Chapter 7
POST-CONSTRUCTION WATER QUALITY POLICIES AND PROCEDURES

7.1 Overview

Metro's comprehensive stormwater management program addresses stormwater runoff during construction through Erosion Prevention and Sediment Control (EPSC) practices and after construction through stormwater quantity and quality controls. After construction has been finished on a site and the site is stabilized, pollutants can be washed into the storm drain system and into receiving streams off of hardened or impervious surfaces, such as driveways, roads and roofs. Typical stormwater runoff from stabilized urban sites contains sediments, nutrients and metals, as well as gross solids such as litter. These pollutants are carried into streams and other water bodies. Major metropolitan areas, including Metro, are required under Federal and State law to reduce the discharge of these stormwater pollutants to achieve stormwater treatment goals set by the U.S. Environmental Protection Agency. New developments and significant redevelopments in Metro are therefore required to design, install, and maintain stormwater quality controls in addition to stormwater quantity controls. Stormwater quality and quantity controls should be integrated into a development's conceptual design early in the design process.

Metro has established a post-construction stormwater quality program that applies a consistent standard for pollutant removal, regardless of the type of development. This chapter describes the post-construction stormwater quality program and requirements including:

- The targeted pollutant and pollutant reduction goal;
- Water quality treatment volume requirement for new development;
- Low Impact site design guidance;
- A listing of pre-approved structural Best Management Practices (BMPs);
- Testing requirements for proprietary BMPs; and
- Water quality treatment volume site design credits.

Volume 4 Section 6 contains detailed design, inspection and maintenance information as well as design examples for the pre-approved BMPs listed in this chapter. An automated calculator that can be used in developing the post-construction stormwater quality plan can be downloaded from Metro's Stormwater website: http://www.nashville.gov/stormwater.

7.2 Pollutant Reduction Goal

Stormwater management systems for new development and redevelopment must be designed to achieve the goal of removing at least 80% of the average annual post-construction total suspended solids (TSS) load. It is presumed that a stormwater management system complies with this performance standard if:

- It is sized to capture and treat the water quality treatment volume, which is defined as the runoff volume resulting from the first 1.1 inches of rainfall from a site; and

- Appropriate structural stormwater controls are selected, designed, constructed, and maintained according to the specific criteria in this Manual.

Please contact MWS Plan Review staff for TSS removal efficiency requirements for sites located in Nashville's combined sewer area.

7.3 Water Quality Volume Overview

Metro's water quality treatment standard is designed to capture 85% of the annual stormwater runoff. Water quality systems must be designed to treat the runoff from the first 1.1 inches of rainfall. Each site's water quality treatment volume is also based upon its percent impervious cover. The treatment standard is the same for all sites throughout the community unless other secondary pollutant reduction goals are established, for instance, through the establishment of Total Maximum Daily Loads (TMDLs). Metro's water quality treatment methodology is as follows:

$$WQv = P \times Rv \times \frac{A}{12}$$

Where:
WQv = water quality treatment volume, ac-ft
P = rainfall for the 85% storm event (1.1 in)
Rv = runoff coefficient (see below)
A = drainage area, ac

$$Rv = 0.015 + 0.0092I$$

Where:
I = drainage area impervious cover, % (50% imperviousness would be 50)

Metro's stormwater quality program is designed to give the developer flexibility in meeting the 80% TSS reduction goal on each site. The BMPs identified in this Chapter give the developer options to meet the water quality requirements in numerous ways through the application of low-impact site design and layout, non-structural BMPs, and structural BMPs. Metro is providing a Site Design Review Tool on its website (www.nashville.gov/stormwater/regs/index.asp) for engineers to use in the calculation of TSS removal efficiencies.

7.4 Low-Impact Site Design Practices

Metro supports the use of low-impact site design practices that reduce the impact of development upon stormwater quality and quantity. Low-impact site design practices are meant to:

1. Minimize the impervious cover on a site,
2. Preserve the natural infiltration ability of the site,

3. Route stormwater to "micro controls" that treat small portions of site stormwater from the site, and
4. Minimize long-term BMP maintenance by preserving and using natural features of the site.

A developer should consider the site design practices listed in Table 7-1 early in the design process in an effort to reduce the overall water quality treatment volume requirement. These practices tie directly into the stormwater quality program, the WQv calculation, and/or the stormwater treatment volume credits discussed in later sections of this Chapter. These practices should only be implemented when not in conflict with other Metro department's regulations.

Table 7-1 Low Impact Site Design Practices

1. ***Reduce roadway widths to the minimum possible. Layout roads to minimize roadway lengths. Avoid curb and gutter in favor of roadside infiltration.***
2. ***Consider cluster development with undisturbed natural areas.***
3. ***Connect natural areas to the maximum extent possible. Avoid small pockets of disconnected natural areas.***
4. ***Conserve existing vegetation as much as practical. Clearly define limits of disturbance on plans and in the field to protect trees and existing grassed areas.***
5. ***Construct the minimum number of parking spaces allowed. Consider alternative parking space layouts to maximize parking spaces while minimizing the area covered by parking lot. Minimize paved area and provide overflow parking on more pervious surfaces.***
6. ***Use vegetated swales instead of piping runoff where possible.***
7. ***Construct sidewalks on one side of the roadway and not both.***
8. ***Use permeable paving materials for low volume traffic areas.***
9. ***Incorporate landscaped areas into cul-de-sacs.***
10. ***Direct rooftop runoff to pervious areas such as yards, grassed channels, or landscaped areas.***

7.5 Pre-Approved BMPs

Structural stormwater controls, or Best Management Practices (BMPs), are engineered structures designed to treat stormwater or mitigate the impact from stormwater runoff. Table 7-2 presents a pre-approved listing of structural BMP practices. These BMPs have been assigned a TSS removal capability, based upon existing research, and can be used by developers to meet the pollutant reduction goal of 80% TSS removal. Design and maintenance information for each

BMP type can be found in Permanent Treatment Practices (PTP) Section 6 of Volume 4. The structural BMPs have been divided into two categories:

1. **General Application BMPs**. These structural BMPs alone are assumed to be able to achieve 80% TSS reduction and have been found to be appropriate for use in Metro.
2. **Limited Application BMPs**. These structural BMPs
   a. Must be used in combination with other BMPs to achieve the 80% TSS reduction;
   b. Require site conditions that are not typically found in Metro; or
   c. Require intensive and frequent maintenance in order to function properly.

Table 7-2 Pre-approved BMPs for use in Metro

BMP Removal Efficiency for Total Suspended Solids (TSS)	
Structural Control	**TSS Removal (%)**
General Application BMPs	
Wet Pond	80
Stormwater Wetland	80
Bioretention Area	80
Sand Filter	80
Enhanced Swale	80
Limited Application BMPs	
Filter Strip	50
Grass Channel	50
Organic Filter	80
Underground Sand Filter	80
Submerged Gravel Wetland	80
Infiltration Trench	80
Gravity (Oil-Grit) Separator	40
Proprietary Structural Control	Based on Testing (see Section 7.6)
Dry Detention / Dry ED Basin	60

7.6 Proprietary BMPs

Many proprietary BMPs are available to treat stormwater runoff. However, some of these BMPs do not have established pollutant removal data. As indicated in Table 7-2 above, Metro considers proprietary BMPs as Limited Application BMPs because of a lack of historic pollutant removal data or because of high maintenance requirements.

Metro requires manufacturers to conduct testing to demonstrate the pollutant removal capability of proprietary BMPs. Test protocols should be developed by qualified laboratories to ensure the usefulness of the data submitted. Metro has established submittal requirements and general guidelines for test requirements. Proprietary devices must be approved before they can be considered for use in Metro. Devices may be approved by Metro and added to the list of pre-approved BMPs for Metro through an application and acceptance process. Submittal requirements can be found in section 7.6.1; however manufacturers are to contact MWS prior to

application to ensure that the most recent application requirements are obtained. Manufacturers' claims for BMP performance must be verified through data that is obtained in independent third party testing. For pretreatment applications (such as 80% removal of 125 micron particles), either field testing or laboratory testing is required. For full treatment applications (i.e. 80% TSS removal), both field testing and laboratory testing are required.

General requirements for testing are in *7.6.3.1 Testing Requirements for Proprietary BMPs.* Test results obtained for other jurisdictions will be considered for acceptance by Metro if the testing locations are climatically similar to Metro and the testing protocol satisfies Metro's requirements.

7.6.1 Submittal Requirements

The application for consideration of proprietary BMP approval by Metro shall include the following:

1. Statement of the intended use of the device. Intended uses may include pretreatment (for floatables, oil and grease, or sediment, for example), water quality treatment, hydraulic detention, velocity dissipation, an element of a comprehensive treatment train, etc.

2. Statement of the TSS removal performance at the flow rate specified in the equation in Section 7.6.2, certified by an independent testing laboratory.

3. A report of the results of the independent testing laboratory satisfying the requirements of 7.6.3.1.

4. Published technical papers, if available, documenting performance of the device.

5. Engineering drawing of the assembled device.

6. Installation, repair, and maintenance instructions and schedule.

7. Parts list including materials of construction and recommended manufacturers.

8. Certified tests of load bearing capacity for traffic bearing devices.

9. A sample device should be made available to Metro Water Services Stormwater Division upon request.

10. A list of locations where the device is installed and operational. The list should include the customer's name, agency, telephone number, and address.

11. Other relevant information available from the manufacturer.

Any device found not to meet the certified performance criteria in the field may be removed from the approved list. Submittals containing unsubstantiated or unrealistic claims will be returned

without further review pending receipt of a resubmittal without such claims. An approved device may not be suitable for use in all applications. Metro may reject the use of an otherwise approved device if a specific application is determined to be not suitable.

7.6.2 Design Guidance for Water Quality Treatment

Most proprietary BMPs are flow-through-type BMPs and rated for TSS removal based upon a specified flow rate. The WQv equation, which forms the foundation of Metro's stormwater quality program, establishes a volume that must be treated. In an effort to simulate the WQv approach for proprietary BMPs, the following peak flow design equation must be used to develop the stormwater quality treatment required.

$$Qp = C * I * A$$

Where:
Qp = the peak flow through the proprietary BMP in cfs
C = runoff coefficient
I = rainfall intensity, 2.45 inches/hour for Metro
A = the contributing drainage area for the BMP, in acres

7.6.3 Performance Standards for Proprietary BMPs

Water quality treatment for Metro is defined as a goal of 80% TSS removal. Treatment may be achieved using a single treatment method, such as a wet pond, or by using a treatment train. A treatment train achieves 80% removal of TSS using a combination of pretreatment and/or treatment methods. Manufacturers of proprietary BMPs can apply for either 1) pretreatment approval by demonstrating fine sand removal effectiveness; or 2) full treatment approval demonstrating 80% TSS removal using traditional TSS analysis.

Ratings of proprietary BMPs for pretreatment will be based on the percent removal of 125 micron diameter particles (fine sand) as demonstrated in laboratory testing. Testing can be conducted with either: 1) a mix of sand with particles no larger than 1 mm used in the testing and supported with influent/effluent gradation reports demonstrating 80% removal at the 125 micron particle size; or 2) using pre-graded sand with a D_{50} of 125 microns or less. Acceptable pre-graded sands are OK-110 and F-95.

The basic pretreatment rating will be for 80% removal of 125 micron particles assumed equivalent to 50% TSS removal. Applicants submitting for a different percent removal of fine sand will be assigned a TSS removal equivalence on a case-by-case basis.

Proprietary BMP approval shall last for 4 years at which time reapplication will be required. Applications will be required to meet new Metro regulations or policy in effect at the time of reapplication.

Metro reserves the right to recall approvals for reasons including, but not limited to: 1) restrictions placed by the Tennessee Department of Environment and Conservation; 2) product modifications or system failures indicating questionable performance capability; or 3) changes in Metro stormwater regulations or policy.

Proprietary BMPs that are assumed to be acceptable for use in Metro prior to this regulations revision shall continue to be accepted until two years from the effective date of this regulation. After the two year period, applications meeting the requirements of this chapter must be approved for the proprietary BMP to continue to be acceptable for use in Metro.

Proprietary BMPs approved for full treatment prior to this regulatory revision will be automatically converted to pretreatment status (i.e. 50% TSS removal) upon the effective date of this regulation.

7.6.3.1 Testing Requirements for Proprietary BMPs

It is the responsibility of the manufacturer to develop and implement technically valid plans for laboratory and field testing. The following guidelines are provided as minimum considerations for an approvable testing program. Metro reserves the right to reject any data submitted including rejection based on invalid or undocumented testing procedures. Metro may provide review of test plans as staff time allows.

All testing plans must include a Quality Assurance Plan defining testing and analysis methods. The Quality Assurance Plan must be prepared by a qualified testing laboratory. Examples of a Quality Assurance Plan are provided, among other sources, in the Technology Acceptance Reciprocity Partnership (TARP) Protocol for Stormwater BMP Demonstrations: http://www.dep.state.pa.us/dep/deputate/pollprev/techservices/tarp/ .

7.6.3.1.a Field Testing

Metro encourages that field testing conform to the TARP Protocol for Stormwater BMP Demonstrations, and that conformation with and deviations from the TARP be noted in an applicants protocol and test report.

The following items are required in addition to the TARP procedure:

1. A minimum of 8 field tests is required. A minimum of 10 samples (influent/effluent) are to be collected per event. Results are to be reported in mg/L TSS in order to apply for full treatment credit, or in Suspended Sediment Concentration (SSC) for pretreatment device credit. Reporting in both TSS and SSC is recommended.

2. For pretreatment devices, particulate removal can be reported for particles between 75 and 1000 microns. Particles greater than 1000 microns cannot be counted toward the percent removal value. The resulting removal rate will be adjusted to an assumed TSS

removal (for example, 80% removal of fine sand at 125 microns will be assumed to equal 50% removal of TSS).

3. For full-treatment devices, TSS must be reported using conventional analysis (particles uniformly distributed between 25 and 75 microns and smaller).

4. All data collected must be reported.

5. Particles larger than 1000 microns must be excluded from the analysis results. Submittal of influent and effluent gradations is considered adequate demonstration of compliance.

6. At a minimum, one of the 8 tests must be at no less than 75% of the design flow of the unit. The other test flows must be at least 50% of the design flow of the unit.

7. Field tests must be conducted without adding sediment to the influent or augmenting flow. Sediment must be naturally-occurring, undisturbed on-site sediment.

8. Rainfall data from a site gauge must be provided for each sampled storm event.

9. Drainage area delineation must be provided for each sampled site.

7.6.3.1.b Laboratory Testing

Metro encourages that laboratory testing conform to published protocols such as those at the New Jersey Center for Advanced Technology (NJCAT) website (http://www.njcat.org/) .

General requirements for laboratory test plans are as follows:

1. Particle size distribution:
    a. For pretreatment devices, percent capture of 125 micron particles must be demonstrated either by providing influent/effluent gradations or by using pre-graded sand (OK-110 or F-95). No particles larger than 1 mm are to be introduced to the test. 80% capture of 125 micron particles will be assumed equivalent to 50% TSS removal.
    b. For full treatment devices (80% TSS removal), use of traditional TSS analysis methods is required (including demonstrating 80% removal of particles uniformly distributed in the range of 25 to 75 microns and smaller).

2. Test Procedure:
    a. At a minimum, complete a total of 9 test runs including three (3) tests each at a constant flow rate of 75, 100, and 125 percent of the treatment flow rate. These tests should be conducted with initial sediment loading of 50% of the unit's capture capacity. Preloaded sediment size should not exceed 125 microns D50.
    b. The three tests for each treatment flow rate will be conducted for influent concentrations of 100, 200, and 300 mg/L TSS.

c. Report direct and indirect measurements: 1) Influent and effluent paired sample results; 2) total weight input and discharged; 3) beginning and final weight of pre-loaded sand in unit.

3. Measuring Treatment Efficiency:
   a. Calculate the individual removal efficiency for the 9 test runs.
   b. Average the three test runs for each operating rate. Consistent results must be achieved reliably bracketing the 100% design flow rate treatment efficiency.
   c. The removal efficiency of the 100% design flow rate will be used by Metro to establish the pretreatment rating of the unit. For pretreatment units, Metro will adjust the removal efficiency of sand to an assumption of TSS removal. For full treatment units, Metro may round the averaged results for use as the rated value.

7.7 Safety and Mosquito Control

7.7.1 Safety Considerations

Public safety must be considered in the design of each BMP. Section 6 of Volume 4 contains the detailed design parameters for each BMP type. These design parameters incorporate safety factors into the design itself, such as safety benches in wet ponds and locking grate options for vault type BMPs. Additional safety precaution options are listed below.

1. Fencing of stormwater ponds may be required under conditions such as those specified in Volume 2, Chapter 8.10 Access Management. Fencing is not recommended because of access requirements for maintenance and emergency response; therefore, alternative safety precautions, such as gentle slopes and safety benches, are preferred.

2. When structural BMPs are installed in residential areas, signs should be posted to warn residents of potential dangers.

3. Each entrance point for water into a detention area should incorporate an energy dissipater so that water does not flow into ponds at an unsafe rate.

4. All devices should be easily and safely accessible without special requirements (e.g. confined-space equipment and procedures).

5. All covers should be spring-loaded or lightweight for easy opening and a manually activated locking mechanism should be incorporated into the structure. Automatic locking devices are not permissible.

6. Vegetative growth should be controlled to prevent barriers to access inlets, outlets and treatment areas.

7. Stormwater management ponds shall include escape provisions as follows:

a. If a pond has an outlet structure greater than 4 feet in height, escape provisions must be incorporated in or on the structure. Escape provisions include permanent ladders, steps, rungs, or other features that provide an easy egress from the pond or its outlet structure.
b. In new ponds, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than 3:1 (horizontal to vertical).

7.7.2 Mosquito Control

Many stormwater BMPs have either a permanent pool of water or hold stormwater for an extended period of time and can potentially provide mosquito-breeding habitat. However, if structural BMPs are properly designed, installed, and maintained, mosquito problems can be minimized. The following controls should be considered when determining the appropriate BMP and long-term maintenance plans for each development:

1. BMPs with open water (such as stormwater ponds) may need aeration or some other means of water movement through artificial means.

2. Ponds designed to detain water temporarily should discharge water in 72 hours or less. (This issue has been addressed in the Permanent Treatment Practices (PTP) section of Volume 4 through the design and maintenance guidance.)

3. Good maintenance and monitoring of BMPs is essential. For instance, discharge orifices should be monitored for debris or sediment clogging *weekly* in the summer months when mosquito breeding peaks.

4. Grout around riprap to prevent pooling while maintaining the benefits of the riprap for energy dissipation.

5. Vault-type BMPs that have the potential to hold water for longer than 72 hours should be contained and completely sealed.

6. Introduce *Gambusia affinis* (mosquitofish) or other mosquito predators into stormwater ponds with permanent pools. They feed on immature mosquitoes.

7. Use mosquito larvicides as a last resort to control mosquitoes.

7.8 Site Design Water Quality Volume Credits

In an effort to encourage low-impact site design practices and provide an incentive to use non-structural BMPs when possible, Metro has adopted *site design water quality volume credits*. These credits are site design practices that benefit stormwater quality by providing treatment, reducing the imperviousness of a site, or both. The design criteria for the five non-structural BMPs that may be used as water quality treatment credits are outlined below. To have an area or areas approved as a credit, **all** rules and criteria specified by the credit must be met.

Site Design Credit #1: Natural Area Conservation

A credit against the water quality volume may be granted when undisturbed natural areas are conserved on a site, thereby retaining their pre-development hydrologic and water quality characteristics. Under this credit, a designer subtracts conservation areas from total site area when computing water quality volume requirements. An added benefit is that the post-development peak discharges will be smaller, and hence water quantity control volumes will be reduced due to lower post-development curve numbers or rational formula "C" values. The Natural Area Conservation credit cannot be applied to floodway buffers or stream buffers and cannot be applied to floodways except under certain circumstances. (See Site Design Credit #2). Previously disturbed areas are subject to staff review to determine if they qualify as a natural area.

Rule: Subtract conservation areas from total site area when computing water quality volume requirements.

Criteria:

- Conservation area cannot be disturbed during project construction.
- The limits of disturbance around the conservation area must be clearly shown on all construction drawings and staked in the field.
- Areas must be located within an acceptable conservation easement or other legal instrument that ensures **perpetual** protection of the proposed area. The easement or legal instrument must clearly specify how the natural area vegetation shall be managed and boundaries will be marked. Note: managed turf (e.g., playgrounds, regularly maintained open areas) is not an acceptable form of vegetation management.
- Areas must have a minimum contiguous area requirement of 10,000 square feet.
- Exceptionally wide floodways will be reviewed on a case-by-case basis for inclusion under this credit.

Site Design Credit #2: Floodways and Stream Buffers

This credit may be granted for floodways, floodway buffers and stream buffers contained within a project site that are undisturbed. Under this credit, a designer subtracts undisturbed areas contained within a floodway, floodway buffer and stream buffer from the total site acreage when computing water quality volume requirements.

Rule: Subtract areas within the floodway, floodway buffer or stream buffer that are to remain undisturbed from total site area when computing water quality volume requirements and do not use the buffer area to calculate the site imperviousness with respect to stormwater regulations (not applicable to Codes ISR regulations).

Criteria:

- The minimum undisturbed buffer width shall be the total width of both zones of the buffer, as set forth in the Stormwater Management Manual.
- This credit is not applicable if the Natural Area Conservation Credit can apply.
- Buffers and floodways shall remain unmanaged other than routine debris removal, where roots are left intact.

Site Design Credit #3: Vegetated Channels

This credit may be granted when vegetated (grass) channels are used for water quality treatment. Under this credit, a designer subtracts the areas draining to a grass channel from the total site area when computing water quality volume requirements. A vegetated channel may be able to fully meet the water quality volume requirements for certain kinds of low-density residential development. An added benefit is that the post-development peak discharges will likely be lower due to a longer time of concentration for the site. Note: This credit cannot be granted if grass channels are being used as a limited application structural stormwater control towards meeting the 80% TSS removal goal for WQv treatment.

Rule: Subtract the areas draining to a vegetated (grass) channel from total site area when computing water quality volume requirements.

Criteria:

- The credit shall only be applied to moderate or low density residential land uses (3 dwelling units per acre maximum).
- The maximum flow velocity for water quality design storm shall be less than or equal to 1.0 feet per second.
- The minimum residence time in the channel for the water quality storm shall be 5 minutes.
- The channel bottom width shall be a maximum of 6 feet. If a larger channel is needed use of a benched or compound cross section is required
- The channel side slopes shall be no steeper than 3:1 (horizontal: vertical) and channel slope shall be 3 percent or less.

Site Design Credit #4: (For Commercial Development ONLY) Overland Flow Filtration/Infiltration Zones

This credit may be granted on commercial sites when overland flow filtration or infiltration zones are incorporated into the site design to receive runoff from rooftops or other small impervious areas (e.g., driveways, small parking lots, etc). This can be achieved by grading the site to promote overland vegetative filtering or by providing infiltration or “rain garden” areas. If impervious areas are adequately disconnected, the designer subtracts the area of these zones from the total site area when computing the water quality volume requirements. An added benefit will be that the post-development peak discharges will likely be lower due to a longer time of concentration for the site.

Rule: If impervious areas are adequately disconnected as outlined below, they can be deducted from total site area when computing the water quality volume requirements.

Criteria:

- Relatively permeable soils (hydrologic soil groups A and B) must be present.
- Runoff cannot come from car washes, car care facilities, landfills, junk yards, gas stations or other land uses that have the potential to have higher than normal pollutant loading.
- The maximum contributing impervious flow path length shall be 75 feet.
- Downspouts shall be at least 10 feet away from the nearest impervious surface to discourage "re-connections".
- The disconnection shall drain continuously through a vegetated channel, swale, or filter strip to the property line or structural stormwater control.
- The length of the "disconnection" shall be equal to or greater than the contributing impervious flow path length.
- The entire vegetative "disconnection" shall be on a slope less than or equal to 3 percent.
- The maximum impervious area discharging to any one overland flow filtration zone shall not exceed 5,000 square feet.
- For those areas draining directly to a buffer, either the overland flow filtration credit or the stream buffer credit can be used.

Site Design Credit #5: Environmentally Sensitive Large Lot Subdivisions and Conservation Subdivisions

This credit may be granted when a group of environmental site design techniques are applied to low and very low-density residential development (e.g., 1 dwelling unit per 2 acres [du/ac] or lower). The credit can eliminate the need for structural stormwater controls to treat water quality volume requirements. This credit is targeted towards large lot subdivisions.

Rule: Large lot and conservation subdivisions (e.g. 2 acre averaged lots and greater) may qualify. The requirement for structural practices to treat the water quality volume treatment requirements shall be waived.

Criteria:

For Single Lot Development:

- Total site impervious cover (including roadways/driveway) is less than 15%
- Lot size shall be at least two acres
- Rooftop runoff is disconnected in accordance with the criteria in Credit #4
- Grass channels are used to convey runoff instead of curb and gutter

For Multiple Lots:

- Total impervious cover footprint (including streets) shall be less than 15% of the area
- Lot areas should be at least 2 acres, unless clustering is implemented. Open space developments should have a minimum of 25% of the site protected as natural conservation areas.
- Grass channels should be used to convey runoff versus curb and gutter (see Credit #3)

7.9 Stormwater Quality BMP Long Term Maintenance

Each water quality BMP installed on a site requires maintenance so that it functions properly, ensuring that it helps fulfill the water quality goal for the site. Therefore, a BMP-specific maintenance agreement for each development site is required. The maintenance agreement consists of the following:

a. An Inspection and Maintenance Agreement signed by the developer or BMP owner.
b. A long term maintenance plan written by the engineer or site designer that includes a description of the stormwater system and its components, inspection priorities and schedule for each component, and BMP schematics for each BMP. The plan should also include requirements for the proper disposal of any materials removed from the BMP during maintenance; and
c. A drawing of easements on a plat or a system location map to enable Metro to locate BMPs as needed.

The maintenance agreement and its attachments must be submitted for review by Metro with the site plans. After the plans and the agreement are approved, the property owner shall record the maintenance agreement and its attachments with the register of deeds. The property owner, under the maintenance agreement, shall be responsible for inspecting and maintaining the BMPs and for turning in inspection reports annually to show that the facilities have been inspected and maintained. Maintenance agreement templates for approved BMPs are found in Appendix C.