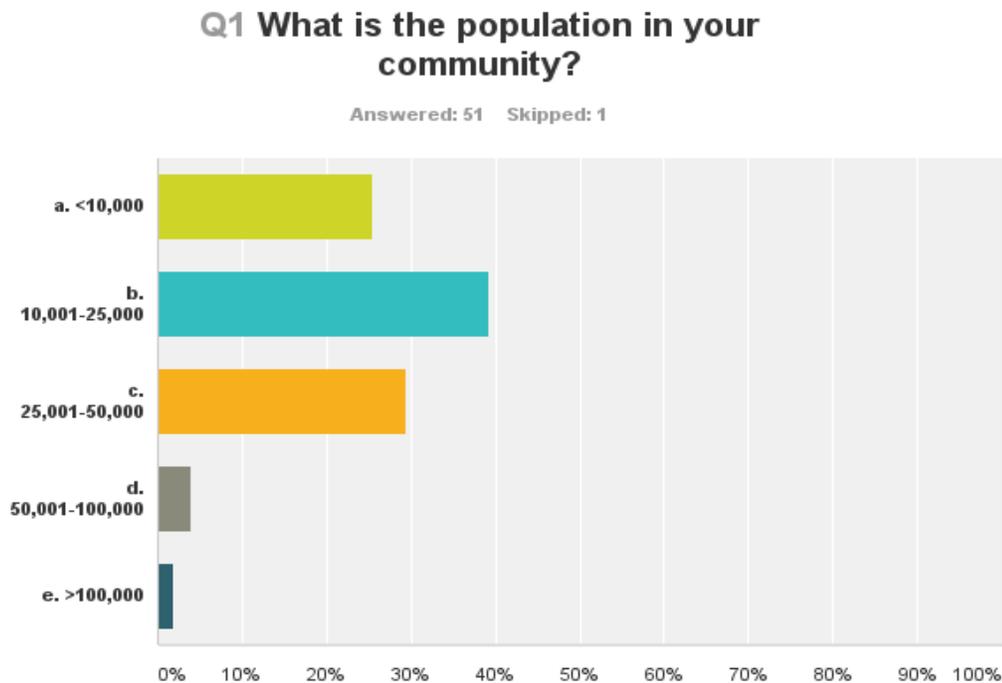


MS4 Survey Results – White Paper

Overview

A survey was issued to 259 MS4 Phase II coordinators in Massachusetts and New Hampshire in the late summer of 2014, with partial preliminary results released to respondents in September 2014. Shortly after, an announcement of the revised Massachusetts Draft MS4 Permit was published by the U.S. EPA Region 1 in the Federal Register on September 30, 2014. Based on the revised draft, CEI has updated our survey results to show how they relate to the most recent draft permit.

CEI received a response rate of approximately 20%, or 52 out of the 259 regulated communities surveyed. Of the respondents, most reported their population as between 10,000 and 50,000 as shown below:



Note: percentages are based on the total number of respondents answering each question.

The survey results are divided into four topics/sections: 1) Compliance Plans; 2) Mapping; 3) Maintenance; and 4) Compliance Costs. Each topic grouping is reported below with a discussion of what this might mean in terms of the newest draft permit.

1. Compliance Plans

*Question: The regulated communities were asked which of the 3 currently required and 2 future required Compliance Plans they already have?**

There are 5 categories of plans that are or will be required as follows, with the first 3 types already required under the existing 2003 permit and the last 2 expected to be required under the

MS4 Survey Results – White Paper

new permit. It is important to note that some of these plans, namely the Storm Water Pollution Prevention Plans (SWPPPs) and the Operations and Maintenance Plans (O&M) may be required for more than one facility as discussed under each category heading. The required plans include:

- A. *Storm Water Management Plans – MS4s are already required to have a written plan.*
- B. *Illicit Discharge Detection Elimination Plans – MS4s are already required to have a written plan.*
- C. *O&M Plans – MS4s are already required to have written plans for certain common public works facilities.*
- D. *Phosphorus Control Plans – A new MS4 requirement expected in the upcoming permit for MS4s with discharges to water bodies, or their tributaries, with a phosphorus total maximum daily load (TMDL). Communities subject to this requirement are called out in each draft permit, however, any MS4 discharging to any listed lake or its tributaries is subject to this requirement, whether or not the community is listed in the permit.*
- E. *Storm Water Pollution Prevention Plans – A new MS4 requirement for municipal waste handling and maintenance facilities not covered under the Multi-Sector General Permit (MSGP). Note that municipalities are already required to have written plans for certain common public works facilities regulated under the MSGP and for construction sites.*

*Note: The previous 2013 draft NH permit also had requirements for the development of Water Quality Response Plans (WQRPs) for impaired waters without a TMDL, which were listed in the survey. However, this is not present in the revised 09/30/14 Massachusetts draft permit. Instead, the revised draft now requires incorporation of specific additional or enhanced BMPs within the six minimum measures, primarily focused on public education, regulatory requirements and good housekeeping. In the case of nutrients, municipalities will be required to develop nutrient source identification reports that prioritize areas with high nutrient loadings and identify opportunities for structural best management practices.

More information and the survey results on these are given below.

Question 6 asked whether the respondent has a written Storm Water Management Plan?

Storm Water Management Plans – Regulated communities are currently required to have a Storm Water Management Program (SWMP) that supports their initial Notice of Intent (NOI) to discharge storm water. The NOI was a required filing with EPA in 2003. EPA has stated that their intent was for this to be a written program that would be available from the MS4 to agencies or interested persons on request, but some MS4s still have no written plan. Of the respondents to this survey, 22% do not yet have written storm water management plans (Question 6). The existing plan should include:

- *Documentation of endangered species and historic properties;*
- *Map of storm water outfalls based on existing records;*
- *List of receiving waters and their impairments;*

MS4 Survey Results – White Paper

- All existing and planned control measures to control pollutants of concern identified in approved TMDLs;
- All existing and planned control measures to reduce the discharge of pollutants from the MS4 to the maximum extent practicable;
- Proposed best management practices (BMPs) to meet the six minimum measures of the permit, including the responsible person/department, measurable goals, timelines and milestones for implementation; and
- Prioritization of receiving waters/areas for implementation of the storm water management plan and associated documentation.

When it is issued, the new permit is expected to specifically require a written plan that documents:

- Names and titles of the implementation team and a schedule;
- List of all receiving waters, their classification, impairments, applicable TMDLs and number of outfalls to each;
- Documentation of public surface drinking water sources that may be impacted by MS4 discharges;
- List of interconnected MS4s and the receiving water they ultimately discharge to along with any impairments;
- Endangered species and historic properties documentation;
- Documentation of authorization of all new or increased discharges granted by MassDEP;
- Map of separate storm sewer system;
- Description of how the MS4 will achieve water quality requirements for impaired waters with TMDLs, including meeting targeted pollutant reductions and Phosphorus Control Plans (PCPs) where required;
- Description of how MS4s will reduce pollutant discharges from the MS4 to impaired waters without a TMDL;
- BMPs to meet the Maximum Extent Practicable (MEP) requirements (e.g., six minimum measures) along with compliance deadlines and measurable goals, if any;
- Description of measures to avoid or minimize impacts to surface public drinking water supply sources; and
- Annual program evaluation/report.

This is similar to what is already required, however, it is more clearly spelled out in the draft permit. The draft permit also includes some additional requirements for inclusion in the storm water management plan, such as a more detailed map of the separate storm sewer system, including catch basins and manholes, a description of how pollutant discharges from the MS4 to impaired waters will be reduced, and measures to minimize impacts to private drinking water sources.

Survey Results: Almost 80% of respondent MS4 communities are in compliance with EPA's current requirement to have a Storm Water Management Plan (refer to Question 6). Nonetheless, many still do not yet have a written plan. This requirement will likely be expanded and communities who have existing written plans should be able to update and build on their existing plan with less effort than those starting from scratch.

MS4 Survey Results – White Paper

Question 6 asked whether the respondent has a written IDDE plan.

Illicit Discharge Detection and Elimination (IDDE) Plans – Regulated communities must also develop an IDDE program and plan. An illicit discharge is any discharge to the MS4 that is not composed entirely of storm water, excluding some sources with very low pollution potential. The purpose of the written plan is to prioritize areas for illicit discharge investigations, and to develop procedures and protocols for initial and follow-up investigations.

The upcoming permit is expected to require that all outfall catchment areas, or subwatersheds, be delineated and ranked for follow-up investigation. A written ‘Catchment Investigation’ procedure must be prepared that includes review of mapping and historic records for all catchments, a manhole inspection methodology and procedures to isolate and confirm sources of illicit discharges. This involves inspection of all key junction manholes under dry weather conditions, even where no evidence of an illicit discharge is observed at the outfall. Catchments must also be investigated for the presence of specific System Vulnerability Factors that focus on vulnerabilities associated with sewer and septic systems and their potential to impact the MS4. Where System Vulnerability Factors are present, inspection and sampling under wet weather conditions will be required. These evaluation components must be included in the IDDE Plan.

Survey Results: About 40% of respondent MS4 communities do not comply with EPA’s current requirement to have a written IDDE Plan (refer to Question 6). Communities with existing IDDE Plans should be able to update and build on their existing plan with less effort, since some of the procedures and protocols for performing the inspections and follow-up work will likely not change.

Question 6 asked whether the respondent has a written Phosphorus Control Plan and/or WQRP?

Phosphorus Control Plans (PCPs) – PCPs are a new requirement of the draft MS4 permit. MS4s with impaired waterbodies subject to a phosphorus Total Maximum Daily Load (TMDL) will need to develop a PCP that documents phosphorus loads from the MS4, required reductions, and proposed measures to meet the load reductions. This plan is likely to be similar to a Watershed Restoration Plan.

Survey Results: Phosphorus Control Plans and WQRPs are currently not required (WQRPs are no longer anticipated to be required); however, two of the survey respondents (4%) did indicate that they already developed one of these plans (Question 6).

MS4 Survey Results – White Paper

The survey asked MS4s which facilities they already have SWPPPs for, with responses shown in Question 12.

Storm Water Pollution Prevention Plans (SWPPPs) – SWPPPs have historically been required under a MSGP for certain industries as well as for municipalities with landfills and recycling centers to document potential pollutant sources and measures and controls for storm water management. They are also currently required for construction sites that disturb greater than one acre. These requirements are separate from the MS4 permit requirements.

When the new MS4 permit is issued, it is expected to require SWPPPs for some facilities not currently covered under the MSGP, including maintenance garages, public works facilities, transfer stations and other waste handling or maintenance facilities.

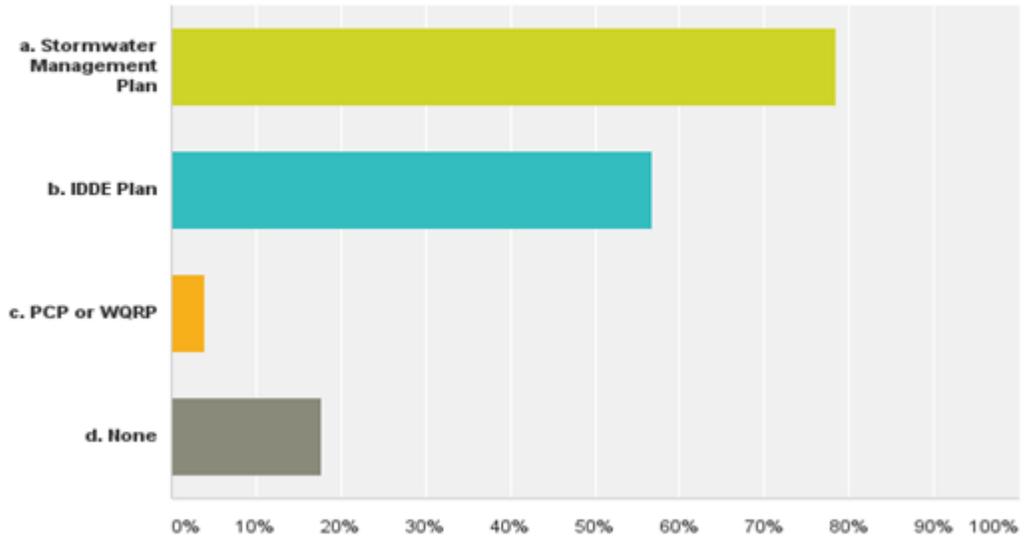
Survey Results: About half of the respondents have SWPPPs for their DPW maintenance facilities and yards (refer to Question 12). SWPPPs are currently not required for DPW maintenance garages, but are expected to be when the new permit is released.

There can be cost savings in combining the preparation of SWPPPs and Spill Prevention Control and Countermeasures (SPCC) Plans. SPCC plans are often required at DPW facilities due to petroleum products commonly used in maintenance, waste oil collection and fueling and these must evaluate measures to prevent oil from reaching nearby surface waters so they are closely related to SWPPPs.

MS4 Survey Results – White Paper

Q6 Please identify which of the following written plans you have: (check all that apply)

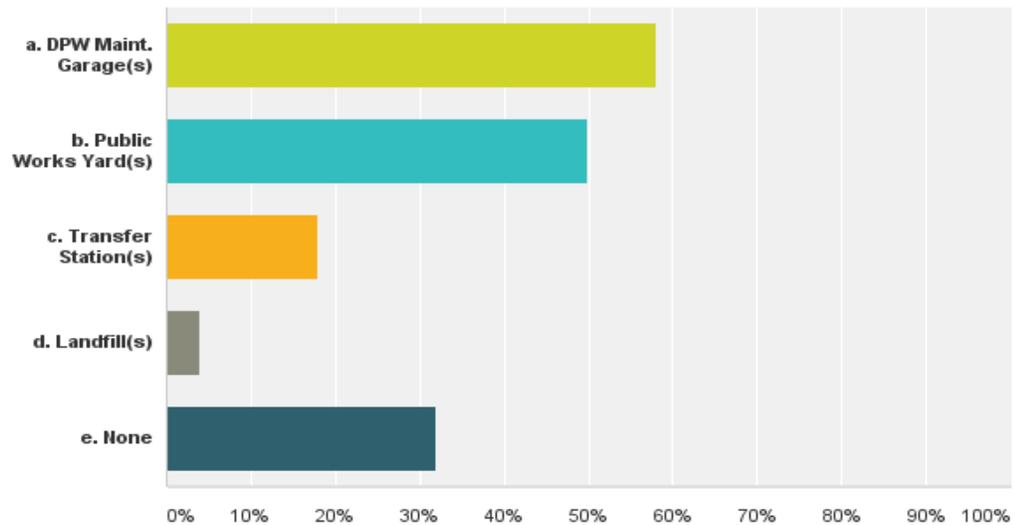
Answered: 51 Skipped: 1



Note: percentages are based on the total number of respondents answering each question.

Q12 Identify which of the following facilities you have Stormwater Pollution Prevention Plans (SWPPPs) for: (check all that apply)

Answered: 50 Skipped: 2



Note: percentages are based on the total number of respondents answering each question.

MS4 Survey Results – White Paper

Regulated MS4s were asked which infrastructure maintenance plans they had documented in writing, with responses provided under Question 13.

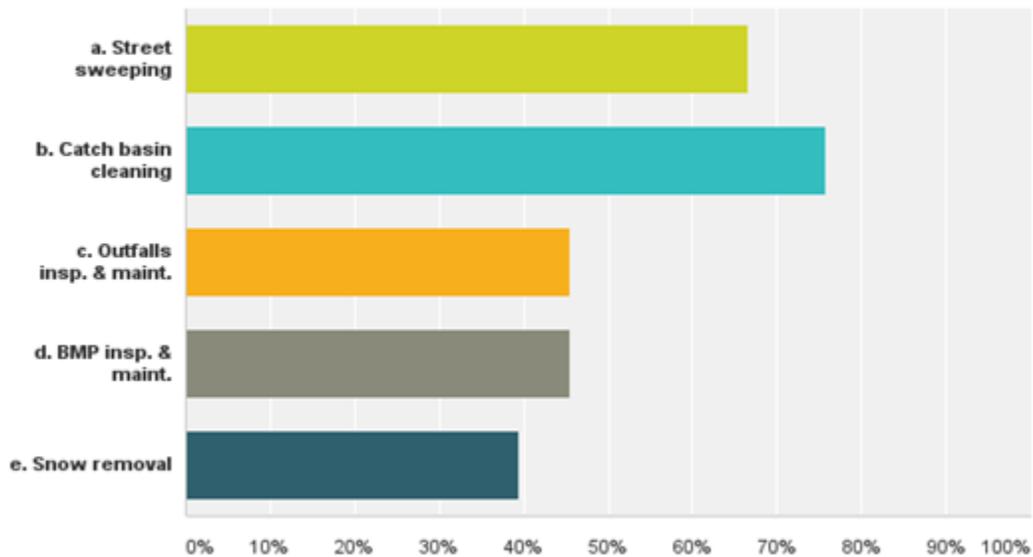
Operation and Maintenance (O&M) Plans – The new permit is expected to require MS4 operators to inventory all municipally-owned facilities and establish written O&M procedures covering a) parks and open space, b) buildings, c) vehicles and equipment, and d) infrastructure. Procedures must also be established for winter road maintenance and the maintenance of the storm drainage system, which may include street sweeping, catch basin cleaning, outfall inspection and maintenance, BMP inspection and snow removal.

CEI recommends that brief standard operating protocols (SOPs) are developed using bullets or checklist type formats that are easy to follow.

Survey Results: MS4s will likely be required to have O&M Plans in place for municipal facilities and infrastructure. A majority of the survey respondents already have them for catch basin cleaning and street sweeping (Question 13).

Q13 Identify which of the following you have written O&M Plans for:

Answered: 33 Skipped: 19



Note: percentages are based on the total number of respondents answering each question.

MS4 Survey Results – White Paper

Compliance Plan Preparation Conclusion: Based on a strong showing of MS4 survey submittals, many communities are ahead of the curve and have complied with the previously required Compliance Plan preparation. Some have even gotten a head start on anticipated plans that will be needed for the upcoming permit. A few responding systems do not have any of the plans, which may make compliance with the upcoming permit more expensive.

2. Mapping and Infrastructure

Question: Have the respondent communities completed the mapping in current and anticipated permits? How much of their infrastructure is mapped and in what format?

This section focuses on how communities are handling mapping and maintenance, specifically catch basin cleaning, of their infrastructure. The 2003 MS4 permit required regulated communities to develop a map showing the location of all outfalls and the names of all waters that receive discharges from those outfalls.

The latest 09/30/2014 draft permit now requires mapping of the entire storm sewer system, including all outfalls and receiving waters, pipes, open channel conveyances, catch basins (CBs), manholes, interconnections with other MS4s and municipally-owned storm water treatment structures or best management practices (BMPs) (e.g., detention and retention basins, infiltration systems, bioretention areas, water quality swales, gross particle separators, oil/water separators, or other proprietary systems). Catchments (e.g., area that drains to an individual outfall or interconnection) must also be delineated and mapped under the draft permit.

As part of the survey, we requested information on which infrastructure components communities had mapped and in what formats. Most, >90%, have outfalls, catch basins, pipes and manholes mapped in one form or another. Over 40% already have outfall drainage areas mapped and about 20% have municipally-owned structural BMPs mapped. Refer to Q7 for survey results.

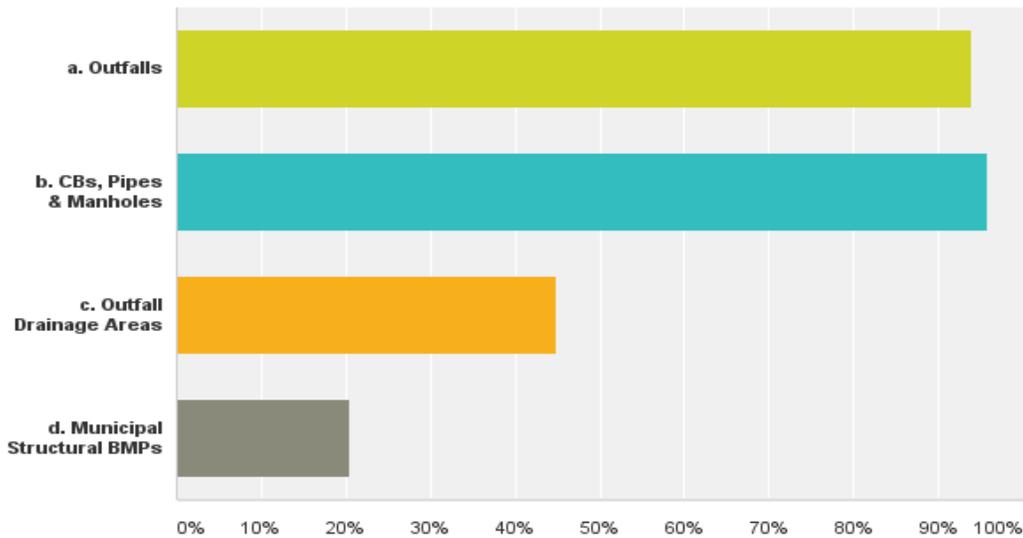
The majority of respondents use GIS for their mapping needs, however, a large percentage (~39%) have a combination of paper, CAD and GIS formats. Although EPA does not require use of a specific or single format for mapping, it is convenient to have the entire system mapped with GIS, which also allows for inclusion of database(s) containing notes on the system (e.g., invert elevations, inspection notes). Some communities have used Clean Water State Revolving Funds (SRF) to pay for mapping of their systems, including field verification using GPS and documentation in GIS, as part of a larger storm water management plan project to comply with the NPDES MS4 permit.

MS4 Survey Results – White Paper

Survey Results – Most communities are in compliance with the existing outfall mapping requirements and many have a head start on mapping other system components (refer to Q7). Less than half have this information available in an electronic format such as GIS (refer to Q8).

Q7 Which components of your stormwater drainage system are mapped? (check all that apply)

Answered: 49 Skipped: 3

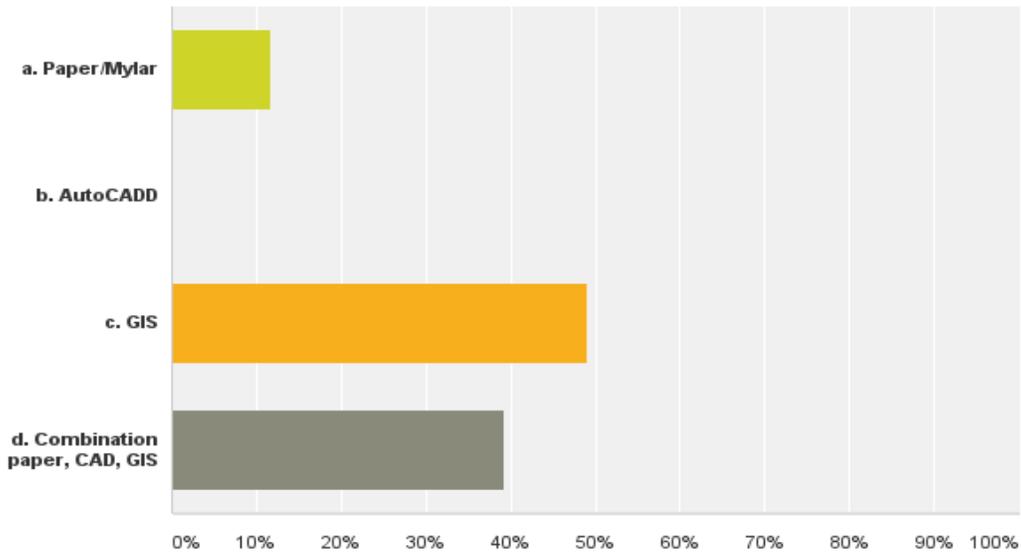


Note: percentages are based on the total number of respondents answering each question.

MS4 Survey Results – White Paper

Q8 In what format is mapping available?

Answered: 51 Skipped: 1



Note: percentages are based on the total number of respondents answering each question.

Question: How often are catch basins cleaned?

The 2003 permit required communities to develop and implement maintenance activities, including road way drainage system maintenance and storm water system maintenance, however, did not provide any specifics on what these practices had to entail. Thus, it was up to the community to define the level of maintenance for their system. The draft permits released to date have gotten more specific on the expectations for catch basin cleaning, with the most recent NH and MA drafts requiring communities to prioritize and schedule for maintenance so that no sump becomes more than 50% full of sediment.

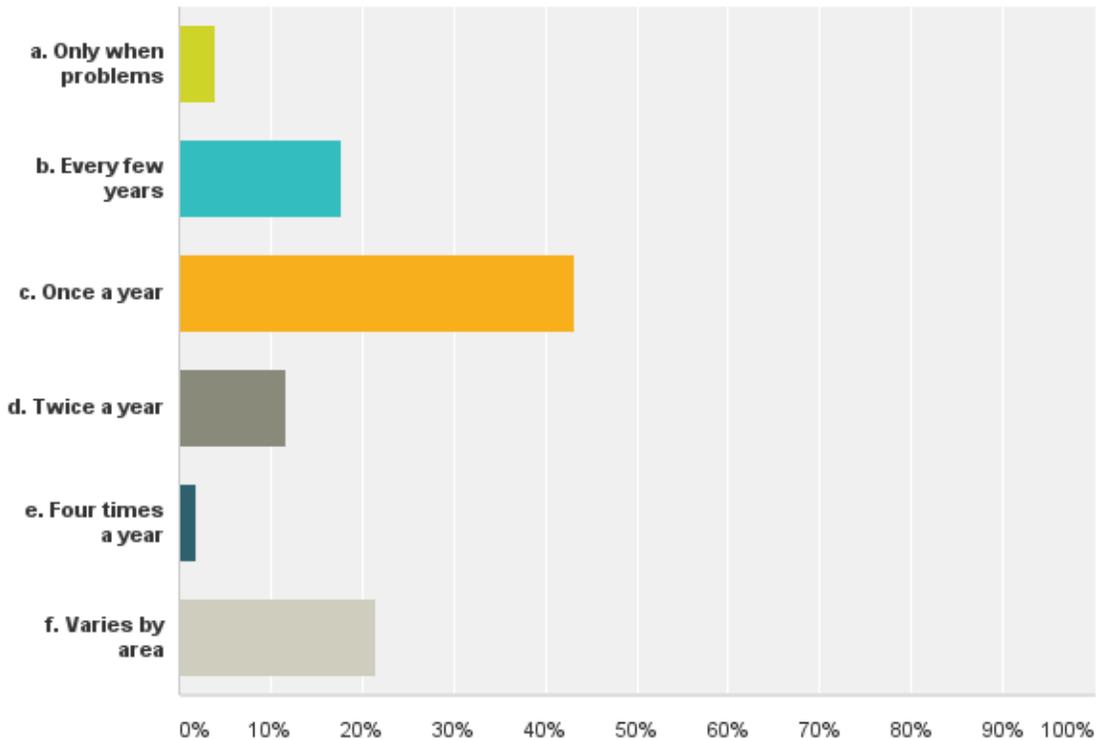
As part of this survey, we asked regulated communities to provide information on how often they currently clean their catch basins. Most clean once a year or at varying schedules depending on the area (refer to Q11).

Survey Results – The majority of respondents clean their catch basins on a set schedule, at least once a year or more. Future cleaning will need to focus on sediment accumulation rates in a given area, rather than a set schedule. This may require more frequent cleaning in some cases and less in others.

MS4 Survey Results – White Paper

Q11 How often do you clean your catch basins?

Answered: 51 Skipped: 1



Note: percentages are based on the total number of respondents answering each question.

3. Outfall Inspections

Question: Have all outfalls been inspected in dry weather? Have respondents sampled dry weather flows?

The 2003 permit required regulated communities to develop and implement a plan to detect and address non-storm water discharges, including illegal dumping, into the system. As part of this plan, communities had to include procedures for locating illicit discharges (i.e., visual screening of outfalls for dry weather discharges, dye or smoke testing). There were no requirements for testing flow found during these dry weather inspections, however, EPA recommended testing for conductivity, ammonia, surfactant and pH, along with fecal coliform or E. coli. Observations for physical characteristics of the discharge, such as flow rate, temperature, odor, color, turbidity, floatable matter, deposits and stains, and vegetation were also suggested.

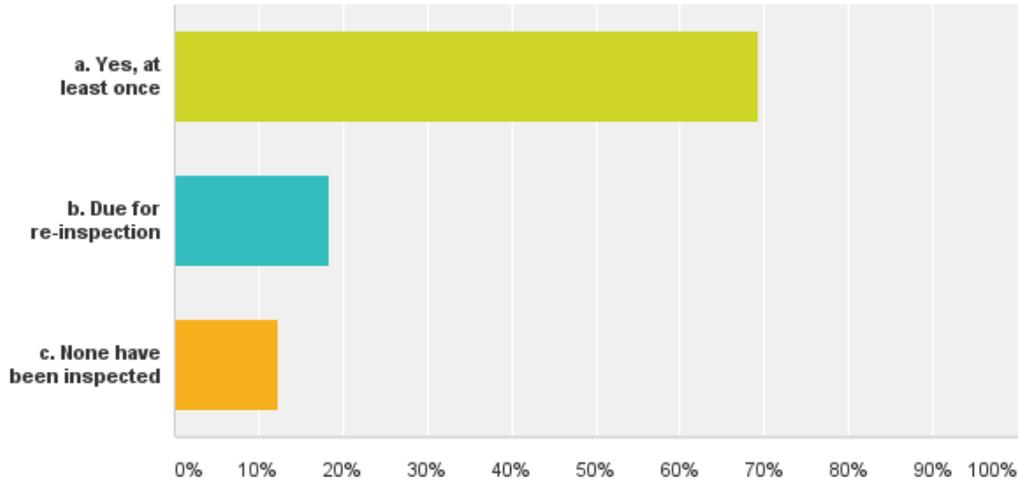
The survey was used to obtain information on whether communities implemented outfall inspection procedures to locate illicit discharges and the type of analysis they performed on documented dry weather flows. About 70% of respondents inspected their outfalls (refer to Q9)

MS4 Survey Results – White Paper

and about 47% performed some type of analysis (i.e., field, laboratory, or both) of the dry weather flows (refer to Q10).

Q9 Have you inspected all of your outfalls in dry weather?

Answered: 49 Skipped: 3

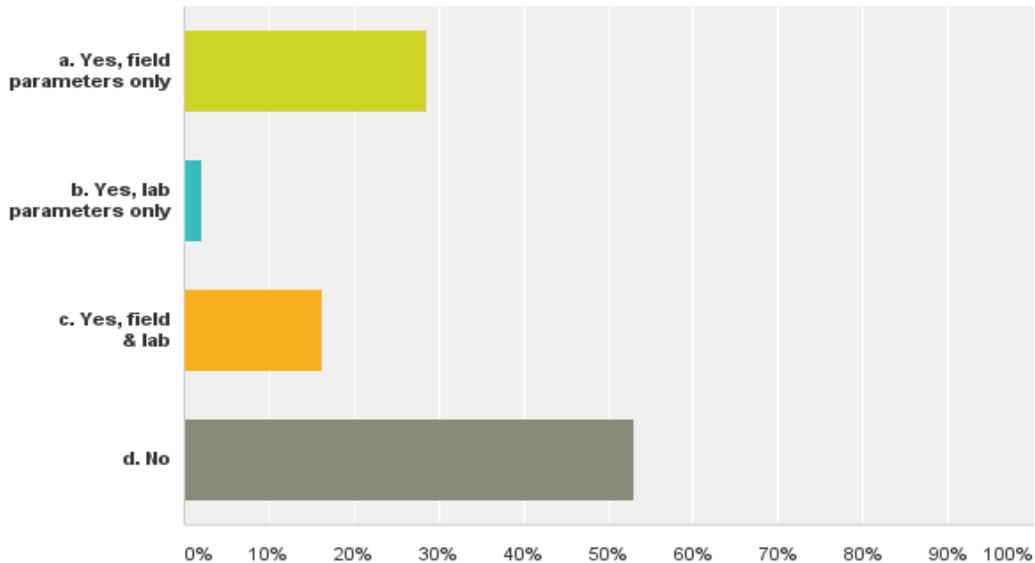


Note: percentages are based on the total number of respondents answering each question.

MS4 Survey Results – White Paper

Q10 Did you sample dry weather flows during outfall inspections?

Answered: 49 Skipped: 3



Note: percentages are based on the total number of respondents answering each question.

If you haven't tested dry weather flows in the past, you will be required to when the new permit is released. The draft permits now require testing of all dry weather flows for ammonia, chlorine, conductivity, salinity, *E.coli* (fresh receiving waters) or Enterococcus (saline receiving waters), surfactants, temperature and any pollutants for which the receiving water is impaired. Field kits can be used in place of laboratory analysis for all water quality parameters, with the exception of bacteria.

Survey Results – About 70% of responding regulated communities performed dry weather inspections of their outfalls, despite only about 57% having written IDDE plans. About half of the respondents performed some type of analysis of the dry weather flows discovered, either using field equipment and/or laboratory analysis. Re-inspection of outfalls and testing of dry weather flows for specific parameters will be required under the final permit.

MS4 Survey Results – White Paper

4. Compliance and Cost

The results below focus on anticipated costs to comply with the new permit when it is released along with the resources and funding communities plan to use.

Question: What do respondents anticipate their annual costs to be? What do they anticipate to be the largest cost component?

Regulated communities were asked what they anticipated the annual cost of compliance would be when the new final permit is released (refer to Q2), along with what they anticipated the largest cost component to be (refer to Q3). Several respondents (~25%) were not sure what it would cost to comply with the new permit. Most (~57%) anticipate it will cost more than \$25,000 a year to comply, with ~24% anticipating costs greater than \$150,000 a year. The majority of respondents think TMDL (Total Maximum Daily Loads) compliance will be the largest cost component of the new permit.

Costs will obviously vary between communities depending on a number of factors including: the size of the community, the number of outfalls and drainage structures, the level of infrastructure mapping already completed, the number and types of impaired waters and completed TMDLs within the community, the number of dry weather flows encountered, and system vulnerabilities identified that require wet weather sampling.

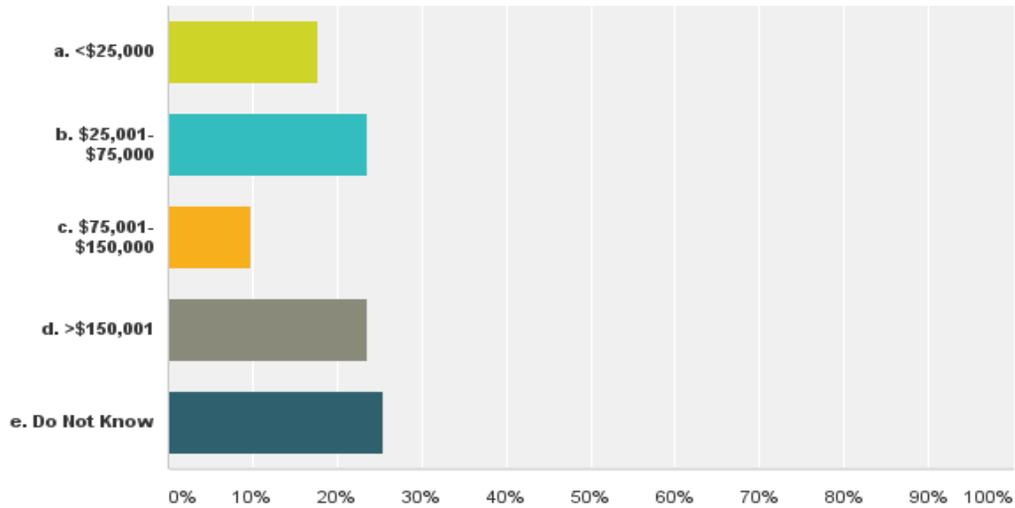
As a point of reference, Students at Worcester Polytechnic Institute (WPI) performed a project¹ to estimate the cost of implementing the draft permit for four Massachusetts case study towns with different population, area, and impervious surface areas. The towns included Upton, Oxford, Westborough, and Webster and considered what they currently had in place and what they would need to do to comply with the 2013 draft NH permit, primarily focusing on the six control measures. The study estimated expected yearly costs to range between \$143,000 and \$417,000 for each of the four communities, including labor and materials. Note that this includes estimates for staff labor, which many communities do not account for in their estimates, but does not include actions necessary to comply with impaired water requirements.

¹ Deng, Xinping. Houghton, Nicholas. Li, Haoran. Weiler, Joseph. Cost Analysis for the MS4 Permits: An Interactive Qualifying Project Report Submitted to the Faculty of Worcester Polytechnic Institute. May 5, 2014.

MS4 Survey Results – White Paper

Q2 Based on your current understanding of what the new rules will include, how much do you think you will have to spend per year in total compliance costs when the rules become final?

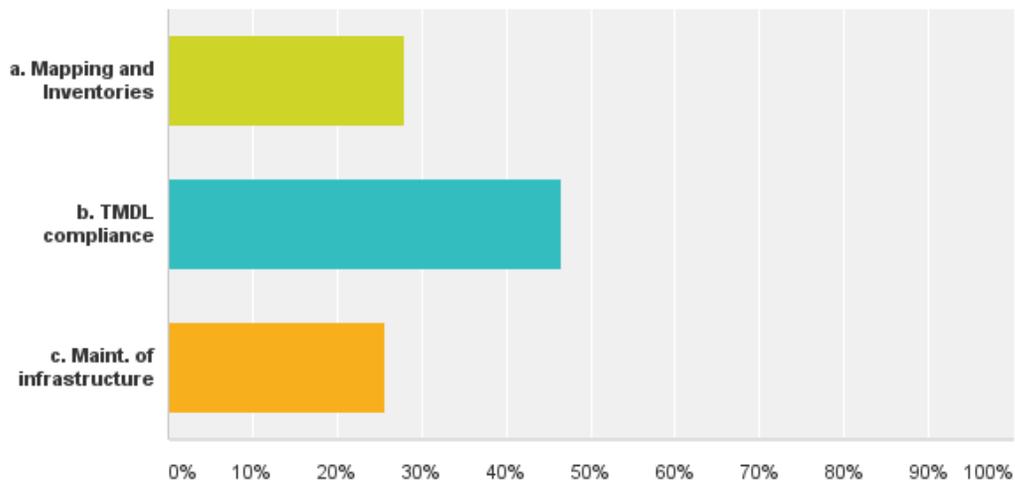
Answered: 51 Skipped: 1



Note: percentages are based on the total number of respondents answering each question.

Q3 What do you think will be the largest cost component?

Answered: 43 Skipped: 9



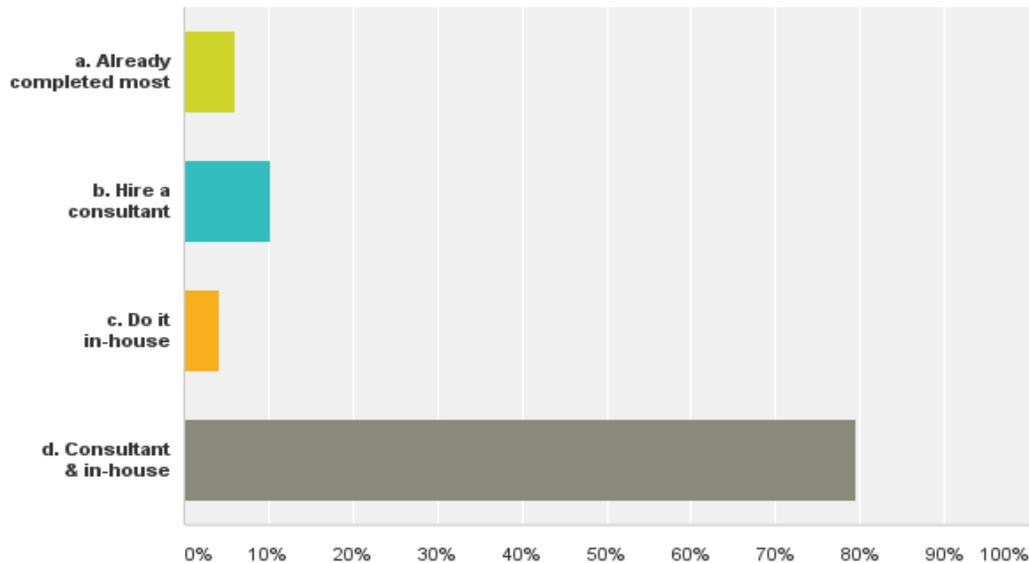
Note: percentages are based on the total number of respondents answering each question.

MS4 Survey Results – White Paper

Question: What resources do respondents plan to use to comply with the final permit when released?

Q4 How do you plan to comply with the new rules when they become final?

Answered: 49 Skipped: 3



Note: percentages are based on the total number of respondents answering each question.

Question: How do respondents plan to pay for their storm water program?

One of the challenges communities will face is how to pay for their storm water program to comply with the new permit. When asked what their plans were (refer to Q5), most respondents (50%) indicated they were planning to have a dedicated storm water account within their municipal budget to pay for their program, 26% had no idea how they were going to pay for their program at this time and 14% were planning on using in-house resources under their existing budget to pay for their programs. Only 6% were considering a State Revolving Fund (SRF) loan or developing a storm water fee to pay for their programs.

The Clean Water SRF provides low-cost financing that can be used for planning and construction projects, such as the development and implementation of storm water management programs that comply with the MS4 permit requirements. These loans can be used to develop written plans required under the MS4 permit (i.e., storm water management plan, IDDE plan, O&M plans, SWPPPs, PCPs, WQRPs), mapping of storm water infrastructure, outfall and catchment inspections and sampling, development of public education materials, development of regulations, essentially any of the requirements under the MS4 permit. They can also be used to evaluate and develop a storm water fee for communities interested in a long-term funding mechanism for ongoing maintenance and compliance.

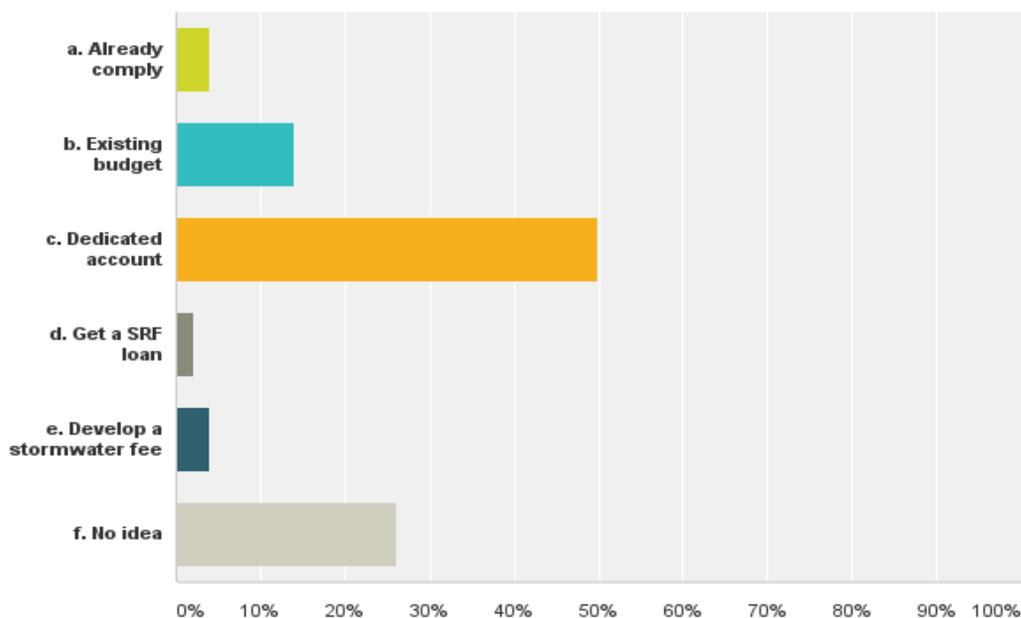
MS4 Survey Results – White Paper

The SRF application process involves initial submission of a Project Evaluation Form (PEF), usually in the summer of each year for Massachusetts. After evaluating the PEFs, DEP will publish an Intended Use Plan (IUP) typically by the following January, which identifies applicants selected for SRF funding. Those identified on the IUP are required to submit final application documentation to receive funding. SRF funding is also available to New Hampshire MS4s, however, has not yet been used for this purpose.

Most MS4s (~80%) plan on using a combination of in-house resources and outside consulting services to complete the work. A few respondents (~6%) indicated they have already completed most of the work required under the new permit.

Q5 How do you plan to pay for your stormwater program once the new rules become final?

Answered: 50 Skipped: 2



Note: percentages are based on the total number of respondents answering each question.

Notes:

- Already comply – only maintenance costs are anticipated
- Existing budget – anticipate implementing the storm water program with dedicated or new staff under existing budget
- Dedicated account – Incorporate into municipal budget as dedicated account
- Get a SRF loan – Apply for a State Revolving Fund (SRF) loan
- Develop a storm water fee – set up and charge residents and businesses a separate fee that will be dedicated to the implementation of the storm water program

MS4 Survey Results – White Paper

CEI is happy to assist you with development, implementation and compliance for any of the above written plans. Whether you need to determine facility applicability, update an existing plan, develop a new plan, or require assistance with training or sampling, we can work as an extension of your staff to provide the level of assistance you need. Should you have any questions, please feel free to contact me at 800-725-2550 x301, or epannetier@ceiengineers.com, Rebecca Balke, P.E., at x308, or rbalke@ceiengineers.com, or Nick Cristofori, P.E., x303, or ncristofori@ceiengineers.com.