

STATE OF COLORADO



Colorado Department
of Public Health
and Environment

COLORADO'S PHASE II MUNICIPAL GUIDANCE

*A guide to application requirements and program
development for coverage under Colorado's Phase II
municipal stormwater discharge permit*

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ACRONYMS AND TERMS AS USED IN THIS DOCUMENT

The definitions below are intended strictly for clarification purposes, and may not contain the full legal definition as per regulation.

- Annual Report A yearly report to the Division on the permittee’s compliance with the permit requirements, including an accounting of progress made towards each of the permittee’s measurable goals.
- BMPs Best Management Practices – physical, structural, and/or managerial practices that, when used singly or in combination, prevent or reduce pollution of stormwater.
- CCR Colorado Code of Regulations.
- CDOT Colorado Department of Transportation.
- CDPHE Colorado Department of Public Health and Environment.
- CDPS Colorado Discharge Permit System – Colorado’s version of the NPDES program.
- CDPS MS4 permit Discharge permit issued by the Division that authorizes the discharge of stormwater from the MS4 to state waters.
- CFR Code of Federal Regulations.
- CRS Colorado Revised Statutes.
- Division Water Quality Control Division, which is under the CDPHE.
- EPA U.S. Environmental Protection Agency.
- HOA Homeowners’ Association.
- Measurable goals A municipality’s Stormwater Program goals, which are intended to gauge permit compliance and program effectiveness.
- MEP Maximum Extent Practicable – the standard for evaluating permit compliance.
- Minimum measures Stormwater management programs that are required under the CDPS MS4 permit. They include public education and outreach, public participation/involvement, illicit discharge detection and elimination, construction site stormwater runoff control, post-construction stormwater management, and pollution prevention/good housekeeping for municipal operations.
- MS4 Municipal Separate Storm Sewer System – see more complete definition in Chapter 1, section B.
- Municipality A city, town, county, district, association, or other public body created by or under State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes.
- NPDES National Pollutant Discharge Elimination System – Section 402 of the federal Clean Water Act.
- Permittee The MS4 operator to whom the CDPS stormwater discharge permit is issued.
- Phase II Second stage of the State and Federal stormwater permit regulations (see Chapter I, Introduction).
- Regulation 61 Colorado Discharge Permit System Regulations – includes stormwater regulations.
- SWMP Stormwater Management Plan – required under Colorado’s industrial stormwater permits.
- TMDL Total Maximum Daily Load – the amount of a specific pollutant that a listed waterbody can assimilate without violating applicable water quality standards.

Chapter I INTRODUCTION

The federal Clean Water Act requires that stormwater discharges from certain types of facilities be authorized under stormwater discharge permits. (See 40 CFR 122.26.) The goal of the stormwater permits program is to reduce the amount of pollutants entering streams, lakes and rivers as a result of runoff from residential, commercial and industrial areas. The original 1990 regulation (**Phase I**) covered municipal (i.e., publicly-owned) storm sewer systems for municipalities over 100,000 population. The regulation was expanded in 1999 to include smaller municipalities as well. This expansion of the program is referred to as **Phase II**.

In Colorado, stormwater discharge permits are issued by the Colorado Department of Public Health and Environment, Water Quality Control Division (the “Division”). Such permits are part of the Colorado Discharge Permit System, or CDPS, under regulation 61. The Phase II municipal separate storm sewer systems (MS4s) will be covered under a general permit for stormwater discharges from MS4s. (While the permittee may be either the MS4 owner or operator, for simplicity’s sake this document will only refer to the operator.) As per the Division’s regulation, the main requirement of this general permit will be for the MS4 operator to develop and implement six stormwater management programs, or minimum measures. These measures, which are described in the following chapters, are:

- 1) Public education and outreach
- 2) Public participation/involvement
- 3) Illicit discharge detection and elimination
- 4) Construction site stormwater runoff control
- 5) Post-construction stormwater management
- 6) Pollution prevention/good housekeeping for municipal operations

The following information/guidance is intended to assist municipalities in applying for stormwater discharge permit coverage for their MS4. The main requirement for the application is a summary of the proposed six minimum measures, and measurable goals related to them. The measures are described in more detail in Chapters II through VII of this guidance.

This guidance is also available electronically from the Division ((303) 692-3555, or nathan.moore@state.co.us), or on the internet at <http://www.cdph.e.state.co.us/wq/PermitsUnit/wqcdpmt.html>.

The regulation states that the MS4 operator must “develop, implement, and enforce a stormwater management program designed to reduce the discharge of pollutants from the MS4 to the Maximum Extent Practicable (MEP), to protect water quality, and to satisfy the appropriate water quality requirements of the Colorado Water Quality Control Act” (CCR 61.8(11)(a)(i)). In short, the permittee must develop programs that meet the requirements of the six minimum measures and protect state waters from pollution, contamination, and/or degradation.

When developing the outline for a minimum measure, the MS4 operator will have to make certain decisions on what to include in their program to meet the above requirements. This guidance lists numerous items that *must* be included in a program to be in compliance. These are items that are either directly required by the regulation or that the Division has interpreted must be done to be in compliance.

However, there are also numerous items that the guidance says *should* or *may* be included in order to meet the requirement to protect state waters from pollution, contamination, and/or degradation. In general, this document lays out instructions for developing a complete MS4 program that will protect state waters. In order to allow for maximum flexibility, the Division does not require an MS4 operator to complete every item that the guidance says should be done. Rather, the Division has included these items as recommended or acceptable ways to carry out the regulatory requirements. The MS4 operator may develop alternative program elements to those recommended by the guidance if they provide a similar level of protection to state waters.

In addition, there are areas where the permittee will have to decide to what extent different program aspects will be developed and relied on to protect water quality, based on the specific circumstances within the MS4. In other words, in areas where the guidance lists alternative approaches that should be completed for meeting the same requirement of the regulation, the permittee may choose to rely more heavily on one program aspect and therefore reduce resources expended for another.

The Division will notify all municipalities in the State of Colorado that will be regulated as a Phase II MS4 operator. **Do not apply for coverage under the Phase II Municipal Permit unless you have first been in contact with the Water Quality Control Division.** If you have any questions, please contact the Division at (303) 692-3500, and ask for Nathan Moore or Kathy Dolan.

A. Permit Application

The deadline for submittal of the application for Phase II municipalities is **March 10, 2003**, unless the Division has specified a different date. (See Table 1, below.)

The Division will provide an application form. The permit application must include the following information, at a minimum:

- *Identifying information* (entity name, contact information, address, etc.) as specified on the application form provided by the Division.
- *The person(s) responsible* for implementing or coordinating the permittee's stormwater management program.
- *A general description of the program elements* that the permittee or another entity will implement for each of the stormwater minimum control measures discussed in Chapters II through VII of this guidance.
- *The measurable goals* for each of the minimum control measure components, including, as appropriate, a proposed schedule of dates for each of the measurable goals, including interim milestones and the frequency of the action. (Although the examples of measurable goals in this document are based on permit year, other dates, such as mid-year, may also be used. The measurable goals in this document are examples only; the permittee's will be specific to their program.)
- *Other information* the Division may reasonably require, if requested (e.g., if a Total Maximum Daily Load limit, or TMDL, is in place).

As indicated, the details of the applicant's programs do not need to be included with the application, just an overall description of the program elements. This description must be clear enough for the Division to determine the MS4 operator's general strategy for complying with each of the six minimum measures. This should include an indication of which of the program elements recommended in this guidance (or other BMPs) the permittee intends to utilize, and to what degree particular elements will be stressed. For example, for the Construction Program minimum measure, the application may indicate that an extensive reconnaissance inspection program may be utilized, relying heavily on right-of-way inspectors, and therefore education of contractors (outside of what occurs during inspections) will likely be minimized.

The Division will review all applications for completeness, and adequacy in meeting the intent of the regulations. If the Division determines that a proposed program or measurable goal is inadequate, the permittee will be notified and required to amend the program or goal. However, this process is not expected to delay issuance of the permittee's certification under the general permit.

1. Measurable Goals

Measurable goals are milestones in the development and implementation of the minimum measures. They will be used to determine program progress, and to assess compliance with the permit.

The permittee will be required to complete implementation of all six minimum measures by the end of the first permit term, March 9, 2008. The schedule for the goals must reflect a relatively steady level of effort throughout the permit term. That is, the compliance dates should not all be near the end of the permit term. The permittee’s Annual Report will require a summary of progress made towards each goal. Alternately, if a minimum measure will be fully developed and implemented before the end of the permit term, measurable goals for the remaining permit years (for that particular measure) may not be needed. However, the Annual Report will still require a description of program status each year.

Justification as to why each measurable goal was selected must be included with the application. The justification must include a brief discussion on why the measurable goal is an effective measurement of the permittee's progress towards compliance with the minimum measure.

In some cases, the MS4 operator may already have a program or segments of a program in place and functioning, that meet the requirements of the regulation. In this case, the program or segments shall be described in the application. If the program or segments will be used to fulfill the permit requirement, then the description will be considered as a commitment to continue them. Measurable goals for those sections will not be needed, unless some existing segments need to be merged with new items.

For example, under the Public Involvement measure, an MS4 operator may already have in place an effective process to notify citizens of upcoming hearings, etc. The application would include a description of this process, but no measurable goals. However, the MS4 operator plans to augment the program by adding the formation of a citizen panel, a river watch program, and a storm drain stenciling program. These segments would be described, with appropriate measurable goals.

As a very rough estimate, the Division expects the narrative portion of the application (for a single entity), including the program element descriptions and measurable goals, to be approximately ten to thirty pages.

While the information provided in the application must be accurate to the best knowledge and belief of the applicant, the Division recognizes that as programs are more fully developed, changes can occur to the program elements described in the application. The general permit will describe the process to be used in this situation.

Table 1 – Schedule

Activity	Date/Deadline
Division notifies initial Phase II MS4 operators of need to apply	December 2001 – June 2002
Division drafts MS4 general permit	July 2002 – October 2002
Division issues MS4 general permit	February 2003
Application deadline for Phase II MS4s	March 10, 2003
MS4 operators complete implementation of six minimum measures	March 9, 2008

B. Municipal Permit Coverage

The regulation covers discharges from municipal separate storm sewer systems, or MS4s. An MS4 is defined as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

1. Owned or operated by a State, city, town, county, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or

- drainage district, or similar entity, or a designated and approved management agency under section 208 of the Clean Water Act that discharges to state waters;
2. Designed or used for collecting or conveying stormwater;
 3. Which is not a combined sewer; and
 4. Which is not part of a Publicly Owned Treatment Works (POTW).

A regulated municipality's permit will cover all areas of the municipality, unless explicitly excluded due to being outside of the urbanized area or designated area for the permit.

C. **Municipal Permits – Violations**

The discharge of stormwater from a regulated MS4, or any source requiring a CDPS discharge permit, without coverage under the appropriate permit, is a violation of the Federal Clean Water Act and the Colorado Water Quality Control Act, CRS 25-8-101. Additionally, for facilities covered under a CDPS permit, failure to comply with any CDPS permit requirement constitutes a violation. Civil penalties for violations of the Act or CDPS permit requirements may be up to \$10,000 per day of violation. Criminal pollution of state waters is punishable by fines of up to \$25,000 per day. As the permittee, the MS4 operator would be the liable party for any violations under their permit.

D. **Municipal Permits – Permitting Options**

The following sections from the Colorado Discharge Permit System Regulations (Regulation No. 61) are relevant to this section: 61.4(3)(d); 61.8(11)(a)(iii) and (vii).

1. **Different Permitting Options**

The Phase II regulation allows for several different options for permit coverage, application, and compliance to allow for flexibility in how the permits are administered in Colorado. Below is a summary of the various options available to MS4 operators.

a. **General Permit**

The Division foresees that the vast majority, if not all, of the Phase II MS4 operators in Colorado will be covered under general permits. A general permit is a single permit that is written to cover multiple permittees.

Under coverage for a general permit, even though each MS4 operator is required to obtain separate certification, there is little restriction in the amount of cooperation that can occur between separately certified MS4 operators, as well as entities not covered by the stormwater program.

i. *Relying on Other Entities to Meet Permit Requirements*

The Division strongly supports cooperation between permit holders in complying with the six minimum measures. Part 61.8(11)(a)(vii) of the regulation allows for a permittee to rely on another entity to implement all or part of a minimum control measure to comply with the permit. The permittee must still make sure that the requirements of the minimum control measure are met and is liable if they are not. If the entity that the permitted MS4 operator is relying on to carry out the requirements of the minimum control measure fails to meet the permit requirements, it is the permittee's responsibility to then find alternative means to assure compliance. (See the section 1.a.iv.B on Joint Applications, below.)

ii. Qualifying Local Programs – MS4 Operators

In cases where the Phase II requirements are found to be duplicative of an existing local regulatory program, the Division may include conditions in the permit that direct the permittee to follow that program's requirements in place of those specified in the Phase II regulation. A qualifying local program is a municipal stormwater management program that imposes, at a minimum, the relevant requirements of the regulation (or the equivalent), and thus is used as a substitute for that particular requirement in the permit. For example, a county may already require an MS4 operator within the county to implement a public education program. Providing that it meets the Division's requirements as well, this would replace the requirement for the MS4 operator to comply with the public education section of the MS4 permit.

This permitting option may be used to minimize duplication of efforts when existing programs are in place. If the qualifying local program at some point fails to meet the regulatory requirements, the permit may be reopened and modified to include the requirement to implement a minimum control measure.

The Division may require additional information to be submitted with the application, addressing the qualifying local program's compliance with the Phase II regulation within the MS4 operator's permitted area.

iii. Types of General Permits

A) Statewide General Permit

The Division will issue a statewide general permit for Phase II MS4s by February 2003. Because of the flexibility allowed in the regulations, the Division's intent is to draft this general permit to adequately cover the majority of Phase II regulated MS4 operators.

Although this permit will be used statewide, some requirements may be included that only pertain to permittees in specific geographical areas or that meet certain criteria. This may include qualifying local programs as discussed in (a)(ii) above.

B) Alternative General Permits

In most cases, the Division foresees that the statewide general permit will contain enough flexibility to remove the need for alternative general permits. However, the ability to issue additional general permits will remain an option.

The final decision on this approach is within the Division's discretion, due to the extra resources that would be required to issue such a permit and potential complications for enforcement/compliance/liability.

Additional general permits will only be issued by the Division when one or more of the following conditions are met and more than one MS4 needs to be addressed:

- Additional regulatory requirements, such as a TMDL (Total Maximum Daily Load; see http://www.cdphe.state.co.us/wq/tmdl_status.htm for information), require stricter permit requirements than those included in the statewide general permit.
- Qualifying local programs, as discussed in section (a)(ii) above, are determined by the Division to possibly cause confusion in the statewide general permit.
- Requirements in the statewide permit conflict with local regulations and/or statutes.
- The permittee can demonstrate to the Division that the statewide permit is too inflexible to allow for alternative means of compliance and/or environmental

protection that may provide better or more efficient protection of state waters, and that these alternative means warrant the use of Division resources in development/administration of the alternative permit.

iv. Application Options

A) Single MS4 Operator Application

An MS4 operator may complete the application requirements for a Phase II general permit and submit material to the Division that covers only its own MS4. If the MS4 operator is relying on another entity to meet any portion of the minimum control measures, the applicant must still submit the required information on the control measure and measurable goals in its application.

B) Joint Application with Separate Coverage

Multiple MS4 operators may submit one application to the Division that satisfies the requirements of each MS4 covered in the joint application. The Division encourages the use of this approach, with the goal of fostering cooperation between MS4 operators in meeting the permit requirements, and thus hopefully improving the benefit to the environment while minimizing the cost to permittees. However, each permittee under the joint application is still responsible for ensuring that the requirements of the minimum control measures are met within their own jurisdiction, and is liable if they are not.

The format of the joint application can vary, as long as it meets the requirements of the regulation by adequately addressing each of the minimum control measures and measurable goals for each MS4. The application must clearly indicate which entities will be carrying out which minimum measures (or component thereof).

b. Individual Permit

An individual permit is a permit that is drafted by the Division to cover only one permittee, or several co-permittees. As with general permits, the Division may draft an individual permit to allow for a permittee to rely on another entity to implement all or part of a minimum control measure to comply with the permit as discussed in section (a)(i) above. Also, qualifying local programs as discussed in (a)(ii) above may be included.

The final decision on whether to issue individual permits is within the Division's discretion, due to the extra resources that would be required to issue such a permit and potential complications for enforcement/compliance/liability.

i. Individual Permits for Single Permittees

In most cases, the Division believes that a general permit will be adequate to address the needs of the permittee and the Division. However, the Division may issue an individual permit if the conditions for coverage under an alternative general permit are met, as discussed in section (a)(iii)(B) above, except that only one permittee requires coverage.

ii. Individual Permits for Multiple Permittees (Joint Coverage)

Individual permits may also be issued to multiple permittees who wish to have joint coverage under a permit. Joint coverage is where multiple permittees share coverage under a single individual permit. This allows for permittees to have joint liability for all aspects of the permit.

An individual permit will only be issued to joint permittees when the permittees can demonstrate to the Division that shared liability for permit compliance, or portions of permit compliance, will allow for alternative means of compliance and/or environmental protection that will provide better or more efficient protection of state waters, and that these alternative means warrant the use of Division resources in development/administration of an individual permit.

A) Joint Coverage with Phase I MS4 operators

If a Phase II MS4 operator wishes to have joint coverage with a Phase I permittee (Denver, Aurora, Lakewood, Colorado Springs, or CDOT), coverage must be under the Phase I individual permit, and both permittees will be subject to the Phase I permit conditions. In addition, the Phase II MS4 operator must meet the more extensive Phase I application requirements, except as specified in Regulation 61.4(3)(d)(v).

E. Overlapping Jurisdictions

In many cases, an MS4 may be in an area where multiple State, city, town, county, district, association, or other public bodies (created by or pursuant to State law) have jurisdiction. In these cases, it is only the MS4 operator that will be required by the Division to obtain permit coverage.

The Division is responsible for notifying all potential designated entities of the need to apply for a Phase II permit, and ensuring that the proper permits are obtained and complied with. The Division will work with known regulated entities (municipalities and counties) to help identify such special districts or other entities that may require a permit.

As the permittee, the MS4 operator is responsible for implementing the six minimum measures to the maximum extent practicable (MEP). In many cases, this will require working with other government agencies that have jurisdiction to administer aspects of the minimum measures. For example, a special district that owns and operates an MS4 may need to work with the county they are located in to administer the construction and post-construction programs, if the district does not have the legal authority to place requirements on developers. In such cases, a joint application is recommended (see section 1.a.iv.B of this chapter).

F. Ordinances

This section of the guidance document discusses the types and uses of ordinances that may be helpful in assisting the Phase II permittee in meeting their permit requirements. Also see the Resource List, Chapter VIII, which provides a listing of references for reviewing various model, or example, ordinances that may be applicable to the Phase II permitting process.

1. Background

Ordinances are an important and useful tool in helping the Phase II permittee meet the requirements of their permit. Ordinances provide a means for the permittee to implement and enforce their permit conditions by providing a compliance mechanism that assists in the attainment of measurable goals. To the extent allowable under State or local law, ordinances (or other regulatory mechanisms) are required under the following sections:

- *Illicit discharge detection and elimination* – to prohibit non-stormwater discharges into the storm sewer system, and implement appropriate enforcement procedures and actions
- *Construction site stormwater runoff control* – to require erosion and sediment controls, as well as sanctions to ensure compliance

- *Post-construction* – to address post-construction runoff from new development and redevelopment projects, and sanctions to ensure compliance

Each ordinance proposed for use by the permittee should be reviewed by the engineering (or other technical) and legal departments of the permittee(s). There are several sources of existing model ordinances that the permittee can use in the development of their own ordinances (see Resource List, Chapter VIII).

2. Items to Consider When Drafting and Implementing Ordinances

There are several items to consider when drafting and implementing ordinances with respect to Phase II permitting requirements. Points to consider include:

- *Legal authority* – does the Phase II permittee have the legal authority to develop and implement the applicable ordinance(s)? It is the responsibility of the permittee to determine if they do not have such legal authority. If they do not have legal authority, the permittee must provide adequate evidence of this to the Division.
- *Practicability* – is the ordinance written so that all parties can clearly understand and meet its objectives and requirements? Is it designed so that it can be implemented in the field with minimal problems? Is the ordinance “enforceable” by the permittee?
- *Applicability* – does the ordinance meet the intent, as well as the specifics, of the Phase II requirements? Does the ordinance apply to any and all appropriate entities within the permittee’s boundaries (both physical and jurisdictional)?
- *Desired goal(s) and objective(s)* – does the ordinance clearly state the applicable goals and objectives, relative to the Phase II permitting requirements? Are the goals and objectives obtainable by all parties involved? Are the overall goals and objectives of the ordinance tied to appropriate measurable goals?
- *Resources* – is the cost to develop, implement, and enforce the ordinance commensurate with its priority in the overall permitting program? Are the necessary resources available to develop, implement, and enforce the ordinance?
- *Implementation* – is the ordinance implementable, particularly with respect to the entity(s) that will need to meet the ordinance requirements? Are there provisions in the ordinance that may preclude it from being usable and reasonable?

3. Typical Ordinances Applicable to Phase II Permitting

Typical ordinances that may be necessary to meet the Phase II permitting requirements include, but are not limited to:

- Grading, erosion and sedimentation control (including revegetation/reclamation requirements) for construction projects (required by the construction minimum measure)
- Structural BMPs for post-construction (permanent) development and significant redevelopment projects (required by the post-construction minimum measure)
- Storm drainage design and management (e.g., Storm Drainage Design and Technical Criteria Manual)
- Aquatic buffers
- Illicit discharge detection, cleanup, and elimination (required by the illicit discharge minimum measure)
- Stormwater utility
- Transfer of development rights
- Golf course management
- Wetlands and watercourse management
- Operation and maintenance of MS4s
- Operation and maintenance of short-term and long-term best management practices (BMPs)

- Litter and floatable material (nuisance) management (e.g., trash, junk, weeds and yard waste)
- Stream protection ordinances
- Landscape design code

Other tools associated with ordinances, which may also play a key role in implementing the Phase II permitting requirements, include:

- Design and construction standards
- Design guidelines
- Stormwater Quality Control Plan standards
- Stream Buffer and Floodplain Overlay Districts

Each ordinance that the permittee develops should focus on specific objectives relative to meeting the intent and requirements of Phase II, particularly with respect to measurable goals as defined in the permit.

4. Measurable Goals – Ordinances

Before any measurable goals are developed in conjunction with applicable ordinances, the permittee should evaluate its current ordinances (if any) to assess needs and requirements with respect to the Phase II Program. Based on this assessment, a list of needed ordinances should be developed. Then, measurable goals for drafting, implementing, and evaluating compliance with an ordinance should be developed. The measurable goals should be developed to meet the intent and requirements of Phase II permitting, should be attainable and reasonable, and should mesh with existing technologies.

Chapter II PUBLIC EDUCATION AND OUTREACH

This section outlines the State of Colorado Phase II stormwater regulatory requirements for the public education and outreach programs and offers some general guidance on how to satisfy them. It is important to keep in mind that the MS4 operator has a great deal of flexibility in choosing exactly how to satisfy the minimum control measure requirements.

A. Benefits of a Public Education and Outreach Program

An informed and knowledgeable community is crucial to the success of a stormwater management program. Without a public knowledge of local water quality problems caused by urban runoff, it is difficult to obtain public support for local stormwater quality programs. This support ranges from individuals changing their daily actions to community backing for all of the six minimum measures. As with all of the minimum measures, the goal of this measure is reduce the degradation of local water bodies and improve chemical, physical and biological quality of state waters. In order to achieve this water quality benefit, Public Education programs should be targeted to these outcomes:

- **Improve understanding** of the reasons why stormwater quality programs exist. Public understanding of local impacts is particularly important when MS4 operators attempt to institute new funding initiatives for the program or seek volunteers to help implement the program; and
- **Greater compliance** with the program as the public becomes aware of the personal responsibilities expected of them and others in the community, including the individual actions they can take to protect or improve the quality of area waters.

B. Program Requirements

The regulation (CCR 61.8(11)(a)(ii)(A)) is as follows:

(A) Public education and outreach on stormwater impacts. The permittee must implement a public education program to:

- (I) Distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on water bodies and the steps that the public can take to reduce pollutants in stormwater runoff; and*
- (II) Inform businesses and the general public of impacts associated with illegal discharges and improper disposal of waste.*

To satisfy this minimum control measure, the MS4 operator must:

- Implement a public education program to distribute educational materials to the community, or conduct equivalent outreach activities about the impacts of stormwater discharges and the steps that can be taken to reduce stormwater pollution. (To be more effective, the focus should be on local waterbodies.)
- Target local businesses with informational materials appropriate to them on potential stormwater impacts of improper waste disposal and illegal discharges.
- Determine the appropriate best management practices (BMPs), in this case informational and educational methods to be used, and measurable goals for this minimum control measure. Some program implementation approaches, BMPs (i.e., the program actions/activities), and measurable goals are suggested below.

C. Guidelines for Developing and Implementing This Measure

Three main action areas are important for successful implementation of a public education and outreach program.

1. Forming Partnerships

MS4 operators are encouraged to enter into partnerships with other governmental entities to fulfill this minimum control measure's requirements. It is generally more cost-effective to use an existing local program, or develop a new program linked to a regional or statewide education program.

Operators are encouraged to seek assistance from non-governmental organizations (e.g., environmental, civic, and industrial organizations), since many already have educational materials and perform outreach activities. Some groups may be providing environmental education activities that can be used to reach the public. Providing basic environmental knowledge about local water bodies is an appropriate step in educating the public on impacts to local waters by urban runoff.

Participation in watershed-based organizations facilitates both intergovernmental and non-governmental coordination, and can often provide an educational opportunity for the participants in those groups. In Colorado, the Colorado Department of Public Health and Environment (CDPHE) has watershed coordinators to facilitate non-regulatory programs (contact the CDPHE for information on the Nonpoint Source (section 319) program). Additionally, the Nonpoint Source program employs an education coordinator who can be helpful with contacts and a materials program (email nps@state.co.us). An extensive list of watershed groups can be found on www.coloradorivers.org.

Additional information and partnership potential for educational activities may be available through the Colorado Association of Environmental Education, the League of Women Voters "Colorado Water Protection Project," and the Colorado Division of Wildlife's River Watch and Project WET Programs. These programs are appropriate for the general public. For specific industries, trade groups are an excellent source for partnering educational efforts. Examples include the International Erosion Control Association (IECA) and the Colorado Contractors Association, for erosion and sediment control. Each permittee should target industrial/commercial groups that are important in their jurisdictions.

2. Using Educational Materials and Strategies

MS4 operators may use stormwater educational information provided by their State, EPA Region, or environmental, public interest, or trade organizations instead of developing their own materials, but to be effective it must be relevant to local waterbodies. Operators should strive to make their materials and activities relevant to local situations and issues, and incorporate a variety of strategies to ensure maximum coverage. Some examples include:

- *Brochures or fact sheets* for general public and specific audiences. The Colorado League of Women Voters has printed the "Colorado Water Protection Kit." Urban Drainage and Flood Control District has developed brochures appropriate for the Metro Denver region. These brochures describe steps individuals can take to reduce pollution of urban runoff. Fact sheets or other program elements that make a community connection with local waterbodies are critical to increase the interest in and use of this pollution prevention information. Other pollution prevention information is available at <http://www.coloradop2.org/>
- *Environmental guides* to educate groups such as golfers, hikers, paddlers, climbers, fishermen, and campers;
- *Alternative information sources*, such as web sites, bumper stickers, refrigerator magnets, posters for bus and light rail stops, and restaurant placemats;
- *Stormwater hotlines* for information and for citizen reporting of polluters (this is particularly applicable to the illicit discharge control measure);

- *Economic incentives* to citizens and businesses (e.g., rebates to homeowners purchasing mulching lawnmowers or biodegradable lawn products);
- *Educational programs for school-age children* are particularly effective ways to reach large numbers of citizens. To be effective and useful to teachers, topics must fit into school curriculum. Colorado teachers must cover specific standards, and with existing educational standards, have little time to teach extra subjects. When topics related to urban runoff pollution are incorporated into existing standards, the chance of having a successful program increases significantly. Many geography and science standards cover subjects that relate to water-land interactions. For example:
 - Geography Standard 3 – Understand how the physical processes shape the earth's surface patterns and systems.
 - Science Standard 4 – Know the major sources of water, its uses, importance and cyclic patterns of movement through the environment.
 - Science Standard 5 – Understand the connections between science, technology, human activity and their impact on the world.

Urban runoff pollution topics fit easily into these and many other standards. Every school district has a list of these standards and has adopted curriculum taught at each grade level. Call the district and ask for a copy and/or check the school district's web site. Fitting your program into these standards is very powerful. Programs that not only meet regulatory requirements but also aid in other local priorities (such as science or literacy education) may be appropriate.

Hands-on explorations that are specific to your community, and outdoor studies led by trained individuals, are the most effective educational tools. Written activities, videos and brochures are less effective, due to the overwhelming amount of media teachers already receive. Programs reaching school age children are an excellent way to build parental and community support that may not be readily available to an "urban runoff pollution prevention" program. The following topics may be used independently or incorporated into a school-based educational program.

- *Water or River Festivals* are excellent ways to reach those interested in water quality topics. Home or garden shows are good for targeted messages like proper paint disposal or garden chemical use.
- *Storm Drain Stenciling* with messages like "Dump No Waste, Drains Directly to ..." These can stand alone or be part of other targeted programs for school-age children or homeowners' associations. Best to use name of the most immediate local waterbody on the stencil.
- *Tributary Signage*, to increase public knowledge of local water resources.
- *A library of educational materials* for community and school groups; some sources include Hands On Save Our Streams Guide (Izaak Walton League – <http://www.iwla.org/SOS/index.html>), Virginia State Parks – Your Backyard Classrooms (<http://www.dcr.state.va.us/parks/vspf.htm>), and WOW! Wonders of Wetlands Activity Guide (<http://www.enc.org/resources/>).
- *Volunteer citizen educators* to staff a public education task force.
- *Event participation* with educational displays at home shows and community festivals.

3. Reaching Diverse Audiences

The public education program should use a mix of appropriate local strategies to address the viewpoints and concerns of a variety of audiences and communities, including minority and disadvantaged communities, as well as children. Printing posters and brochures in more than one language is a method that can be used to reach audiences less likely to read standard materials. Directing materials or outreach programs toward specific groups of commercial, industrial, and institutional entities likely to have significant stormwater impacts is recommended. For example, information could be provided to restaurants on the effects of grease and to auto garages on the effects of oil on local streams.

D. Measurable Goals

Although the outcomes of this minimum measure are focused on the improvement of stormwater quality, the Division recognizes that such improvements would be difficult to measure directly. Instead, one appropriate measure of the outreach in the initial permit term could be individual contact hours. For example, a brochure which take 5 minutes to read, sent to 3000 customers, assumed to be read by 10 percent, might gain $(5\text{min}) \times (2 \text{ persons}) \times (3,000 \text{ bills} \times .10) / (60 \text{ min/hr}) = 50$ contact hours. An event at a local water festival that spends 20 minutes per child and reaches 500 children could translate to $(20\text{min}) \times (500\text{students}) = 167$ contact hours. Using this measure reinforces the actual contact MS4 operators have with their citizens, and allows maximum flexibility with the message and BMPs used.

The following is an example of measurable goals for a public education and outreach plan for the initial permit term.

<u>Target Date</u>	<u>Activity</u>
(end of) Year 1	Develop partnerships to make presentations to local watershed groups, water users (i.e., irrigators, environmental groups, fishing clubs, school groups, etc). Develop locally appropriate brochure.
Year 2.....	Distribute brochure. Create Web site with links based upon information in brochure. Continue partnerships programs.
Year 3.....	Implement target audience-based program (school, industry, general population-based). Continue partnerships programs.
Year 4.....	Revise and redistribute brochure. Continue targeted program(s). Continue partnerships programs.
Year 5.....	Continue partnerships programs. Continue targeted program(s).

Chapter III PUBLIC PARTICIPATION/INVOLVEMENT

This section outlines the State of Colorado Phase II stormwater regulatory requirements and offers some general guidance on how to satisfy them. It is important to keep in mind that the MS4 operator has a great degree of flexibility in determining how to satisfy the minimum control measure requirements.

A. Benefits of a Public Participation and Involvement Program

The public can provide valuable input and assistance to an MS4 operator's municipal stormwater management program. Since it is the activities of the public within urban landscapes that produce diffuse pollution, and the public that funds municipalities, it is imperative that the public be given opportunities to play an active role in both the development and implementation of the program. An active and involved community is crucial to the success of a stormwater management program because it allows for:

- **Broader public support**, since citizens who participate in the development and decision making process are partially responsible for the program and are more likely to take an active role in its implementation;
- **A broader base of expertise and economic benefits**, since the community can be a valuable, free, intellectual resource; and
- **A conduit to other programs**, as citizens involved in the stormwater program development process provide important cross-connections and relationships with other community and government programs. This benefit is particularly valuable when trying to implement a stormwater program integrated on a watershed basis, as is encouraged by the Division.

B. Program Requirements

The regulation (CCR 61.8(11)(a)(ii)(B)) is as follows:

(B) Public involvement/participation. The permittee, must at a minimum, comply with State and local public notice requirements when implementing the stormwater management programs required under this permit. Notice of all public hearings should be published in a community publication or newspaper of general circulation, to provide opportunities for public involvement that reach a majority of citizens through the notification process.

To satisfy this minimum control measure, the MS4 operator must:

- Comply with applicable State and local public notice requirements using an effective mechanism for reaching the public; and
- Determine the appropriate BMPs and measurable goals for this minimum control measure. Possible implementation approaches, BMPs (i.e., the program actions and activities), and measurable goals are described below.

C. Guidelines for Developing and Implementing This Measure

MS4 operators should include the public in developing, implementing, and reviewing each minimum measure of their stormwater management programs. The public participation process should make every effort to reach out and engage all economic and ethnic groups. The Division recognizes that there are challenges associated with public involvement. Nevertheless, the Division strongly believes that these challenges can be addressed through an aggressive and inclusive program. Challenges and example practices that can help ensure successful participation are discussed below.

1. Implementation Challenges

The best way to handle common notification and recruitment challenges is to know the audience and think creatively about how to gain its attention and interest. Traditional methods of soliciting public input are not always successful in generating interest, and subsequent involvement, in all sectors of the community. For example, municipalities often rely solely on advertising in local newspapers to announce public meetings and other opportunities for public involvement. Since there may be large sectors of the population who do not read the local press, the audience reached can be limited. Therefore, alternative advertising methods should be used whenever possible, including radio or television spots, postings at bus or light rail stops, announcements in neighborhood newsletters, announcements at civic organization meetings, distribution of flyers, mass mailings, door-to-door visits, telephone notifications, and multilingual announcements. These efforts, of course, are closely tied to the efforts for the Public Education and Outreach minimum control measure (see Chapter II).

Watershed groups that encompass all or part of the drainages within the MS4 should be included in this effort. In addition, advertising and soliciting for help should be targeted at specific population sectors, including ethnic, minority, and low-income communities; academia and educational institutions; neighborhood and community groups; outdoor recreation groups; and business and industry. The goal is to involve a diverse cross-section of people who can offer a multitude of concerns, ideas, and connections during the program development process.

2. Possible Best Management Practices (BMPs)

There are a variety of practices that could be incorporated into a public participation and involvement program, such as:

- *Public meetings/citizen panels* allow citizens to discuss various viewpoints and provide input concerning appropriate stormwater management policies and BMPs. Watershed groups are excellent venues for this type of discussion. Existing boards and commissions within the governmental agency are also appropriate venues, such as planning and zoning boards, park boards, natural resource committees, etc.
- *Citizen watch groups* can aid local enforcement authorities in the identification of polluters.
- *“Adopt A Storm Drain” programs* encourage individuals or groups to keep storm drains free of debris and to monitor what is entering local waterways through storm drains.

D. Measurable Goals

Measurable goals, which are required for each minimum control measure, are intended to gauge permit compliance and program effectiveness. The measurable goals, as well as the BMPs, greatly depend on the needs and characteristics of the operator and the area served by the MS4. Furthermore, they should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure.

At a minimum, the measurable goal for this program would be to provide adequate public notice of all public hearings, published in a community publication or newspaper of general circulation, when implementing the stormwater management programs required under the permit.

Examples of additional measurable goals that could be used for this minimum measure include:

Target Date	Activity
(end of) 1 year.....	Notice of a public meeting in several different print media and bilingual flyers; citizen panel established;
2 years.....	Final recommendations of the citizen panel; radio spots promoting program and participation.
3 years.....	Community participation in community waterbody clean-ups.
4 years.....	Citizen review of initial program implementation and advising future program actions.

Chapter IV ILLICIT DISCHARGE DETECTION AND ELIMINATION

This section of the document offers general guidance on how to detect illicit discharges and comply with the minimum control measure. MS4 operators have a wide range of flexibility in choosing how to satisfy the minimum control measure based upon their unique conditions and resources.

An illicit discharge is defined by the permit as any discharge to an MS4 that is not composed entirely of stormwater, and has not been authorized under a discharge permit issued by the State of Colorado. Illicit discharges enter the system through either direct connections (e.g., wastewater piping either mistakenly or deliberately connected to the storm drains) or indirect connections (e.g., infiltration into the MS4 from cracked sanitary systems, spills collected by drain outlets, or paint or used oil dumped directly into a drain). The result is untreated discharges. Examples of sources of illicit discharges, as well as some non-stormwater discharges that may be an exception to the illicit discharge requirements, are listed in section B, below.

Illicit discharges may be continuous or intermittent. Intermittent discharges tend to occur when carried by a storm event, while continuous illicit discharges often flow during dry weather.

A. Benefits of an Illicit Discharge Detection and Elimination Program

Illicit discharges can result in untreated discharges that contribute high levels of pollutants, including heavy metals, toxics, oil and grease, solvents, nutrients, viruses, and bacteria, to receiving waterbodies. Pollutant levels from these illicit discharges have been shown in EPA studies to be high enough to significantly degrade receiving water quality and threaten aquatic life, wildlife, and human health.

B. Program Requirements

The regulation (CCR 61.8(11)(a)(ii)(C)) is as follows:

(C) The permittee must develop, implement and enforce a program to detect and eliminate illicit discharges (as defined at 61.2) into the permittee's MS4.

The permittee must:

- (a) Develop, if not already completed, a storm sewer system map, showing the location of all municipal storm sewer outfalls and the names and location of all state waters that receive discharges from those outfalls;*
- (b) To the extent allowable under State or local law, effectively prohibit, through ordinance or other regulatory mechanism, non-stormwater discharges into the storm sewer system, and implement appropriate enforcement procedures and actions; and*
- (c) Develop and implement a plan to detect and address non-stormwater discharges, including illicit discharges and illegal dumping, to the system. The plan must include the following three components: procedures for locating priority areas likely to have illicit discharges; procedures for tracing the source of an illicit discharge; and procedures for removing the source of the discharge.*

1. Sources of Illicit Discharges

The following are some examples of illicit discharges.

- a. **Sanitary wastewater** sources such as:
 - Sanitary wastewater (usually untreated) from improper sewerage connections, exfiltration or leakage
 - Effluent from improperly operating or improperly designed septic tanks
 - Overflows of sanitary sewerage systems

- b. **Automobile maintenance and operation** sources such as:
 - Commercial car wash wastewaters
 - Radiator flushing wastewaters
 - Engine degreasing wastes
 - Improper oil disposal
 - Leaky underground storage tanks
- c. **Landscape irrigation sources** such as:
 - Direct spraying of fertilizers, pesticides or herbicides onto impervious surfaces
 - Over-application of fertilizers, pesticides or herbicides onto landscaping
- d. **Other sources** such as:
 - Laundry wastes
 - Non-contact cooling waters
 - Metal plating baths
 - Dewatering of construction sites
 - Washing of concrete ready-mix trucks
 - Contaminated sump pump discharges
 - Improper disposal of household toxic wastes
 - Spills from roadway and other accidents
 - Chemical, hazardous materials, garbage, and sanitary sludge landfills and disposal sites

2. Non-Stormwater Discharges

Under the Phase II Stormwater regulations, there are only two types of discharges to an MS4 that are not composed entirely of stormwater that are allowable and do not need to be addressed by a Phase II permittee: discharges pursuant to an NPDES (CDPS) permit, and discharges due to fire fighting activities. There are also certain non-stormwater discharges that must be addressed in the stormwater program only if the “*permittee identifies them as significant contributors of pollutants to the permittee’s MS4.*” These non-stormwater discharges include:

- Landscape irrigation
- Lawn watering
- Diverted stream flows
- Irrigation return flow
- Rising ground waters
- Uncontaminated ground water infiltration {as defined at 40 CFR 35.2005(20)}
- Uncontaminated pumped ground water
- Springs
- Flows from riparian habitats and wetlands
- Water line flushing
- Discharges from potable water sources
- Foundation drains
- Air conditioning condensation
- Water from crawl space pumps
- Footing drains
- Individual residential car washing
- Dechlorinated swimming pool discharges
- Street wash water

Note that even if one of these discharges is not covered under the Phase II Stormwater Regulations, it may still require a State-issued permit, such as a Minimal Industrial Discharge (MINDI) permit.

Before applying the exceptions, a determination should be made as to what is considered *significant contributors of pollutants*. On rare occasions, the Division may ask for documentation or further study of a particular non-stormwater discharge of concern, to obtain a reasonable basis for allowing the non-stormwater discharge and excluding the discharge from the MS4 operator's program.

Local ordinances may incorporate these non-stormwater discharges, as long as the ordinance does not conflict with any requirements for State permit coverage. Any ordinance addressing illicit discharges should specify a corrective action procedure to respond to illicit discharges that are not considered exceptions as listed above.

C. **Guidelines for Developing and Implementing This Measure**

This section identifies those provisions that are required under the regulations, and those activities that are recommended but optional.

Although the extent of the efforts a municipality can dedicate to a stormwater management program is dependent on available resources, available contractors, size of staff, and degree and character of its illicit discharges, the following three minimum requirements must be satisfied:

- *Development of the Storm Sewer System Map*
- *Development of a Stormwater Control Ordinance*
- *Development of an Illicit Discharge Detection and Elimination Plan*

1. **Development of the Storm Sewer System Map**

Each MS4 operator must develop a detailed and accurate Storm Sewer System Map. This map is intended to demonstrate a basic awareness of the intake and discharge areas of the system. It is needed to help determine the extent of discharged dry weather flows, the possible sources of the dry weather flows, and the particular water bodies these flows may be affecting. More importantly, a detailed Storm Sewer System Map will assist the regulated entity in responding to and tracing illicit discharges when they occur.

a. **Municipal Stormwater Outfalls and State Waters**

The regulation requires that the map include the location of each municipal stormwater outfall, and the subsequent state waters for each outfall. To identify the stormwater outfalls and the state waters within each jurisdiction, it is important to understand the definition of each.

According to Section 61.2(49) of the CDPS Regulations, a municipal stormwater outfall means a point source "at the point where a municipal separate storm sewer discharges to state waters and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels or other conveyances which connect segments of the same stream or other state waters and are used to convey state waters."

For purposes of this guidance and when discussing the Illicit Discharge Detection and Elimination Minimum Control Measure, it is assumed that a municipal stormwater outfall is the same as the storm sewer outfall.

Because a municipal stormwater outfall has been defined as the point where a municipal separate storm sewer discharges to state waters, it is also important to understand what are state waters. The definition of state waters under Section 2(81) of the CDPS Regulations is "any and all surface and subsurface waters which are contained in or flow in or through this State, but does not include waters in sewage systems, waters in treatment works of disposal systems, waters in potable water distribution systems, and all water withdrawn for use and treatment until use and treatment have

been completed.” Therefore, most surface water is considered state waters, including canals, ditches and man-made conveyance structures.

State waters may be categorized as “classified” or “unclassified.” Classified state waters are listed stream segments in the State standards-setting process and undergo periodic evaluation and public hearing process. Classified state waters, by definition, exempt “waters in ditches and other man-made conveyance structures.” Because water quality standards are not applied, waters in ditches and other man-made conveyance structures are considered “unclassified” state waters. For the purposes of the Phase II Stormwater Regulations, Illicit Discharge Detection and Elimination Control Measure, the permittee must map the municipal stormwater outfalls that discharge to both classified state waters and unclassified state waters (irrigation ditches, canals, and other man-made diversions).¹

b. Maximum Extent Practicable (MEP)

An umbrella requirement of the Phase II regulations is that regulated entities “develop, implement, and enforce a stormwater management program designed to reduce the discharge of pollutants from the MS4 to the maximum extent practicable.” The term “maximum extent practicable,” or MEP, also applies to the development of the Storm Sewer System Map.

The Storm Sewer System Map must include, to the MEP, all municipal stormwater outfalls that are owned or operated by a municipality. However, there may be circumstances beyond the control of the regulated entity that affect the accuracy and completeness of the Storm Sewer System Map, including the following:

- i. Access is Physically or Legally Limited:* There may be areas where an outfall is missed even when exercising a reasonable effort. These areas may be severely overgrown with vegetation, or access may be limited due to land ownership, jurisdictional boundaries, or topographic or man-made features.

If access is legally limited or exceptionally physically limited, then the Division will accept an incomplete map. However, justification will need to be provided with the application, and the Division may request additional information from the permittee on why certain areas were excluded.

- ii. Mapping is Not Practicable:* In some cases, mapping all stormwater outfalls is not practicable. Although a regulated entity must make a reasonable effort to locate all municipal stormwater outfalls, the Division understands that extraordinary circumstances do exist that may prevent completing the mapping effort without expending excessive resources. Below is an illustration of two situations that may preclude a permittee from mapping all municipal stormwater outfalls:

- It would be unreasonable to expect the area to be mapped due to its complexity. An example of this first scenario might be an irrigation ditch or piped creek, which are considered to be state waters, flowing underground into a well-developed and established area. Multiple outfalls flow into the now underground conduit. To map the underground outfalls may be very difficult and unreasonably expensive. Instead, the permittee must map the outfalls into the ditch when it daylights.
- The outfalls can reasonably be consolidated for purposes of illicit discharge detection and elimination. An example of this second scenario might be an area where multiple sheet flows and individual outfalls drain a small area (less than 10 acres) into a natural drainage.

¹ State of Colorado Department of Law, Attorney General Opinion, Aug. 26, 1974.

The natural drainage is operating as part of the MS4 and it is easy to determine where an illicit discharge occurred due to its very small aerial extent. In this case, multiple sheet flows and individual outfalls may not need to be included in the mapping requirement. Instead, one outfall can be used to represent the group.

Should the permittee decide to omit certain areas from the Storm Sewer System Map because the area is very complex or the effort would not benefit illicit discharge detection and elimination, a letter requesting that the areas be omitted from the mapping requirement must be submitted to the Division. The letter must explain why the area was omitted. Should the Division approve certain areas to be omitted from the Storm Sewer System Map, there may be additional requirements for those areas to assure that an illicit discharge is observable. Some alternative approaches to the typical surveillance techniques are listed below:

- Training of maintenance personnel on illicit discharge detection
- Creation of observation points
- Placement of “Drains to Creek” signs on all affected inlets
- Conducting accelerated public education in the area
- Filming the MS4 routinely
- Conducting monitoring

c. Prioritization of Mapping

Continuous illicit discharges (i.e., illicit connections) are less likely to occur in newer residential areas than in older residential areas. This occurs partially because criteria for subdivision development, including connections to storm sewers, became more strict with the implementation of subdivision regulations in the 60's and 70's. The date that these more stringent regulations were applied varies by MS4.

Also, it is less likely to find both continuous and intermittent illicit discharges in residential areas, both old and new, than in commercial/industrial areas. Again, the newer commercial/industrial areas typically have fewer illicit discharges than the older areas. In some MS4s, it may be that industrial areas have more illicit discharges than commercial areas.

When mapping outfalls, it may therefore be practicable for an MS4 operator with limited resources to prioritize the mapping of areas based on the above information. For example, an MS4 operator may choose to map older commercial/industrial areas first, followed by newer commercial/industrial areas, then older residential areas, and finally the remaining residential areas. An awareness of the land use, age of development, reports of illicit discharges and other information specific to each MS4 as it relates to the areas tributary to outfalls will allow an MS4 operator to prioritize their resources in the areas where most illicit discharges occur. The submittal of a systematic plan to map outfalls, coordinated with the implementation of a comprehensive plan to detect and eliminate illicit discharges during the permit term, may be the most practicable way for some MS4 operators to conduct this program.

d. Information Sources

Although the best method to inventory and map municipal stormwater outfalls within a jurisdiction is to walk the stream banks, there may be other information sources that can be of great assistance in anticipating where municipal stormwater outfalls are located. Possible sources of information for developing the Storm Sewer System Map include:

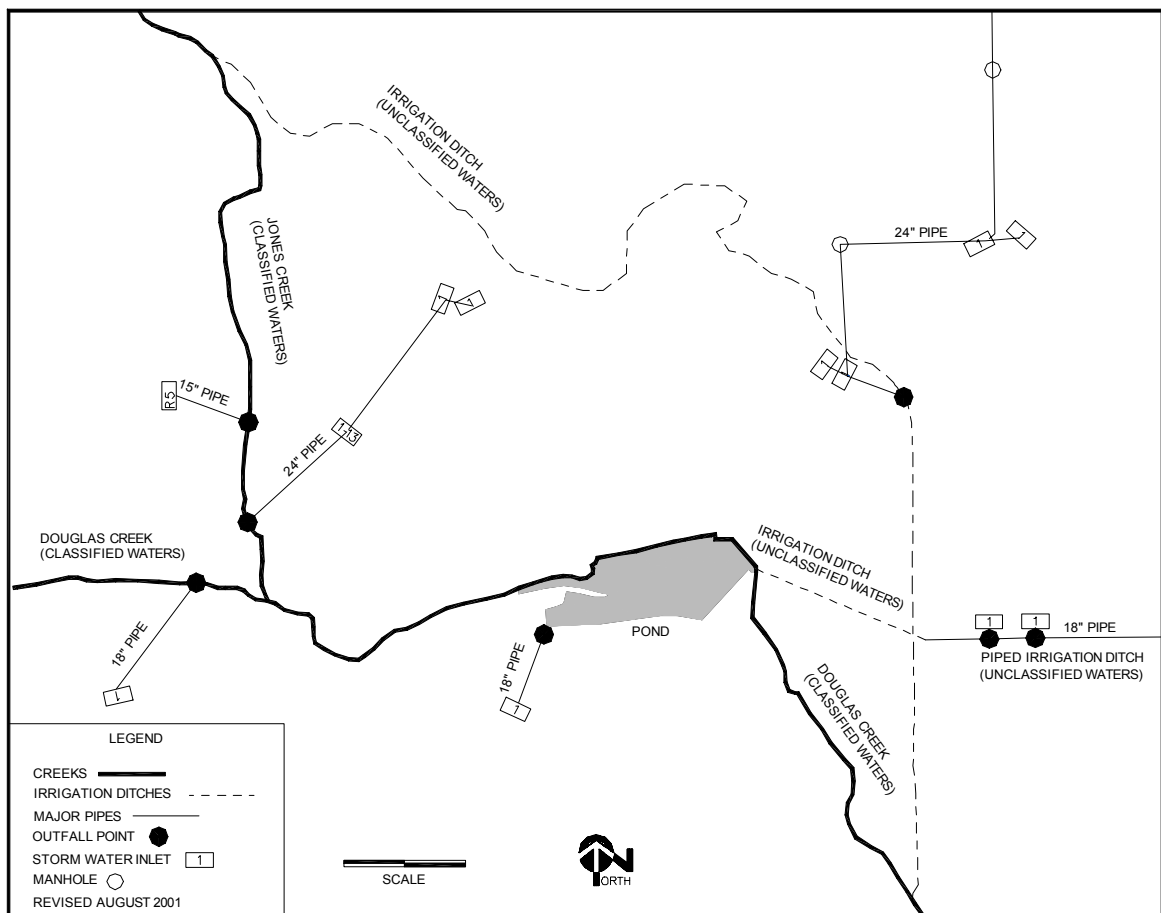
- City records, drainage maps and storm drain maps (e.g., flood control districts)
- Previous surveys (e.g., sanitary sewer infiltration/inflow and sewer system)
- Evaluation surveys

- Topographic maps
- Existing GIS data
- Pre-development stream locations
- Drainage department personnel
- Aerial surveys

In a large metropolitan area, there may also be opportunities to share resources with neighboring communities to leverage resources while gathering the needed information.

Once all the materials have been gathered, the Storm Sewer System Map can be developed. Figure 1 is an example of how a Storm Sewer System Map may appear. Remember to follow accepted mapping techniques, by including a north arrow, the scale, the date the map was completed, and a legend describing any symbols used. The Urban Drainage and Flood Control District map legend is provided in Figure 1 as a reference.

Figure 1. Example of a Storm Sewer System Map



e. Outfall Designation Protocol

A systematic method of mapping is recommended to meet the outfall mapping requirement. The specification of protocols for organization of data at the outset will assist the MS4 operator to identify, index and retrieve outfall data that will be collected and mapped. The mapping system selected will also support the management program actions required to implement detection and elimination of illicit discharges.

The purpose of the reference system is to assign a name (or label) to each outfall. Urban outfalls are part of a surface water hydrologic system, and thus a geographic reference system is recommended. In general, one of three basic forms or systems is used:

- *Stream Distance.* Lineal dimensions from a reference point are used. The stream, storm sewer, or other conveyance system forms the structure of the network. An outfall name includes the distance (usually in feet) upstream from an origin point (usually a confluence of two streams). All outfalls that discharge to a stream or drainageway are identified by stream name (or number), and are further distinguished from one another by their distance along the stream or drainageway. In addition, the relevant side of the stream or drainageway can be further distinguished by an appended letter L (left) or R (right) referring to the bank (oriented looking in a downstream direction). A symbol, such as a dot of appropriate dimension relative to the map, can be used to locate the outfall, with a label to denote its defined name.

An example using this nomenclature would be an outfall located 1,234 feet upstream of the confluence of Perennial Creek on the left bank of Ephemeral Draw:

- Ephemeral 12+34 L

Some type of base map, such as a 7½ minute US Geological Survey quadrangle map, is needed to scale off the distance along the stream centerline (thalweg). Some type of measurement tool (rolling-wheel map measure, planimeter, or AutoCAD snap line) is used to plot the true-scale distance of stations along the thalweg. In the field, a tape or surveying instrument is used to obtain the on-the-ground measurement of the outfall relative to known stations on the map, such as a bridge. The expression of length (feet) in this example uses the convention of route surveying called stationing, where points along the reference line (thalweg) are noted as stations with origin (confluence) at 0+00 and 100-foot increments.

- *Latitude/Longitude.* An alternate geographic reference system for defining outfall locations uses latitude/longitude. Although each point in this coordinate system is unique and explicit, the relationship of two outfalls along a drainageway is not readily apparent. In addition, the minimum dimension of measurement (seconds) is large relative to urban features. The determination of lat/long can be scaled off a base map. However, a GPS (Global Positioning System) receiver is required to obtain the position of the outfall in the field.
- *Street Reference.* Another coordinate system that is inherent in urban areas is streets or roads. Of course, surface waters follow geomorphic structure and not the transportation system. In common usage, however, an outfall may be described in terms of its position relative to lengths or primary direction from nearby streets and intersections.

The recommended method for mapping outfalls is stream distance, based on the benefit of defining outfall location in relation to the receiving stream. The other reference systems may also be considered as supplementary information to gather at the time of field observation.

In the Denver/Boulder metropolitan area, the Urban Drainage and Flood Control District can provide information to MS4 operators that will assist in outfall mapping. This information includes base maps, at a scale of 1 inch equals 1000 feet, with stationing defined along streams and major drainageways, and a software database program developed for storing and retrieving outfall data. MS4 operators in adjacent jurisdictions may benefit from working together in developing outfall mapping for their geographic area.

2. Development of a Stormwater Control Ordinance

Each MS4 operator must put in place ordinances or other regulatory mechanisms that provide it with appropriate authority to ensure that all illicit discharges are prohibited. This authority should also ensure that reasonable efforts are made to locate and eliminate any existing illicit discharges. The ordinance must also allow for effective enforcement of illicit discharges by the municipality. Ordinances requiring regular maintenance of private septic systems may be useful, especially where low permeability soils make percolation slow. Zoning rules may have to be changed to restrict new construction that relies on septic systems. A discussion of ordinances is provided in Chapter 1.

3. Development of an Illicit Discharge Detection and Elimination Plan

Each MS4 operator must develop an Illicit Discharge Detection and Elimination Plan. There are three components that the Plan must address, including:

- *Procedures for Locating Priority Areas*
- *Procedures for Tracing the Source of an Illicit Discharge*
- *Procedures for Removing the Source of Discharge*

The Division understands that depending upon available resources, available contractors, size of staff, and degree and character of its illicit discharges, the extent of the plans developed by regulated entities may vary widely. The determining factors on whether a plan is adequate will be whether it addresses the areas of concern and contains all required elements. This section describes methods that may be used to address areas of concern and satisfy the requirements.

A factor that should be considered by all regulated entities is the importance of preliminary planning, reconnaissance, and record keeping in order to be proactive in managing the stormwater program. It may increase costs early on to develop a management program to map inlets and pipes, survey watersheds, and understand how illicit discharges might enter into state waters, but when an illicit discharge occurs, the regulated entity can respond promptly and not in a crisis management mode.

a. **Procedures for Locating Priority Areas**

Although not individually required in the regulations, below is a list of various methods that may be used to locate illicit discharges, including:

- Training of employees on recognition and reporting of suspected problems
- Establishing and maintaining a public complaint hotline
- Performing periodic or regular visual screening during dry weather (no less than 72 hours after the last rain fall of 0.10 inches or more)
- Performing follow-up inspections of suspect outfalls
- Sampling of suspect outfalls for parameters of concern
- Evaluating water samples (visual description and/or chemical/biological testing)
- Evaluating samples for discharges from leaking septic systems (E. coli tests)

b. **Procedures for Tracing the Source of an Illicit Discharge**

Various methods can be used to find the source of illicit discharges. Initially, development of a more thorough Storm Sewer System Map may assist the regulated entity in tracing the source of an illicit discharge. Information that could be added to the Storm Sewer System Map to improve its usability may include the following, as appropriate:

- Identification of the drainage area for each outfall
- Identification of the land use for each drainage area

- Locations of all inlets
- Locations of all manholes
- Information on pre-development streams and springs
- Information regarding depth of water table
- Areas serviced by sanitary sewerage
- Areas serviced by septic systems
- Older residential areas with failing sanitary systems
- High density residential areas with septic systems
- CDPS permittees
- Significant contributors such as airports, military bases, landfills, and agricultural operations using irrigation

Once an illicit discharge has occurred, various methods could be used to ascertain its source. Below is a list of technologies that could be incorporated in a regulated entity's Illicit Discharge Detection and Elimination Plan:

- Conducting dye-testing to delineate potential source areas
- Conducting smoke tests to delineate potential source areas
- Collecting samples of the discharge and of potential sources of the discharge, and comparing the chemical analysis results
- Using TV or video cameras to inspect storm sewers
- Recruiting public involvement to report illicit discharges by using an "illicit discharge reporting hotline"

c. Procedures for Removing the Source of Discharge

There are various proven methods that can be used to remove/correct illicit discharges. Often, training of designated personnel on how to contact sources of illicit discharges and secure the cooperation of the party who is responsible to correct the problem is the most beneficial method in correcting illicit discharges and eliminating future discharges. Should the responsible party not be willing to remedy the problem, legal actions may be necessary to secure their cooperation. It may also be desirable to establish time frames for illicit discharge elimination and incorporate this factor as a performance measure.

Other procedures that may be helpful in discouraging future illicit discharges include:

- Dye-testing buildings in problem areas
- Dye or smoke-testing buildings at the time of sale
- Certification program that shows that buildings have been checked for illicit connections
- Inspection program of existing septic systems
- Use of TV or video cameras to inspect storm sewers
- Identification of areas of widespread septic system failure
- Storm drain stenciling/markings
- Poster campaigns
- Educational efforts (schools and non-profit public service organizations)
- Cooperative efforts with local industrial associations, chambers of commerce, homeowners' associations and merchant associations

Prioritization of illicit discharge detection is also advisable. Development of a plan to inspect areas more prone than others to illicit discharges will assure that scarce resources are used effectively. Additionally, procedures for dealing with illicit discharges that originate in other jurisdictions, including procedures for notification, assignment of responsibility, and follow-up enforcement efforts, are also suggested.

It is always advisable to document the surveillance of each illicit discharge as well as the actions that are taken in responding to the illicit discharge. The Division requires an Annual Report that must include “progress towards achieving the permittee’s identified measurable goals for each of the minimum control measures.” At a minimum, the regulated entity must report progress achieved towards the Illicit Discharge Detection and Elimination measurable goals provided as a part of the application (see the Measurable Goals Section). An Annual Report submitted to the Division may include the following:

- Progress towards completing the Storm Sewer System map
- Progress towards implementing a recycling program for household hazardous waste
- Progress towards the passage of an ordinance that prohibits illicit discharges
- Progress towards training public employees
- Number of illicit discharges detected
- Number of illicit discharges eliminated
- Number of households participating in regular household hazardous waste special collection days
- Number of outfalls screened
- Number of complaints received, corrected
- Number of dye or smoke tests conducted

Information that is collected and reported in the required Annual Report to the Division can also be used for periodic reports to the city council, county commissioners, or other interested parties.

D. Measurable Goals

The measurable goals, as well as the BMPs, should reflect the needs and characteristics of the MS4 operator and the area served by the MS4. The minimum measurable goals for the permit term may include activities such as the following:

<u>Target Date</u>	<u>Activity</u>
(end of) Year 1	Storm Sewer System Map completed. Recycling program for household hazardous waste in place.
Year 2.....	Ordinance in place prohibiting illicit discharges. Training for public employees completed.
Year 3.....	Number of inspections performed. Number of illicit discharges detected. Number of illicit discharges eliminated. Number of households participating in periodic household hazardous waste special collection days, or volume of waste collected.
Year 4.....	Number of illicit discharges detected. Number of illicit discharges eliminated. Number of households participating in periodic household hazardous waste special collection days.

Chapter V CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

This section outlines the State of Colorado Phase II stormwater regulatory requirements for the construction site stormwater runoff control program and offers some general guidance on how to satisfy them. It is important to keep in mind that the MS4 operator has a great deal of flexibility in choosing exactly how to satisfy the minimum control measure requirements.

Note that this section refers primarily to the construction site operator; however, the MS4 operator may also choose to include the site owner as a responsible party.

A. Benefits of a Construction Site Program

Polluted stormwater runoff from construction sites often flows to MS4s and ultimately is discharged into local rivers and streams. Sediment is usually the main pollutant of concern. Sediment runoff rates from construction sites are typically 10 to 20 times greater than those of agricultural lands, and 1,000 to 2,000 times greater than those of forest lands. During a short period of time, construction sites can contribute more sediment to streams than can be deposited naturally during several decades. The resulting siltation, and the contribution of other pollutants from construction sites, can cause physical, chemical, and biological harm to our nation's waters. For example, excess sediment can quickly fill rivers and lakes, requiring dredging and destroying aquatic habitats.

Additional pollutants are also often present in stormwater runoff from construction sites and may result in degradation of receiving water. Nutrients (nitrogen and phosphorous) are of specific concern and can cause significant impairment. In addition, solid and sanitary wastes, pesticides, oil and grease, concrete truck washout, construction chemicals, construction debris and metals may be discharged and cause an impact on receiving waters.

B. Program Requirements

The regulation (CCR 61.8(11)(a)(ii)(D)) is as follows:

(D) Construction site stormwater runoff control.

(I) The permittee must develop, implement, and enforce a program to reduce pollutants in any stormwater runoff to the MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of pollutants in stormwater discharges from construction activity disturbing less than one acre must be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more. If the Division waives requirements for stormwater discharges associated with a small construction activity in accordance with 61.3(2)(f)(ii)(B), the permittee is not required to develop, implement, and/or enforce its program to reduce pollutant discharges from such a site.

(II) The program must be developed and implemented to assure adequate design, implementation, and maintenance of BMPs at construction sites within the MS4 to reduce pollutant discharges and protect water quality. The 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 BMPs;*
- (c) Requirements for construction site operators to control waste such as discarded 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.*

1. Regulatory Mechanism

Through the development of ordinances or other regulatory mechanisms, the MS4 operator must establish a construction program that controls polluted runoff from construction sites with a land disturbance of greater than or equal to one acre. Regulations must also be established for land disturbances of less than one acre if the construction activity is part of a larger common development that would disturb one acre or more. Refer to section F of Chapter 1 for more information on the development of ordinances.

C. Guidelines for Developing and Implementing This Measure

1. Minimum Design Criteria

A standard operating procedure must be developed to guide the operators of construction activities in the selection and design of appropriate erosion and sediment control BMPs and waste control measures. The standard operating procedure should incorporate guidelines for the following areas.

a. **Best Management Practices (BMPs)**

Guidelines for the appropriate selection and design of construction, structural and non-structural BMPs should be provided. The design criteria and standards can be provided by reference to existing criteria manuals. (One example is Urban Drainage and Flood Control District's Volume 3 – BMP Manual. See the Reference section for additional resources.) When considering construction structural and non-structural BMPs, it is often more effective to stress performance-based specifications than method-based specifications. In other words, it might be better to require contractors to minimize or eliminate the transportation of sediment off site than to specifically require silt fences or detention ponds.

Examples of BMPs include:

- *Preventative Controls:* minimizing disturbance, preserving natural vegetation, good housekeeping
- *Erosion Controls:* mulch, grass, stockpile covers
- *Sediment Controls:* silt fence, inlet protection, check dams, stabilized construction entrances, sediment basins
- *Drainageway Controls:* diversions, temporary crossings
- *Non-Sediment Controls:* covered chemical storage, spill containment and procedures, waste containment

b. **Stabilization**

Temporary, seasonal, and final stabilization practices should be defined and required. The types of stabilization should be handled as follows:

- i. *Temporary stabilization.* Standards should be specified for disturbed areas that will remain exposed for long periods of time due to construction staging. Maximum exposure time limits should be specified.
- ii. *Seasonal stabilization.* Standards should be adopted for construction activities that are affected by seasonal shutdowns for climactic conditions or a long construction schedule. Stabilization standards and inspection/maintenance schedules should be addressed.

- iii. Final stabilization.* Standards should be provided for when a site is considered stabilized and program coverage terminated (for example, the Division's construction permit requires that vegetative cover has been established with a uniform density of at least 70 percent of pre-disturbance levels).

c. **Materials Handling**

Materials handling BMPs must be required. At a minimum, such BMPs must include controlling waste, such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site, that may cause adverse impacts to water quality. Spill prevention and containment practices should be included such as, but not limited to, providing containment for materials, waste, and fuel stored on the construction site.

2. Control Mechanism

An administrative or other control mechanism must be used to ensure that the requirements to develop and maintain erosion, sediment and materials handling controls are clear to the developer and/or contractor. One way to do this is to incorporate the requirements into a grading permit. This simplifies the process by using an existing mechanism, and gives the MS4 operator more authority to ensure that the requirements are being met.

3. Stormwater Control Site Plans

The construction program must include a mechanism to determine if a construction site is in compliance with the above provisions. The MS4 operator must develop a standard operating procedure for the development of a stormwater control site plan based on the Minimum Design Criteria (see section 1). The regulation also requires that the municipality develop procedures for plan submittal and review. It is the Division's expectation that stormwater control site plans will be submitted to the MS4 operator for all areas of significant development and redevelopment. The following items are suggested for the development of the standard operating procedure:

- a. Procedures for reviewing and approving stormwater control site plans.
- b. System to track the status of the stormwater control site plans.

The regulation does not require that all submitted plans be reviewed and/or approved. However, the permittee must provide adequate project oversight to prevent inadequate stormwater control site plans from being implemented and resulting in degradation of state waters.

4. Inspections and Enforcement

As construction commences, BMPs should be in place and the MS4 operator's inspection and enforcement activities should begin. A standard operating procedure for site inspection and enforcement of control measures must be developed. The standard operating procedure for site inspections can incorporate two segments: an inspection program through the reviewing authority to ensure and maintain compliance, and a separate inspection program maintained by the operator of each construction site.

a. **MS4 Inspection Program**

It is suggested that a monitoring and inspection guide be developed for the MS4 Inspection Program to ensure that consistent actions are taken. Specific items to include are:

- *A standard for performing inspections.* This could include a single inspection form applicable to residential, industrial, commercial, and municipal developments. As part of the development of the standard, an evaluation should be made of the frequency of inspections for high and low priority sites based on proximity to sensitive areas, seasonal climactic changes, or other area-specific concerns. A system that prioritizes sites may benefit both the MS4 operator and environment, by ensuring that resources are targeted at those sites with the highest potential to affect water quality.
- *A system for tracking the stormwater control site plans.* The system should be capable of identifying sites due for inspections and those sites for which there has been an enforcement action, and provide needed information to the Annual Report preparer.

Municipal inspection protocols can be tailored to the specifics of each municipality's Construction Program plan. For example, some plans may be more inspection-driven and, thus, more extensive. At a minimum, all programs should include:

- i. *Compliance Inspections.* Compliance inspections are routine inspections conducted to ensure that the BMPs are implemented according to approved plans or as required by the site conditions and are receiving proper maintenance. The inspector not only verifies that the BMPs are functioning according to design and that only allowable discharges are occurring, but also confirms that the required documentation of inspection and BMP modification is occurring. This should include an appropriate level of follow-up when deficiencies are discovered.

Compliance inspections are advisable at the onset of construction to confirm the proper implementation of the stormwater control site plan. Additionally, final inspections may be needed to ensure that proper revegetation and stabilization is in place, and that all temporary erosion and sediment controls have been removed, before program coverage terminates.
- ii. *Complaint Response Inspections.* Each reviewing authority must have the ability to respond to third party concerns regarding the implementation of a site's stormwater control site plan and BMPs. This could include a point of contact, response protocol (either a telephone call to operator, inspection of site by representative of that reviewing authority, or some other means of follow-up with the construction site), and review of the plan, as appropriate. An appropriate level of follow-up should be included when deficiencies are discovered.
- iii. *Reconnaissance Inspections.* These can be used to facilitate compliance inspections by adding a random, visual check that a construction site is in compliance, or that a construction site has filed the stormwater control site plan with the MS4 operator. These inspections can be performed by municipal staff already in the field, such as right-of-way inspectors, or by staff performing numerous brief erosion and sediment control inspections in one day.

The following can be considered for inclusion when developing a schedule for any of the inspection programs listed above.

- *The size of the disturbed area.* The larger the area of disturbed land, the more sediment likely to run off the site and the more difficult it is for the contractor to ensure that BMPs are implemented properly. In general, the larger construction sites will require more frequent inspections.
- *The length of time that the site will be left disturbed.* The longer a site remains unstabilized, the greater the potential for a water quality impact. Therefore, sites that will be under construction for long periods should be inspected more frequently.

- *The proximity of the construction site to areas of significant environmental concern.* Sites located close to environmentally sensitive areas, such as wetlands or streams, endangered species habitat, on steep slopes or where the slopes are erosive should be inspected more frequently to ensure that the BMPs necessary to protect these areas are implemented and properly maintained. Sites located close to streams should be watched more closely.
- *The phase of construction.* The impact from a construction site is directly related to the type of activity on site. During initial ground clearing and excavation, the potential for impact is at its greatest. Inspections should be more frequent during this phase of construction than during subsequent phases.
- *Past experiences with the site operators and/or their representatives.* Inspections should be more frequent if the site is run by a construction operator with whom the MS4 operator has experienced past compliance difficulties.

b. Operator Inspections

Separate procedures should be developed to document the inspection of construction sites by the operator of a construction project and by the MS4 operator. This includes a means of tracking and documenting the inspections performed and following up to ensure that corrective actions are taken.

Requirements for inspections by the operator of a site should include regularly scheduled inspections, as well as post-event (storm, snowmelt, and etc.) inspections, to ensure that the BMPs are operating as designed, determine if maintenance is needed, and to locate and clean up any areas where sediment and debris have run off the site.

Results of all regularly scheduled and storm event inspections should be required to be readily accessible to representatives of the reviewing authority.

5. Training and Education for Construction Site Operators

An education and training program must be developed for municipalities, their representatives and/or construction contractors. At a minimum, the program must include an informational program for construction site operators unfamiliar with the reviewing authority's regulatory requirements. This would likely be provided with other pre-development documents.

Additional components of this part of the program could include:

- a. An informational and training program on BMPs.
- b. A resource list for existing stormwater training programs.
- c. Notification of upcoming educational opportunities.
- d. Encouraging construction groups in the area to provide such training to their members. This training would benefit their members by providing the information needed to comply with MS4 and State regulations to avoid enforcement actions and penalties.
- e. Providing a reviewing authority or MS4-specific certification program, or requiring compliance with another entity's certification program. (This is currently available in a program administered through Red Rocks Community College and supported by CDOT, UDFCD, and CDPHE; and a separate, but similar program through the Colorado Contractors Association. An existing or

regional certification program has the advantage of providing consistency between MS4s for developers.)

6. Enforcement

An Enforcement Program for construction site erosion, sediment and materials handling controls must be developed. The system should address appropriate responses to common noncompliance issues, such as failure to implement or maintain BMPs. The system should also specify when and how enforcement procedures, such as stop work orders or summons to appear before a magistrate, will be used, and how these activities would be tracked.

There are several options available for formal action. They include:

- *Withholding of grading or building permit or building inspections*
- *Warning letter/inspection report*
- *Letter of noncompliance*
- *Stop-work order*
- *Withholding of the Certificate of Occupancy*
- *Permit revocation*
- *Notice of violation and order with monetary fines*
- *Municipal summons*

7. Responses

It is important that the MS4 operator address the range of problems that can occur at a construction site in a manner that reflects the seriousness of the situation. The following is a sample guide that addresses the more common situations that can occur and those measures that should be taken prior to formal action.

a. **Failure to Obtain a State Permit**

Some developers or contractors may need to be reminded of the need to obtain a State stormwater construction permit. If it is determined that a permit is not obtained from the State for a site that requires permit coverage, some suggested actions are:

- i. *Deny approval* for construction until a State permit is obtained.
- ii. *Inform the developer/contractor* of the need to obtain a State permit and give them a deadline to apply for a permit from the State, beyond which the MS4 operator will notify the Division. (Note that the Division does not require a construction application to be submitted for stormwater permitting until 10 days prior to beginning earth-disturbing activities.)
- iii. *Notify the Division.*

b. **Failure to Develop a Stormwater Control Site Plan**

One of the most elementary violations that can occur at the site is the failure to develop the required stormwater control site plan. In most cases, it is recommended that the MS4 operator not approve any development plans without the completion and/or approval of the stormwater control site plan. This will ensure that construction cannot commence until the plan is completed. A suggested action if a plan is not developed is to withhold approval of the development plan.

c. **Failure to Implement the Stormwater Control Site Plan**

The most significant violation that can occur at the site is the failure to implement the stormwater control site plan. This can range from failing to implement all, or a portion of the plan, to failing to properly install the BMPs. It is suggested that the MS4 operator try to determine why the plan is

not being implemented as approved before deciding on appropriate follow-up. Specifically, determine if it is the result of ignorance of the requirements, a change in site conditions, or a general disregard for the requirements.

d. Failure to Maintain BMPs

It is important to not only implement the plan, but to ensure that the BMPs implemented are maintained. As with failure to implement the plan, it is necessary to determine the cause of the noncompliance. Suggested actions include:

- i.* Document the need for maintenance on the inspection report. Provide time for the contractor to address the concerns. A follow-up inspection will need to be conducted.
- ii.* If the contractor fails to take the necessary measures, meet with the owner and contractor to discuss the necessary measures and time frames for addressing the problems.
- iii.* If actions are not taken in the specified time frame, issue a Letter of Noncompliance that requires the necessary measures to be taken. (Also see options under Enforcement, section 6, above.)

e. Failure to Modify the Erosion and Sediment Plan

Since it is not always possible to anticipate site conditions, it may be necessary for the stormwater control site plan to be modified to reflect changing site conditions. It is also important for the construction site operator to have a plan that accurately reflects the site. Compliance with the plan as drafted is required. The construction site operator should note those areas of the plan that prove to be inadequate or unnecessary and take the steps necessary to implement any necessary changes and modify the plan. Enforcement for failing to modify the plan may only need to be considered if the construction site operator fails to make modifications when the plan has proven to be inadequate to protect water quality. The MS4 operator should also consider setting up an approval process for amended plans.

f. Failure by Operator to Perform Inspections

In addition to those violations that directly affect water quality, there are other violations of the plan that are related to the required documentation of the activities. These violations are handled differently than the others. If there is a failure to perform inspections, the following actions can be taken.

- i.* Document the need to perform inspections in the inspection report.
- ii.* Advise the site owner and operator of the requirement to perform the inspections, and have them submit inspection reports to the MS4 operator at a set frequency.
- iii.* Re-inspect the site to determine if inspections have been performed.
- iv.* If the operator fails to perform inspections at the required frequency, begin formal enforcement that requires the performance of the inspections and submission of the reports on a predetermined basis.

8. Obtaining Public Input

A program or procedures must be developed for the receipt and consideration of public inquiries, concerns and information submitted regarding construction sites. This provision is intended to further reinforce the public participation program (see Chapter III), and to recognize the crucial role that the public can play in identifying instances of noncompliance.

The MS4 operator is required only to consider the information submitted, and may not need to follow up and respond to every complaint or concern. Although some form of enforcement action or reply is not

required, the MS4 operator is required to demonstrate acknowledgment and consideration of the information submitted. A simple tracking process will suffice in which submitted public information, both written and verbal, is recorded and then given to the construction site inspector for possible follow-up.

9. Waivers

For small construction sites (1 to 5 acres of disturbed area), the Division has the option of granting a waiver from the requirement to obtain a stormwater permit if, using the Revised Universal Soil Loss Equation and based on the Rainfall Erosivity Factor, the construction site operator can show that the potential for soil loss and polluted discharges is low enough to justify a waiver from the requirements. The MS4 operator has the option of also waiving coverage under their construction program for any site that has received a waiver from the Division.

10. Qualifying Local Programs – Construction

The regulation (CCR 61.8(12)) allows the Division to accept the requirements of a qualifying local erosion and sediment control program as satisfying the requirements of the Division’s construction permit(s). The local program would be incorporated by reference into the Division’s construction permit(s). This is mainly of concern for the small (1 to 5 acres of disturbed area) construction sites. Such sites would not need to apply to the Division for stormwater permit coverage if the Division’s construction permit stated that the local program should be followed instead. (The provision can also apply to larger construction sites, but the construction operator would still have to apply for a permit from the Division. Therefore, it does not provide as much benefit to the operator or the municipality.)

The construction program outlined above in the minimum measures (which will be required in the Division’s MS4 general permit) would meet the requirements for a qualifying local program, except that development, submittal and implementation of a Stormwater Management Plan (SWMP) by the construction site operator is also required. The SWMP requirements are similar to those outlined under a stormwater control site plan (see section 3, above), with a few additions. The SWMP must include site descriptions, descriptions of appropriate control measures, copies of approved local requirements, maintenance procedures, inspection procedures, and identification of non-stormwater discharges.

If the MS4 operator wishes to be designated as having a qualifying local program, they must submit the request, including a detailed description of their program, to the Division. This submittal must be separate from the MS4 operator’s permit application. The program must be fully implemented before the designation request can be submitted.

D. Measurable Goals

The measurable goals should reflect the needs and characteristics of the MS4 and the area served by the MS4. The minimum measurable goals for the permit term may include measures such as the following:

<u>Target Date</u>	<u>Activity</u>
(end of) Year 1	Design Criteria, Standard Operating Procedures for Stormwater Control Site Plan review and monitoring developed; procedures for information submitted by public in place.
Year 2	Ordinance or other regulatory mechanism in place.
Year 3	Stormwater Control Site Plan review and monitoring implemented. Enforcement Program developed and implemented.
Year 4	Increase in number of site plans reviewed and approved, number of inspections performed.

Chapter VI POST-CONSTRUCTION STORMWATER MANAGEMENT

This section outlines the Phase II requirements for post-construction runoff control and offers some general guidance on how to satisfy those requirements. The MS4 operator should keep in mind that it has some flexibility in choosing exactly how to satisfy the minimum control measure requirements.

A. Benefits of a Post-Construction Stormwater Management Program

Post-construction stormwater management in areas undergoing new development or redevelopment is necessary because runoff from these areas has been shown to significantly affect receiving water bodies. Many studies indicate that prior planning and design for the minimization of pollutants in post-construction stormwater discharges is the most cost-effective approach to stormwater quality management.

There are generally two forms of substantial impacts from post-construction runoff. The first is caused by an increase in the type and quantity of pollutants in stormwater runoff. As runoff flows over areas altered by development, it picks up harmful sediment and chemicals such as oil and grease, pesticides, heavy metals, and nutrients (e.g., nitrogen and phosphorus). These pollutants often become suspended in runoff and are carried to receiving waters, such as lakes, ponds, and streams. Once deposited, these pollutants can enter the food chain through small aquatic life, eventually entering the tissues of fish and humans. The second kind of post-construction runoff impact occurs by increasing the quantity of water delivered to the water body during storms. Increased impervious surfaces interrupt the natural cycle of gradual percolation of water through vegetation and soil. Instead, water is collected from surfaces such as asphalt and concrete and routed to drainage systems where large volumes of runoff quickly flow to the nearest receiving water. The effects of this process include stream bank scouring and downstream flooding, which often lead to a loss of aquatic life and damage to property.

B. Program Requirements

The regulation (CCR 61.8(11)(a)(ii)(E)) is as follows:

Post-construction stormwater management in new development and redevelopment.

(I) The permittee must develop, implement, and enforce a program to address stormwater 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 the MS4. The program must ensure that controls are in place that would prevent or minimize water quality impacts.

(II) The permittee must:

- (a) Develop and implement strategies which include a combination of structural and/or non-structural BMPs appropriate for the 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.*

C. Guidelines for Developing and Implementing This Measure

The MS4 operator must implement comprehensive and detailed planning procedures and enforcement controls to reduce the discharge of pollutants after construction is complete, from areas of significant new development and redevelopment.

1. Regulatory Mechanism

The permit requires that the MS4 operator establish an ordinance or other regulatory mechanism requiring the implementation of post-construction runoff controls. The MS4 operator should evaluate

the area under consideration and identify management objectives for streams, wetlands, and other receiving waters. Areas where urban development is likely to occur and areas that are sensitive to the effects of urbanization should be identified. Consideration should be given to receiving waters, topography, soil types, groundwater uses and potential impacts, and other relevant factors. This evaluation will help improve water quality by guiding the development of a community away from sensitive areas, and by restricting certain types of growth to areas that can support it without compromising water quality.

Suggested items to include in the ordinances or regulations are described in the following sections.

a. Significant New Development or Redevelopment

“Significant” new development or redevelopment and the runoff control requirements should be defined. Project size (i.e., greater than or equal to one acre) can be considered to determine significance. In addition to project size, the project phasing may also be evaluated. If a project will be constructed in several phases that in total encompass more than one acre, the project should be considered significant. Additionally, if the new development or redevelopment may impact sensitive waters, the project may be considered significant.

Zoning is another tool to consider in defining significance. This includes evaluating existing zoning and determining which zones should be considered significant. As an example, significant new development and redevelopment may be defined as:

- *All sites zoned commercial, industrial, or mixed use* that include total development/redevelopment disturbing one acre or larger.
- *All sites zoned residential* that include total development/redevelopment disturbing one acre or larger, except:
 - sites zoned single or double family residential disturbing between 1-2 acres, or with only 2 residential lots if they are determined to pose a low risk of impact. Additional criteria may be used that provide a similar level of protection.
- *All other sites* that do not meet the above requirements may be defined as significant new development/redevelopment if:
 - significant water quality impacts are anticipated as a result of development/redevelopment of the site, as determined by the city engineer. For example, areas with a high density of small developments, that otherwise may not be included, may pose a substantial threat of unmediated impacts to water quality, and thus would be considered significant.
 - stormwater quantity detention is required. Water quality features should be incorporated into the stormwater quantity detention basins.

Significant new development and redevelopment should be required to provide nonstructural and structural BMPs as defined in the MS4 operator's program.

2. Review and Approval Procedures

The regulation requires the post-construction program to include controls to determine if new development and redevelopment designs incorporate adequate structural and/or nonstructural BMPs. The MS4 operator should review their existing “review and approval” procedures to determine if the current program includes elements required in the regulation, or if additional improvements are warranted. If a review and approval procedure does not exist, a program should be developed.

Elements that should be considered for inclusion in the review and approval procedure are described in the following.

- *Develop a standard operating procedure* for the new development or redevelopment plan reviews and approval. The standard operating procedure should identify the department(s) to be included in the process, and should summarize minimum nonstructural and structural BMP requirements as a checklist.
- *Develop a system* to track the status of plans. This system can be combined with existing tracking systems.

3. Design Criteria and Standards

A standard operating procedure must be developed for the selection and design of appropriate non-structural and structural BMPs. The design criteria and standards can be provided by reference to existing criteria manuals such as the Urban Drainage and Flood Control District's Volume 3 – BMP manual (see Chapter VIII for other sources). The standard operating procedure should incorporate guidelines for the following minimum measures.

- *Planning* – Runoff problems can be addressed effectively with sound planning procedures. The planning process should include Master Plans and Comprehensive Plans that should be reflected in zoning ordinances.
- *Non-Structural Practices* – These controls are intended to prevent or control the sources of pollutants. These can include controls on disposal of household waste and toxins, use of pesticides, herbicides, and fertilizer, illicit discharges, good housekeeping, preventative maintenance, and spills.
- *Structural Practices*. – These controls are intended to reduce the amount of pollutants that enter state waters. They include:
 - o *Storage Practices* – Storage or detention BMPs control stormwater by gathering runoff in wet ponds, dry basins, or multichamber catch basins and slowly releasing it to receiving waters or drainage systems. These practices control stormwater volume and settle out particulates for pollutant removal.
 - o *Infiltration Practices* – Infiltration BMPs are designed to facilitate the percolation of runoff through the soil to groundwater, thereby reducing both stormwater quantity and mobilization of pollutants. Examples are infiltration basins/trenches, dry wells, and porous pavement.
 - o *Vegetative Practices* – Vegetative BMPs are landscaping features that, with optimal design and good soil conditions, enhance pollutant removal, maintain/improve natural site hydrology, promote healthier habitats, and increase aesthetic appeal. Grassy swales, filter strips, and artificial wetlands are examples.
- *Regional BMPs* – These controls are usually implemented downstream of a large drainage area. They can be online (located in the state waters), or offline (prior to entering state waters). In general, where regional BMPs such as a detention pond exist, some onsite BMPs will be necessary.

If the regional BMPs are being placed prior to discharging into state waters, then the regional BMPs can be used to meet the post-construction requirement, and additional on-site BMPs may only be needed to assist in the function of the regional BMPs. However, if the regional BMPs are located after stormwater runoff has discharged into state waters, including natural drainageways being utilized by the municipality as part of their MS4, this may be a violation of the regulation's requirement to protect state waters, and additional on-site BMPs must be considered to protect the state waters.

It is the Division's interpretation of the regulation that regional BMPs may be utilized after stormwater has been discharged to a state water if additional BMPs are in place to protect the state water between the regional BMP and the area of "New Development and Significant Redevelopment." In this case, the BMPs used prior to discharging to a state water may not be as

extensive as would normally be required, as long as they are adequate to protect the state water upstream from the regional BMP. Usually these state waters upstream from the regional BMP are smaller, intermittent drainage ways less susceptible to impacts from stormwater runoff. The regional BMP would then be utilized to further reduce pollutants from the stormwater, prior to reaching water bodies further downstream that are more sensitive to stormwater pollutant loading.

4. Ensure Adequate Long-Term Operation and Maintenance of BMPs

Under this program, a permittee must develop, implement and enforce a program that ensures adequate long-term operation and maintenance of BMPs.

As the permittee, the ultimate responsibility for compliance is placed on the municipality. There is general agreement that BMPs must be maintained to operate properly. However, most municipalities prefer and require that responsibility for operation and maintenance of structural controls, such as a stormwater detention basin, remain with the private-property owner. Municipalities normally require a drainage easement that precludes modification of the BMP and allows legal access to the property for inspection and actions as necessary to maintain the operation of the BMP as originally intended.

Municipalities, as part of the approval process for any development, can require that certain conditions be met prior to receiving its approval to proceed with construction of the development. Usually, the most important of those conditions are contained on the recorded plat. In all instances, municipalities should require that, as part of the plat, it be noted that the legal title holder to the property is responsible for maintaining the BMPs, and that the municipality has the legal right to enforce that obligation, either by legal action to obtain compliance, or by performing the maintenance itself and then collecting those expenses by recording a lien on the property. However, in addition to the above procedure, the municipality should require each approved development, prior to the approval of the plat, to create a Homeowners' Association (HOA).

For residential areas, the land area in a subdivision where a BMP is located is usually held in common by an HOA. The HOA is a legal entity that can levy assessments on developed properties within the subdivision to raise funds for expenditures to operate and maintain infrastructure held in common. The formation of the HOA can encompass various terms, conditions, responsibilities and authorities. The MS4 operator should ensure that these include the legal responsibility to maintain the BMPs installed in the development, as well as the legal authority to levy an assessment on each owner to pay for that maintenance. In addition, the HOA should have the right to impose a lien on an owner's property for failure to pay the assessment. All of these powers should be set forth in the articles of incorporation of the HOA, its bylaws, and the covenants, conditions and restrictions, which affect all of the property in the development. The covenants are recorded with the County Clerk, and are enforceable by the HOA.

For commercial developments, such as a shopping mall, a relatively large area of land is involved that would be developed by one individual (or corporation), and subsequently sold or leased to relatively few tenants or property owners. It is likely that this land would be built at one time with one or two structural BMPs comprising a system for the entire site. Individual lots for industrial, commercial, or residential use would also follow this model where on-site BMPs would be designed and constructed. For these properties, the requirements for operation and maintenance of on-site BMPs should identify the responsible party as part of the development agreement and be recorded for the property. In addition, municipalities should consider requiring the formation of an owners' association in those instances in commercial development where there will be multiple owners of the real property. An ordinance or other regulatory mechanism should indicate that, regardless of whether the owner or tenant is responsible for the maintenance, the MS4 operator would enforce on the owner if the maintenance were not performed.

HOAs have not always remained diligent in their responsibilities, and they have at times provided notification of dissolution. Under a strict interpretation of "ensure" as contained in the regulation, the

municipality could be held liable for the responsibility of operation and maintenance of BMPs on private property. Therefore, by assuring through the development approval process that the owner of the real property will ultimately be legally responsible for the maintenance of the BMPs, a municipality has done all in its power to “ensure” that the BMPs will be maintained as agreed. To this end, the municipality should not only provide for the performance of the needed maintenance by itself, if necessary, but should also include a process whereby a lien of record (or similar legal action) can be placed on the owner’s property. The lien would be used to assure collection of the owner’s share of the maintenance costs expended by the municipality. It is the Division’s position that this process is permitted under 31-15-401 C.R.S., which grants to municipalities general police powers, including the authority to promote health and abate nuisances.

The standard for permit compliance for MS4 permits is that municipalities ensure maintenance and operation of BMPs to the maximum extent practicable (MEP). In determining if an MS4 operator has complied to the MEP, the Division may consider such factors as the adequacy of the MS4 operator’s post-construction program, its ability to require that the necessary actions be performed by the responsible parties, how the MS4 operator has carried out the post-construction program, and, if necessary, the MS4 operator’s ability to provide appropriate mechanisms to ensure such maintenance and operation.

It is expected that the MS4 operator will put into place procedures, ordinances or other regulatory mechanisms that will require, to the extent allowed by State or local law, that BMPs be appropriately designed and planned, and provide for enforceable operation and maintenance by the owner/operator. Factors such as the extent of the inspection/verification system, and the procedures in place and implemented for instances when BMPs are not operated and/or maintained, can be evaluated by the Division to determine if the MS4 operator’s program meets the MEP standard.

Some additional measures that a municipality may need to consider for inclusion in this management program are:

- Regular inspections of BMPs and a report sent to the owner/operator noting compliance or deficiencies, as discussed below in section 6.
- Requirement for a surety bond, letter of credit, or other financial instrument to be held by the municipality in case of default on maintenance responsibility.
- “Charge-back” provisions where the municipality will perform the required maintenance of a BMP and invoice the owner for repayment.
- Policy that all BMPs are transferred into public ownership (by deed or easement), and fees are assessed for operation and maintenance by the municipality.
- Establish a maintenance contract with a private subcontractor for maintenance of municipally-owned BMPs.
- Establish a fee system whereby privately owned BMPs are maintained under a contract with a private subcontractor, but the municipality administers the contract.

a. **Recommendations**

It is recommended that all municipalities evaluate their existing ordinances to determine if sufficient authority currently exists to comply with the provisions of this regulation. If not, the following or a similar model ordinance is recommended for adoption:

“All stormwater best management practices (BMPs) shall have an enforceable operation and maintenance agreement to ensure that the system functions as designed. This agreement will include any and all maintenance easements required to access and inspect the BMP(s), and to perform routine maintenance as necessary to ensure proper functioning of the stormwater BMP. In addition, prior to the issuance of any permits for land development, legally binding documents shall be

adopted and agreed to wherein the owners of the real property associated with the BMPs that benefit that property are held ultimately responsible for the proper maintenance of all stormwater BMPs, including a mechanism for the collection of the costs of the maintenance if it is not performed by the owners of the property.”

The adoption and implementation of an ordinance; its enforcement (if necessary); obtaining drainage easements; and review/approval of covenant restrictions for all new development and redevelopment approved in the municipality, will satisfy this section of the regulation.

5. Monitoring Compliance During Construction

The MS4 operator must develop procedures to determine if the BMPs required by the Design Criteria (see section 3, above) are being installed according to specifications. This will most likely need to be developed in conjunction with the Construction Program. It is suggested that the MS4 operator try to determine why the plan is not being implemented as approved before determining appropriate follow-up. Specifically, the MS4 operator should determine if it is the result of ignorance of the requirements, a change in site conditions, or a general disregard for the requirements. The MS4 operator must have ordinances or other control mechanisms in place to allow measures to be taken to ensure the BMPs are installed correctly, such as not allowing release of development bonds until the proper BMPs are in place and operating.

6. Monitoring Long-Term Compliance

The permit requires the MS4 operator to ensure adequate long-term operation and maintenance of BMPs. Inspection and Enforcement programs are required. The elements of the programs should include the following.

a. **Database**

The MS4 operator should develop a database of all new post-construction BMPs in its jurisdiction. In addition to being an important tool for other elements of the Post-Construction minimum measure, such as inspections and enforcement, the database could be used for mailings to remind BMP owners to perform necessary maintenance.

b. **Inspection Program**

The Post-Construction Inspection Program should be a continuation of the Construction Program and contain the same program elements. A standard should be developed for performing inspections, and should include inspection forms applicable to residential, commercial, and municipal developments. As part of the development of the standard, an evaluation should be made of the frequency of inspections based on proximity to sensitive areas, seasonal climactic changes, or other area-specific concerns. The program should include the following:

- i. *Compliance Inspections.* Compliance inspections are routine inspections conducted to ensure that the BMPs are receiving proper maintenance. The inspector not only verifies that the BMPs are functioning according to design and that only allowable discharges are occurring, but also confirms that the required documentation of inspection and BMP modification is occurring. This should include an appropriate level of follow-up when deficiencies are discovered.
- ii. *Complaint Response Inspections.* The MS4 operator must have the ability to respond to third party concerns regarding malfunctioning or poorly maintained BMPs. This should include a point of contact, response protocol (either a telephone call to owner/operator, inspection of site by representative of reviewing authority, or some other means of follow-up with the

construction site), or review of the site plan, as appropriate. A suitable level of follow-up should be included when deficiencies are discovered.

c. Enforcement Program

An Enforcement Program must be implemented. The program must address appropriate responses to common noncompliance issues with developers/property owners, such as failure to maintain BMPs. The system should also specify when and how items such as summons to appear before the magistrate will be used, and how these activities would be tracked. Several options for formal action are available. They include:

- *Verbal warning to the developer/property owner*
- *Letter of noncompliance*
- *Notice of violation and order*
- *Charge back to contractor for work completed by MS4 representatives*
- *Municipal summons*

d. Failure to Maintain BMPs

It is important to ensure that the BMPs implemented are maintained. It is also necessary to determine the cause of any noncompliance. Suggested actions include the following:

- i.* Document the need for maintenance on the inspection report. Provide time for the developer/property owner to address the concerns. A follow-up inspection will need to be conducted.
- ii.* If the developer/property owner fails to take the necessary measures, meet with the developer/property owner to discuss the necessary measures and time frames for addressing the problems.
- iii.* If actions are not taken in the specified time frame, issue a Letter of Noncompliance that requires the necessary measures be taken.

D. Measurable Goals

The measurable goals, as well as the BMPs, should reflect the needs and characteristics of the MS4 operator and the area served by the MS4. A sample approach for this minimum measure could include the following goals.

<u>Target Date</u>	<u>Activity</u>
(end of) Year 1	Design Criteria, Standard Operating Procedures for Site Plan Review and Monitoring developed.
Year 2.....	Ordinance or other regulatory mechanism in place.
Year 3.....	Number of site plans reviewed and approved, number of inspections performed. Enforcement Program developed and implemented.
Year 4.....	Increase in number of site plans reviewed and approved, number of inspections performed.

Chapter VII**POLLUTION PREVENTION/GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS**

This section outlines the State of Colorado Phase II stormwater regulatory requirements for the Pollution Prevention/Good Housekeeping for Municipal Operations program, and offers some general guidance on how to satisfy them. It is important to keep in mind that the MS4 operator has a great deal of flexibility in choosing exactly how to satisfy the minimum control measure requirements.

A. Benefits of a Pollution Prevention/Good Housekeeping Program

The Pollution Prevention/Good Housekeeping for Municipal Operations minimum control measure is a key element of the MS4 stormwater management program. This measure requires the MS4 operator to examine and subsequently alter their own actions to help ensure a reduction in the amount and type of pollution that: (1) collects on streets, parking lots, open spaces, and storage and vehicle maintenance areas and is discharged into local waterways; and (2) results from actions such as street maintenance, environmentally damaging municipal land development and flood management practices, or poor maintenance of storm sewer systems. While this measure is meant primarily to improve or protect receiving water quality by altering municipal activities, facility operations and property management, the MS4 operator can also realize cost savings from such things as spill prevention (thus reducing clean-up costs), inventory control, and re-use/recycling of materials.

B. Program Requirements

The regulation (CCR 61.8(11)(a)(ii)(F)) is as follows:

(F) Pollution prevention/good housekeeping for municipal operations.

(I) The permittee must develop and implement an operation and maintenance program that includes an employee training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations. The program must also inform public employees of impacts associated with illegal discharges and improper disposal of waste from municipal operations. The program must prevent and/or reduce stormwater pollution from facilities such as streets, roads, highways, municipal parking lots, maintenance and storage yards, fleet or maintenance shops with outdoor storage areas, salt/sand storage locations and snow disposal areas operated by the permittee, and waste transfer stations, and from activities such as park and open space maintenance, fleet and building maintenance, street maintenance, new construction of municipal facilities, and stormwater system maintenance, as applicable.

Recognizing the benefits of pollution prevention practices, the rule requires the MS4 operator to:

- Develop and implement an operation and maintenance program with the ultimate goal of preventing or reducing pollutant runoff from municipal operations into the storm sewer system;
- Include employee training on how to incorporate pollution prevention/good housekeeping techniques into municipal operations such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and stormwater system maintenance. Also include employee training on proper waste recycling and disposal, and impacts of illicit discharges from municipal operations. To minimize duplication of effort and conserve resources, the MS4 operator can use any applicable training materials that are available from EPA, the State, or relevant organizations (see Resource List, Chapter VIII);
- Determine the appropriate BMPs and measurable goals for this minimum control measure. Some program implementation approaches, BMPs (i.e., the program actions/activities), and measurable goals are suggested below.

C. Guidelines for Developing and Implementing This Measure

The intent of this control measure is to ensure that existing and future municipal operations are performed in ways that will minimize contamination of stormwater discharges. This measure includes municipal operations performed on non-municipally-owned property, and municipal operations performed by private contractors. The Division encourages the MS4 operator to consider the following components when developing their program for this measure:

1. Maintenance activities, maintenance schedules, and long-term inspection procedures for structural and non-structural controls to reduce floatables and other pollutants discharged from storm sewers.
2. Controls for reducing or eliminating the discharge of pollutants from municipal facilities such as:
 - Streets
 - Roads
 - Highways
 - Municipal parking lots
 - Maintenance and storage yards
 - Fleet or maintenance shops with outdoor storage areas
 - Salt/sand storage locations
 - Snow disposal areas
 - Waste transfer stations

and from activities such as:

- Park and open space maintenance
- Fleet and building maintenance
- Street maintenance
- New construction of municipal facilities
- Stormwater system maintenance

Documentation of the BMPs to be used can take the form of a runoff control plan or the equivalent. Such a plan should include the following elements, as applicable:

- a. Activity description
- b. Facility site map
- c. Description of potential pollutant sources, including an evaluation of that potential.
- d. Stormwater Management Controls. The description of stormwater management controls should address the following minimum components, including a schedule for implementing such controls:
 - i. Preventive maintenance
 - ii. Good housekeeping
 - iii. Spill prevention and response procedures
 - iv. BMPs for pollutant sources
 - v. Employee training
- e. Inspection procedures
- f. Reporting procedures. The Annual Report to the Division should include information on overall conformity with the runoff control plan for each facility and activity covered.

During the initial evaluation, if the MS4 operator determines that there is a very low risk for potential stormwater impacts from the facility or activity (i.e., no industrial activities or materials exposed to stormwater, wastes recycled or disposed of properly, etc.), then a runoff control plan (or the equivalent) does not need to be developed for the facility. If such facilities or activities are subject to changing circumstances, they should be periodically re-evaluated to determine if plan coverage is needed.

3. Procedures for the proper disposal of waste removed from storm sewer systems and other areas listed in section 2, above, including dredge spoil, accumulated sediments, floatables, and other debris.

4. Ways to ensure that new flood management projects assess the impacts on water quality and examine existing projects for incorporation of additional water quality protection devices or practices. The Division encourages coordination with flood control managers for the purpose of identifying and addressing environmental impacts from such projects.

The effective performance of this control measure hinges on the proper maintenance of the BMPs used, particularly for sections 1 and 2, above. For example, structural controls, such as grates on outfalls to capture floatables, typically need regular cleaning, while non-structural controls, such as training materials and recycling programs, need periodic updating.

D. Measurable Goals

Measurable goals are meant to gauge permit compliance and program effectiveness. The measurable goals, as well as the BMPs, should consider the needs and characteristics of the operator and the area served by its MS4. The measurable goals should be chosen using an integrated approach that fully addresses the requirements and intent of the minimum control measure. An integrated approach for this minimum measure could include activities such as the following:

<u>Target Date</u>	<u>Activity</u>
(end of) Year 1	A certain percentage or number of facilities/operations covered under a runoff control plan (a set percentage or number can be assigned to each permit year); employee training materials gathered or developed; procedures in place for catch basin cleaning after each storm and regular street sweeping.
Year 2.....	Training for appropriate employees completed; recycling program fully implemented.
Year 3.....	Some pollution prevention BMPs incorporated into master plan; a certain percentage reduction in pesticide and sand/salt use; maintenance schedule for BMPs established.
Year 4.....	A certain compliance rate with maintenance schedules for BMPs; controls in place for all areas of concern.

Chapter VIII RESOURCE LIST

The following is a list of resources that the Division recommends for developing and implementing a Phase II stormwater program. An "*" prior to an entry indicates a resource that has been found to be particularly useful.

A. U.S. EPA

A.1. *EPA Stormwater Phase II

- A very useful web page with a lot of information and good FAQs. Resources available include: 14 fact sheets covering the Small MS4 Program, the Six Minimum Measures, Permitting and Reporting, the Construction Program, and the Industrial "No Exposure" Waiver. Available from the net at http://cfpub1.epa.gov/npdes/pubs.cfm?program_id=6
- EPA's *Stormwater Phase II Compliance Assistance Guide*, March 2000. This publication can be downloaded at <http://www.cicacenter.org/or-stormwater.html> or at <http://www.epa.gov/npdes/pubs/comguide/pdf>. Warning: This is a large document, nearly 100 pages long.
- A copy of the EPA regulation, which includes an extensive discussion in the preamble, is available at http://cfpub1.epa.gov/npdes/regresult.cfm?program_id=6&view=all&type=1
- More information can be obtained by calling EPA's Storm Water Phase II Rule Hotline at (202) 260-7786 sending an e-mail to sw2@epa.gov.
- *EPA's final Menu of BMPs – this has been updated to include another 20 new fact sheets to highlight innovative practices. www.epa.gov/npdes/menuofbmps
- BMPs for unpaved roads – <http://www.epa.gov/owow/nps/unpavedroads.html>
- EPA's guidance on measurable goals – <http://www.epa.gov/npdes/stormwater/measurablegoals/index.htm>
- EPA's guide for State and Local Government Guide to Environmental Program Funding Alternatives – <http://www.epa.gov/owow/nps/MMGI/funding.html>
- EPA Region 8, which includes Colorado, maintains information for MS4 permits. Their website is located at <http://www.epa.gov/region8/water/stormwater/municipal.html>

B. GENERAL BMPS

B.1. *Center for Watershed Protection

The Center provides objective and scientifically sound information on effective techniques to protect and restore urban watersheds. Workshops, journals, publications and links are available. There is a strong focus on Low Impact Development. Also includes a good section on model ordinances and several quality reference books. <http://www.cwp.org>

- Some recommended publications:
 - *The Practice of Watershed Protection: Techniques for Protecting and Restoring Urban Watersheds* – Consists of 150 articles on urban watershed protection
 - *Rapid Watershed Planning Handbook* – A guide to creating an effective watershed plan quickly and at a low cost.
 - *Better Site Design: A Handbook for Changing Development Rules in Your Community* – \$35 This handbook outlines 22 guidelines for better developments and provides detailed rationale for each principle. Includes a sample Codes & Ordinances Worksheet.
 - The Center for Watershed Protection permits free downloads of several publications such as *Stormwater BMP Design for Cold Climates* and **Illicit Discharge Detection and Elimination Guidance Manual*.

B.2. Denver Regional Council of Governments (DRCOG)

A regional website, designed to assist Colorado Phase II municipalities in application and program development. Includes local case studies and ordinances.

- <http://www.drcog.com/index.cfm?page=WaterResources>

B.3. Know Your Watershed

Tips, tools, and resources for watershed management. Sponsored by the Conservation Technology Information Center (CTIC) at Purdue University. Available publications include *Putting Together a Watershed Management Plan: A Guide for Watershed Partnerships*.

- <http://www.ctic.purdue.edu/KYW/>

B.4. Municipal Research and Services Center

Storm and Surface Water Management Program for the State of Washington includes extensive information on funding, public education, construction, BMPs, research.

- <http://www.mrsc.org/environment/water/water-s/SW-main.htm>

B.5. National Resource Defense Council (NRDC) Stormwater Strategies

Report available for download from the net on community responses to runoff pollution, including 100 case studies. They also have an extensive links section.

- Stormwater strategies are available at <http://www.nrdc.org/water/pollution/storm/stoinx.asp>
- Steps to clean up pollution: <http://www.nrdc.org/water/pollution/gsteps.asp>

B.6. International Stormwater Best Management Practices (BMP) Database (EPA/ASCE, 4/01)

Database of monitoring results showing effectiveness of structural and non-structural BMPs. Currently, the database and web site do not include much analysis of the data; this will be added in the future. Data contributions are being solicited on an on-going basis. Data contributions and evaluations are available as a free-download on the web at <http://www.bmpdatabase.org>

B.7. *Proceedings from the National Conference on Tools for Urban Water Resources Management & Protection (EPA/625/R-00/001 2/2000)

Proceedings from a recent conference with several quality papers on topics such as Phase II cost estimates, developing a stormwater utility fee, tools for eliminating illicit connections, public information projects, and many more directly applicable to Phase II and the six minimum measures. Highly recommended.

- The report is available free of charge from the EPA; call (800) 490-9198. Or you can download the proceedings by visiting <http://nepis.epa.gov/> then conduct a simple search using the following key words: urban, water, resources and management.

B.8. Stormwater Authority

A good source of technical information on stormwater. Includes a large library of technical papers.

- <http://www.stormwaterauthority.org/>

B.9. *Texas Nonpoint Source Book

A web site with stormwater information geared to public works professionals and other interested parties. A great resource for stormwater BMP information.

- <http://www.txnpsbook.org>

B.10*Urban Drainage and Flood Control District (UDFCD) Drainage Criteria Manual (Vols. 1-3)

The UDFCD manual for stormwater management was updated in 2001 and 2004. This stormwater BMP manual was developed for the Denver metro area and includes regional, residential, industrial, commercial, and construction BMPs. The manuals are highly recommended and may be downloaded for free from their website. Highly recommended.

- http://www.udfcd.org/downloads/down_critmanual.htm

C. GENERAL PHASE II PROGRAM GUIDANCE

See Also:

- Item B.2. – The Denver Regional Council of Governments website is specifically designed for Colorado municipalities.
- Item B.9. – The Texas Nonpoint Source Book contains guidance on program planning and implementation.

C.1. California Model Urban Runoff Program (MURP)

- A how-to guide for developing urban runoff programs for small municipalities. Developed by the City of Monterey, California. Available for free on the internet at <http://www.coastal.ca.gov/la/murp.html>.
- The MURP Internet Resources List is extensive, containing links for subjects such as urban runoff program development, model water quality ordinances, urban runoff program funding and many more. <http://www.coastal.ca.gov/la/docs/bmp.pdf>

C.2. *American Public Works Association (APWA) – Designing and Implementing an Effective Storm Water Management Program

This manual contains over 200 pages of detailed guidance, samples, and case studies, featuring the NPDES Phase II requirements. Several other storm water publications including CD-ROMs about Phase II case studies and setting measurable goals are available.

<http://www.apwa.net/bookstore/detail.asp?PC=PB.ASWT>

The APWA maintains an extensive library on water resources:

<http://www.apwa.net/bookstore/category.asp?Category=Water%20Resources&p=1>

C.3. Model Ordinances

- Stormwater Manager's Resource Center site maintains an extensive list of model ordinances: http://www.stormwatercenter.net/Manual_Builder/stormwater_ordinance.htm
- EPA site: <http://www.epa.gov/owow/nps/ordinance/stormwater.htm>
- Local Government Environmental Assistance Network: <http://www.lgean.org>
- Denver Regional Council of Governments (includes examples of local ordinances): http://www.drcog.org/reg_growth/water/StormWater.htm
- City of Los Angeles, California: <http://www.lacity.org/SAN/wpd/WPD/residents/ordinance.htm>
- City of Seattle, Washington: <http://www.seattle.gov/dclu/codes/sgdcode.htm>
- City of Austin, Texas (Good example of a stream protection ordinance as well as design manual): <http://www.ci.austin.tx.us/watershed/>

D. TOOLS FOR THE SIX MINIMUM MEASURES

See Also:

- Item A.1. – The EPA has developed Fact Sheets and a BMP Menu for each of the Six Minimum Measures, as well as guidance on developing Measurable Goals.
- Item B.2. – The Denver Regional Council of Governments website is specifically designed for Colorado municipalities.

D.1. Public Education & Outreach

See Also:

- Item B.1. – The Center for Watershed Protection includes education & outreach in their watershed planning publications.
- Item B.7. – These proceedings include several papers covering successful education & outreach.
- Item B.9. – The Texas Nonpoint Source Book contains guidance on planning and implementing education and outreach programs and examples of materials available for use.
- Item C.1. – The MURP covers public education.

D.1.i. League of Women Voters Education Fund – Water Resources

- Information regarding educational programs and resources offered through the League of Women Voters, including the Wetlands Citizen Education Program. The League of Women Voters is very active in stormwater education in Colorado. <http://www.ourwater.org>
 - Under the guidance of the League of Women Voters with funding from the Colorado Department of Public Health and Environment and technical expertise from Colorado State University Cooperative Extension, AWARE Colorado was created to inform local decision makers about water quality. A free publication, *Water Protection Toolkit for Local Officials: Connecting Land Use with Water Quality*, can be downloaded at <http://www.awarecolorado.org/toolkit.pdf>

D.1.ii EPA: Getting in Step

The Council State Governments with the EPA created *Getting in Step: A Guide to Effective Outreach in Your Watershed*. The guide provides tools for watershed groups and public agencies to develop and implement an effective outreach
<http://www.epa.gov/owow/waters> <http://www.epa.gov/owow/waters>

D.1.iii *Colorado Foundation for Water Education

A nonprofit devoted to promoting “better understanding of Colorado's water resources and issues.” Contains an extensive listing of educational resources and products for everyone from schools to cities and counties.
<http://cfwe.org/>

D.1.iv *Teacher Resources for Introducing Urban Stormwater Quality Concepts to the Classroom

Developed by the Colorado Water Quality Control Division as a resource for K-12 schools. Including example lesson plans meeting Colorado standards for science, geography and civics.
<http://www.cdphe.state.co.us/wq/PermitsUnit/urbansw.pdf>

D.2. Public Involvement/Participation

See:

- Item B.7. – These proceedings include papers covering successful public involvement programs.
- Item C.2. – This manual includes guidance on building community support with stakeholder involvement.

D.2.i Adopt a Watershed

The EPA is leading an "Adopt Your Watershed" campaign. Through this effort, EPA challenges citizens and organizations to join organizations who are working to protect and restore our valuable rivers, streams, wetlands, lakes, ground water, and estuaries. The database contains more than 4,000 watershed organizations across the country.
<http://www.epa.gov/adopt/>

D.3. Illicit Discharge Detection & Elimination

See Also:

- Item B.1. – The Center for Watershed Protection includes an illicit discharge detection guidance manual in their free downloadable publications.
- Item B.7. – These proceedings include papers covering illicit discharge detection tools and programs.
- Item C.3. – There are many options listed for finding appropriate model ordinances.

D.3.i Investigation of Inappropriate Pollutant Entries into Storm Drainage Systems – A User's Guide (EPA/600/R-92/238)

The EPA released this manual in 1992 and can be downloaded for free at
<http://www.epa.gov/ORD/NRMRL/Pubs/600r92238/600r92238.pdf>

D.3.ii. Rouge River National Wet Weather Demonstration Project – Illicit Connection Reports

The Rouge River National Wet Weather Demonstration Project began in 1992 and is a comprehensive program to manage wet weather pollution to restore the water quality of the Rouge River. The project contains a wealth of technical information regarding sewer overflow control. <http://www.rougeriver.com/>

D.4. Construction Site Stormwater Runoff Control

See Also:

- Items B.6, B.7, B.8, B.9 and B.10 – All of these have good BMP information for construction site controls. The UDFCD Volume 3 (Item B.10) is highly recommended as a resource for construction site BMPs.
- Item B.7. and B.9.– Both of these contain guidance on setting up Construction Site Stormwater Runoff Control programs.
- Item C.3. – There are many options listed for finding appropriate model ordinances.

D.4.i. “Building for a Cleaner Environment”

The Colorado Department of Public Health and Environment created this ready-mix washout training DVD and manual. It is available for free from the CDPHE.

- Contact Matt Czahor at (303) 692-3575, or matthew.czahor@state.co.us

D.4.ii. *Colorado Contractors Association (CCA) – Stormwater Best Management Practices Course

The course material is similar to item D.4.v. and includes CDOT certification.

- Contact the CCA at <http://www.coloradocontractors.org> or (303) 290-6611. The course costs \$155.

D.4.iii. Colorado Department of Transportation (CDOT) Erosion Control and Stormwater Quality Guide

A guide for controlling stormwater pollution from construction sites. The focus is on highway projects, but the BMPs are generally applicable. A laminated pocket guide is also available.

- Contact CDOT at (303) 757-9313. Regular guide is \$20 and a laminated pocket guide costs \$10.

D.4.iv. International Erosion Control Association

This website provides information regarding news, conferences, training and exhibits regarding erosion control, as well as numerous links to other sites. The association produces a publication, *Erosion Control Journal*.

- <http://ieca.org/>

D.4.v. *Rocky Mountain Education Center – Stormwater Management and Erosion Control Course

Rocky Mountain Education Center offers several one-day courses, with an optional additional half-day in the field, on the principles and practices of erosion and sediment control. Recommended for municipal erosion control inspectors and those practicing erosion control in the field. This course is required for the CDOT certified erosion control supervisor certification. Course is given at Red Rocks Community College in Lakewood and is referenced as CETC #150.

- Contact the Rocky Mountain Education Center at (800) 933-86394 or on the web at <http://www.rrcc.edu/rmec>. Cost is \$175.

D.4.vi. Mountain Driveways Best Management Practices Manual.

Prepared by Wright Water Engineers and Denver Regional Council of Governments in September 1999 for the Colorado Nonpoint Source Council, the manual includes guidelines on application of BMPs to driveway construction in mountain areas. Addresses special considerations such as steep slopes, road drainage, and vegetation for limited growing season in mountainous areas. A free download of the manual is available at <http://www.nwc.cog.co.us/documents/Mountain%20Driveways%20BMPs.pdf>

D.5. Post-Construction Stormwater Management

See Also:

- Item B.1. – The Center for Watershed protection has extensive information on BMPs for post-construction runoff controls, as well as guidance on how to develop your municipal program. This is a highly recommended source for information on this minimum measure.
- Item B.6. – Although not complete, the database does contain some data on the effectiveness of post-construction BMPs.
- Item B.7. – These proceedings include papers on Post-Construction Stormwater Management practices and programs.
- Item B.10. – The UDFCD Volume 3 is highly recommended as a resource for post-construction BMPs.
- Item C.3. – There are many options listed for finding appropriate model ordinances.

D.5.i. Growing Greener: Putting Conservation into Local Plans and Ordinances by Randall Arendt

Written from a land planning perspective, describes concepts of cluster development (low impact development) and benefits to drainage and surface water quality. Includes description of ordinances and zoning processes for implementation. This book is offered for sale by numerous websites.

D.5.ii. Low Impact Development

Low Impact Development: An Integrated Design Approach (EPA 841-B-00-003) was prepared by local planners, engineers, developers and elected officials. The manual details how to develop and implement LID methods from an integrated design perspective. *Low Impact Development Hydrologic Analysis* (EPA 841-B-00-002) is the companion document. It contains methodology that can be used to estimate changes in site hydrology due to new development, and also to design appropriate treatment systems to maintain the pre-development hydrology of the site. Both documents can be downloaded for free at <http://www.epa.gov/owow/nps/lid/>

The Low Impact Development Center provides watershed managers with a new set of tools and techniques that can be used to meet regulatory and receiving water protection program goals for urban retrofits, re-development projects, and new development sites. The non-profit organization is dedicated to the advancement of Low Impact Development technology. Case studies and detailed information for design, master planning, ordinance development and outreach. <http://www.lowimpactdevelopment.org/>

D.5.iii. Puget Sound Online – Water Quality Action Team

In 2005, the Puget Sound Action Team released its *Low Impact Development: Technical Guidance for Puget Sound*. The report and more information about LID are available at <http://www.psat.wa.gov/Programs/LID.htm>

Also worth examining is an extensive Water Quality Management Plan for the Puget Sound available at http://www.psat.wa.gov/Publications/manplan00/mp_index.htm

D.5.iv. Guidelines for Water Quality Enhancement at Golf Courses through the Use of Best Management Practices

In addition to recommendations on BMPs at the design stage, includes post-construction maintenance BMPs on Integrated Pest Management, irrigation management, turf grass fertilizer use, landscaping and vegetative practices. Prepared for the Colorado Nonpoint Source Task Force by Wright Water Engineers and Denver Regional Council of Governments, free download of the report is available at

<http://www.nwc.cog.co.us/documents/Golf%20Course%20BMPs.pdf>

D.6. Pollution Prevention/Good Housekeeping for Municipal Operations

See:

- Items B.6., B.7., B.8., B.9., and B.10. – All of these have good information on BMPs for municipal operations. The UDFCD Volume 3 (Item B.10.) is highly recommended as a resource for structural municipal BMPs.

E. FINANCING STORMWATER MANAGEMENT

See Also:

- Item B.7. – These proceedings include papers on administering and funding stormwater programs.
- Item B.9. – The Texas Nonpoint Source Book contains guidance on setting up stormwater utilities.

E.1. Center for Urban Policy and the Environment, Indiana University

This website is designed to help communities find ways to pay for stormwater management projects.

- <http://stormwaterfinance.urbancenter.iupui.edu/home.htm>

F. MORE TOOLS FOR LOCAL GOVERNMENTS**F.1. American Forests**

American Forests is assessing urban forests across the country. They have developed a process called Urban Ecosystem Analysis (UEA) to map the structure of a land area. The UEA process involves a technical analysis of satellite data, the application of GIS computer software in order to calculate dollar benefits based on specific site conditions analyzing numerous variables including stormwater runoff.

<http://www.americanforests.org/resources/urbanforests/analysis.php>

F.2. Storm Water Management Authority

The Storm Water Management Authority is a clearinghouse for local governments working together for clean water through education, engineering and information technology.

<http://www.swma.com/>

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