



Green Infrastructure Barriers and Opportunities in Neosho, Missouri

An Evaluation of Local Codes and Ordinances

About the Green Infrastructure Technical Assistance Program

Stormwater runoff is a major cause of water pollution in urban areas. When rain falls in undeveloped areas, the water is absorbed and filtered by soil and plants. When rain falls on our roofs, streets, and parking lots, however, the water cannot soak into the ground. In most urban areas, stormwater is drained through engineered collection systems and discharged into nearby waterbodies. The stormwater carries trash, bacteria, heavy metals, and other pollutants from the urban landscape, polluting the receiving waters. Higher flows also can cause erosion and flooding in urban streams, damaging habitat, property, and infrastructure.

Green infrastructure uses vegetation, soils, and natural processes to manage water and create healthier urban environments. At the scale of a city or county, green infrastructure refers to the patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the scale of a neighborhood or site, green infrastructure refers to stormwater management systems that mimic nature by soaking up and storing water. These neighborhood or site-scale green infrastructure approaches are often referred to as *low impact development*.

EPA encourages the use of green infrastructure to help manage stormwater runoff. In April 2011, EPA renewed its commitment to green infrastructure with the release of the *Strategic Agenda to Protect Waters and Build More Livable Communities through Green Infrastructure*. The agenda identifies technical assistance as a key activity that EPA will pursue to accelerate the implementation of green infrastructure.

In February 2012, EPA announced the availability of \$950,000 in technical assistance to communities working to overcome common barriers to green infrastructure. EPA received letters of interest from over 150 communities across the country, and selected 17 of these communities to receive technical assistance. Selected communities received assistance with a range of projects aimed at addressing common barriers to green infrastructure, including code review, green infrastructure design, and cost-benefit assessments. The City of Neosho was selected to receive assistance identifying green infrastructure barriers and opportunities and design guidance.

For more information, visit http://water.epa.gov/infrastructure/greeninfrastructure/gi_support.cfm.

Acknowledgements

Principal USEPA Staff

Kerry Herndon, USEPA Region 7
Mandy Whitsitt, USEPA Region 7
Tamara Mittman, USEPA
Christopher Kloss, USEPA
James Pittman, USEPA

Community Team

John Harrington, City of Neosho
Dana Daniel, City of Neosho

Consultant Team

Emily Clifton, LID Center
Martina Frey, Tetra Tech, Inc.
John Kosco, Tetra Tech, Inc.

This report was developed under EPA Contract No. EP-C-11-009 as part of the 2012 EPA Green Infrastructure Technical Assistance Program.

Contents

Introduction 1
Key Findings 3
Next Steps 4
References 19

Table

Table 1. Detailed Review of Neosho’s Codes..... 5

Introduction

The City of Neosho is located on the western edge of the Missouri Ozarks and, with a population of more than 11,800, is the most populous city in Newton County, Missouri. Its name, which is of Native American origin, means “clear or abundant water,” was given due to the abundance of natural, freshwater springs within the area. Its historic downtown square is traditionally designed, with a majority of the buildings being constructed between 1870 and 1900, and has recently enjoyed renewed interest and private/public investments. The area has seen considerable population growth based on its location within a fast-growing, four state region, with new development primarily occurring along the urban fringe.

The City of Neosho is one of approximately 150 communities within Missouri which has been designated by the US Environmental Protection Agency (USEPA) and the Maryland Department of Natural Resources (MDNR) as a small Municipal Separate Storm Sewer System (MS4) community that must meet and comply with Missouri’s Phase II MS4 general permit requirements. As such, the City was required by March 10, 2008, to put in place a stormwater management program which meets six minimum control measures (MCMs). These are:

- MCM1: Public Education and Outreach
- MCM2: Public Involvement and Participation
- MCM3: Illicit Discharge Detection and Elimination
- MCM4: Construction Site Runoff Control
- MCM5: Post-construction Runoff Control
- MCM6: Pollution Prevention and Good Housekeeping for Municipal Operations

The City of Neosho is seeking to satisfy its Phase II MS4 general permit requirements and improve its local water quality by identifying barriers to MCM implementation and to incorporate the use of Green Infrastructure (GI) practices and Low Impact Development (LID) techniques in the management of stormwater. Measures to reduce illicit discharge, improve construction site sediment and erosion control, and minimize the post-construction impacts of stormwater runoff on water resources not only aide in satisfying permit requirements, but can also provide significant ancillary benefits for the town (e.g., enhance tourism and trout fishing, contribute to the city’s continued beautification efforts, and increase real estate value from increased curb appeal).

Often, existing codes and standards can work against these goals. Local codes and ordinances can require inflexible standards or incorporate outdated requirements that present barriers to implementation. This memorandum presents findings by EPA from a review of the regulations and standards relevant to the implementation of stormwater best management practices within the City. The purpose of the review was to identify regulatory updates needed to comply with Missouri’s Small MS4 General Permit as they relate to meeting three of the minimum control measures:

1. Illicit Discharge Detection and Elimination—MCM3
2. Construction Site Stormwater Runoff Controls—MCM4
3. Post-construction Runoff Controls—MCM5

A checklist was prepared accordingly to assist the City in their efforts of evaluating current code for compatibility with its Phase II requirements.

EPA reviewed the following City codes and documents:

- Title II. Public Health, Safety, and Welfare
- Title IV. Ch. 405: Zoning
- Title IV. Ch. 425: Flood Prevention
- Title IV. Ch. 430: Stormwater Runoff Management
- Title VII. Ch. 700: Water, Sewers, and Sewage Disposal
- City of Neosho's Draft Stormwater Management Program (January 2010)
- City of Neosho's Comprehensive Plan (May 2006)

A number of existing guidance documents exist that identify key land development and green stormwater infrastructure principles to reduce sediment and pollutant runoff and stormwater flows, reduce impervious cover, and conserve natural areas during the development process. For this effort, principles relevant to maintaining, minimizing, and mitigating stormwater impacts were adapted from the following:

- Missouri DNR's 2012 *Missouri Guide to Green Infrastructure*
- Missouri DNR's 2011 *Protecting Water Quality: A Field Guide to Erosion, Sediment and Stormwater Management Practice for Development Sites in Missouri and Kansas*
- The Center for Watershed Protection's 2004 *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*
- EPA's 2009 *Water Quality Scorecard*

Emphasis was placed on site design techniques and stormwater management practices considered appropriate for Neosho.

The findings presented in this memo are intended to highlight code areas for City staff discussion. Potential solutions to the identified issues were included and prioritized in order to help initiate a conversation when the city considers this report. However, it is fully expected and presented in a way that the City, through discussions with staff and external stakeholders, can manipulate and revise recommendations and priorities as necessary. EPA's review did not include an evaluation of administrative, inspection, or enforcement procedures; cost/benefit analyses; interviews with agency staff; or work sessions engaging the local regulatory, development, and environmental communities, which would likely precede any formal code update process. Where practical, EPA provided alternatives for addressing some of the issues identified, but ultimately it is up to the City to determine the most appropriate recommendations for local implementation.

Key Findings

As of March 10, 2008, all Phase II MS4 communities were required to put in place a stormwater management program which meets the six MCMs identified above. The most significant measures identified to satisfy the City of Neosho's existing permit requirements are listed below. These findings represent those that EPA believes will address the City's most immediate needs of meeting its permit obligations.

- **Submit a final, approved Stormwater Management Program Plan to MDNR.** In 2010, the City prepared and delivered a draft stormwater management plan to MDNR which outlines in draft form the steps the City intends to take in order to meet the six MCMs. However, this document was never approved by the City Council and has remained in draft form. In addition, key measures identified within the plan have not been implemented.
- **Prepare and adopt an illicit discharge stream mapping and screening project protocol manual to guide the completion of the outfall inventory.** Completion of an outfall inventory will aid in satisfying the City's Phase II MS4 requirements and will provide the City with a functional mapping and water quality screening program. The end product of the stream mapping and screening will be a complete database populated with the required information for all outfalls within the City's limits.
- **Prepare and adopt a more comprehensive illicit discharge detection and elimination code.** While some regulatory codes are already in place, the city should update its code to directly prohibit illicit discharges into the MS4 and to include powers of entry for identifying illicit discharge sources, enforcement measures, remediation recovery, response procedures, and adequate penalties for non-compliance (such as an enforcement escalation policy). According to the city's Draft Stormwater Management Program plan, a draft ordinance has already been prepared, and must simply be reviewed to ensure it meets the MCM requirements and submitted to the City Council for adoption.
- **Revise the City's stormwater code to include a land disturbance activity code and a comprehensive land disturbance permit requirement.** In order to be consistent with DNR requirements, the City must revise its code to require that a city land disturbance permit be obtained for any development greater or equal to 1 acre or when they are part of a larger common plan. In reviewing the City's Draft Stormwater Management Plan, it appears that the city has already drafted a revised stormwater management ordinance. No final ordinance, however, has been adopted by the City.
- **Revise the City's stormwater code to ensure it adequately protects environmentally sensitive features.** In order to comply with the City's Phase II MS4 permit, the city must ensure that environmentally sensitive features (steep slopes, hydric soils, erodible soils, stream and wetland buffers, etc.) are protected through the construction and post-construction process. Consider revising §430.120, Submission of Preliminary Stormwater Management Plan, to require either the submission of a separate, approved plan which shows the buffers of environmentally sensitive features with the submission of a preliminary SWM plan or land disturbance plan application package. Require buffers and a limit of disturbance line to be approved and shown on subsequent development plans.

- **Prepare, adopt, and reference a regularly updated stormwater manual with design specifications and performance design standards.** Currently, the city code does not reference a regularly updated stormwater management manual. Not only is a manual necessary to provide guidance for the planning and implementation of stormwater BMPs and monitoring programs at construction sites, but it is also necessary for enforcement.

Next Steps

In addition to the key findings presented above, a tabulated code review is presented in Table 1 that provides a more detailed review of the City's codes. As the City works to come into compliance with its Phase II MS4 permit obligations, the attached table provides some example code language and other resources for crafting code text amendments, drafting design templates, and drafting a stormwater manual for City Council consideration.

Next steps for this project include the preparation of a green infrastructure handbook that will focus more specifically on the types of GI and LID techniques applicable to Neosho. Such practices better mimic pre-construction runoff conditions on new development projects and more effectively utilize water quality strategies and technologies on redevelopment projects to the maximum extent practicable.

Table 1. Detailed Review of Neosho's Codes

Permit Reference	Key Question	Finding	Code / Ordinance	Section Reference	Comments	Recommendation	Priority
Illicit Discharge Detection							
Storm Sewer Map With Outfall Locations							
4.2.3.1.1	Ensure locations of known outfalls are mapped and sources verified with field surveys	No	Draft SMPP	—	<p>Outfall stream mapping and screening is a part of the Illicit Discharge Detection and Elimination Minimum Control Measures and is a major component of the process required to reduce pollutant discharge and protect water quality. In order to identify illicit discharges, all outfalls into water bodies need to be mapped and screened. The Draft SMPP states that the city began mapping the storm sewer system in 2008 by collecting GPS point data on stream outfalls and storm drain inlets, and identified measurable goals for determining success.</p> <p><i>Note:</i> the city intends to incorporate the storm sewer data into the city's GIS system. The draft stormwater management program plan states that the city will conduct field screenings of at least 20% of all outfalls per year. Both are important for meeting the goals if identifying and tracking outfall locations and sources.</p>	Evaluate and finalize the Draft SMPP for compliance with Phase II MS4 requirements, and prepare and adopt an illicit discharge stream mapping and screening project protocol manual to guide the completion of the outfall inventory (for examples of protocol manuals, see DNR's website at: http://dnr.mo.gov/env/wpp/stormwater/sw-local-gov-programs.htm#mcm3). Completion of an outfall inventory will aid in satisfying the City's Phase II MS4 requirements and will provide the City with a functional mapping and water quality screening program. The end product of the stream mapping and screening will be a complete database populated with the required information for all outfalls within the City's limits. Given the gap in time between the development and implementation of the Draft SMPP, consider increasing the number of field screenings per year in order to finalize data population.	High
Prohibit Stormwater Discharges and Implement Enforcement							
—	Include definition of a municipal separate storm sewer system (MS4) in the city's stormwater runoff management code	No	TITLE IV	CH 430	In §430.040, Definitions, of Ch. 430, MS4s are not currently defined. While not critical, including a regulatory definition of MS4s in the Stormwater Runoff Management chapter would help the city in determining how success or improvements are defined and in demonstrating enforcement of certain aspects of the local codes under the MS4 permit.	Consider revising Title IV, Ch. 430, §430.040 to include a definition of MS4s that includes the city's overall storm water management program performance goals	Low

Permit Reference	Key Question	Finding	Code / Ordinance	Section Reference	Comments	Recommendation	Priority
4.2.3.1.2	Ordinance prohibiting non-stormwater discharges into the storm sewer system and enforcement mechanisms to prohibit discharges	Partly	TITLE II and TITLE VII	CH 215	<p><i>Title II, Public Health, Safety and Welfare, Chapter 215 , Offenses and Miscellaneous Provisions:</i></p> <ul style="list-style-type: none"> • § 215.390, §215.570 and §215.600 deal with throwing trash from vehicles and keeping sidewalks free of trash, as well as draining filth, slops, waste water, etc. into streets • §230.100 prohibits littering and imposes minimum \$100 fine • §230.110 and §230.120 deal with depositing dirt, grass, and other litter in public alleys, streets, and ditches, as well as dirt from vehicle wheels <p><i>Title VII, Ch. 700, Waters, Sewers, and Sewage Disposal:</i></p> <ul style="list-style-type: none"> • §705.050 makes it unlawful to discharge without a permit • § 705.070 prohibits unsanitary disposal of human/animal waste, etc. • §705.100+ identifies penalties • §705.300 prohibits cesspools or septic tanks to discharge to natural outlets and §705.400 allows cost-recovery charges and fees • §705.540 includes reporting requirements for permittees • §705.550 prohibits sewage or other discharges into natural outlets • §705.560 prohibits stormwater, roof water, drains, etc., to drain to sanitary sewers 	While the Draft SMPP indicates that the city will adopt a more comprehensive code that directly prohibits illicit discharges into MS4 and include powers of entry for identifying illicit discharge sources, enforcement measures, remediation recovery, and response procedures, this has not yet happened. As such, the City is not in compliance with their Phase II MS4 permit. If the city has not yet drafted an ordinance, the Metropolitan St. Louis Sewer District Ordinance No. 8472 may have language that is adaptable. A final ordinance will need to incorporate adequate penalties (such as an enforcement escalation policy).	High

Permit Reference	Key Question	Finding	Code / Ordinance	Section Reference	Comments	Recommendation	Priority
4.2.3.1.3	Plan and implementation schedule in place to detect and address non-stormwater discharges, including illegal dumpings	No	Draft SMPP	--	In order to comply with Phase II MS4 requirements, the City must have a plan and implementation schedule in place to detect and address non-stormwater discharges, including from illegal dumpings and spills, to the permittee's system. As per Phase II requirements, it must include dry weather field screening for non-stormwater flows and field tests of selected chemical parameters. The 2010 Draft SMPP states that the city will conduct visual field screenings of at least 20% of all outfalls per year, as well as include methods for reporting illicit discharges (via stream teams, volunteer monitoring, and the storm water management web page, which will have info on what an illicit discharge looks like and have an online reporting form). An EPA fact sheet regarding illicit discharges is available on the web, but other portions of the draft plan have not been enacted.	Evaluate and finalize the Draft SMPP for compliance with Phase II MS4 requirements, including procedures for tracing and removing sources and appropriate enforcement actions. Prepare and adopt an illicit discharge stream mapping and screening project protocol manual to guide the completion of the outfall inventory and field verification that will be conducted by the City. As stated above under comment 1, examples are available on DNR's website at: http://dnr.mo.gov/env/wpp/stormwater/sw-local-gov-programs.htm#mcm3). DNR suggests that the fact sheet Series PUB2209 available at this website may also prove useful to inspectors. While the City intends to conduct its own field screenings, the Draft SMPP also indicates that materials will be available to encourage volunteer monitoring. To this degree, the City should consider providing or hosting workshops and training (in coordination with the stream teams, where they exist) on the collection of scientific data by volunteers to ensure that data collected is useful to the city.	High
4.2.3.1.4	Identify and address significant non-stormwater discharges or flows that are significant contributors of pollutants	Yes			As per the Phase II permit, examples of non-stormwater discharges or flows (i.e., illicit discharges) that are significant contributors of pollutants to the regulated small MS4 can include uncontaminated pumped groundwater, discharges from potable water sources, foundation drains, air conditioning condensation, springs, water from crawl space pumps, footing drains, lawn watering, flow from riparian habitats and wetlands, and street wash water. §705.560 prohibits the discharge of foundation drains, subsurface drainage, cooling water, or unpolluted industrial process water to any sanitary sewer.	Review list of possible contaminants to make sure that all significant contributors are addressed.	Low

Permit Reference	Key Question	Finding	Code / Ordinance	Section Reference	Comments	Recommendation	Priority
Construction Site Stormwater Runoff Control							
Bmp Concept Development							
4.2.4.1	Require a city land disturbance permit for developments >=1 ac. or part of larger common plan	No	Draft SMPP		The State of Missouri requires Land Disturbance Permits for disturbance of one acre or greater. While the city does require stormwater management plans for developments equal or greater to 10,000 sq. ft. (see comments for No. 7 regarding updates), a land disturbance permit is not required. The implementation of a comprehensive land disturbance permit program, including the revision of erosion and sediment control best management practices (BMP) standards and requirements, is necessary to be in conformance with state requirements.	Revise city code to include a land disturbance activity code and a comprehensive land disturbance permit requirement in order to be consistent with DNR requirements. While the city has drafted a revised stormwater management ordinance (see comments for #7) which appears to be consistent with the state's requirements, it is still in draft form. In addition to adopting an ordinance, Consider preparing a checklist for obtaining a land disturbance permit in order to help applicants understand and keep track of the necessary components. As an example, see the City of Springfield's comprehensive land disturbance permit program website: www.springfieldmo.gov/stormwater/esc/index.html .	High
4.2.4.1	Require a local soil and erosion sediment control plan or stormwater management plan to mitigate soil erosion, prevent stormwater runoff increases, and minimize pollutant discharges for developments >= 1 ac. or part of larger common plan	Partly	TITLE IV	CH 430	Title IV Ch. 430 (Stormwater Runoff Management) requires developments equal or greater to 10,000 sq. ft. to have an approved stormwater management plan, and shall not increase the quantity and rate of stormwater emanating from the development, except in accordance with a SWMP (§430.110). However, other pollutants of concern are not addressed. The Phase II permit requires permittees to include an ordinance or other regulatory mechanism that requires erosion and sediment control BMPs at construction sites. The Draft SMP indicates that a revised stormwater management ordinance which contains new requirements for land disturbance activities and erosion and sediment control for all activities affecting an area >= 1 ac., including any land disturbance activity that is part of a larger common plan. It also addresses land disturbances < 1 ac. where there is significant potential for sediment deposition in violation ordinance, when in close proximity to valuable resource waters, when 25 ft. or less from a spring, sinkhole rim, cave, wetland, watercourse, stream buffer, or 100 yr. floodplain.	Adopt the 2010 Stormwater Management Ordinance prepared for the City of Neosho. In order to be in compliance with the City's Phase II MS4 requirements, the city must update its stormwater management code. While the revised stormwater management ordinance identified in the Draft SMPP was not available for review, its description in the Draft SMPP appears to meet the requirements of the Phase II MS4 Permit. Evaluate the ordinance to ensure that all pollutants of concern (sediments and urban pollutants such as oils, greases, etc.) are addressed.	High

Permit Reference	Key Question	Finding	Code / Ordinance	Section Reference	Comments	Recommendation	Priority
4.2.4.1	Include criteria to determine who can prepare a stormwater management plan or soil and erosion sediment control plan	Yes	TITLE IV	CH 430	§430.110: GENERAL, states: "No development equal to or greater than ten thousand (10,000) square feet shall increase the quantity and rate of stormwater emanating from said land areas except in accordance with an approved Stormwater Management Plan as provided in these regulations. The Stormwater Management Plan shall be prepared by a licensed professional engineer in the State where the development occurs. No building permits shall be issued until and unless the Stormwater Management Plan has been approved by the City Building Inspector."	None. If altered to include other professionals, ensure that prepares are, at a minimum, certified SWPP preparers or other individuals whose qualifications are acceptable to the City	--
4.2.4.1	City code references a regularly updated erosion and sediment control manual or stormwater management manual	No	TITLE IV	CH 430	No manual is available through the city's website, though the city's draft stormwater management program plan indicates that a design manual may have already been prepared. Not only is a manual necessary to provide guidance for the planning and implementation of stormwater BMPs and monitoring programs at construction sites, but it is also necessary for enforcement.	Prepare and adopt a regularly updated manual with design specifications and performance design standards in order to be in compliance with Phase II MS4 requirements. See www.dnr.mo.gov/env/wpp/wpcp-guide/wpcp-guide.pdf or http://dnr.mo.gov/env/wpp/stormwater/sw-local-gov-programs.htm#mcm4 for a list of manuals available through DNR's website. Revise the existing stormwater management code to reference the (newly created) manual, as may be updated and modified by the department, for the minimum requirements that must be met in order to obtain a land disturbance permit, and for providing BMP guidance and additional resources to facilitate control of soil erosion and pollutants on land that is undergoing development.	High

Permit Reference	Key Question	Finding	Code / Ordinance	Section Reference	Comments	Recommendation	Priority
4.2.4.1.1	At the local level, require the disturbance of vegetated areas to be phased and disturbance of vegetated areas minimized?	No	TITLE IV	CH 430	Both are common BMPs included in erosion and sediment control manuals. The adoption of a manual would help bring the City in compliance with its Phase II MS4 and state requirements. E.g., the Missouri GI Guide states that GI principles be given more weight during the concept development and preliminary design/pre-construction phase in order to minimize soil disturbances and limit soil exposure. Non-structural stormwater control measures such as stream setback requirements and similar regulatory tools promote runoff source control through minimizing land alterations and taking advantage of existing natural features to help manage runoff. State requirements for land disturbance activities for 1 acre + require existing vegetation to be preserved where practical. The time period for disturbed areas to be without vegetative cover is to be minimized to the maximum extent possible.	Prepare and adopt a regularly updated manual with design specifications and performance design standards in order to be in compliance with Phase II MS4 requirements. See www.dnr.mo.gov/env/wpp/wpcp-guide/wpcp-guide.pdf or http://dnr.mo.gov/env/wpp/stormwater/sw-local-gov-programs.htm#mcm4 for a list of manuals available through DNR's website. Revise the existing stormwater management code to reference the (newly created) manual, as may be updated and modified by the department, for the minimum requirements that must be met in order to obtain a land disturbance permit, and for providing BMP guidance and additional resources to facilitate control of soil erosion and pollutants on land that is undergoing development. (Same recommendation as #9).	High

Permit Reference	Key Question	Finding	Code / Ordinance	Section Reference	Comments	Recommendation	Priority
4.2.4.1.3	Require environmental buffers to be shown on a stormwater management plan and designs to preserve existing runoff pathways to adequately support existing wetlands	No	TITLE IV	CH 430	The Draft SMPP indicates that a revised stormwater ordinance has been prepared that requires buffers of 75 ft. min. for stream buffers (increased for steep slopes and floodplain). It does not appear that this ordinance was submitted for approval. (Note: Missouri DNR’s “A field guide to erosion, sediment and stormwater BMPs for development sites in Missouri and Kansas,” some communities have stream setback requirements up to 300 feet, depending on the quality of the stream to be protected. It cites the ordinance for the City of Kansas City or the City of Lenexa, KS, as a good model. The Missouri GI Guide states that “ordinances that include stream setbacks and buffers provide a measurable area of vegetation between the streams and development and help protect the functions and values of aquatic habitat. They typically are designed so that almost all types of development or land clearing are prohibited near the stream, with gradually increased development as the distance from the top of the stream bank increases.”). In addition to requiring buffers for environmentally sensitive features, it is important to ensure that such buffers have been verified and approved by the city either with or prior to the acceptance of a stormwater management plan. This greatly increases the ability of such areas to be adequately protected during and after the construction process, and allow the permittee to consider and review pre-construction site plans for potential water quality impacts.	Review the revised stormwater ordinance (as identified in the Draft SMPP) to ensure it adequately protects environmentally sensitive features (steep slopes, hydric soils, erodible soils, stream and wetland buffers, etc.) in order to be in conformance with the Phase II MS4 Permit. In addition, consider revising §430.120, Submission of preliminary stormwater management plan, to require either the submission of a separate, approved plan which shows the buffers of environmentally sensitive features with the submission of a preliminary SWM plan or land disturbance plan application package	High

Permit Reference	Key Question	Finding	Code / Ordinance	Section Reference	Comments	Recommendation	Priority
Inspection, Enforcement and Maintenance							
4.2.4.1.1	Require formalized inspection and maintenance program to ensure that BMPs are properly installed and operating during construction phase, and sanctions to ensure compliance	Yes	TITLE IV	CH 430	<p>The Minnesota Stormwater Manual identifies a formalized inspection and maintenance program as essential to proper BMP implementation. For land disturbances of 1 acre +, state permit requirements include regularly scheduled inspections by a qualified person.</p> <p>In the city code, §430.210: INSPECTION states: "A. The City Building Inspector shall be responsible for determining whether the Stormwater Management Plan is in conformance with requirements specified in Article IV of this Chapter, and whether development is proceeding in accordance with the approved drainage permit. Periodic inspection of the development site shall be made by the City Building Inspector. Through such periodic inspections the City Building Inspector shall ensure that the Stormwater Management Plan is properly implemented and that the improvements are maintained." Parts B and C establish measures for requiring remedial work and allow the issuance of stop-work orders.</p>	<p>Include inspection and maintenance requirements for construction site stormwater runoff controls in an approved stormwater manual (e.g., regularly scheduled inspections (1x/mo. min) and within a reasonable time period (not to exceed 72 hrs) following heavy rains). Consider adding violations and penalties to the enforcement measures already provided, including a fine for each offense and requirements to bear the expense of restoration.</p>	Med
4.2.4.1.5	Require inspectors to be trained and certified	No	TITLE IV	CH 430	<p>While §430.210 assigns inspection duties to the City Building Inspector, no formal requirements are included to ensure that the inspector has sufficient knowledge in erosion, sediment, and stormwater control principles</p>	<p>Include requirements to ensure that the City Building Inspector (or, in the case that the inspection process is revised to allow inspection by applicant or a third party) has a thorough and demonstrable knowledge of the site's SWPPP and erosion and sediment control practices in general, and is knowledgeable in erosion, sediment, and stormwater control principles by requiring SWPP certification of the inspector</p>	Med
4.2.4.1.5	Provide tools to help SMPP plan reviewers and construction inspectors	No	—	—	<p>There are several things the City could do to improve to help SMPP plan reviewers and construction inspectors. For example, including detailed checklists or manuals for plan submittals ensures consistency; and the preparation and inclusion of brochures on SWPPs and maintenance (such as ones listed on DNR's website) may also help. In addition, providing information on upcoming workshops available through the state can also greatly improve knowledge and understanding of planning, construction, and maintenance responsibilities (a quick web search resulted in finding a regularly scheduled Stormwater Pollution Prevention Plan (SWPPP) Preparer Workshop available through Missouri State University, for ex).</p>	<p>Consider providing additional materials to SMPP plan reviewers and construction inspectors to ensure that there is consistency in plan submittals (important for the review and inspection process), and that reviewers and inspectors are up to date in their knowledge of construction site BMPs. Simply updating the website to provide links to Missouri-specific resources (and upcoming workshops, etc.) would likely be better received by the community than generic EPA materials.</p>	Med

Permit Reference	Key Question	Finding	Code / Ordinance	Section Reference	Comments	Recommendation	Priority
4.2.4.1.6	Require stormwater BMP maintenance agreements	Yes	TITLE IV	CH 430	§430.100. City Public Works Dept. is responsible, during and after construction, for the operation and maintenance of all drainage structures and improved courses which are part of the stormwater runoff management system under public ownership (and are not State or Federal). Each developer or owner has the responsibility and duty before and after construction to properly operate and maintain any on-site stormwater runoff control facility which has not been accepted for maintenance by the public. Requires a maintenance agreement with a 2 yr. maintenance bond (\$430.180).	None.	—
—	Require maintenance to be performed by a certified professional	No	TITLE IV	CH 430	Currently, no certification requirements exist for anyone who designs and/or maintains stormwater practices.	Consider incorporating regulations that require companies performing repair or maintenance on a stormwater management facility to: have demonstrated experience in stormwater management facility construction; have demonstrated experience in stormwater management facility inspection; and hold a Certificate of Attendance awarded through a training program approved by the City. Companies that perform repair or maintenance on underground stormwater facilities may also have state and federal training and credential requirements.	Low
Post-Construction Stormwater Management							
Protect Sensitive Areas from Encroachment							
4.2.5.1.5	At the local level, require buffers for streams and other environmentally sensitive areas and require/ encourage building envelopes to avoid sensitive environmental areas and highly permeable soils	No	TITLE IV	CH 405 and CH 410	At the local level, there are limited to no regulations regarding minimizing impacts to slopes exceeding 15 percent and to wetlands, streams, swales, and riparian buffers. In the zoning regulations, such areas may be considered 'natural site features to be preserved' in cluster subdivisions, but natural site features are not clearly defined. See comments above for SWMPs, which are required for developments =>10,000 sq. ft. Language on buffers for streams and wetlands should be added. In addition, plan requirements for developments in ch.s 405 (zoning) and 410 (subdivision) do not include showing buffers for environmentally sensitive features, and should be updated to show such features (as well as an approved limit of disturbance line).	Update the stormwater control ordinance to include restrictions on development in environmentally sensitive areas (e.g., slopes exceeding 15%, highly erodible soils, wetland/stream buffers, etc.). Require buffers and a limit of disturbance line to be approved and shown on subsequent development plans.	High

Permit Reference	Key Question	Finding	Code / Ordinance	Section Reference	Comments	Recommendation	Priority
4.2.5.1.5	At the local level, require/ encourage stream buffers to remain in a natural state (new development)	No	TITLE IV	CH 405 and CH 410 and CH 430	No requirements currently exist in the City's code as they relate to the stormwater chapter (CH 430), or those on zoning (CH 405) or subdivision (Ch. 410) regulations. The Missouri GI Guide identifies site-based non-structural stormwater control measures as including not only stream buffer setbacks, but preserving riparian zones, minimizing areas of disturbance and imperviousness, and maximizing open space. See comments above regarding buffers for streams or other environmentally sensitive areas. No similar regulations were found in the city's local codes.	Revise the city's stormwater chapter to require riparian buffers that remain in a natural state	High

Address Long-Term Storm Water Runoff Quality

4.2.5.1	Local ordinance or other mechanism in place to require pre-site design meetings with developers	Yes	TITLE IV	CH 430	Integrating GI into plans is easier to accomplish when considered at the beginning of the site design process, rather than at the end. It simplifies implementation into three questions: 1. Are land disturbances minimized? 2. Is vegetation preserved? 3. Is impervious cover minimized? Minimizing earthwork, clearing and construction of stormwater management infrastructure helps minimize environmental impacts while reducing construction, operation, and maintenance costs. §430.130 states: "Following receipt of a preliminary stormwater management plan, general drainage concepts and planning proposals are reviewed by the City Building Inspector (CBI), and a review meeting is scheduled btwn.. the CBI and developer to jointly agree on a stormwater management concept."	While the requirement of a meeting between the CBI following the receipt of a preliminary SWM plan is a good one, the planning process in general would benefit greatly by requiring that a prior plan be submitted and approved which sets up the site's environmental restrictions, i.e., require the approval of a plan showing approved buffers, etc., as identified in the construction BMP section. This would increase the ability for land disturbances in environmentally sensitive areas to be minimized and vegetation preserved.	Med
---------	---	-----	----------	--------	---	--	-----

Permit Reference	Key Question	Finding	Code / Ordinance	Section Reference	Comments	Recommendation	Priority
4.2.5.1.2	Local ordinance or other mechanism in place to require site plan reviews for storm water quality for projects >= 1ac. and to require reasonable mimicking of preconstruction SWR quality (projects >= 1 ac.)	No	TITLE IV	CH 430	<p>Stormwater code refers to quantity, but not quality. §430.030. Any development =>10,000 sq. ft. shall apply to the CBI for approval of a SWMP and issuance of a drainage permit.</p> <p>§430.110. Developments =>10,000 square feet shall not increase the quantity or rate of stormwater except in accordance with an approved SWMP. §430.160, Design Criteria, #2, states that streets, blocks, depth of lots, parks, and other public grounds shall be located and laid out in such a manner as to minimize the velocity of overland flows and allow maximum opportunity for infiltration of stormwater into the ground, and to preserve and utilize existing and planned streams, channels, and detention basins, and include, whenever possible, streams and floodplains within parks and other public grounds.</p> <p>The Draft SMPP includes code changes to shift focus onto water quality by requiring mimicking of pre-development hydrology, including storm water detention and water quality features, for all new development or redevelopment projects over a certain size. The current purpose statement in §430.030 does not explicitly identify this as an intent of the city code. Its focus is reducing property damage and human suffering, and minimizing the hazards of personal injury and loss of life to flooding. Flow control standards, which focus on ensuring public safety and reducing property damage, have very little to do with ecosystem protection. For preserving stream integrity, it is important for a stormwater system to specifically address the frequent or micro-storms that occur on a regular basis.</p>	Revise the stormwater code to, at a minimum, require projects >= 1 acre or part of a larger development plan to include site plan review for storm water quality. Revise Ch. 430 of Title IV to require mimicking of pre-development hydrology, including storm water detention and water quality features, for all new development or redevelopment projects over a certain size, as required to be in compliance with Phase II MS4 permit.	High
4.2.5.1.2	Local ordinance or other mechanism in place to require incremental improvements of existing SWM controls	No	TITLE IV	CH 430	Not specifically addressed. Development and redevelopment requirements are generally combined.	Require retrofits of stormwater management systems during redevelopment of property. Consider providing incentives and credits to property owners who redevelop/retrofit properties with green infrastructure improvements.	Med
4.2.5.1.2	Local criteria in place to determine which new/re-development SWM plans will be reviewed for water quality	No	TITLE IV	CH 430	The City's current stormwater runoff management requirements apply to all developments => 10,000 sq. ft. However, these requirements are just for water quantity. A new stormwater ordinance was prepared but not implemented which include requirements for what developments would be reviewed for water quality.	Update the stormwater control ordinance design criteria to be in conformance with the Phase II MS4 requirements	High

Permit Reference	Key Question	Finding	Code / Ordinance	Section Reference	Comments	Recommendation	Priority
4.2.5.1.5 and 4.2.5.1.6	Local ordinance or mechanism in place to allow for non-structural site design options that allow for optimal water quality mgmt. in long-term SWR and allows for structural contemporary, disperse microinfiltration/ filtration practices	No	TITLE IV	CH 430	"Non-structural site design options that allow for optimal water quality mgmt. in long-term SWR" refers to measures such as minimizing/ disconnecting impervious surfaces, cluster housing, resource protection boundaries, etc. These are not expressly allowed or prohibited. "Structural contemporary, disperse microinfiltration/ filtration practices" refers to practices such as grassed swales, sand filters, neighborhood roundabouts with rain gardens, etc. See §430.160, Development design: "Streets, blocks, depth of lots, parks, and other public grounds shall be located and laid out in such a manner as to minimize the velocity of overland flow and allow maximum opportunity for infiltration of stormwater into the ground, and to preserve and utilize existing and planned streams, channels, and detention basins, and include, whenever possible, streams and floodplains within parks and other public grounds."	Prepare and adopt a regularly updated manual with design specifications and performance design standards in order to be in compliance with Phase II MS4 requirements. See www.dnr.mo.gov/env/wpp/wpcp-guide/wpcp-guide.pdf or http://dnr.mo.gov/env/wpp/stormwater/sw-local-gov-programs.htm#mcm4 for a list of manuals available through DNR's website. Revise the existing stormwater management code to reference the (newly created) manual, as may be updated and modified by the department, which includes nonstructural structural post construction BMPs and specifications (in addition to construction BMPs, as identified previously).	High
4.2.5.1.2	Require new and re-development to require water quality design or performance standards, either directly or by reference	No	TITLE IV	CH 430	Water quality is not explicitly identified as a goal of the ordinance. Performance standards can be found in Article IV of Ch. 430	See other recommendations about revisions to Title IV Ch. 430.	High

Permit Reference	Key Question	Finding	Code / Ordinance	Section Reference	Comments	Recommendation	Priority
4.2.5.1	Require design standards or performance measures to require that pre-construction runoff in new developments be met for: flow volumes, peak discharge rates, discharge frequencies, flow duration, and/or water quality	No	TITLE IV	CH 430	<p>§430.030 Purpose: 2. Minimize the hazards of personal injury and loss of life due to flooding, to be accomplished through the approval of SWMPs pursuant to the provisions of these regulations, which:...</p> <p>c. Establish guidelines for handling increases in volume and peak discharges of runoff</p> <p>§430.160 Design Criteria. Outlet control works. 6. Detention. C (1) Outlet works shall be designed to limit peak outflow rates from detention storage areas to or below peak flow rates that would have occurred prior to the proposed development. Design criteria for temporary detention: 6. Detention. Development also may include temporary detention of stormwater runoff in order to minimize downstream flooding conditions. The following design criteria shall govern the design of temporary detention facilities; a. Storage volume. The volume of storage provided in detention basins shall be sufficient to control the differential runoff from the fifty (50) year storm frequency of twenty-four (24) hour duration. The differential runoff is that volume and rate of flow of stormwater runoff discharged from a parcel of land or drainage area which is or will be greater than that volume and rate which pertained prior to proposed development or redevelopment. b. Freeboard. Detention storage areas shall have adequate capacity to contain the storage volume of tributary stormwater runoff with at least two (2) feet of freeboard above the water surface of flow in the emergency spillway in a fifty (50) year storm or as required by State law.</p>	Approve a revised stormwater ordinance (note: a draft has already been prepared by the city, but not approved) that brings the city in compliance with their Phase II MS4 permit. Modifications to the city's existing code as per the city's previously prepared stormwater ordinance (as indicated in the Draft SWPP) include: requiring the mimicking of predevelopment hydrology, including stormwater detention and water quality features; requiring water quality structural BMPs to capture and treat 90% of the annual runoff events generated by a site; new extended detention requirements for water quality capture volume (in addition to existing flood protection criteria). While the draft ordinance was not available for review, these measures appear sufficient for bringing the city into compliance with the Phase II MS4 permit. It is recommended that the ordinance be submitted and approved by the city council.	High
	Presence of a water quality checklist in the review approval process	No	TITLE IV	CH 430	No. However, the stormwater regulations stipulate what should be submitted as part of a preliminary stormwater plan (§430.110). This includes: 1) topo map w/ 10 ft. contour intervals; site plan; location of streams, flood water runoff channels, etc. Boundaries of existing vegetation are not required to be shown, nor is a functional landscape plan.	Tools such as water quality checklists and information on how to prepare and submit an accurate plan improves consistency and helps both the submitter, the plan reviewer, and the inspector. At the minimum, plan submittal requirements should be updated to include more information on environmental features and buffers, as well as to identify a limit of disturbance line (which should be different from buffers).	Low

Permit Reference	Key Question	Finding	Code / Ordinance	Section Reference	Comments	Recommendation	Priority
Ensure Long-Term Operation and Maintenance							
4.2.5.1.3	Local ordinance or other mechanism in place to require long-term O&M of SWM controls	Yes	TITLE IV	CH 430	§430.100 requires the City Public Works Dept. to be responsible for O&M of all publicly owned stormwater runoff management, and each developer or owner of land to be responsible for the O&M of on-site stormwater management controls that have not been accepted for maintenance by the public. Such responsibility is to be transmitted to subsequent owners through appropriate covenants.	In addition to the existing measures, a draft stormwater management ordinance was prepared by the city (see Draft SMPP) which requires developers to ensure ownership and maintenance of facilities via sufficient easements and covenants approved by the City of Neosho City Attorney. Where maintenance or repair is required, the ordinance provides the City with the ability to correct violations and assess the costs against the property owner or subdivision homeowners if the owner fails to comply. These measures would serve to improve the City's ability to require and enforce long-term O&M.	High

References

- Center for Watershed Protection. 2004. *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*. Accessed December 2013. http://www.epa.gov/npdes/pubs/idde_manualwithappendices.pdf.
- Missouri Department of Natural Resources. 2011. *Protecting Water Quality: A Field Guide to Erosion, Sediment and Stormwater Management Practice for Development Sites in Missouri and Kansas*. Revised January 2011. Accessed December 2013. <http://www.dnr.mo.gov/env/wpp/wpcp-guide.htm>.
- Missouri Department of Natural Resources. 2012. *Missouri Guide to Green Infrastructure*. Pub. 2446. Revised May 2012. Accessed December 2013. <http://www.dnr.mo.gov/env/wpp/stormwater/mo-gi-guide.htm>.
- Neosho, Missouri. 2006. *Comprehensive Plan*. Revised May 2006. Accessed December 2013. <http://neoshomo.org/DocumentCenter/Home/View/650>.
- USEPA (U.S. Environmental Protection Agency). 2009. *Water Quality Scorecard: Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scale*. Updated October 2009. Accessed December 2013. http://www.epa.gov/dced/pdf/2009_1208_wq_scorecard.pdf.