

Georgia Environmental Protection Division

Guidance Document

Notice of Intent & Storm Water  
Management Program Preparation



November 2002

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## **Chapter One** **Background Information**

The Federal Phase II Stormwater regulations, 40 CFR Part 122.33, require an operator of a small municipal separate storm sewer system (MS4) to apply for coverage under an NPDES permit for discharges from its storm sewer system. In Georgia, a general NPDES permit will be used for all small MS4s. A general permit includes requirements that apply to all permittees, as opposed to an individual permit, which is tailored to a specific permittee. To apply for a general NPDES permit, a permittee must file a Notice of Intent (NOI) to be covered under the permit. The Georgia Environmental Protection Division (EPD) has developed a NOI form for use by small MS4s, called a Georgia Notice of Intent (GaNOI). Any small MS4 applying for coverage under the general NPDES permit must return this completed GaNOI form to EPD by March 10, 2003.

The regulations require that you develop, implement and enforce a Storm Water Management Program (SWMP) designed to reduce the discharge of pollutants from your MS4 to the "Maximum Extent Practicable" to protect water quality. The MS4 will not be required to treat storm water to comply with numerical discharge standards. Instead, you will be required to implement best management practices (BMPs), which reduce pollutants prior to their discharge into the storm sewer system.

The SWMP will consist of 6 minimum control measures. These measures are as follows:

- Public education and outreach on storm water impacts;
- Public involvement/ participation;
- Illicit discharge detection and elimination;
- Construction site storm water runoff control;
- Post-construction storm water management in new development and redevelopment; and
- Pollution prevention/ good housekeeping for municipal operations.

For each of the 6 minimum control measures, you will need to select BMPs and set measurable goals. The steps the MS4 should undertake to select BMPs and set measurable goals will be discussed in future chapters. EPD has written the GaNOI form so that when the MS4 completes the form, it has also completed development of a SWMP.

## **Chapter Two** **Identifying Water Quality Problems**

In order to develop a SWMP, the first step must be to identify water quality problems within your jurisdiction. For example, has the MS4 noted an increase of debris in the stream after a rain event? Have there been reports by local citizens of an oil sheen on a local stream? Has the MS4 received complaints from citizens that residential ponds are filling up with sediment? The potential problems in your area may be numerous and diverse. You may not be aware of all the problems. However, a starting point for identifying the problems is to look at any existing data. Your MS4 may have other data sources available, so the following list of sources is intended as an example only:

- Check the 303(d) list of impaired State waters to see if any stream segments within your jurisdiction are included (available from Georgia EPD or at [www.state.ga.us/dnr/environ](http://www.state.ga.us/dnr/environ));
- Review any existing watershed assessment reports (possibly developed due to a wastewater treatment plant expansion);
- Review any existing stream monitoring data; and
- Review any existing source water/ well head protection plan.

Another method for identifying water quality problems within your area is to talk to people who may be in a position to have noticed a problem:

- Citizen complaints;
- Municipal employee observations; and
- Volunteer organizations (Adopt-A-Stream groups, Clean & Beautiful groups, etc).

You may want to identify possible sources of pollution within your jurisdiction. When developing your storm water management program, it may benefit you to address possible pollutants generated at these sources. For example, you may want to consider the following potential sources of pollution:

- Commercial and retail parking lots;
- Gasoline/service stations;
- Businesses with drive-through windows;

- Car washes; and
- Industrial areas.

Finally, it may not be only known problems that you consider during development of the storm water management program. You may have a valuable resource within your jurisdiction that it is your goal to protect, such as a drinking water source, a recreational area, or a trout stream.

Once you have identified the water quality problems or valuable resources within your jurisdiction, you are ready to begin selecting appropriate BMPs and setting attainable measurable goals.

### **Chapter Three** **Best Management Practices (BMPs)**

A BMP can be structural or non-structural. Examples of structural BMPs are detention basins or vegetated swales. A non-structural BMP can consist of a program or procedure, such as a household hazardous waste recycling program, erosion control program, or a street cleaning program. Because structural BMPs can be costly and are not always a suitable solution to correcting a water quality problem, the City should explore all the possible non-structural BMPs before deciding on a structural BMP.

EPA has created a “menu” of BMPs. This BMP menu list includes multiple BMPs for each of the 6 minimum control measures. The menu of BMPs can be found at [www.epa.gov/npdes/menuofbmps](http://www.epa.gov/npdes/menuofbmps). EPA tried to fully evaluate each of the BMPs and provide information on the effectiveness of the BMP, the implementation cost and other useful information. After reviewing the list of BMPs, the MS4 may find that they are already implementing some of the BMPs. If not, the MS4 should be able to review the list and choose those BMPs which would appear to work for their situation. The MS4 should realize that the menu of BMPs is just a guidance document. The MS4 is free to be creative and develop their own BMPs.

In August 2001, a guidance document titled “Georgia Stormwater Management Manual (Volumes 1 and 2) was completed. If the MS4 determines that a structural BMP is required, then EPD recommends the use of this guidance document during the design of the structural control device. If a structural BMP will be constructed, then the MS4 should develop a schedule for maintaining the structure. By not maintaining a structure, the MS4 may appear to save money. However, the effectiveness of the BMP may be reduced. The MS4 would then need to implement additional BMPs to address the problem, which may result in the MS4 spending additional money. So, it is very important that the MS4 include a maintenance schedule during the development of any structural BMP. The schedule could require periodic inspection with maintenance as needed or periodic maintenance, whichever is appropriate. The MS4 should have a system in place which allows the inspection or maintenance schedule to be tracked, either manually or through a computer database.

The number of BMPs chosen for each of the 6 minimum control measures will vary. The MS4 may determine that only one BMP is needed to address a water quality problem. However, the MS4 should not limit themselves to only one BMP if they think a second, third or additional BMPs will prove effective. Also, the number of BMPs needed may depend on the size of a MS4. Due to a larger population, an increased number of pollution sources, and increased impervious surface area, a larger MS4 may have more identified water quality problems. Therefore, a larger MS4 may need to implement more BMPs and develop a more complex SWMP.

The SWMP is meant to be flexible and constantly evolving. The MS4 can try a BMP, determine it is not effective or too costly, and replace it with a new BMP. The

MS4 may identify a new water quality problem several years after the GaNOI was completed. Therefore, the MS4 might need to implement a new or additional BMP at that time. You may also find after you begin to implement a BMP that your measurable goals require revision. When determining the BMP to implement and setting the measurable goal for that BMP, you should develop a rationale. This rationale will detail your decision-making process as to how and why the BMP was chosen and how the measurable goal was set. If you determine a revision is needed to either the BMP or measurable goal, then the reason for the revision should be documented on the rationale.

You may share responsibility with another entity for implementing a minimum control measure or a component of a measure. You must have a written agreement with the other entity clearly stating that they will implement the control measure or a component of the measure on your behalf. You must submit a copy of this agreement to EPD. You will still have to submit a GaNOI form, all annual reports, and any other information that EPD requests. If the other entity does implement a control measure for you, then you will need to explain that in the annual report. In addition, you will need to either provide a summary of the other entity's activities on your behalf, or have the other entity prepare a summary of its activities and you submit a copy of their summary with your annual report.

For example, you are a Phase II City. The County has agreed to implement a public education program for septic tank maintenance on your behalf. You will need to have a written agreement with the County and submit a copy of the agreement to EPD. When it comes time to prepare the annual report, you need to explain that the County has performed this task on your behalf and provide a summary of what activities they undertook during the reporting year (e.g. created a brochure, distributed 200 brochures throughout the County, held two training seminars). You can write the summary of what the County did, or they can prepare a summary and you can submit it with your annual report. These steps will need to be taken whether you enter into an agreement with another governmental agency, a volunteer organization (Clean & Beautiful, Adopt-A-Stream, scout troop, environmental group, etc), or an educational institute (e.g. local university).

You need to be aware that there is liability involved by allowing another entity to implement a control measure or component on your behalf. If the other entity agrees to implement the measure, but fails to perform the task, you may be liable for EPD enforcement action. Therefore, it is very important that you have a close working relationship with the other entity before entering into the agreement.

As previously explained, you may try a BMP, determine it is not suited to your needs and try another BMP. The only stipulation is that you notify EPD in writing at least 30 days prior to making a substantial change to the SWMP. You do not have to receive EPD approval for the SWMP revision or revised BMP. However, EPD would like to be informed so we can provide guidance if needed. For example, you may decide that a regional detention basin is the solution to your problem. If you notify EPD

of your decision during the initial planning stages, then we may be able to suggest another less expensive alternative, before you spend large sums of money.

You may spend the first four years (2003-2006) of the general NPDES permit term in fine-tuning your SWMP. You are expected to evaluate your BMP options and begin implementing those BMPs that are not complex or time-consuming as soon as possible. Some BMPs, such as those requiring construction or ordinance revision, will take longer to implement. However, by December 9, 2006, the MS4 must have developed and begun implementing a complete SWMP that addresses all of the 6 minimum control measures. The SWMP may still be revised as needed; however, the revisions should happen less frequently than during the four year trial period.

## **Chapter Four** **Measurable Goals**

Once you determine which BMPs you will use to address the identified problems, then you must set a measurable goal for each BMP. Measurable goals allow you to track the effectiveness of each BMP and the overall progress of your SWMP. You should review any existing BMPs the MS4 may already be implementing. If you determine the BMP should be retained, then you need to set a measurable goal for that BMP. Also, each newly proposed BMP will need to have a corresponding measurable goal. Following is some general information on how to set measurable goals. In subsequent chapters dealing with each of the 6 minimum control measures, more specific information tailored to the possible goals for that control measure will be discussed.

When setting a measurable goal, the MS4 needs to establish an implementation schedule. The schedule can be written in one of two ways. The first method is for those BMPs that will take time to implement (e.g. construction of a control structure, mapping the storm sewer system). For this type of BMP, the implementation schedule needs to include a start date, interim milestone dates, and a date for completion.

The second type of BMP will require an implementation schedule that either tracks how often a BMP is performed (e.g. conducting an annual workshop for construction site operators) or the total number of BMPs implemented (e.g. number of retention basins constructed during permit term).

The MS4 will need to establish a method to track the implementation schedule and determine when the goal is achieved. You may develop a database which allows tracking of milestone dates and/or activities, or choose some other tracking method. This information will be useful when the MS4 is compiling an annual report for submittal to EPD.

Once you have established the measurable goal and implementation schedule for each BMP, you will need to have procedures in place for evaluating the effectiveness of the BMP and if the goal is being achieved. In order to do this, you will need to establish a baseline condition and compare it against a quantifiable target. Establishing the baseline condition can consist of something as simple as photographing a stream segment, which shows the condition of the stream at a given time. Photographs are inexpensive, easy to do, and are easily understood. You may decide to document a baseline condition using another method, such as stream monitoring to establish a water quality baseline. You can set a baseline based on the number of BMPs in existence (e.g. the number of existing detention basins). Other methods of establishing baselines are also available and the MS4 should explore all possible options.

In order to determine if the BMP is being effective, the MS4 will need to establish a quantifiable target to compare against the baseline condition. For example, stream monitoring may show an improvement in water quality since the baseline monitoring was performed. The MS4 may have had 3 existing retention basins and now has completed construction of 4 additional basins for a total of 7 basins. The MS4 may have determined a control structure required modification in order to increase pollutant removal and the amount of increased pollutant removal efficiency can be quantified to show the BMP is being effective.

EPA has developed a guidance document for measurable goals that can be found at [www.epa.gov/npdes/stormwater/measurablegoals](http://www.epa.gov/npdes/stormwater/measurablegoals). As part of this guidance, they list the following 26 indicators that can be used to evaluate the effectiveness of a BMP.

<b>Category</b>	<b>Number</b>	<b>Indicator Name</b>
Water Quality Indicators	1	Water quality pollutant constituent monitoring
	2	Toxicity testing
	3	Loadings
	4	Exceedance frequencies of water quality standards
	5	Sediment contamination
	6	Human health criteria
Physical and Hydrological Indicators	7	Stream widening/ downcutting
	8	Physical habitat monitoring
	9	Impacted dry weather flows
	10	Increased flooding frequency
	11	Stream temperature monitoring
Biological Indicators	12	Fish assemblage
	13	Macroinvertebrate assemblage
	14	Single species indicator
	15	Composite indicator
	16	Other biological indicators
Social Indicators	17	Public attitude surveys
	18	Industrial/commercial pollution prevention
	19	Public involvement and monitoring
	20	User perception
Programmatic Indicators	21	Number of illicit connections identified/corrected
	22	Number of BMPs installed, inspected, maintained
	23	Permitting and compliance
	24	Growth and development
Site Indicators	25	BMP performance monitoring
	26	Industrial site compliance monitoring

Each chapter for the 6 minimum control measures will include more specific information on setting measurable goals and evaluating their effectiveness.

**Chapter Five**  
**First Minimum Control Measure**  
**Public Education and Outreach on Stormwater Impacts**

Regulatory Requirement, 40 CFR Part 122.34(b)(1):

You must implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impact of stormwater discharges on water bodies and the steps that the public can take to reduce pollutants in stormwater runoff.

Guidance:

As explained in Chapter 2, the first step you need to take is to identify the water problem areas in your community. This will allow you to determine who your “target audience” will be. Following are two examples to show you how the process should occur.

Example #1:

Employees of the water and sewer department have noticed an increased algae growth on a local lake. They have inspected all the sewer lines in the area and determined that there are no lines leaking sanitary sewage to the lake. The local health department has received numerous complaints of leaking septic tanks within the past 6 months. Therefore, it would benefit your community to target your public education program towards homeowners on the importance of maintaining their septic tank systems.

Example #2:

You have received complaints from local citizens of an oil sheen on a local stream. This could indicate the improper disposal of motor oil either from a resident or an automotive repair facility. If the stream is located in a residential area, you will want to target your educational program towards the proper disposal of used oil by citizens, including possibly providing an acceptable disposal location. If the stream is located in a commercialized business district, then you would want to develop educational materials more tailored to business types, such as automotive repair facilities or auto part stores.

These two scenarios are just examples in order to describe the process you should go through to identify the water quality problem within your jurisdiction and the potential target audience. Some other potential audiences to consider when developing your SWMP include:

- Subdivision homeowner associations;
- Community groups;
- Minority organizations;
- School children;
- Commercial businesses (e.g. restaurants, landscapers, auto repair facilities); and
- Industries.

During the development of your public education program, you will also need to determine the type of educational materials you will use. You should ensure you choose materials that will adequately convey your message to the largest available audience. You want to try to use the most effective means for conveying your message at the least amount of cost (i.e. the most bang for your buck).

You can use print materials (e.g. brochures, utility bill inserts) or the media (newspaper, radio, television). You will need to determine the best method to disseminate your message depending on your budget. You may use existing educational materials from EPA or other organizations or you may create your own. If possible, you should try to involve individuals and civic groups (e.g. Adopt-A-Stream, Clean & Beautiful) in educating other members of the public, such as through storm drain stenciling programs or stream clean-up events.

After determining the water quality problems in your area and your target audience, then you need to select potential BMPs. EPA has provided numerous examples of BMPs in their “menu of BMPs”. They have suggested BMPs for educating homeowners, commercial businesses, and various specific communities. It is recommended that you review these potential BMPs to determine if any will work for your community. You may also be creative and develop your own BMPs.

The final step is to establish a measurable goal for each BMP. The goal should be specific for each BMP. For example, to address the problem of algal blooms on the lake, you decided the appropriate BMP is to educate homeowners on the importance of septic tank maintenance. You have decided to develop and distribute an informational brochure. Your measurable goal for this BMP will be to complete development of the brochure within 6 months and distribute the brochure to 500 homeowners within 2 years of development.

EPA has developed a list of parameters the MS4 can use when establishing the measurable goals for the Public Outreach and Education minimum control measure (Measurable Goals Guidance for Phase II Small MS4s, pages 36-38). We have reiterated them in Table 1 for your convenience.

**Table 1**  
**Measurable Parameters**  
**Public Outreach and Education**

Classroom Education on Storm Water

- The number of educational materials distributed to schools.
- The number of classes, schools, or students that participate in municipal-sponsored storm water workshops or activities.
- The number of workshops held for teachers on storm water education.
- The number of certificates or other rewards given out for classes/students who participate in storm water education.
- The number of students receiving storm water education as a regular part of the school curriculum.
- The number of students receiving storm water education as part of after-school programs.

Education/Outreach for Commercial Activities

- The number of educational materials that were distributed to business owners and operators.
- The number of certified businesses that participated in training for a “green certification” program.
- The number of businesses trained under a training program.

Educational Displays, Pamphlets, Booklets, and Utility Stuffers

- List compiled of target audiences and possible activities for each.
- The number of materials created and distributed.
- The number of events attended with displays.
- The number of people at an event who saw the display (guest book) or took a pamphlet/booklet.

Lawn and Garden Activities

- The number of partnerships established with local lawn care businesses.
- The number of partnerships established with lawn care suppliers/retail stores.
- The number of municipal employees trained in proper lawn care practices.
- The number of homeowners that attend training workshops for lawn/garden care BMPs.
- A survey of homeowners about their lawn care behavior before and after message is delivered.
- Fertilizer and pesticide residues in runoff.
- The number of requests for soil testing.

### Low Impact Development

- The number of meetings held to educate citizens and developers about low impact development.
- The percentage of land use codes reviewed to ensure consistency with low impact development principles and practices.
- The number of new site plans that incorporate low impact development principles & practices.
- The number of municipal-owned facilities that are retrofitted with low impact development practices.

### Pet Waste Management

- Whether or not a pet waste ordinance was developed.
- The number of “clean up after your pet” signs posted in parks or neighborhoods.
- The number of dog-walking designated areas in parks.
- Nutrient and bacteria levels in runoff.
- The number of citations given under an enforcement program.
- The number of posters/brochures put up in pet supply stores.
- The number of educational materials given out to pet owners.

### Promotional Giveaways

- The number of items given out.
- The number of events attended (to give out items).
- The number of partnerships with radio and TV stations for promotions.

### Proper Disposal of Household Hazardous Wastes

- The pounds of household hazardous waste collected on amnesty days.
- The number of pickup days per year.
- The number of educational materials distributed to homeowners.
- The number of partnerships established with businesses.
- The number of curbside pickup days.
- Toxic chemical levels in receiving waters.

### Tailoring Outreach Programs to Minority and Disadvantaged Communities and Children

- The number of brochures/posters created in non-English languages.
- The number of partnerships established with minority organizations.
- Attendance at workshops or public meetings held in low-income or minority neighborhoods.
- The number of educational materials distributed to low-income neighborhoods.

### Trash Management

- The mass of trash removed from conveyance systems and receiving waters during cleanup campaigns.
- The number of structural trash controls installed.
- Floatables in receiving waters.
- Track the number of additional trash bins installed and signage posted.
- Whether or not a litter ordinance was established.

### Using the Media

- The number of public service announcements made on radio and TV.
- The number of storm-water-related press releases.
- The number of storm-water-related articles published.

### Water Conservation Practices for Homeowners

- The number of partnerships established with local water utilities.
- The number of water conservation utility inserts that are distributed with utility bills.
- A survey of homeowners about their water conservation behavior before and after the message is delivered.

**Chapter Six**  
**Second Minimum Control Measure**  
**Public Involvement/ Participation**

Regulatory Requirement, 40 CFR Part 122.34(b)(2):

You must, at a minimum, comply with State and local public notice requirements when implementing a public involvement/ participation program.

Guidance:

It is recommended that you involve citizens from your community in both the development and the implementation of the SWMP. If possible, you should try to engage all economic and ethnic groups. By involving the citizens in the decision-making process, you have the potential to garner more support for various aspects of the program, including funding. Also, you may be able to use volunteer labor to implement some of your SWMP BMPs, as opposed to MS4 employees performing the tasks.

During the SWMP development, you might involve the public by holding meetings with stakeholders in the community. The meetings would serve as a forum where the stakeholders can express their concerns regarding local stormwater issues. The citizens may be able to provide ideas on how to improve any existing stormwater BMPs. Also, after the program is drafted, you may want to hold public meetings to educate the public on the proposed program. The public will be able to provide feedback during the meetings and you may gain support for the proposed program.

After the SWMP development is complete, you may involve the public in the implementation of the program. The involvement may consist of periodic meetings with stakeholders to discuss the program's progress in addressing stormwater issues. The involvement may be more of a "hands-on" approach. Stakeholder groups may participate through such things as stream clean-ups, road clean-ups, or storm drain stenciling programs. Also, community groups or citizens may participate in the SWMP implementation by performing periodic monitoring of a water body.

Example #1

During the SWMP development, the MS4 creates a panel of citizens taken from several sectors of the community (e.g. commercial businesses, industries, homeowners, environmental groups). The MS4 holds sessions with the citizen panel to allow an exchange of ideas on what water quality problems they perceive exist in the community and what the goals of the SWMP should be.

### Example #2

You can also involve the public in implementation of the SWMP. An area stream contains a large amount of litter and the water quality is noticeably degraded. The MS4 forms a partnership with a local citizen group (e.g. civic organizations, elementary school class, scout troop) to perform periodic stream clean-ups and basic water quality monitoring.

As discussed in Chapter 4, Public Education and Outreach, it is important to identify your “target audience”. This will allow you to determine which civic or community groups the MS4 can potentially involve in the development and implementation of the SWMP. You may want to consider the following stakeholder groups:

- Commercial and industrial businesses;
- Trade associations;
- Environmental groups;
- Homeowner associations; and
- Educational groups.

Once you have identified the target audience, you must select BMPs and set a measurable goal for each BMP. Suggested BMPs can be found in EPA’s “menu of BMPs” or you may develop your own. As previously explained, the measurable goal must be a quantifiable target. For example, you determine a BMP will be to involve the public in implementation of the SWMP by entering into an Adopt-A-Stream (AAS) partnership with the local Kiwanis club. Your measurable goal for the BMP is how many Kiwanis club members participate in the AAS each year and/or how many miles of stream the members will clean up each year.

EPA has developed a list of parameters the MS4 can use when establishing the measurable goals for the Public Involvement/ Participation minimum control measure (Measurable Goals Guidance for Phase II Small MS4s, pages 39-40). We have reiterated these parameters in Table 2 for your convenience.

**Table 2**  
**Measurable Parameters**  
**Public Involvement/ Participation**

Adopt-A-Stream Programs

- Track the number of participants in Adopt-A-Stream programs.
- Water quality at Adopt-A-Stream sites.
- The quantity of trash and debris removed by Adopt-A-Stream volunteers.

Attitude Surveys

- The number of citizens solicited to complete surveys.
- The number of completed surveys.
- A survey of citizens gauging change in attitude/behavior after storm water education activities are held.

Community Hotlines

- The number of hotlines established to handle stormwater related concerns.
- The number of calls received by hotlines.
- The number of problems/incidents remedied as a result of hotline calls.

Reforestation Programs

- The number of volunteer tree planters.
- The number of trees planted.
- The number of acres planted with trees.

Stakeholder Meetings

- The number of meetings held.
- The number of attendees.
- The number of actions taken as a result of stakeholder meetings.

Storm Drain Stenciling

- The number of drains or proportion of drains stenciled.
- The number of stenciling volunteers.
- Changes in water quality at outfalls of stenciled areas.

Stream Clean-up and Monitoring

- The number of stream clean-ups.

- The number of clean-up participants.
- The quantity of waste collected as a result of clean-up efforts.
- The number of stream miles cleaned.
- Water quality at the stream clean-up sites.

#### Volunteer Monitoring

- The number of volunteers participating in monitoring programs.
- The frequency of monitoring in the watershed.
- The number of volunteer monitoring stations established in the watershed.
- The number of volunteer monitoring training sessions held.
- The number of actions that were taken as a result of the monitoring data collected by volunteers.

#### Watershed Organization

- Whether or not a watershed organization was established.
- The number of participants in the watershed organization.
- The number of actions taken as a result of the watershed organization.

#### Wetland Plantings

- The acres of land planted.
- The number of volunteers that participated in planting.
- The number of planting events held.

**Chapter Seven**  
**Third Minimum Control Measure**  
**Illicit Discharge Detection and Elimination**

Regulatory Requirement, 40 CFR Part 122.34(b)(3):

You must develop, implement and enforce a program to detect and eliminate illicit discharges into you small MS4.

- A. You must develop, if not already completed, a storm sewer system map, showing the location of all outfalls and names and locations of all waters of the State that receive discharges from those outfalls.
- B. You must, to the extent allowable under State or local law, effectively prohibit through ordinance, non-storm water discharges into your storm sewer system and implement appropriate enforcement procedures and actions.
- C. You must, develop and implement a plan to detect and address non-storm water discharges, including illegal dumping, to your system.
- D. You must inform public employees, businesses, and the general public of hazards associated with illegal discharges or improper disposal of waste.

You need to address the following categories of non-storm water discharges or flows (i.e. illicit discharges) only if you identify them as significant contributors of pollutants to your small MS4:

- Water line flushing;
- Landscape irrigation;
- Diverted stream flows;
- Rising ground waters;
- Uncontaminated ground water infiltration;
- Uncontaminated pumped ground water;
- Discharges from potable water sources;
- Foundation drains;
- Air conditioning condensation;
- Irrigation water;
- Springs;
- Water from crawl space pumps;
- Footing drains;
- Lawn watering;
- Individual residential car washing;
- Flows from riparian habitats and wetlands;

- Dechlorinated swimming pool discharges; and
- Street wash water.

## Guidance

The first requirement is that you develop a storm sewer system map, showing all outfalls and waters of the State that receive discharges from these outfalls. The complexity of your system will determine the type of map you develop. For a larger storm sewer system, you may be able to develop a map showing your jurisdictional boundaries, with areas color-coded to show the land use (e.g. agricultural, industrial, residential). You could then add the receiving waters, the storm sewer system conveyances, and the outfalls to this map. However, not every MS4 will have the equipment (i.e. GIS), capabilities, or funds to create this complex a map. In those cases, the MS4 should use whatever method works for them. For example, you may be able to take a topographical or road map, draw in any receiving waters, storm sewer lines and outfalls. In some cases, where only a few outfalls exist in a very small municipality, even a hand-drawn map may be sufficient. You should be aware that the purpose of the map is to aid you in the future detection and elimination of illicit discharges to your MS4 and not just a “busy work” exercise to comply with the regulations. Therefore, it is important that you create the best map you can with the resources you have available.

Once the storm sewer system is mapped, you should ensure procedures are in place to update the map. If new areas of your jurisdiction undergo development, then new storm sewer lines and outfalls may be created. The MS4 should ensure that an inventory of new lines and outfalls is maintained and that the map is periodically updated.

After the mapping is completed, then you should identify high priority areas that are likely to have illicit discharges. The MS4 may want to concentrate on older sections of the municipality, since these areas tend to have failing infrastructures and have historically had more lax building codes. The MS4 may also be aware of an area of the system that has had numerous problems in the past. To detect illicit discharges in these problem areas, the MS4 might consider establishing a program to periodically walk the area streams and look for dry weather flows from storm sewer outfalls. Local organizations, such as Adopt-A-Stream participants, could possibly conduct this task for the MS4.

You may want to consider field screening of any dry weather discharges to see if they are naturally occurring, (e.g. spring) or an illicit connection. The first step in the field screening process should be to note any unusual odor (e.g. sewage, petroleum, industrial), color, or the presence of an oil sheen. If unusual characteristics are noted, then you may want to proceed with field testing. You may test for any parameters that you feel will allow you to identify the source of the flow. Some suggested parameters include chlorine, surfactants, pH, and conductivity. If your field observation notes any unusual odor or color or the field testing shows unusual levels of any parameters, then

you may determine additional testing is required. If you suspect a discharge of sewage, then you may want to collect a sample to test for fecal coliform bacteria. If you note an oil sheen, then you may want to test for total petroleum hydrocarbons (TPH). You should use common sense when deciding if additional testing is warranted and what analyses to conduct.

Once you establish how you will identify the presence of any potential illicit discharges, then you need to have procedures in place for tracing the source. Your program may consist of walking the storm sewer line and looking for potential upstream sources. You may have to use more elaborate detection procedures, such as dye testing, smoke testing or videotaping the line.

The detection procedures may be effective for locating an illicit connection; however, they will not help the MS4 in identifying illegal dumping into the storm sewer system. If you have evaluated all potential illicit connections and determined the only source of the pollutant can be from illegal dumping, then you will need to handle this situation differently. The dumping may be occurring as a result of ignorance and the MS4 may want to escalate their educational activities in the area (e.g. homeowners dumping yard waste, used oil, or antifreeze down the storm drain). The dumping may be occurring purposely, such as from an industrial source. In such cases, the MS4 will have to use its enforcement capabilities to stop the dumping. Also, the MS4 might want to institute a citizen hotline, where the public can notify the MS4 of any observed illegal dumping.

The MS4 will need an ordinance which prohibits illicit discharges, gives the MS4 the right to enter the property, the authority to require the illicit connections to be removed, and allows enforcement against an ordinance violator. Examples of model ordinances can be found at EPA's website: [www.epa.gov/owow/nps/ordinance](http://www.epa.gov/owow/nps/ordinance). Once the ordinance authority exists, then the MS4 will need procedures in place for ensuring illicit discharges are eliminated. The procedures should clarify whose responsibility it is to ensure the discharge ceases. For example, if you conduct field testing and determine the discharge is composed of sanitary sewage, then the procedure may be that you notify the municipal water and sewer department. If it is your responsibility to ensure the discharge is eliminated, then the procedures need to specify what steps you will take to ensure the discharge ceases, the time frame for completing the task, the corrective action to be taken, any follow-up inspection, etc.

#### Example #1

During a stream walk, you notice flow coming from an outfall. You visually observe an oil sheen and odor to the discharge. You follow the storm sewer line upstream and find an area of commercial businesses. One of the businesses is an automotive repair facility. An inspection of the facility reveals the owner is periodically washing down the parking and repair area, which results in the washwater flowing into the storm drain. You inform the owner of the ordinance requirements and potential enforcement action if the practice does not cease.

### Example #2

The MS4 has formed an Adopt-A-Stream partnership with the local Boy Scout troop. During a stream clean-up event, one of the scouts notices flow coming from an outfall. Knowing that it hasn't rained in several weeks, the scout notifies the MS4 representative. You notice the discharge has a strong sewage odor and is gray in color. You proceed to conduct a field test of the discharge for pH, conductivity, chlorine and surfactants. You decide to take a sample for fecal coliform bacteria analysis. The laboratory results indicate a high fecal coliform bacteria count. Following the MS4s written procedures, you notify the municipal water and sewer department. They locate and repair a sanitary sewer line which has been leaking into your storm sewer system. You re-visit the outfall in a month to ensure the problem has been fully corrected.

Finally, the regulations require that the MS4 have a program in place to educate the municipal employees and the public of problems caused by illicit connections and illegal dumping. The program can include the development and distribution of educational literature. You can establish a program for informing the public how to report any observed dumping, including the establishment of a hotline. You can stencil storm drains to inform residents that anything they pour down the drain flows to the stream. These are just a few examples and the MS4 should consider all possible options.

Once you determine the BMPs you will use to detect and eliminate illicit discharges, then you will need to set a measurable goal for each BMP. EPA has developed a list of parameters the MS4 can use when establishing the measurable goals for the Illicit Discharge Detection and Elimination minimum control measure (Measurable Goal Guidance for Phase II Small MS4s, pages 41-42). We have reiterated these parameters in Table 3 for your convenience.

**Table 3**  
**Measurable Parameters**  
**Illicit Discharge Detection and Elimination**

**Failing Septic Systems**

- The number of regular maintenance and inspection reminders issued to tank owners.
- The number of partnerships formed with private pumping companies.
- Whether or not an inventory of tanks and when they were last serviced was completed.
- The number of field tests and screening conducted.
- The number of post construction inspections conducted to insure proper installation.
- The number of scheduled pump-outs and routine maintenance work conducted.

**Identifying Illicit Connections**

- Inventory conducted and sites prioritized for inspection.
- The number of field tests conducted in high-risk areas.
- Whether or not an ordinance was developed to allow entrance into private buildings for the purpose of conducting tests.
- The number of illicit connections reported by business employees.
- The number of survey responses indicating a possible illicit connection.
- The number of illicit connections repaired/replaced.
- Whether or not an ordinance was developed for mandatory inspection of new buildings.
- The number of new buildings inspected.

**Illegal Dumping**

- The number of flyers, posters, or other public education tools distributed.
- The number of illegal dumps reported by citizens.
- The number of penalties enforced upon the participants of illegal dumps.
- Whether or not an inventory of prime areas for illegal dumping was completed.
- The number of rewards distributed to citizens who reported an illegal dump.
- The number of illegal dump clean-ups completed.

**Industrial/Business Connections**

- The number of dry weather tests completed.
- The number of high-risk connections prioritized.
- The number of codes developed to prohibit connections.
- The number of illicit connections reported by business employees.

- The number of survey responses indicating a possible illicit connection.
- The number of illicit connections found.
- The number of illicit connections repaired/replaced.
- The number of new buildings inspected.
- Whether or not an ordinance was developed for mandatory inspection of new buildings.

### Recreational Sewage

- Whether or not an inventory of high-risk areas was completed.
- The number of pump-out stations installed.
- The amount of wastewater that pump-out stations collect.
- The number of no-discharge areas created.
- The number of new signs added to remind citizens of dumping policies and alternatives.
- The number of enforced cases of recreational dumping.
- The number of citizen complaints made reporting illegal action.
- The change in water quality at marinas.

### Sanitary Sewer Overflows

- The frequency of routine maintenance and cleaning activities.
- The number of overflows reported.
- The number of overflow causes that were identified during inspection.
- The number of sites repaired.
- The number of rainfall gauges installed.
- Whether or not an ordinance was developed to prohibit new and illicit connections.

### Wastewater Connections to the Storm Drain System

- The number of rerouted connections.
- The number of dry weather monitoring activities performed.
- Whether or not an inventory and prioritization of potential connection sites was completed.
- The number of field tests conducted in high-risk areas.
- The number of unwarranted connections reported.
- The number of unwarranted connections found.
- The number of unwarranted connections repaired/replaced.
- Whether or not an ordinance was developed for mandatory inspections of new buildings.
- The number of new buildings inspected.
- Changes in water quality at re-routed outfalls and high risk areas.

**Chapter Eight**  
**Fourth Minimum Control Measure**  
**Construction Site Stormwater Runoff Control**

Regulatory Requirement, 40 CFR Part 122.34(b)(4):

You must develop, implement, and enforce a program to reduce pollutants in any storm water runoff to your small MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of storm water discharges from construction activity disturbing less than one acre must be included in your program if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more.

Your program must include the development and implementation of, at a minimum:

- A. An ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under State or local law;
- B. Requirements for construction site operators to implement appropriate erosion and sediment control best management practices;
- C. Requirements for construction site operators to control waste such as discharged building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality;
- D. Procedures for site plan review which incorporate consideration of potential water quality impacts;
- E. Procedures for receipt and consideration of information submitted by the public; and
- F. Procedures for site inspection and enforcement of control measures.

Guidance

In order to adequately regulate construction activities, the MS4 must have an adopted, comprehensive ordinance. The ordinance must contain requirements to control erosion and sediment (E&S) from construction sites disturbing one acre or more. If the site is less than 1 acre, but is part of a larger development (e.g. subdivision), so that more than 1 acre is disturbed, then the MS4 must regulate this development also. The State Soil and Water Conservation Commission has developed an E&S model ordinance. Under the existing State E&S Act, many MS4s may already have an existing

ordinance which requires E&S controls on sites greater than 1.1 acres. In order to comply with Phase II requirements, the MS4 will need to modify the ordinance to reflect the 1.0 acre disturbed site size. However, there are currently on-going discussions on changes to the State E&S Act. These proposed changes should be resolved in 2003. Therefore, it is recommended that the MS4 not take steps to modify their ordinance until all the E&S issues are resolved.

In addition to requiring the control of E&S at construction sites, you must have the ability to take enforcement for any identified violations. You may also need to include other requirements in the MS4's ordinance. The Federal and State regulations require that your storm water management program require construction site operators to control waste materials on the site, such as discarded building materials, sanitary waste, concrete truck washout, and litter. By including requirements for controlling these waste materials in the ordinance, the MS4 will have the authority to inspect for these items and take any necessary enforcement action.

Other requirements the MS4 may want to consider including in the ordinance are such things as wording allowing right-of-entry for inspection purposes, fee collection, and structural control installation requirements. You could also require construction site operators to submit a storm water pollution prevention plan (SWP3) or Erosion, Sedimentation & Pollution Control Plan (ES&PCP). The submittal of this plan could be in conjunction with the submittal of the site plan. The SWP3 would describe how the site operator will dispose of waste materials, ensure servicing of sanitary waste disposal units (e.g. "porta-potties"), how fuel and chemical staging areas will be contained, etc.

Once the ordinance is complete and adopted, then the MS4 needs to develop procedures for ensuring construction sites comply with the ordinance requirements. Most MS4s probably already have procedures in place for ensuring site plan reviews are conducted and for issuing various types of permits (e.g. land disturbance activity (LDA) permits, building permits, etc.). However, the MS4 should ensure that employees involved in issuing permits verify that the construction site operator has obtained all necessary permits. If the MS4 has been delegated as an "Issuing Authority (IA)", then the operator can obtain the LDA permit from the MS4, for sites greater than 1.1 acres. If the MS4 is not an IA, then the operator should be referred to the State to obtain the permit. For sites disturbing greater than 1.0 acre, the operator will also need to submit a notice of intent to be covered under the State's General NPDES Permit for Construction Activity.

Once the operator has received approval of the site plans and obtained coverage under the necessary permits, then construction on the site may begin. The MS4 needs to develop inspection procedures. Ideally, an inspection of each site should be conducted at various stages of construction (e.g. start of construction, completion of construction, after storm events). However if the MS4 is experiencing areas of rapid growth and there is a shortage of man-power, then frequent inspections of each site may be impossible. In this case, the MS4 will need to establish priorities for inspecting sites, possibly based on the nature of the construction activity, the site topography, the

characteristics of the soils on the site, and/or the water quality of any receiving streams near the site. The MS4 should ensure that each inspection is documented in some manner, such as through completion of an inspection form.

In addition to inspecting the site for compliance with E&S requirements, the MS4 should inspect any structural controls being installed. In some municipalities, if construction of development amenities (e.g. roads, utilities, etc.) complies with local codes, then the municipality accepts ownership of the amenities. The MS4 may want to consider including residential structural controls in this agreement. Often, when these structures are privately-owned, whether by a resident or a homeowner's association, they are not adequately maintained. If the MS4 assumes ownership, then they can ensure periodic maintenance of the structure occurs. Another option is that ownership of the structural control is privately retained. The private owner would then enter into an agreement with the MS4 for inspection and maintenance services in exchange for paying a fee to the MS4. The inspection/maintenance agreement should become part of the deed of the affected property, so the agreement is binding on all subsequent landowners.

The regulations require that the MS4 have procedures in place for receiving and considering information from the public. The MS4 should make public reporting of problems as easy as possible, whether it is through publication of a telephone number, use of a web site, etc. Once a citizen complaint is received, if the MS4 is an IA, then procedures need to be in place to ensure an employee responds to the complaint. If the MS4 is not an IA, the complaint should be referred to EPD for response. The MS4 may decide that each complaint will be handled through a site visit to verify if a problem exists or the MS4 may respond to each complaint on a case-by-case basis. The MS4 should document any site inspections, findings and requested corrective actions. Also, the MS4 may have to conduct a follow-up to ensure the complaint is resolved and this follow-up action should be documented. For good public relations, it is highly recommended that after the MS4 has resolved the complaint, the citizen be notified of the results of the investigation and any corrective actions taken.

During site inspections and complaint investigations, the MS4 may identify violations of ordinance requirements. In this case, the MS4 will need to proceed with enforcement action. The ordinance should provide the MS4 with the authority to take enforcement and specify what enforcement responses are available. Enforcement options could include such things as monetary fines, non-monetary penalties (e.g. implementation of additional best management practices, stop work orders), bonding requirements, and/or permit denials. Based on the severity of the violation and the enforcement options available, the MS4 will need to determine what level of enforcement is appropriate. It might be useful for the MS4 to develop an "enforcement response guide". This guide would specify what enforcement action should be taken, based on the numbers or types of violations.

### Example #1

A citizen complains that the stream behind his house is red in color. You investigate a construction site upstream from the citizen's house. You document that the construction site operator is not maintaining the best management practices (i.e. the silt fences are laying on the ground, no protection around the storm drain inlet structure). You notify him to immediately correct the violations and you will re-check. The next day, you visit the site and the violations have been corrected, so no additional enforcement action is necessary.

### Example #2

You note red mud running down the street after a storm event. You investigate and find a construction site operator is clearing land for a small subdivision. The operator has obtained the necessary permits, but failed to install the best management practices included in his site plan. You issue a "stop-work order" until the E&S controls are installed.

Some ordinance violations will be the result of ignorance of the ordinance requirements on the part of the construction site operators. Therefore, the MS4 should consider providing periodic training to the operators and/or site workers. You can provide informal on-site education during inspection of the site. You can also develop a more formal training program. The training could cover such things as the proper selection, installation, and inspection and maintenance of best management practices and good housekeeping practices on the site. The State Soil & Water Conservation Commission provides periodic training for operators, workers, and even design engineers, of which the MS4 may want to take advantage.

We have addressed the need for the following: a comprehensive ordinance; permitting, inspection and enforcement procedures; complaint response procedures; and construction site operator training. Once you determine the BMPs you will use to put these procedures in place, you need to set a measurable goal for each BMP. EPA has developed a list of parameters the MS4 can use when establishing the measurable goals for the Construction Site Storm Water Runoff Control minimum control measure (Measurable Goal Guidance for Phase II Small MS4s, pages 43-47). We have reiterated these parameters in Table 4 for your convenience.

**Table 4**  
**Measurable Parameters**  
**Construction Site Storm Water Runoff Control**

**BMP Inspection and Maintenance**

- The frequency of inspection and maintenance of BMPs.
- The number of failed storm water BMPs.
- The number of BMPs reported to be in need of repair.
- Whether or not an inventory of inspection and maintenance activities was created and is regularly maintained.

**Brush Barrier**

- The number of brush barriers installed.
- The number of construction sites with brush barriers.
- The amount of sediment collected brush barriers.
- The frequency of inspection and maintenance of brush barrier installations.
- Suspended solids levels at the site outfall.

**Check Dams**

- The number of check dams installed.
- The number of construction sites that have check dams.
- The reduction in runoff quantity.
- The frequency of inspection and maintenance of check dam installations.
- The amount of sediment collected.
- Suspended solids levels at the site outfall.

**Chemical Stabilization**

- The number of personnel trained to apply chemicals.
- Suspended solids levels at the site outfall.
- The frequency of chemical reapplication.
- The number of construction sites that use chemical stabilization.

**Construction Entrances**

- The frequency of inspection and maintenance of construction entrances.
- The amount of sediment collected at construction entrances.
- Suspended solids levels at the site outfall.
- Whether or not an ordinance was developed that requires special construction entrances.

### Construction Reviewer

- The number of trained inspectors.
- Whether or not an ordinance was developed requiring that sites be inspected.
- The number of inadequate sites/plans reported by inspectors.
- The number on non-compliant permits reported.

### Construction Sequencing

- Whether or not an ordinance was developed that requires construction sequencing.
- The number of construction sites that practice sequencing.
- Suspended solids levels at the site outfall.

### Contractor Certification and Inspector Training

- The number of certified contractors.
- The number of training and certification programs offered.
- Whether or not an ordinance requiring certification was developed.
- Whether or not an incentives program for certified contractors and inspectors was developed.
- The number of certified inspectors.
- The number of sites inspected.
- Changes in water quality at inspected sites.

### Dust Control

- Suspended solids levels at the site outfall or in nearby receiving waters.

### Filter Berms

- The number of filter berms installed.
- The number of construction sites with filter berms.
- The frequency of inspections and maintenance activities.

### Geotextiles

- The number of geotextile installations at construction sites.
- The number of construction sites that use geotextiles.
- The frequency of inspection and maintenance of geotextile installations.
- Suspended solids levels at the site outfall.

### Gradient Terraces

- The number of gradient terrace installations at construction sites.

- The number of construction sites that use gradient terraces.
- The frequency of inspection and maintenance of gradient terraces.
- Suspended solids levels at the site outfall.

### Grass-lined Channels

- The number of grass-lined channels installed.
- The number of construction sites that use grass-lined channels.
- The frequency of inspection and maintenance of grass-lined channels.
- The reduction in runoff quantity.
- Water quality at the site outfall.

### Land Grading

- The number of construction sites that use better land grading practices.
- Suspended solids levels at the site outfall.

### Model Ordinances

- Whether or not an ordinance was developed to address construction site runoff control.
- The number of enforcement actions taken.
- The number of stop work orders given.
- The number of bonding requirements set.

### Mulching

- The amount of exposed soils protected with mulch.
- The number of construction sites that use mulching.
- Suspended solids levels at the site outfall.

### Permanent Diversions

- The number of permanent diversions installed.
- The number of construction sites that use permanent diversions.
- The amount of runoff reduced.
- The frequency of inspection and maintenance of permanent diversions.
- Water quality at the site outfall.

### Permanent Seeding

- The amount of seeded area.
- The number of construction sites that use permanent seeding.
- The frequency of inspection and maintenance of seeded areas.
- Suspended solids levels at the site outfall.

### Preserving Natural Vegetation

- The amount of naturally vegetated land area preserved.
- The number of construction sites that preserve natural vegetation.
- Whether or not an ordinance was developed that requires that some natural vegetation be preserved at construction sites.
- Water quality at the site outfall.

### Riprap

- The number of riprap installations.
- The number of construction sites that use riprap.
- Suspended solids levels at the site outfall.
- The frequency of inspection and maintenance of riprap installations.
- The reduction in runoff velocity.

### Sediment Filters and Sediment Chambers

- The number of sediment filters and chambers installed.
- The number of construction sites that use sediment filters and chambers
- The frequency of inspection and maintenance of sediment filters and chambers.
- Water quality at the site outfall.
- The acreage of disturbed land that drains to sediment filters and chambers.
- The amount of sediment collected in filters and chambers.

### Sediment Traps

- The number of sediment traps installed.
- The number of construction sites that use sediment traps.
- The amount of sediment collected in sediment traps.
- Suspended solids levels at the site outfall.
- The frequency of inspection and maintenance of sediment traps.

### Sediment Basins and Rock Dams

- The number of sediment basins and rock drains installed.
- The number of construction sites that use sediment basins and rock dams.
- The amount of sediment collected in sediment basins.
- Suspended solids levels at the site outfall.
- The frequency of inspection and maintenance of sediment basins and rock drains.

### Silt Fence

- The amount of silt fence installed.
- The number of construction sites that use silt fences.
- The amount of sediment collected by silt fences.
- The frequency of inspection and maintenance of silt fences.
- Suspended solids levels at the site outfall.

#### Sodding

- The amount of disturbed land protected by sod installations.
- The number of construction sites that use sodding.
- The frequency of inspection and maintenance of sod installations.
- Suspended solids levels at the site outfall.

#### Soil Roughing

- The amount of disturbed land protected by soil roughing.
- The number of construction sites that use soil roughing.
- Suspended solids levels at the site outfall.

#### Soil Retention

- The number of soil retaining structures installed.
- The number of construction sites with soil retaining structures.
- Suspended solids levels at the site outfall.
- The frequency of inspections to ensure that no erosion is occurring.

#### Spill Prevention and Control Plan

- The number of reported spills.
- Whether or not an ordinance for storage of high-risk chemicals was developed.
- The number of personnel trained in spill response.

#### Storm Drain Inlet Protection

- The number of storm drain inlets protected.
- The number of construction sites that use storm drain inlet protection.
- The amount of sediment collected.
- Suspended solids levels at the site outfall.
- The frequency of inspection and maintenance of storm drain inlets.

#### Temporary Diversion Dikes

- The number of temporary diversion dikes installed.
- The number of construction sites that use temporary diversion dikes.
- The reduction in runoff quality at the site outfall.

- Suspended solids levels at the site outfall.
- The amount of sediment collected by temporary diversion dikes outfall.

#### Temporary Slope Drain

- The number of temporary slope drains installed.
- The number of construction sites that have temporary slope drains.
- Suspended solids levels at the site outfall.
- The frequency of inspection and maintenance of temporary slope drains.

#### Temporary Stream Crossings

- The number of temporary stream crossings installed.
- The frequency of inspection and maintenance of temporary stream crossings.
- Suspended solids levels at the site.

#### Vegetated Buffer

- The number of vegetated buffers installed.
- The number of construction sites with vegetated buffers.
- Changes in water quality of runoff leaving buffer areas.
- The reduction in runoff quantity.
- The frequency of inspection and maintenance of vegetated buffers.

#### Vehicle Maintenance and Washing Areas

- Water quality at the site outfall.
- Whether or not construction vehicles are regularly inspected.
- The number of vehicle wash areas on-site.
- The number of construction sites with designated vehicle maintenance and washing areas.

#### Wind Fences and Sand Fences

- The number of fences installed.
- The number of construction sites that use fences.
- The frequency of inspection and maintenance of wind and sand fences.
- Suspended solids levels at the site outfall.

**Chapter Nine**  
**Fifth Minimum Control Measure**  
**Post-Construction Storm Water Management**  
**in New Development and Redevelopment**

Regulatory Requirement, 40 CFR Part 122.34(b)(5):

You must develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into your small MS4. Your program must ensure that controls are in place that would prevent or minimize water quality impacts.

You must:

- A. Develop and implement strategies which include a combination of structural and/or non-structural best management practices (BMPs) appropriate for your community;
- B. Use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under State or local law; and
- C. Ensure adequate long-term operation and maintenance of BMPs.

Guidance

The purpose of post-construction storm water management is to minimize water quality impacts and attempt to maintain pre-development conditions. In order to do this, the MS4 should consider post-construction conditions even before construction begins on the site. By considering the impacts at the beginning of a project, the MS4 has greater opportunity to include the practices and/or control structures needed to protect water quality. For example, the MS4 may use this opportunity to require that a temporary structural control, installed during the construction phase, be designed so it can be retrofitted for permanent use in the post-construction phase. As another example, the site design can include more pervious areas (e.g. areas with vegetative cover), which will reduce runoff and allow for groundwater recharge.

The first step should be to evaluate an existing ordinance or develop a new ordinance, if needed. If an ordinance does exist, you want to ensure that runoff is required to be controlled after construction is completed. You also want to make sure that it addresses both new developments and redevelopment of sites. If an existing ordinance does not address these issues, or an ordinance does not exist, then the MS4 will need to create a comprehensive ordinance. An example ordinance can be found at EPA's website: [www.epa.gov/owow/nps/ordinance](http://www.epa.gov/owow/nps/ordinance). You might include such things in

the ordinance as maintaining specified buffers, minimizing impervious surfaces, and minimizing the disturbance of soils and vegetation. You might also want to require structural BMPs under certain conditions.

Structural BMPs include such things as detention ponds, grassed swales, and infiltration basins. It is important that the MS4 regulate the design, installation and construction of these structures. It is recommended that the MS4 require the control structure design to be submitted as part of an E&S control/construction site plan. The Atlanta Regional Commission (ARC), in conjunction with several metro communities, has developed a Storm Water Design Manual, which the MS4 may choose to use. The MS4's ordinance could either refer to this design manual, or other specific design criteria for structural controls. Once the MS4 accepts the structural control design and construction of the control structure begins, the MS4 should conduct periodic inspections to ensure the structure is being constructed as proposed. The MS4 should ensure these inspections are documented and documentation is retained.

The MS4 needs to determine who will own the structure upon completion. If the MS4 will take ownership, then procedures need to be in place to ensure the structure is periodically inspected and maintained. If the structure will be privately owned (e.g. residential, commercial), then the MS4 should have the authority through an ordinance to require the structure to be maintained, require the owner to take corrective action, or take enforcement action against the owner for failure to maintain the structure. One method of ensuring privately-owned structural controls will be maintained is to require the private owner to enter into a "maintenance agreement" with the MS4. The submittal and execution of the agreement can occur during the submittal of the E&S control/construction site plan. The executed agreement becomes part of the property deed and is binding for subsequent landowners.

You can also use non-structural BMPs to control post-construction runoff. Non-structural BMPs include such things as policies, procedures, and practices. For example, the MS4 may direct growth towards less sensitive areas of its jurisdiction (e.g. away from wetland areas) or increase open spaces (e.g. through green space acquisition). A non-structural BMP can include educational programs for various groups, such as developers and the public, on project designs that minimize water quality impacts. The MS4 can also require a reduction in impervious area in order to allow rain filtration and recharge of the groundwater supply.

#### Example #1

There has been a significant amount of development occurring in the southern part of your jurisdiction. This has resulted in an increase in impervious area. You have determined that you will require the installation of grassed swales in place of curbs and gutters in new developments and re-developments. In order to do this, you modify the ordinance to require future developments to comply with the grassed swale installation requirement. In the future, you evaluate a reduction in runoff quantity to document the effectiveness of the BMP.

Example #2

There are numerous detention basins throughout your jurisdiction. However, it is unknown how many actually exist and if they are being properly maintained. You determine an inventory of the detention basins is needed. Once the inventory is complete, then a schedule for regular inspection and maintenance of the structures will be developed.

Once you have determined which BMPs to use, either structural or non-structural, then you need to set a measurable goal for each BMP. EPA has developed a list of parameters the MS4 can use when establishing the measurable goals for the Post-construction Storm Water Management in New Development and Redevelopment minimum control measure (Measurable Goals Guidance for Phase II Small MS4s, pages 48-52). We have reiterated these parameters in Table 5 for your convenience.

**Table 5**  
**Measurable Parameters**  
**Post-Construction Stormwater Management**  
**In New Development and Redevelopment**

Alternative Turnarounds

- The reduction in impervious cover.
- The number of turnarounds modified.
- Whether or not development codes were changed to allow alternative turnarounds.
- The reduction in runoff quantity.
- Changes in the physical characteristics of streams downstream from modified areas.

Alternative Pavers

- Whether or not development codes were changed to allow for alternative pavers.
- The amount of new alternative paver installations added or replaced.
- The number of new development sites that use alternative pavers.
- The reduction in runoff quantity.
- Changes in the physical characteristics of streams downstream from areas with alternative paver installations.

Alum Injection

- Whether or not an inventory of sites where alum injection was used was completed.
- Changes in water quality.
- Changes in biological populations.

Bioretention

- The reduction in impervious cover.
- The reduction in runoff quantity.
- Changes in runoff water quality (nutrients, sediments, metals, organics, etc.)
- The number of new bioretention cells installed (both commercial and residential).
- The number of acres that are drained by bioretention cells.

BMP Inspection and Maintenance

- The frequency of inspection and maintenance activities.
- The number of problems that were identified and remedied.

- The change in the proportion of BMPs that are well-maintained as a result of inspection and maintenance.
- Whether or not an inventory of BMPs requiring maintenance was completed and is regularly updated.
- Changes in water quality of effluent from BMPs.

#### Buffer Zones

- Whether or not development codes were changed to require buffer zones.
- The acreage of land conserved as buffers.
- The acreage of land converted to buffers.
- Changes in water quality of runoff leaving buffer areas.
- Changes in the physical characteristics of streams downstream from areas with buffer zones.
- The frequency of inspections and maintenance activities in buffer zones.
- The acreage that drains to buffer zones.

#### Catch Basin

- Whether or not an inventory of catch basins was completed.
- The number of catch basins retrofitted with filtering devices.
- The quantity of sediment removed from catch basins.

#### Conservation Easements

- The acreage of land conserved under easements.
- Whether or not an inventory of lands that could be conserved with conservation easements was completed.

#### Dry Extended Detention Ponds

- The reduction in runoff quantity.
- Changes in water quality of effluent from the dry pond outlet.
- The number of new dry ponds installed.
- The acreage of land drained by dry ponds.

#### Eliminating Curbs and Gutters

- Whether or not development codes were changed.
- The reduction in runoff quantity.
- The number of new developments without curbs and gutters.
- The number of curb cuts made in existing developments.
- The number of miles of gutterless streets.

#### Grassed Swales

- The number of new grassed swales installed.
- The miles of streets with grassed swales.
- The reduction in runoff quantity.
- The reduction in runoff velocity.
- Change in water quality of runoff from areas with grassed swales.
- The number of acres drained by grassed swales.

#### Grassed Filter Strip

- The number of new grassed filter strips installed.
- The miles of streets with grassed filter strips.
- The reduction in runoff quantity.
- The reduction in runoff velocity,
- Changes in water quality of runoff from areas with grassed filter strips.
- The number of acres drained by grassed filter strips.

#### Green Parking

- Whether or not development codes were changed to allow green parking.
- The number of new green parking lots installed.
- The reduction in runoff quantity.
- The number of impervious acres served by green parking lots.
- The number of impervious lots converted to green lots.

#### In-line Storage

- The reduction in peak flow of runoff.
- The number of basins retrofitted with flow regulators.
- The acreage drained by in-line storage systems.

#### Infiltration Basin

- The reduction in runoff quantity.
- Changes in water quality.
- The number of new infiltration basins installed.
- The acreage drained by infiltration basins.

#### Infiltration Trench

- The reduction in runoff quantity.
- Changes in water quality.
- The number of new infiltration trenches installed.
- The acreage drained by infiltration trenches.

### Infrastructure Planning

- Whether or not development codes were modified.
- The number of new developments using storm water BMPs.
- The reduction in impervious surface area and infrastructure.

### Manufactured Products for Storm Water Inlets

- Whether or not an inventory of areas where installation of manufactured products would be appropriate was completed.
- Whether or not a review was conducted to identify which products would be best for each inlet.
- The number of manufactured products installed in storm water inlets.
- Changes in water quality.

### Narrower Residential Streets

- Whether or not development codes were modified.
- The reduction in impervious surface area.
- The number of new developments that use narrow streets.
- Changes in water quality.

### On-lot Treatment

- The reduction in runoff quantity.
- The reduction in runoff peak flow.
- The number of lots that use on-lot treatment.
- The acreage of impervious surfaces that drain to on-lot treatment BMPs.
- The number of manufactured products sold to store runoff on-site (i.e. rain barrels).
- Changes in water quality downstream from areas that use on-lot treatment.

### Open Space Design

- Whether or not development codes were modified to accommodate open space developments.
- The number of new developments that use open space design principles.
- The number of acres of open space preserved with open space design.

### Ordinances for Post-Construction Runoff

- Whether or not an ordinance was developed to address post-construction runoff.
- The projected amount of impervious cover reduced under the new ordinance.
- The number of enforcement actions that occur as a result of the new ordinance.

### Porous Pavement

- Whether or not development codes were modified to allow for porous pavement.
- The amount of new porous pavement added or replaced.
- The number of new development sites that use porous pavement.
- The reduction in runoff quantity.
- Changes in the physical characteristics of streams downstream from areas with porous pavement installations.

### Sand and Organic Filters

- Changes in water quality.
- The reduction in runoff quantity.
- The number of new sand and organic filters installed.
- The acreage of impervious surface that drains to sand and organic filters.

### Storm Water Wetland

- Changes in water quality.
- The reduction in runoff quantity.
- The number of storm water wetlands created.
- The acreage of impervious surface that drains to storm water wetlands.

### Urban Forestry

- Whether or not development codes were modified to promote urban forestry.
- Whether or not an ordinance was developed to promote urban forestry.
- The number of trees planted as a result of urban forestry initiatives.
- The acreage of treed land.
- The reduction in runoff quantity.
- Changes in water quality.
- The acreage of forest habitat created.
- Aesthetic and shade benefits.

### Wet Ponds

- Changes in water quality.
- The reduction in runoff quantity.
- The number of wet ponds installed.
- The acreage of impervious surface that drains to wet ponds.

### Zoning

- Whether or not development codes were modified.
- The amount of open space protected with new zoning codes.

- The projected number of new storm water treatment areas expected under the new zoning codes.
- The projected number of upgrades to existing storm water facilities expected as a result of changes in expected development density.

**Chapter Ten**  
**Sixth Minimum Control Measure**  
**Pollution Prevention/ Good Housekeeping for Municipal Operations**

Regulatory Requirement, 40 CFR Part 122.34(b)(6):

You must develop and implement an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations. Using training materials that are available from EPA, your State, or other organizations, your program must include employee training to prevent and reduce storm water pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance.

Guidance:

The regulations require that you develop an operation and maintenance program for municipal operations. The first logical step is to inventory all potential municipal operations. You will need to consider both actual facilities and the activities performed there and also, practices throughout the MS4's jurisdiction. Some of the things to consider include:

- Fleet or maintenance shops;
- Maintenance and storage yards;
- Streets and parking lots;
- Vehicle washing;
- Waste transfer stations;
- Parks and public areas; and
- Storm sewer system (cleaning and maintenance).

One of the most important aspects of pollution prevention and good housekeeping is the education of municipal employees. This is important because once they become aware of the potential water quality impacts their facilities or actions may cause, they can take steps to prevent these impacts. Educating employees can be accomplished through formal training sessions or even something as simple as placing posters in their work areas.

For municipal facilities, you need to evaluate all operations that occur at that location. For example, you need to determine if chemicals, such as fertilizers, paints, solvents or automotive products are properly stored and inventoried. When reviewing proper storage practices, the MS4 should ensure procedures exist to store chemicals in areas not exposed to precipitation or storm water. Procedures should also be in place to ensure containers are sound, or if they have the potential to leak, are stored in a retaining (diked) area. The MS4 should take steps to minimize the amounts of chemical

used. Finally, procedures should be in place to properly dispose of spent chemicals and containers.

You will also need to review maintenance practices. For example, during street maintenance, do you limit paving to periods of dry weather? Are procedures in place to limit the amount of vegetative area disturbed when street maintenance is performed? The MS4 should consider such things as procedures to ensure proper disposal of debris after the storm drain systems or streets are cleaned. Use of herbicides, pesticides, and fertilizers on public lands (e.g. parks, roadway shoulders) should be minimized and properly controlled. Washing of MS4 vehicles (e.g. police cars, municipal vehicles) should be performed in a manner which limits the amount of runoff (e.g. use of a commercial car wash with an grit/oil/water separator instead of in a facility parking lot). In short, the MS4 will need to look at every aspect of operating the municipality and determine if procedures need to be developed to improve pollution prevention.

Another aspect of pollution prevention is having spill response procedures in place. These procedures should detail who will respond to a spill, how the spill will be contained or diverted, and steps that will be taken to clean up the spill. All employees who have the potential to cause or encounter a spill should be trained in the proper procedures, even if they are just made aware of whom to contact in the event of a spill.

#### Example #1

There have been numerous complaints of algal blooms during warm weather on the lake located in a park owned by the MS4. Because algal blooms are caused by increased nutrients, you investigate and find that MS4 grounds crews are applying large quantities of fertilizer to the park grounds. You develop a workshop to train MS4 employees to limit the amount of fertilizer used and to provide information about the use of native vegetation.

#### Example #2

A large amount of debris and sediment has been noted in an urban stream. The MS4 has a street sweeping program and catch basins are periodically cleaned. Upon investigation, it is determined that the MS4 crews have only been removing debris from grate openings, and not fully cleaning the catch basins. You develop a program for periodic inspection and cleaning of the catch basins, including educating MS4 employees on proper cleaning of the storm sewer system and disposal of debris.

Once you have selected the BMPs to be implemented, either from EPA's "menu of BMPs" or through creating your own, you must establish measurable goals. EPA has developed a list of parameters the MS4 can use when establishing the measurable

goals for the Pollution Prevention/ Good Housekeeping for Municipal Operations minimum control measure (Measurable Goals Guidance for Phase II Small MS4s, pages 53-55). We have reiterated these parameters in Table 6 for your convenience.

**Table 6**  
**Measurable Parameters**  
**Pollution Prevention/ Good Housekeeping for Municipal Operations**

Alternative Products

- The number of educational materials distributed.
- The number of consumers surveyed who have increased their use of alternative products.

Alternative Discharge Options for Chlorinated Water

- Whether or not an ordinance was developed to prevent direct discharge of chlorinated water.
- The number of pool owners informed of the options for discharging chlorinated water.
- Chlorine levels in receiving waters.
- The number of enforcement actions pertaining to pool discharges.

Automobile Maintenance

- The number of employees trained in preventing pollution from automobile maintenance activities.
- The number of sites rewarded as being a “clean site” under a rewards program.
- The number of spills reported.
- The number of educational materials distributed at garages, auto shops, and other automobile-related businesses.

Hazardous Materials Storage

- The number of regularly inspected storage units.
- The number of employees trained in hazardous material storage and maintenance.
- The total number of storage facilities equipped to store hazardous materials.
- The level of toxic pollutants in receiving waters.
- The number of materials distributed educating citizens on home storage of hazardous materials.

Illegal Dumping Control

- Whether or not areas where illegal dumping is common were identified.
- The number of “no dumping” signs posted.
- The number of educational materials distributed.
- The number of reports of illegal dumping received.

- The number of dumps sites cleaned up.
- The number of sites improved to eliminate them as target dumping spots.
- The number of enforcement actions pertaining to illegal dumping.
- Whether or not a partnership with the community was established to promote reporting and to educate citizens.

### Landscaping and Lawn Care

- The number of stores/gardens participating in education program.
- The number of people trained in safe landscaping, lawn care, and pest management techniques.
- The number of classes/seminars offered in landscaping and lawn care.
- Whether or not a survey of lawn and landscaping methods used by the community was conducted.

### Materials Management

- The number of facilities storing hazardous materials.
- The frequency of inspection and maintenance visits to storage facilities.
- The number of personnel trained in hazardous material handling and storage.
- The amount of waste generated by municipal operations.
- Whether or not an inventory of hazardous materials was created for each storage facility.

### Parking Lot and Street Cleaning

- Whether or not roads and parking lots were inventoried and prioritized for cleaning.
- The number of scheduled road cleanings.
- The suspended solids levels in runoff.
- The pounds of debris collected from street sweeping.

### Pest Control

- The number of businesses participating in education at the point of purchase.
- The number of municipal employees trained in integrated pest management.
- Pesticide levels in runoff and receiving waters.
- The number of educational materials distributed.

### Pet Waste Collection

- The number of dog parks.
- The number of signs posted stating regulations.
- The number of educational materials distributed.
- The number of “pooper-scooper” stations installed.

- Whether or not an ordinance was created to address pet waste.

#### Road Salt Application and Storage

- The number of storage facilities included in a regular inspection and maintenance program.
- The number of storage facilities repaired.
- The number of employees trained in road salt application.
- The quantity of salt applied to roadways.
- The quantity of alternative products used.
- The water quality at outfalls near downstream of storage facilities.

#### Roadway and Bridge Maintenance

- Whether or not a current list of roadway and bridge construction is maintained.
- The quantity of debris removed from construction sites.
- The number of employees trained in pollution prevention techniques.
- The amount of deicing salts used.
- The number of catch basins at construction sites that are cleaned regularly.

#### Septic Systems Controls

- The number and location of septic systems.
- The number of systems that are inspected and maintained regularly.
- The number of reminder and educational flyers distributed.
- The number of people trained in inspection and installation of septic systems.
- The number of failed septic systems.

#### Spill Response and Prevention

- Whether or not an inventory of municipal facilities at risk for spills was created.
- The number of leak detection devices at municipal facilities.
- The number of preventative maintenance procedures performed on tanks, valves, pumps, pipes, and other equipment.
- Whether or not a spill response plan was developed for municipal facilities.
- The number of personnel trained on spill response.
- The number of regularly inspected high-risk facilities.
- The number of educational materials distributed to municipal employees.

#### Storm Drain System Cleaning

- Whether or not areas with high pollutant loadings were inventoried and prioritized for cleaning.
- The length of storm drain pipe cleaned regularly.
- The number of outfalls cleaned regularly.

- The amount of trash, sediment, and other pollutants removed during cleaning.
- Water quality at storm drain system outfalls.

#### Used Oil Recycling

- The number of gallons of used oil collected from municipal operations.
- The number of recycling facilities that collect oil from municipal operations.
- The number of educational materials distributed to municipal employees.

#### Vehicle Washing

- The number of educational materials distributed to municipal employees.
- The number of designated municipal vehicle washing areas.

## **Chapter Eleven** **Data Management and Reporting**

Although this guidance document focused mainly on the completion of the GaNOI form and development of the stormwater management program (SWMP), there is one more item that needs to be addressed. The General NPDES Permit will require submittal of a report which summarizes the status of the program on an annual basis (Annual Report). The Annual Report will require the MS4 to provide information on the steps taken each year to implement the SWMP. The report will require the MS4 to report such things as the following:

- What BMPs were implemented during the reporting year;
- The status of BMPs already in place;
- Revisions to any BMPs (you tried a BMP, found it to be ineffective, and implemented a new BMP);
- Stormwater activities performed during the reporting year, including the results of any information collected (e.g. monitoring results, completed inspections, enforcement actions); and
- Planned activities for the next reporting year.

For some of the items you will be required to report on, narrative text may suffice. For example, during the year in which a BMP is implemented, you will probably be reporting the steps taken to get the BMP going and not be able to report actual data or results of activities performed. However, in subsequent years, after a BMP has been implemented, you will be expected to provide more specific information.

### **Example #1**

As part of the NOI/SWMP development, you determine a component of your Public Education and Outreach minimum control measure will be stenciling of storm drains. In the first annual report, you will probably only be able to discuss details on the storm drain stenciling program implementation. You explain that during the first year, you organized certain groups to perform the task, obtained the necessary materials, and prioritized the drains to be stenciled.

### Example #2

This is the second year that you are required to submit an Annual Report. You implemented a storm drain stenciling program during the first year of your SWMP. In this Annual Report, you discuss that during the reporting year, Boy Scout Troop #36578 stenciled 25 drains in the Sleepy Hollow Park area, Kiwanis Club stenciled 50 drains in the Queen Mary River basin, and Blue County Clean & Beautiful stenciled 200 drains in the historic downtown area of Smalltown for a total of 275 drains stenciled this year.

In order to provide specific information on the tasks performed during a reporting year by the MS4 (e.g. number of detention basins inspected, number of brochures distributed, number of outfalls screened for illicit connections), the MS4 will need to develop tracking procedures. The first step will be to ensure all tasks are documented. If an inspection is performed, then an inspection form should be completed. If enforcement is taken, then documentation of the enforcement action (e.g. letter, form) should be retained. For every item reported to EPD as having been completed, there should be some type of documentation to support this statement. If you state in the Annual Report that you inspected 10 industries, but are unable to provide documentation to EPD upon request, then it must be assumed that the inspections were not performed. Therefore, it is extremely important to document each action.

Once you have developed procedures for ensuring tasks are documented, than you need to determine how the information will be compiled and the status tracked. Some smaller communities may be able to do this using hard copies and manually tabulating results. Larger communities may find they need to develop some type of database. In some cases, the MS4 will only have to track the number of items completed (e.g. number of miles of streets swept, pounds of debris removed from stream, number of storm drains stenciled). In other cases, the MS4 may need to track when something is due (e.g. inspections of the Old North Church detention basin are due 2 times per year), when the task was performed (e.g. the Old North Church detention basin was inspected in April and October 2004), or additional information (e.g. the Old North Church detention basin outlet structure was repaired on November 15, 2004).

In summary, the MS4 will need to submit an Annual Report to EPD which provides the status of implementation of the SWMP. The MS4 should ensure all tasks performed are documented in some manner. The MS4 will need to tailor their data management program to their own needs and ensure it allows the MS4 to compile and report all the necessary information to EPD in the Annual Report.