



# JOINT STORMWATER MANAGEMENT PROGRAM

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MS4 PERMIT #MO-0136557

*Coverage for:*

*Boone County, Missouri*

*City of Columbia, Missouri*

*University of Missouri (MU)*

*Prepared by:*

*Boone County Resource Management*

*City of Columbia Utilities Department*

*MU Department of Environmental Health and Safety*

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# JOINT STORMWATER MANAGEMENT PROGRAM

Boone County/City of Columbia/MU

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## D. REQUIREMENTS

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This Joint Stormwater Management Plan (SWMP) has been developed in accordance with The Stormwater Phase II Final Rule requirements specified in Part D of the site-specific permit MO-0136557 for discharges from small regulated Municipal Separate Storm Sewer Systems (MS4s), as well as per state regulation 10 CSR 20-6.200 and federal regulations 40 CFR Parts 9 and 122. The three co-permittees, Boone County, City of Columbia and MU, have developed and implemented this program in order to protect water quality and effectively reduce stormwater pollutant runoff within their respective jurisdictions to the maximum extent practicable. MU will serve as the coordinating authority for this joint SWMP; however, MU does not have regulatory authority over either of the other co-permittees. Responsibility for implementation of all MCMs will be shared jointly among the three co-permittees. This plan will be reviewed on an annual basis and updated as necessary.

IN ACCORDANCE WITH PART D OF THE PERMIT, THE PERMITTEES WILL:

- Develop a SWMP that shall contain each of the six (6) MCMs described in Part E – Minimum Control Measures of the permit including all applicable requirements specified in Sections D.1.A –D.1.d. of the permit.
- Fully implement each MCM in accordance with the approved SWMP.
- Revise the SWMP when necessary and submit the revised SWMP to the Water Protection Program’s MS4 Coordinator for review and rating.
- Implement the SWMP on all new areas added to the MS4 area as expeditiously as practicable.
- List in the MS4 SWMP Report any transfer of ownership, continuing authority, or responsibility that occurs in the MS4 area.

This plan contains Best Management Practices (BMPs) and Measurable Goals (MGs) for the six Minimum Control Measures (MCMs) described in Sections E.1-E.6 of the permit. Measurable goals are selected to evaluate the effectiveness of individual control measures and the stormwater management program as a whole.

BMPs will be described as follows:

**BMP:** Best Management Practice

**MG:** Measurable Goal (Responsible Permittee—Status)

## CONTACTS

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The individuals listed below are the persons primarily responsible for the content of this SWMP and are listed as specified by section D.1.d. of the permit.

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## BACKGROUND INFORMATION

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### POPULATION AND LAND USE:

Boone County has a population of 162,642 (2010 US census). The largest city is Columbia, with a population over 108,000. Columbia is fifth largest city, and the second fastest growing community in Missouri. The City's current land mass is over 60 mi<sup>2</sup>, with an annexation rate of 0.6 mi<sup>2</sup> per year.

Columbia is the home of the University of Missouri, with more than 35,000 students, as well as Stephens College (1,750 students) and Columbia College (1,082 daytime students only). Other towns in Boone County include Centralia (4,027), Ashland (3,707), Hallsville (1,491), Sturgeon (872) Rocheport (239), Harrisburg (266), Hartsburg (103), Pierpont (76), McBaine (10) and Huntsdale (32).

Approximately 27% of the population lives in the rural areas of Boone County. According to the 2012 US Agriculture Census, there are over 1,100 farms in the county with an average size of 206 acres. The total land used for farming is almost 241,000 acres.

### CLIMATE:

The average winter temperature is 29.6° F. In summer, the average temperature is 74.7° F and the average daily maximum of 85.9° F. The highest recorded temperature of 116 degrees occurred on July 15, 1954.

The total annual precipitation is 38.94 inches. The heaviest recorded 1-day rainfall was 5.37 inches on August 12, 1993. Thunderstorms are common from May to August. The average seasonal snowfall is 22.4 inches. During the three year period between January 1, 2008 and December 31, 2010 annual precipitation was more than 14 inches higher than average (56.98, 53.15, and 53.50 respectively).

The average relative humidity in mid-afternoon is about 60%. Humidity is higher at night, peaking at dawn with an average of 83%. It is sunny 66% of the time in summer and 49% of the time in winter. The growing season in Boone County is 192 days. The first frost is around October 19<sup>th</sup>, while the last frost is around April 10<sup>th</sup>. (Boone County Soil Survey, 2005)

### HYDROLOGY:

Boone County is bordered by the Missouri River on the southwest, and by Cedar Creek on the east. There are twenty-three sub-basins that are entirely or partially within the county boundaries. Drainage is mainly towards the Missouri River, from northeast to southwest. However, the extreme northeastern section of the county (Centralia) flows towards the Salt River. The largest watershed is Perche Creek which drains more than 70% of the landmass. Hinkson Creek, a 90 mi<sup>2</sup> watershed, is the single largest contributor to Perche Creek.

Hinkson is fed by Grindstone Creek, Flat Branch, Hominy Branch, County House Branch, Meredith Branch, and Mill Creek. More than 90,000 people live in the Hinkson Creek Watershed.

Between Columbia and Ashland is the Bonne Femme Watershed. This area is well known for Karst topography, with numerous caves, sinkholes and losing streams. The area also contains several state parks. The Bonne Femme feeds the cave system for the Devil’s Icebox, and Rockbridge State Park. Also in this area is Three Creeks Conservation Area, maintained by the Missouri Department of Conservation. The streams running through these parks are designated as State Resource Waters.

**WATER QUALITY AND TMDLs IN BOONE COUNTY:**

Several area streams do not support warm water aquatic life or whole body contact recreation. These streams have been listed on the State’s List of Impaired Waters as required by section 303(d) of the Clean Water Act (CWA). Once a waterbody is listed, then a Total Maximum Daily Load (TMDL) must be developed to set the maximum amount of pollution that can enter the stream and still maintain water quality standards. The following table shows the waterbodies in Boone County that are on the 2014 Impaired Waters List (Section 303(d)).

<b>Waterbody Name</b>	<b>Pollutant</b>	<b>Source</b>	<b>Miles/acres impaired</b>	<b>TMDL</b>
Bonne Femme Creek	Bacteria	Rural NPS	14.8	
Cedar Creek	Unknown	Unknown	37.4	
Little Bonne Femme Creek	Bacteria	Unknown	9.0	
Bass Creek	Bacteria	Rural NPS	4.4	
Foster Creek	Ammonia	Ashland WWTP	0.5	
Fowler Creek	Low D.O.	Unknown	6.0	
Gans Creek	Bacteria	Unknown	5.5	
Grindstone Creek	Bacteria	Urban/Rural NPS	2.5	
Hinkson Creek	Unknown	Urban Runoff	18.0	Developed
Hinkson Creek	Bacteria	Urban/Rural NPS	18.8	

Hominy Branch	Bacteria	Runoff-various	1.0	
Turkey Creek	Bacteria	Unknown	6.3	
Lake of the Woods	Mercury	Atmospheric	1.3	
Philips Lake	Mercury	Atmospheric	32.0	

In streams where the identified pollutant is bacteria, the sources could be from wildlife or agriculture in the rural areas, leaky septic systems, sanitary sewer or lagoon overflows, or cross connected pipes in the suburban areas.

According to the 2012 National Agricultural Statistics Service (NASS) there were 19,150 head of cattle, 10,599 hogs and pigs, 1,749 sheep, 1,460 goats, 2,924 horses and ponies and 14,674 poultry in the county.

The Central Missouri Humane Society estimates that approximately 55,000 dogs reside in Columbia Missouri.

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# E. MINIMUM CONTROL MEASURES

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## 1. MCM 1: PUBLIC EDUCATION AND OUTREACH

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An informed and knowledgeable community is a key component to the success of a stormwater management program. The public education and outreach component coordinates a variety of activities and partners to support all the minimum control measures. Education and outreach is the backbone to a comprehensive stormwater management program that educates the public in many formats and on a variety of levels. Outreach can be printed material, online material, activities, training and events. Those receiving the education can be K-12 and college students, employees, interest groups, elected officials and the general public. Connecting water quality to our everyday activities through a variety of elements can affect change in behavior and awareness.

**Permit Requirement:** Implement a coordinated public education program which involves the distribution of educational materials to the community, or equivalent outreach activities about the impacts of stormwater discharges on water bodies and steps the public can take to reduce pollutants in the stormwater runoff.

Raising citizen's understanding and awareness of stormwater impacts and issues is the primary goal of MCM 1 and the permittee's level of commitment to education and outreach programs is significant.

This requirement continues to be met by each of the three co-permittees with the following BMPs and associated Measurable Goals.

**BMP 1:** Maintain an education and outreach program to educate strategically targeted audiences about annually selected topics that are pertinent and timely to local water quality issues. The audiences will include municipal inspectors, contractors, developers, engineers, interest groups, general public, and schools. The intent of this BMP is to create and maintain a public that is conscientious of the impacts that their behaviors have on local watersheds in order to reduce pollution from residential and industrial activities.

**MG:** Maintain a list of all education and outreach programs conducted throughout the year. Maintain a participation roster and date for each education and outreach activity.

**BMP 2:** Develop and distribute education and outreach materials.

**MG:** Develop brochures, fact sheets, public service announcements, etc. Update educational materials as necessary to remain current on local water quality issues.



**MG:** Prepare and distribute materials at events. Review and update educational materials as necessary.

**BMP 3:** Conduct education and outreach activities.

**MG:** The Permittees will staff at least two (2) community events (e.g., Earth Day), make presentations to citizen's groups (e.g. Center for Watershed Protection webinars), and present to schools and industry (e.g. Stream table demonstrations).

**BMP 4:** Maintain Hinkson Creek GIS Habitat Viewer.

**MG:** Maintain Hinkson Creek GIS Habitat viewer by reviewing annually and updating when pertinent data becomes available.

**BMP 5:** The co-permittees will provide and continue to maintain dedicated stormwater resource websites. These websites educate the community about the impacts of stormwater runoff, permit and inspection requirements, and general watershed information.

**MG:** Maintain stormwater resource websites such as: [www.gocolumbiamo.com/PublicWorks/StormWater](http://www.gocolumbiamo.com/PublicWorks/StormWater) , [www.showmeboone.com/stormwater](http://www.showmeboone.com/stormwater), <http://ehs.missouri.edu/ehs/env/stormwater>, and [www.helpthehinkson.org](http://www.helpthehinkson.org) by reviewing and updating as necessary.

**BMP 6:** Many household products are hazardous because they contain chemicals that are toxic, corrosive, flammable, or reactive. Improper disposal can cause these products to find their way into receiving streams and lakes. The co-permittees will provide the public with proper, publically announced, disposal opportunities to minimize the presence of these chemicals in local waterways.

**MG:** Hold a special co-permittee coordinated Household Hazardous Waste collection event annually as funding permits. This event will include the collection of used tires.

**MG:** Continue the twice a month City of Columbia Household Hazardous Waste Collection Program. This collection event takes place between and including the months of April through November.

## 2. MCM 2 - PUBLIC INVOLVEMENT/PARTICIPATION

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The public has a role in the success of a stormwater management program. The public can participate through public hearings and public meetings. The public has the opportunity to be involved in various stormwater quality awareness and improvement activities. Furthermore, a developing avenue for participation and involvement is interaction through social media.

**Permit Requirement:** Implement an effective public involvement/participation program that complies with State and local public notice requirements.

This requirement continues to be met by each of the three co-permittees with the following BMPs and associated Measurable Goals.

**BMP 1:** Implement an effective public involvement/participation program that allows citizens and civic groups to provide input concerning policies and complies with state and local public notice requirements.

**MG:** Hold public hearings/stakeholder meetings when properties are annexed or request a change in zoning, during the platting process, and throughout the project design stage.

**MG:** Annually publicize and present the Campus Master Plan, which identifies planning principles and includes current and proposed construction projects.

**BMP 2:** Select a targeted topic for each calendar year.

**MG:** Select a specific topic to focus on for year. The topic may be based on issues that are of highest importance for that year.

**BMP 3:** Continue to implement and maintain public involvement/participation activities to engage citizens and continue to form partnerships that reach a diverse audience.

**MG:** Promote Adopt-A-Spot/Adopt-A-Road programs, TreeKeepers, C.A.R.P., public service announcements, and community clean-up events.

**MG:** Maintain social media and websites for promotion of public involvement and participation to facilitate conversation of pertinent topics.

**BMP 4:** Many household products are hazardous because they contain chemicals that are toxic, corrosive, flammable, or reactive. Improper disposal can cause these products to find their way into receiving streams and lakes. The co-permittees will provide the public with proper, publically announced, disposal opportunities to minimize the presence of these chemicals in local waterways.

**MG:** Hold a special co-permittee coordinated Household Hazardous Waste collection event annually as funding permits. This event will include the collection of used tires.

**MG:** Continue the twice a month City of Columbia Household Hazardous Waste Collection Program. This collection event takes place between and including the months of April through November.

### 3. MCM 3 - ILLICIT DISCHARGE DETECTION AND ELIMINATION

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Illicit discharges enter the system through either direct or indirect connections. Direct connections are usually vehicular accidents and first responders continue to be educated on clean up techniques. Other direct connections happen mistakenly and require education on the spot. A robust program to detect and address indirect wastewater connections is underway. The necessary legal measures are in place to prohibit and enforce illicit discharges. Addressing indirect wastewater connections and educating the public continue to be primary activities for this measure.

**Permit Requirement:** Develop, implement and enforce a program to detect and eliminate illicit discharges into the regulated MS4. The responsibility will be shared jointly among the three co-permittees.

This requirement continues to be met by each of the three co-permittees with the following BMPs and associated Measurable Goals.

**BMP 1:** Continue to maintain stormwater drainage system map(s) with all outfalls, pipes, inlets and associated attributes by reviewing and updating.

The purpose of his BMP is to document the location of all new and existing stormwater outfalls, pipes, inlets, and other associated attributes for locational and logistical reference. A geospatial tool helps permittees understand the impacts of illicit discharges to the MS4.

**MG:** The co-permittees will review new development and update stormwater drainage system map(s) accordingly.

**BMP 2:** Effectively prohibit, through IDDE ordinance, or other IDDE regulatory mechanisms, non-stormwater discharges into the stormwater drainage system and implement appropriate enforcement procedures and actions.

The purpose of his BMP is to maintain water quality by restricting certain discharges into the stormwater drainage system.

**MG:** Document and track IDDE Ordinance/Regulatory Mechanism enforcements. Document any illicit discharges and illegal dumping enforcement actions taken.

**MG:** Review IDDE Ordinances/Regulatory Mechanisms annually and update as needed.

**BMP 3:** Evaluate certain non-stormwater discharges or flows, or certain categories of non-stormwater discharges or flows, to determine if they are significant contributors of pollutants to the MS4.

**MG:** Address occasional incidental non-stormwater discharges on a case-by-case basis to determine whether such discharges may appropriately be directed to the storm sewer system. The co-permittees have not identified any of the listed non-stormwater discharges as significant contributors to the regulated MS4.

**BMP 4:** Maintain an implementation schedule to detect and address incidental non-stormwater discharges including discharges from illegal dumping and spills to the MS4.

The purpose of this BMP is to detect cross connections in the sanitary sewer system and other discharges to the MS4.

**MG:** Each permittee will visually inspect 10% of stormwater discharge points each year on a rotating basis.

**MG:** Continue plan to detect and address non-stormwater discharges which may include on-site visual inspections, smoke and dye testing, closed circuit television (CCTV) inspections.

**MG:** Track non-stormwater discharges reported by the public through provided outlets via web-based reporting and hotlines.

**BMP 5:** Inform public employees, businesses, and the general public of the hazards associated with illegal discharges and improper disposal of waste.

**MG:** Include this information as an element in the outreach, education and municipal training programs. Update this information as necessary.

## 4. MCM 4 - CONSTRUCTION SITE STORMWATER RUNOFF CONTROLS

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Construction site runoff is a publicly visible element of the stormwater management program. Regulatory mechanisms are in place to control construction site runoff. Site plan review and inspections for construction site runoff control are ongoing. Each permittee continues to refine internal procedures for inspection and enforcement. Public concerns that are received are inspected in a timely manner.

**Permit Requirement:** Develop, implement and enforce a program that reduces pollutants in stormwater runoff to the MS4 from construction activities that result in a land disturbance of greater than or equal to one acre.

Construction activities that result in a land disturbance of greater than or equal to one acre have the potential to contribute more pollutants to local waterways.

The purpose of the construction site stormwater runoff control MCM is to prevent soil, construction material, and other materials from leaving the construction site and entering the stormwater drainage system. Sediment is the primary pollutant of concern.

This requirement continues to be met by each of the three co-permittees with the following BMPs and associated Measurable Goals.

**BMP 1:** Require an MDNR land disturbance permit for sites that will disturb one acre or greater. The purpose of this BMP is to ensure that proper disposal mechanisms are utilized to control runoff from construction sites disturbing greater than one acre.

**MG:** Track the number of land disturbance permits issued each year.

**BMP 2:** Enforce ESC/Land Disturbance Ordinance/Regulatory Mechanism (City Chapter 12 Land Disturbance Ordinance, County Chapter 24 Erosion and Sediment Control Ordinance, MU Business Policy and Procedure Manual Chapter 7, Section 7.001).

**MG:** Track inspections and enforcements.

**BMP 3:** Maintain land disturbance regulatory mechanism.

**MG:** Conduct an annual review of regulatory mechanism and report any changes.

**BMP 4:** Develop and maintain stormwater design manual(s) requiring construction site operators to implement appropriate erosion and sediment control best management practices.

The purpose of this BMP is to require construction site operators to implement appropriate erosion and sediment control best management practices to improve downstream water quality.

**MG:** Implement and maintain stormwater design manuals. Review annually and update as necessary.

**BMP 5:** Require construction site operators to control waste and erosion on construction sites by requiring Stormwater Pollution Prevention Plans (SWPPPs)/erosion and sediment control plans.

**MG:** Document SWPPP site plan and SWPPP reviews and record any comments provided to the construction company pertaining to the contractor's SWPPP.

**BMP 6:** Maintain procedures for receipt and consideration of information submitted by the public. Maintain websites and hotline phone numbers.

**MG:** Track information submitted by the public.

**BMP 7:** Conduct site inspections to ensure construction site operators implement appropriate erosion and sediment control best management practices.

**MG:** Inspect 100% of locally permitted sites.

## 5. MCM 5 - POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

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The necessary regulatory mechanisms are in place to require post construction runoff control for all new development. Opportunities to retrofit post construction runoff controls are identified and implemented when possible. Maintenance of structural BMPs (Best Management Practices) is a critical component to the success of post construction runoff controls. Inventory and inspection of BMPs encourages proper maintenance which supports pollutant and runoff reductions.

**Permit Requirement:** Develop, implement and enforce a program to address the quality of stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre. This includes projects less than one acre which are part of a larger common plan for development or sale that discharge into the regulated MS4.

This requirement continues to be met by each of the three co-permittees with the following BMPs and associated Measurable Goals.

**BMP 1:** Identify and develop strategies including structural and/or non-structural BMPs to improve the quality of stormwater runoff.

**MG:** Continue to implement and track water quality improvement projects, BMP monitoring projects, LEED building standards, etc.

**MG:** Track permits for installation of private BMP's for development and redevelopment projects.

**BMP 2:** Continue to maintain Stormwater Management/Water Quality Manual or equivalent.

**MG:** Conduct an annual review of the Stormwater Management/Water Quality Manual or equivalent and/or update as necessary.

**BMP 3:** Continue to maintain stormwater ordinance(s) or other regulatory mechanism(s) to address post-construction runoff from new development and redevelopment projects.

**MG:** Review annually and update as necessary.



**BMP 4:** Continue to maintain Stream Buffer Ordinance and MU Stormwater Master Plan.

**MG:** Review the ordinance and master plan annually and revise standards as necessary.

**BMP 5:** Promote adequate long-term operation and maintenance of BMPs by maintaining an operation and maintenance schedule of post-construction BMP's.

The purpose of this BMP is to utilize inspection and maintenance of post-construction stormwater controls to improve downstream water quality.

**MG:** Maintain an inventory, a maintenance schedule, and an inspection schedule of post-construction BMPs.

**MG:** Inspect BMPs according to the operation and maintenance schedule.

**MG:** Track maintenance of all structural and non-structural BMP's.

**BMP 6:** Many household products are hazardous because they contain chemicals that are toxic, corrosive, flammable, or reactive. Improper disposal can cause these products to find their way into receiving streams and lakes. The co-permittees will provide the public with proper, publically announced, disposal opportunities to minimize the presence of these chemicals in local waterways.

**MG:** Hold a special co-permittee coordinated Household Hazardous Waste collection event annually as funding permits. This event will include the collection of used tires.

**MG:** Continue the twice a month City of Columbia Household Hazardous Waste Collection Program. This collection event takes place between and including the months of April through November.

## 6. MCM 6 - POLLUTION PREVENTION/GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

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All permittees' employees receive regular training on maintaining facilities and properly using and storing potential pollutants. In addition to training, operations personnel continue to improve road salt application methods, street sweeping procedures, and site maintenance to reduce pollutants to our waterways. Pollution prevention opportunities are extended to the greater community through household hazardous waste drop offs, recycling programs, and education and outreach efforts.

**Permit Requirement:** Develop and implement an operation and maintenance program that includes a training component and has the ultimate goal of preventing and/or reducing pollutant runoff from municipal operations, including those not currently required to be permitted as associated with industrial activities. The program must include employee training to prevent and reduce storm water pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and storm water system maintenance.

This requirement continues to be met by each of the three co-permittees with the following BMPs and associated Measurable Goals.

**BMP 1:** Maintain operation and maintenance schedule for operation and maintenance program.

**MG:** Review annually hazardous materials management and SPCC operation and maintenance schedules. Update schedules as necessary.

**BMP 2:** The co-permittees will continue to identify and train all impacted employees.

**MG:** Each co-permittee will maintain and update a list of impacted employees.

**BMP 3:** Review and update pollution prevention/good housekeeping training presentation(s).

**MG:** Annually review and update as necessary training presentation(s) with current regulatory information, procedures, and projects associated with pollution prevention/good housekeeping.

**BMP 4:** Continue to schedule and conduct Pollution Prevention training.

**MG:** Train all impacted employees annually. The training will be provided in person or via electronic methods. Maintain an attendance roster and training date for each training session.

**BMP 5:** Many household products are hazardous because they contain chemicals that are toxic, corrosive, flammable, or reactive. Improper disposal can cause these products to find their way into receiving streams and lakes. The co-permittees will provide the public with proper, publically announced, disposal opportunities to minimize the presence of these chemicals in local waterways.

**MG:** Hold a special co-permittee coordinated Household Hazardous Waste collection event annually as funding permits. This event will include the collection of used tires.

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