be revisited during dry weather within one week of the initial observation, if practicable, to perform a second dry weather screening and sample any observed flow.

Where dry weather flow is found at an outfall/interconnection, at least one (1) sample will be collected, and analyzed at a minimum for:

- ammonia,
- chlorine,
- conductivity,
- salinity,
- E. coli (freshwater receiving water) or enterococcus (saline or brackish receiving water),
- surfactants (such as MBAS),
- temperature, and
- pollutants of concern.

When the discharge is directly into a water quality limited water, or a water subject to an approved TMDL as indicated in Appendix F of the MS4 Permit, the sample will be analyzed for the pollutant(s) of concern identified as the cause of the impairment as specified in Appendix G of the MS4 Permit. The receiving waters and pollutants of concern for sampling are identified in **Table 11-1** and on the map in **Appendix B**. The estimated number of outfalls directly discharging to these receiving waters are identified in the NOI and their locations are identified on the map in **Appendix B**.

All analyses with the exception of indicator bacteria and pollutants of concern can be performed with field test kits or field instrumentation and are not subject to 40 CFR part 136 requirements. Sampling for bacteria and pollutants of concern will 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. Sampling for ammonia and surfactants must use sufficiently sensitive methods to detect those parameters at or below the threshold indicator concentrations of 0.5 mg/L for ammonia and 0.25 mg/L for surfactants. Sampling for residual chlorine must use a method with a detection limit of 0.02 mg/L or 20 ug/L. Detailed dry weather screening and sampling procedures, methods and forms can be found in **Appendix C**.

All screening and sampling data collected in compliance with this part will be submitted in the Annual Report.

The MATRIX will be updated annually to reprioritize outfalls and interconnections based on information gathered during dry weather screening and sampling. Outfalls/interconnections where relevant information was found indicating sewer input to the MS4 or where sampling results indicate sewer input will be considered highly likely to contain illicit discharges from sanitary sources, and ranking of such outfalls/interconnections will be updated to the top of the High Priority outfalls category for investigation ("Very High Priority").

Table 11-1 MS4 Area Receiving Waters and Pollutants of Concern for Sampling

NAME	CATEGORY	SEGMENT ID	WATERSHED	IMPAIRMENT CAUSE (EPA TMDL NO.)	MONITORING PARAMETERS FOR ANALYSIS (NMR = No Monitoring Required)
West River	5	MA51-11	Blackstone	Non-Native Aquatic Plants	NMR
				pH, Low	pH
West River	5	MA51-12	Blackstone	Non-Native Aquatic Plants	NMR
				Cadmium (WQLW)	Cadmium, Total
				Chloride (WQLW)	Chloride
				Copper (WQLW)	Copper, Total
				Lead (WQLW)	Lead, Total
				Nutrient/Eutrophication Biological Indicators	Total Phosphorus (freshwater)
Mill River	5	MA51-35	Blackstone	pH, Low	pH
				Non-Native Aquatic Plants	NMR
				Aquatic Plants (Macrophytes)	NMR
				Metals	
Mill Pond	4C	MA51104	Blackstone	PCBs in Fish Tissue	NMR
North Pond	4C	MA51112	Blackstone	Non-Native Aquatic Plants	NMR
Pratt Pond	4C	MA51123	Blackstone	Non-Native Aquatic Plants	NMR
Taft Pond	4C	MA51165	Blackstone	Non-Native Aquatic Plants	NMR

Source: Massachusetts Year 2016 Integrated List of Waters.

NOTE: Certain Pollutants (in **BOLD**) result in Total Maximum Daily Load (TMDL) or Water Quality Limited Water Bodies (WQLW) requirements defined in Appendix H & F of the Permit.

Table 11-1 MS4 Area Receiving Waters and Pollutants of Concern for Sampling, Continued

NAME	CATEGORY	SEGMENT ID	WATERSHED	IMPAIRMENT CAUSE (EPA TMDL NO.)	MONITORING PARAMETERS FOR ANALYSIS (NMR = No Monitoring Required)
Blackstone River	5	MA51-05	Blackstone	Aquatic Plants (Macrophytes)	NMR
				Flow Regime Modification	NMR
				Non-Native Aquatic Plants	NMR
				Physical substrate habitat alterations	NMR
				Algae	Total Phosphorus (freshwater)
				Benthic Macroinvertebrates	Contact MassDEP
				Cadmium	Cadmium, Total
				Copper	Copper, Total
				DDT in Fish Tissue	NMR
				Escherichia Coli (E. Coli)	E. Coli
				Fish Bioassessments	Contact MassDEP
				Lead	Lead, Total
				Nutrient/Eutrophication Biological Indicators	Total Phosphorus (freshwater)
				Odor	NMR
				PCBs in Fish Tissue	NMR
				Phosphorus, Total	Total Phosphorus
				Sedimentation/Siltation	Total Suspended Solids
				Turbidity	Total Suspended Solids, Turbidity

Source: Massachusetts Year 2016 Integrated List of Waters.

NOTES:

Blackstone River is outside of Upton, but Upton is a tributary for the Blackstone River. According to the MA MS4 General Permit (2.2.2.b), Upton is on the list that states the permittee must comply with the provisions in Appendix H applicable to it. Therefore, it is important to note the Phosphorus in the Blackstone River.

Certain Pollutants (in **BOLD**) result in Total Maximum Daily Load (TMDL) or Water Quality Limited Water Bodies (WQLW) requirements defined in Appendix H & F of the Permit.

12.0 CATCHMENT INVESTIGATIONS

The Permit requires that each catchment associated with an outfall or interconnection of the Town's MS4 be investigated for potential illicit discharges. This section outlines a systematic procedure to prioritize and conduct outfall catchment investigations and to trace the source of potential illicit discharges. The procedures include the following steps as outlined in the Permit and described in this section:

1. **Identify maps, historic plans and records, and other sources of data:** to be used in identifying system vulnerability factors within each catchment.
2. **Manhole inspection methodology:** methodology for performing storm drain network investigation by systematically and progressively observing, sampling, and evaluating all key junction manholes in the MS4 to determine the approximate location of suspected illicit discharges or SSOs, even where no evidence of an illicit discharge is observed at the outfall. Methodology includes procedures for dry and wet weather investigations
3. **Procedures that will isolate and confirm sources of illicit discharge:** to be applied where investigations or physical evidence or screening has identified that the MS4 is influenced by illicit discharges or SSOs and the location of potential contaminate sources needs to be refined. Implementation of more detailed investigations and inspection of manholes for source isolation and confirmation procedures will be followed as described in **Section 14**.

All data collected as part of the catchment investigation will be recorded using the catchment investigation summary report form in **Appendix D** and reported in each annual report and used to update the system mapping and MATRIX.

12.1 System Vulnerability Factors (SVFs)

Begin by identifying maps, historic plans, and records and other sources of data including (but not limited to) plans related to construction of the storm drain and of sanitary sewers, prior work performed on the storm drains and sanitary sewers, board of health or other municipal data on septic system failures or required upgrades, and compliant records related to SSOs, sanitary sewer surcharges, and septic system breakouts. Continue by reviewing relevant mapping and system vulnerability factors previously identified for the catchment. Look for any new information that may be available including Board of Health records on septic systems, plans related to recent construction of storm and sanitary sewer infrastructure, and complaint records related to SSOs. Use this information to identify areas within the catchment with higher potential for illicit connections. The presence of any of the following specific System Vulnerability Factors (SVFs) is to be recorded in the MATRIX:

- History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages;
- Common or twin-invert manholes serving storm and sanitary sewer alignments;
- Common trench construction serving both storm and sanitary sewer alignments;
- Crossings of storm and sanitary sewer alignments where the sanitary system is shallower than the storm drain system;
- Sanitary sewer alignments known or suspected to have been constructed with an underdrain system;

- Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints;
- Areas formerly served by combined sewer systems;
- Sanitary sewer infrastructure defects such as leaking service laterals, cracked, broken, or offset sanitary infrastructure, directly piped connections between storm drain and sanitary sewer infrastructure, or other vulnerability factors identified through Inflow/Infiltration Analyses, Sanitary Sewer Evaluation Surveys, or other infrastructure investigations.

If available, the following information may also be included in the evaluation of SVFs:

- Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs;
- Any sanitary sewer and storm drain infrastructure greater than 40 years old;
- Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather than poor owner maintenance);
- History of multiple Board of Health actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather than poor owner maintenance);

Catchments with a minimum of one (1) System Vulnerability Factor are subject to wet weather sampling requirements described in **Section 12.3**.

12.2 Dry Weather Key Junction Manhole Inspections

Field crews are to systematically inspect all key junction manholes and gather catchment information of the location of MS4 pipes, manholes and the extent of the contributing catchment. Begin at the first key junction upgradient of the outlet/interconnection or previously investigated key junction and work progressively upstream inspecting and sampling at manholes in the storm drain network to isolate the illicit discharge source as follows:

- During dry weather, key junction manholes will be opened and inspected systematically for visual and olfactory evidence of illicit connections (e.g., excrement, toilet paper, gray filamentous bacterial growth, or sanitary products present).
- If flow is observed, the Town will sample the flow at a minimum for ammonia, chlorine and surfactants using field kits for these analyses.
- Where sampling results or visual or olfactory evidence indicate potential illicit discharges or SSOs, the area draining to the junction manhole will be flagged for further upstream investigation.

Key junction and subsequent manhole investigations will proceed, repeating the inspection and sampling of upstream key junction manholes until the location of suspected illicit discharges or SSOs can be isolated to a pipe segment between two manholes. Source isolation and confirmation procedures will then be followed as described in **Section 14**. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole sampling.

Where catchments do not contain junction manholes, the dry weather screening and sampling will be considered as meeting the manhole inspection requirement and source isolation and confirmation procedures will be followed as described in **Section 14**.

For most catchments, manhole inspections will proceed from the outfall moving up into the system as described. However, depending on the nature of the drainage system, it may be more efficient to move from upstream down, particularly if the sources of illicit discharges are believed to be located in the upstream portions of the catchment area. In either case, once a manhole inspection methodology has been selected, investigations will continue systematically through the catchment.

12.3 Wet Weather Investigation

After meeting the requirements for dry weather investigation, catchments with a minimum of one (1) System Vulnerability Factor will also be inspected and sampled under wet weather conditions to the extent necessary to determine whether wet-weather induced high flows in the sanitary sewers or high groundwater in areas of septic systems result in discharge of sanitary flow to the MS4. Wet weather outfall sampling will be conducted as follows:

- At least one wet weather screening and sampling will be conducted at the outfall with the same parameters required during dry weather screening.
- Wet weather sampling and screening will proceed during or after a storm event of sufficient depth or intensity to produce a stormwater discharge at the outfall. Every effort should be made to sample during the spring (March through June) when groundwater levels are relatively high.
- The Permit does not require a minimum rainfall event prior to wet weather screening; however, the rainfall event must result in enough depth or intensity to produce a stormwater discharge at the outfall. Sampling should be avoided during the initial period of discharge ("first flush").

If wet weather outfall sampling indicates a potential illicit discharge, then additional wet weather source sampling will be performed, as warranted, or source isolation and confirmation procedures will be followed as described in **Section 14**. If wet weather outfall sampling does not identify evidence of illicit discharges, then the wet weather investigation is complete.

12.4 Marking the Catchment Investigation Complete

If all key junction manholes have been inspected (or, if no key junction manholes are present, junction manholes, or, if no junction manholes are present, the outfall) and found to be free of dry weather flow or illicit discharge indicators, and any required wet weather outfall screening and catchment investigation has been completed, the investigation of that catchment is marked complete.

If sources of illicit discharge or SSO are found in a catchment, the investigation may be marked complete once the sources of the discharge have been isolated and confirmed as described above. In such cases the catchment may be marked "inspection complete, awaiting repair." Once repairs are finished, further catchment investigation will be scheduled to confirm that all sources of discharge have been eliminated.

If all required manhole inspections are clean but the outfall inspection still shows evidence of illicit discharge, the catchment may be marked "inspection complete, results inconclusive" and the Town will schedule further catchment investigation and/or outfall screening until such time as the source of illicit discharge has been identified, or the catchment has been confirmed to be free of illicit discharges.

12.5 Timeline

Investigations of catchments associated with Problem outfalls, and where any information gathered on the outfall/interconnection identifies sewer input, will begin by the end of Year 2 (June 30, 2020) and will be completed by the end of Year 7 (June 30, 2025). Investigations of catchments associated with Very High, High and Low Priority outfalls will follow the ranking of outfalls and will be completed by Year 10 (June 30, 2028). In general, catchment investigations will be performed in the order that the team leader believes is likely to lead to the most rapid identification and elimination of problem discharges to the MS4 and/or local waterways, and the team leader retains the discretion to adjust the prioritization as needed to accomplish that goal.

13.0 CITIZEN CALL IN REPORTS

The Town of Upton will provide opportunity to report suspected illicit discharges through their stormwater website, email, phone and by office visit. When a report is received about a suspected illicit discharge, an Illicit Discharge Incident Tracking Form as found in **Appendix F** shall be used to document appropriate information.

Potential illicit discharges reported by citizens should be reviewed on an annual basis to locate patterns of illicit discharges, identify high-priority catchments, and evaluate the call-in inspection program.

14.0 IDENTIFICATION/CONFIRMATION OF ILLICIT SOURCE

Where the source of an illicit discharge has been reported and/or delimited between two manholes, more detailed investigation techniques will be used to isolate and confirm the source. Based on the site conditions, one or more of the following techniques may be used:

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

DYE TESTING is used to confirm a suspected illicit connection to a storm drain system. Prior to testing, permission to access the site should be obtained. Dye is discharged into the suspected fixture, and nearby storm drain structures and sanitary sewer manholes observed for presence of the dye. Each fixture, such as sinks, toilets, and sump pumps, should be tested separately. A third-party contractor may be required to perform this testing activity.

SMOKE TESTING can be used to locate the source of illicit discharges when there is no obvious potential source. Smoke testing is an appropriate tracing technique for short sections of pipe and for pipes with small diameters. Smoke added to the storm drain system will emerge in connected locations. A third-party contractor may be required to perform this testing activity.

CLOSED CIRCUIT TELEVISION INSPECTION (CCTV) can be used to locate illicit connections and infiltration from sanitary sewers. In CCTV, cameras are used to record the interior of the storm drain pipes. They can be manually pushed with a stiff cable or guided remotely on treads or wheels. A third-party contractor may be required to perform this testing activity.

15.0 ILLICIT DISCHARGE REMOVAL

When the specific source of an illicit discharge is identified, the Town will exercise its authority as necessary to require its removal pursuant to part 2.3.4.2 or 2.3.4.3 of the Permit.

For each confirmed source, annual reporting will include 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; and
- estimate of the volume of flow removed.

Within one year of removal of all identified illicit discharges within a catchment area, confirmatory outfall or interconnection screening will be conducted. The confirmatory screening will be conducted in dry weather unless System Vulnerability Factors have been identified, in which case both dry weather and wet weather confirmatory screening will be conducted. If confirmatory screening indicates evidence of additional illicit discharges, the catchment will be scheduled for additional investigation.

16.0 INDICATORS OF IDDE PROGRAM PROGRESS

The Town of Upton will define or describe indicators for tracking program success and evaluate and report on the overall effectiveness of the IDDE program in each annual report. At a minimum the Town will document in each annual report:

- The MATRIX, updated annually with data collected as part of catchment investigations
- All dry and wet weather screening and sampling results
- Reports on actions taken, SSOs and illicit connection identified and removed, and the estimated volume of sewage removed
- The number and percent of total Town-owned MS4 catchment areas evaluated using the IDDE program procedures
- Training records for frequency and type of employee training

17.0 ONGOING SCREENING

Upon completion of all catchment investigations and illicit discharge removal and confirmation (if necessary), each outfall or interconnection will be reprioritized and scheduled for ongoing screening once every five years. Ongoing screening will consist of dry weather screening and sampling consistent with **Section 11** of this report; wet weather screening and sampling will also be required at outfalls where wet weather screening was required due to SVFs as outlined in **Section 12.3** of this report.

18.0 TRAINING

The Town will, at a minimum, annually provide training to employees involved in the IDDE program about the program, including how to recognize and report illicit discharges and SSOs. See **Appendix E** for the IDDE Employee Training Record

19.0 RECORDS AND REPORTING

The progress and effectiveness of the IDDE program will be evaluated and reported on in each annual report. Indicators and documentation for tracking the program success are identified in **Section 16**. The success of the IDDE program will be measured by the IDDE activities completed within the required Permit timelines.