

Chapter 7

Minimum Control Measure: Item 5

Post-Construction Stormwater Management in New Development and Redevelopment

A. Permit Requirements

Section 4.2.5.1 of the general MS4 permit requires the permittee to develop, implement and enforce a program to address the quality of long-term 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 permittee's regulated small MS4. The permittee's program shall ensure that controls are in place that have been designed and implemented to prevent or minimize water quality impacts. As part of the SWMP document, the post construction runoff control program shall include the following information, at a minimum;

4.2.5.1.1 – 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. If the permittee needs to develop a mechanism, the permittee shall describe the plan and a schedule for implementation. If the permittee's ordinance or regulatory mechanism is already developed, the permittee shall include a copy of the relevant sections with the SWMP document. *See Section E BMP #2; addendum MCM #5-2 a copy "Draft" of the Post-Construction Stormwater Management Ordinance.*

4.2.5.1.2 – a plan to ensure adequate long-term operation and maintenance of selected BMPs, including, as appropriate, types of agreements between the permittee and other parties such as post development landowners or regional authorities; *See Section E BMP #2, BMP #4, and BMP #5; addendum MCM #5-3 a "Draft copy of the Post-Construction Stormwater Management Plan.*

4.2.5.1.3 – Strategies to minimize water quality impacts, which include a combination of structural and/or non-structural BMPs appropriate for the permittee's community, including but not limited to the assessment of site characteristics at the beginning of the construction site design phase to ensure adequate planning for stormwater program compliance. *See addendum MCM #4-2 for additional information.*

The goal of this approach is to arrive at designs that protect sensitive areas, minimize the creation of stormwater pollution, and utilize BMPs that effectively remove stormwater pollution. *See Section E BMP #2, BMP #4 and BMP #5; Chapter 6 MCM #4 for additional information.*

This can be achieved by reasonably mimicking pre-construction runoff conditions on all affected new development projects, or the permittee may achieve this goal through a method more appropriate for its community; *See addendum MCM #5-1 Technical Specifications Section 81 Stormwater Planning and Design and Section 82 Stormwater Runoff Calculations.*

4.2.5.1.4 – An inspection plan with implementation schedules for post construction BMPs; and *See Section E BMP #2 and BMP #4; addendum MCM #5-3 a “Draft copy of the Post-Construction Stormwater Management Plan.*

4.2.5.1.5. – The permittee shall inspect or require the inspection of post-construction stormwater BMPs to ensure that all BMPs are implemented and effective. *See Section E BMP #2 and #4; addendum MCM #5-3 a “Draft copy of the Post-Construction Stormwater Management Plan.*

B. Benefits of a Post-Construction Stormwater 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. Studies indicate that prior planning and design for the control of pollutants, peak discharge, disbursement, and volume 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 occurs 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 drainage systems where large volumes of runoff quickly flow to the nearest receiving body of water. The effects of the process include stream bank scouring and downstream flooding, which often lead to a loss of aquatic life and damage to property.

C. Program Intent

As with most communities, the City of Nixa's regulations and requirements for stormwater management have traditionally focused on stormwater facilities for conveyance of stormwater runoff and flood control. The City has adopted requirements for the design and construction of storm drainage systems, i.e. drainage channels and stormwater detention basins to serve new developments.

The intent of this minimum control measure is to improve stormwater quality and reduce total stormwater amount by using structural and non-structural best management practices for proposed commercial, industrial and residential developments.

For the purposes of the stormwater management plan, we define Post-Construction Stormwater Management as a combination of non-structural and structural BMP's which control both the planning of new developments and the design, construction, operation and maintenance for *permanent* stormwater management facilities in those developments, as opposed to stormwater management for construction sites, which is, at its very nature, temporary.

Nixa's definition of non-structural and structural BMP's may be somewhat different than the commonplace usage at MDNR. However, our definitions are consistent with the way these terms are used nationally and by USEPA:

Non-structural BMPs include practices which affect stormwater quality by activities and requirements which do not include construction of stormwater facilities per se. Examples of non-structural BMP's are public education, standards for land use planning and design, etc.

The City has adopted a number of regulations and policies which are very effective non-structural BMPs with regard to water quality protection. These include:

- Comprehensive Plan
- Zoning Regulations
- Subdivision Regulations
- Floodplain Management Regulations
- Stormwater Design Standards

Structural BMPs (temporary and permanent) are those which result in the actual construction of a stormwater management facility. Permanent structural BMP's included riprap, concrete trickle channels, detention basins, etc., which will remain in place through the life of the development.

D. Maximum Extent Practicable (MEP)

The term Maximum Extent Practicable shall be defined as the capture of runoff from the 90th percentile rainfall for the City as well as to capture the first flush of pollutants from directly connected impervious areas. The first flush is generally considered to be the first one-half inch (1/2") of runoff. The owner/developer must submit plans, specifications, and calculations signed and sealed by a professional engineer licensed in the state of Missouri.

E. Program BMPs

BMP #1. Stormwater Advisory Committee (4.2.5.1.2, 4.2.5.1.3, also see MCM #2, BMP #2)

Description: The City of Nixa will develop a panel of diverse individuals to make up a Stormwater advisory committee. The City will solicit committee participation from all target groups that are potentially affected stakeholders as listed above in the "Target Groups" heading in Chapter 4 MCM #2. *See addendum MCM #2-2, example of Stormwater Advisory Committee Application.*

Measurable Goals: In January of years 2 – 5 (2018 – 2021), the City will solicit volunteers to participate in the Stormwater committee. The City will maintain this Stormwater advisory committee annually throughout the permit term as long as there are enough volunteers to convene a viable committee.

An application process will be established. Interested individuals from all target groups will be able to either go on line to fill out the application or pick up a paper copy at Nixa City Hall or at either of the two Public Works Campuses. From these completed applications, City staff will make recommendations to City Council for appointment to committee.

The City will record the number of attendees (whether committee member or general public), an outline of topics discussed, their comments and suggestions from each meeting. Once compiled, City staff will take these comments under advisement toward updating the SWMP and the Post-Construction Plan.

The participants of the Committee will be requested to meet quarterly for one year after which the City will advertise for new committee members within the target groups. Any committee member wishing to remain on the committee from year to year will be allowed to do so.

After the initial first year of meeting quarterly (2018), the goal is to meet bi-annually (no less than 2 times per year) for the remainder of this permit cycle (2019-2021).

Annually, each Stormwater committee member will be given the opportunity to complete an online and/or printed survey. This will allow the City to evaluate the effectiveness of this BMP.

Rational for BMP: The public can provide valuable input and assistance to a municipal Stormwater Management Program. It is imperative that the public be given every opportunity to play an active role in the development, implementation and ongoing evolution of the SWMP program as a whole. If there are no citizen volunteers available for this committee, available and qualified City staff (some of which are also citizens of Nixa) will make up this Stormwater committee.

Parties Key to Implementation: MS4 Coordinator, City Staff from various other departments, City Management, Public Information Officer.

**BMP #2: Post-Construction Stormwater Management Ordinance
(4.2.5.1.1, 4.2.5.1.2, 4.2.5.1.3, 4.2.5.1.4, 4.2.5.1.5)**

Description: The City will develop and implement this ordinance to address Post-Construction stormwater runoff from new development and redevelopment projects, as well as sanctions and penalties associated with non-compliance, to the extent allowable under State or local law.

Measurable Goal: In year 2 (2018) coverage under this permit, City staff with the assistance of the Stormwater Advisory committee will finalize a first draft standalone Post-Construction Stormwater Management Ordinance. The intent of this ordinance will be to meet the requirements of this permit. This draft ordinance will be submitted to City council for review, direction and/or approval, with an anticipated implementation date of January 2019. *See addendum MCM #5-2 a copy "Draft" of the Post-Construction Stormwater Management Ordinance.*

Rational for BMP: Permit Requirement

Parties Key to Implementation: City Staff

BMP #3: Low Impact Development. (4.2.5.1.3)

Description: In year 4 (2020) the City will research the possibility of developing and implementing measures to encourage and expand the use of Low Impact Development (LID) in new and redevelopment. These measures will also include encouragement of retrofitting LID into existing development Post-Construction stormwater BMP's.

Measurable Goal: Develop, adopt and implement an ordinance consistent with LID practices and repeal sections of existing ordinances that conflict with LID practices.

Rational for BMP: The EPA website provides publications on LID, including Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices Publication Number EPA 841-F-07-006, December 2007 at <http://www.epa.gov/owow/nps/lid/costs07/>.

Parties Key to Implementation: MS4 Coordinator, Stormwater committee member

BMP #4: Post-Construction Stormwater Management Plan (4.2.5.1.2, 4.2.5.1.3, 4.2.5.1.4, 4.2.5.1.5) (see BMP #1)

Description: Develop and implement a Post-Construction Stormwater Management Plan that outlines required periodic inspections of all post-construction stormwater BMPs; create an inventory list; record and track names of the responsible parties of all qualified projects.

Measurable Goal: In year 2 (2018) The Committee (along with City staff) will strive to develop an outline for the City's Post-Construction Stormwater Regulation Manual. The Committee will release a draft manual for public review and comment in late 2018.

Once all public comments have been considered, City staff will present the final draft to City Council for approval, with an anticipated implementation date of January 2019. The City will review and update this Post-construction Stormwater management Plan annually to evaluate the effectiveness of this BMP. *See addendum MCM #5-3 a "Draft copy of the Post-Construction Stormwater Management Plan."*

The City will create an inventory list of qualifying Post-Construction BMPs. This inventory shall include:

- a. All Post-Construction BMPs that are installed to meet requirements of the NPDES Permits for stormwater discharges associated with construction activities where the projects preliminary plat was filed after January 15, 2017.
- b. The exact location of the Post Construction Stormwater Management (PCSM) BMP (e.g., street address, GPS coordinates);
- c. Information (e.g., name, address, phone number(s)) for BMP owner and entity responsible for BMP Operation and Maintenance (O&M), if different from BMP owner;
- d. The type of BMP and the year it was installed;
- e. Maintenance required for the BMP type.
- f. The actual inspection/maintenance activities for each BMP;
- g. An assessment by the permittee if proper maintenance occurred during the year and if not, what actions the permittee has taken, or shall take, to address compliance with O&M requirements
Along with this inventory, the City will develop maps, inspection procedures, enforcement procedures, and a tracking system to ensure that the requirements of the BMP are met.

Rational for BMP: To ensure adequate Operation and Maintenance (O&M) of all qualifying Post-Construction Stormwater Management BMPs.

Parties Key to Implementation: MS4 Coordinator, Stormwater committee member

BMP #5: Home Owners Association (HOA) Involvement (4.2.5.1.2, 4.2.5.1.3)

Description: Develop and implement a program by which members of the City's Home Owners Associations participate in the inspection of the stormwater post-construction BMPs in their neighborhood.

Measurable Goal: Starting in year 2 (2018) and continuing in each year of permit cycle, utilizing a series of face to face semi-annual meetings and/or e-mail correspondence, the City hopes to encourage the various HOAs situated around the different and diverse neighborhoods across the city, to get involved as a group, to help with the inspection and oversight of the post construction BMPs where they live. This BMP will work hand in hand with MCM 2 BMP#3, Storm Drain Medallion Program and MCM 2 BMP #4 Adopt-A-Street program.

Rational for BMP: These HOA associations are likely responsible for the Operation and Maintenance of a large portion of these BMPs.

Parties Key to Implementation: City Staff, Home Owners Association members.

F. Chapter Summary Table

*Year 1 = 2017, Year 2 = 2018, Year 3 = 2019, Year 4 = 2020, Year 5 = 2021.

BMP ID #	BMP	Activity	Measurable Goal	Due Date	Responsible Party
1	Stormwater Advisory Committee	Solicit volunteers to participate in the Stormwater committee.	Maintain Stormwater Advisory Committee annually, as long as there are enough volunteers to convene a viable committee.	*Year 2-5	City staff, Stormwater Advisory Committee members
2	Post-Construction Stormwater Management Ordinance	Draft ordinance to be submitted to City council for review, direction and/or approval.	Implement ordinance to address Post-Construction stormwater runoff.	*Year 2	City staff, Stormwater Advisory Committee members
3	Low Impact Development	Develop, adopt and implement an ordinance consistent with LID practices	Implement measures to encourage and expand the use of Low Impact Development	*Year 4	City staff
4	Post-Construction Stormwater Management Plan	Develop and implement a Post-Construction Stormwater Management Plan	Release draft manual for public review and comment in late 2018. Present the final draft to City Council for approval and implementation.	*Year 2 *Year 3	City staff, Stormwater Advisory Committee
5	Home Owners Association Involvement	Develop and implement a program where members of Home Owners Associations participate in the inspection of post-construction BMPs in their neighborhood.	Utilizing a face to face quarterly meetings and/or e-mail correspondence, the City hopes encourage participation.	Annually	City Staff, HOA members