Town of Stoneham, Massachusetts

ILLICIT DISCHARGE DETECTION & ELIMINATION (IDDE) PLAN

DRAFT

July 2019

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ACRONYMS AND ABBREVIATIONS

BMP	Best Management Practice
CCTV	Closed Circuit Television
CMRSWC	Central Massachusetts Regional Stormwater Coalition
CWA	United States Environmental Protection Agency's Clean Water Act
DEP	Massachusetts Department of Environmental Protection
DPW	Department of Public Works
EPA	United States Environmental Protection Agency
GIS	Geographic Information System
IDDE	Illicit Discharge Detection and Elimination
MCM	Minimum Control Measure
MS4	Municipal Separate Storm Sewer System
MS4 Permit	General Permit for Small Municipal Separate Storm Sewer Systems
NPDES	National Pollutant Discharge Elimination System
NOAA	National Oceanic Atmospheric Administration
PPE	Personal Protective Equipment
SSO	Sanitary Sewer Overflow
SOP	Standard Operating Procedure
SVF	System Vulnerability Factor
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
USGS	United States Geological Survey
WQS	Water Quality Standards

1 INTRODUCTION

The Town of Stoneham (Town) owns, operates, and maintains a Small Municipal Separate Storm Sewer System (MS4) which conveys and discharges stormwater runoff to surface waters of the United States. The 2016 National Pollution Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small MS4's (MS4 Permit) issued by the United States Environmental Protection Agency (EPA) and made effective July 1, 2018 requires all permittees, or regulated communities to create a Stormwater Management Program that addresses six minimum control measures (MCMs):

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

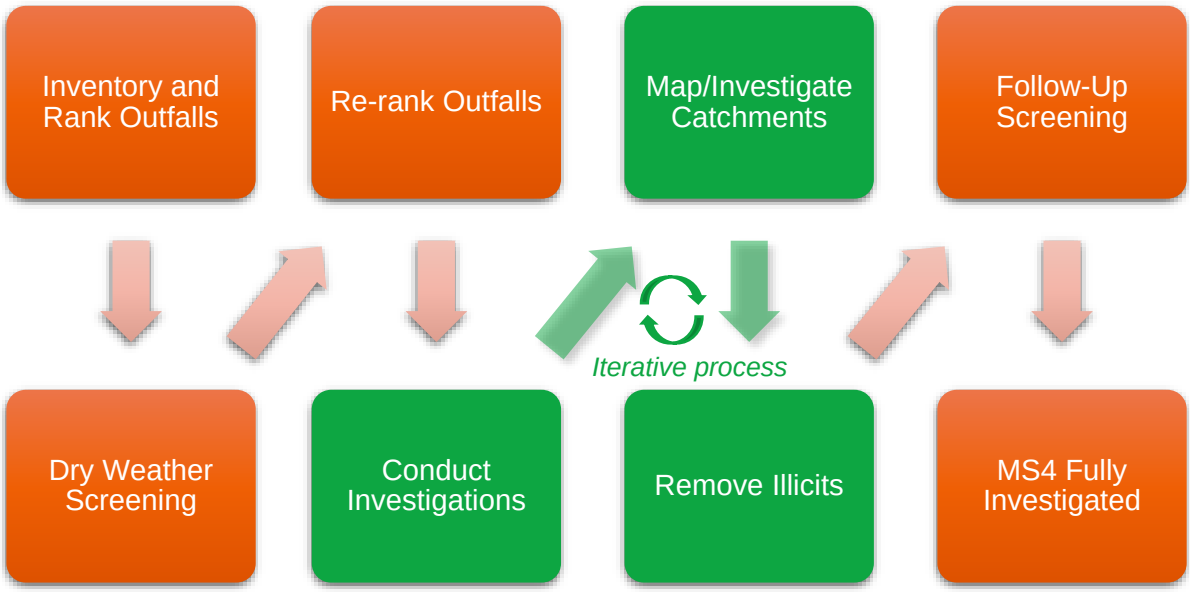
Under MCM 3, the permittee is required to implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its MS4 and implement procedures to prevent such discharges. The IDDE program must also be recorded in a written (hardcopy or electronic) document. This IDDE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

1.1 IDDE Program Goals

The goals of this written IDDE plan include the major components as outlined in the MS4 Permit to find and successfully eliminate illicit discharges to the MS4:

- Identification of legal authority and regulatory mechanism to prohibit illicit discharges and enforce this IDDE program;
- An assessment of the current mapping of the MS4 and protocols for the continual improvements and addition to the mapping of the MS4;
- Inventory and ranking of outfalls;
- Dry weather outfall screening protocols and procedures;
- Catchment investigations protocols and procedures;
- Methods for the identification/confirmation of illicit source;
- Follow-on screening; and,
- Employee training.

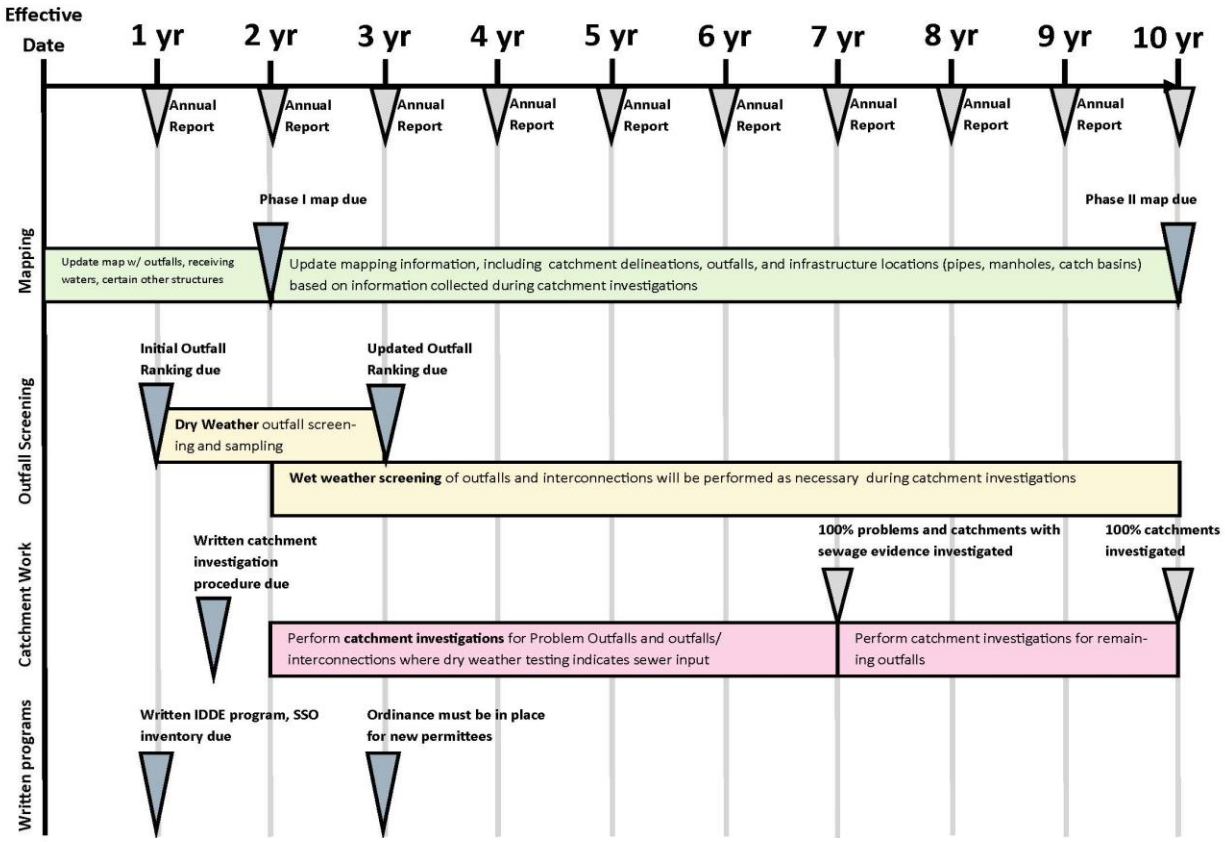
The IDDE investigation procedure framework shown in Figure 1, from the Central Massachusetts Regional Stormwater Coalition (CMRSWC), will generally be used to guide IDDE investigations work in the Town throughout the permit term.



Source: Central Massachusetts Regional Stormwater Coalition IDDE Plan Template, Figure 1-1.

Figure 1. IDDE Investigation Procedure Framework

It is the Town's intent to adhere to the IDDE timeline requirements of the MS4 permit as graphically shown in **Figure 2**, as provided by the EPA. **Table 1** presents a summary of the IDDE program requirement deadlines for the current permit term.



Source: EPA Region 1 Stormwater Tools in New England webpage. (https://www3.epa.gov/region1/npdes/stormwater/ma/idde-implementation-timeline.pdf)

Figure 2. IDDE Program Implementation Timeline

Table 1. Summary of IDDE Program Details

IDDE Permit Requirement	Deadline (Permit Year End Date)
Phase I Map	June 30, 2020 (Year 2)
Phase II Map	June 30, 2028 (Year 10)
Dry Weather Outfall Screening	June 30, 2021 (Year 3)
Initial Outfall Ranking	June 30, 2019 (Year 1) – included in this IDDE Plan
Updated Outfall Ranking	June 30, 2021 (Year 3)
Wet Weather Screening	June 30, 2028 (Year 10)
Written Catchment Investigation Procedures	December 30, 2019 (between Years 1 & 2)
100% Problem Catchments and outfalls where dry weather testing indicates sewer input	June 30, 2025 (Year 7)
Catchment investigations for remaining outfalls	June 30, 2028 (Year 10)
Written IDDE program, SSO Inventory	June 30, 2019 (Year 1)

1.2 Illicit Discharges

An illicit discharge is defined as any non-stormwater discharge to a drainage system, with the exception of discharges pursuant to a private NPDES permit (not to include the NPDES permit for discharges from the MS4) or those considered allowable non-stormwater discharges, such as discharges resulting from fire-fighting activities. A list of allowable non-stormwater discharges is presented in **Section 1.3** of this Plan.

Illicit discharges may take a variety of forms. Illicit discharges may enter the drainage system through direct or indirect connections. Direct connections may be relatively obvious, such as cross-connections of sanitary sewer services to the storm drain system. Indirect illicit discharges may be more difficult to detect or address, such as failing septic systems that discharge untreated sewage to a ditch within the MS4, or a sump pump that discharges contaminated water on an intermittent basis.

Some illicit discharges are intentional, such as dumping used oil (or other pollutant) into catch basins, a resident or contractor illegally tapping a new sewer lateral into a storm drain pipe to avoid the costs of a sewer connection fee and service, and illegal dumping of yard wastes into surface waters.

Some illicit discharges are related to the unsuitability of original infrastructure to the modern regulatory environment. Examples of illicit discharges in this category include connected floor drains in old buildings, as well as sanitary sewer overflows that enter the drainage system. Sump pumps legally connected to the storm drain system may be used inappropriately, such as for the disposal of floor washwater or old household products, in many cases due to a lack of understanding on the part of the homeowner.

Regardless of the intention, when not addressed, illicit discharges can contribute high levels of pollutants, such as heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to surface waters.

1.3 Allowable Non-Stormwater Discharges

The following categories of non-storm water discharges are allowed under the MS4 Permit and under the Town's Stormwater Management Bylaw, unless the Town, EPA or DEP identifies any category or individual discharge of non-stormwater discharge as a significant contributor of pollutants to the MS4:

- Water line flushing
- Landscape irrigation or lawn watering
- Diverted stream flows
- Rising groundwater
- Uncontaminated groundwater infiltration (40 CFR 35.2005(20))
- Uncontaminated pumped groundwater
- Discharge from potable water sources
- Foundation drains and Footing drains

- Air conditioning condensation
- Irrigation water, springs
- Water from crawl space pumps
- Individual residential car washing
- De-chlorinated swimming pool discharges (untouched for no less than 1 week and containing less than 1 ppm of chlorine)
- Street wash waters; and
- Residential building wash waters absent of detergents

Additionally, discharges resulting from fire-fighting activities are exempt from being considered illicit discharges and shall be considered allowable discharges to the MS4.

1.4 Surface Waters within the Town

There are ten (10) Surface waters within or encroaching the border of Stoneham. The DEP Massachusetts Surface Water Quality Standards (WQS), 314 CMR 4.00, classifies inland, coastal, and marine surface waters a in accordance with the intended beneficial uses of each surface water. Surface waters identified in Stoneham have been classified as Class A or Class B waters. Waterbodies not identified are automatically designated as Class B for inland waters and Class SB for Coastal Waters. Wetlands bordering a classified water is designated the same class as the classified water, all vernal pools and other wetlands not bordering a waterbody are designated as Class B waters, and reservoirs are designated Class A waters per 314CMR 4.06.

Classified waters within the Town and its borders include:

- Class A – Waters designated for public water supply sources, fish and wildlife resource areas, primary and secondary recreation, and are protected as Outstanding Resource Waters; or
- Class B – Waters designated as fish and wildlife resource areas, as well as primary and secondary recreation areas

Additionally, the Massachusetts Year 2016 Integrated List of Waters prepared by the DEP's Division of Watershed Management has categorized 2 surface waters partially within the Town. The document provides assessments on the quality of Massachusetts surface waters pursuant to Sections 303(d) and 305(b) of the EPA's Clean Water Act (CWA). Section 305(b) of the CWA outlines the process by which surface waters are to be evaluated or classified with respect to their uses and Section 303(d) of the CWA requires the categorization of surface waters. The process of assessing surface waters under Section 305(b) and listing impairments under Section 303(d) of the Clean Water Act is inextricably linked to the Massachusetts Surface WQS, as the standards define the uses that are to be evaluated for any given water body.

The State's surface waters are separated into the following categories:

- Category 1 – Waters attaining all designated uses
- Category 2 – Waters attaining some uses; other uses not assessed

- Category 3 – No uses assessed
- Category 4a – TMDL completed
- Category 4b – Impairment controlled by alternative pollution control requirements
- Category 4c – Impairment not caused by a pollutant – TMDL not required,
- Category 5 – Waters requiring a TMDL

These categories determine which waters require an allowable total maximum daily load (TMDL) for a given pollutant or impairment. The Integrated List of Waters is developed every two years and contains a growing list of impairments, many of whose primary sources are stormwater runoff. Waterbodies not listed under a category under the impaired waters listing are considered Category 3 waters. There are currently only Category 3 waters within the Town of Stoneham.

1.4.1 TMDL Development

Currently, a Pathogen TMDL has been established for the Boston Harbor watershed, which includes the Mystic River and its tributary waters. This TMDL specifically addresses the pathogen indicators fecal coliform for shellfish areas, E. coli for freshwaters, and enterococci for bathing and marine waters. These have been determined by DEP as indicators generally arising from failing sewer line infrastructure, failing septic systems, and animal (mammal and bird) wastes. The watershed assessment findings conclude that sources of these indicator bacteria within the watershed are varied, but most are believed to originate from stormwater. Mitigation actions include removal of illicit discharges to stormwater drainage systems, removal of CSOs, and implementation of stormwater Best Management Practices (BMPs) throughout the watershed.

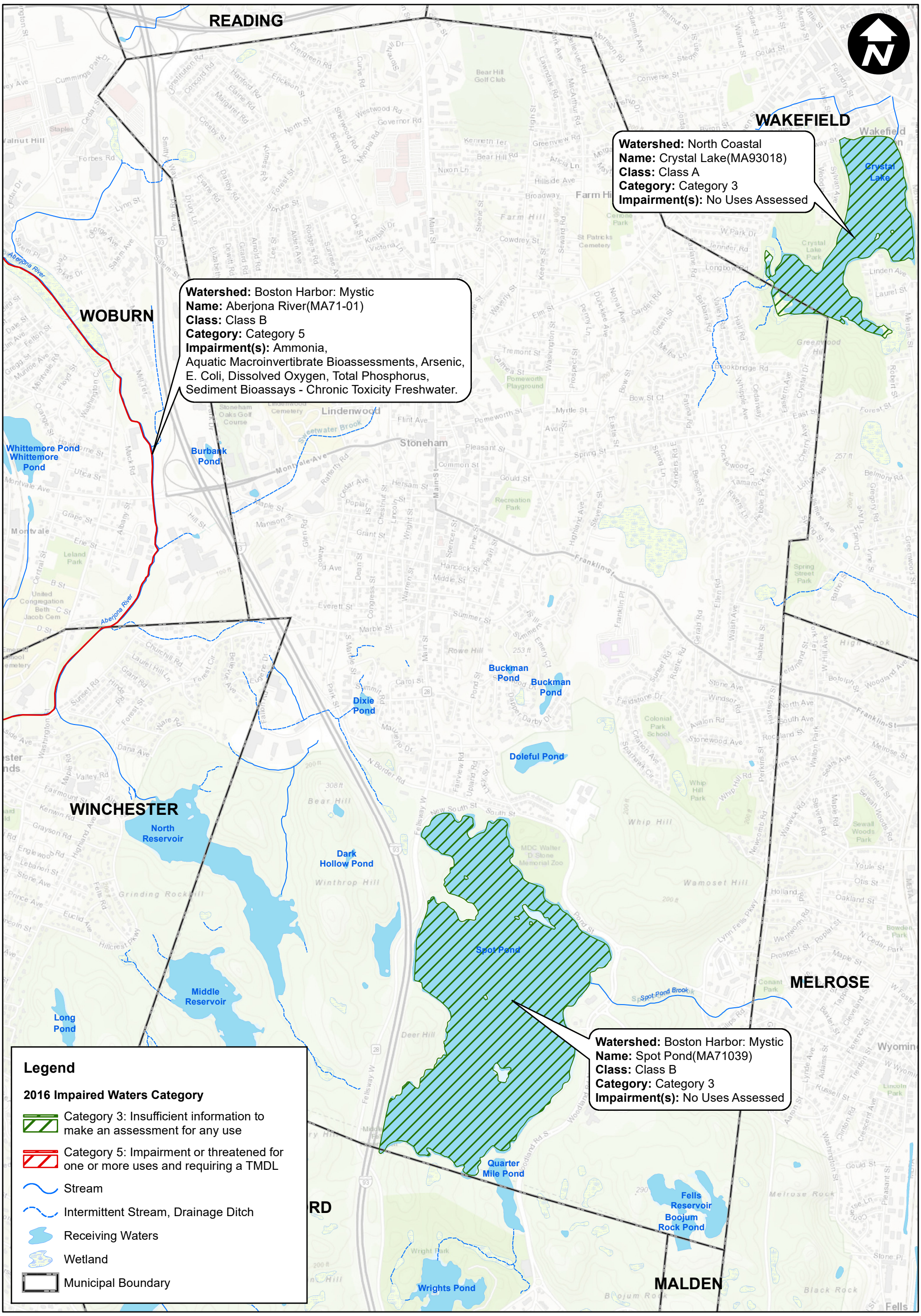
Figure 3 shows the location and class of surface waters within the Town, and **Table 2** provides a summary of surface water classifications and impairment categories.

1.5 Administrative Order

On August 7, 2009 the Town of Stoneham was presented with an Administrative Order (EPA Docket NO. 09-027) for findings of violations and noncompliance with the 2003 NPDES General Permit for Stormwater Discharges from Small MS4's. The work required under the AO is summarized below:

- Develop & Submit an IDDE Plan
- Complete & Submit CMOM Program Self Assessment, CMOM Corrective Action Plan, and CMOM Program document.
- Complete & Submit Digital/GIS Map of collection system and MS4
- Develop & Make Effective IDDE, Sediment and Erosion Control, and Post-Construction Bylaw(s)
- Submit Compliance Reports twice per year

All work has been completed to date, with IDDE investigations and compliance reporting being an ongoing effort.



TOWN OF STONEHAM, MASSACHUSETTS

ARCADIS

Surface Water Classifications and Impairment Categories

Feet
0 1,000 2,000 3,000

FIGURE 3

\\arcadis-us.com\officedata\Wakefield-MA\GIS\3487-Stoneham\IDDE Plan\2019 MS4 Compliance\Figure 3 - Stoneham, MA Surface Waters.mxd

Table 2. Stoneham Surface Water Classifications and Impairment Categories

Receiving Waterbody and Segment ID	Surface Water Class	TMDL Category	Impairment
Buckman Pond	Class B*	Category 3*	Insufficient Information
Burbank Stream	Class B*	Category 3*	Insufficient Information
Crystal Lake (MA93018)	Class A	Category 3	Insufficient Information
Dark Hollow Pond	Class B*	Category 3*	Insufficient Information
Doleful Pond	Class B*	Category 3*	Insufficient Information
North Stream	Class B*	Category 3*	Insufficient Information
Quarter Mile Pond	Class B*	Category 3*	Insufficient Information
Spot Pond (MA71039)	Class B*	Category 3	Insufficient Information
Spot Pond Brook	Class B*	Category 3*	Insufficient Information
Sweetwater Brook	Class B*	Category 3*	Insufficient Information

*Waters Classified based on 314 CMR 4.00 General Water Classifications

1.6 Work Completed to Date

The 2003 MS4 Permit required each MS4 community to develop a plan to detect illicit discharges using a combination of storm system mapping, adopting a regulatory mechanism to prohibit illicit discharges and enforce this prohibition, and identifying tools and methods to investigate suspected illicit discharges. Each MS4 community was also required to define how confirmed discharges would be eliminated and how the removal would be documented.

The Town of Stoneham has completed the following IDDE program activities consistent with the 2003 MS4 Permit requirements and the 2009 Administrative Order:

- Developed a map of the stormwater system including catch basins, manholes, pipes, outfalls and receiving waters.
- Developed and maintained an inventory of outfalls and intermunicipal connections, and an inventory of sanitary sewer overflows.
- Adopted a Stormwater Bylaw and Stormwater Rules and Regulations covering IDDE, Sediment & Erosion Control, and Post-Construction regulatory requirements.
- Conducted comprehensive outfall screening for compliance with the 2003 MS4 Permit and the 2009 AO. The Town continues to investigate priority catchment areas along Sweetwater Brook.

2 AUTHORITY AND STATEMENT OF IDDE RESPONSIBILITIES

2.1 Legal Authority

The Town has adopted a Stormwater Bylaw and associated Stormwater Management Rules and Regulations. These regulatory documents provide the Town with the 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.
- Implement appropriate enforcement procedures and actions.
- Promulgate and modify regulations.

The Stormwater Bylaw can be found as Chapter 11A in the Town Code. The most recent Town Bylaws may be viewed at the Town Clerk's office or found on the Town's website at the link below:

https://ma-stoneham.civicplus.com/244/Town-Clerk

(Click on ***Town Code***)

The Stormwater Management Rules and Regulations may be found on file at the Department of Public Works (DPW).

2.2 Statement of Responsibility

The DPW is the lead municipal agency or department responsible for implementing the IDDE program pursuant to the provisions of the Stormwater Bylaw and the MS4 Permit. Other agencies or departments with responsibility for aspects of the program include:

- **Water and Sewer Departments** – Support for investigations and removal of illicit connections/discharges.
- **Building Department** – Ensure illicit connections are not made during renovations or new construction.
- **Health Department** – Ensure illicit discharges from food establishments and other facilities are not going to the MS4.
- **Planning and Community Development**– Ensure stormwater requirements are being met during review/inspection of new development and redevelopment.
- **Town Administrator and/or Town Counsel** – Support for enforcement or legal actions.

All Town departments are responsible for following-up with the DPW on any reports of suspected illicit connections or discharges to the MS4.

3 MUNICIPAL STORM DRAINAGE SYSTEM

3.1 Mapping and GIS Database Management

The Town of Stoneham originally developed mapping of its stormwater system to meet the mapping requirements of the 2003 MS4 Permit and the AO. The 2016 MS4 Permit requires a more detailed storm system map than was required by the 2003 MS4 Permit. The revised mapping is intended to facilitate the identification of key infrastructure, factors influencing proper system operation, and the potential for illicit discharges.

The Town fulfilled the 2003 MS4 permit requirements for mapping and conducted additional mapping efforts to produce a stormwater drainage system map that includes catch basins, manholes, pipe connectivity on top of the outfalls and receiving waters which were already mapped. The mapping exists in a Geographic Information System (GIS) database and is updated as projects occur. A map of the Stoneham Municipal Storm Drainage System is included as **Figure 4**.

The 2016 MS4 Permit requires the storm system map to be updated in two phases as outlined below. The DPW is responsible for updating the stormwater system mapping pursuant to the 2016 MS4 Permit. The Town will report on the progress towards completion of the storm system map in each annual report.

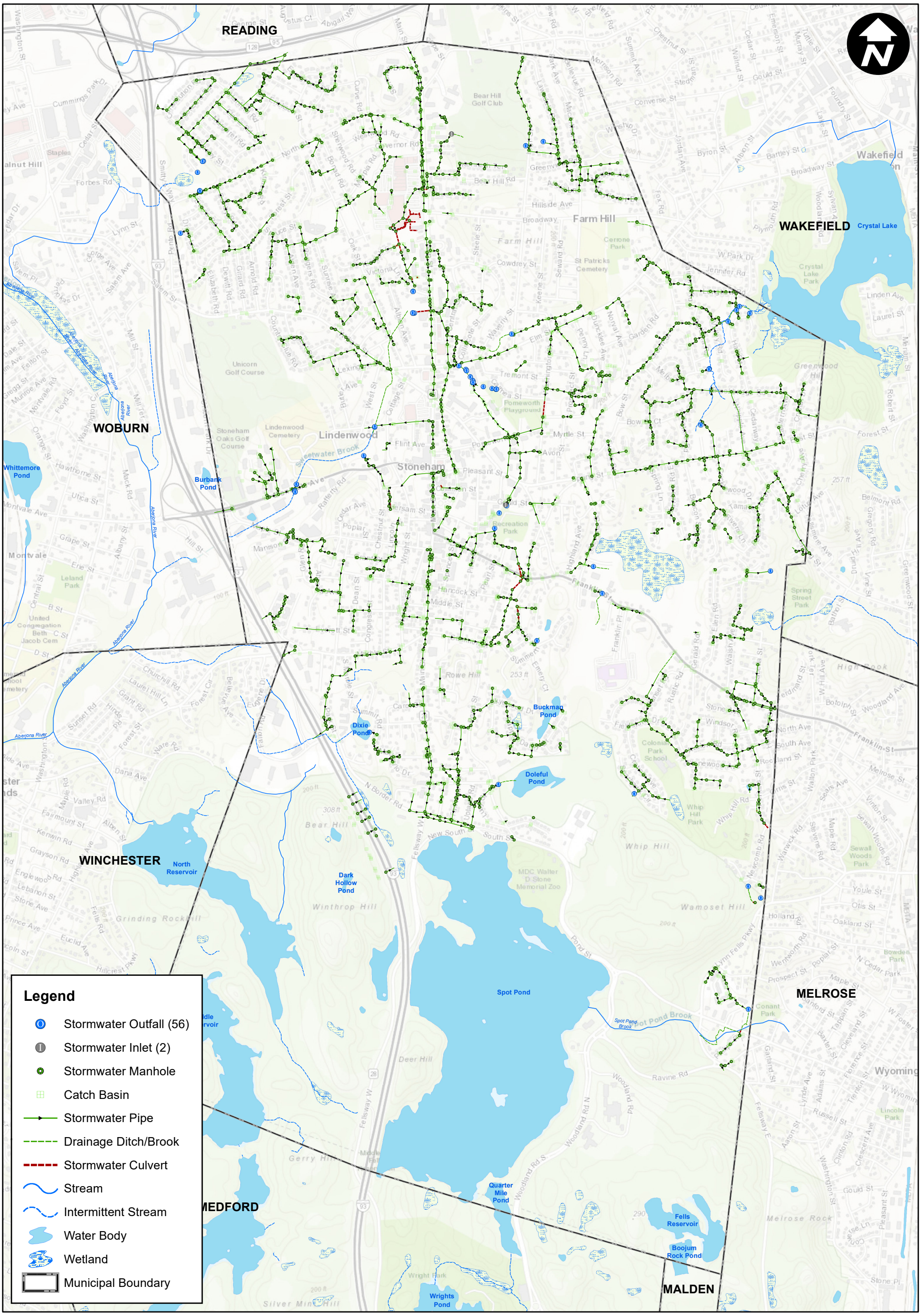
The Town plans to continually update their stormwater mapping during field investigations and maintenance of their storm drainage system to comply with the requirements of the 2016 Massachusetts Small MS4 general permit.

3.1.1 Phase 1 Mapping

Phase I mapping must be completed within two (2) years of the effective date of the permit (by June 30, 2020) and include the following information:

- Outfalls and receiving waters (previously required by the MS4-2003 permit)
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- Municipally owned stormwater treatment structures (Bioswales, BMPS, etc.)
- Water bodies identified by name and indication of all use impairments as identified on the most recent EPA approved Massachusetts Integrated List of Waters report
- Initial catchment delineations. Topographic contours and drainage system information may be used to produce initial catchment delineations.

The Town will update its stormwater mapping by July 1, 2020 to include the remaining Phase I information.



TOWN OF STONEHAM, MASSACHUSETTS

ARCADIS

Municipal Stormwater System and Water Bodies

0 1,000 2,000 3,000 Feet

FIGURE 4

G:\GIS\3487-Stoneham\IDDE Plan\2019 MS4 Compliance\Figure 4 - Stoneham, MA Municipal Stormwater System.mxd

3.1.2 Phase 2 Mapping

Phase II mapping must be completed within ten (10) years of the effective date of the permit (July 1, 2028) and include the following information:

- Outfall spatial location (latitude and longitude with a minimum accuracy of +/-30 feet)
- Pipes
- Manholes
- Catch basins
- Refined catchment delineations. Catchment delineations must be updated to reflect information collected during catchment investigations.
- Municipal Sanitary Sewer system (if available)
- Municipal combined sewer system (if applicable).

The Town will update its stormwater mapping by July 1, 2028 to include the remaining Phase II information.

4 SANITARY SEWER OVERFLOWS

The 2016 MS4 Permit requires municipalities to prohibit illicit discharges, including sanitary sewer overflows (SSOs), to the separate storm sewer system. SSOs are discharges 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 defects that allow stormwater and groundwater to overload the system, power failures, improper sewer design, and vandalism.

The Town keeps information on SSOs and maintains an inventory of SSOs that have occurred within the since 2010. A record of each SSO event includes the location of each event, the date and time of each event, an estimated discharge volume, the known or suspect source and cause of the overflow, and mitigation measures. The current inventory of known SSOs in the Town is included in **Appendix A**.

Upon detection of an SSO, the Town will eliminate it as expeditiously as possible and take interim measures to minimize the discharge of pollutants to and from its MS4 until the SSO is eliminated. Upon becoming aware of an SSO to the MS4, the Town will provide oral notice to EPA within 24 hours and written notice to EPA and MassDEP within five (5) days of becoming aware of the SSO occurrence.

The inventory in Appendix A will be updated by the DPW at least annually. The SSO inventory will be included in the annual report, including the status of mitigation and corrective measures to address each identified SSO.

5 IDDE PROTOCOL AND PROCEDURES

The 2016 MS4 Permit requires an assessment and priority ranking of outfalls in terms of their potential to have illicit discharges and SSOs and the related public health significance. The ranking helps determine the priority order for performing IDDE investigations and meeting permit milestones.

5.1 Outfall Catchment Delineations

A catchment is the area that drains to an individual outfall[1] or interconnection.[2] The catchments for each of the MS4 outfalls will be delineated to define contributing areas for investigation of potential sources of illicit discharges. Catchments are typically delineated based on topographic contours and mapped drainage infrastructure, where available. Initial catchment delineations will be completed as part of the Phase I mapping, and refined catchment delineations will be completed as part of the Phase II mapping to reflect information collected during catchment investigations.

5.2 Outfalls and Interconnections

5.2.1 Initial Outfall / Interconnection Ranking

The DPW will complete an initial outfall[1] and interconnection[2] inventory and priority ranking to assess illicit discharge potential within one (1) year from the effective date of the permit (by June 30, 2019). All known outfalls and interconnections will be ranked into four classifications, as described on the following page, prior to the implementation of outfall screening. The initial ranking of outfalls will use information from previous screenings, catchment investigations, reports to the Town, the Massachusetts Integrated List of Waters, and proximity to areas where public health, or environmental impact may be a concern.

An updated inventory and ranking will be provided in each annual report after the initial ranking. The inventory will be updated annually to include data collected in connection with dry weather screening and other relevant inspections.

The outfall and interconnection inventory will identify each outfall and interconnection discharging from the MS4, record its location and condition, and provide a framework for tracking inspections, screenings and other IDDE program activities.

Outfalls and interconnections will be classified into one of the following categories:

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[1] **Outfall** means 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. Culverts longer than a simple road crossing shall be included in the inventory unless the permittee can confirm that they are free of any connections and simply convey waters of the United States.

[2] **Interconnection** means 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.

- **Problem Outfalls:** Outfalls/interconnections with known or suspected contributions of illicit discharges based on existing information shall be designated as Problem Outfalls. This shall include any outfalls/interconnections where previous screening indicates likely sewer input. Likely sewer input indicators are any of the following:
    - 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.
- **High Priority Outfalls:** Outfalls and interconnections that have not been classified as Problem Outfalls and that discharge to surface waters in an area of concern to public health, categorized as having or needing a TMDL, in a catchment area where exists aging sewer or storm structures, SSO's, or septic systems, or where flows are received from a network of previously combined sewer-storm system.
- **Low Priority Outfalls:** Outfalls and interconnections determined to have low likelihood for an illicit discharge by the Town and are not considered for any of the criteria indicating the outfall or interconnection as a High Priority Outfall.
- **Excluded Outfalls:** Outfalls and interconnections with no potential for illicit discharges based on the tributary stormwater features being a significant distance from any sanitary sewers or septic systems, where non-stormwater flows are determined as absent from the area and only road and surface stormwater runoff may enter the system. 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.

Dry weather screening and sampling, as described in **Section 6** of this IDDE Plan and Part 2.3.4.7.b of the MS4 Permit, is not required for Problem Outfalls or Excluded Outfalls. Problem Outfalls will be directly investigated following the procedures for catchment investigations as detailed in **Section 7**. Outfalls/interconnections classified as High Priority Outfalls and Low Priority Outfalls will be screened for indicators of illicit discharges.

Outfalls will be ranked into the above priority categories (<u>except for Excluded Outfalls, which may be excluded from the IDDE program</u>) based on the following characteristics of the defined initial catchment areas, where information is available. Additional relevant characteristics, including location-specific characteristics, may be considered but must be documented in this IDDE Plan.

- **Previous screening results** – previous screening/sampling results indicate likely sewer input (see criteria above for Problem Outfalls).
- **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 TMDLs applicable to the permittee, where illicit discharges have the potential to contain the pollutant identified as the cause of the water quality impairment.

An outfall inventory and priority ranking matrix table is included as **Appendix B.**

6 DRY WEATHER OUTFALL SCREENING

Dry weather flow is a common indicator of potential illicit connections. The MS4 Permit requires all outfalls/interconnections (excluding Problem and Excluded Outfalls) to be inspected for the presence of dry weather flow. The DPW is responsible for conducting dry weather outfall screening, starting with High Priority outfalls, followed by Low Priority outfalls, based on the initial priority rankings described in the previous section.

6.1 Outfall Screening Weather Conditions Criteria

Dry weather outfall screening and sampling may occur when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and when no significant snow melt is occurring. For purposes of determining dry weather conditions, program staff will use precipitation data from an approved local weather station within or nearby the investigation area. If the approved weather stations is not available or not reporting current weather data, then the use of local weather forecasting data from sources like the United States Geological Survey (USGS), and the National Oceanic Atmospheric Administration (NOAA) may serve as a back-up.

6.2 Dry Weather Outfall Screening/Sampling Procedures

6.2.1 General Procedure

The dry weather outfall inspection and sampling procedure consists of the following general steps:

1. Identify outfall(s) to be screened/sampled based on initial outfall inventory and priority ranking
2. Acquire the necessary staff, mapping, and field equipment (see **Table 3** for list of potential field equipment)
3. Conduct the outfall inspection during dry weather (see **Section 6.1** for weather criteria):
    a. Mark and photograph the outfall
    b. Record the inspection information and outfall characteristics (using paper or digital forms)
    c. Look for and record visual/olfactory evidence of pollutants in flowing outfalls including odor, color, turbidity, and floatable matter (suds, bubbles, excrement, toilet paper or sanitary products). Also observe outfalls for deposits and stains, vegetation, and damage to outfall structures.
4. If flow is observed, sample and test the flow following the procedures described in **Section 6.2.3**.
5. If no flow is observed, but evidence of illicit flow exists (illicit discharges are often intermittent or transitory), 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. Other techniques can be used to detect intermittent or transitory flows including conducting inspections during evenings or weekends, sandbagging, and using optical brighteners.
6. Input results from screening and sampling into spreadsheet/database. Include pertinent information in the outfall/interconnection inventory and priority ranking.
7. Include all screening data in the annual report.

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

Equipment	Use/Notes
Clipboard	For organization of field sheets and writing surface
Field Sheets	Field sheets for both dry weather inspection and dry weather sampling should be available with extras
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 and boots at a minimum
GPS Receiver	For taking spatial location data
Water Quality Sonde	If needed, for sampling conductivity, temperature, pH
Water Quality Meter	Hand held meter, if available, for testing for 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. 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 requires sterile containers).
Pry Bar, Pick or Manhole Puller	For opening catch basins and manholes when necessary
Sandbags	For damming low flows in order to take samples
Small Mallet or Sledge Hammer	Helping to free stuck manhole and catch basin covers
Utility Knife	Multiple uses
Measuring Tape	Measuring distances and depth of flow
Safety Cones	Safety
Hand Sanitizer	Disinfectant/decontaminant
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

Previous outfall screening/sampling conducted under the 2003 MS4 Permit may be used to satisfy the dry weather outfall/screening requirements of the 2016 MS4 Permit only if the previous screening and sampling was substantially equivalent to that required by the 2016 MS4 Permit, including the list of analytes outlined in Section 2.3.4.7.b.iii.4 of the 2016 permit.

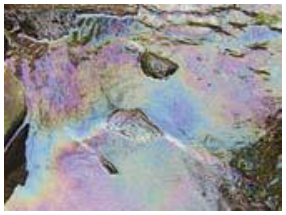
The following information is generally recorded during dry weather investigations:

- Field personnel, inspection date and time, weather and temperature
- Time (in hours) since last precipitation event and amount (in inches of precipitation).
- Photos (One general area photo, one closeup of outfall structure)
- Outfall/Structure ID
- Receiving Waterbody
- Outfall type (pipe, box culvert, arch, horizontal elliptical, vertical elliptical)
- Outfall material (reinforced concrete, corrugated metal, PVC, HDPE, stone, brick, earthen, other)
- Opening Size Diameter if round or Width and Height if not round (inches)
- Condition (corrosion, cracks/breaks, spalling, pipe collapsed, pipe crushed, pipe submerged)
- Dry weather flow (indication of flow and flow depth in inches)
- Color, clarity, and odor of flow
- Presence of floatables (trash, oil, suds, scum, leaves) and deposits/stains (oil, rust, sediments)
- Vegetation growth (algae, iron floc)
- Test kit sampling results (if sample is taken)
- Whether or not an Illicit discharge is suspected

A sample of an outfall inspection form is included as **Appendix C.**

6.2.2 Evidence of Illicit Flows

In the event an outfall is inspected, and no flows are observed, indicators of illicit flow evidence may be used in the determination of likely illicit discharges. Some observable evidence of an illicit discharge includes the presence of toilet paper and other sanitary items, staining, grease deposits, or excessive vegetation or bacterial growth. Examples of illicit flow evidence in non-flowing outfalls are shown in **Figure 5**. These examples are excerpts from the Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments by the Center for Watershed Protection and Robert Pitt, 2004.

 Toilet paper or other sanitary items directly around the storm drain outlet are indicators of an upstream illicit connection.	 Suds present at an outfall may indicate and illicit connection and likely when accompanied by the presence of a fragrant detergent odor.
 Bacterial growth at an outfall indicates nutrient enrichment likely from sanitary connections / defects.	 Excessive vegetation and algae growth may indicate enriched flows associated with sewage or fertilizers from lawn care
 Water color indicators may identify the presence of an illicit connection or illegal dumping and may require additional investigation. Note: water color may also be a result of minerals and algae growth	 Oily Sheen or Film may indicate the presence of an illicit connection or illegal dumping of pollutants. Note: some oils are organic and should be differentiated from Synthetic oils before using as an indicator

Source: Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments by the Center for Watershed Protection and Robert Pitt, 2004.

Figure 5. Evidence of Illicit Flow

6.2.3 General Outfall Sampling Procedure

If flow is present during a dry weather outfall inspection, a sample will be collected and analyzed for the required permit parameters[3] listed in **Table 4**. The general procedure for collection of outfall samples is as follows:

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

In the event that an outfall is submerged, either partially or completely, or inaccessible, field staff will proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results. Field staff will continue to the next upstream structure until there is no longer an influence from the receiving water on the visual inspection or sampling.

Field test kits or field instrumentation are permitted for all parameters except indicator bacteria and any pollutants of concern. Field kits need to have appropriate detection limits and ranges. **Table 4** lists various field test kits and field instruments that can be used for outfall sampling associated with the 2016 MS4 Permit parameters, other than indicator bacteria and any pollutants of concern.

If flow is observed at an outfall or interconnection during dry weather conditions, a grab sample will be taken and analyzed for the minimum parameters of E. coli or Enterococcus (dependent on the impairment and class of the receiving water), ammonia, surfactants, and total chlorine. When flow is observed, the inspectors will also conduct a visual windshield survey of the surrounding areas. Windshield surveys will entail driving through the area serviced by the drainage system of concern seeking to identify or isolate the source of an illicit or approved non-stormwater discharge. Potential illicit sources might include significant commercial, industrial or construction activity, un-swept streets, poorly maintained catch basins, broken pipes, etc. Potential approved non-stormwater discharge sources might include normal seasonal stream flow, lawn irrigation, non-commercial car washing, hydrant flushing, etc. All pertinent observations will be recorded and compiled along with other field collected screening data.

[3] Other potentially useful parameters, although not required by the MS4 Permit, include **fluoride** (indicator of potable water sources in areas where water supplies are fluoridated), **potassium** (high levels may indicate the presence of sanitary wastewater), and **optical brighteners** (indicative of laundry detergents).

Outfalls that are flowing will be sampled as described in the general procedure for outfall sampling. If an outfall is observed with no flow, but evidence of an illicit discharge is observed, the outfall will be rescreened within one week, if possible, under dry weather conditions.

Table 4. Sampling Parameters and Analysis Methods

Analyte or Parameter	Instrumentation (Portable Meter)	Field Test Kit
Ammonia	CHEMetrics™ V-2000 Colorimeter Hach™ DR/890 Colorimeter Hach™ Pocket Colorimeter™ II	CHEMetrics™ K-1410 CHEMetrics™ K-1510 (series) Hach™ NI-SA Hach™ Ammonia Test Strips
Surfactants (Detergents)	CHEMetrics™ I-2017	CHEMetrics™ K-9400 and K-9404 Hach™ DE-2
Chlorine	CHEMetrics™ V-2000, K-2513 Hach™ Pocket Colorimeter™ II	NA
Conductivity	CHEMetrics™ I-1200 YSI Pro30 YSI EC300A Oakton 450	NA
Temperature	YSI Pro30 YSI EC300A Oakton 450	NA
Salinity	YSI Pro30 YSI EC300A Oakton 450	NA
Temperature	YSI Pro30 YSI EC300A Oakton 450	NA
Indicator Bacteria: *E. coli* (freshwater) or Enterococcus (saline water)	EPA certified laboratory procedure (40 CFR § 136)	NA
Pollutants of Concern[1]	EPA certified laboratory procedure (40 CFR § 136)	NA

[1] Where the discharge is directly into a water quality limited water or a water 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.

Testing for indicator bacteria and any pollutants of concern must be conducted using analytical methods and procedures found in 40 CFR § 136.[4] Samples for laboratory analysis must also be stored and preserved in accordance with procedures found in 40 CFR § 136. **Table 5** lists analytical methods, detection limits, hold times, and preservatives for laboratory analysis of dry weather sampling parameters.

Suspect dry weather flows without obvious evidence of contamination (olfactory, excrement, toilet paper, etc.) will be sampled and analyzed for the minimum parameters of E. coli or enterococcus (as appropriate), ammonia, surfactants, chlorine, temperature, specific conductance, and salinity. In the presence of dry weather flow, samples will be gathered prior to the performance of any inspections which could cause flow disturbance. Temperature and pH of the dry weather flow will be determined after samples are secured.

[4] 40 CFR § 136: http://www.ecfr.gov/cgi-bin/text-idx?SID=b3b41fdea0b7b0b8cd6c4304d86271b7&mc=true&node=pt40.25.136&rgn=div5

Table 5. Required Analytical Methods, Detection Limits, Hold Times, and Preservatives[4]

Analyte or Parameter	Analytical Method	Detection Limit	Max. Hold Time	Preservative
Ammonia	**EPA**: 350.2, **SM**: 4500-NH3C	0.05 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2, No preservative required if analyzed immediately
Surfactants	**SM**: 5540-C	0.01 mg/L	48 hours	Cool ≤6°C
Chlorine	**SM**: 4500-Cl G	0.02 mg/L	Analyze within 15 minutes	None Required
Temperature	**SM**: 2550B	*NA*	Immediate	None Required
Specific Conductance	**EPA**: 120.1, **SM**: 2510B	0.2 µs/cm	28 days	Cool ≤6°C
Salinity	**SM**: 2520		28 days	Cool ≤6°C
Indicator Bacteria: *E.coli* Enterococcus	*E.coli* **EPA**: 1603 **SM**: 9221B, 9221F , 9223 B **Other**: Colilert®, Colilert-18® *Enterococcus* **EPA**: 1600 **SM**: 9230 C **Other**: Enterolert®	*E.coli* **EPA**: 1 cfu/100mL **SM**: 2 MPN/100mL **Other**: 1 MPN/100mL *Enterococcus* **EPA**: 1 cfu/100mL **SM**: 1 MPN/100mL **Other**: 1 MPN/100mL	8 hours	Cool ≤10°C, 0.0008% $Na_2S_2O_3$
Total Phosphorus	**EPA**: Manual-365.3, Automated Ascorbic acid digestion-365.1 Rev. 2, ICP/AES4-200.7 Rev. 4.4 **SM**: 4500-P E-F	**EPA**: 0.01 mg/L **SM** : 0.01 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2
Total Nitrogen (Ammonia + Nitrate/Nitrite, methods are for Nitrate-Nitrite and need to be combined with Ammonia listed above.)	**EPA**: Cadmium reduction (automated)-353.2 Rev. 2.0, **SM**: 4500-NO_3 E-F	**EPA**: 0.05 mg/L **SM** : 0.05 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2

SM = Standard Methods

Note: Total Phosphorus and Total Nitrogen are not required parameters for the outfalls found in the Town of Stoneham, at this time.

6.3 Interpreting Outfall Sampling Procedure

Outfall analytical data from dry weather sampling can be used to help identify the major type or source of discharge. **Table 6** shows values identified by the U.S. EPA and the Center for Watershed Protection as typical screening values for select parameters. These represent the typical concentration (or value) of each parameter expected to be found in stormwater. Screening values that exceed these benchmarks may be indicative of pollution and/or illicit discharges.

6.3.1 Follow on Priority Ranking of Outfalls / Interconnections

The Town will update and re-prioritize the initial outfall and interconnection rankings based on information gathered during dry weather screening. The rankings will be updated periodically as dry weather screening information becomes available but will be completed within three (3) years of the effective date of the permit (July 1, 2021).

Outfalls/interconnections where relevant information was found indicating sewer input to the MS4 or sampling results indicating sewer input are highly likely to contain illicit discharges from sanitary sources will be ranked at the top of the High Priority Outfalls category for investigation. Other outfalls and interconnections may be re-ranked based on any new information from the dry weather screening. All other outfalls will be ranked accordingly based on the levels found for the indicators shown in **Table 6**.

Table 6. Water Quality Sampling Criteria

Indicator	EPA Water Quality Standard	Benchmark: Illicit Discharge Likely	Benchmark: Illicit Discharge Unlikely	Instrumentation
E. coli (Class B waters)	235 cfu/100 ml The geometric mean of the five most recent samples taken during the same bathing season shall not exceed 126 colonies per 100 ml and no single sample taken during the bathing season shall exceed 235 colonies per 100 ml	≥ 1000 colonies/100 ml	< 1000 colonies/100 ml	Samples are taken in the field and analyzed at a local laboratory
Enterococci (Class SB waters)	104 cfu/100 ml The geometric mean of the five most recent samples taken during the same bathing season shall not exceed 35 colonies per 100 ml and no single sample taken during the bathing season shall exceed 104 colonies per 100 ml	≥ 1000 colonies/100 ml	< 1000 colonies/100 ml	
Surfactants (as MBAS)	>0.25 mg/l (field kits) 0.1 mg/l (lab)	≥ 0.25 mg/l	< 0.25 mg/l	MBAS Test Kit (e.g. CHEMetrics K-9400)
Ammonia (NH_3)	> 0.5 mg/l	≥ 1.0 mg/l	< 1.0 mg/l	NH_3 Test Kit (e.g. CHEMetrics K-1510)
Total Residual Chlorine	>0.02 mg/l (detectable levels per the 2016 MS4 Permit)	See note below.	See note below.	Total Chlorine Test Kit (e.g. CHEMetrics K-2504)
Temperature	-	> Air Temperature and < 54°	≤ Air Temperature and ≥ 54°	Thermometer
pH	-	≥ 9.0 or ≤ 6.3	< 9.0 or > 6.3	pH Meter

Note: Detectable total residual chlorine will require additional investigation of the outfall and catchment area to determine the likelihood of an illicit discharge. The presence of Chlorine can affect other outfall screening parameters and result in a loss of data accuracy. Additionally, the presence of chlorine may indicate and upstream watermain break, pool discharge, firefighting activity, hydrant flushing, etc. and should be investigated by means of a windshield survey.

7 CATCHMENT INVESTIGATIONS

Once stormwater outfalls with evidence of illicit discharges have been identified, various methods can be used to trace the source of the potential discharge within the outfall catchment area. Catchment investigation techniques include but are not limited to review of maps, historic plans, and records; manhole observation; dry and wet weather sampling; video inspection; smoke testing; and dye testing. This section outlines a systematic procedure to investigate outfall catchments to trace the source of potential illicit discharges. All data collected as part of the catchment investigations will be recorded and reported in each annual report.

7.1 System Vulnerability Factors

The DPW will review relevant mapping and historic plans and records to identify areas within the catchment with higher potential for illicit connections. The following information will be reviewed:

- Plans related to the construction of the drainage network
- Plans related to the construction of the sewer drainage network
- Prior work on storm drains or sewer lines
- Board of Health or other municipal data on septic systems
- Complaint records related to SSOs
- Septic system breakouts.

Based on the review of this information, the presence of any of the following **System Vulnerability Factors (SVFs)** will be identified for each catchment:

- History of SSO's
- Common or Twin Invert manholes
- Common trench constructions
- Storm / Sewer crossings, where Sewer pipe is above Storm pipe
- Sanitary lines with underdrains
- Surcharging sewers or backups
- Areas formerly served by a combined system
- Sanitary infrastructure defects
- Dated Sewer / Storm infrastructure (>40 years)
- Septic with poor soils or water table separation
- History of Board of Health actions addressing septic failure.

An SVF inventory will be documented for each catchment and, retained in **Appendix D** as part of this IDDE Plan, and included in the annual report.

7.2 Dry Weather Manhole Inspections

The Town will implement a dry weather storm drain network investigation that involves systematically and progressively observing, sampling and evaluating key junction manholes in the MS4 to determine the approximate location of suspected illicit discharges or SSOs.

The DPW will be responsible for implementing the dry weather manhole inspection program and making updates as necessary. Infrastructure information will be incorporated into the storm system map, and catchment delineations will be refined based on the field investigation, where necessary. The SVF inventory will also be updated based on information obtained during the field investigations, where necessary.

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

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

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

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

For most catchments, manhole inspections will proceed from the outfall moving up into the system. However, the decision to move up or down the system depends on the nature of the drainage system and the surrounding land use and the availability of information on the catchment and drainage system. Moving up the system can begin immediately when an illicit discharge is detected at an outfall, and only a map of the storm drain system is required. Moving down the system 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 discharges are believed to be located in the upstream portions of the catchment area. Once a manhole inspection methodology has been selected, investigations will continue systematically through the catchment.

Inspection of key junction manholes will proceed as follows:

1. Manholes will be opened and inspected for visual and olfactory evidence of illicit connections. A sample field inspection form is provided in **Appendix C.**

2. If flow is observed, a sample will be collected and analyzed at a minimum for ammonia, chlorine, and surfactants. Field kits can be used for these analyses. Sampling and analysis will be in accordance with procedures outlined in **Section 6**. Additional indicator sampling may assist in determining potential sources (e.g., bacteria for sanitary flows, conductivity to detect tidal backwater, etc.).

3. 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 manhole investigation and/or isolation and confirmation of sources.

4. Subsequent key junction manhole inspections will proceed until the location of suspected illicit discharges or SSOs can be isolated to a pipe segment between two manholes.

5. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole sampling.

7.3 Wet Weather Outfall Sampling

Where a minimum of one (1) SVF is identified based on previous information or the catchment investigation, a wet weather investigation must also be conducted at the associated outfall. Wet weather investigations will occur concurrently with catchment area investigations, and as such must be completed by the end of the 10-year IDDE timeframe set by the EPA (refer to Figure 2). The DPW will be responsible for implementing the wet weather outfall sampling program and making updates as necessary.

Outfalls will be inspected and sampled under wet weather conditions, to the extent necessary, to determine whether wet weather-induced high flows in sanitary sewers or high groundwater in areas served by septic systems result in discharges of sanitary flow to the MS4.

Wet weather outfall sampling will proceed as follows:

1. At least one wet weather sample will be collected at the outfall for the same parameters required during dry weather screening.

2. Wet weather sampling will occur during or after a storm event of sufficient depth or intensity to produce a stormwater discharge at the outfall. There is no specific rainfall amount that will trigger sampling, although minimum storm event intensities that are likely to trigger sanitary sewer interconnections are preferred. To the extent feasible, sampling should occur during the spring (March through June) when groundwater levels are relatively high.

3. 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 7.4**.

4. If wet weather outfall sampling does not identify evidence of illicit discharges, and no evidence of an illicit discharge is found during dry weather manhole inspections, catchment investigations will be considered complete.

7.4 Source Isolation and Confirmation

Once the source of an illicit discharge is approximated between two manholes, more detailed investigation techniques will be used to isolate and confirm the source of the illicit discharge. The following methods may be used in isolating and confirming the source of illicit discharges

- Sandbagging
- Smoke Testing
- Dye Testing
- CCTV/Video Inspections
- Optical Brightener Monitoring
- IDDE Canines

These methods are described in the sections below.

Public notification is an important aspect of a detailed source investigation program. Prior to smoke testing, dye testing, or TV inspections, the DPW will notify property owners in the affected area. Smoke testing notification will include door hanger/residential flyer notifications for single family homes, businesses and building lobbies for multi-family dwellings.

7.4.1 Sandbagging

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

7.4.2 Smoke Testing

Smoke testing involves injecting non-toxic smoke into drain lines and noting the emergence of smoke from sanitary sewer vents in illegally connected buildings or from cracks and leaks in the system itself. Typically, a smoke bomb or smoke generator is used to inject the smoke into the system at a catch basin or manhole and air is then forced through the system. Test personnel are placed in areas where there are suspected illegal connections or cracks/leaks, noting any escape of smoke (indicating an illicit connection

or damaged storm drain infrastructure). It is important when using this technique to make proper notifications to area residents and business owners as well as local police and fire departments.

If the initial test of the storm drain system is unsuccessful then a more thorough smoke-test of the sanitary sewer lines can also be performed. Unlike storm drain smoke tests, buildings that do not emit smoke during sanitary sewer smoke tests may have problem connections and may also have sewer gas venting inside, which is hazardous.

It should be noted that smoke may cause minor irritation of respiratory passages. Residents with respiratory conditions may need to be monitored or evacuated from the area of testing altogether to ensure safety during testing.

7.4.3 Dye Testing

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

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

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

7.4.4 CCTV/Video Inspection

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

7.4.5 Optical Brightener Monitoring

Optical brighteners are fluorescent dyes that are used in detergents and paper products to enhance their appearance. The presence of optical brighteners in surface waters or dry weather discharges suggests there is a possible illicit discharge or insufficient removal through adsorption in nearby septic systems or wastewater treatment. Optical brightener monitoring can be done in two ways. The most common, and

least expensive, methodology involves placing a cotton pad in a wire cage and securing it in a pipe, manhole, catch basin, or inlet to capture intermittent dry weather flows. The pad is retrieved at a later date and placed under UV light to determine the presence/absence of brighteners during the monitoring period. A second methodology uses handheld fluorometers to detect optical brighteners in water sample collected from outfalls or ambient surface waters. Use of a fluorometer, while more quantitative, is typically more costly and is not as effective at isolating intermittent discharges as other source isolation techniques.

7.4.6 IDDE Canines

Dogs specifically trained to smell human related sewage are becoming a cost-effective way to isolate and identify sources of illicit discharges. While not widespread at the moment, the use of IDDE canines is growing as is their accuracy. The use of IDDE canines is not recommended as a standalone practice for source identification; rather it is recommended as a tool to supplement other conventional methods, such as dye testing, in order to fully verify sources of illicit discharges.

7.5 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. The annual report will include the status of IDDE investigation and removal activities including the following information for each confirmed source:

- 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.

7.5.1 Confirmatory Outfall Screening

Within one (1) 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.

7.6 Ongoing Outfall Screening

Upon completion of all catchment investigations and illicit discharge removal and confirmation (if necessary), each outfall or interconnection will be re-prioritized for screening and scheduled for ongoing screening once every five (5) years. Ongoing screening will consist of dry weather screening and sampling consistent with the procedures described in **Section 6.2** of this plan. Ongoing wet weather screening and sampling will also be conducted at outfalls where wet weather screening was required due

to System Vulnerability Factors and will be conducted in accordance with the procedures described in **Section 7.3**. All sampling results will be reported in the annual report.

8 TRAINING

Annual IDDE training will be made available to all employees involved in the IDDE program. This training will at a minimum include information on how to identify illicit discharges and SSOs and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program. Training records will be maintained in **Appendix E**. The frequency and type of training will be included in the annual report.

9 PROGRESS REPORTING

The progress and success of the IDDE program will be evaluated on an annual basis. The evaluation will be documented in the annual report and will include the following indicators of program progress:

- Number of SSOs and illicit discharges identified and removed
- Number and percent of total outfall catchments served by the MS4 evaluated using the catchment investigation procedure
- Number of dry weather outfall inspections/screenings
- Number of wet weather outfall inspections/sampling events, and updated inventory of catchment areas with System Vulnerability Factors
- Number of enforcement notices issued
- All dry weather and wet weather screening and sampling results
- Estimate of the volume of sewage removed, as applicable
- Number of employees trained annually.

The success of the IDDE program will be measured by the IDDE activities completed within the required permit timelines.

APPENDIX A

Sanitary Sewer Overflow Inventory

Appendix D
Town of Stoneham, MA
SSO Events Worksheet

SSO Events Worksheet - Cumulative
Reporting Period: January 1, 2018 through June 30, 2018

SSO Event	To Surface Water or to Business/Residence	Date & Time Event Discovered/Reported	Date & Time Event was Stopped	Event Location (Address)	Source of Notification (property owner, citizen report, field crew, police)	Cause of Event (vandalism, roots, grease, structural, capacity, etc.)	Responsibility (Town, homeowner, etc.)	Measures Taken to Stop Event	Date of Last SSO at this Location	Estimated Volume of Wastewater Released (gal)	Method Used to Estimate Volume	Final Disposition of SSO (ground/street, water body, etc.)	Name of Water Body, street or intersecting streets nearest SSO	ID of Nearest Downgradient Catch Basin (if release to ground/street)	Nearest Receiving Water of MS4 (if release to ground/street)	Name of Surface Water Body (if release to surface water)
3/15/2010	Residence	3/15/2010	3/20/2010	24 Cottage Street	Property Owner	MWRA trunk lines caused the Town sewer lines to surcharge	Town	Bypass with a 4" pump borrowed from MWRA a town owned sewer manhole directly to the MWRA trunk line	4/17/2007	Unknown	N/A	MWRA Trunk Sewer	Sweetwater Brook	N/A		
3/15/2010	Residence	3/15/2010	3/20/2010	26 Cottage Street	Property Owner		Town		4/17/2007	Unknown	N/A	MWRA Trunk Sewer	Sweetwater Brook	N/A		
3/15/2010	Residence	3/15/2010	3/20/2010	28 Cottage Street	Property Owner		Town		4/17/2007	Unknown	N/A	MWRA Trunk Sewer	Sweetwater Brook	N/A		
3/15/2010	Residence	3/15/2010	3/20/2010	32 Cottage Street	Property Owner		Town		4/17/2007	Unknown	N/A	MWRA Trunk Sewer	Sweetwater Brook	N/A		
3/15/2010	Street	3/15/2010	3/19/2010	SMH 2013 on West Wyoming Avenue	Field Crew	MWRA trunk lines caused the Town sewer lines to surcharge	Town	-	Unknown	Unknown	N/A	Street	Phillips Road	CB1750		
3/15/2010	Street	3/15/2010	3/17/2010	SMH 1825 on Windsor Road	Field Crew	Excessive I/I in this area during the rain event	Town	Opened bypass to eliminate basement backups	Unknown	Unknown	N/A	Street	North Avenue	N/A		
3/15/2010	Street	3/15/2010	3/17/2010	SMH 357 on Oak Street	Field Crew	MWRA trunk lines caused the Town sewer lines to surcharge	Town	-	Unknown	Unknown	N/A	Street	Magnolia Terrace	CB323		
6/15/2012	Residence to Street	6/15/2012	6/15/2015	99 Maple Street	Property Owner	Blockage between Town's sewer lines and MWRA trun line	Town	Blockage was removed	Unknown	50 gallons	Field crew visual estimation	Street	Sweetwater Brook	N/A		
8/19/2013	Residence	8/19/2013	8/19/2013	40 Lynn Fells Parkway	Tenent	Illegal debris in sewer lateral	Property owner	Blockage was removed, Illegal CB connection to sewer seperated to drain by Property owner	none	0 (was cleaned out of catchbasin)	Field crew visual estimation	Ground surface	Lynn Fells Parkway	NA		
5/1/2015	Residence	5/1/2015	5/1/2015	Easement from Cliff Street to Irving Street (nearest address 8 Irving Street)	Field Crew	Root instrusion in the sanitary sewer	Town	Line was jetted to remove roots and manhole was added to Town's Critical manhole list	Unknown	40 gallons	Field crew estimated flow rate exiting manhole cover	Street	Irving Street	N/A		
5/11/2015	Business	5/11/2015	5/11/2015	42 Pleasant Street - Parking Lot	Field Crew	Silt infiltration and incorrect paper goods blocking the sewer system	Property owner	Blockage was removed, contacted property owner regarding illegal deposit of paper towls	Unknown	10 gallons	Pick holes & area of wetness	Ground surface	Pleasant Street	NA		
12/12/2015	Street	12/12/2015	12/12/2015	SMH1408A - Hill Court	Field Crew	Heavy grease builup in sanitary sewer	Town	The sewer section was jetted with degreaser and th surcharged manhole and receiving catch basin were disinfacted with chlorine	none	10 - 15 gallons	Field crew visual estimation	Street	Hill Court	Driveway of #11 and #13 Maple Street		
4/13/2016	Business	4/13/2016	4/13/2016	302 Main Street	Field Crew	Grease, rags in sewer line. Lack of maintenance of Oil/Water Separator at gas station.	Business owner	Vac/jet line, removed obstruction. Informed owner/tenant of responsibilities.	Unknown	10-20 gallons	estimated from pick hole/wet area	wet well	Main Street	NA		
4/13/2016	Business	4/13/2016	4/13/2016	302 Main Street	Field Crew	Grease, paper towels in sewer line. Lack of maintenance of Oil/Water Separator at gas station.	Business owner	Vac/jet line, removed obstruction. Informed owner/tenant of responsibilities.	4/13/2016	10 gallons	estimated from wet area around manhole cover	wet well	Main Street	NA		
3/23/2017	Surface Water	3/23/2017	3/23/2017	58 Lindenwood Road	Field Crew	Structural/collapsed pipe	Town	Collapsed section of pipe was replaced	None	10 gallons	estimated from wet area around manhole cover	Water body	Sweetwater Brook	Lindenwood Road between 53 Montvale Ave and 53 Lindenwood		
4/9/2017		4/9/2017	4/9/2017	Rita Road	Field Crew	Pump station failure	Town		None	200 gallons	estimated from wet area around manhole cover	Grass area	Rita Road	NA		
4/17/2018		4/17/2018	4/17/2018	Washington & Avon Streets	Property Owner	Blockage	Town	Emergency Crews and Ramjet dispatched to site immediately. Blockage cleared within 90 minutes	None	10 gallons	estimated in property basement	Sewage disposed back into collection system	Washington St. & Avon St.	NA	NA	NA
8/16/2018	Street	8/16/2018	8/16/2018	Melba Lane	Police	Structural/collapsed pipe	Town	Disribured sand around CB to ensure no access. Spread sand on street to limit flow overnight. Pump truck deployed. Pipe repaired 8/17/18.	Unknown	20-25 gallons	estimated from wet area on street	sewage disposal by pumping contractor	Melba Lane		NA	NA

NOTE: SSO EVENTS TO SURFACE WATERS INCLUDE ALL RELEASES WITH REASONABLE POTENTIAL TO REACH SURFACE WATERS SUCH AS RELEASES TO STREETS OR AREAS WITH STORM DRAIN CATCH BASINS.

APPENDIX B

Outfall Inventory and Ranking

Outfall_ID	Location	Recieving Water	Outfall Type	MS4 Outfall Priority
MH UNK 1	Lindenwood Road	Sweetwater Brook	MS4 OUTFALL	High
OF002	Near Marshall Road	Unnamed Wetland	MS4 OUTFALL	Low
OF003	High Street	Discharges Overland	MS4 OUTFALL	High
OF004	Near Aspen Lane	Aberjona Tributary Wetland	MS4 OUTFALL	Low
OF005	Near Aspen Lane	Aberjona Tributary Wetland	MS4 OUTFALL	Low
OF007	North Street	Aberjona Tributary Wetland	MS4 OUTFALL	High
OF008	North Street	Aberjona Tributary Wetland	MS4 OUTFALL	Low
OF009	North Street	Aberjona Tributary Wetland	MS4 OUTFALL	Low
OF010	Near Rita Road	Crystal Lake	MS4 OUTFALL	Low
OF011	Near Rita Road	Crystal Lake	MS4 OUTFALL	Low
OF012	Near Hall Road	Crystal Lake	MS4 OUTFALL	Low
OF013	Stoneham Ford Area	Sweetwater Brook	MS4 OUTFALL	Problem
OF014	High Street	Unnamed Brook	MS4 OUTFALL	High
OF016	Near Melba Lane	Discharges Overland	MS4 OUTFALL	Low
OF018	Near Tremont Street	Sweetwater Brook	MS4 OUTFALL	High
OF021	Cardinal Road	Discharges Overland	MS4 OUTFALL	Low
OF023	Lindenwood Road	Sweetwater Brook	MS4 OUTFALL	Problem
OF024	Recreation Park	Discharges Overland	MS4 OUTFALL	Low
OF025	Recreation Park	Discharges Overland	MS4 OUTFALL	Problem
OF026	Chapel Way	Unnamed Wetland	MS4 OUTFALL	Low
OF027	Near Mardin Lane	Unnamed Brook	MS4 OUTFALL	Low
OF028	Near Emerald Court	Unnamed Wetland	MS4 OUTFALL	Low
OF031	Thompson Pond Road	Unnamed Wetland	MS4 OUTFALL	Low
OF032	Summit Road	Dixie Pond	MS4 OUTFALL	Low
OF033	Pond Street	Doleful Pond	MS4 OUTFALL	Low
OF034	Sparhawk Circle	Discharges Overland	MS4 OUTFALL	Low
OF036	Near Newcomb Road	Discharges Overland	MS4 OUTFALL	Low
OF037	Warwick Road	Discharges Overland	MS4 OUTFALL	Low
OF038	Park Terrace Drive	Spot Pond Brook	MS4 OUTFALL	Low
OF040	Richardson Lane	Sweetwater Brook	MS4 OUTFALL	Problem
OF041	Near Elm Street	Sweetwater Brook	MS4 OUTFALL	Low
OF042	Near Elm Street	Sweetwater Brook	MS4 OUTFALL	Low
OF043	Near Elm Street	Sweetwater Brook	MS4 OUTFALL	Low
OF044	Near Calthea Street	Sweetwater Brook	MS4 OUTFALL	Low
OF045	Near Calthea Street	Sweetwater Brook	MS4 OUTFALL	Low
OF046	Near Calthea Street	Sweetwater Brook	MS4 OUTFALL	Low
OF047	Near Albion Avenue	Sweetwater Brook	MS4 OUTFALL	Low
OF048	Near Albion Avenue	Sweetwater Brook	MS4 OUTFALL	Low
OF049	Near Albion Avenue	Sweetwater Brook	MS4 OUTFALL	High
OF050	Near Hall Road	Crystal Lake	MS4 OUTFALL	Unknown
OF051	Near Elm Street	Sweetwater Brook	MS4 OUTFALL	Low
OF052	Richardson Lane	Sweetwater Brook	MS4 OUTFALL	High
OF053	Near Montvale Avenue	Sweetwater Brook	MS4 OUTFALL	Problem
OF054	Montvale Avenue	Sweetwater Brook	MS4 OUTFALL	Low
OF055	Montvale Avenue	Sweetwater Brook	MS4 OUTFALL	Low
OF056	Montvale Avenue	Sweetwater Brook	MS4 OUTFALL	Low
OF057	Montvale Avenue	Sweetwater Brook	MS4 OUTFALL	Low
OF058	Montvale Avenue	Sweetwater Brook	MS4 OUTFALL	Low
OF059	Near Drury Lane	Discharges Overland	MS4 OUTFALL	Low
OF060	Near Aspen Lane	Aberjona Tributary Wetland	MS4 OUTFALL	Low
OF061	Near Pomeworth Playground	Sweetwater Brook	MS4 OUTFALL	Problem
OF062	Recreation Park	Discharges Overland	MS4 OUTFALL	Low
OF063	Near Elm Street	Sweetwater Brook	MS4 OUTFALL	Low
OF064	Near Elm Street	Sweetwater Brook	MS4 OUTFALL	Low
OF065	Near Pomeworth Playground	Sweetwater Brook	MS4 OUTFALL	Low
OF066	Near Pomeworth Playground	Sweetwater Brook	MS4 OUTFALL	Low
DMH UNK 6		From Stoneham To Melrose	Intermunicipal	Low
DMH 051	Hanford & Wagner Roads	From Reading to Stoneham, then Swamp/Wetlands OF005	Intermunicipal	High
DMH 796	Spring Street	From Stoneham to Wakefield	Intermunicipal	High
DMH UNK 5		From Stoneham to Woburn	Intermunicipal	Low
DMH 038	Wagner Road	From Reading to Stonheam (DMH 051), then Swamp/Wetlands (OF005)	Intermunicipal	Low
DMH 1244	Paul Michael Way	From Stoneham to Melrose	Intermunicipal	Low
DMH 1258	Phillips Street/West Wyoming	From Stoneham to Melrose	Intermunicipal	Low
DMH 858	Spring & Marion Streets	From Stoneham to Wakefield	Intermunicipal	Low
DMH UNK 28		From Stoneham to Melrose	Intermunicipal	Low
DMH 773	Montvale Ave & Maple Street	From Stoneham to Woburn	Intermunicipal	Low
DMH 003	Main Street (Rt 28)	From Reading to Stoneham (OF040)	Intermunicipal	Low
CB 1514	Harrison Street	From Stoneham to Melrose	Intermunicipal	Low

APPENDIX C

Inspection Forms

Town of Stoneham, MA Outfall Inspection Form

Outfall ID: _____ Weather: _____

Inspection By: _____ Temperature: _____

Date: _____ Photograph1: _____

Time: _____ Photograph2: _____

Location: (Street Address, Intersection, Business) _____

Watershed/Discharge Location: _____

Time (hours) since last precipitation event: _____ Last precipitation amount (inches): _____

1. Predominant Contributing Land Use

☐ Residential ☐ Commercial ☐ Industrial ☐ Open Space ☐ Other: _____

Describe any known industrial or commerical users in the drainage area:

_____

2. Outfall Type ☐ Circular/Pipe ☐ Box Culvert ☐ Open Channel ☐ Elliptical ☐ Other _____

3. Outfall Material ☐ Reinforced Conc ☐ Corr.Metal ☐ PVC ☐ HDPE ☐ Clay ☐ Brick ☐ Other _____

4. Outfall Size - Diameter (inches): _____

5. Is there visable flow from the pipe? If yes, check all that apply, if not go to #11 _____

6. Color: ☐ Colorless ☐ Gray ☐ Red ☐ Green ☐ White ☐ Other: _____

7. Odor: ☐ None ☐ Musty ☐ Sewage ☐ Sour Milk ☐ Rotten Eggs ☐ Other _____

8. Floatables: ☐ None ☐ Oily ☐ Sewage ☐ Suds ☐ Algae ☐ Scum ☐ Garbage ☐ Other _____

9. Deposits/Stains ☐ None ☐ Oils ☐ Corrosion ☐ Sediment ☐ Rust ☐ Other: _____

10. Clarity ☐ Clear ☐ Cloudy ☐ Muddy ☐ Milky ☐ Suspended Solids ☐ Other: _____

11. Absence of plant life surrounding conveyance structure (Y/N) - Description: _____

12. Notable difference in plant life surrounding conveyance structure (Y/N) - Description: _____

13. Estimated Flow (cfs) _____

Estimated Flow: Channel Width (ft) x Water Depth (ft) x Water Velocity (ft) = Estimated Flow (cfs)

13a. Channel Width (ft): _____

13b. Water Depth (ft): _____

13c. Water Velocity (ft/s): _____

OR

Estimated Flow: Time taken to fill a known volume = Estimated Flow (cfs)

13d. Volume of Container (cf): _____

13e. Time to fill container (sec): _____

14. Standing Water Present: Y/N _____

15. If yes, location of standing water ☐ Inside Outfall ☐ Outside Outfall

16. Are there unusual piping or ditches that drain to the stormwater conveyance? Y/N (Description) _____

17. Is there any overland flow visible from the discharge location? Y/N (Description) _____

Sampling/Field Testing

LabID: _____

pH: _____

Sample Temperature: _____

Enterococcus: _____

Specific Conductance: _____

EColi: _____

Surfactants: _____

Surfactants Photo #: _____

Ammonia: _____

Ammonia Photo #: _____

Total Chlorine: _____

Total Chlorine Photo #: _____

Results

Illicit Discharge/Connection ☐ Ruled Out ☐ Suspected ☐ Confirmed

Follow Up Actions ☐ None Required ☐ Notified Town ☐ Illicit Removed ☐ Investigate Further

☐ Dye Test ☐ CCTV ☐ Sandbag ☐ Other: _____

New Outfall (Y/N): _____ CNF (Y/N): _____ CNI (Y/N): _____

Comments: _____

Town of Stoneham, MA Manhole Inspection Form

Manhole ID: _____ Weather: _____

Inspection By: _____ Temperature: _____

Date: _____ Photograph1: _____

Time: _____ Photograph2: _____

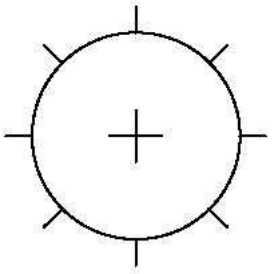
Location: (Street Address, Intersection, Business) _____

Watershed/Discharge Location: _____

Time (hours) since last precipitation event: _____ Last precipitation amount (inches): _____

1. Buried: ☐ Yes ☐ No
2. Frame Condition: ☐ Good ☐ Reset ☐ Replace
3. Frame Material: ☐ Metal ☐ Concrete ☐ Other
4. Corbel Material: ☐ Brick ☐ Concrete Block ☐ Pre-Cast Concrete ☐ Cast in Place ☐ Hybrid ☐ Lined
5. Wall Material: ☐ Brick ☐ Concrete Block ☐ Pre-Cast Concrete ☐ Cast in Place ☐ Hybrid ☐ Lined
6. Floor Material: ☐ Brick ☐ Concrete Block ☐ Pre-Cast Concrete ☐ Cast in Place ☐ Hybrid ☐ Lined
7. Invert Material: ☐ Brick ☐ Concrete Block ☐ Pre-Cast COncrete ☐ Cast in Place ☐ Hybrid ☐ Lined
8. Wall Condition: ☐ Good ☐ Fair ☐ Poor
9. Structure Shape: ☐ Round ☐ Square ☐ Rectangular
10. Currently Surcharged: ☐ Yes ☐ No
11. Evidence of Surcharging: ☐ Yes ☐ No
12. Leaking: ☐ Yes ☐ No
13. Type: ☐ Sewer ☐ Drain
14. Dirt or Debris Present: ☐ Below Invert ☐ Above Invert

Comments:



15. Is there visable flow from the pipe? If yes, check all that apply, if not go to #11 _____

16. Color: ☐ Colorless ☐ Gray ☐ Red ☐ Green ☐ White ☐ Other: _____

17. Odor: ☐ None ☐ Musty ☐ Sewage ☐ Sour Milk ☐ Rotten Eggs ☐ Other _____

18. Floatables: ☐ None ☐ Oily ☐ Sewage ☐ Suds ☐ Algae ☐ Scum ☐ Garbage ☐ Other _____

19. Deposits/Stains ☐ None ☐ Oils ☐ Corrosion ☐ Sediment ☐ Rust ☐ Other: _____

20. Clarity ☐ Clear ☐ Cloudy ☐ Muddy ☐ Milky ☐ Suspended Solids ☐ Other: _____

21. Intermunicipal Connection ☐ Yes ☐ No

Sampling/Field Testing

pH: _____

Enterococcus: _____

EColi: _____

Surfactants: _____ Photo #: _____

Ammonia: _____ Photo #: _____

Total Chlorine: _____ Photo #: _____

LabID: _____

Sample Temp: _____

Spec. Cond: _____

Results

Illicit Discharge/Connection

☐ Ruled Out

☐ Suspected

☐ Confirmed

New Outfall (Y/N): _____

CNF (Y/N): _____

CNI (Y/N): _____

Follow Up Actions

☐ None Required

☐ Notified City

☐ Illicit Removed

☐ Investigate Further

☐ Dye Test

☐ Sandbag

☐ CCTV

☐ Other: _____

Comments: _____

Town of Stoneham, MA Catch Basin Inspection Form

Catch Basin ID: _____ Weather: _____

Inspection By: _____ Temperature: _____

Date: _____ Photograph1: _____

Time: _____ Photograph2: _____

Location: (Street Address, Intersection, Business) _____

Watershed/Discharge Location: _____

Time (hours) since last precipitation event: _____ Last precipitation amount (inches): _____

1. Grate Shape: ☐ Rounded ☐ Square ☐ Rectangular
2. Curb Inlet: ☐ Casting ☐ Stone ☐ Concrete ☐ None
3. Grate Condition: ☐ Good ☐ Cracks/Broken ☐ Replace
4. Type: ☐ Single Grate ☐ Double Grate
5. Structure Shape: ☐ Round ☐ Square ☐ Rectangular
6. Frame Condition: ☐ Good ☐ Reset ☐ Replace
7. Structure Construction: ☐ Brick ☐ Concrete Block ☐ Pre-Cast Concrete ☐ Cast in Place ☐ Hybrid
8. Wall Condition: ☐ Good ☐ Fair ☐ Poor
9. Currently Surcharged: ☐ Yes ☐ No
10. Evidence of Surcharging: ☐ Yes ☐ No
11. Hood Present: ☐ Yes ☐ No
12. Type of Hood: ☐ Cast Iron with Hinge ☐ Other
13. Dirt or Debris Present: ☐ Below Invert ☐ Above Invert

Sampling/Field Testing

pH: _____

Enterococcus: _____

EColi: _____

Surfactants: _____ Photo #: _____

Ammonia: _____ Photo #: _____

Total Chlorine: _____ Photo #: _____

LabID: _____

Sample Temp: _____

Spec. Cond: _____

Results

Illicit Discharge/Connection

☐ Ruled Out

☐ Suspected

☐ Confirmed

New Outfall (Y/N): _____

CNF (Y/N): _____

CNI (Y/N): _____

Follow Up Actions

☐ None Required

☐ Notified City

☐ Illicit Removed

☐ Investigate Further

☐ Dye Test

☐ Sandbag

☐ CCTV

☐ Other: _____

Comments: _____

APPENDIX D

System Vulnerability Factors

APPENDIX E

Personnel Training Record

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Wakefield, Massachusetts 01880

Tel 781 213 4931

Fax

www.arcadis.com