Illicit Discharge Detection and Elimination (IDDE) Plan

Town of Northbridge, Massachusetts
Central Massachusetts Regional Stormwater Coalition

30 June 2019

CMRSWC

FUSS & O'NEILL

Town of Northbridge. Massachusetts
NPDES Permit No. MAR041144

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NPDES Permit No. MAR041144
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1 Introduction – Town of Northbridge, Massachusetts

1.1 MS4 Program

This Illicit Discharge Detection and Elimination (IDDE) Plan has been developed by the Town of Northbridge to address the requirements of the United States Environmental Protection Agency's (USEPA's) 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereafter referred to as the "2016 Massachusetts MS4 Permit" or "MS4 Permit."

The 2016 Massachusetts MS4 Permit requires that each permittee, or regulated community, address six Minimum Control Measures. These measures include the following:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination 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 Minimum Control Measure 3, the permittee is required to implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its municipal separate storm sewer system 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.

1.2 Illicit Discharges

An "illicit discharge" is any discharge to a drainage system that is not composed entirely of stormwater, with the exception of discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the MS4) and discharges resulting from fire-fighting activities.

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 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.

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

Regardless of the intention, 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 unless the permittee, USEPA or Massachusetts Department of Environmental Protection (MassDEP) identifies any category or individual discharge of non-stormwater discharge as a significant contributor of pollutants to the MS4:

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground water
- Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20))
- Uncontaminated pumped groundwater
- Discharge from potable water sources
- Foundation drains
- Air conditioning condensation
- Irrigation water, springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual resident car washing
- De-chlorinated swimming pool discharges
- Street wash waters
- Residential building wash waters without detergents

If these discharges are identified as significant contributors to the MS4, they must be considered an "illicit discharge" and addressed in the IDDE Plan (i.e., control these sources so they are no longer significant contributors of pollutants, and/or eliminate them entirely).

1.4 Receiving Waters and Impairments

Table 1-1 lists the "impaired waters" within the boundaries o Town of Northbridge's regulated area based on the 2018 Massachusetts Integrated List of Waters produced by MassDEP every two years. Impaired waters are water bodies that do not meet water quality standards for one or more designated use(s) such as recreation or aquatic habitat.

Table 1-1. Impaired Waters
Northbridge, Massachusetts

Water Body Name	Segment ID	Category	Impairment(s)	Associated Approved TMDL
Swan's Pond	MA51164	4c	Caused By Non-Native Aquatic Plants	TMDL NOT REQUIRED
Whitin's Pond	MA 51180	4c	Caused By Non-Native Aquatic Plants	TMDL NOT REQUIRED
Arcade Pond	MA 51003	5	Bacteria, Phosphorus, Solids, Etc.	N/A
Blackstone River	MA 51004 & MA 51005	5	Bacteria, Phosphorus, Solids, Etc.	N/A
Mumford River	MA 51014	5	Phosphorus, Solids, Etc.	N/A

Category 4a Waters – impaired water bodies with a completed Total Maximum Daily Load (TMDL).
Category 4c Waters – impaired water bodies where the impairment is not caused by a pollutant. No TMDL required.
Category 5 Waters – impaired water bodies that require a TMDL.
"Approved TMDLs" are those that have been approved by EPA as of the date of issuance of the 2016 MS4 Permit.

NOTE: The Swan's Pond and Whitin's Pond Water Bodies are categorized as TMDL NOT REQUIRED and are do not have IDDE-related requirements. The Arcade Pond Water Body require a TMDL.

Instructions: Review the impaired waters and approved TMDLs and describe below any IDDE-related requirements identified in the TMDLs.

1.5 IDDE Program Goals, Framework, and Timeline

The goals of the IDDE program are to find and eliminate illicit discharges to municipal separate storm sewer system and to prevent illicit discharges from happening in the future. The program consists of the following major components as outlined in the MS4 Permit:

- Legal authority and regulatory mechanism to prohibit illicit discharges and enforce this prohibition
- Storm system mapping
- Inventory and ranking of outfalls
- Dry weather outfall screening
- Catchment investigations
- Identification/confirmation of illicit sources
- Illicit discharge removal

- Followup screening
- Employee training.

The IDDE investigation procedure framework is shown in **Figure 1-1.** The required timeline for implementing the IDDE program is shown in **Table 1-2.**

Figure 1-1. IDDE Investigation Procedure Framework

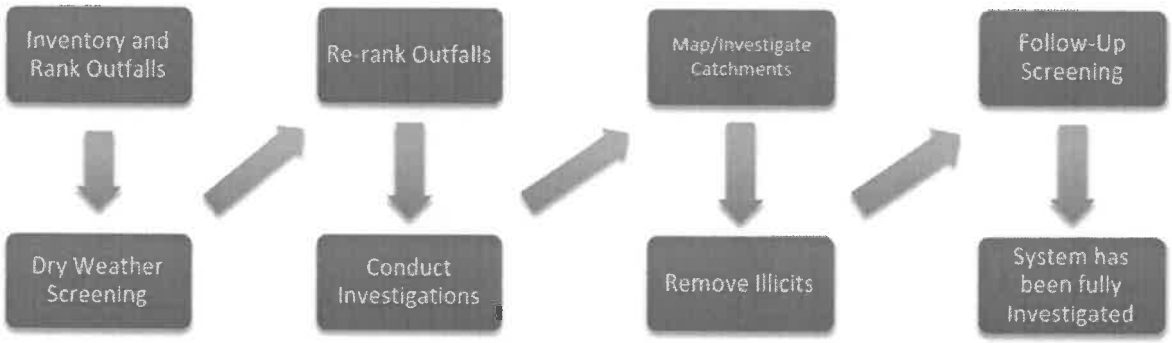

Table 1-2. IDDE Program Implementation Timeline

IDDE Program Requirement	Completion Date from Effective Date of Permit					
	1 Year	1.5 Years	2 Years	3 Years	7 Years	10 Years
Written IDDE Program Plan	X					
SSO Inventory	X					
Written Catchment Investigation Procedure		X				
Phase I Mapping			X			
Phase II Mapping						X
IDDE Regulatory Mechanism or By-law (if not already in place)				X		
Dry Weather Outfall Screening				X		
Follow-up Ranking of Outfalls and Interconnections				X		
Catchment Investigations – Problem Outfalls					X	
Catchment Investigations – all Problem, High and Low Priority Outfalls						X

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 Northbridge has completed the following IDDE program activities consistent with the 2003 MS4 Permit requirements:

IDDE Implementation Workshop

CMRSWC, with the assistance of Fuss & O'Neill, held a workshop on April 24, 2019 at the Framingham Department of Public Works to train participants on important aspects of the IDDE program. The workshop emphasized a hands-on approach and targeted municipal employees who will be performing or involved in outfall sampling and investigation. CMRSWC also developed an IDDE template available to member communities through its website. 15 member communities participated.

In March 2019, CMRSWC and Fuss & O'Neill developed a survey to measure communities' concerns regarding compliance with the 2016 MS4 Permit. Out of 30 communities, 18 responded. Key findings include:

- Communities anticipate having to at least double their operational budgets for stormwater services to meet the future permit requirements.
- Communities anticipate the need to hire additional staff to meet permit requirements.
- Only Shrewsbury and Ashland have set up a stormwater enterprise but many communities are considering it.
- There is interest in shared equipment for mapping (RTK or tablets) and water quality field screening kits.
- Shifting concerns: compared to the last annual survey, the development of written IDDE plans and SWPPPs is now higher priority. SWMP and NOI preparation are no longer priorities, as these needs were met by previous CMRSWC efforts.
- Most valuable Coalition tools: members ranked the CMRSWC website, annual summary, *Think Blue Massachusetts* materials, and SWMP/IDDE/SOP templates as the most useful resources.

Conclusion

CMRSWC assists 30 communities in Massachusetts in meeting MS4 Permit requirements. More than 28 representatives from 14 member communities participated in the IDDE workshop, while the NOI and SWMP workshops reached 14 and ten communities respectively. Collaboration with WPI and *Think Blue Massachusetts* helped educate thousands on the subject of stormwater pollution prevention.

The enhanced MS4 templates and information sources on developing IDDE plans, SOPs, SWPPPs, bylaw review, and LID, which are accessible on the Coalition's website, provide relevant tools to communities implementing their MS4 program with local staff and resources.

CMRSWC members receive ongoing value from the Coalition's workshops, field training, video library, templates, and outreach materials. CMRSWC membership provides consistency to an MS4 constituency subject to routine staff changes, questionable access to funding, and ongoing regulatory demands.

- Developed a map of outfalls and receiving waters (~60% complete)
- Adopted an IDDE bylaw or regulatory mechanism
- Developed procedures for locating illicit discharges (i.e., visual screening of outfalls for dry weather discharges, dye or smoke testing)
- Developed procedures for locating the source of the discharge
- Developed procedures for removal of the source of an illicit discharge
- Developed procedures for documenting actions and evaluating impacts on the storm sewer system subsequent to removal

In addition to the 2003 MS4 Permit requirements, other IDDE-related activities that may have been completed include:

- SSO inventory
- Additional storm system mapping, including the locations of catch basins, manholes and pipe connectivity

2 Authority and Statement of IDDE Responsibilities

2.1 Legal Authority

Instructions: Use the following language if your municipality already has an illicit discharge bylaw, ordinance, or other regulatory mechanism in place, as required by the 2003 MS4 Permit.

The Town of Northbridge has adopted a Stormwater Management Bylaw (adopted 06 May 2008). A copy of the Stormwater Management Bylaw is provided in **Appendix A**. The Stormwater Management Bylaw, adopted 06 May 2008 provides the Town of Northbridge with adequate 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.

The Town of Northbridge will review its current Stormwater Bylaw adopted 06 May 2008 and related land use regulations and policies for consistency with the 2016 MS4 Permit.

Instructions: Use the following language if your municipality has not adopted an illicit discharge bylaw, ordinance, or other regulatory mechanism in place, as required by the 2003 MS4 Permit.

The Town of Northbridge will adopt a bylaw, ordinance, or other regulatory mechanism to provide the Town of Northbridge with adequate 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.

The bylaw, ordinance, or other regulatory mechanism will meet the requirements of the 2016 MS4 Permit and will be in place within 3 years of the permit effective date (July 1, 2021).

2.2 Statement of Responsibilities

The Town of Northbridge – Department of Public Works/Engineering is the lead municipal agency or department responsible for implementing the IDDE program pursuant to the provisions of the **Town of Northbridge Illicit Discharge Detection and Elimination (IDDE) Bylaw (which will be in place on or before 01 July 2021)**. Other agencies or departments with responsibility for aspects of the program include:

- Department of Public Works & Engineering – Administration of MS4 Permit.
- Highway Department –Stormwater System.
- Sewer Department – Sewer System.
- Building Inspector and/or Code Enforcement Officer – Building within the town and possible enforcement of the Stormwater Bylaw.
- Licensed Plumbing Inspector – Plumbing Systems.
- Health Department – Health Inspections including but not limited to septic systems and restaurants.
- Conservation Agent – Wetland permitting and site construction inspections.
- Conservation Commission - Wetland permitting and site construction inspections.
- Planning Board Chairperson – Stormwater Bylaw and Regulations. Site Plan and subdivision permitting and construction.
- Board of Selectmen – Oversight of the Town. Possible involvement in negotiations/fines/penalties to remove illicit discharges.
- Town Administrator and/or Mayor - Possible involvement in negotiations/fines/penalties to remove illicit discharges.

3 Stormwater System Mapping

The Town of Northbridge originally developed mapping of its stormwater system to meet the mapping requirements of the 2003 MS4 Permit. A copy of the existing storm system map is provided in **Appendix B**. 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 2016 MS4 Permit requires the storm system map to be updated in two phases as outlined below. The Town of Northbridge – Department of Public Works/Engineering is responsible for updating the stormwater system mapping pursuant to the 2016 MS4 Permit. The Town of Northbridge will report on the progress towards completion of the storm system map in each annual report. Updates to the stormwater mapping will be included in **Appendix B**.

3.1 Phase I Mapping

Phase I mapping must be completed within two (2) years of the effective date of the permit (July 1, 2019) 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
- 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 of Northbridge has completed the following updates to its stormwater mapping to meet the Phase I requirements:

The Town of Northbridge will update its stormwater mapping by 01 July 1, 2020 to include the remaining Phase I information.

3.2 Phase II Mapping

Phase II mapping must be completed within ten (10) years of the effective date of the permit (01 July 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 of Northbridge has completed the following updates to its stormwater mapping to meet the Phase II requirements:

- *Outfall locations (60% mapped)*
- *Pipes*
- *Manholes*
- *Catch basins*
- *Municipal Sanitary Sewer system. Note: There are no known Combined Sewer Systems in the Town of Northbridge*

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

3.3 Additional Recommended Mapping Elements

Although not a requirement of the 2016 MS4 Permit, the Town of Northbridge has included the following recommended elements in its storm system mapping:

- Storm sewer material, size (pipe diameter), age
- Sanitary sewer system material, size (pipe diameter), age

4 Sanitary Sewer Overflows (SSOs)

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 of Northbridge has completed an inventory of SSOs that have discharged to the MS4 within the five (5) years prior to the effective date of the 2016 MS4 Permit, based on review of available documentation pertaining to SSOs (**Table 4-1**). The inventory includes all SSOs that occurred during wet or dry weather resulting from inadequate conveyance capacities or where interconnectivity of the storm and sanitary sewer infrastructure allows for transfer of flow between systems.

Upon detection of an SSO, the Town of Northbridge 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 of Northbridge 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 **Table 4-1** will be updated by the Town of Northbridge – Department of Public Works/Engineering when new SSOs are detected. The SSO inventory will be included in the annual report, including the status of mitigation and corrective measures to address each identified SSO.

Table 4-1. SSO Inventory

Northbridge, Massachusetts
Revision Date: 30 Jun3 2019

SSO Location[1]	Discharge Statement[2]	Date[3]	Time Start[3]	Time End[3]	Estimated Volume[4]	Description[5]	Mitigation Completed[6]	Mitigation Planned[7]
Lake Street	Entered Arcade Pond	4-11-13	4-11-13	4-13-13	10,000 gallons	I&I High Flow	No corrective measures were completed since flows decreased and overflows ended over time.	This area will be incorporated in our CWMP I&I Elimination Program.

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

5 Assessment and Priority Ranking of Outfalls

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. As described in **Section 3**, 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 Outfall and Interconnection Inventory and Initial Ranking

The Town of Northbridge – Department of Public Works/Engineering will complete an initial outfall and interconnection inventory and priority ranking to assess illicit discharge potential based on existing information. The initial inventory and ranking will be completed within one (1) year from the effective date of the permit. An updated inventory and ranking will be provided in each annual report thereafter. 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:

1. **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:

[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.

- 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.

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.

2. **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 below or other available information.

3. **Low Priority Outfalls**: Outfalls/interconnections determined by the permittee as low priority based on the characteristics listed below or other available information.

4. **Excluded outfalls**: Outfalls/interconnections with no potential for illicit discharges may be excluded from the IDDE program. This category is limited to roadway drainage in undeveloped areas with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land.

Outfalls will be ranked into the above priority categories (except for excluded outfalls, which may be excluded from the IDDE program) 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.

NOTE: Table 5-1 provides a sample format for an outfall inventory and priority ranking matrix.

Table 5-1. Outfall Inventory and Priority Ranking Matrix

Northbridge, Massachusetts
Revision Date: ##DATE OF LAST UPDATE

Outfall ID	Receiving Water	Previous Screening Results Indicate Likely Sewer Input? [1]	Discharging to Area of Concern to Public Health? [2]	Frequency of Past Discharge Complaints	Receiving Water Quality [3]	Density of Generating Sites [4]	Age of Development/ Infrastructure [5]	Historic Combined Sewers or Septic? [6]	Aging Septic? [7]	Culverted Streams? [8]	Additional Characteristics	Score	Priority Ranking
Information Source		Outfall inspections and sample results	GIS Maps	Town Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual Observation	Town Staff, GIS Maps	Land Use, Town Staff	GIS and Storm System Maps	Other		
Scoring Criteria		Yes = 3 (Problem Outfall) No = 0	Yes = 3 No = 0	Frequent = 3 Occasional = 2 None = 0	Poor = 3 Fair = 2 Good = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	Yes = 3 No = 0	Yes = 3 No = 0	Yes = 3 No = 0	TBD		
Sample 1	XYZ River	3	0	2	0	2	1	0	0	3	None	11	Problem
Sample 2	XYZ Lake	0	3	0	3	1	2	0	3	3	None	15	High Priority
Sample 3	XYZ Stream	0	0	2	0	1	1	0	0	0	None	4	Low Priority

Scoring Criteria:

[1] Previous screening results indicate likely sewer input if any of the following are true:

- 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

[2] Outfalls/interconnections that discharge to or in the vicinity of any of the following areas: public beaches, recreational areas, drinking water supplies, or shellfish beds

[3] Receiving water quality based on latest version of MassDEP Integrated List of Waters.

- Poor = Waters with approved TMDLs (Category 4a Waters) where illicit discharges have the potential to contain the pollutant identified as the cause of the impairment
- Fair = Water quality limited waterbodies that receive a discharge from the MS4 (Category 5 Waters)
- Good = No water quality impairments

[4] Generating sites are institutional, municipal, commercial, or industrial sites with a potential to contribute to illicit discharges (e.g., car dealers, car washes, gas stations, garden centers, industrial manufacturing, etc.)

[5] Age of development and infrastructure:

- High = Industrial areas greater than 40 years old and areas where the sanitary sewer system is more than 40 years old
- Medium = Developments 20-40 years old
- Low = Developments less than 20 years old

[6] Areas once served by combined sewers and but have been separated, or areas once served by septic systems but have been converted to sanitary sewers.

[7] Aging septic systems are septic systems 30 years or older in residential areas.

[8] Any river or stream that is culverted for distance greater than a simple roadway crossing.

Outfall ID	Receiving Water	Previous Screening Results Indicate Likely Sewer Input? [1]	Discharging to Area of Concern to Public Health? [2]	Frequency of Past Discharge Complaints	Receiving Water Quality [3]	Density of Generating Sites [4]	Age of Development/ Infrastructure [5]	Historic Combined Sewers or Septic? [6]	Aging Septic? [7]	Culverted Streams? [8]	Additional Characteristics	Score	Priority Ranking
Information Source		Outfall inspections and sample results	GIS Maps	Town Staff	Impaired Waters List	Land Use/GIS Maps, Aerial Photography	Land Use Information, Visual Observation	Town Staff, GIS Maps	Land Use, Town Staff	GIS and Storm System Maps	Other		
Scoring Criteria		Yes = 3 (Problem Outfall) No = 0	Yes = 3 No = 0	Frequent = 3 Occasional = 2 None = 0	Poor = 20 Fair = 15 Good = 0	High = 3 Medium = 2 Low = 1	High = 3 Medium = 2 Low = 1	Yes = 3 No = 0	Yes = 3 No = 0	Yes = 3 No = 0	TBD		
CR-01	Carpenter Reservoir	0	0	0	0	1	1	0	3	0	0	5	Low Priority
CR-02	Carpenter Reservoir	0	0	0	0	1	1	0	3	0	0	5	Low Priority
CR-03	Carpenter Reservoir	0	0	0	0	1	1	0	3	0	0	5	Low Priority
CR-04	Carpenter Reservoir	0	0	0	0	1	1	0	3	0	0	5	Low Priority
CR-05	Carpenter Reservoir	0	0	0	0	1	1	0	3	0	0	5	Low Priority
CR-06	Carpenter Reservoir	0	0	0	0	1	1	0	3	0	0	5	Low Priority
CR-06	Carpenter Reservoir	0	0	0	0	1	1	0	3	0	0	5	Low Priority
CR-07	Carpenter Reservoir	0	0	0	0	1	1	0	3	0	0	5	Low Priority
CR-08	Carpenter Reservoir	0	0	0	0	1	1	0	3	0	0	5	Low Priority
CR-09	Carpenter Reservoir	0	0	0	0	1	1	0	3	0	0	5	Low Priority
CR-10	Carpenter Reservoir	0	0	0	0	1	1	0	3	0	0	5	Low Priority
CR-11	Carpenter Reservoir	0	0	0	0	1	1	0	3	0	0	5	Low Priority
FP-01	Fish Pond	0	0	0	0	1	1	0	3	0	0	5	Low Priority
SP-01	Swan's Pond	0	0	0	0	1	1	0	3	0	0	5	Low Priority
AP-01	Arcade Pond	0	0	0	20	1	1	0	0	0	0	22	High Priority
AP-02	Arcade Pond	0	0	0	20	1	1	0	0	0	0	22	High Priority
AP-03	Arcade Pond	0	0	0	20	1	1	0	0	0	0	22	High Priority
AP-04	Arcade Pond	0	0	0	20	1	1	0	0	0	0	22	High Priority
AP-05	Arcade Pond	0	0	0	20	1	1	0	0	0	0	22	High Priority
AP-06	Arcade Pond	0	0	0	20	1	1	0	0	0	0	22	High Priority
AP-07	Arcade Pond	0	0	0	20	1	1	0	0	0	0	22	High Priority
AP-08	Arcade Pond	0	0	0	20	1	1	0	0	0	0	22	High Priority
AP-09	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority
AP-10	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority
AP-11	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority
AP-12	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority
AP-13	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority
AP-14	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority
AP-15	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority
AP-16	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority
AP-17	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority
AP-18	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority
AP-19	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority

AP-20	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority
AP-21	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority
AP-22	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority
AP-23	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority
AP-24	Arcade Pond	0	3	0	20	1	1	0	0	0	0	25	High Priority
MR-01	Mumford River	0	0	0	20	1	1	0	0	0	0	22	High Priority
MR-02	Mumford River	0	0	0	20	1	1	0	0	0	0	22	High Priority
MR-03	Mumford River	0	0	0	20	1	1	0	0	0	0	22	High Priority
MR-04	Mumford River	0	3	0	20	1	1	0	0	0	0	25	High Priority
MR-05	Mumford River	0	3	0	20	1	1	0	0	0	0	25	High Priority
MR-06	Mumford River	0	3	0	20	1	1	0	0	0	0	25	High Priority
MR-07	Mumford River	0	3	0	20	1	1	0	0	0	0	25	High Priority
MR-08	Mumford River	0	3	0	20	1	1	0	0	0	0	25	High Priority
MR-09	Mumford River	0	3	0	20	1	1	0	0	0	0	25	High Priority
M,R-10	Mumford River	0	3	0	20	1	1	0	0	0	0	25	High Priority
MR-11	Mumford River	0	3	0	20	1	1	0	0	0	0	25	High Priority
MR-12	Mumford River	0	3	0	20	1	1	0	0	0	0	25	High Priority
LP-01	Linwood Pond	0	0	0	0	1	1	0	0	0	0	2	Low Priority
LP-02	Linwood Pond	0	0	0	0	1	1	0	0	0	0	2	Low Priority
LP-03	Linwood Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
LP-04	Linwood Pond	0	3	0	0	1	3	0	0	0	0	7	Low Priority
LP-05	Linwood Pond	0	3	0	0	1	3	0	0	0	0	7	Low Priority
LP-06	Linwood Pond	0	3	0	0	1	3	0	0	0	0	7	Low Priority
LP-07	Linwood Pond	0	0	0	0	1	3	0	0	0	0	4	Low Priority
LP-08	Linwood Pond	0	0	0	0	1	3	0	0	0	0	4	Low Priority
LP-09	Linwood Pond	0	3	0	0	1	3	0	0	0	0	7	Low Priority
LP-10	Linwood Pond	0	3	0	0	1	3	0	0	0	0	7	Low Priority
LP-11	Linwood Pond	0	0	0	0	1	1	0	0	0	0	2	Low Priority
RP-01	Riverdale Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-01	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-02	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-03	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-04	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-05	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
0MP-06	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
M0P-07	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP0-08	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-09	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-10	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-11	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-12	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-13	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-14	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority

MP-15	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-16	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-17	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-18	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-19	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-20	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-21	Meadow Pond	0	3	0	0	1	1	0	0	0	0	5	Low Priority
MP-22	Meadow Pond	0	0	0	0	1	3	0	0	0	0	4	Low Priority
MP-23	Meadow Pond	0	0	0	0	1	3	0	0	0	0	4	Low Priority
MP-24	Meadow Pond	0	0	0	0	1	3	0	0	0	0	4	Low Priority
MP-25	Meadow Pond	0	0	0	0	1	3	0	0	0	0	4	Low Priority
BR-15	Blackstone River	0	0	0	0	1	1	0	0	0	0	2	Low Priority
BR-16	Blackstone River	0	0	0	20	1	1	0	0	0	0	22	High Priority
BR-17	Blackstone River	0	0	0	20	1	1	0	0	0	0	22	High Priority
BR-18	Blackstone River	0	0	0	20	1	1	0	0	0	0	22	High Priority
BR-19	Blackstone River	0	0	0	20	1	1	0	0	0	0	22	High Priority
BR-20	Blackstone River	0	0	0	20	1	1	0	0	0	0	22	High Priority
BR-21	Blackstone River	0	0	0	20	3	3	0	0	0	0	22	High Priority
BR-22	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-23	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-24	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-25	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-26	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-27	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-28	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-29	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-30	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-31	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-32	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-33	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-34	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-35	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-36	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-37	Blackstone River	0	0	0	20	3	3	0	0	0	0	26	High Priority
BR-38	Blackstone River	0	0	0	20	1	1	0	0	0	0	22	High Priority
BR-39	Blackstone River	0	0	0	20	1	1	0	0	0	0	22	High Priority
CBR-01	Blackstone River Canal	0	0	0	20	1	1	0	0	0	0	22	High Priority
CBR-02	Blackstone River Canal	0	0	0	20	1	1	0	0	0	0	22	High Priority
CBR-03	Blackstone River Canal	0	0	0	20	1	1	0	0	0	0	22	High Priority
CNR-04	Blackstone River Canal	0	0	0	20	1	1	0	0	0	0	22	High Priority
CBR-05	Blackstone River Canal	0	0	0	20	1	1	0	0	0	0	22	High Priority
CBR-06	Blackstone River Canal	0	0	0	20	1	1	0	0	0	0	22	High Priority
CBR-07	Blackstone River Canal	0	0	0	20	1	1	0	0	0	0	22	High Priority
CBR-08	Blackstone River Canal	0	3	0	20	1	1	0	0	0	0	31	High Priority

CBR-09	Blackstone River Canal	0	3	0	20	1	1	0	0	0	0	31	High Priority
CBR-10	Blackstone River Canal	0	3	0	20	1	1	0	0	0	0	31	High Priority
CBR-11	Blackstone River Canal	0	3	0	20	1	1	0	0	0	0	31	High Priority
CBR-12	Blackstone River Canal	0	3	0	20	1	1	0	0	0	0	31	High Priority
CBR-13	Blackstone River Canal	0	3	0	20	1	1	0	0	0	0	31	High Priority
CBR-14	Blackstone River Canal	0	3	0	20	1	1	0	0	0	0	31	High Priority

6 Dry Weather Outfall Screening and Sampling

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 Town of Northbridge – Department of Public Works/Engineering 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 Weather Conditions

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 no significant snow melt is occurring. For purposes of determining dry weather conditions, program staff will use precipitation data from Precision Weather, Inc. If Precision Weather, Inc. is not available or not reporting current weather data, then National Weather Service will be used as a back-up.

6.2 Dry Weather Screening/Sampling Procedure

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 6-1** for list of potential field equipment)
3. Conduct the outfall inspection during dry weather:
    a. Mark and photograph the outfall
    b. Record the inspection information and outfall characteristics (using paper forms or digital form using a tablet or similar device) (see form in **Appendix C**)
    c. Look for and record visual/olfactory evidence of pollutants in 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 the following sections.
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 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.

Previous outfall screening/sampling conducted under the 2013 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.

6.2.2 Field Equipment

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

Table 6-1. 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 or Pick	For opening catch basins and manholes when necessary
Sandbags	For damming low flows in order to take samples
Small Mallet or Hammer	Helping to free stuck manhole and catch basin covers
Utility Knife	Multiple uses
Measuring Tape	Measuring distances and depth of flow
Safety Cones	Safety
Hand Sanitizer	Disinfectant/decontaminant
Zip Ties/Duct Tape	For making field repairs
Rubber Boots/Waders	For accessing shallow streams/areas

Equipment	Use/Notes
Sampling Pole/Dipper/Sampling Cage	For accessing hard to reach outfalls and manholes

6.2.3 Sample Collection and Analysis

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 6-2**. The general procedure for collection of outfall samples is as follows:

1. Fill out all sample information on sample bottles and field sheets (see **Appendix C** for Sample Labels 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 6-2**)
6. Place laboratory samples on ice for analysis of bacteria and pollutants of concern
7. Fill out chain-of-custody form (**Appendix C**) for laboratory samples
8. Deliver samples to HUB Testing Laboratory, 95 Beaver Street, Waltham, MA
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 6-2** 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. Analytic procedures and user's manuals for field test kits and field instrumentation are provided in **Appendix D**.

Table 6-2. Sampling Parameters and Analysis Methods

[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).

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 6-3** lists analytical methods, detection limits, hold times, and preservatives for laboratory analysis of dry weather sampling parameters.

Table 6-3. Required Analytical Methods, Detection Limits, Hold Times, and Preservatives[4]

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

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

6.3 Interpreting Outfall Sampling Results

Outfall analytical data from dry weather sampling can be used to help identify the major type or source of discharge. **Table 6-4** 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.

Table 6-4. Benchmark Field Measurements for Select Parameters

Analyte or Parameter	Benchmark
Ammonia	>0.5 mg/L
Conductivity	>2,000 µS/cm
Surfactants	>0.25 mg/L
Chlorine	>0.02 mg/L (detectable levels per the 2016 MS4 Permit)
Indicator Bacteria[5]: *E.coli* *Enterococcus*	*E.coli*: 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 *Enterococcus:* the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 33 colonies per 100 ml and no single sample taken during the bathing season shall exceed 61 colonies per 100 ml

6.4 Follow-up Ranking of Outfalls and Interconnections

The Town of Northbridge 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. Such outfalls/interconnections 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.

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.

[5] Massachusetts Water Quality Standards: http://www.mass.gov/eea/docs/dep/service/regulations/314cmr04.pdf

7.1 System Vulnerability Factors

The Town of Northbridge – Department of Public Works/Engineering 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 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
- 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 that 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 that poor owner maintenance).

A SVF inventory will be documented for each catchment (see **Table 7-1**), retained as part of this IDDE Plan, and included in the annual report.

Table 7-1. Outfall Catchment System Vulnerability Factor (SVF) Inventory

Northbridge, Massachusetts
Revision Date: ##DATE OF LAST UPDATE

Outfall ID	Receiving Water	1 History of SSOs	2 Common or Twin Invert Manholes	3 Common Trench Construction	4 Storm/Sanitary Crossings (Sanitary Above)	5 Sanitary Lines with Underdrains	6 Inadequate Sanitary Level of Service	7 Areas Formerly Served by Combined Sewers	8 Sanitary Infrastructure Defects	9 SSO Potential In Event of System Failures	10 Sanitary and Storm Drain Infrastructure >40 years Old	11 Septic with Poor Soils or Water Table Separation	12 History of BOH Actions Addressing Septic Failure
Sample 1	XYZ River	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

Presence/Absence Evaluation Criteria:

1. History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages
2. Common or twin-invert manholes serving storm and sanitary sewer alignments
3. Common trench construction serving both storm and sanitary sewer alignments
4. Crossings of storm and sanitary sewer alignments where the sanitary system is shallower than the storm drain system
5. Sanitary sewer alignments known or suspected to have been constructed with an underdrain system
6. Inadequate sanitary sewer level of service (LOS) resulting in regular surcharging, customer back-ups, or frequent customer complaints
7. Areas formerly served by combined sewer systems
8. Sanitary sewer infrastructure defects such as leaking service laterals, cr`acked, 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
9. Sewer pump/lift stations, siphons, or known sanitary sewer restrictions where power/equipment failures or blockages could readily result in SSOs
10. Any sanitary sewer and storm drain infrastructure greater than 40 years old
11. 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 that poor owner maintenance)
12. 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 that poor owner maintenance)

7.2 Dry Weather Manhole Inspections

The Town of Northbridge 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 Town of Northbridge – Department of Public Works/Engineering 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) System Vulnerability Factor (SVF) is identified based on previous information or the catchment investigation, a wet weather investigation must also be conducted at the associated outfall. The Town of Northbridge – Department of Public Works/Engineering 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

Instructions: Include all relevant SOPs for specific tools such as dye testing and smoke testing, in Appendix F.

The CMRSWC "Locating Illicit Discharges SOP" provides suggested language for a source isolation and confirmation program.
http://centralmastormwater.org/Pages/crsc_toolbox/Locating%20Illicit%20Discharges%20SOP%20and%20Form_FINAL.pdf

Sample Smoke Testing SOP:
ftp://ftp.ocfl.net/divisions/Utilities/pub/C%20I%20P/Specifications/Smoke%20Testing%20SOP.pdf
Sample Dye Testing SOP:
http://www.oseh.umich.edu/pdf/guideline/dye_testing_guideline.pdf

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. Instructions and Standard Operating Procedures (SOPs) for these and other IDDE methods are provided in **Appendix F**.

Public notification is an important aspect of a detailed source investigation program. Prior to smoke testing, dye testing, or TV inspections, the Town of Northbridge – Department of Public Works/Engineering will notify property owners in the affected area. Smoke testing notification will include reverse 911 calls, Town of Northbridge website notifications, neighborhood door-knocker

notifications and/or neighborhood meetings 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 place 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 of Northbridge 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 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** 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
- 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

Legal Authority (IDDE Bylaw or Ordinance)

Refer to attached Town of Northbridge Stormwater Management Bylaw (adopted 06 May 2008) and Chapter 10, Section 10-400: ILLEGAL DISCHARGES AND STORMWATER CONNECTIONS (Added 10-25-2005 ATM, Art. 10), Bylaw

TOWN OF NORTHBRIDGE
STORMWATER MANAGEMENT BYLAW
[Adopted May 06, 2008 –Spring Annual Town Meeting, Article 22]

1.0 PURPOSE

A) The purpose of this Bylaw is to protect, maintain and enhance the public health, safety, environment and general welfare of the Town of Northbridge by establishing minimum requirements and procedures to control the adverse effects of increased post-development stormwater runoff and nonpoint source pollution associated with new development and redevelopment. It has been determined that proper management of post-development stormwater runoff will minimize damage to public and private property and infrastructure, safeguard the public health, safety, environment and general welfare of the public, protect water and aquatic resources, and promote groundwater recharge to protect surface and groundwater drinking supplies. This Bylaw seeks to meet that purpose through the following objectives:

1. Establish decision-making processes surrounding land development activities that protect the integrity of watersheds and preserve the health of water resources;
2. Require that new development, redevelopment and all land conversion activities maintain the after-development runoff characteristics that are equal to or less than the pre-development runoff characteristics in order to reduce flooding, stream bank erosion, siltation, nonpoint source pollution, property damage, and to maintain the integrity of stream channels and aquatic habitats;
3. Establish minimum post-development stormwater management standards and design criteria for the regulation and control of stormwater runoff quantity and quality; establish minimum design criteria for the protection of properties and aquatic resources downstream from land development and land conversion activities from damage due to increases in volume, velocity, frequency, duration, and peak flow rate of storm water runoff; Establish minimum design criteria for measures to minimize nonpoint source pollution from stormwater runoff which would otherwise degrade water quality;
4. Establish design and application criteria for the construction and use of structural stormwater control facilities that can be used to meet the minimum post-development stormwater management standards;
5. Encourage the use of nonstructural stormwater management practices, stormwater better site design practices or "low-impact development practices", such as reducing impervious cover and the preservation of greenspace and other natural areas, to the maximum extent practicable;
6. Establish provisions for the long-term responsibility for and maintenance of structural stormwater control facilities and nonstructural stormwater management practices to ensure that they continue to function as designed, are maintained, and pose no threat to public safety;
7. Establish provisions to ensure there is an adequate funding mechanism, including financial security or surety, for the proper review, inspection and long-term maintenance of stormwater facilities implemented as part of this Bylaw;
8. Establish administrative procedures for the submission, review, approval or disapproval of stormwater

management plans, and for the inspection of approved active development projects, and long-term follow up; establish certain administrative procedures and fees for the submission, review, approval or disapproval of stormwater plans, and the inspection of approved projects.

B) Nothing in this Bylaw is intended to replace the requirements of either the Town of Northbridge Zoning Bylaw, the Town of Northbridge General Wetlands Protection Bylaw, or any other Bylaw that may be adopted by the Town of Northbridge. Any activity subject to the provisions of the above-cited Bylaws must comply with the specifications of each.
Town of Northbridge

2.0 DEFINITIONS
The following definitions shall apply in the interpretation and implementation of this Bylaw. Additional definitions may be adopted by separate regulation:
ALTERATION: Any activity that will measurably change the ability of a ground surface area to absorb water or will change existing surface drainage patterns. Alteration may be similarly represented as "alteration of drainage characteristics," and "conducting land disturbance activities."
BEST MANAGEMENT PRACTICE (BMP): Structural, non-structural and managerial techniques that are recognized to be the most effective and practical means to prevent and/or reduce increases in stormwater volumes and flows, reduce point source and nonpoint source pollution, and promote stormwater quality and protection of the environment. "Structural" BMPs are devices that are engineered and constructed to provide temporary storage and treatment of stormwater runoff. "Nonstructural" BMPs use natural measures to reduce pollution levels, do not require extensive construction efforts, and/or promote pollutant reduction by eliminating the pollutant source.
BETTER SITE DESIGN: Site design approaches and techniques that can reduce a site's impact on the watershed through the use of nonstructural stormwater management practices. Better site design includes conserving and protecting natural areas and greenspace, reducing impervious cover, and using natural features for stormwater management.
GENERAL STORMWATER MANAGEMENT PERMIT (GSMP): A permit issued for a development project that meets a set of predetermined standards outlined in the Regulations to be adopted by the Stormwater Authority under Section 4 of this Bylaw. By meeting these pre-determined standards, the proposed project will be presumed to meet the requirements and intent of this Bylaw.
HOTSPOT: Land uses or activities with higher potential pollutant loadings, such as auto salvage yards, auto fueling facilities, fleet storage yards, commercial parking lots with high intensity use, road salt storage areas, commercial nurseries and landscaping, outdoor storage and loading areas of hazardous substances, or marinas.
MASSACHUSETTS STORMWATER MANAGEMENT POLICY: The Policy issued by the Department of Environmental Protection, as amended, that coordinates the requirements prescribed by state regulations promulgated under the authority of the Massachusetts Wetlands Protection Act G.L. c. 131 § 40 and the Massachusetts Clean Waters Act G.L. c. 21, §§ 23-56. The Policy addresses stormwater impacts through implementation of performance standards to reduce or prevent pollutants from reaching water bodies and control the quantity of runoff from a site.
NEW DEVELOPMENT: Any construction or land disturbance of a parcel of land that is currently in a natural vegetated state and does not contain alteration by man-made activities.
NONPOINT SOURCE POLLUTION: Pollution from many diffuse sources as opposed to discrete conveyances caused by water, rainfall or snowmelt moving over or through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into water resource areas.
PERSON: Any individual, group of individuals, association, partnership, corporation, company, business organization, trust, estate, the Commonwealth or political subdivision thereof to the extent subject to Town Bylaws, administrative agency, public or quasipublic corporation or body, the Town of Northbridge, and any other legal entity, its legal representatives, agents, or assigns.
PRE-DEVELOPMENT: The conditions that exist at the time that plans for the land development of a site or parcel of land are submitted to the Stormwater Authority. Where phased development or plan approval occurs

(preliminary grading, roads and utilities, etc.), the existing conditions at the time prior to the first plan submission shall establish pre-development conditions.

POST-DEVELOPMENT: The conditions that reasonably may be expected or anticipated to exist after completion of the land development activity on a specific site or parcel of land. Post- development refers to the phase of a new development or redevelopment project after completion, and does not refer to the construction phase of a project.

RECHARGE: The replenishment of underground water reserves.

REDEVELOPMENT: Any construction, alteration, or improvement involving land disturbance of more than 5,000 square feet, where the existing land use is commercial, industrial, institutional, or multi-family residential.

STORMWATER AUTHORITY: The Stormwater Authority is responsible for coordinating the review, approval and permit process as defined in this Bylaw. The Stormwater Authority shall be the Planning Board or its authorized delegates or agents. The Planning Board shall have the authority to delegate to other Town boards and commissions, including, but not limited to, the Board of Health and the Conservation Commission, the duties and responsibilities of the Stormwater Authority for those matters within the regulatory jurisdiction of such other boards and commissions, as may be set forth in the Stormwater Regulations adopted under Section 4 of this Bylaw. Other boards and/or departments of the Town may participate in the review process as described in such Stormwater Regulations.

STORMWATER CREDITS: A form of incentive for developers to promote conservation of natural and open space areas that may be included in the Stormwater Regulations adopted by the Stormwater Authority and may include provisions for reductions in stormwater management requirements in recognition of the use of techniques to reduce stormwater runoff at the site.

STORMWATER MANAGEMENT PERMIT (SMP): A permit issued by the Stormwater Authority, after review of an application, plans, calculations, and other supporting documents, which is designed to protect the environment of the Town from the deleterious affects of uncontrolled and untreated stormwater runoff.

3.0 AUTHORITY

This Bylaw is adopted under authority granted by the Home Rule Amendment of the Massachusetts Constitution, the Home Rule statutes, and pursuant to the regulations of the federal Clean Water Act found at 40 CFR 122.34.

4.0 ADMINISTRATION

A) The Stormwater Authority, shall administer, implement and enforce this Bylaw. Any powers granted to or duties imposed upon the Stormwater Authority may be delegated in writing by the Stormwater Authority to its employees or agents.

B) Stormwater Regulations. The Stormwater Authority may adopt, and periodically amend, Stormwater Regulations to effectuate the purposes of this Bylaw, including terms, conditions, definitions, enforcement, fees (including application, inspection, and/or consultant fees), procedures and administration, by majority vote, after conducting a public hearing to receive comments on the regulations or any proposed revisions. Such hearing dates shall be advertised in a newspaper of general local circulation, at least seven (7) days prior to the hearing date. Failure by the Stormwater Authority to promulgate such Stormwater Regulations or a legal declaration of their invalidity by a court shall not act to suspend or
invalidate the provisions of this Bylaw.

C) Stormwater Management Manual. The Stormwater Authority will utilize the policy, criteria and information including specifications and standards of the latest edition of the Massachusetts Stormwater Management Policy, or local equivalent, for execution of the provisions of this Bylaw. This Policy includes a list of acceptable stormwater treatment practices, including the specific design criteria for each stormwater practice. The Policy may be updated and expanded periodically, based on improvements in engineering, science, monitoring, and local maintenance experience. Unless specifically altered in the Stormwater Regulations, stormwater management practices that are designed, constructed, and
maintained in accordance with these design and sizing criteria will be presumed to be protective of Massachusetts water quality standards.

D) General Permit. The Stormwater Authority shall have the authority to develop a General Stormwater Management Permit (GSMP) for specific types of projects, such as, without limitation construction of a deck, patio, retaining wall, existing driveway expansion, shed, swimming pool, tennis or basketball court. Any such

General Stormwater Management Permit Requirements shall be defined and included as part of any Stormwater Regulations promulgated pursuant to this Bylaw.

E) Actions by the Stormwater Authority. The Stormwater Authority may take any of the following actions on an application for a Stormwater Management Permit as may be more specifically described in the Stormwater Regulations promulgated pursuant to this Bylaw: Approval, Approval with Conditions, Disapproval, or Disapproval without Prejudice.

F) Appeals of Action by the Stormwater Authority. A decision of the Stormwater Authority shall be final. Further relief from a decision by the Stormwater Authority made under this Bylaw shall be by petition to the Superior Court in an action filed in accordance with M.G.L. Ch 249, § 4.

G) Stormwater Credit System. The Stormwater Authority may adopt, as part of the Stormwater Regulations, a Stormwater Credit System. This credit system will allow applicants the option, if approved by the Stormwater Authority, to take credit for the use of stormwater better site design practices to reduce some of the requirements specified in the Regulations. Failure by the Stormwater Authority to promulgate such a credit system through its Stormwater Regulations or a legal declaration of its invalidity by a court shall not act to suspend or invalidate the provisions of this Bylaw.

H) Stormwater Facility Charges. The Stormwater Authority may adopt, as part of the Stormwater Regulations, a system of stormwater facility charges pursuant to M.G.L. Chapter 83, Section 16. The Stormwater Authority shall administer, implement and enforce the system of facility charges. Failure by the Stormwater Authority to adopt such a system of facility charges or a legal declaration of its invalidity by a court shall not act to suspend or invalidate the provisions of this Bylaw.

5.0 APPLICABILITY

A) This Bylaw shall be applicable to all new development and redevelopment, including, but not limited to, site plan applications, subdivision applications, grading applications, land use conversion applications, any activity that will result in an increased amount of stormwater runoff or pollutants flowing from a parcel of land, or any activity that will alter the drainage characteristics of a parcel of land, unless exempt pursuant to Section 5.B) of this Bylaw. No person shall alter land within the Town of Northbridge without having obtained a Stormwater Management Permit (SMP). All new development and redevelopment under the jurisdiction of this Bylaw shall be subject to the requirement to obtain a Stormwater Management Permit.

B) Exemptions The following activities shall be exempt from the requirement of a Stormwater Management Permit:

1. Any activity that will disturb an area less than 5,000 square feet or less than 25% of a contiguous property, whichever is less.
2. Normal maintenance and improvement of land in agricultural use as defined by the Wetlands Protection Act regulation 310 CMR 10.04 and MGL Chapter 40A Section 3.
3. Maintenance of existing landscaping, gardens or lawn areas provided such maintenance does not include the alteration of drainage patterns or expansion of the disturbed area;
4. Normal maintenance and repair of Town owned public land, ways and appurtenances;
5. The construction of any fence that will not alter existing terrain or drainage patterns;
6. Construction of utilities (gas, water, electric, telephone, etc.) other than drainage, which will not alter terrain, ground cover, or drainage patterns;
7. Repairs to any stormwater management facility or practice to address an emergency that poses a threat to public health or safety, or as deemed necessary by the Stormwater Authority;
8. Any work or projects for which all necessary approvals and permits have been issued before the effective date of this Bylaw;

C). Redevelopment projects are presumed to meet the stormwater management requirements specified in the Stormwater Regulations if the total impervious cover is reduced by 40% from existing conditions. Where site conditions prevent the reduction in impervious cover, stormwater management practices shall be implemented to provide stormwater controls for at least 40% of the site's impervious area. When a combination of impervious area reduction and stormwater management practice implementation is used for redevelopment projects, the combination of impervious area reduction and the area controlled by a stormwater management practice shall equal or exceed 40%.

D) An alteration, redevelopment, or conversion of land use to a hotspot such as, without limitation: auto salvage yards, auto fueling facilities, fleet storage yards, commercial parking lots with high intensity use, road salt storage areas, commercial nurseries and landscaping, outdoor storage and loading areas of hazardous substances, or marinas, shall require a Stormwater Management Permit.

6.0 PERMIT PROCEDURES

Permit Procedures and Requirements shall be as described in the Stormwater Regulations promulgated as permitted under Section 4 of this Bylaw.

7.0 ENFORCEMENT

The Stormwater Authority or an authorized agent of the Stormwater Authority shall enforce this Bylaw, the Stormwater Regulations, orders, violation notices, and enforcement orders issued thereunder, and may pursue all civil and criminal remedies for such violations. Any person who violates any provision of this Bylaw, the Stormwater Regulations or any order or permit issued thereunder shall be punished by a fine of not more than three hundred dollars ($300). Each day during which a violation exists shall constitute a separate offense. As an alternative to criminal prosecution in a specific case, the Stormwater Authority may issue citations pursuant to the non-criminal disposition procedure set forth in G.L. ch. 40, §21D, as adopted under §1-109 of the Code of the Town of Northbridge. For purposes of non-criminal disposition, the penalty for a first offense shall be $100, for a second offense $200, and for a third and subsequent offenses $300. Enforcement shall be further described in the Stormwater Regulations promulgated under Section 4 of this Bylaw.

8.0 SEVERABILITY

The invalidity of any section, provision, paragraph, sentence, or clause of this Bylaw shall not invalidate any other section, provision, paragraph, sentence, or clause thereof, nor shall it invalidate any permit or determination that previously has been issued.

Chapter 10
PUBLIC WORKS

SECTION 10-100: SEWERS

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§ 10-420. Violations deemed a public nuisance.
§ 10-421. Prosecution of violations.
§ 10-422. Remedies not exclusive.

[HISTORY: Adopted by the Annual Town Meeting 10-28-1997, Art. 26. Amendments noted where applicable.]

SECTION 10-100: SEWERS

§ 10-101. Permission required to connect to sewers or storm drains.

No person shall allow his vault or house or stable drain to drain into any sewer or storm drain, until first obtaining from the proper authorities permission in writing to do so.

§ 10-102. Sewer connections required when possible.

The sewerage of every building shall be connected with the public sewer when such sewer is located in a street, way or other land adjacent to the lot on which the building is located, if the sewer is so located as to take the sewage therefrom. If the public sewer becomes available after a residence has been constructed and a private waste water treatment system installed the connection to the public sewer shall be made within two years, or at the time of any transfer of title to the property, if sooner. The time for connection shall be extended for up to five years in cases where a new on site septic system has been installed, provided a Title V certificate of compliance has been issued and the system remains in satisfactory condition. The Board of Health may, after a public hearing and for good cause shown, extend the time for compliance.

§ 10-103.[1] Common sewers. [Added 2-23-1999 STM, Art. 2]

Any sewer or drain laid in any land or way, public or private, opened or proposed to be opened for public travel, shall be a common sewer, and it shall not be laid or connected with any existing common sewer unless authorized by the Board of Selectmen or its designee. The penalty for violation of this section shall be as set forth in § 1-109 of the Northbridge Code of Bylaws.

SECTION 10-200: TREE REPLACEMENT

§ 10-201. Tree replacement formula.

All town-owned trees, those being all trees wholly or partially located on property owned by the Town of Northbridge or located wholly or partially within the layout of any public way, in the event of their permanent removal for any reason, shall be replaced according to the following formula: The replacement of town-owned trees shall occur at a ratio of one tree replacement for each tree removed.

[1] Editor's Note: Former § 10-103, Removal of septic tank and cesspool material, was repealed 10-24-2006 ATM, Art. 23. Said Article also renumbered former § 10-104 as § 10-103.

§ 10-202. Period for replacement.

Such replacement shall be accomplished by the Department of Public Works within a ninety-day period, weather permitting. Regardless of circumstances, replacement shall take no longer than 12 months.

§ 10-203. Replacement by private parties.

Private parties who remove town-owned trees shall replace them at their own expense according to the above formula and time frame. The Department of Public Works shall determine planting sites for the replacement trees.

§ 10-204. Annual report.

The Department of Public Works shall report to the Town annually on the number and size of the trees which were removed and the number and size of replacement trees planted.

SECTION 10-300: WATER USE RESTRICTIONS
[Added 6-11-2002 ATM, Art. 9]

§ 10-301. Authority.

This bylaw is adopted by the Town under its police powers to protect public health and welfare and its powers under M.G.L. c. 40, §§ 21 et seq. and implements the Town's authority to regulate water use pursuant to M.G.L. c. 41, § 69B. This bylaw also implements the Town's authority under M.G.L. c. 40, § 41A, conditioned upon a declaration of water supply emergency issued by the Department of Environmental Protection.

§ 10-302. Purpose.

The purpose of this bylaw is to protect, preserve and maintain the public health, safety and welfare whenever there is in force a state of water supply conservation or state of water supply emergency by providing for enforcement of any duly imposed restrictions, requirements, provisions or conditions imposed by the Town or by the Department of Environmental Protection.

§ 10-303. Definitions.

As used in this bylaw, the following terms shall have the meanings indicted:

PERSON — Any individual, corporation, trust, partnership or association, or other entity.

STATE OF WATER SUPPLY EMERGENCY — A state of water supply emergency declared by the Department of Environmental Protection under M.G.L. c. 21G, § 15-17.

STATE OF WATER SUPPLY CONSERVATION — A state of water supply conservation declared by the Town pursuant to § 10-304 of this bylaw.

WATER USERS or WATER CONSUMERS — All public and private users of the Town's public water system, irrespective of any person's responsibility for billing purposes for water used at any particular facility.

§ 10-304. Declaration of a state of water supply conservation.

The Town, through its Board of Selectmen, may declare a state of water supply conservation upon a determination by a majority vote of the Board that a shortage of water exists and conservation measures are appropriate to ensure an adequate supply of water to all water consumers. Public notice of a state of water conservation shall be given under § 10-306 of this bylaw before it may be enforced.

§ 10-305. Restricted water uses.

A declaration of a state of water supply conservation shall include one or more of the following restrictions, conditions, or requirements limiting the use of water as necessary to protect the water supply. The applicable restrictions, conditions or requirements shall be included in the public notice required under § 10-306.

A. Odd/even day outdoor watering. Outdoor watering by water users with odd-numbered addresses is restricted to odd-numbered days. Outdoor watering by water users with even-numbered addresses is restricted to even-numbered days.

B. Outdoor watering ban. Outdoor watering is prohibited.

C. Outdoor watering hours. Outdoor watering is permitted only during daily periods of low demand, to be specified in the declaration of a state of water supply conservation and public notice thereof.

D. Filling swimming pools. Filling of swimming pools is prohibited.

E. Automatic sprinkler use. The use of automatic sprinkler systems is prohibited.

§ 10-306. Public notification of a state of water supply conservation; notification of DEP.

Notification of any provision, restriction, requirement or condition imposed by the Town as part of a state of water supply conservation shall be published in a newspaper of general circulation within the Town, or by such other means reasonably calculated to reach and inform all users of water of the state of water supply conservation. Any restriction imposed under § 10-305 shall not be effective until such notification is provided. Notification of the state of water supply conservation shall also be simultaneously provided to the Massachusetts Department of Environmental Protection.

§ 10-307. Termination of a state of water supply conservation; notice.

A state of water supply conservation may be terminated by a majority vote of the Board of Selectmen, upon a determination that the water supply shortage no longer exists. Public

notification of the termination of a state of water supply conservation shall be given in the same manner required by § 10-306.

§ 10-308. State of water supply emergency; compliance with DEP orders.

Upon notification to the public that the Department of Environmental Protection has issued a declaration of a state of water supply emergency, no person shall violate any provision, restriction, requirement, or condition of any order approved or issued by the Department intended to bring about an end to the state of emergency.

§ 10-309. Penalties.

Any person violating this bylaw shall be liable to the Town in the amount of $50 for the first violation and $100 for each subsequent violation which shall inure to the Town. Fines shall be recovered by indictment, or on complaint before the District Court, or by noncriminal disposition in accordance with Section 21 D of Chapter 40 of the General Laws and § 1-109 of the Code of the Town of Northbridge. Each day of violation shall constitute a separate offense.

§ 10-310. Severability.

The invalidity of any portion or provision of this bylaw shall not invalidate any other portion or provision thereof.

SECTION 10-400: ILLEGAL DISCHARGES AND STORMWATER CONNECTIONS
[Added 10-25-2005 ATM, Art. 10]

§ 10-401. Purpose/intent.

The purpose of this bylaw is to provide for the health, safety, and general welfare of the citizens of the Town of Northbridge through the regulation of non-stormwater discharges to the storm drainage system to the maximum extent practicable as required by federal and state law. This bylaw establishes methods for controlling the introduction of pollutants into the municipal separate storm sewer system (MS4) in order to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process. The objectives of this bylaw are:

A. To regulate the contribution of pollutants to the municipal separate storm sewer system (MS4) by stormwater discharges by any user.

B. To prohibit illicit connections and illegal discharges to the municipal separate storm sewer system.

C. To establish legal authority to carry out all inspection, surveillance and monitoring procedures necessary to ensure compliance with this bylaw.

§ 10-402. Definitions.

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

AUTHORIZED ENFORCEMENT AGENCY — Means the Department of Public Works and its employees or agents designated by the Director of Public Works to enforce this bylaw.

BEST MANAGEMENT PRACTICES (BMPS) — Means schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

CLEAN WATER ACT — Means the federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

CONSTRUCTION ACTIVITY — Means activities subject to NPDES Construction Permits. These include construction projects resulting in land disturbance of one acre or more. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.

DISCHARGE OF POLLUTANTS — Means the addition from any source of any pollutants or combination of pollutants into the municipal storm drainage system or into waters of the United States from any source.

GROUNDWATER — Means water beneath the surface of the ground.

HAZARDOUS MATERIALS — Means any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

ILLEGAL DISCHARGE — Means any direct or indirect non-stormwater discharge to the municipal storm drainage system, except as exempted in § 10-407 of this bylaw.

ILLICIT CONNECTIONS — An illicit connection is defined as either of the following:

Any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm drain system including but not limited to any conveyances which allow any non-stormwater discharge including sewage, process wastewater, and wash water to enter the municipal storm drainage system and any connections to the municipal storm drainage system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved before the effective date of this bylaw, or

Any drain or conveyance connected from a commercial or industrial land use to the municipal storm drainage system, which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.

INDUSTRIAL ACTIVITY — Means activities subject to NPDES industrial permits as defined in 40 CFR, Section 122.26 (b)(14).

MUNICIPAL AUTHORITY — Means the Northbridge Board of Selectmen.

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) or MUNICIPAL STORM DRAINAGE SYSTEM — Means any facilities by which stormwater is collected and/or conveyed, including but not limited to any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER DISCHARGE PERMIT — Means a permit issued by the United States Environmental Protection Agency (EPA) or jointly with the Commonwealth of Massachusetts that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

NON-STORMWATER DISCHARGE — Means any discharge to the storm drain system that is not composed entirely of stormwater.

PERSON — Means any individual, association, organization, partnership, firm, corporation, or other entity recognized by law and any officer, employee or agent of such person.

POLLUTANT — Means anything, which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects and accumulations, so that the same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

PREMISES — Means any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

STORMWATER — Means any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation, and resulting from such precipitation.

STORMWATER POLLUTION PREVENTION PLAN — Means a document, which describes the Best Management Practices and activities to be implemented by a person or business to identify sources of pollution or contamination at a site and the actions to eliminate or reduce pollutant discharges to stormwater, stormwater conveyance systems, and/or receiving waters to the maximum extent practicable.

SURFACE WATER DISCHARGE PERMIT — Means a permit issued by the Massachusetts Department of Environmental Protection pursuant to 314 CMR 3.00 that authorizes the discharge of pollutants to waters of the Commonwealth of Massachusetts.

WASTEWATER — Means any sanitary waste, sludge, or septic tank or cesspool overflow, and water that during manufacturing, cleaning, or processing comes into direct contact

with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

WATERCOURSE -- Means a natural or man-made channel through which water flows or a stream of water, including a river, brook, or underground stream.

Other terms used in this bylaw and not specifically defined herein shall have the meaning set forth in the Clean Water Act.

§ 10-403. Applicability.

This bylaw shall apply to all water entering the municipal storm drainage system generated on any developed and undeveloped lands unless explicitly exempted by an authorized enforcement agency.

§ 10-404. Responsibility for administration.

The Town of Northbridge Department of Public Works shall administer, implement, and enforce the provisions of this bylaw. Any powers granted or duties imposed upon the authorized enforcement agency may be delegated in writing by the Director of Public Works to persons or entities acting in the beneficial interest of or in the employ of the Department.

§ 10-405. Severability.

The provisions of this bylaw are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this bylaw or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions or application of this bylaw.

§ 10-406. Ultimate responsibility.

The standards set forth herein and promulgated pursuant to this bylaw are minimum standards; therefore, this bylaw does not intend nor imply that compliance by any person will ensure that there will be no contamination, pollution, nor unauthorized discharge of pollutants.

§ 10-407. Discharge prohibitions.

Prohibition of illegal discharges.

No person shall discharge or cause to be discharged into the municipal storm drainage system or watercourses any materials, including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than stormwater.

The commencement, conduct, or continuance of any illegal discharge to the municipal storm drainage system is prohibited except as described as follows:

A. The following discharges are exempt from discharge prohibitions established by this bylaw: water line flushing; flow from potable water sources; landscape irrigation or lawn watering; diverted stream flows; rising groundwater; uncontaminated groundwater infiltration to storm drains or uncontaminated pumped groundwater, water from foundation or footing drains (not including active groundwater dewatering systems), crawl space pumps, or air conditioning condensation; springs; non-commercial washing of vehicles; natural riparian habitat or wetland flows, swimming pools (if dechlorinated: typically less than one PPM chlorine), fire-fighting activities, and any other water source not containing pollutants.

B. Discharges specified in writing by the authorized enforcement agency as being necessary to protect public health and safety.

C. Dye testing is an allowable discharge, but requires a verbal notification to the authorized enforcement agency prior to the time of the test.

D. The prohibition shall not apply to any non-stormwater discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the United States Environmental Protection Agency or the Department of Environmental Protection, provided that the discharge is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the municipal storm drainage system.

Prohibition of illicit connections.

A. The construction, use, maintenance, or continued existence of illicit connections to the municipal storm drainage system is prohibited.

B. This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

C. A person is considered to be in violation of this bylaw if the person connects a line conveying sewage to the municipal storm drainage system, or allows such a connection to continue.

§ 10-408. Suspension of MS4 access.

Suspension due to illegal discharges in emergency situations.

The Department of Public Works may, without prior notice, suspend MS4 discharge access to a person when such suspension is necessary to stop an actual or threatened discharge, which presents or may present imminent and substantial danger to the environment, or to the health or welfare of persons, or to the MS4 or waters of the United States. If a person fails to comply with a suspension order issued in an emergency, the authorized enforcement agency may take such steps as deemed necessary to prevent or minimize damage to the MS4 or waters of the United States, or to minimize danger to persons.

Suspension due to the detection of illegal discharge.

Any person discharging to the MS4 in violation of this bylaw may have his MS4 access terminated if such termination would abate or reduce an illegal discharge. The authorized enforcement agency will notify a violator of the proposed termination of its MS4 access. The violator may petition the authorized enforcement agency for a reconsideration and hearing.

A person commits an offense if the person reinstates MS4 access to premises terminated pursuant to this section, without the prior approval of the authorized enforcement agency.

§ 10-409. Industrial or construction activity discharges.

Any person subject to an industrial or construction activity NPDES stormwater discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the Department of Public Works prior to the allowing of discharges to the MS4.

§ 10-410. Monitoring of discharges.

A. Applicability. This subsection applies to all facilities that have stormwater discharges associated with industrial activity, including construction activity.

B. Access to facilities.

(1) To the extent permitted by law, the Department of Public Works shall be permitted to enter and inspect facilities subject to regulation under this bylaw as often as may be necessary to determine compliance with this bylaw. If a discharger has security measures in force, which require proper identification and clearance before entry into its premises, the discharger shall make the necessary arrangements to allow access to representatives of the authorized enforcement agency.

(2) Facility operators shall allow the Department of Public Works ready access to all parts of the premises for the purposes of inspection, sampling, examination and copying of records that must be kept under the conditions of an NPDES permit to discharge stormwater, and the performance of any additional duties as defined by state and federal law.

(3) The Department of Public Works shall have the right to set up on any permitted facility such devices as are necessary in the opinion of the authorized enforcement agency to conduct monitoring and/or sampling of the facility's stormwater discharge.

(4) The Department of Public Works has the right to require the discharger to install monitoring equipment as necessary. The facility's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the discharger at its own expense. All devices used to measure stormwater flow and quality shall be calibrated to ensure their accuracy.

(5) Any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled shall be promptly removed by the operator at the written or

oral request of the Department of Public Works and shall not be replaced. The costs of clearing such access shall be borne by the operator.

(6) Unreasonable delays in allowing the Department of Public Works access to a permitted facility shall be a violation of a surface water discharge permit and of this bylaw. A person who is the operator of a facility with a NPDES permit to discharge stormwater associated with industrial activity commits an offense if the person denies the authorized enforcement agency reasonable access to the permitted facility for the purpose of conducting any activity authorized or required by this bylaw.

(7) If the Department of Public Works has been refused access to any part of the premises from which stormwater is discharged, and is able to demonstrate probable cause to believe that there may be a violation of this bylaw, or that there is a need to inspect and/or sample as part of a routine inspection and sampling program designed to verify compliance with this bylaw or any order issued hereunder, or to protect the overall public health, safety, and welfare of the community, then the authorized enforcement agency may seek issuance of a search warrant from any court of competent jurisdiction.

§ 10-411. Requirement to prevent, control, and reduce stormwater pollutants by the use of best management practices.

The Department of Public Works will adopt requirements identifying best management practices for any activity, operation, or facility, which may cause or contribute to pollution or contamination of stormwater, the storm drain system, or waters of the United States. The owner or operator of a commercial or industrial establishment shall provide, at their own expense, reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drainage system or watercourses through the use of these structural and non-structural BMPs. Further, any person responsible for a property or premises which is, or may be, the source of an illicit discharge, may be required to implement, at said person's expense, additional structural and non-structural BMPs to prevent the further discharge of pollutants to the municipal storm drainage system. Compliance with all terms and conditions of a valid NPDES permit authorizing the discharge of stormwater associated with industrial activity, to the extent practicable, shall be deemed compliance with the provisions of this section. These BMPs shall be part of a stormwater pollution prevention plan (SWPP) as necessary for compliance with requirements of the NPDES permit.

§ 10-412. Watercourse protection.

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

§ 10-413. Notification of spills.

Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials which are resulting or may result in illegal discharges or pollutants discharging into stormwater, the municipal storm drainage system, or waters of the United States said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials said person shall immediately notify emergency response agencies (including the Northbridge Police and Fire Departments) of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the authorized enforcement agency in person or by phone or facsimile no later than the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the Department of Public Works within three business days of the phone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

§ 10-414. Enforcement.

A. Notice of violation.

It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this bylaw. The Department of Public Works and its employees and agents designated by the Director of Public Works shall enforce this bylaw. Whenever the Department of Public Works finds that a person has violated a prohibition or failed to meet a requirement of this bylaw, the authorized enforcement agency may order compliance by written notice of violation to the responsible person. Such notice may require without limitation:

(1) The performance of monitoring, analyses, and reporting;

(2) The elimination of illicit connections or discharges;

(3) That violating discharges, practices, or operations shall cease and desist;

(4) The abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property; and

(5) Payment of a fine to cover administrative and remediation costs; and

(6) The implementation of source control or treatment BMPs.

If abatement of a violation and/or restoration of affected property is required, the notice shall set forth a deadline within which such abatement or restoration must be completed. Said notice shall further advise that, should the violator fail to abate or restore within the established deadline, the Town of Northbridge may, at its option, undertake the work and the expense thereof shall be charged to the violator.

§ 10-415. Appeal of notice of violation.

Any person receiving a notice of violation may appeal the determination of the authorized enforcement agency to the Northbridge Board of Selectmen. The notice of appeal must be received within 10 calendar days from the date of the notice of violation. A hearing on the appeal before the Board of Selectmen shall take place within 15 days from the date of receipt of the notice of appeal. The decision of the Northbridge Board of Selectmen shall be final.

§ 10-416. Enforcement measures after appeal.

If the violation has not been corrected pursuant to the requirements set forth in the notice of violation, or, in the event of an appeal, within 30 calendar days of the decision of the Northbridge Board of Selectmen upholding the decision of the authorized enforcement agency, then representatives of the authorized enforcement agency may, to the extent permitted by law, enter upon the subject property and are authorized to take any and all measures necessary to abate the violation and/or restore the property. It shall be unlawful for any person, owner, agent, or person in possession of any premises to refuse to allow the government agency or designated contractor to enter upon the premises for the purposes set forth above.

§ 10-417. Cost of abatement of the violation.

Within 15 calendar days after abatement of the violation, the owner of the property will be notified of the cost of abatement, including administrative costs, which cost shall be assessed to the owner. The property owner may file with the Board of Selectmen, a written protest objecting to the amount of the assessment within 10 calendar days. If the amount due is not paid by the expiration of the time in which to file a protest or, if a protest is filed, within 10 calendar days after the decision of the Board of Selectmen upholding, in whole or in part, the amount of the cost, the cost shall become a special assessment against the property and shall constitute a lien on the property for the amount of the assessment. The cost shall be paid in not more than 12 equal payments. Interest at the statutory rate provided in MGL c. 59, § 57 shall be assessed on the balance beginning on the 31st day after the cost first becomes due.

§ 10-418. Injunctive relief.

If a person has violated or continues to violate the provisions of this bylaw, the authorized enforcement agency may petition for a preliminary or permanent injunction restraining the person from activities, which would create further violations, or compelling the person to perform abatement or remediation of the violation.

§ 10-419. Compensatory action.

In lieu of enforcement proceedings, penalties, and remedies authorized by this bylaw, the authorized enforcement agency may impose upon violator alternative compensatory actions, such as storm drain stenciling, attendance at compliance workshops, creek cleanup, etc.

§ 10-420. Violations deemed a public nuisance.

In addition to the enforcement processes and penalties provided, any condition caused or permitted to exist in violation of any of the provisions of this bylaw is deemed to be a threat to public health, safety, and welfare, and is declared and deemed a nuisance, and a civil action to abate, enjoin, or otherwise compel the cessation of, such nuisance may be taken by the authorized enforcement agency.

§ 10-421. Prosecution of violations.

Any person that has violated or continues to violate this bylaw shall be liable to criminal prosecution to the fullest extent of the law, and shall be subject to a penalty of $500 per violation per day. The authorized enforcement agency may recover all attorney's fees, court costs and other expenses associated with enforcement of this bylaw, including sampling and monitoring expenses. Notwithstanding the foregoing, the Town may choose to employ the "noncriminal" remedies detailed on § 1-109 of this Code of Bylaws.

§ 10-422. Remedies not exclusive.

The remedies listed in this bylaw are not exclusive of any other remedies available under any applicable federal, state, or local law and it is within the discretion of the authorized enforcement agency to seek cumulative remedies.

Appendix B

Storm System Mapping

Refer to the Town of Northbridge - Phase I storm system mapping that reflects a total of one hundred twenty-five outfalls.

Refer to the Town of Northbridge - Phase II mapping that includes outfall locations (but not spatial with latitude and longitude), pipes, manholes, catchbasins, refined catchment delineations (not completed at this time), and sanitary sewer systems. There are not combined sewer systems in the Town of Northbndige.l.

Stormwater System Infrastructure

Town of Northbridge, Massachusetts

Source: Data provided by the Town of Northbridge, the Central Massachusetts Regional Planning Commission (CMRPC), the Commonwealth of Massachusetts, mass DOT/Office Of Transportation Planning Geospatial Resources Section and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division.

Information depicted on this map is for planning purposes only.

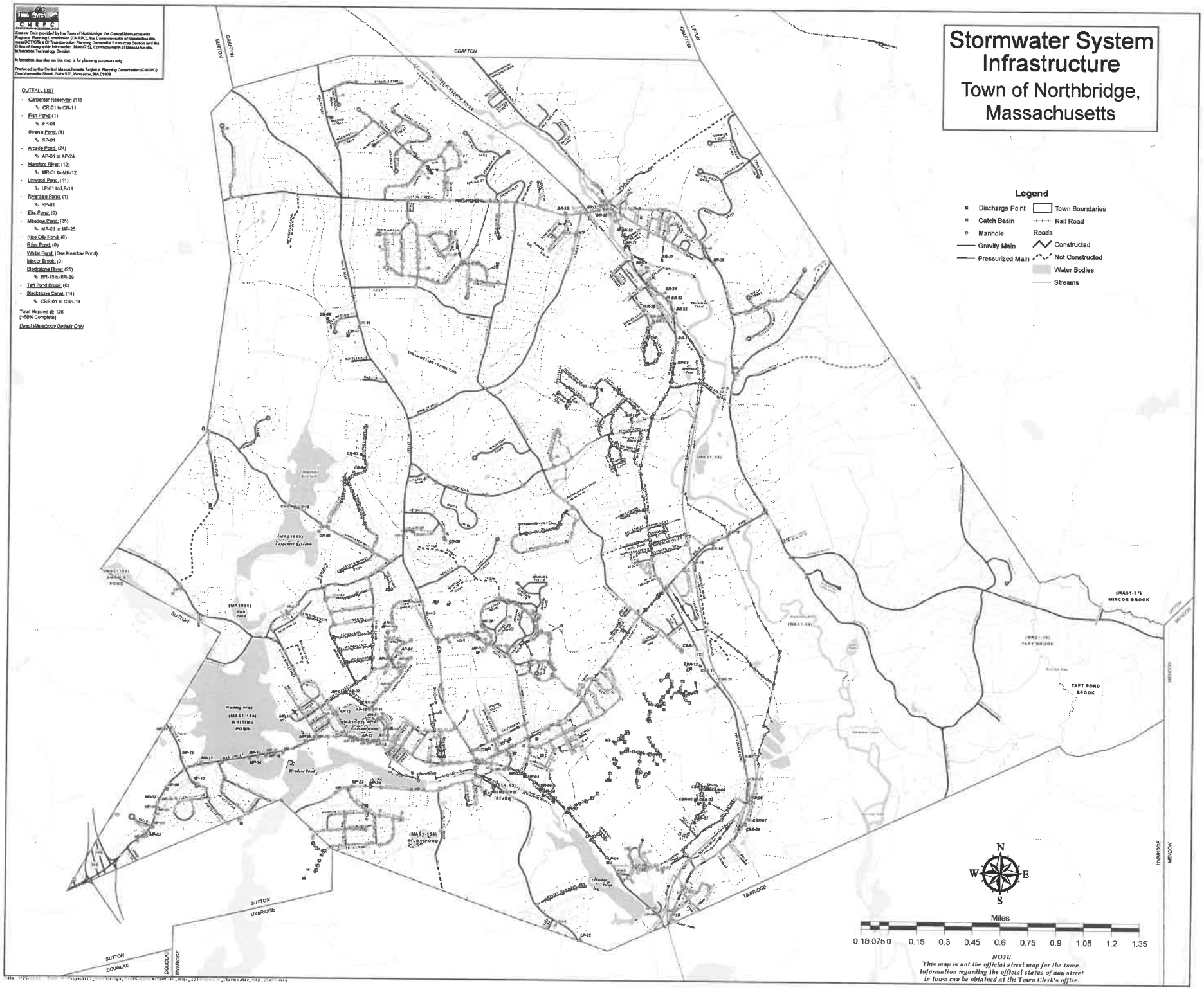
Produced by the Central Massachusetts Regional Planning Commission (CMRPC)
One Mercantile Street, Suite 620, Worcester, MA 01608

OUTFALL LIST

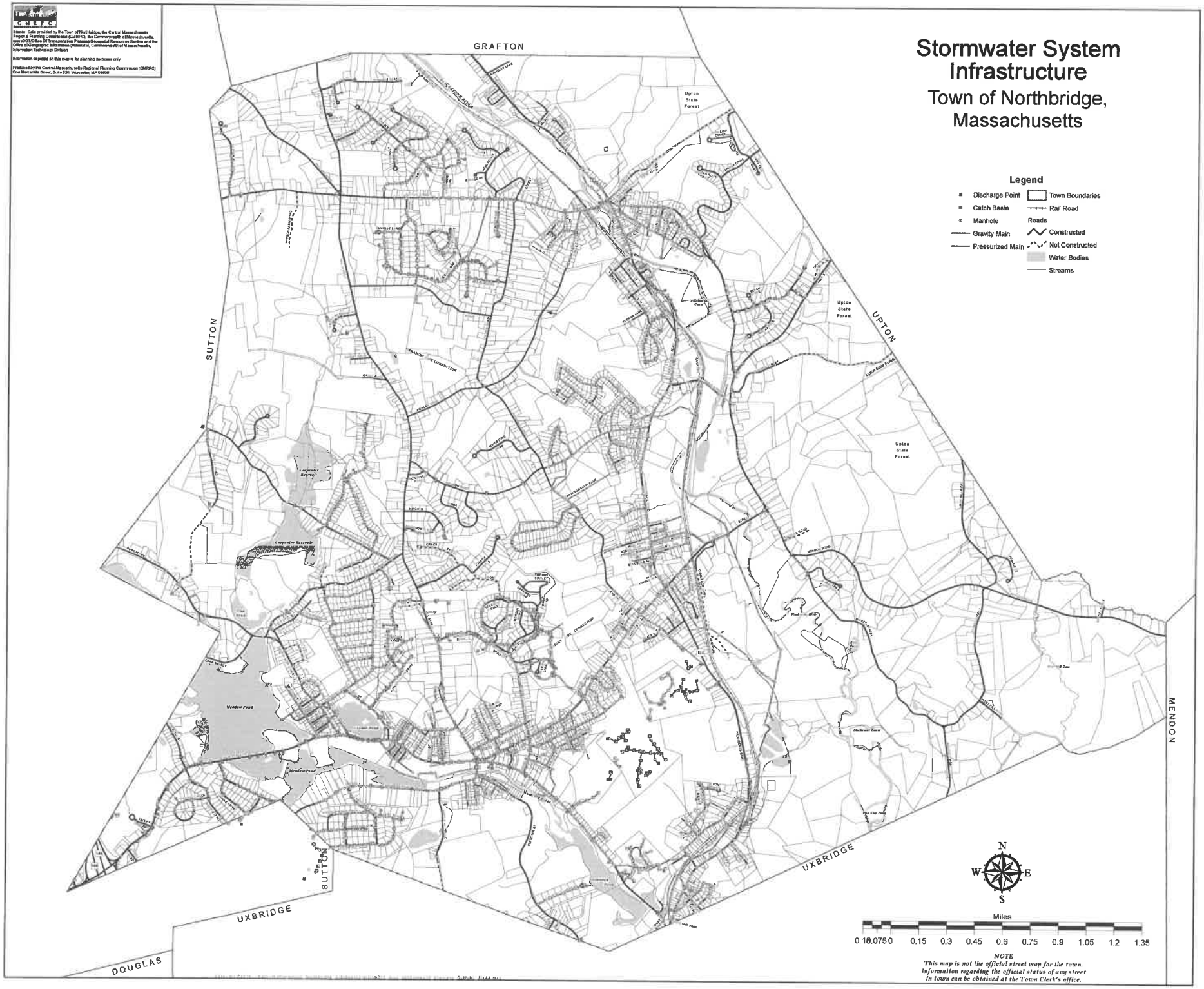
- Carpenter Reservoir (11)
  - CR-01 to CR-11
- Fish Pond (1)
  - FP-01
- Swan's Pond (1)
  - SP-01
- Arcade Pond (24)
  - AP-01 to AP-24
- Mumford River (12)
  - MR-01 to MR-12
- Linwood Pond (11)
  - LP-01 to LP-11
- Riverdale Pond (1)
  - RP-01
- Ellis Pond (0)
- Meadow Pond (25)
  - MP-01 to MP-25
- Rice City Pond (0)
- Riley Pond (0)
- Whitin Pond (See Meadow Pond)
- Mercor Brook (0)
- Blackstone River (35)
  - BR-15 to BR-39
- Taft Pond Brook (0)
- Blackstone Canal (14)
  - CBR-01 to CBR-14

Total Mapped @ 125
(~50% Complete)

Direct Waterbody Outfalls Only



NOTE
This map is not the official street map for the town. Information regarding the official status of any street in town can be obtained at the Town Clerk's office.


Stormwater System Infrastructure
Town of Northbridge, Massachusetts
Legend
Discharge Point
Catch Basin
Manhole
Gravity Main
Pressurized Main
Town Boundaries
Rail Road
Roads
Constructed
Not Constructed
Water Bodies
Streams
GRAFTON
SUTTON
UPTON
UXBRIDGE
MENDON
DOUGLAS
Upton State Forest
Miles
0.18.0750
0.15
0.3
0.45
0.6
0.75
0.9
1.05
1.2
1.35
NOTE
This map is not the official street map for the town.
Information regarding the official status of any street
in town can be obtained at the Town Clerk's office.

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Appendix C

Field Forms, Sample Bottle Labels, and Chain of Custody Forms

Refer to field sampling documents including sample bottle labels, chain of custody forms, etc. prepared for the CMRSWC Member Communities prepared by Fuss & O"Neill.

BETA Group Inc. Stormwater Inventory Outfall Screening/Sampling Form

Municipality Name:

General Data

Outfall ID:

Inspection Date: **Inspection Time**

Inspector:

Weather: Clear | Cloudy | Rain | Snow

Able to Access: Yes | No

Outfall Environmental Inspection

Surrounding Area: Residential | Commercial | Industrial | Municipal | Open Space | Unknown

Outfall Flowing To: Bay | Lake | Land | Marsh | Pond | River | Stream | Wetland

Structure Under Water: Yes | No

Outfall Flow Amount: Drip | Moderate | None | Substantial | Trickle

Outfall Flow Clarity: Clear | Cloudy | None | Opaque

Outfall Flow Color:

Sediment Yes | No

Scouring Yes | No

Algae Growth: Yes | No

Stressed Vegetation: Yes | No

Staining: Yes | No

Floatables: Yes | No

Oil Sheen: Yes | No

Odor: None | Sewer | Eggs | Fuel | Laundry | Sewage

Turbidity: Yes | No

Outfall Sampling

Sampling Required? Yes | No

Sampling Performed? Yes | No

Structure Where Sampling Was Performed Outfall | MH | CB | Other

Structure ID If Not Outfall:

Ammonia Reading: **Salinity Reading:** **Temperature Reading**

Chlorine Reading: **pH Reading:**

Conductivity Readin **Surfactant Reading**

Sample Bottle Label

Company _____

Sample ID _____

Location _____

Collected by _____

Date _____

Analysis _____

Comments _____

_____

SAMPLE

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME/LOCATION
CLIENT	
REPORT TO:	
INVOICE TO:	

DATE	TIME	COMP	GRAB	SAMPLE I.D.	AQUEOUS	SOIL	OTHER	NO. OF CONTAINERS	PRESERVATIVE	TESTS**						REMARKS

Sampled by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Laboratory Remarks: Temp. received: _____ Cooled ☐	Special Instructions: List Specific Detection Limit Requirements:
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time		
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time		Turnaround (Business Days)_____

**Netlab subcontracts the following tests: Radiologicals, Radon, Asbestos, UCMRs, Perchlorate, Bromate, Bromide, Sieve, Salmonella, Carbamates

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Appendix D

Water Quality Analysis Instructions, User's Manuals and Standard Operating Procedures

Refer to Standard Operating Procedures, Water Quality Analysis Instructions and Procedures prepared for the CMRSWC Member Communities prepared by Fuss & O"Neill for all sample parameters and all meters or field test kits that are used for analysis. These include manufacturer's instructions for how to use field test kits as well as manufacturer's instructions or user's manuals for any field instrumentation.

IDDE Outfall Investigation and Sampling Checklists

Central Massachusetts Regional Stormwater Coalition (CMRSWC)

April 24, 2019

FUSS & O'NEILL

1550 Main Street, Suite 400
Springfield, MA 01103

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IDDE Outfall Investigation and Sampling Checklists
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1 Introduction

These checklists and instructions were prepared to guide members of the Central Massachusetts Regional Stormwater Coalition (CMRSWC) in outfall investigation and sampling as part of an illicit discharge detection and elimination (IDDE) program. The IDDE program is a requirement under the 2016 Massachusetts Small MS4 General Permit. It is assumed that outfalls and catchments have already been prioritized and ranked based on criteria detailed in Section 2.3.4.7 of the permit.

These checklists and instructions were created to aid in the following stormwater outfall investigations:

- Dry weather Outfall Screening
- Dry weather Outfall Sampling
- Post Screening/Sampling Procedures
- Catchment Investigation

The purpose of dry weather outfall screening is to identify potential illicit connections through inspection and sampling during times when stormwater should not be an influence. Outfalls are inspected and those that have flow during dry weather are sampled for pollutants that are commonly attributed to illicit discharges. An illicit discharge is any discharge to a MS4 that is not composed entirely of stormwater. Sources of illicit discharges may include illegal floor drain connections, broken sanitary lines, cross-connections, sanitary sewer overflows, and grass clippings, pet waste, or other material dumped into catch basins.

CMRSWC

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2 Equipment Checklist

Outfall Screening/Sampling Equipment Checklist

Equipment needed for both screening and sampling:

- ☐ Clipboard
- ☐ Field Sheets/ Tablet
- ☐ Pens/Pencils/Permanent Markers
- ☐ Dry Erase Board and Markers
- ☐ Measuring Tape
- ☐ Flashlight/Headlamp with Batteries
- ☐ Digital Camera (or phone with a camera)
- ☐ GPS Receiver (or phone with a GPS app.)
- ☐ Manhole Cover Assisted Opener, Pry Bar, Pick, and/or Manhole Lifter
- ☐ Small Mallet or Hammer
- ☐ Appropriate footwear (Boots and/or Waders)
- ☐ Reflective Vest
- ☐ Traffic Cones
- ☐ Poison Ivy Scrub

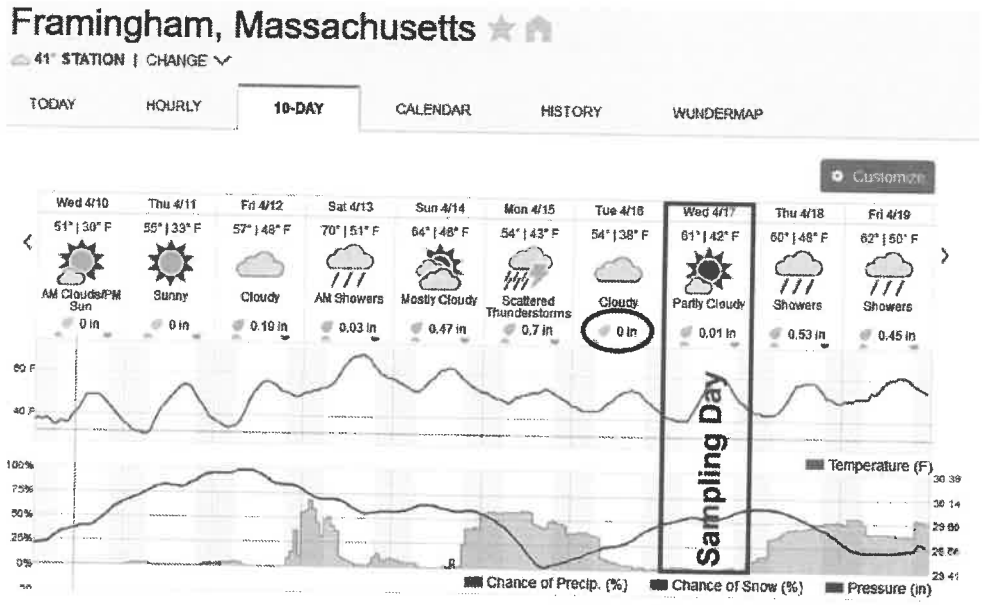
Equipment needed for sampling:

- ☐ Sampling Pole
- ☐ Utility Knife
- ☐ Zip ties/Duct Tape
- ☐ Safety Glasses
- ☐ Nitrile Gloves
- ☐ Hand Sanitizer
- ☐ Chain of Custody Forms
- ☐ Cooler with Ice
- ☐ Water Quality Sonde (if needed/available for conductivity, temperature and pH)
- ☐ Water Quality Meter (if needed/available for ammonia, surfactants and/or chlorine)
- ☐ Test Kits (if needed/available for ammonia and surfactants)
- ☐ Labels for sample bottles
- ☐ Sample bottles (bring some extras; bacteria bottles need to be sterile)
- ☐ Sand bags (for damming low flows)

3 Preparation and Weather Tracking

3.1 Preparation: 1 Week Prior to Screening

- Look at the extended forecast for a day that will meet dry weather criteria **< 0.1 inch of rain in the past 24 hours and no significant snow melt.**
    - Get weather data from Weather Underground or similar weather resource https://www.wunderground.com
    - Enter your town/city in the search bar. Hourly forecasts with rain totals and historical rainfall data are provided.



- Acquire all required field equipment. See the Outfall Screening Equipment Checklist (**Section 2**).

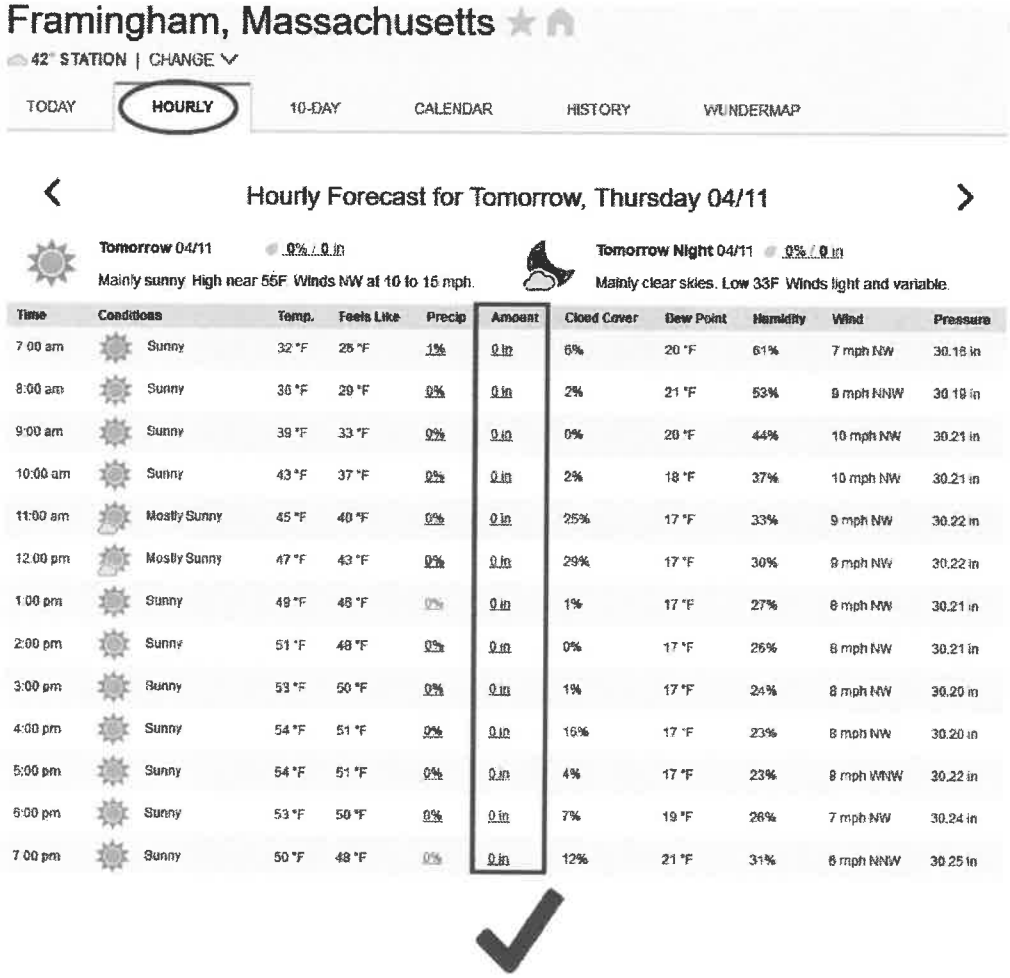
3 Preparation and Weather Tracking

3.2 Preparation: 1 Day Prior to Screening

- Verify that dry weather criteria will be met for the following day: **< 0.1 inch of rain in the past 24 hours and no significant snow melt.**

- Identify outfalls to be screened based on initial outfall inventory and priority ranking. Plan a route to minimize driving time.

- Gather all required field equipment. See the Outfall Screening Equipment Checklist (section 2).



Framingham, Massachusetts

42° STATION | CHANGE

TODAY | HOURLY | 10-DAY | CALENDAR | HISTORY | WUNDERMAP

Hourly Forecast for Tomorrow, Thursday 04/11

Tomorrow 04/11 0% / 0 in
Mainly sunny. High near 55F. Winds NW at 10 to 15 mph.

Tomorrow Night 04/11 0% / 0 in
Mainly clear skies. Low 33F. Winds light and variable.

Time	Conditions	Temp.	Feels Like	Precip	Amount	Cloud Cover	Dew Point	Humidity	Wind	Pressure
7:00 am	Sunny	32 °F	25 °F	1%	0 in	6%	20 °F	61%	7 mph NW	30.18 in
8:00 am	Sunny	36 °F	29 °F	0%	0 in	2%	21 °F	53%	9 mph NNW	30.19 in
9:00 am	Sunny	39 °F	33 °F	0%	0 in	0%	20 °F	44%	10 mph NW	30.21 in
10:00 am	Sunny	43 °F	37 °F	0%	0 in	2%	18 °F	37%	10 mph NW	30.21 in
11:00 am	Mostly Sunny	45 °F	40 °F	0%	0 in	25%	17 °F	33%	9 mph NW	30.22 in
12:00 pm	Mostly Sunny	47 °F	43 °F	0%	0 in	29%	17 °F	30%	9 mph NW	30.22 in
1:00 pm	Sunny	49 °F	46 °F	0%	0 in	1%	17 °F	27%	8 mph NW	30.21 in
2:00 pm	Sunny	51 °F	48 °F	0%	0 in	0%	17 °F	26%	8 mph NW	30.21 in
3:00 pm	Sunny	53 °F	50 °F	0%	0 in	1%	17 °F	24%	8 mph NW	30.20 in
4:00 pm	Sunny	54 °F	51 °F	0%	0 in	16%	17 °F	23%	8 mph NW	30.20 in
5:00 pm	Sunny	54 °F	51 °F	0%	0 in	4%	17 °F	23%	8 mph WNW	30.22 in
6:00 pm	Sunny	53 °F	50 °F	0%	0 in	7%	19 °F	26%	7 mph NW	30.24 in
7:00 pm	Sunny	50 °F	48 °F	0%	0 in	12%	21 °F	31%	6 mph NNW	30.25 in

4 Outfall Screening

4.1 Screening Procedure: Day of Screening

- Navigate to the outfall to be screened.
- Take a photograph of the outfall. Good photos include context. Write the outfall ID on the dry-erase board and include it in the picture.
- If the outfall is inundated:
  - conduct visual screening at the first non-influenced upstream structure (catch basin or drainage manhole).
  - Take a photo of both the inundated outfall and the upstream structure.
  - Note the type of upstream structure and the coordinates on the field form.

Example of a photo that includes surrounding context.

Example of an inundated outfall: the water from the waterbody is backing up into the structure.

4 Outfall Screening

4.1 Screening Procedure: Day of Screening

- Begin the outfall inspection. Fill out the outfall screening form (paper or digital).

This is the unique outfall identifier.

Select Dry Weather Screening.

If screening at an upstream structure, note unique identifier for that structure here.

If practical, park vehicle so as to create a safe working environment

Fill out all physical characteristics for outfall. Fill this section out for the outfall even if screening at an upstream structure.

Obtain Lat. and Long. with phone or GPS.

Outfall/Catchment Screening Form

CMRSWC

FUSS & O'NEILL

Catchment ID: _____ **Town:** _____

Inspector: _____ **Date/Time:** _____

Street Name: _____

Last rainfall event (date and amount): _____

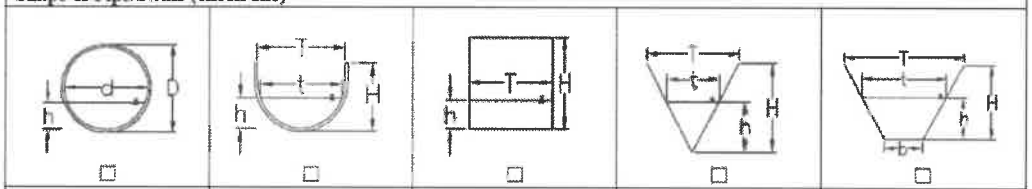
Type of Sampling Event ☐ Dry Weather Screening ☐ Wet Weather Sampling

Location: ☐ Outfall ☐ Manhole ☐ Catch Basin ☐ Interconnection

Is outfall submerged/inundated ? ☐ Yes ☐ No **If YES screen/sample at 1st non-influenced structure:** ☐ MH ☐ CB

Location ID: **Latitude:** **Longitude:**

Shape of Pipe/Swale (check one)



Rounded Pipe	Rounded Swale	Rectangular Pipe/Swale	Triangular Swale	Trapezoidal Swale
☐	☐	☐	☐	☐

Outfall Material:	Pipe Measurements:	Swale Measurements:
☐Concrete	Inner Dia. (in): d =	Swale Width (in): T =
☐HDPE	Outer Dia. (in.): D =	Flow Width (in.): t =
☐Corrugated Metal Pipe (CMP)	Pipe Width (in.): W =	Swale Height (in.): H =
☐ Ductile Iron	Pipe Height (in.): H =	Flow Depth (in.): h =
☐ Clay	Flow Depth (in.): h =	Bottom Width (in.): b =
☐ PVC		
☐ Other		
Outfall/Manhole/Catchbasin Condition:		
☐ Good ☐ Fair		
☐ Poor ☐Crumbling		

4 Outfall Screening

4.1 Screening Procedure: Day of Screening

- Look for and record visual/olfactory evidence of pollutants in flowing outfalls.
- If no flow is observed but evidence of flow exists (outfall is damp or there is visual/olfactory evidence of illicit discharge), mark the outfall to be revisited during dry weather within one week of the initial observation to conduct a second screening and sample any observed flow.

Select all applicable boxes.

Sampling is covered in section 5.

Evidence of Flow: ☐ Yes ☐ No **If Yes, Description of Flow:** ☐ Damp ☐ Trickle ☐ Moderate ☐ High

Visual Evidence of Illicit Discharge
Visual Inspection: ☐ None ☐ Floatables ☐ Pet Waste ☐ Oily Sheen ☐ Sanitary Waste ☐ Algae ☐ Foam

Olfactory Evidence of Illicit Discharge
Olfactory Inspection: ☐ None ☐ Sewage Smell ☐ Musty ☐ Rotten Eggs ☐ Ammonia ☐ Petroleum

Samples Taken and Sampling Results

Temp.	Conductivity	Salinity	Chlorine
Ammonia	Surfactants	Bacteria	Pollutant of Concern

4.2 Post-Screening Procedures

- Schedule any revisits to outfalls based on initial screening.
  - If the outfall was "Damp" then it must be revisited within 7 days
- Store field forms in a designated space. Forms must be included in your Annual Report.
- Review the data and update ranking/prioritization of outfalls. Outfalls that show visual or olfactory signs of illicit discharge should be ranked as "High" priority.

Likely Sewer Input Indicators

- Olfactory or visual evidence of sewage
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine

5 Outfall Sampling

5.1 Preparation: 1 Week Prior to Sampling

- As with outfall screening, look at the extended forecast for a day that will meet dry-weather criteria. **See section 2.1 for criteria and options to obtain weather data.**
- Identify which parameters will be measured in the field and which will be sent to the laboratory for analysis. Bacteria and all pollutants of concern EM6ld be taken to a lab for analysis.
- Ensure you have all required field test kits or instrumentation for parameters that will be measured in the field.
- Make arrangements with a laboratory for sample analysis and to obtain sample bottles with proper preservatives. Nearby laboratory options include:

Con-test Analytical Laboratory
39 Spruce St, East Longmeadow, MA, 01028 SE2 SB3
(413) 525-2332

RI Analytical Laboratories
131 Coolidge St Suite #105, Hudson, MA 01749
(978) 568-0041

Hub Testing Laboratory
95 Beaver St, Waltham, MA, 02453
(781) 893-8330

Sampling Parameters and Analysis Methods

Analyte or Parameter	Instrumentation (Portable Meter)	Field Test Kit
Ammonia (field or lab)	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, MBAS) (field or lab)	CHEMetrics™ I-2017	CHEMetrics™ K-9400 and K-9404 Hach™ DE-2
Chlorine (field only)	CHEMetrics™ V-2000, K-2513 Hach™ Pocket Colorimeter™ II	NA
Conductivity (field or lab)	CHEMetrics™ I-1200 YSI Pro30 YSI EC300A Oakton 450	NA
Salinity (field or lab)	YSI Pro30 YSI EC300A Oakton 450	NA
Temperature (field only)	YSI Pro30 YSI EC300A Oakton 450	NA
Indicator Bacteria: E. coli (freshwater) or Enterococcus (saline water) (Laboratory only)	EPA certified laboratory procedure (40 CFR § 136)	NA
Pollutants of Concern[1] (Laboratory Only)	EPA certified laboratory procedure (40 CFR § 136)	NA

5 Outfall Sampling

5.2 Preparation: 1 Day Prior to Sampling

- Verify that dry weather criteria will be met for the following day: **< 0.1 inch of rain in the past 24 hours and no significant snow melt.**

- Call the laboratory to remind them you will be dropping off samples the next day.

- Identify outfalls to be sampled. Map out a route for the following day. When creating the route remember that **bacteria samples have a hold time of 6 hours from sample collection**. It is **critically important** that your chosen testing laboratory is nearby to maximize your sampling time and deliver samples within 6 hours.

- Gather all required field equipment. See the Outfall Screening/Sampling Equipment Checklist (**Section 2**).EM7

5 Outfall Sampling

5.3 Sampling Procedure: Day of Sampling

- Navigate to the outfall to be sampled and follow the outfall screening procedures in **Section 3.1**.
- If the outfall (or upstream structure in the case of outfall inundation) is flowing, prepare to collect samples. Take the following precautions:
  - Do not eat, drink or smoke or chew tobacco during sample collection
  - Park vehicle away from sampling area and do not leave the vehicle running to reduce risk of contaminating samples
  - Wear gloves when collecting and handling samples
  - When collecting the sample, do not breathe in the direction of the sample bottle
  - If using a sampling pole, triple rinse the bottle holder with distilled water then in the water to be sampled (Skip this step for bacteria sampling). Follow the same procedure for field meters SB5
    - When using a sampling pole, sample bottles should be attached directly to the bottle holder and all bottles should be clean, free of contamination, and in the case of bacteria, sterile.
  - Do not touch the inside of sample bottles or sample bottle caps
  - Do not enter an upstream structure to collect a sample. Use a sampling pole.

5 Outfall Sampling

5.3 Sampling Procedure: Day of Sampling

- Collect samples in the following manner:
  - Make sure all proper PPE is in use (ie nitrile gloves, safety glasses, etc.)
  - Fill out information on sample bottle labels. Place labels on proper bottles
  - Collect bacteria samples first, followed by any additional parameters.
  - If possible, collect samples from the flow directly into the sample bottles. Use a sampling pole if it is unsafe or not possible to directly collect the sample. In cases where flow is particularly light, sandbagging may be necessary to accumulate enough water to collect a sample.
  - Place all laboratory samples (bacteria and pollutants of concern) on ice in a cooler.
  - Use test strips, test kits and/or field meters to measure all other parameters. Record the results on the bottom of the field form.

Enter values for parameters measured in the field. For Bacteria and Pollutants of concern note "Laboratory Analysis"

Samples Taken and Sampling Results			
Temp. 21.2 °C	Conductivity	Salinity	Chlorine
Ammonia	Surfactants	Bacteria Laboratory Analysis	Pollutant of Concern Laboratory Analysis

5.4 Post Sampling Procedures

- Schedule any revisits to outfalls.
  - If the outfall was "Damp" then it must be revisited within 7 days.
- Store field forms, laboratory data and copies of Chains of Custody together in a designated space.
- Review the data and update ranking/prioritization of outfalls. Outfalls that show visual or olfactory signs of illicit discharge or that exceed the benchmark criteria for any parameters should be ranked as "High" priority.
- For outfalls with evidence of an illicit discharge, begin source isolation and identification procedures outlined in the written IDDE Program Plan.

Likely Sewer Input Indicators

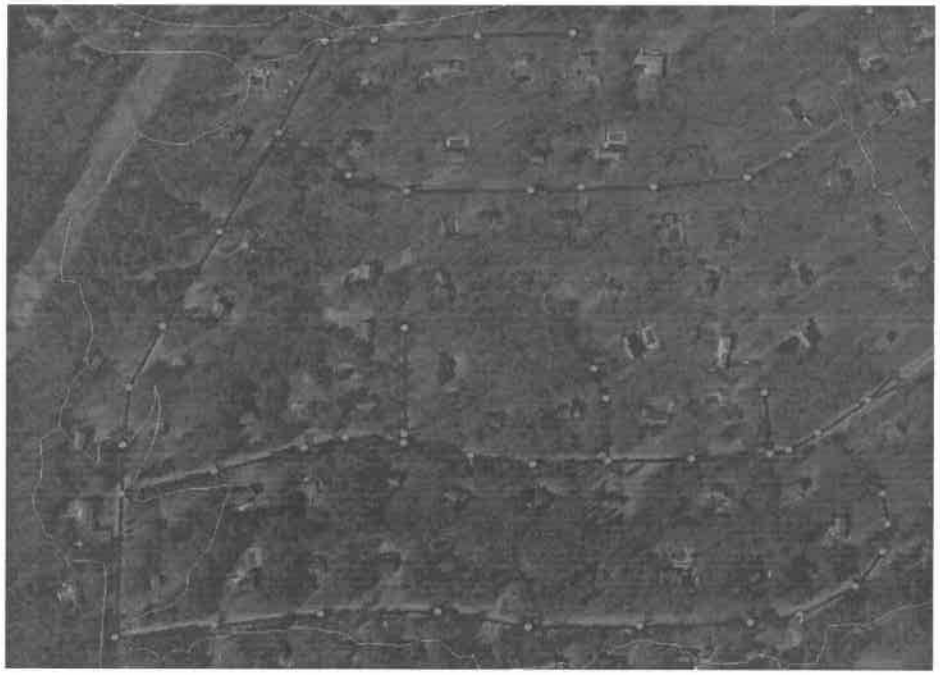
- Olfactory or visual evidence of sewage
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine

Analyte or Parameter	IDDE Benchmark Criteria
Ammonia	>0.5 mg/L
Conductivity	>2,000 µS/cm
Surfactants	>0.25 mg/L
Chlorine	>0.02 mg/L (detectable levels per the 2016 MS4 Permit)
Indicator Bacteria: E.coli Enterococcus	E.coli: 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 Enterococcus: the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 33 colonies per 100 ml and no single sample taken during the bathing season shall exceed 61 colonies per 100 ml

6 Catchment Investigation Procedure

For all Problem and High/Low Priority catchments:

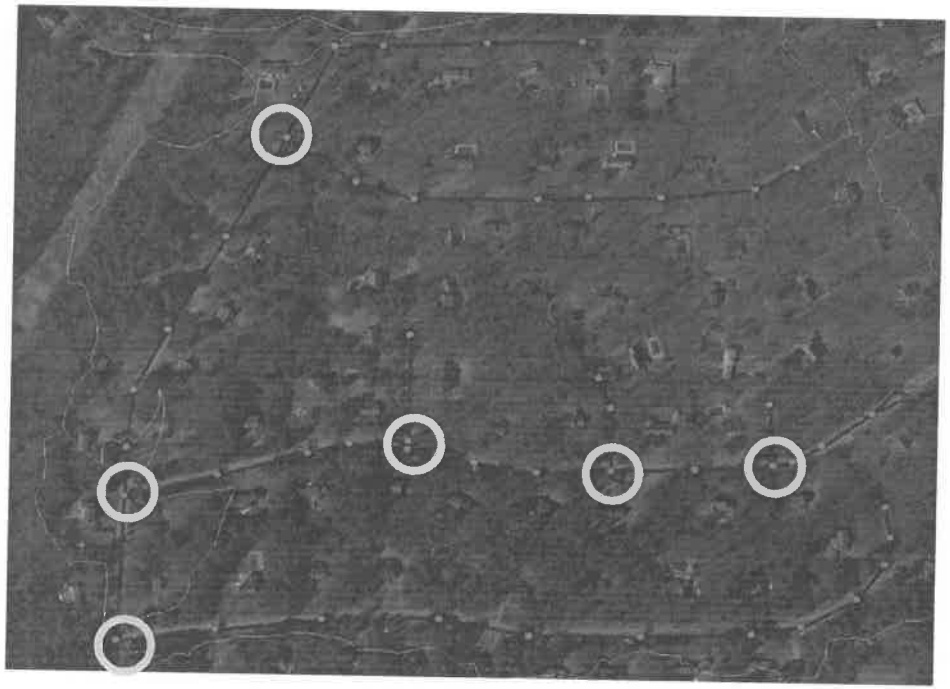
- Identify Key Junction Manholes in the catchment
- Inspect Key Junction Manholes/Catch Basins and sample any observed flow
- If sampling results indicate a potential illicit discharge, continue inspection and sampling of junction structures to isolate pipe segment where illicit discharge originates
- Conduct source identification procedures such as smoke/dye testing or video inspection of pipe segment
- Identify/locate source of discharge
- Eliminate discharge
- Perform Follow-up inspection and sampling to confirm removal of illicit discharge



6 Catchment Investigation Procedure

6.1 Identify Key Junction Manholes

For all Problem and High/Low Priority catchments:

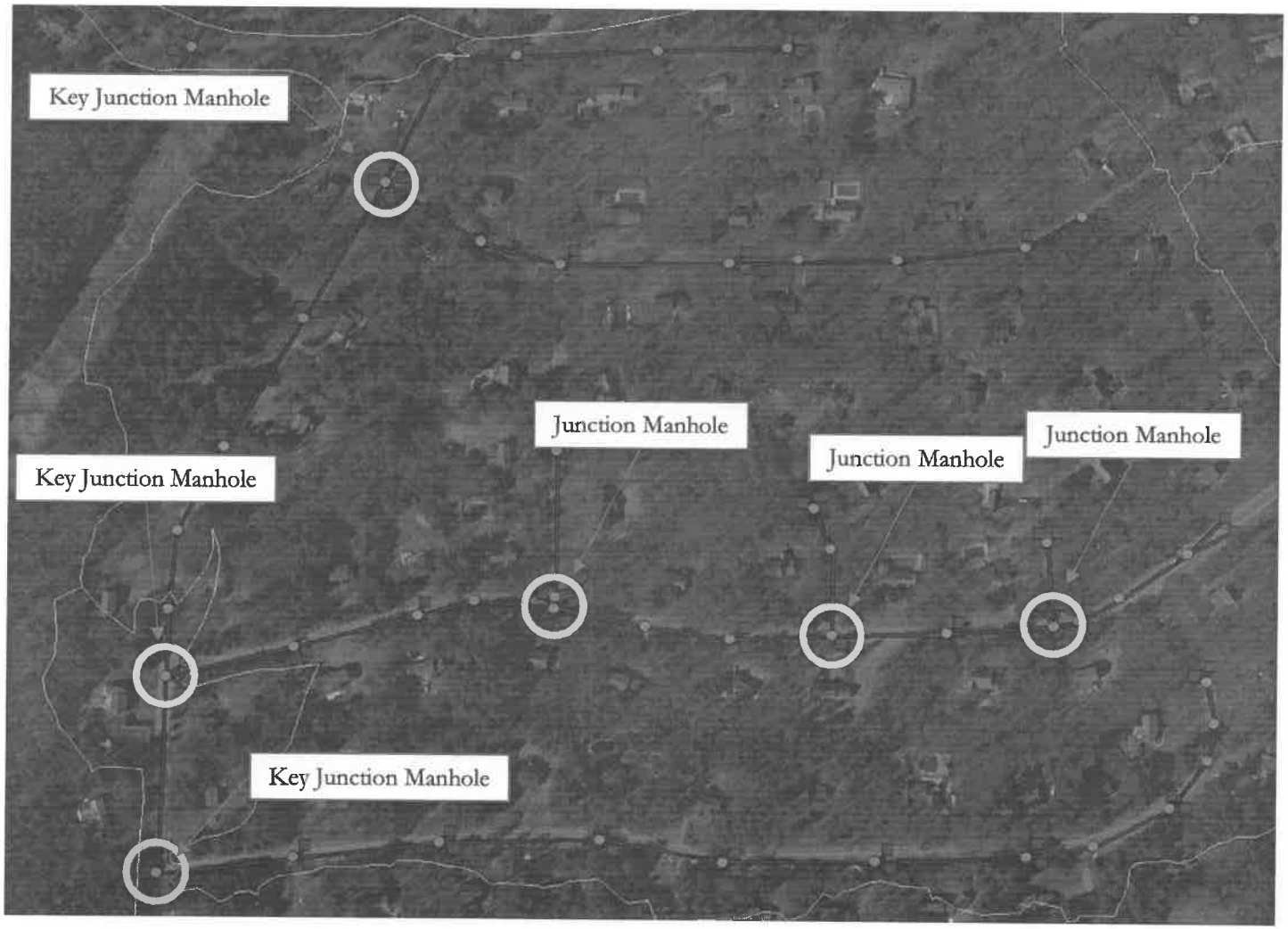


Junction Manhole - For the purposes of this permit, a junction manhole is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.

Key Junction Manhole - For the purposes of this permit, 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.

6 Catchment Investigation Procedure

6.1 Identify Key Junction Manholes



6.2 Inspect/Sample Key Junction Manholes

Catchment ID often times will default to the outfall ID.

Manhole Inspection Form

Catchment ID Example	Date/Time
Structure ID MH-131	Last Rain Date/Amount
Location Description Street and house or pole #	
Inspector	

CMRSWC

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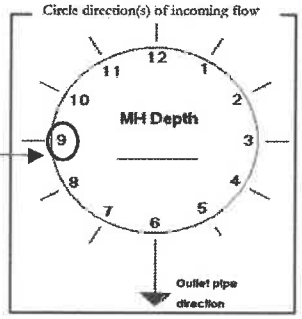
Circle location of all pipes entering structure and fill out corresponding table. The "Six" position is always the outlet of the structure

Circle direction(s) of incoming flow

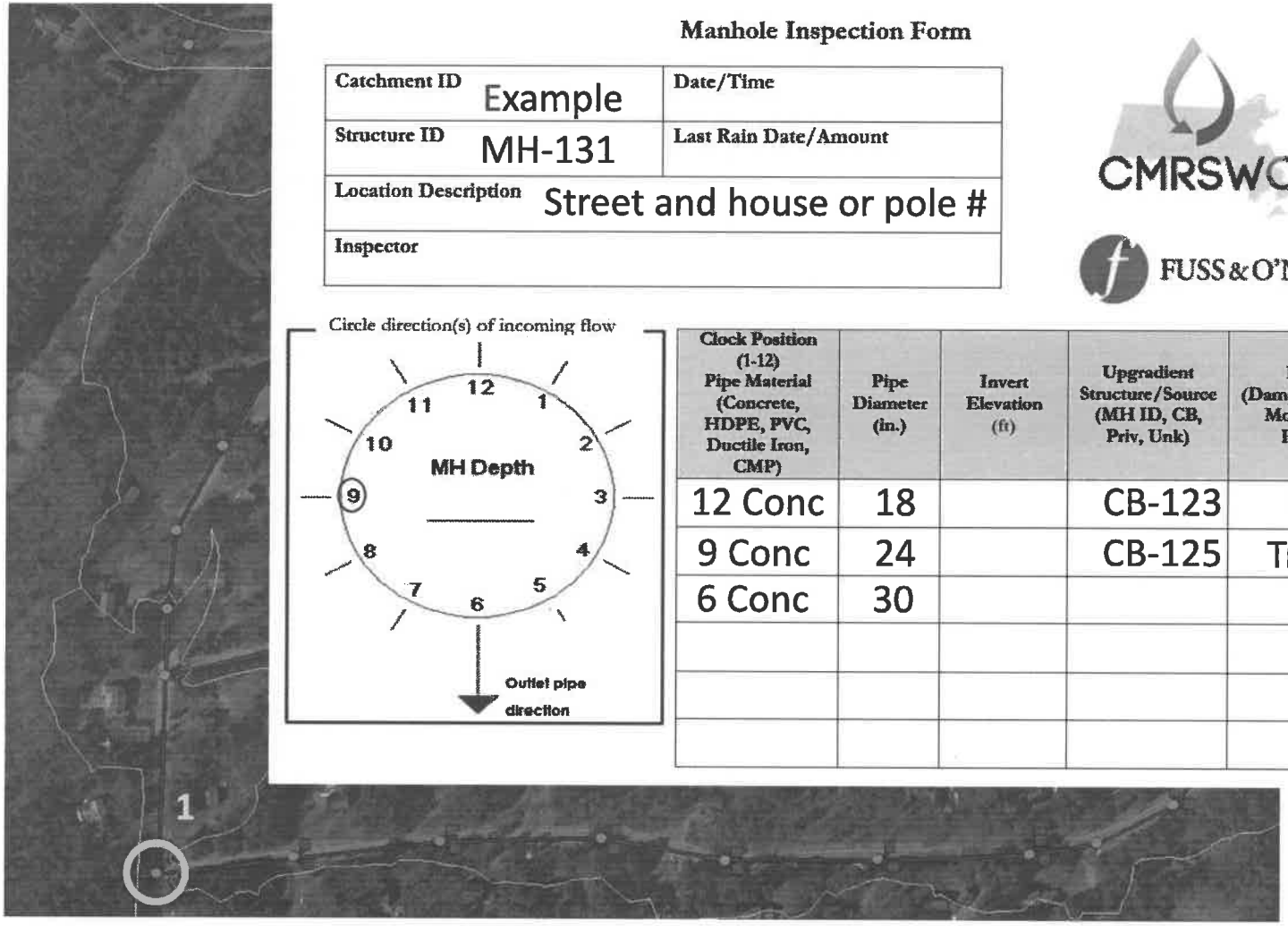


Clock Position (1-12) Pipe Material (Concrete, HDPE, PVC, Ductile Iron, CMP)	Pipe Diameter (in.)	Invert Elevation (ft)	Upgradient Structure/Source (MH ID, CB, Priv, Unk)	Flow (Damp, Trickle, Moderate, High)
12 Conc	18		CB-123	Dry
9 Conc	24		CB-125	Trickle
6 Conc	30			

Fill in table with all pertinent information about the position, material, elevation or depth of invert, information on any upgradient structures and presence of flow

6 Catchment Investigation Procedure

6.2 Inspect/Sample Key Junction Manholes



Manhole Inspection Form

Catchment ID	Example	Date/Time	
Structure ID	MH-131	Last Rain Date/Amount	
Location Description	Street and house or pole #		
Inspector			

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Circle direction(s) of incoming flow

Clock Position (1-12) Pipe Material (Concrete, HDPE, PVC, Ductile Iron, CMP)	Pipe Diameter (in.)	Invert Elevation (ft)	Upgradient Structure/Source (MH ID, CB, Priv, Unk)	Flow (Damp, Trickle, Moderate, High)
12 Conc	18		CB-123	Dry
9 Conc	24		CB-125	Trickle
6 Conc	30			

6.2 Inspect/Sample Key Junction Manholes

Select all applicable boxes.

Enter values for parameters measured in the field. For Bacteria and Pollutants of concern note "Laboratory Analysis"

Cover Conditions: Diameter of clear opening (in.) ☐ Buried ☐ Cannot Inspect ☐ Cannot Locate

Evidence of Flow: ☐ Yes ☐ No **If Yes, Description of Flow:** ☐ Damp ☐ Trickle ☐ Moderate ☐ High

Visual Evidence of Illicit Discharge (select all that apply)

Visual Inspection: ☐ None ☐ Floatables ☐ Pet Waste ☐ Oily Sheen ☐ Sanitary Waste ☐ Algae ☐ Foam

Olfactory Evidence of Illicit Discharge (select all that apply)

Olfactory Inspection: ☐ None ☐ Sewage Smell ☐ Musty ☐ Rotten Eggs ☐ Ammonia ☐ Petroleum

Samples Taken and Sampling Results

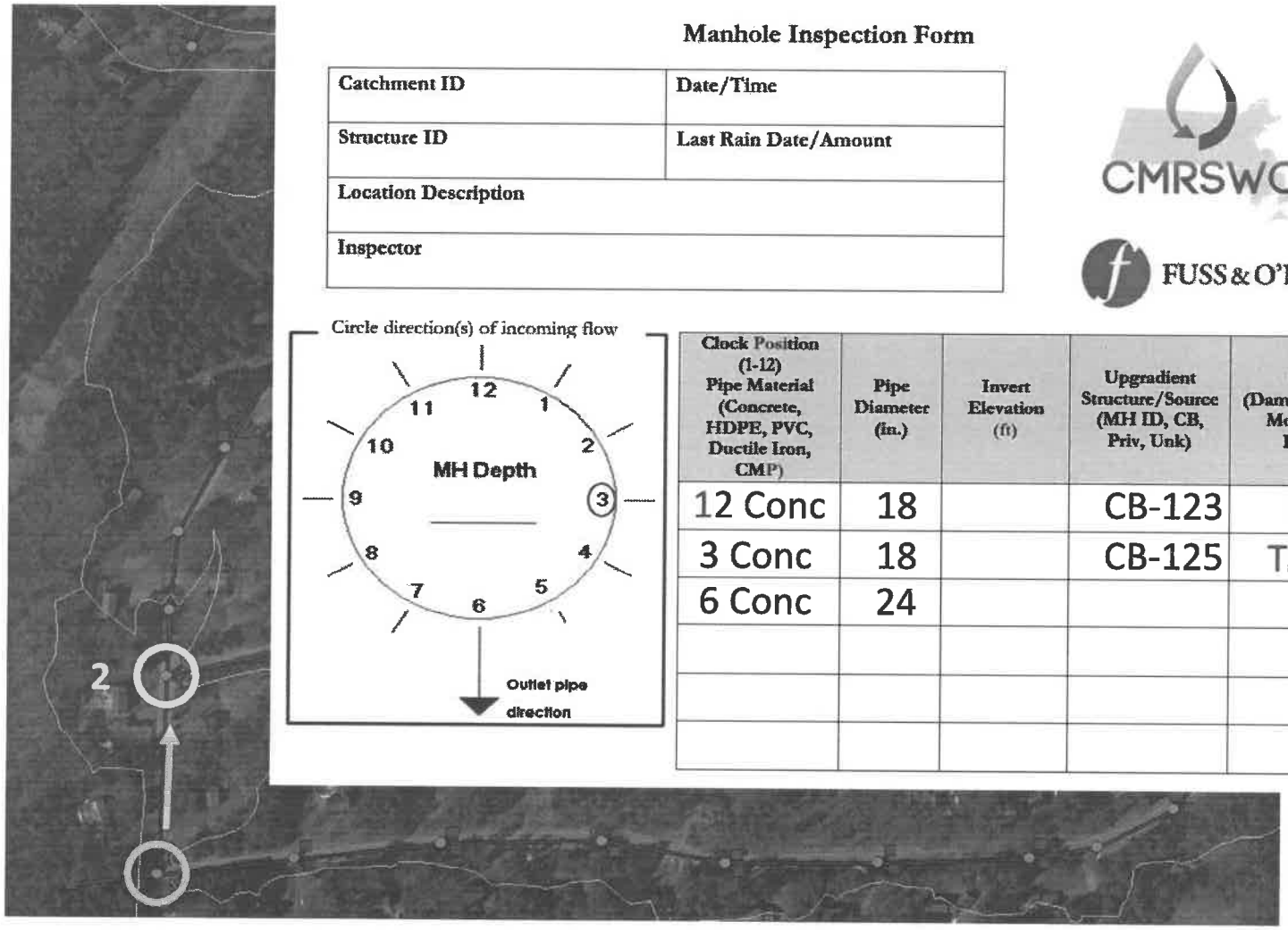
Temp.	Conductivity	Salinity	Chlorine 0.5 mg/L
Ammonia 1.0 mg/L	Surfactants 0.75 mg/L	Bacteria Laboratory Analysis	Pollutant of Concern

COMMENTS:

Further investigation needed? ☐ Yes ☐ No

6 Catchment Investigation Procedure

6.2 Inspect/Sample Key Junction Manholes



Manhole Inspection Form

Catchment ID	Date/Time
Structure ID	Last Rain Date/Amount
Location Description	
Inspector	

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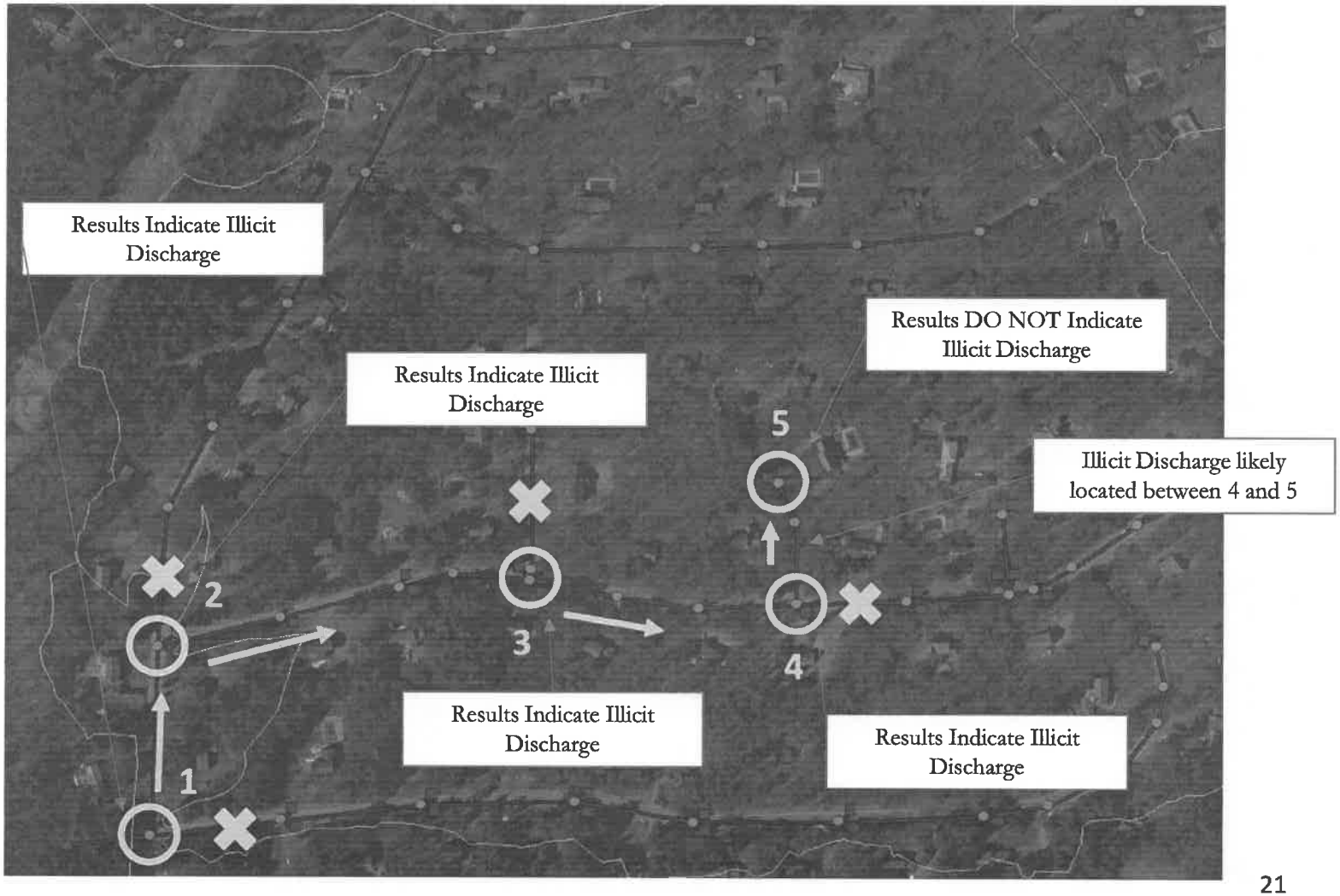
Circle direction(s) of incoming flow

Clock Position (1-12) Pipe Material (Concrete, HDPE, PVC, Ductile Iron, CMP)	Pipe Diameter (in.)	Invert Elevation (ft)	Upgradient Structure/Source (MH ID, CB, Priv, Unk)	Flow (Damp, Trickle, Moderate, High)
12 Conc	18		CB-123	Dry
3 Conc	18		CB-125	Trickle
6 Conc	24			

6.3 Source Isolation

- Systematically inspect and sample structures in order to isolate the potential illicit discharge to a specific pipe segment.



7 Appendix 1: Outfall Screening Form

Outfall/Catchment Screening Form

Catchment ID: _____ **Town:** _____

Inspector: _____ **Date/Time:** _____

Street Name: _____

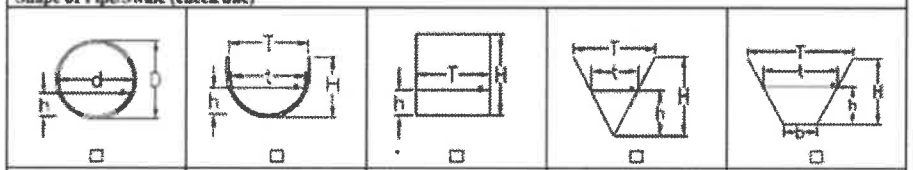
Last rainfall event (date and amount): _____

Type of Sampling Event ☐ Dry Weather Screening ☐ Dry Weather Sampling ☐ Wet Weather Sampling

Location: ☐ Outfall ☐ Manhole ☐ Catch Basin ☐ Interconnection

Is outfall submerged/inundated? ☐ Yes ☐ No	**If YES screen/sample at 1st non-influenced structure:** ☐ MH ☐ CB	
Structure ID:	**Latitude:**	**Longitude:**

Shape of Pipe/Swale (check one)



☐ Rounded Pipe	☐ Rounded Swale	☐ Rectangular Pipe/Swale	☐ Triangular Swale	☐ Trapezoidal Swale

Outfall Material:	**Pipe Measurements:**	**Swale Measurements:**
☐Concrete ☐HDPE ☐Corrugated Metal Pipe ☐ Ductile Iron ☐ Clay ☐ PVC ☐ Other	Inner Dia. (in): d = Outer Dia. (in.): D = Pipe Width (in.): W = Pipe Height (in.): H = Flow Depth (in.): h =	Swale Width (in): T = Flow Width (in.): t = Swale Height (in.): H = Flow Depth (in.): h = Bottom Width (in.): b =
Outfall/Manhole/Catchbasin Condition: ☐ Good ☐ Fair ☐ Poor ☐Crumbling		

Evidence of Flow: ☐ Yes ☐ No **If Yes, Description of Flow:** ☐ Damp ☐ Trickle ☐ Moderate ☐ High

Visual Evidence of Illicit Discharge
Visual Inspection: ☐ None ☐ Floatables ☐ Pet Waste ☐Oily Sheen ☐ Sanitary Waste ☐ Algae ☐ Foam

Olfactory Evidence of Illicit Discharge
Olfactory Inspection: ☐ None ☐ Sewage Smell ☐ Musty ☐ Rotten Eggs ☐ Ammonia ☐ Petroleum

Samples Taken and Sampling Results

Temp.	Conductivity	Salinity	Chlorine
Ammonia	Surfactants	Bacteria	Pollutant of Concern

7 Appendix 2: Manhole Screening Form

Manhole Inspection Form

Catchment ID	**Date/Time**
Structure ID	**Last Rain Date/Amount**
Location Description	
Inspector	

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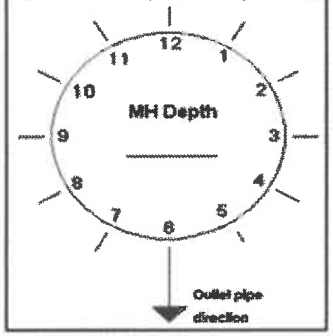
Circle direction(s) of incoming flow



Clock Position (1-12) Pipe Material (Concrete, HDPE, PVC, Ductile Iron, CMP)	Pipe Diameter (in.)	Invert Elevation (ft)	Upgradient Structure/Source (MH ID, CB, Priv, Unk)	Flow (Damp, Trickle, Moderate, High)

Cover Conditions: Diameter of clear opening (in.) ☐ Buried ☐ Cannot Inspect ☐ Cannot Locate

Evidence of Flow: ☐ Yes ☐ No **If Yes, Description of Flow:** ☐ Damp ☐ Trickle ☐ Moderate ☐ High

Visual Evidence of Illicit Discharge (select all that apply)

Visual Inspection: ☐ None ☐ Floatables ☐ Pet Waste ☐ Oily Sheen ☐ Sanitary Waste ☐ Algae ☐ Foam

Olfactory Evidence of Illicit Discharge (select all that apply)

Olfactory Inspection: ☐ None ☐ Sewage Smell ☐ Musty ☐ Rotten Eggs ☐ Ammonia ☐ Petroleum

Samples Taken and Sampling Results			
Temp.	Conductivity	Salinity	Chlorine
Ammonia	Surfactants	Bacteria	Pollutant of Concern

COMMENTS:

Further investigation needed? ☐ Yes ☐ No

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Appendix E

IDDE Employee Training Record

Various Central Massachusetts Regional Stormwater Coalition (CMRSWC) Training Workshops & Steering Committee Meetings have been attended as of 30 June 2019 as shown on the following spreadsheets. Other Illicit Discharge Detection and Elimination (IDDE) Employee Training will continue and will recorded on the attached "Employee Training Record" sheet.

Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Northbridge, Massachusetts

Date of Training: **19 June 2019 (Auburn, MA) – CMRSWC Steering Committee Meeting**

Duration of Training: **3:00 hours**

Name	Title	Signature
James Shuris	Town of Northbridge - DPW Director & Town Engineer	

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Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Northbridge, Massachusetts

Date of Training: **11 June 2019 (Norfolk, MA) – SERSG IDDE Workshop**

Duration of Training: **6:00 hours**

Name	Title	Signature
James Shuris	Town of Northbridge - DPW Director & Town Engineer	

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Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Northbridge, Massachusetts

Date of Training: **08 May 2019 (Lunenburg, MA) – CMRSWC Steering Committee Meeting**

Duration of Training: **3:00 hours**

Name	Title	Signature
James Shuris	Town of Northbridge - DPW Director & Town Engineer	

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Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Northbridge, Massachusetts

Date of Training: **24 April 2019 (Framingham, MA) – CMRSWC Workshop**

Duration of Training: **3:00 hours**

Name	Title	Signature
James Shuris	Town of Northbridge - DPW Director & Town Engineer	
Jamie Luchini	Town of Northbridge – DPW Highway Superintendent	

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Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Northbridge, Massachusetts

Date of Training: **27 March 2019 (Holden, MA) – CMRSWC Steering Committee Meeting**

Duration of Training: **3:00 hours**

Name	Title	Signature
James Shuris	Town of Northbridge - DPW Director & Town Engineer	

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Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Northbridge, Massachusetts

Date of Training: **27 March 2019 (Holden, MA) – CMRSWC Steering Committee Meeting**

Duration of Training: **3:00 hours**

Name	Title	Signature
James Shuris	Town of Northbridge - DPW Director & Town Engineer	

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Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Northbridge, Massachusetts

Date of Training: **27 February 2019 (Auburn, MA) – CMRSWC SWMP Workshop**

Duration of Training: **5:00 Hours**

Name	Title	Signature
James Shuris	Town of Northbridge - DPW Director & Town Engineer	

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Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Northbridge, Massachusetts

Date of Training: **14 February 2019 (Auburn, MA) – CMRSWC PeopleGIS Stormwater Suite Training Workshop**

Duration of Training: **6:00 Hours**

Name	Title	Signature
James Shuris	Town of Northbridge - DPW Director & Town Engineer	

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Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Northbridge, Massachusetts

Date of Training: **14 February 2019 (Fitchburg, MA) – CMRSWC Steering Committee Meeting**

Duration of Training: **4:00 Hours**

Name	Title	Signature
James Shuris	Town of Northbridge - DPW Director & Town Engineer	

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Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Northbridge, Massachusetts

Date of Training: **09 January 2019 (Auburn, MA) – CMRSWC Steering Committee Meeting**

Duration of Training: **3:00 Hours**

Name	Title	Signature
James Shuris	Town of Northbridge - DPW Director & Town Engineer	

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Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Northbridge, Massachusetts

Date of Training: 02 October 2018 – Worcester County Highway Association – MS4 NPDES Stormwater Permitting for MA

Duration of Training: 0:30 Hours

Name	Title	Signature
James Shuris	Town of Northbridge - DPW Director & Town Engineer	
Jamie Luchini	Town of Northbridge – DPW Highway Superintendent	

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Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Northbridge, Massachusetts

Date of Training: _____

Duration of Training: _____

Name	Title	Signature

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Appendix F

Source Isolation and Confirmation Methods: Instructions, Manuals, and SOPs

Refer to Standard Operating Procedures, Instructions, Manuals and Procedures prepared for the CMRSWC Member Communities prepared by Fuss & O"Neill.

SOP 10: LOCATING ILLICIT DISCHARGES

Introduction

An "illicit discharge" is any discharge to an engineered storm drain system that is not composed entirely of stormwater unless the discharge is defined as an allowable non-stormwater discharge under the 2003 Massachusetts MS4 Permit. Illicit discharges may enter the engineered storm drain system through direct or indirect connections, such as: cross-connections of sewer services to engineered storm drain systems; leaking septic systems; intentional discharge of pollutants to catch basins; combined sewer overflows; connected floor drains; and sump pumps connected to the system (under some circumstances). Illicit discharges can contribute high levels of pollutants, such as heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to receiving streams.

Illicit discharges can be located by several methods, including routine dry weather outfall inspections and catch basin inspections, which are described in detail in SOP 1, "Dry Weather Outfall Inspection" and SOP 3, "Catch Basin Inspection and Cleaning", respectively, as well as from citizen reports.

This SOP assumes that the municipality has legal authority (i.e., a bylaw or ordinance) in place, per the requirements of the 2003 Massachusetts MS4 Permit, to prohibit the connection of non-stormwater discharges into the storm drain system. The authority or department for addressing illicit discharge reports would be clearly identified in the municipality's legal authority. In Massachusetts, this is typically a combination of the Board of Health, the Department of Public Works (or Highway Department), and the local sanitary sewer department or commission. In some communities, the Conservation Commission may also play a role. This SOP refers to "appropriate authority" generically to reflect differences in how municipalities have identified these roles.

Identifying Illicit Discharges

The following are often indicators of an illicit discharge from stormwater outfall:

1. Foam: indicator of upstream vehicle washing activities, or an illicit discharge.
2. Oil sheen: result of a leak or spill.
3. Cloudiness: indicator of suspended solids such as dust, ash, powdered chemicals and ground up materials.
4. Color or odor: Indicator of raw materials, chemicals, or sewage.
5. Excessive sediment: indicator of disturbed earth of other unpaved areas lacking adequate erosion control measures.
6. Sanitary waste and optical enhancers (fluorescent dyes added to laundry detergent): indicator of the cross-connection of a sewer service.
7. Orange staining: indicator of high mineral concentrations.

Both bacteria and petroleum can create a sheen on the water surface. The source of the sheen can be differentiated by disturbing it, such as with a pole. A sheen caused by oil will remain intact and move in

a swirl pattern; a sheen caused by bacteria will separate and appear "blocky". Bacterial sheen is not a pollutant but should be noted.

Citizen Call in Reports

Reports by residents and other users of a water body can be effective tools in identifying the presence of illicit discharges. Many communities have set up phone hotlines for this purpose, or have provided guidance to local police departments and dispatch centers to manage data reported in this manner. Municipal employees and the general public should receive education to help identify the signs of illicit discharges and should be informed how to report such incidents.

When a call is received about a suspected illicit discharge, the attached IDDE Incident Tracking Sheet shall be used to document appropriate information. Subsequent steps for taking action to trace, document, and eliminate the illicit discharge are described in the following sections.

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.

Tracing Illicit Discharges

Whenever an illicit discharge is suspected, regardless of how it was identified, the attached IDDE Incident Tracking Sheet should be utilized. The Incident Tracking Sheet shall be provided to the appropriate authority (i.e., Board of Health, Department of Public Works, etc.), which shall promptly investigate the reported incident.

If the presence of an illicit discharge is confirmed by the authority, but its source is unidentified, additional procedures to determine the source of the illicit discharge should be completed.

1. Review and consider information collected when illicit discharge was initially identified, for example, the time of day and the weather conditions for the previous 72 hours. Also consider and review past reports or investigations of similar illicit discharges in the area.
2. Obtain storm drain mapping for the area of the reported illicit discharge. If possible, use a tracking system that can be linked to your system map, such as GIS.
3. Document current conditions at the location of the observed illicit discharge point, including odors, water appearance, estimated flow, presence of floatables, and other pertinent information. Photograph relevant evidence.
4. If there continues to be evidence of the illicit discharge, collect water quality data using the methods described in SOP 13, "Water Quality Screening in the Field". This may include using field test kits or instrumentation, or collecting analytical samples for full laboratory analysis.
5. Move upstream from the point of observation to identify the source of the discharge, using the system mapping to determine infrastructure, tributary pipes, and drainage areas that contribute. At each point, survey the general area and surrounding properties to identify potential sources of the illicit discharge. Document observations at each point on the IDDE Incident Tracking Sheet as well as with photographs.
6. Continue this process until the illicit discharge is no longer observed, which will define the boundaries of the likely source. For example if the illicit discharge is present in catch basin 137

but not the next upstream catch basin, 138, the source of the illicit discharge is between these two structures.

If the source of the illicit discharge could not be determined by this survey, consider using dye testing, smoke testing, or closed-circuit television inspection (CCTV) to locate the illicit discharge.

Dye Testing

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

Smoke testing is a useful method of locating 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)

Televised video inspection 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.

If the source is located, follow steps for removing the illicit discharge. Document repairs, new sanitary sewer connections, and other corrective actions required to accomplish this objective. If the source still cannot be located, add the pipe segment to a future inspection program.

This process is demonstrated visually on the last page of this SOP.

Removing Illicit Discharges

Proper removal of an illicit discharge will ensure it does not recur. Refer to Table SOP 10-1, attached for, for examples of the notification process.

In any scenario, conduct a follow up inspection to confirm that the illicit discharge has been removed. Suspend access to the storm drain system if an "imminent and substantial danger" exists or if there is a threat of serious physical harm to humans or the environment.

Attachments

1. Illicit Discharge Incident Tracking Sheet

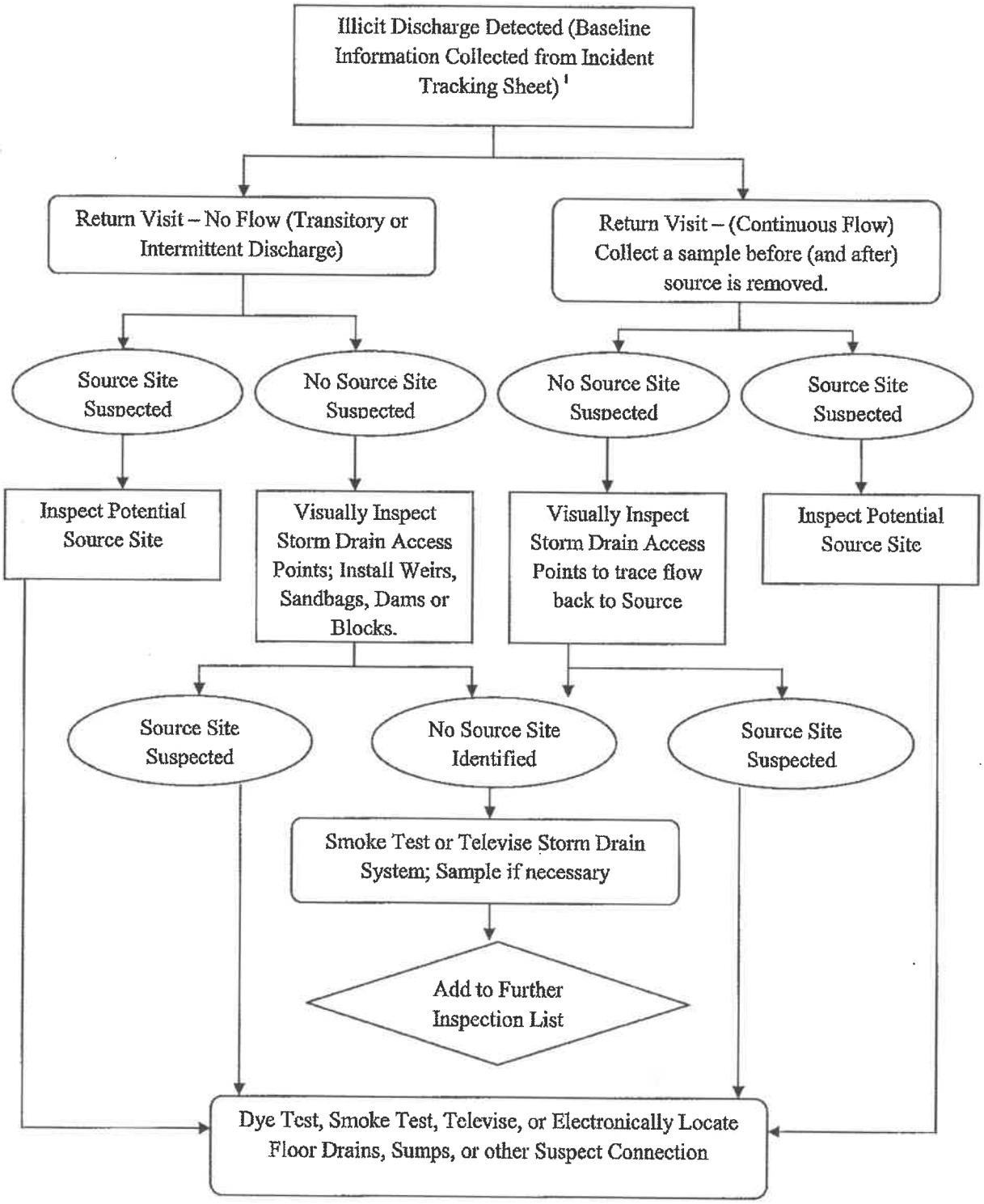
Related Standard Operating Procedures

1. SOP 1: Dry Weather Outfall Inspection
2. SOP 2: Wet Weather Outfall Inspection
3. SOP 3: Catch Basin Inspection
4. SOP 13: Using Field Test Kits For Outfall Screening
5. SOP 15: Private Drainage Connections

Table SOP 10-1

Notification and Removal Procedures for Illicit Discharges into the Municipal Separate Storm Sewer System

Financially Responsible	Source Identified	Enforcement Authority	Procedure to Follow
Private Property Owner	One-time illicit discharge (e.g. spill, dumping, etc.)	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Contact Owner • Issue Notice of Violation • Issue fine
Private Property Owner	Intermittent or continuous illicit discharge from legal connection	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Contact Owner • Issue Notice of Violation • Determine schedule for removal • Confirm removal
Private Property Owner	Intermittent or continuous illicit discharge from illegal connection or indirect (e.g. infiltration or failed septic)	Plumbing Inspector or ordinance enforcement authority	• Notify Plumbing Inspector or ordinance enforcement authority
Municipal	Intermittent or continuous illicit discharge from illegal connection or indirect (e.g. failed sewer line)	Ordinance enforcement authority (e.g. Code Enforcement Officer)	• Issue work order • Schedule removal • Remove connection • Confirm removal
Exempt 3rd Party	Any	USEPA	• Notify exempt third party and USEPA of illicit discharge


Illicit Discharge Detected (Baseline Information Collected from Incident Tracking Sheet) [1]
Return Visit – No Flow (Transitory or Intermittent Discharge)
Return Visit – (Continuous Flow) Collect a sample before (and after) source is removed.
Source Site Suspected
No Source Site Suspected
No Source Site Suspected
Source Site Suspected
Inspect Potential Source Site
Visually Inspect Storm Drain Access Points; Install Weirs, Sandbags, Dams or Blocks.
Visually Inspect Storm Drain Access Points to trace flow back to Source
Inspect Potential Source Site
Source Site Suspected
No Source Site Identified
Source Site Suspected
Smoke Test or Televise Storm Drain System; Sample if necessary
Add to Further Inspection List
Dye Test, Smoke Test, Televise, or Electronically Locate Floor Drains, Sumps, or other Suspect Connection

[1] – *Guidelines and Standard Operating Procedures: Illicit Discharge Detection and Elimination and Pollution Prevention/Good Housekeeping for Stormwater Phase II Communities in New Hampshire,* New Hampshire Estuary Project, 2006, p. 25, Figure 2-1.

Illicit Discharge Incident Tracking Sheet

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

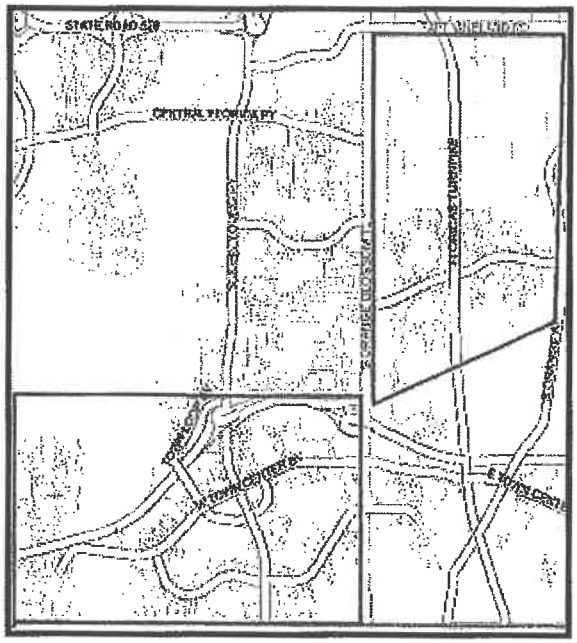
CMRSWC

SMOKE TESTING STANDARD OPERATING PROCEDURE

Based on the Smoke Testing conducted in #58166 SMOKE TESTING in Southern Service Area

AREA SELECTION

This may be a result of specific project in the design phase or the result of areas connected to the existing project.



In the case of Project #58166, subareas to the master pump station were tested due to issues during and immediately following rain events. SCADA provided the list of pump stations with excessive run times which pumped to the MPS in question. These pump stations were collected and mapped for location. In addition to the stations with excessive run times, several other subareas were tested in order to Smoke the entire region.

Once the area is selected, the OCUD Project Manager will coordinate with GIS. GIS will provide a total count of manholes and linear footage of gravity mains based on GIS data and assets. These quantities will be shared for pricing. GIS will also provide quarter sections maps with customization including house addresses and aerials (shaded 50%). These quarter sections should be plotted immediately prior to smoke testing so the most current information is included and provided to the Contractor.

Project timing is also significant. Smoke will not be evident in areas that are saturated. The optimal scheduling for smoke testing is during the dry season. The purpose of testing is to locate not only surface features including illegal connections and broken cleanouts but also issues in the sanitary sewer main, laterals and manholes. In addition, criteria should be developed to determine how long after a rain event that smoke testing may commence.

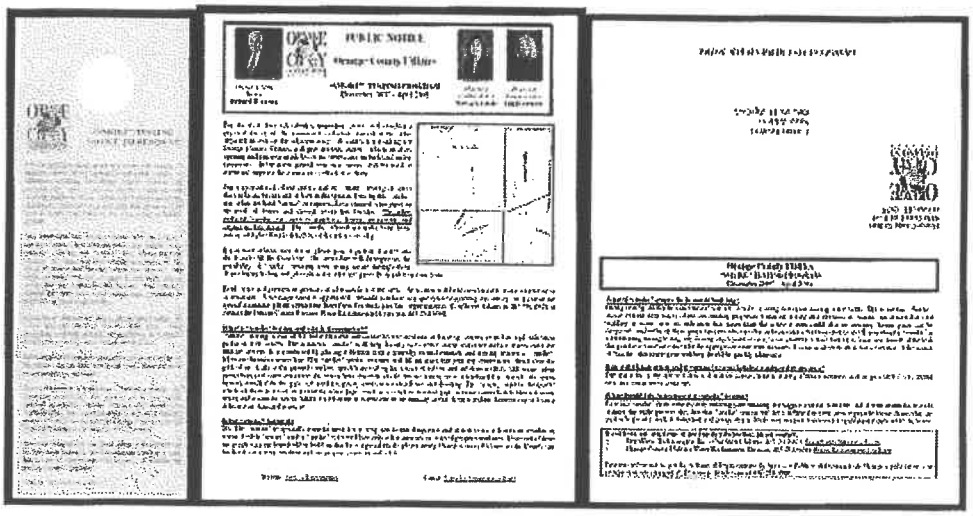
NOTIFICATIONS

This is a critical function of the testing program. OCU customers, General Public, Utilities Water Reclamation, Director's office, Commissioners Office, 911, Fire Department and Utilities Dispatch need to know the purpose, location, dates, procedure and status reports.

- ☐ Director's approval of Public Notification flyer/mailer and door hanger,
- ☐ Commissioners office notification and briefing,
- ☐ Fire Department and 911 contacts and notification,
- ☐ Residents received the public notice as a mass mailing prior to smoke testing
- ☐ Door hangers were hung at each residence 2-4 days prior to smoke testing specific subdivision

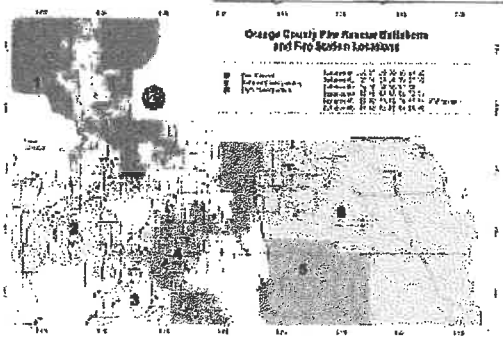
- ☐ Provide Variable Message boards strategically placed throughout testing including major streets into the area and entrances into subdivisions
- ☐ Weekly updates were sent to the Fire Department, 911, Utilities and Testing Company
- ☐ Notification of all parties of project completion

1. The OCUD Project Manager must have the Public Notification flyer / mailer and door hanger approved through the Director's office using the PIO request form and PIO checklist unless an approved template is being utilized.



2. The OCUD Project Manger will contact the Commissioners office and notify the Commissioners that there will be smoke testing in their District. Commissioners need to be notified or briefed prior to the public notification flyers / mailers being sent to the public.

3. The OCUD Project Manger shall provide initial notification to Orange County Fire Rescue and locate the Assistant Chiefs commanding the Fire Stations of the affected area. This may cover several areas depending on the total area to be smoke tested. However, the City of Orlando may also be providing fire service for the area, and coordination is required.

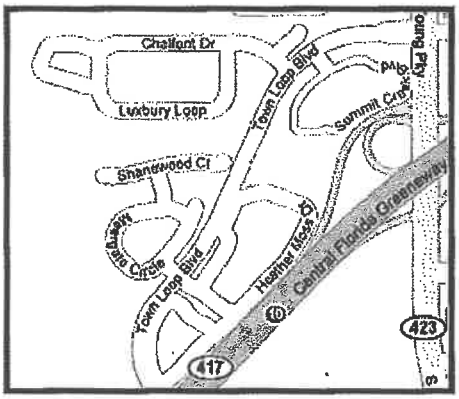


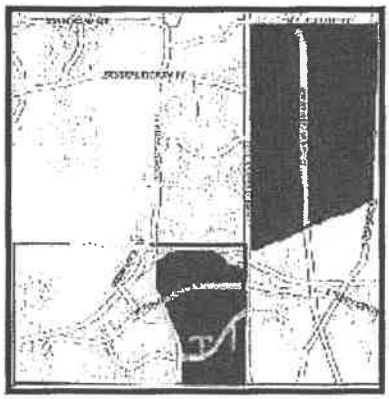
4. The Contractor or OCU shall provide a mass mailing to all residents in the smoke testing area approximately two (2) weeks prior to project start. The Project Manager shall determine if the mailers shall be handled in-house or by the Contractor. The Project Manager will provide residents names and addresses by coordinating with GIS. GIS can export all the information in an excel table for an easy mail merge. Please request customers billing address be provided in addition to the home owner data so that renters are included in the notification process. Note that Customer service's reverse dialing system may also be utilized and a printed note can be placed on Customers Bills, to supplement the public notification flyer / mailer.

5. The Contractor will hang door hangers approximately 2-4 days prior to Testing specific streets.

6. The Contractor shall provide Variable Message Boards (VMB) strategically placed throughout testing including major streets into the area and entrances into subdivisions. Project 58166 covered 75 miles of sanitary sewer (400,000 LF) and 7,300 residents over a 2 month period. The Contractor constantly relocated the three (3) VMB to cover the areas being smoked.

7. The Project Manager shall provide weekly updates to the Fire Department, 911, Water Reclamation contacts, Utilities Dispatch and Testing Company. Work for the upcoming week as well as total progress shall be provided by the Contractor and this information shall be conveyed to all parties on a weekly basis and sent the Friday before the upcoming week by the Project Manager. This included an overall progress map of the entire project progress, narrative describing the week look ahead and a map showing all street names to be tested the following week. The Project Manager is the sole point of contact for all Public Safety and Utilities Departments.





Green = complete
Yellow = In Progress
Red = not started

8. Provide Notification to all parties that the smoke testing is complete. The Fire Department will call immediately if they haven't received the weekly update.

OCUD DOCUMENTATION COLLECTION

The OCUD Project Manager will provide the Consultant or Contractor with the following information to provide a quote.

- ☐ Proposed smoke testing area map,
- ☐ One set of quarter section maps for the purpose of bidding
- ☐ Total Linear Footage of Sanitary Sewer,
- ☐ Total number of Manholes,
- ☐ Total number of Resident Addresses & spreadsheet for Mailers and door hanger count,
- ☐ Requirements for Variable Message Boards,
- ☐ Requirements for the door hanger and 2 page mailer including sizes, color, etc.
- ☐ Three (3) color sets of quarter section maps to the Contractor plotted at the time of smoke testing.
- ☐ Coordination with Water Reclamation for Manhole locates just prior to smoke testing (several manholes were found to be paved over or located in the R-O-W)
- ☐ Coordination with Construction and Water Reclamation during smoke testing for an emergency contact / standby personal to make emergency repairs if required and provide sewer cleaning if line is blocked.

SMOKE TESTING SCOPE OF SERVICES.

Procedures

- ☐ Approved Public Notification Mass Mailers. The Contractor shall mail out to all the residences and businesses in the proposed project area, the approved Smoke Testing public notification flyer / mailers, as a mass mailing approximately 2 weeks before the overall project starts. The mailer shall only be the approved Orange County Utilities smoke testing public notification flyer / mailer and shall be provided by the Project Manager for each project.

- ☐ Door Hangers. The Contractor shall place door hangers on all residences and business 2-4 days prior to smoke testing at those specific addresses. Door hangers shall be an ongoing process throughout the project and shall be limited to the area provided in the look ahead schedule. Door Hangers shall not be placed for areas which will not be tested within 4 days.

- ☐ Smoke Test Setup. The contractor will setup on every other manhole and smoke test no more than 400 ft both directions from setup (Total of 800 LF). This distance shall not be exceeded unless written authorization and field verification is given by the verifying that distances greater than a 400 ft radius are providing acceptable results. The Contractor shall be responsible for Maintenance of Traffic and relocation of variable message boards throughout the duration of the project.

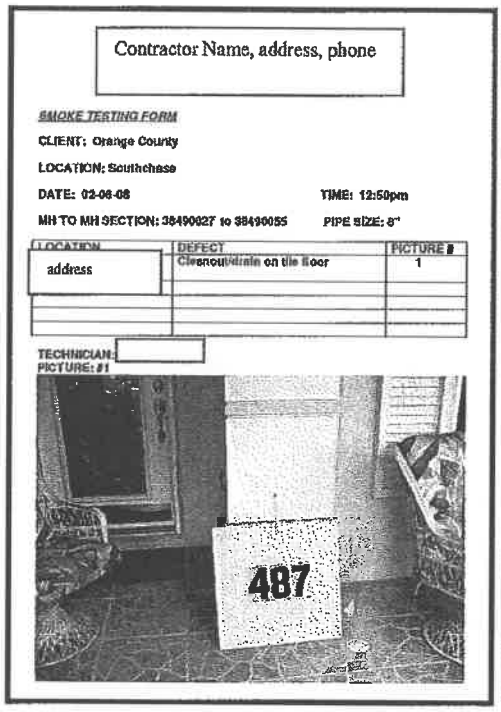
- ☐ Smoke Testing Crew. The smoke testing Contractor shall provide at minimum a crew of four (4) people. One member to man the machine, two (2) to walk and one supervisor. The supervisor will assist in all functions but with primary effort on data collection, logging, determination of smoke testing schedule and tracking.

- ☐ Smoke Testing. Smoke will be turned on and remain on throughout the entire time of testing including the walkthrough for identification of defect locations with flags as well as during the taking digital pictures for each flagged and numbered defect.

- ☐ Identification of Defects. The walk through for locating of defects will not begin until smoke is highly visible with a smoke plume emanating from the plumbing vents of houses at the end of the setup location (maximum 400 ft radius) from the smoke testing machine. A colored locate flag will dropped at the location of the defect and will be left for the homeowner to remove. Walkers shall traverse not only the sidewalk but between all homes and in back yards looking for illegal connections including patio, pool drains and roof drain connections.

- ☐ Defect Pictures. Once the area has been flagged the Smoke Testing Contractor will snap a digital picture (not less than 2 Megapixel with time and date stamp on the digital photograph) showing the smoke billowing from the defect, flag, unique number, and physical features at or near the defect. Pictures without smoke plume from the located defect or missing visible unique number are unacceptable. The contractor will provide a self standing sign (sandwich board) at each defect with minimum 4" tall numbers physically located at each defect part of the picture. Numbering shall be consecutive, unique number per defect, clearly visible in the picture and noted on the report, record drawings and summary spreadsheet.

- ☐ Defect Reporting. The report for each defect shall be a MS Word document containing the following information: Contractor letterhead, name of smoke tester, date, time, address of defect, description of defect, manhole to manhole OCU identification, digital photograph, priority rating of defect, Total Drainage Area estimation, quarter section number, footage smoked and map for exact location of defect. Note the map may be of an entire street with multiple defects shown. Weekly reports shall be provided to the Project Manager in digital form as well as 2 hard copies. The Project Manager shall provide one copy to Water Reclamation.
    - Common description of defects include: broken cleanout, broken cleanout cap, missing cleanout cap, manhole lid, roof leader, drain connection, AC connection, smoke under sidewalk or driveway, etc
    - Common priority ratings and Total Drainage Area estimations include: Priority 1 (illegal connections, direct impact, large drainage area), Priority 2 – High Impact (low lying area, down spouts near cleanout, etc), Priority 3 – Moderate Impact (small impact but potential inflow), Priority 4 - Insignificant (None, no impact).



Contractor Name, address, phone

SMOKE TESTING FORM

CLIENT: Orange County

LOCATION: Southchase

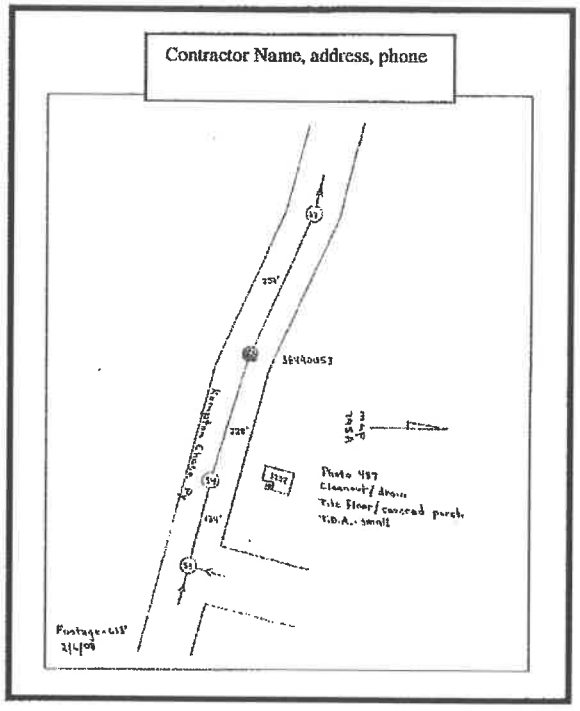
DATE: 02-06-08 TIME: 12:50pm

MH TO MH SECTION: 38490027 to 38490055 PIPE SIZE: 8"

LOCATION	DEFECT	PICTURE #
address	Cleanout/drain on tile floor	1

TECHNICIAN:

PICTURE: #1



Contractor Name, address, phone

☐ Record Drawings and Summary. The Contractor shall return on set of the quarter section maps showing all the defects for the project to the Project Manager. In addition, the Contractor shall provide an Excel table listing the defect number, priority, total drainage area estimation, location, address, and description of defect. The spreadsheet shall be provided each week with the reports and shall be cumulative with a final summary of all defects at the end of the project.

Defect / Pic #	Priority	Total Drainage Area	TDA Notes	Location	Address	Notes
45	1	large	MH ditch			MH #22 in ditch
46	3	small				cleanout
47	3	small				cleanout
48	3	small				MH #11 Below Grade
49	3	small				cleanout
50	4	nil				Broken C.O.
51	2	low area				Broken C.O.

☐ Project Coordination. The Contractor shall provide a one week look-ahead schedule and coordinate with the Project Manger the exact locations of Smoke Testing for the upcoming week. This information will be transmitted to the Fire Rescue Department by the Project Manager.

REQUEST FOR QUOTES (RFQ)

The RFP will contain the following bid items based on the scope of services as well as minimum details for the smoke testing procedure:

☐ Cost per foot for smoke testing LF
☐ Cost for mailer and door hanger LS

- ☐ Cost for variable message boards Per Month
- ☐ Final Report, Excel Summary and Record DWGS LS
- ☐ Acknowledgements of Contractor Responsibilities and Scope of Services
    - Responsible for all MOT including traffic control, barricades, flagmen, traffic cones, police, etc
    - Providing all flags, equipment, chemicals, water, fuel and all appurtenances to be included in the per foot cost
    - Responsible for protecting the public from open manholes
    - Responsible for any special permits or licenses
    - Coordination with Schools and high traffic roads for testing on weekends only
    - Providing a phone number for information and point of contact onsite during testing for the public

UTILITY INSPECTOR

As with any project, there are several procedural errors or shortcuts that can be made which will detrimentally affect the outcome. The inspector will verify the procedures are being followed by the Contractor including, running the smoke the entire time, effectiveness of the walkers, verify backyards and side yards are being investigated, speaking with the public and documentation. The project schedule shall be coordinated by the Project Manager with Construction to verify the specifications are being adhered.

In 58166, we provided a full time inspector as well as a part time representative from Water Reclamation. Both Utilities representatives were looking for defects, calling in critical defects to be repaired immediately, speaking with the public about the project and directly responding to customer calls to the Smoke Tester PIO as well as the Water Reclamation hotline. In addition, we corrected several issues with the smoke tester procedures. The first was the duration of the smoke. The walkers were leaving before the smoke had reached the end of the area to be tested and were missing vital defects. There is a time lag from when the machine is started until the smoke fills the volume of the gravity collection system, laterals, house plumbing and reaches the final point of the testing area. The coordination between the Contractor in charge of running the smoke test machine and the walkers was not efficient. In one instance, they ran out of smoke and the walkers continued looking for defects even though no smoke was in the system. Finally, the machine was being turned off immediately after the flagging was finished. In some instances, the defect (broken later under a sidewalk, manhole shifted cone section or deep cleanout) were not readily apparent without the presence of smoke. The defect pictures must show smoke to identify the specific defect and show proof that there is an issue.

GPS COORDINATES

In 58166, the Prime Contractor shot GPS coordinates of each defect as well as took coordinates for every manhole and lift station in the testing area. This task was a full time position and required the Contractor to provide the GPS Trimble equipment. The need to locate both the existing facilities as well as the defects is a coordination effort by the Project Manager with both GIS and Water Reclamation. In addition, the GPS Technology is not normally a service provided by Smoke Testers, so the additional cost for a sub will have to be evaluated by the Project Manager and the need for the Utility.

DATA ANALYSIS

The Project Engineer is responsible for analyzing the defects found during smoke testing, verifying priority, and creating a column on the summary spreadsheet for responsibility. Illegal connects or cleanout issues at the home are the responsibility of the homeowner to repair. The cleanouts at the R-O-W line, defects found under sidewalks or driveway aprons, manholes, etc are the responsibility of Utilities to repair. The Project Manager will sort the summary spreadsheet by responsibility and priority. This information shall be coordinated through both Water Reclamation for scheduling of repairs as well as with the Water Reclamation Environmental Compliance section for residential compliance and verification of repairs. The project manager shall ensure that the digital data is filed on the digital network under the appropriate sequence number.

PROJECT CLOSEOUT

The Project Manager shall have a closeout meeting and pass all the information including spreadsheet, record drawings and Final Report with pictures to Water Reclamation. Water Reclamation will schedule repairs that are the responsibility of the Utility and coordinate the compliance action with homeowners responsible for private property repairs.

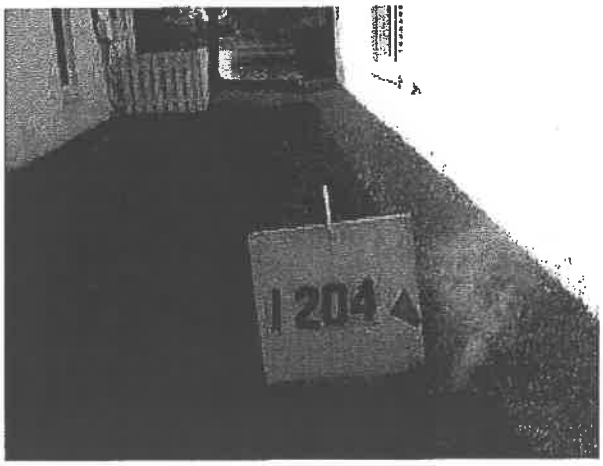
The results for #58166

Priority of Defect	Description	ROW / Easement	Private Property	Total	Percent
Priority 1 - Illegal Connections	Direct Connection (Roof Gutters, porch / pool drains, plumbing, etc)	0	20	20	1.6%
Priority 1 - Direct Impact	(Ponds nearby, large depressions, parking lots, MH in drainage)	45	10	55	4.5%
Priority 2 - High Impact	(Low areas, down spouts near cleanout, etc)	527	186	713	58.4%
Priority 3 - Moderate Impact	Small impact but potential inflow	134	221	355	29.1%
Priority 4 - Insignificant	Above grade or high ground, No observable impact	8	70	78	6.4%
Total		**714**	**507**	**1221**	100%

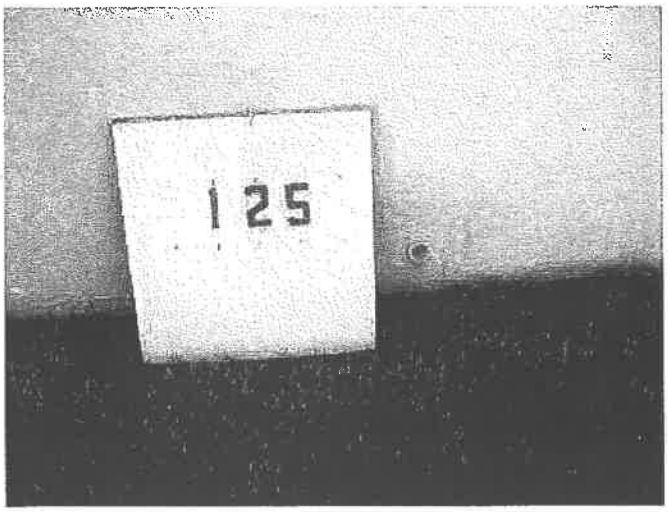
Priority 2 –Impact – Low Areas.
Note swale between houses

Priority 2 – Impact (Low Area) Note screen on cleanout and swale between houses

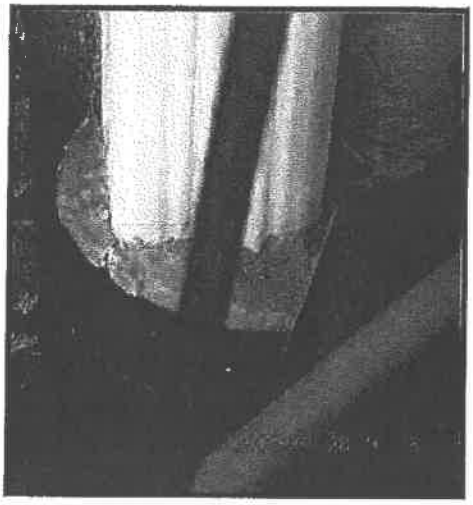
Priority 3 – Small Impact
Good drainage to lake. Small impact.

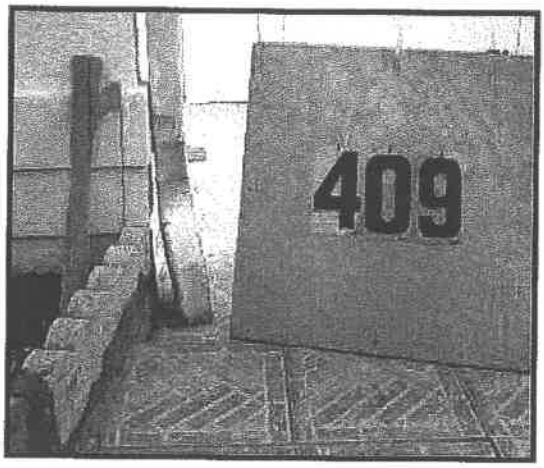


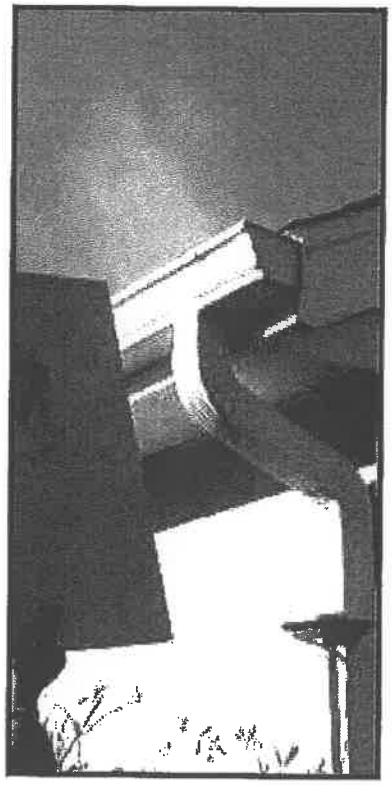
Priority 4 – No Impact – No drainage Area.
Homeowner to repair c/o on house



Priority 1 - Illegal connections







UDOT Dye Test Standard Operating Procedure

Purpose:

UDOT's MS4 permit requires the following:

- UDOT's entire storm drain system must be mapped including all storm drain pipe and other storm water conveyance structures (drains, creek, ditch, retention pond, detention pond, etc.).
- An inventory must be created of floor drains inside UDOT-owned or operated buildings. This inventory must be kept current. UDOT must ensure that all floor drains discharge to the appropriate locations.
- UDOT must develop site maps/diagrams to evaluate stormwater discharges and ensure that only stormwater is allowed into the storm drain system and that the appropriate BMPs are in place to minimize pollutants from entering the storm drain system.

When in doubt of a drainage pattern or ultimate discharge point, a dye test, video test, or smoke test are all tools to aid in making these determinations. Dye testing is an excellent indicator of illicit connections and is conducted by introducing non-toxic dye into sinks, shop drains and other plumbing fixtures. The discovery of dye in the storm drain, rather than the sanitary sewer, conclusively determines that the illicit connection exists. The following procedures are for conducting a dye test.

Test Preparation:

- Review storm drain, sewer maps, and any available as-built/utility drawings to identify lateral sewer connections and how they can be accessed. Print the station map included in the station SWPPP which can be found in Uplan at http://uplan.maps.arcgis.com/home/item.html?id=a647f52268964e7aa890332b6b544be6
- Prepare the following materials prior to the test.
    - Tracing dye in 2 colors in order to alternate between them when testing multiple fixtures. * All dyes must be non-toxic, biodegradable and NSF certified.
    - Outfall/manhole observers
    - Flashlight
    - Cameras
    - Materials to document findings
- Notify the local health department and DWQ (801) 536-4300 of when and where dye testing is occurring so that dye released into the storm drain system or local waterway is not mistaken for a spill or illegal discharge.

Test Procedure:

- Station personnel at the identified manhole, sump, cleanout, outfall or other appropriate locations needed to watch for dye. ***Dye observed in an o/w separator does NOT necessarily mean the fixture is plumbed to the sanitary sewer nor do manholes marked "sewer" necessarily indicate that the line goes to the sanitary sewer.**

- See product guidelines for the amounts of dye needed. If it is a dye that needs dissolving in water before pouring, follow the product instructions for the initial dilution rate.
- Add dye to fixture (floor drain, sink, etc.). Make sure to record the time the dye was added and mark the location on the map for each fixture where dye was added.
- Flush each fixture with 20-30 gallons of water minimum or until dye is observed in a manhole, storm sewer outfall, or other location. The more water flushed will shorten the time it takes for the dye to be observed.
- Watch the sanitary and storm drain discharge points until the dye is observed. Once dye is observed, note the time, and repeat steps at each drain being tested.
- Document all observations.

Test Results

- If dye is observed in the sanitary sewer sump, cleanout, or manhole and *no* dye is observed in the storm drain sump, cleanout, manhole or waterway, then the test is successful. Record the results both on the SWPPP map and in the drain inventory for the station.
- If *any* dye is observed in the storm drain sump, cleanout, manhole, or waterway, retest if necessary to determine which fixture(s) or drains(s) are cross-connected.
- Take the cross-connected fixtures out of service until they are properly connected to the sanitary sewer (upon approval of local authorities) or arrangements are made for containment, collection, and proper disposal of wastewater. Document a timeline of necessary corrections needed, and follow-up dye testing results to document the corrections made.

Helpful Hints

- Locating Missing Dye. The investigation is not complete until the dye is found. Some reasons for dye not appearing include:
    - The building/fixture is actually hooked up to a septic system.
    - The sewer line is clogged.
    - There is a leak in the sewer line or lateral pipe.
- Facility SWPPP map should be marked with numbered drains tested that could correspond to a Dye Test Log which includes:
    - Fixture number;
    - Fixture name or description;
    - Color of dye used;
    - Dye in time;
    - Dye out time;
    - Location of dye observed and other information/notes