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

Small MS4 Permit Technical Support Document, December 2016

Final Permit Requires Enhanced IDDE Program

The final Massachusetts Small Municipal Separate Storm Sewer Systems (**MS4**) permit includes enhanced requirements aimed at eliminating non-stormwater, illicit discharges (**IDs**) to MS4s. In addition to the IDDE program requirements instituted under the 2003 permit, permittees are 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. cracked and leaking sanitary sewers where exfiltrating sewage enters nearby storm drain pipes).

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 (part 1.4).

Final Mapping/Inventory Requirements

The final 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 final permit specifies the information that must be collected during inventories and mapped (Table 1).

Table 1. Inventory and Mapping Requirements

Description*	Information Required
Inventory of Known Sanitary Sewer Overflows (SSOs) Discharging to the MS4 (2.3.4.4)	1. Locations of sanitary sewer overflows (SSOs); 2. A clear statement of whether the discharge entered a surface water directly or entered the MS4; 3. Dates and times of known discharges; 4. Estimated discharge volume; 5. Description of occurrence noting known or suspected sources; 6. Mitigation and corrective measures implemented; 7. Mitigation and corrective measures planned and implementation schedule.
MS4 Map (2.3.4.5)	1. Outfall locations and receiving waters; 2. Open channel conveyances; 3. Interconnections with other storm sewer systems; 4. Impaired waterbodies; 5. Delineation of catchment area draining to each outfall; 6. Names & locations of receiving waters; 7. Storm drainage infrastructure (catch basins, manholes, pipes, treatment facilities); 8. Water resource areas (beaches, drinking water sources, critical habitats); 9. Municipal sanitary sewers, if available; and 10. Municipal combined sewers, if any.
Inventory of MS4 Outfalls (2.3.4.7)	1. Outfall location and condition; 2. Unique identifier for each outfall; 3. Ranking of each outfall; 4. Inspection all outfalls within three years of the permit effective date; 5. Sampling of outfalls with flow.

** Reference to MA MS4 General Permit part*

Due to the serious health risks posed by untreated sanitary sewage, the final permit requires an inventory of known SSOs into the MS4. SSOs have a variety of causes, such as blockages, line breaks, and lapses in sewer system operation and maintenance. Upon detection of an SSO, the permittee must eliminate it as quickly as possible and take interim mitigation measures to minimize the discharge of pollutants to its MS4 (2.3.4.4). The final 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 final 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.

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 final 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. The final permit requirements of the plan are outlined in Table 2.

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

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

Table 2. Requirements of the Written IDDE Program

Topic	Description
Legal Authority (2.3.4.a and 2.3.4.6.a)	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).
Protocol & Responsibilities (2.3.4.6.c)	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.
Assessment and Priority Ranking of Outfalls (2.3.4.7)	Assesses the ID and SSO potential of all outfalls and priority rank them as problem, high priority, low priority, or excluded based on a number of criteria.
Catchment Investigations (2.3.4.8)	Requires a written systematic procedure to investigate each catchment with an outfall within 18 months of the permit effective date. Also must identify maps, historic plans, and records; include a manhole inspection methodology; and establish procedures to isolate, confirm, and remove sources of IDs.
Indicators of IDDE Program Progress (2.3.4.9)	Describes the indicators to be used to track progress of the program and gauge its success.
Ongoing Screening (2.3.4.10)	Consists of dry weather screening and sampling and wet weather screening and sampling once every five years upon completion of all catchment investigations.
Employee Training (2.3.4.11)	Creates a program of training on how to recognize IDs and SSOs. Training frequency and type must be documented in the annual report.

Outfall Screening and Analytical Monitoring

Based on the final permit, the MS4 operator must perform at least one dry weather screening and analytical monitoring at each outfall within three years of the permit effective date. Wet weather analytical monitoring must be conducted in accordance with part 2.3.4.8.c.ii. 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 no significant snow melt is occurring. Dry weather screening 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 ammonia, chlorine, conductivity, salinity, surfactants, and E. coli (if discharging to fresh water) or enterococcus (if discharging to saline or brackish 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 final 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 final permit requires that wet weather discharges must also be screened for pollutants identified as causing the impairment.

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 final 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).

According to the final permit, if flow is observed, a sample must be taken and tested for ammonia, chlorine, 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 as chosen by the permittee and described in the written system investigation protocol.

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.

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. Sandbag dams— During dry weather, place sandbags in pipes and return in 24/48 hours of dry weather to sample any flows captured behind sandbags.
3. Pool sampling—If a plunge pool exists at an outfall, use it as a water sample source.
4. 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.

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

Based on the final permit, IDs and SSOs should be eliminated as expeditiously as possible (2.3.4.2 and 2.3.4.4).

What are the IDDE Reporting Requirements?

MS4 reporting requirements related to the IDDE program include:

- Dates of ID identification and schedules for removal in the annual report (2.3.4.2);
- Within five days of becoming aware of an SSO, a written notice must be sent to the EPA and MassDEP (2.3.4.4.b-d);
- Status of MS4 mapping (2.3.4.5.e), outfall inventory (2.3.4.7.a), and data collected as part of the dry and wet weather catchment investigations (2.3.4.8.c.iii);

- Dry weather screening and sampling data used in compliance with part 2.3.4.7.b in the annual report (2.3.4.7.b.iv-v);
- Presence or absence of system vulnerability factors (SVFs) for each catchment in the annual report (2.3.4.8.c.i);
- ID confirmed source information such as location, method of discovery, date of elimination or planned corrective measures, and estimated volume of flow removed (2.3.4.8.e.i);
- Evaluation of overall effectiveness of the IDDE Program (2.3.4.9);
- All ongoing screening and sampling results in the annual report (2.3.4.10);
- Frequency and type of employee training in the annual report (2.3.4.11).

What is the Proposed Schedule?

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

Where Can I go for More Information?

For more information regarding the final permit, go to https://www3.epa.gov/region1/npdes/stormwater/MS4_MA.html.

Center for Watershed Protection (CWP). 2004. *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, https://www3.epa.gov/npdes/pubs/idde_manualwithappendices.pdf.

EPA NPDES Training Courses and Webinars on IDDE https://www.epa.gov/npdes/npdes-stormwater-webcasts#municipal.

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

Final Milestone (MA MS4 General Permit Part)	Deadline (from Effective Date of Permit)						
	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 7	Yr 10
Completion of known SSO inventory (2.3.4.4.b)	X						
Filing of annual report—due 90 days after the close of each reporting period (4.4)	X	X	X	X	X	X	X
• Written IDDE program must be completed (2.3.4.6) • Completed ID assessment and prioritization for all MS4 catchments (2.3.4.7.a) • Development of an outfall and interconnection screening and sampling procedure to be included in the IDDE program (2.3.4.7.b.i) • Submittal of written systematic procedures for investigating each outfall for illicit connections—due 18 months of the permit effective date (2.3.4.8.a)	X						
• Update of MS4 Map with outfalls, receiving waters, open channel conveyances, interconnections, stormwater treatment facilities, impaired waterbodies, and initial catchment delineations (2.3.4.5.a) • Investigations of catchments associated with problem outfalls must begin (2.3.4.8.a)		X					
• For new permittees the ordinance, by-law, or other regulatory mechanism must be in place (2.3.4) • Inspection of all outfalls/interconnections (excluding problem and excluded outfalls) for the presence of dry weather flow (2.3.4.7.b) • Initial priority ranking of outfalls (2.3.4.7.c.iii)			X				
• Investigation of catchments associated with problem outfalls must be completed (2.3.4.8.a) • Investigation of catchments where any information gathered on the outfall identifies sewer input must be completed (2.3.4.8.a)						X	
• Update of MS4 map with outfall spatial locations, pipes, manholes, catch basins, refined catchment delineations, sanitary sewers, and combined sewers (2.3.4.5.b) • Investigation of catchments associated with all problem, high- and low-priority outfalls must be completed (2.3.4.8.a)							X

Additional milestones: within one year of removal of all identified illicit discharges within a catchment area, confirmatory outfall or interconnection screening shall be conducted (2.3.4.8.e.ii). Each outfall or interconnection must be reprioritize for screening and scheduled for ongoing screening once every five years (2.3.4.10).