



Montgomery MS4 Program

Post Construction Stormwater Management Technical Memorandum – 1 March 2020

To: Owners, Developers and Consultants Date: 1 March 2020

From: Patrick Dunson, P.E.
City Engineer

Re: Post Construction Stormwater Management
Updated Design Requirements

Overview

In 1990, the U.S. Environmental Protection Agency (EPA) promulgated regulations establishing Phase I of the National Pollutant Discharge Elimination Systems (NPDES) stormwater program. The Phase I program for municipal separate storm sewer systems (MS4s) require operators of “medium” and “large” MS4s that generally serve populations of 100,000 or greater to implement a stormwater management program as a means to control, to the maximum extent practicable (MEP), polluted discharges from certain municipal, industrial and construction activities into the MS4.

The Alabama Department of Environmental Management (ADEM) presently has primary jurisdiction over permitting and enforcement of the Stormwater Program for Alabama. The City of Montgomery (City) was initially issued NPDES Permit Number ALS000004 on 25 September 2013. In January 2020, the City’s NPDES Permit was renewed for another 5-year permit term. The City is required to develop and implement a Stormwater Management Program (SWMP) in accordance with the NPDES Permit requirements.

In accordance with the NPDES Permit, the City has developed and implemented a Post-Construction Stormwater Program to address stormwater runoff from qualifying new development and re-development projects. This memorandum provides technical guidance regarding the City’s updated post-construction stormwater management requirements in accordance with the City’s NPDES Permit.

Applicable Developments

The City’s updated post-construction stormwater management requirements are applicable to New Development or Redevelopment projects that meet one of the following criteria:



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1. New development and redevelopment projects that result from the disturbance of one acre or more of land or the disturbance of less than one acre of land if part of a larger common plan of development or sale that is greater than one acre. Qualifying new development and redevelopment does not include land disturbances conducted by entities under the jurisdiction and supervision of the Alabama Public Service Commission; or,
2. New development and redevelopment projects that result from the disturbance of less than one acre and stormwater management is required to provide adequate protection of the City's MS4. Projects meeting this requirement shall be identified at the discretion of the City Engineer.

Since the City has implemented its post-construction stormwater management program in October 2015, the primary Best Management Practices (BMPs) that have been used for post-construction stormwater management include but are not limited to detention ponds, retention ponds, underground detention, bioretention and hydrodynamic separators. This technical memorandum has been updated to address stormwater management BMPs that have been used for post-construction stormwater management. However, this does not preclude the use of other generally accepted BMPs.

Implementation

Effective 1 October 2015, all qualifying new development and redevelopment projects shall be designed in accordance with this technical memorandum.

Waiver Request

The City recognizes that certain developments may qualify for a waiver from post-construction stormwater management requirements: Developments that meet one of the following criteria may request a waiver:

1. An existing development that has been constructed or approved prior to the effective date (1 October 2015) of this technical memorandum;
2. A development that is part of a larger development that has been approved prior to the effective date (1 October 2015) of this technical memorandum and all stormwater management facilities were constructed as part of the larger development; or,



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3. A Development that reduces the existing impervious area within the development.

A development that meets criteria 1 or 2 may apply for a waiver by completing an Existing Development Waiver Request Form (Figure 1A). A development that meets criteria 3 may apply for a waiver by completing a Redevelopment Impervious Area Waiver Request Form (Figure 1B).

In order for a development to be considered for a waiver, the proposed development shall meet the following requirements:

1. The appropriate waiver request form shall be completed and submitted to the City for review.
2. All supporting documentation (i.e. master plan, basin maps, H&H calculations, development plan approval, etc.) shall be submitted with the waiver request form.
3. For an Existing Development project, density of the development has not increased and/or been modified.
4. For a Redevelopment project, the development does not adversely impact and/or cause flooding of properties within the development, upstream of the development, or downstream of the development. If known flooding or stormwater related concerns are located within the development, upstream of the development, or downstream of the development, the City Engineer may deny the waiver request.

Water Quality Requirements

Post-construction stormwater runoff quality is an important component of the City's SWMP. In order to meet the requirements of the City's NPDES Permit, a Water Quality Volume (WQ_v) must be accounted for on each development and BMPs must be utilized to store and/or treat the WQ_v . The required WQ_v is based upon the first 1.1 inches of rainfall that occurs on the development. The WQ_v can be estimated as described below:

$$WQ_v = 1.1 \text{ inches per acre of additional impervious area}$$

For example: An existing 12.5-acre site planned for redevelopment contains 3 acres of existing impervious area. The proposed development will contain 7 total acres of



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impervious area in the post-development condition. The required WQ_v shall be calculated as follows:

$$WQ_v = 1.1 \text{ inches} * 4 \text{ acres of additional impervious area}$$

$$WQ_v = 1.1 \text{ inches} * (1 \text{ foot} / 12 \text{ inches}) * 4 \text{ acres} * (43,560 \text{ sq.ft.} / 1 \text{ acre})$$

$$WQ_v = 15,972 \text{ cubic feet of storage required}$$

The WQ_v that is required for each development may be provided in multiple ways to allow greater flexibility during design. There are a number of post-construction BMPs (such as detention ponds, retention ponds, underground detention, bioretention areas, proprietary stormwater quality treatment devices, etc.) that may be utilized by the Owner and Engineer to meet the water quality and stormwater management requirements.

Low Impact Development (LID)

As an option for meeting the updated post-construction stormwater management requirements, the City encourages Owners, Developers, and Engineers to incorporate the use of low impact development (LID) practices into qualifying development and redevelopment projects. The latest version of the Alabama Low Impact Development Handbook is incorporated into this technical memorandum by reference.

Design Standards and Requirements

All stormwater management facilities and BMPs shall be designed in accordance with the following requirements:

1. The calculation methodology for hydrologic and hydraulic (H&H) analysis shall utilize the National Resource Conservation Resources (NRCS) Urban Hydrology for Small Watersheds Technical Release 55 (TR-55) or equivalent as approved by the City Engineer. For the determination of pre-construction and post-construction stormwater runoff hydrology, the 24-hour rainfall depths from National Oceanic and Atmospheric Administration (NOAA) Atlas14, Volume 9, Version 2 included in Table 1 shall be used:



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Table 1 – Design Storms

Storm Event (24 hour)	Rainfall (inches)
WQ _v	1.10
2-year	4.24
5-year	5.30
10-Year	6.24
25-Year	7.64
100-Year	10.00

2. As a part of the City's requirements for post-construction stormwater runoff management, all project sites shall be responsible for ensuring, to the MEP, that post-development runoff mimics pre-development hydrology for the WQ_v, 2-year, 5-year, 10-year, and 25-year rainfall depths listed in Table 1.
3. Stormwater management facilities cannot be constructed within a floodway.
4. The installation of post-construction BMPs shall not adversely impact and/or cause flooding of properties within the development, located upstream, and located downstream of post-construction BMPs.
5. The storm drainage system (i.e. piped storm sewer, overland flow, etc.) within the development shall be designed to convey the discharge resulting from a 100-year, 24-hour storm event in a manner that will not adversely impact and/or cause flooding of structures within the development.
6. The principal spillway for a stormwater management facility shall be sized to convey the 25-year, 24-hour discharge without allowing any discharge from the emergency spillway.
7. All stormwater management facilities shall be able to convey the peak discharge associated with a 100-year, 24-hour storm event.
8. Each stormwater management facility shall provide for an emergency spillway designed to convey the discharge resulting from a 100-year, 24-hour rainfall event. A freeboard of 20 percent (1 foot minimum) should be added to the embankment above the emergency spillway height to prevent overtopping.



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9. Design plans for stormwater management facilities shall show existing contours, proposed contours, details of outlet structure, details of emergency spillway, layout of storm sewer system, details of storm sewer system outlet protection, property lines, drainage area boundaries, roads, rights-of-way, streets, easements, etc.
10. H&H studies for stormwater management facilities shall include model network, existing drainage areas, proposed drainage areas, time of concentration, curve number, pre-development peak discharges, post-development peak discharges, outlet structure geometry, emergency spillway geometry, pond stage-area-storage summary, pond discharge summary, inflow and outflow hydrographs, outlet pipe velocities, etc.
11. Design Forms have been developed by the City to aid in the review and approval of stormwater management BMP submittals. The design forms provide a standard format for the Engineer to provide information concerning pre-development conditions, post-development conditions, and BMP information. For a development that contains multiple BMPs, the Engineer shall provide a completed Design Form for each .BMP

As-Built Certification

As a part of the NPDES permit, the City shall ensure the BMPs that have been designed and approved are constructed and operated in accordance with their original design. In an effort to confirm that the constructed BMPs meet the designer's intent, As-Built Certification Forms have been developed. It shall be the Owner's responsibility to have as-built information, such as pond volume, embankment size and elevations, invert size and elevations, and spillway elevations, field surveyed by a Professional Land Surveyor. It shall be the Engineer's responsibility to utilize the field surveyed information to fill out the applicable As-Built Certification Form. The Owner has two options for completing the As-Built Certification process:

- Option 1 The As-Built Certification Form shall be submitted and approved by the City prior to the issuance of a Certificate of Occupancy (CO) and/or prior to the recording of the final subdivision plat.
- Option 2 If the Owner would like to obtain a CO and/or record the final subdivision plat prior to the City's approval of the As-Built Certification Form, the Owner may post a bond or other forms of surety acceptable to the City in the amount of 100% of the construction cost associated with post-



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construction stormwater management BMPs and the cost associated with the effort required to complete the As-Built Certification Form. The As-Built Certification Form shall be submitted to the City within 120 days of receipt of a CO and/or recording of the final subdivision plat.

Annual Inspections

In order for post-construction BMPs to continue to function in accordance with their original design and installation, annual inspections are required by the City's NPDES permit. The Owner of the development is required to have these annual inspections performed and must then submit the required Annual Inspection Form to the City. The Annual Inspection Form shall provide documentation concerning the condition of each BMP and any maintenance required and/or performed. The City shall evaluate the documentation submitted to confirm that the stormwater management facilities are continuing to function as designed.

The Annual Inspection Form shall be submitted to the City each year by 30 September.

Operation and Maintenance

It is the responsibility of the Owner to operate and maintain the stormwater management facility and/or BMPs in accordance with the original design intent and approval. If the original Owner or Developer has sold the development or passed ownership on to a Homeowner's Association (HOA), then it is the new Owner or HOA's responsibility to maintain the facility and provide any required inspection and maintenance.

Should maintenance be needed at a facility as a result of the Annual Inspection, the Owner shall provide the City documentation of the maintenance required and a schedule for completing all maintenance activities. Once all maintenance activities are completed, the Owner shall provide documentation to the City of the maintenance performed and that the BMP operates as it was designed.

A summary of maintenance activities shall be submitted to the City each year by 30 September. The summary shall cover the previous fiscal year beginning 1 October through 30 September.



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List of Forms

Waiver Request Forms

- Form 1A - Existing Development Waiver Request Form
- Form 1B – Redevelopment Impervious Area Waiver Request Form

Design Forms

- Form 2A – Detention Pond Design Form
- Form 2B – Retention Pond Design Form
- Form 2C – Underground Detention Design Form
- Form 2D – Bioretention Area Design Form
- Form 2E – Hydrodynamic Separator Design Form

As-Built Certification Forms

- Form 3A – Detention Pond As-Built Certification Form
- Form 3B – Retention Pond As-Built Certification Form
- Form 3C – Underground Detention As-Built Certification Form
- Form 3D – Bioretention Area As-Built Certification Form
- Form 3E – Hydrodynamic Separator As-Built Certification Form

Annual Inspection Forms

- Form 4A – Detention Pond Annual Inspection Form
- Form 4B – Retention Pond Annual Inspection Form
- Form 4C – Underground Detention Annual Inspection Form
- Form 4D – Bioretention Area Annual Inspection Form
- Form 4E – Hydrodynamic Separator Annual Inspection Form