Proposed Illicit Discharge Detection and Elimination (IDDE) Program Requirements for Communities in Massachusetts

Small MS4 Permit Technical Support Document, April 2011

DRAFT Permit Requires Enhanced IDDE Program

The draft Massachusetts Small Municipal Separate Storm Sewer Systems (**MS4**) permits includes enhanced requirements aimed at eliminating non-stormwater, illicit discharges (**IDs**) to MS4s. In addition to existing IDDE program requirements instituted under the 2003 permit, if the draft permit provisions become final, permittees will be required to: (1) update and provide additional detail to the storm sewer system map; (2) develop a more detailed IDDE Program and field procedure; (3) implement this procedure in all MS4 catchments; (4) conduct outfall monitoring; (5) eliminate illicit connections; and (6) report details annually on IDDE program implementation.

What is an Illicit Discharge?

Any discharge to an MS4 that is not comprised entirely of stormwater is an Illicit Discharge **(ID)** (with limited exceptions identified in the permit). IDs can be caused by a variety of sources: leaking sanitary sewers or water mains; illegal sewage connections; illegal floor drain connections; seasonal draining of swimming pools; break-out from failing septic systems; and spills and dumping.

IDs can be **continuous** (occurring most, or all of the time, such as leaking sewage), **intermittent** (occurring occasionally, such as flow from a sump pump), or **transitory** (occurring rarely, such as a spill or illegal dumping). IDs can enter the MS4 **directly** (e.g., a sanitary sewer pipe connected to a storm drain manhole) or **indirectly** (e.g. break-out from a failing septic system which runs into a storm drain catchbasin).

Unless identified as a significant contributor of pollutants, some non-stormwater discharges may not need to be addressed as part of the IDDE program, such as: flows from fire fighting activities; uncontaminated pumped groundwater; flows from footing drains; waterline flushing, and runoff from lawn irrigation (Draft MA North Coastal Permit Section 3.1). Under the draft permit, permittees will be required to determine if any of these sources are significant (Section 2.4.4.4).

Draft Mapping/Inventory Requirements

The draft permit requires that each drainage system outfall to a stream, pond or other water of the United States must be field inspected and inventoried. This inventory can be performed concurrently with Dry Weather Outfall Screening. The draft permit specifies the information that must be collected during inventories and mapped (Table 1).

Table 1. Inventory and Mapping Requirements

Description*	Information Required
2.4.4.5 Inventory of known Sanitary Sewer Overflows (SSOs) discharging to the MS4	1. Locations of SSOs; 2. Dates & times of known discharges; 3. Estimated discharge volume; 4. Description of occurrence noting known or suspected sources; 5. Mitigation and corrective measures implemented; 6. Mitigation and corrective measures planned and implementation schedule.
2.4.4.6 MS4 Map	1. Outfall locations; 2. Delineation of catchment area draining to each outfall; 3. Names & locations of receiving waters; 4. Storm drainage infrastructure (catch basins, manholes, pipes, treatment facilities); 5. Water resource areas (beaches, drinking water sources, critical habitats); 6. Key sanitary sewer infrastructure ;and 7. Combined sewers, if any.
2.4.4.6(d) Additional requirements for MS4s in the Charles River Watershed subject to TMDLs (partial list)	1. Detailed infrastructure information (e.g., flow direction and type, such as gravity, pressure or vacuum; rim and invert elevations; catchments and sewersheds); 2. Locations of proposed sewer cleaning and repair projects; 3. Planned roadway or utility projects; 4. Phasing of future ID investigations; 5. Land uses; 6. Soil types; 7. Public parks, golf courses, recreational fields where turf is fertilized.
2.4.4.7 Inventory of MS4 Outfalls	Location and condition; each outfall labeled with a unique identifier; 25% of all outfalls completed in each year during permit term years 2 through 5; sampling of outfalls with flow
** Reference to MA North Coastal Draft Permit Section*	

Due to the serious health risks posed by untreated sanitary sewage, the draft permit requires an inventory of known sanitary sewer overflows (SSOs) into the MS4. SSOs have a variety of causes, such as blockages, line breaks, and lapses in sewer system operation and maintenance.

The draft permit also requires that permittees develop a detailed, accurate and comprehensive MS4 map showing all storm sewer infrastructure, the drainage area (catchment) to each outfall, and features that pose a risk of illicit discharges, such as older sanitary sewers and septic systems (Figure 1). Other data such as groundwater depths, land use, topography and impervious cover may provide useful information and are recommended for inclusion in MS4 maps.

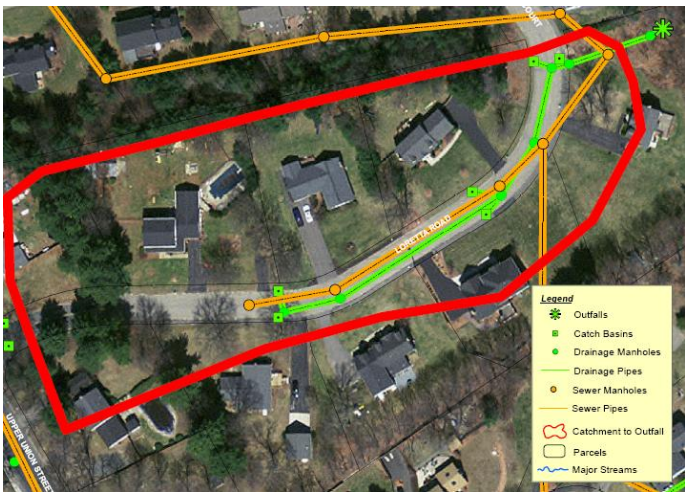

Figure 1. The draft permit requires permittees to map outfalls (green asterisk in upper right corner); drainage areas or catchments to each outfall (in red); associated storm drain inlets and pipe network (in green); sewer lines (in orange); and associated manholes like those shown here from a catchment in Franklin, MA. Geographic Information Systems (GIS) can be a valuable tool for gathering, depicting and analyzing MS4 mapping data.

The Draft permit requires Small MS4s in the Charles River Watershed to incorporate additional detail into their maps to form a more complete picture of the risks for illicit discharges, opportunities for remediation as well as to address the approved TMDL that applies in that watershed.

Components of an IDDE Program

In addition to the inventory and mapping requirements, a comprehensive written IDDE program must be developed and implemented by the MS4 operator under the terms of the draft permit. This requirement builds upon the 2003 MS4 Permit requirement that permittees develop and implement an IDDE program. This written program will outline the legal mechanisms, detection and elimination protocols and procedures, schedules, and training elements of the local IDDE program. Draft requirements of the plan are outlined in Table 2.

Table 2. Draft Requirements of the Written IDDE Program

Topic	Description
2.4.4.8(a) Legal Authority	An ordinance, bylaw or other regulatory mechanism which provides the MS4 operator the legal authority to: prohibit IDs, investigate suspected IDs, eliminate IDs and enforce the IDDE Program (already required under the 2003 Small MS4 Permit).
2.4.4.8(b) Protocol & Responsibilities	Identifies who is responsible for eliminating known IDs or other problems. Establishes protocols to: eliminate illicit connections or other problems, document and verify the removal of IDs and track progress towards overall program goals.
2.4.4.8(c) Assessment of Priority & Problem Catchments	Identifies MS4 catchments with known or highly suspected IDs as problem catchments. Rates the ID potential of all other MS4 catchments as High, Medium, or Low based on a number of criteria.
2.4.4.8(d) Systematic Procedure for Locating & Removing Illicit Connections	Requires that a written systematic procedure, including the opening and inspecting key junction manholes and eliminating illicit connections, be developed and implemented in all MS4 catchments and that that actions and the elimination of illicit connections or discharges be documented. Sets forth additional requirements applicable to the Charles River watershed communities.
2.4.4.8(e) Illicit Discharge Prevention Procedures	Sets procedures for spill response and prevention; spill identification and reporting; spill containment; and training.
2.4.4.8(f) Indicators of IDDE Program Progress	Describes of the criteria to be used to track progress of the program and gauge its success.
2.4.4.8(g) Required IDDE Program Milestones	Specifies IDDE milestones required by the EPA (i.e., at least half of the MS4 area served by the problem catchments and those ranked as having High or Medium ID potential shall be investigated using the written systematic procedure by the end of year three of the permit. All catchments must be investigated by the end of year seven.)
2.4.4.8(h) Employee Training	Creates a program of training on how to recognize IDs and SSOs. Training must be performed annually, at a minimum, and documented.

A significant component of the program is the assessment and prioritization of outfall catchments. Among the proposed criteria to be used for this assessment are the following:

- Frequency of past discharge complaints or reports;
- Poor dry-weather water quality in the receiving waters;
- Density of generating sites;
- Age of developments;
- Whether or not the area was converted from septic to sewer;
- Whether or not the area was previously served by combined sewer;
- Presence of older industrial uses;
- Density of aging septic systems; and
- Presence of culverted streams.

Proposed Outfall Screening and Analytical Monitoring

Based on the draft permit, during the five-year permit term, the MS4 operator must perform at least one dry weather screening and analytical monitoring, and one wet weather analytical monitoring at each outfall. Monitoring and screening should begin at outfalls in those catchments deemed as having the highest risk of IDs.

Dry weather screening will be conducted when no more than 0.1 inches of rainfall has fallen in the preceding 24-hour period and can be done concurrently with the outfall inventory. If the outfall is flowing, the permittee should collect a sample, record its temperature and have the sample tested for conductivity, turbidity, pH, chlorine, surfactants, potassium, ammonia, and E. coli (if discharging to fresh water) or enterococcus (if discharging to salt water). Sensory observations (odor, water color, sheen, turbidity) should also be noted. If there is no flow at the time of observation but signs of flow are evident, the permittee should revisit the outfall during dry weather within one week, if practicable.

If the discharge is directly to impaired waters, or is included in a waste load allocation in an approved TMDL, the draft permit requires that dry weather discharges must also be screened for pollutants identified as causing the impairment.

Wet weather monitoring can be performed after any storm event of sufficient intensity to produce a discharge. A water sample shall be taken and tested for the same characteristics and pollutants as for dry weather screening. If the discharge is directly to an impaired waterbody, or is included in a waste load allocation in an approved TMDL, the draft permit requires that wet weather discharges must also be screened for pollutants identified as causing the impairment.

Tips for Detecting Intermittent or Transitory Flows during Outfall Screening (CWP, 2004)

1. Odd hours monitoring—Conduct inspections of manholes/outfalls in Problem or High Risk catchments during evenings and/or weekends.
2. Optical brightener monitoring traps—An unbleached absorbent cotton pad is secured to the invert of a pipe and left for a period of time. The pad is retrieved and viewed under a black light which will highlight traces of detergent absorbed by the pad.
3. Caulk dams—Using plumber's putty or other materials, create a 2"± high berm to trap a portion of any intermittent flow. Using a hand-pump sampler, obtain a water sample for testing.);
4. Pool sampling—If a plunge pool exists at an outfall, use it as a water sample source.
5. Toxicity monitoring—A perforated plastic bottle containing live minnows is secured within a plunge pool at an outfall. The pool is monitored on a daily basis to track minnow mortality. A sudden die-off may indicate that an illicit discharge has occurred.

Locating Suspected Illicit Connections

The 2003 permit left it up to the permittees to determine the methods used to isolate suspected illicit connections; however the draft permit explicitly stipulates minimum procedures to be followed. The locating of illicit connections requires a systematic inspection of junction manholes (manholes with two or more inflow pipes), starting at either the upstream end of a storm drain network and progressing downstream, or vice versa. Key junction manholes must be opened, and visual and olfactory observations recorded. Some indicators of IDs are the presence of excrement, toilet paper, sanitary products or filamentous bacterial growth (Figure 2).

Figure 2. White/gray material seen in the pipes is a bacterial plaque often indicative of sanitary sewage.

According to the draft permit, if flow is observed, a sample must be taken and tested for ammonia and surfactants, at a minimum. If pollutants are above threshold levels, investigations shall continue until the suspected illicit discharge can be isolated to a single pipe run between two manholes. The source of the discharge can be determined by dye testing, smoke testing, pipe videography, or other methods.

Once the source of an ID is identified, removed, and confirmed, the discharge and source location shall be described, and the method of discovery, date of discovery and removal, repair or enforcement action, and estimate of flow volume recorded.

Based on the draft permit, IDs should be eliminated, within 30 days of identification (Section 2.4.4.2). **SSOs shall be eliminated upon discovery** (2.4.4.5).

For MS4s in the Charles River basin subject to approved TMDLs, the draft permit includes additional procedures that must be followed in locating IDs, such as:

- Determine if storm drains must be cleaned prior to investigations;
- Where no dry-weather flow is observed in suspected junction manholes, dam inflow pipes to capture intermittent flows (see sidebar); and
- Additional analysis of dry weather flow samples taken in junction manholes may be required (e.g., test for chlorine and fluoride if surfactants are below threshold values).

What is the Proposed Schedule?

The draft permit incorporates new interim milestones to be reached during the permit term (Table 3).

What are the IDDE Reporting Requirements?

Proposed annual MS4 reporting requirements related to the IDDE program include:

- Update on SSO inventory and status of SSO elimination efforts (2.4.4.5(a) &(d)). Upon discovery, any SSO not previously recorded in the inventory must be reported, in writing, to the EPA and MassDEP.
- Update on status of MS4 mapping (2.4.4.6(c)), outfall inventory (2.4.4.7(d)), and inventory of problem catchments (2.4.4.8(c)(v));
- Update on status of Protocol & Responsibilities (2.4.4.8(b)) and Systematic Procedure for Locating & Removing Illicit Connections (2.4.4.8(d));
- Update on MS4 catchment investigations (2.4.4.8(g)) and details of ID elimination in problem catchments (2.4.4.8(c)(v)); and
- Evaluation of overall effectiveness of the IDDE Program (2.4.4.8(f)).

Where Can I go for More Information?

For more information regarding the draft permit, go to www.epa.gov/ne/npdes/stormwater/draft_manc_sms4gp.html

Center for Watershed Protection (CWP). 2004. Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments, www.cwp.org/categoryblog/99-idde-and-septics.html

EPA NPDES Training Courses and Webinars on IDDE, cfpub2.epa.gov/npdes/outreach.cfm?program_id=0&otype=1.

New England Interstate Water Pollution Control Commission (NEIWPCC). 2003. Illicit Discharge Detection and Elimination Manual, A Handbook for Municipalities, www.neiwpcc.org/iddemanual.asp.

Table 3. Key Proposed Deadlines

Proposed Milestone (Draft MA North Coastal Permit Section)	Deadline (from Effective Date of Permit)						
	60 days	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 7
Completion of known SSO inventory (2.4.4.5(a))	X						
Filing of annual report—due August 1 (.5.3.1)		X	X	X	X	X	X
• Completed ID risk assessment and prioritization for all MS4 catchments (2.4.4.8(c)(iv)) • Completed inventory of Problem Catchments (2.4.4.8(c)(v)) • Submittal of written Systematic Procedures for Locating & Removing Illicit Connections (2.4.4.8(d))		X					
• 25% of the outfall inventory completed (2.4.4.7(a)) • Completion of MS4 Mapping (2.4.4.6)			X				
• 50% of the outfall inventory completed (2.4.4.7(a)) • 50% of Problem Catchments and catchments with High or Medium ID risk investigated (2.4.4.8(g))				X			
75% of the outfall inventory completed (2.4.4.7(a))					X		
• 100% of the outfall inventory completed (2.4.4.7(a)) • 100% of Problem Catchments and catchments with High or Medium ID risk investigated (2.4.4.8(g))						X	
Investigation protocol completed in all catchments (2.4.4.8(g))							X