



# Montgomery MS4 Program

## Post Construction Stormwater Management Technical Memorandum – 15 August 2022

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To: Owners, Developers and Consultants Date: 15 August 2022

From: Patrick Dunson, P.E.  
City Engineer

Re: Post Construction Stormwater Management  
Updated Design Requirements

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### **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.

In accordance with the NPDES Permit, the City has developed and implemented a Post-Construction Stormwater Management 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 developed in accordance with the City’s NPDES Permit.

### **Applicable Developments**

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

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



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- 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 areas, 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;
3. A redevelopment that reduces the existing impervious area within the redevelopment; or,
4. A development that is part of a regional stormwater management strategy previously approved by the City. The regional stormwater management facility shall be constructed and the as-built certification approved by the City. The proposed development shall have the same or similar density and drainage area that was used to develop the regional stormwater management strategy.



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5. A development or redevelopment project is less than 1-acre, is not part of a larger development, and does not adversely impact the City's MS4.

A development that meets criteria 1 or 2 may apply for a waiver by completing Form 1A – Existing Development Waiver Request Form (Form 1A). A development that meets criteria 3 may apply for a waiver by completing Form 1B – Redevelopment Impervious Area Waiver Request Form (Form 1B). A development that meets criteria 4 may apply for a waiver by completing Form 1C – Regional Stormwater Management Waiver Request Form (Form 1C). A development that meets criteria 5 may apply for a waiver by completing Form 1D – Non Qualifying Development Waiver Request Form (Form 1D).

For a development or redevelopment project 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, drawings, aerial photographs, 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. To meet the requirements of the City's NPDES Permit, a Water Quality Volume ( $WQ_v$ ) shall be accounted for on each development and BMPs shall 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 calculated as described below:

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



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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 impervious area in the post-development condition. Since the additional impervious area will be 4 acres, 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, LID, 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 post-construction stormwater management requirements, the City encourages Owners, Developers, and Engineers to incorporate the use of low impact development (LID) and/or green infrastructure (GI) 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 <sub>v</sub>	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 2-year, 5-year, 10-year, and 25-year rainfall depths listed in Table 1.
3. All stormwater management facilities shall be sized to convey the peak discharge associated with a 100-year, 24-hour storm event.
4. Stormwater management facilities cannot be constructed within a floodway.
5. 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.
6. 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, located upstream of the development, and/or located downstream of the development..
7. The principal outlet control structure for a stormwater management facility shall be sized to convey the 25-year, 24-hour discharge without allowing any discharge from the emergency spillway.
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 minimum freeboard of 1-foot above the maximum stage anticipated shall be provided to prevent overtopping.
9. Design plans for stormwater management facilities shall show existing contours, proposed contours, details of outlet control structure, details of emergency spillway, layout of storm sewer system, details of storm sewer



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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 a watershed model schematic, existing drainage areas, proposed drainage areas, time of concentration, curve number, pre-development peak discharges, post-development peak discharges, outlet control control structure geometry and routing, emergency spillway geometry and routing, stage-area-storage summary, 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. Additional design criteria may be provided in the Supplemental Instructions of the Design Form.

### **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. 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 (i.e. topographic data, storm sewer system, drainage swales, pond volume, embankment size and elevations, outlet control structure details, invert elevations, spillway elevations, etc.) 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 completely, including all required attachments. 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 Conditional CO and/or record the final subdivision plat prior to the City's approval of the As-Built Certification Form, the Owner shall post a bond or other forms of surety acceptable to the City in the amount of 100% of the construction cost associated with post-construction stormwater management BMPs and the cost



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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 Conditional CO and/or recording of the final subdivision plat.

The primary goal of the As-Built Certification process is to ensure that the qualifying development or redevelopment and associated BMPs were constructed as they were designed and will function as they were designed.

### **Annual Inspections**

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 shall submit the required Annual Inspection Form to the City. The Annual Inspection Form shall provide documentation concerning the condition of each BMP, any maintenance required and/or performed, and include all required attachments. The City shall evaluate the documentation submitted to confirm that the stormwater management facilities are continuing to function as designed.

Annual inspections shall be performed by a registered professional that shall include:

- Certified Erosion, Sediment, and Stormwater Inspector (CESSWI)
- Certified Professional in Erosion and Sediment Control (CPESC)
- Certified Professional in Municipal Stormwater Management (CPMSM)
- Certified Professional in Stormwater Quality (CPSWQ)
- Professional Engineer (PE)
- Qualified Credentialed Inspector (QCI)

Depending upon the condition of the BMP, and inspection by a Professional Engineer may be required to ensure that the BMP continues to function as it was designed.

The Annual Inspection Form shall be submitted to the City each year by 30 September and shall include the current contact information for the development.

### **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.





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It is the Owner's responsibility to continuously maintain post-construction BMPs. If a BMP requires maintenance and/or repairs at any time, the Owner shall provide the required maintenance and/or repairs in a timely manner to ensure that the BMP will continue to function as it was designed. Any maintenance and/or repairs performed during the year shall be documented on the Annual Inspection Form.

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 an updated Annual Inspection Form documenting that maintenance has been performed and that the BMP will continue to operate 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.

### **Forms**

The City has developed smart forms to assist the designer in providing the required information to the City. The smart forms were created in excel and have the following features:

- Some fields are highlighted green. Once a number or text is entered, the green highlight will be removed. If a field is highlighted green, the information is required.
- When a Basin ID is entered for Pre-Development and Post-Development drainage basins, additional fields will be highlighted green to identify required information.
- The designer is required to input data for the Proposed Impervious Area (PIA) and Existing Impervious Area (EIA). The form will calculate the Additional Impervious Area (AIA) and the Water Quality Volume (WQ<sub>v</sub>). Calculated fields are highlighted orange. Once the required information is entered to perform the calculation, the orange highlight will be removed.
- For "Yes" or "No" questions, place an "X" in the appropriate box and the green highlight will be removed.
- Some sections of the form may have a dropdown list (i.e. Material, Shape, Filter, etc.) By clicking the dropdown arrow in the bottom left corner of the cell, the user can select the appropriate answer.





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- If a field is highlighted yellow after a number is entered, the yellow highlight may indicate an error and/or concern. Once the error and/or concern is resolved, the yellow highlight will be removed. All yellow highlighted cells shall be resolved or an explanation provided prior to completing the form.
- Automated checks have been incorporated into the forms to indicate an item of concern. Some examples include the following:
  - Total Post Q is greater than the Pre Q, the Total Post Q will be highlighted yellow.
  - Velocity is greater than 6 ft/s, the Velocity will be highlighted yellow.
- At the bottom of the form, the Automated Review Checks section will provide comments that should be addressed by the designer before completing the form.
- Supplemental Instructions may be provided on each form. The Supplemental Instructions shall provide additional guidance for that specific BMP.
- If the form is completed properly, there will be no cell highlighted green, yellow, or orange. Comments in the Automated Review Checks should be blank.
- The design information in the As-Built Certification Form will be automatically populated.

The following forms are currently available on the City's website:

### Montgomery 1A, 1B, 1C & 1D Waiver Forms

- Form 1A – Existing Development Waiver Request Form
- Form 1B – Redevelopment Impervious Area Waiver Request Form
- Form 1C – Regional Stormwater Management Waiver Request Form
- Form 1D – Non-Qualifying Development Waiver Request Form

### Montgomery 2A, 3A, & 4A Detention Pond Forms

- Form 2A – Detention Pond Design Form
- Form 3A – Detention Pond As-Built Certification Form
- Form 4A – Detention Pond Annual Inspection Form

### Montgomery 2A, 3A, & 4A Retention Pond Forms

- Form 2B – Retention Pond Design Form
- Form 3B – Retention Pond As-Built Certification Form
- Form 4B – Retention Pond Annual Inspection Form



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### Montgomery 2A, 3A, & 4A Underground Detention Pond Forms

Form 2C – Underground Detention Design Form

Form 3C – Underground Detention As-Built Certification Form

Form 4C – Underground Detention Annual Inspection Form

### Montgomery 2A, 3A, & 4A Bioretention Area Forms

Form 2D – Bioretention Area Design Form

Form 3D – Bioretention Area As-Built Certification Form

Form 4D – Bioretention Area Annual Inspection Form

### Montgomery 2A, 3A, & 4A Hydrodynamic Separator Forms

Form 2E – Hydrodynamic Separator Design Form

Form 3E – Hydrodynamic Separator As-Built Certification Form

Form 4E – Hydrodynamic Separator Annual Inspection Form