STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.	MO-0136557
Owner:	See page two (2)
Address:	See page two (2)
Continuing Authority:	See page two (2)
Address:	See page two (2)
Facility Name:	Boone County, City of Columbia, University of Missouri MS4
Facility Address:	8 Research Park, Columbia MO 65211
Legal Description:	See pages two (2) through six (6)
UTM Coordinates:	See pages two (2) through six (6)
Receiving Stream:	See pages two (2) through six (6)
First Classified Stream and ID:	See pages two (2) through six (6)
USGS Basin & Sub-watershed No.:	See pages two (2) through six (6)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations, inspection, reporting, and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

SIC/NAICS Codes: 9511/9241110

Phase II Municipal Separate Storm Sewer System (MS4) Co-permitted urbanized area consisting of conveyances or system of conveyances, which includes roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels and storm drains, and is owned or operated by the City of Columbia, Boone County, and the University of Missouri.

This permit authorizes only stormwater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Sections 640.013, 621.250, and 644.051.6 of the Law, and 10 CSR 20-6.020 and 10 CSR 20-1.020

June 1, 2016
Effective Date

Sara Parker Pauley, Director, Department of Natural Resources

March 31, 2020
Expiration Date

John Madras, Director, Water Protection Program

OWNER AND CONTINUING AUTHORITY (continued):

Owner:	University of Missouri
Address:	8 Research Park Development Bldg., Columbia, MO 65211
Owner:	City of Columbia
Address:	701 E. Broadway, Columbia, MO 65201
Owner:	County of Boone
Address:	801 E. Walnut, Columbia, MO 65201
Continuing Authority:	Same as above
Address:	Same as above

FACILITY DESCRIPTION (continued):
All outfalls below were obtained from the above listed owner's application and represent locations where waters leave the co-permittee's jurisdiction

OUTFALL 001

Legal Description	¼ SE, ¼ SW, Sec 27, T48N, R12W, Boone County
UTM Coordinates:	X = 564354.0, Y = 4306804.4
Receiving Water	Tributary to Gans Creek
1St Classified	8-20-13 MUDD V1.0 (C) (3960)
USGS/ SUB WATERSHED	10300102-0903

OUTFALL 002

Legal Description	¼ NW, ¼ NW, Sec 34, T49N, R13W, Boone County
UTM Coordinates:	X = 554002.3, Y = 4316591.6
Receiving Water	Rocky Fork (C)
1St Classified	Rocky Fork (C) (1014)
USGS/ SUB WATERSHED	10300102-0706

OUTFALL 003

Legal Description	¼ NW, ¼ SW, Sec 12, T48N, R15W, Boone County
UTM Coordinates:	X = 538380.3, Y = 4313725.7
Receiving Water	Missouri River (P)
1St Classified	Missouri River (P) (701) 303(d)
USGS/ SUB WATERSHED	10300102-0503

OUTFALL 004

Legal Description	¼ NW, ¼ SW, Sec 12, T51N, R13W, Boone County
UTM Coordinates:	X = 557737.7, Y = 4341804.5
Receiving Water	Tributary to Lick Creek
1St Classified	8-20-13 MUDD V1.0 (C) (3960)
USGS/ SUB WATERSHED	10300102-0701

OUTFALL 005

Legal Description	¼ NW, ¼ NW, Sec 4, T51N, R12W, Boone County
UTM Coordinates:	X = 562754.2, Y = 4344186.1
Receiving Water	Tributary to Reese Fork
1St Classified	8-20-13 MUDD V1.0 (C) (3960)
USGS/ SUB WATERSHED	07110006-0303

FACILITY DESCRIPTION (continued):

OUTFALL 006

Legal Description	¼ SE, ¼ SW, Sec 33, T52N, R11W, Boone County
UTM Coordinates:	X = 573161.3, Y =4343875.9
Receiving Water	Tributary to Goodwater Creek
1St Classified	8-20-13 MUDD V1.0 (C) (3960)
USGS/ SUB WATERSHED	07110006-0102

OUTFALL 007

Legal Description	¼ NW, ¼ NE, Sec 1, T51N, R12W, Boone County
UTM Coordinates:	X = 568629.2, Y = 4343988.9
Receiving Water	Tributary to Long Branch
1St Classified	8-20-13 MUDD V1.0 (C) (3960)
USGS/ SUB WATERSHED	07110006-0101

OUTFALL 008

Legal Description	¼ SE, ¼ SE, Sec 7, T49N, R14W, Boone County
UTM Coordinates:	X = 540285.1, Y = 4322397.4
Receiving Water	Tributary to Moniteau Creek
1St Classified	8-20-13 MUDD V1.0 (C) (3960)
USGS/ SUB WATERSHED	10300102-0303

OUTFALL 009

Legal Description	¼ SE, ¼ SW, Sec 3, T46N, R13W, Boone County
UTM Coordinates:	X = 553868.5, Y = 4293809.8
Receiving Water	Bonne Femme Creek
1St Classified	Bonne Femme Creek (P) (0750)
USGS/ SUB WATERSHED	10300102-0902

OUTFALL 010

Legal Description	LG 1726, Boone County
UTM Coordinates:	X = 553366.3, Y =4296734.9
Receiving Water	Little Bonne Femme Creek (P)
1St Classified	Little Bonne Femme Creek (P) (1003)
USGS/ SUB WATERSHED	10300102-0903

OUTFALL 011

Legal Description	Sec 33, T47N, R13W, Boone County
UTM Coordinates:	X = 552930.6, Y = 4296978.6
Receiving Water	Perche Creek (P1)
1St Classified	Perche Creek (P1) (1005)
USGS/ SUB WATERSHED	10300102-0709

OUTFALL 012

Legal Description	¼ SW, ¼ SW, Sec 29, T49N, R12W, Boone County
UTM Coordinates:	X = 560450.4, Y = 4316453.4
Receiving Water	Tributary to Bear Creek
1St Classified	8-20-13 MUDD V1.0 (C) (3960)
USGS/ SUB WATERSHED	10300102-0706

OUTFALL 013

Legal Description	¼ SW, ¼ SW, Sec 13, T51N, R11W, Boone County
UTM Coordinates:	X = 577258.8, Y = 4339229.1
Receiving Water	Tributary to Youngs Creek
1St Classified	8-20-13 MUDD V1.0 (C) (3960)
USGS/ SUB WATERSHED	07110006-0103

FACILITY DESCRIPTION (continued):

OUTFALL 014

Legal Description	¼ SW, ¼ NW, Sec 21, T45N, R12W, Boone County
UTM Coordinates:	X = 561476.7, Y = 4280178.2
Receiving Water	Missouri River
1St Classified	Missouri River (P) (701) 303(d)
USGS/ SUB WATERSHED	10300102-1302

OUTFALL 015

Legal Description	¼ NE, ¼ NW, Sec 19, T45N, R12W, Boone County
UTM Coordinates:	X = 558790.4, Y = 4280682.0
Receiving Water	Hart Creek (C)
1St Classified	Hart Creek (C) (0748)
USGS/ SUB WATERSHED	10300102-1301

OUTFALL 016

Legal Description	¼ NE, ¼ NW, Sec 35, T46N, R13W, Boone County
UTM Coordinates:	X = 555651.6, Y = 4287225.4
Receiving Water	Tributary to Missouri River
1St Classified	8-20-13 MUDD V1.0 (C) (3960)
USGS/ SUB WATERSHED	10300102-0905

OUTFALL 017

Legal Description	¼ SW, ¼ SW, Sec 26, T46N, R13W, Boone County
UTM Coordinates:	X = 555240.0, Y = 4287376.6
Receiving Water	Tributary to Missouri River
1St Classified	8-20-13 MUDD V1.0 (C) (3960)
USGS/ SUB WATERSHED	10300102-0905

OUTFALL 018

Legal Description	¼ NE, Sec 20, T48N, R14W, Boone County
UTM Coordinates:	X = 541838.8, Y = 4310444.9
Receiving Water	Tributary to Missouri River
1St Classified	8-20-13 MUDD V1.0 (C) (3960)
USGS/ SUB WATERSHED	10300102-0503

OUTFALL 019

Legal Description	¼ SW, ¼ SW, Sec 35, T48N, R14W, Boone County
UTM Coordinates:	X = 545521.5, Y = 4306365.3
Receiving Water	Tributary to Missouri River
1St Classified	8-20-13 MUDD V1.0 (C) (3960)
USGS/ SUB WATERSHED	10300102-0503

OUTFALL 020

Legal Description	LG 2457, Boone County
UTM Coordinates:	X = 544260.2, Y = 4307930.3
Receiving Water	Tributary to Missouri River
1St Classified	8-20-13 MUDD V1.0 (C) (3960)
USGS/ SUB WATERSHED	10300102-0503

OUTFALL 021

Legal Description	¼ SW, ¼ SW, Sec 7, T45N, R11W, Boone County
UTM Coordinates:	X = 568005.9, Y = 4282543.2
Receiving Water	Cedar Creek (P)
1St Classified	Cedar Creek (P) (733)
USGS/ SUB WATERSHED	10300102-1005

FACILITY DESCRIPTION (continued):

OUTFALL 022

Legal Description	¼ SE, ¼ NE, Sec 22, T49N, R11W, Boone County
UTM Coordinates:	X = 575004.2, Y = 4319075.6
Receiving Water	Cedar Creek (P) 303(d)
1St Classified	Cedar Creek (P) (737) 303(d)
USGS/ SUB WATERSHED	10300102-1002

OUTFALL 023

Legal Description	¼ NW, ¼ NW, Sec 6, T45N, R11W, Boone County
UTM Coordinates:	X = 568103.7, Y = 4285226.0
Receiving Water	Cedar Creek (P)
1St Classified	Cedar Creek (P) (733)
USGS/ SUB WATERSHED	10300102-1004

OUTFALL 024

Legal Description	¼ NE, ¼ SW, Sec 31, T46N, R11W, Boone County
UTM Coordinates:	X = 568530.8, Y = 4286123.6
Receiving Water	Brushy Creek (C)
1St Classified	Brushy Creek (C) (746)
USGS/ SUB WATERSHED	10300102-1004

OUTFALL 025

Legal Description	¼ NE, ¼ NW, Sec 22, T47N, R11W, Boone County
UTM Coordinates:	X = 573932.3, Y = 4299951.8
Receiving Water	Cedar Creek (C) 303(d)
1St Classified	Cedar Creek (C) (737) 303(d)
USGS/ SUB WATERSHED	10300102-1003

OUTFALL 026

Legal Description	¼ SE, ¼ NE, Sec 34, T50N, R11W, Boone County
UTM Coordinates:	X = 575210.1, Y = 4325212.5
Receiving Water	8-20-13 MUDD V1.0 (C) (3960)
1St Classified	Cedar Creek (C) (737) 303(d)
USGS/ SUB WATERSHED	10300102-1002

OUTFALL 027

Legal Description	¼ NW, ¼ SE, Sec 9, T47N, R11W, Boone County
UTM Coordinates:	X = 572706.6, Y = 4302160.1
Receiving Water	Cedar Creek (C) 303(d)
1St Classified	Cedar Creek (C) (737) 303(d)
USGS/ SUB WATERSHED	10300102-1003

OUTFALL 028

Legal Description	¼ SW, ¼ SW, Sec 25, T47N, R12W, Boone County
UTM Coordinates:	X = 566798.7, Y = 4296805.8
Receiving Water	8-20-13 MUDD V1.0 (C) (3960)
1St Classified	Bass Creek (C) (752) 303(d)
USGS/ SUB WATERSHED	10300102-0902

OUTFALL 029

Legal Description	¼ SE, ¼ SW, Sec 28, T48N, R11W, Boone County
UTM Coordinates:	X = 572450.5, Y = 4306442.8
Receiving Water	Cedar Creek (C) 303(d)
1St Classified	Cedar Creek (C) (737) 303(d)
USGS/ SUB WATERSHED	10300102-1002

FACILITY DESCRIPTION (continued):

OUTFALL 030

Legal Description	¼ NW, ¼ NE, Sec 11, T48N, R12W, Boone County
UTM Coordinates:	X = 566184.1, Y = 4312615.1
Receiving Water	8-20-13 MUDD V1.0 (C) (3960)
1St Classified	North Fork Grindstone Creek (C) (1010)
USGS/ SUB WATERSHED	10300102-0602

OUTFALL 031

Legal Description	¼ SE, ¼ SE, Sec 15, T49N, R12W, Boone County
UTM Coordinates:	X = 565283.3, Y = 4319667.2
Receiving Water	Hinkson Creek (C) 303(d)
1St Classified	Hinkson Creek (C) (1008) 303(d)
USGS/ SUB WATERSHED	10300102-0602

A. COVERAGE AND RESTRICTIONS

1. This operating permit authorizes the discharge of stormwater from the City of Columbia, County of Boone, and University of Missouri (permittees) Municipal Separate Stormwater Sewer System (MS4) located within urbanized areas as determined by the 2010 Decennial Census by the Bureau of Census or specifically designated in accordance with Missouri regulation 10 CSR 20-6.200(1)(C)24.B.

2. The permittees are authorized to discharge the following non-stormwater sources provided the Department or the permittees have not determined these sources to be substantial contributors of pollutants to the permittees' MS4 that require a separate permit:
    a. Water line and fire hydrant flushing;
    b. Landscape irrigation;
    c. Rising ground water;
    d. Uncontaminated ground water infiltration;
    e. Uncontaminated pumped ground water;
    f. Potable water sources;
    g. Foundation drains;
    h. Air conditioning condensate;
    i. Springs;
    j. Water from crawl space pumps;
    k. Footing drains;
    l. Lawn watering;
    m. Flows from riparian habitats and wetlands;
    n. Street wash water;
    o. Emergency fire-fighting activities;
    p. Individual residential car washing;
    q. Dechlorinated residential swimming pools.

3. This permit does not authorize discharges into the MS4 that are:
    a. Mixed with sources of non-stormwater unless non-stormwater source discharges are:
        i. In compliance with a separate NPDES permit, or
        ii. Determined not to be a substantial contributor of pollutants to waters of the state.
    b. Associated with industrial activities requiring a separate NPDES operating permit as defined by 10 CSR 20-2.010(42)(A) and required by 10 CSR 20-6.200.
    c. Covered under another operating permit.

4. This operating permit does not affect, remove, or replace any requirement of the Endangered Species Act; the National Historic Preservation Act; the Comprehensive Environmental Response, Compensation and Liability Act; or the Resource Conservation and Recovery Act. Determination of applicability to the above mentioned acts is the responsibility of the permittee.

5. Any pesticide discharged into the MS4 shall comply with the requirements of Federal Insecticide, Fungicide and Rodenticide Act as amended (*7 U.S.C. 136 ET. SEQ.*) and the use of such pesticides shall be in a manner consistent with its label.

B. DISCHARGE LIMITATIONS

1. The permittees shall develop, implement, and maintain Best Management Practices (BMPs) via an iterative process to reduce the discharge of pollutants to the Maximum Extent Practicable (MEP) into the MS4 for the goal of attainment with Missouri's Water Quality Standards. Specific requirements are listed in Parts D, E, F, and G.

2. The permittees shall implement and enforce a Stormwater Management Program and Plan (SWMP) per the requirements listed in this operating permit in accordance with section 402(p)(3)(B)(iii) of the CWA, corresponding National Pollution Discharge Elimination System (NDPES) regulations, 40 CFR 122.34, and in accordance with the Missouri Clean Water Law (MCWL) and state regulations 10 CSR 20-6.200(5)(A)(1-6).

3. The permittees shall comply with all other provisions and requirements contained in this operating permit and with their SWMP including plans and schedules developed in fulfillment of this operating permit.

4. The Department may require corrective action(s) if the Department determines this MS4 is causing or creating a significant instream exceedance of Missouri's Water Quality Standards.

C. DISCHARGES TO IMPAIRED WATERS

1. In order to implement the Hinkson Creek TMDL finalized by EPA on or about January 28, 2011, the permittees shall implement BMPs and other actions and monitoring activities as set forth in the *Collaborative Adaptive Management Implementation Schedule and Agreement for Hinkson Creek TMDL* signed by the Department on April 26, 2012, (CAM Agreement). The permittees shall assess the SWMP and update the SWMP as required in **Part D – STORMWATER MANAGEMENT PROGRAM** to reflect the actions taken pursuant to the CAM Agreement based upon various actions or monitoring activities, as specified in section 8.4 of the CAM Agreement.

2. In the event that the CAM Agreement is terminated (based on any of the grounds described therein), the permittees shall:
    a. Within 90 days, submit to the Department a report describing all historical and planned efforts to implement the Hinkson Creek TMDL; and
    b. Within 6 months, update the SWMP to:
        i. Reflect further actions necessary to implement the Hinkson Creek TMDL, and
        ii. Describe a monitoring program (and Quality Assurance Project Plan) to determine whether stormwater controls are adequate.

3. Items C.1 and C.2 were listed as Sections 3.1.1. and 3.1.2, respectfully, under the previous operating permit, which expired on January 27, 2016. These two sections were directly cited in the CAM Agreement and are now referenced in this operating permit under C.1 and C.2. In the event that the co-permittees determine or are required to terminate the CAM Agreement and the receiving stream has not attained its beneficial uses, the co-permittees are then subject to items 4 through 11 under **Part C – DISCHARGES TO IMPAIRED WATERS**.

4. Develop a TMDL Assumptions and Requirement Attainment Plan (ARAP) to address the TMDL's assumptions and requirements where applicable and in accordance with 40 CFR 122.44(k)(2) and (3). The TMDL ARAP shall be incorporated into the SWMP and include, at a minimum, the following:
    a. A process to identify potential sources of the pollutant(s), BMPS to be implemented to address the sources within the permittees' MS4, a prioritization of those actions, and a schedule including beginning and ending milestones by month and year. The schedule for the implementation of the TMDL ARAP is not limited to the term of this operating permit (i.e., 5 years) as attainment can take years or even multiple permit terms;
    b. BMPs developed or designed with a purpose of reducing the pollutant(s) of concern. Each BMP shall contain a description of the BMP, the purpose of the BMP, and the expected results of the BMP.
    c. Measurable goals shall be established for each BMP or in conjunction of multiple BMPs. Each measurable goal shall contain a statement clearly indicating how it will be established to determine the appropriateness of identified BMPs and progress toward the expected results of the BMP. Measureable goals shall be quantifiable; however, if it is not feasible to utilize a measurable that is quantifiable, then the permittee shall provide justification why utilizing a measurable goal is infeasible. If applicable, measurable goals shall also utilize interim and completion milestone dates, and a periodic frequency of measurement to document progress. It is recommended that interim and final milestone dates are established with a format of month and year. If the format of month and year cannot be utilized, the permittee shall ensure that schedules have the minimum format of 1st, 2nd, 3rd, 4th, and 5th year of the operating permit.
    d. An iterative process to be utilized by the permittee that documents how each BMP is evaluated and subject to replacement or modification. The permittee shall apply reasonable further progress by replacing or modifying ineffective BMPs with effective BMPs.

5. The permittees shall draft and submit the TMDL ARAP to the Department within 30 months of issuance of this operating permit for Department review and rating. The initial TMDL ARAP is to be submitted to the Department's Water Protection Program, MS4 Coordinator at P.O. Box 176, Jefferson City, MO 65102. All other revisions are to be included in the MS4 SWMP Report.

6. If the Department approves the TMDL ARAP, it will be presumed that the TMDL ARAP is affordable by the permittee. However, if the Department disapproves the submitted TMDL ARAP and requires additional or different controls or expenses, the Department will conduct an affordability analysis in support of the disapproval unless waived by the permittees.

7. The deadline for the TMDL ARAP may be extended by request of the permittees and with written approval by the Department.

8. If the TMDL ARAP has been submitted to the Department but has not received approval, then the permittees are not required to implement any actions listed in their TMDL ARAP and shall notify the Department of this in their MS4 SWMP Report.

9. The permittees shall provide a summary of the controls that list the BMPs, the expected results of the BMPs, and how the measurable goals are utilized to document effectiveness of the BMPs, and the status of the measurable goals in the MS4 SWMP Report.

10. The permittee may demonstrate that no additional controls are needed beyond the successful implementation of the six Minimum Control Measures (MCMs), which includes modifications to the BMPs or measurable goals, for the goal of attainment with the TMDL's assumptions and requirements. The demonstration is subject to Department approval. If the permittees are to provide a demonstration that no additional controls are needed, they shall contact the Water Protection Program's MS4 Coordinator to begin the process.

11. If the EPA approved or established TMDL does not contain an applicable WLA to the permittee, then the permittees are not required to develop and implement any actions contained in Part C, Section 4 – 10 of this permit.

D. STORMWATER MANAGEMENT PROGRAM (SWMP)

1. The permittees either individually or in combination shall develop a SWMP that shall contain the following for each of the six (6) MCMs described in **Part E – MINIMUM CONTROL MEASURES** of this operating permit:
    a. BMPs developed or designed with a purpose of reducing the pollutant(s) of concern. Each BMP shall contain a description of the BMP, the purpose of the BMP, and the expected result of the BMP.
    b. Measurable goals shall be established for each BMP or in conjunction of multiple BMPs. Each measurable goal shall contain a statement clearly indicating how it will be established to determine the appropriateness of identified BMPs and progress toward the expected results of the BMP. Measureable goals shall be quantifiable; however, if it is not feasible to utilize a measurable that is quantifiable, then the permittee shall provide justification why utilizing a measurable goal is infeasible. If applicable, measurable goals shall also utilize interim and completion milestone dates, and a periodic frequency of measurement to document progress. It is recommended that interim and final milestone dates are established with a format of month and year. If the format of month and year cannot be utilized, the permittee shall ensure that schedules have the minimum format of 1st, 2nd, 3rd, 4th, and 5th year of the operating permit.
    c. An iterative process to be utilized by the permittee that documents how each BMP is evaluated and subject to replacement or modification. The permittees shall apply reasonable further progress by replacing or modifying ineffective BMPs with effective BMPs.
    d. The person(s) primarily responsible for the SWMP or the person(s) responsible for each minimum control measure if different from the primary responsible person.

2. The permittees shall fully implement each MCM in accordance with the approved SWMP within five (5) years of receipt of this operating permit.

3. Within one (1) year of the effective date of this operating permit, the permittees shall revise their SWMP, if necessary, and submit the SWMP to the Water Protection Program's MS4 Coordinator for review and rating.

4. The permittees shall implement the SWMP on all new areas added to their respective as expeditiously as practicable, but no later than one year from addition of the new areas. Implementation may be accomplished in a phased manner to allow additional time for controls that cannot be implemented immediately.

5. The permittees shall list any transfer of ownership, continuing authority, or responsibility in their MS4 SWMP Report. The plan shall include revised schedules for implementation. Information on all new annexed areas and any resulting updates required to the SWMP shall be included in the MS4 SWMP Report.

E. MINIMUM CONTROL MEASURES (MCMs)

The below are the six (6) MCMs that shall be included in the SWMP. The requirements listed below do not supersede or remove any requirement to comply with county or other local ordinances, if applicable.

1. *Public Education and Outreach of Stormwater Impacts*:
    a. The permittees shall implement a public education program to distribute educational material to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on waterbodies and steps the public can take to reduce pollutants in stormwater runoff.

2. *Public Involvement/Participation Program*:
    a. The permittees shall implement a public involvement/participation program that, at a minimum, complies with state and local public notice requirements.

3. *Illicit Discharge Detection and Elimination (IDDE) Program*:
    a. The permittees shall develop, implement and enforce a program to detect and eliminate illicit discharges into the MS4. As part of the SWMP, the IDDE shall include, at a minimum, the development and implementation of:
        i. A stormwater sewer map documenting the location of all known outfalls and the names and location of all waters of the state that receive discharges from those outfalls. The permittees shall make the map data and its origin available to the Department upon request;
        ii. To the extent allowable under State or local law, effectively prohibit through ordinance or other regulatory mechanism non-stormwater discharges from those outfalls into the permittees' MS4 and implement appropriate enforcement procedures and actions. The permittees shall identify in the SWMP the enforcement mechanism and actions, if any, used to prohibit illicit discharges to the MS4;
        iii. A plan and schedule to detect and address non-stormwater discharges, including discharges from illegal dumping and spills, to the permittees' MS4;
        iv. A process to inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste; and
        v. The permittees shall address the categories of non-stormwater discharges or flows listed under Part A – COVERAGE AND RESTRICTIONS, item 2, (a – q) if the permittees identify them as significant contributors of pollutants to the MS4.

4. *Construction Site Stormwater Runoff Control*
    a. The permittees shall develop, implement, and enforce a program to reduce pollutants in any stormwater runoff to their small MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of stormwater discharges from construction activities disturbing less than one acre must be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more. If the NPDES permitting authority waives requirements for stormwater discharges associated with small construction activity in accordance with §122.26(b)(15)(i), the permittees are not required to develop, implement, or enforce a program to reduce pollutants discharges from such sites.
    b. The permittees' program shall include, at a minimum, the development and implementation of:
        i. An ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under State or local law;
        ii. Requirements for construction site operators to implement appropriate erosion and sediment control best management practices;
        iii. Requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality;
        iv. Procedures for site plan review which incorporate consideration of potential water quality impacts;
        v. Procedures for receipt and considerations of information submitted by the public, and
        vi. Procedures for site-inspection and enforcement of control measures.
5. *Post-Construction Stormwater Management in New Development and Redevelopment*
    a. The permittees shall 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, including projects less

than one acre that are part of a larger common plan of development or sale, that discharge into the regulated MS4. This program shall include, at a minimum, the following information:

i. Strategies which include a combination of structural and/or non-structural best management practices appropriate for the your MS4 community;
ii. 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; and
iii. Ensure adequate long-term operating and maintenance of BMPs owned or operated by the permittees, and to the extent possible, privately owned BMPs.

6. *Pollution Prevention/Good Housekeeping for Municipal Operations*
    a. The permittees shall continue the implementation of or, if new BMPs are determined needed, develop and implement an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations, including those not currently required to be permitted as associated with industrial activities.
    b. The permittees shall ensure that the program include employee training to prevent or reduce stormwater pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and stormwater system maintenance.
        i. It is recommended, but not required, that training material used is generated from EPA, the Missouri Department of Natural Resources, or other creditable organizations.

7. Implementation of one or more of the minimum measures may be shared with another entity outside of the permittees, or another entity assumes responsibility for the measure if:
    a. The other entity, in fact, implements the control measure;
    b. The particular control measure, or component of that measure, is at least as stringent as the corresponding permit requirements; and
    c. The other entity agrees to implement the control measures on the permittee's behalf. Written acceptance of this obligation is required. This obligation shall be maintained as part of the SWMP. If the other entity agrees to report on the minimum measure, then the permittees shall supply the entity with the reporting requirements contain in **Part F - MONITORING, RECORDKEEPING, AND REPORTING**. If the entity fails to implement the control measure on the permittee's behalf, then the permittee remains liable for any discharges due to that failure to implement.

F. MONITORING, RECORDKEEPING, AND REPORTING

1. The permittees shall retain records of all monitoring information, including all calibrations and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit for a period of at least three (3) years from the date sampled, measurement, report or application. This period may be extended by official request of the Department at any time. If applicable, monitoring that has been conducted by the permittee shall include:
    a. The date, location, and time of sampling or measurement;
    b. The individual(s) who performed the sampling or measurement;
    c. The date(s) analyses were performed;
    d. The individual(s) who performed the analyses;
    e. The analytical technique(s) or method(s) used; and
    f. The results of such analyses.

2. Any monitoring conducted for the purpose of implementation of any part of this permit shall be conducted in accordance to test procedures approved under 40 CFR 136 unless another method is required under 40 CFR sub-chapter N or O.

3. The permittees shall retain records for a period of at least three (3) years or for the term of this operating permit, whichever is longer. The term of the operating permit means the period of time from the issuance of this operating permit to the re-issuance of an operating permit renewal. Records shall include, but is not limited to, the following:
    a. The SWMP;
    b. A copy of their operating permit;
    c. A copy of all ordinances pertaining to MS4 activities;
    d. A copy of all policies pertaining to MS4 activities;

e. All data used to complete their application for this operating permit;
f. All monitoring information including calibration and maintenance records (if applicable);
g. Original strip chart recordings for continuous monitoring (if applicable); and
h. Copies of all reports required by this operating permit.

4. The permittees shall submit the items listed in Part F.3.(a – h) of this operating permit upon request of the Department, and ensure that these items are at a location accessible to the Department during inspections or audits. In addition, the permittees shall ensure that these items are available to the public upon request by the public.

5. MS4 SWMP Report - the permittees shall submit a MS4 SWMP Report containing, at a minimum:
   a. Information regarding progress achieving the statutory goal of reducing the discharge of pollutants to the Maximum Extent Practicable;
   b. The status of the MS4's compliance with permit conditions;
   c. Assessment(s) of the appropriateness of identified BMPs and corresponding measureable goals for each MCM;
   d. A summary of results of information collected and analyzed during the reporting period, including monitoring data or quantifiable values per the MS4's measurable goals;
   e. A summary of the TMDL Attainment Plan;
   f. If the permittees are utilizing an integrated planning approach, then the MS4 SWMP Report shall provide a summary of the status of the integrated plan that incorporates the TMDL Attainment Plan.
   g. A summary of the stormwater activities the permittees plan to undertake during the next reporting cycle (including an implementation schedule);
   h. Any proposed changes to the permittees' SWMP, including changes to any identified BMPs or measurable goals that apply to the SWMP; and
   i. Notice that the permittees individually or in combination are relying on another government or non-government entity to satisfy some of the permittees' permit obligations. If applicable, the permittees shall supply the name of the entity, the name of the entity's primary contact person, and other relevant contact information.
   j. The MS4 SWMP Report shall be submitted on **April 28th** every odd year during the life of the permit until this operating permit is renewed. The MS4 SWMP shall contain all required information and cover the reporting period of January 1st of the initial year to December 31st of the immediate following year.
   k. The permittees shall submit the MS4 SWMP Report on the STORM WATER ANNUAL REPORT – SMALL MS4 PERMITS, form (MO 780-1846) or revisions thereafter.

6. Item F.5. was listed as part 5.3 under the previous operating permit, which expired on January 27, 2016. Section 5.3 was listed in the CAM Agreement and is now referenced in this operating permit under item F.5.

G. STANDARD PERMIT CONDITIONS

1. *Duty to Comply*: The permittees shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Missouri CWL and the Federal CWA and is grounds for enforcement action, permit termination, revocation and reissuance, modification, or denial of a permit renewal.
   a. It is a violation of the Missouri CWL to fail to pay fees associated with this permit, [§644.055].

2. *Duty to Mitigate*: The permittees shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

3. *Proper Operation and Maintenance*: The permittees shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This condition of this permit requires the operation of backup or auxiliary facilities or similar systems installed by a permittee only when necessary to achieve compliance with the conditions of this permit.

4. *Advanced Notice*: The permittees shall give advanced notice to the Department of any planned changes which may result in noncompliance with the terms and conditions of this permit.

5. *Inspection and Entry***:** The permittees shall allow the department or an authorized representative (including an authorized contractor as a representative to EPA or the department) upon the presentation of credentials and other documents as may be required by law to:
   a. Enter the permittees' premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;
   b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect any facility, equipment (including monitoring and control equipment), practices, or operation regulated or required under this permit; and
d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the federal CWA and/or Missouri's CWL, any substance or parameter at any location.

6. *Monitoring Methods*: Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless another method is required under 40 CFR subchapters N or O or unless otherwise specified in this permit or an approved Quality Assurance Project Plan (QAPP).

7. *Need to Halt or Reduce Activity Not an Excuse*: It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

8. *Permit Actions*: This permit may be modified, revoked, reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, termination, or notification of planned changes or anticipated noncompliance does not stay any term or condition of this permit.

9. *Duty to Reapply*: If the permittee wishes to continue an activity regulated by this permit after the permit expiration date, the permittee must apply for and obtain a renewed permit. The renewal application shall be submitted at least 30 days prior to expiration of this permit unless the Department allows a later deadline not to exceed the expiration of this permit.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
FACT SHEET
FOR THE PURPOSE OF RENEWAL
FOR
MO-0136557
BOONE COUNTY, CITY OF COLUMBIA, UNIVERSITY OF MISSOURI
MUNICIPAL SEPARATE STORMWATER SEWER SYSTEM (MS4)

The Federal Water Pollution Control Act ("Clean Water Act" Section 402 Public Law 92-500 as amended) established the National Pollution Discharge Elimination System (NPDES) permit program. This program regulates the discharge of pollutants from point sources into the waters of the United States, and the release of storm water from certain point sources. All such discharges are unlawful without a permit (Section 301 of the "Clean Water Act"). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal "Clean Water Act" and "Missouri Clean Water Law" Section 644 as amended). MSOPs are issued for a period of five (5) years unless otherwise specified.

A fact sheet gives pertinent information regarding the applicable regulations, rationale for the development of the NPDES Missouri State Operating Permit (operating permit), and the public participation process for operating permit listed below.

A fact sheet is not an enforceable part of an operating permit.

PART I: FACILITY INFORMATION

Facility Type: Stormwater Facility SIC Code(s): 9511

FACILITY DESCRIPTION:
The Boone County, City of Columbia, and University of Missouri (permit holders) Phase II MS4 is a co-permitted urbanized area that consist of conveyances and systems of conveyances, which include roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, and storm drains that are owned or operated by the permit holders.

The total areas covered by this permit is 691.15 mi^2, which includes the City of Columbia (65.09mi^2 exclusive of the University of Missouri campus and Boone County property within the city limits of Columbia); Boone County (613.49mi^2 exclusive of the City of Columbia, University of Missouri, 11 other municipalities, and state and federal holdings); and University of Missouri (12.57mi^2 of which 7.53mi^2 are surrounded by the City of Columbia).

Complete Application Date: 08/11/2015

FACILITY PERFORMANCE HISTORY & COMMENTS:
Department records indicate that a Compliance Monitoring Activity action (water pollution emergency) occurred on 09/25/2012 resulting in an Enforcement Action Request and Notice of Violation (NOV). The Compliance Monitoring Activity documents the following as Observations: (1) Caused pollution of waters of the state; (2) Violated Water Quality Standards; and (3) Operating w/o required permit. The activity found this facility to be in non-compliance. On 09/25/2012, the Department's Northeast Regional Office issued NOV 2012092712564656. The NOV cited the violations of Failed to apply for/obtain required permit; violation of water quality standards; and caused pollution of waters of the state. The NOV was resolved through Abatement Order on Consent, NO. 2014-WPCB-1226.

PART II: PERMITTED FEATURES

A NPDES Permitted Feature is a term borrowed from the Department's Clean Water Information System (MoCWIS), which is typically a three digit code used to describe if the point source location is an outfall, monitoring location, well, internal monitoring location, stormwater outfall, etc.

Applications for MS4 operating permit (renewal or new) require the MS4 to provide information regarding the location of outfalls from the regulated MS4. In accordance with 10 CSR 20-6.200, an outfall is defined as, "A point source as defined by 10 CSR 20-2.010 at the point where a municipal separate storm sewer discharges and does not include open conveyances connecting two (2) municipal separate storm sewers pipes, tunnels or other conveyances which connect segments of waters of the state and are used to convey water of the state." Basically, an outfall is a point source where a regulated separate storm sewer system discharges to waters of the state; however, there are other types permitted features that do not clearly fall under the term outfall.

As indicated above, a point source is defined in 10 CSR 20-2.010 as, “Any discernible, confined and discrete conveyance including but not limited to, any pipe, ditch, channel, tunnel conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, separate storm sewer or vessel or other floating craft from which pollutants are, or may be, discharged.” Thus, there are locations from regulated MS4s that meet the definition of a point source; however, they do not meet the definition of an outfall.

Because of this difference and the necessity to ensure that all point sources are protected under this NPDES operating permit, the term MS4 Boundary Point Source is being determined applicable via the permit writer’s best professional judgement (i.e., not defined in regulated at this time). A MS4 Boundary Point Source is defined as, “Any discernable, confined and discrete conveyance including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock from which a regulated separate storm sewer system crosses the municipal boundary but does not directly discharge to waters of the state.” Basically, this means that there is a point source that is located wher a regulated separate storm sewer system crosses the permittee’s boundary (e.g., city limit).

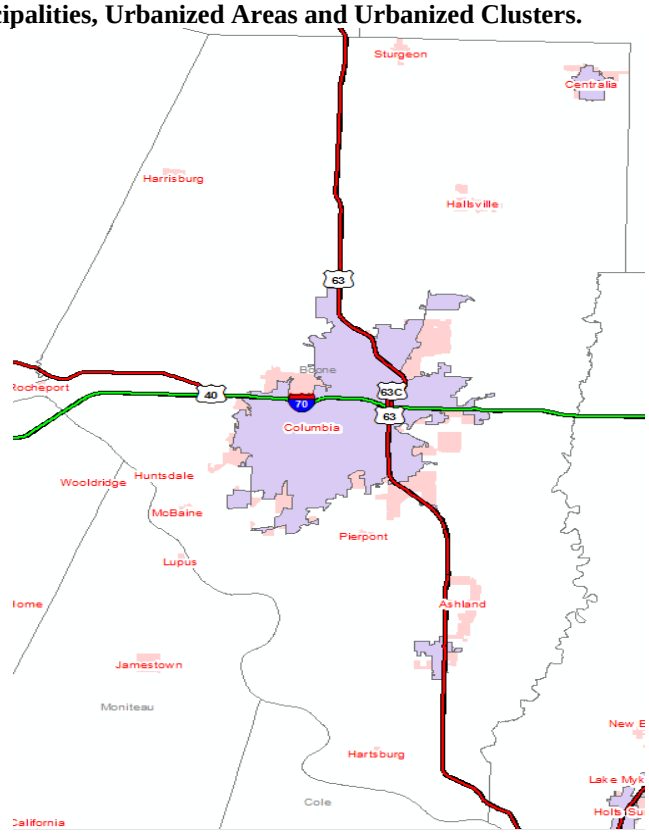
A full description of the all outfalls and MS4 Boundary Point Sources either submitted via an application or by other means will appear on the coverage document issued to a General Permit Covered Facility. However, at this time, both outfalls and MS4 Boundary Point Sources will be designated with the term outfall until such time as applicable regulations and applications can be modified to include and describe the difference between these two types of permitted features.

The full description of these permitted features will include:
Permitted Feature ID (e.g., Outfall #001)
Legal Description ¼, ¼, Section, Township, Range, Direction
UTM Coordinates: X=000000.0, Y=0000000.0 (Easting, Northing respectively)
Receiving Stream: Name and classification
First Classified Stream and ID: Name, class, waterbody ID – currently provided by the department.
USGS Basin and Sub-watershed No.: (# - #) [12 digit USGS Hydrologic Unit Code (HUC)]

In addition to the above mentioned permitted feature, there are other types of permitted features for which the permittee is required to track but are not listed in the certification page. The permittee is required to track and map all outfalls into their regulated MS4 via the Illicit Discharge Detection and Elimination Minimum Control Measure. The map and tracking of these types of outfalls is part of the permittee’s stormwater management plan, which is an enforceable document under this operating permit.

This permit allows regulated MS4s to discharge stormwater to the following waters, depending on location of the regulated MS4: Missouri or Mississippi River, lakes or reservoirs, losing streams, metropolitan no-discharge waters, special streams, subsurface waters and other waters of the state.

- **Boone County with municipalities, Urbanized Areas and Urbanized Clusters.**



PART III: RATIONALE FOR PERMIT TERMS AND CONDITIONS

ADDITIONAL FEDERAL ACTS
In accordance with 40 CFR 122.49(b) and (c) the operating permit cites the Endangered Species Act (ESA) and the National Historic Preservation Act (NHPA) and places the permittee on notice that the operating permit does not affect, remove or replace the requirements or compliance determination o NPDES operating permits. It is the responsibility of the permittee to determine if activities conducted within their MS4 or stormwater discharging from their MS4 are in compliance with the ESA and NHPA.

Assistance in determining applicability to ESA conditions and requirements can be found in the U.S. Fish and Wildlife Service (FWS) Endangered Species webpage, which is located at: http://www.fws.gov/endangered/. Additionally, the FWS Information for Planning and Conservation (IPaC) web-based project planning tool that streamlines the environmental review process is highly recommended and is located at: http://ecos.fws.gove/ipac/.

Assistance in determining applicability to NHPA conditions and requirements can be found in the Department's State Historic Preservation Office Section 106 Review, which is located at: http://dnr.mo.gov/shpo/sectionrev.htm. Additionally, the Advisory Council on Historic Preservation Citizen Guide to Section 106 Review, which explains the process, is located at: http://www.achp.gov/citizensguide.html.

In addition to the ESA and NHPA, this operating permit does not affect, replace or remove the requirements and compliance determinations with respect to substances not otherwise covered under a NPDES permit and is regulated by federal law under the Resource Conservation and Recovery Act or the Comprehensive Environmental Response, Compensation, and Liability Act.

ANTI-BACKSLIDING:
Anti-backsliding is a provision in federal statute and regulations CWA §303(d)(4); CWA §402(o); 40 CFR 122.44(l) that requires a reissued permit to be as stringent as the previous permit with some exceptions. The permit complies with Anti-backsliding regulations.

The previous operating permit established ambiguous conditions that stated, "discharges that cause or contribute to violations of instream water quality standards" were not permitted. The permit did not establish how compliance with this condition was to be implemented or justify its inclusion into the operating permit. Justification for removal of the ambiguous condition is in accordance with CWA §402(o)(2)(B)(ii), which states, "*The Administrator determines that technical mistakes or mistaken interpretations of the law were made in issuing the permit under subsection (a)(1)(B) of this section*." Review of the previous MS4 permit does not give justification for the implementation of instream WQS (i.e., there wasn't a clear description in the operating permit's fact sheet providing justification). Rather, terms and conditions of strict compliance to Missouri's WQS appear to be an erroneous interpretation of the law.

Prior to 1987, municipal stormwater was subject to the same controls as other point sources including industrial dischargers, which was section 301(b) of the CWA. However, in 1987, "Congress retained the existing, stricter controls for industrial stormwater discharges but prescribed new controls for municipal storm water discharges," *NRDC v. EPA, 966 f.2D 1292, 9th Cir. 1992* (*NRDC v. EPA*). This "new control" was established in section 402(p)(3)(B)(iii) of the CWA, which states, "*Permits for discharges from municipal storm sewers – shall require controls to reduce the discharge of pollutants to the* ***maximum extent practicable****, including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or State determines appropriate for the control of such pollutants.*"

The argument for "new controls" contained in the case of *NRDC v. EPA* was subsequently supported in the case of *Defenders of Wildlife v. Browner, 191 F.3d 1159, 9th Cir. 1999* (*Defenders of Wildlife v. Browner*), in which it was concluded that section 402(p)(3)(B) of the CWA "replaces" the requirements of section 301(b) of the CWA with the Maximum Extent Practicable standard for MS4 discharges, and that it create a "lesser standard" than section 301(b) of the CWA establishes on other types of discharges.

ANTI-DEGRADATION:
Anti-degradation consists of policies designed to ensure protection of water quality for a particular waterbody where the water quality exceeds levels necessary to protect fish and wildlife propagation and recreation on and in the water. This also includes special protection of waters designated as outstanding natural resource waters. Anti-degradation plans are adopted by each state to minimize adverse effects on water.

As per 10 CSR 20-7.031(3), the three levels of protection provided by the anti-degradation policy in subsections (A), (B) and (C) of this section shall be implemented according to procedures developed by the department. On April 20, 2007, the Missouri Clean Water Commission approved "Missouri Anti-degradation Rule and Implementation Procedure" (Anti-degradation Rule), which is applicable to new or upgraded/expanded facilities.

The department has determined that the best avenue forward for implementing the Anti-degradation requirements for this co-permitted MS4 is by requiring the appropriate development, implementation, and maintenance of a successful Stormwater Management Plan (SWMP). The permit directs the permittees to develop and implement effective Best Management Practices (BMPs), develop and implement self-evaluating measurable goals, and develop and implement an iterative process (how BMPs are determined ineffective and the steps needed to replace or revise the BMPs). This process ensures that MS4s apply Reasonable Further Progress, which subsequently ensures that the MS4s are reducing pollutants in stormwater runoff to the Maximum Extent Practicable (MEP). This selection and documentation of appropriate control measures will then serve as the analysis of alternatives and fulfill the requirements of the Antidegradation Rule and Implementation Procedure at 10 CSR 20-7.031(3) and 10 CSR 20-7.015(9)(A)5.

Any expansion to the MS4s boundary must be updated in their SWMP and must be subject to BMPs, measurable goals, and the iterative process. Renewal of coverage for a facility requires a review of the SWMP by the Department to assure that the selected BMPs continue to be appropriate.

APPLICATION REQUIREMENTS:
Phase II MS4s (as defined under 10 CSR 20-6.200) are to apply and obtain a small MS4 General Permit or site-specific permit in accordance with 40 CFR 122.33 and 10 CSR 20-6.200(5).

COMPLIANCE AND ENFORCEMENT:
Enforcement is the action taken by the Water Protection Program (WPP) to bring an entity into compliance with the Missouri CWL, its implementing regulations, and/or any terms and conditions of an operating permit. The primary purpose of the enforcement activity in the WPP is to resolve violations and return the entity to compliance. For entities covered under a NPDES permit, failure to comply with any applicable NPDES permit requirement also constitutes a violation of the Missouri CWL and its implementing regulations.

ITERATIVE PROCESS
The iterative process is a documented process consisting of action items and analysis that is to be conducted by the permittee to ensure that BMPs are effective, and that the permittee is meeting the MEP standard. The process starts with the evaluation of a BMP with its designated measurable goal, which is the reason quantifiable measurable goals greatly assist in the iterative process. If the BMP is found effective, then the permittee with regards to the BMP continues as normal until the next round of evaluation. If the BMP is found to be ineffective, then the permittee is required to conduct analysis to determine if the ineffective BMP is truly ineffective or if the measurable goal set was ill-chosen or unattainable due to no fault of the BMP.

If the measurable goal was ill-chosen or unattainable, then the permittee would need to conduct analysis to determine a more appropriate measurable goal, preferably quantifiable. If the measurable goal wasn't ill-chosen or unattainable, then the permittee is to conduct analysis, research, or review to determine a replacement BMP that is to be effective at reaching the existing measurable goal. However, if the replacement BMP requires a new measurable goal, preferably quantifiable, then it is advantageous for the permittee to develop an appropriate measurable goal for the BMP. The replacement of the ineffective BMP with an effective BMP provides the permittee with reasonable further progress.

This process should occur as an annual evaluation; however, it would be naïve to believe that all BMPs can be evaluated annually. Thus, BMPs should be evaluated every 5 years (i.e., the life of the permit) as required by this operating permit.

MAXIMUM EXTENT PRACTICABLE (MEP) STANDARD:
Prior to 1987, municipal stormwater was subject to the same controls as other point sources like industrial and domestic discharges, which was section 301(b) of the CWA. However, in 1987, "Congress retained the existing, stricter controls for industrial stormwater discharges but prescribed new controls for municipal stormwater discharges," *NRDC v. EPA, 966 f.2D 1292, 9th Cir. 1992 (NRDC v. EPA)*. This "new control" was established in section 402(p)(3)(B)(iii) of the CWA, which states, "*Permits for discharges from municipal storm sewers – shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system, designs and engineering methods, and such other provisions as the Administrator or State determines appropriate for the controls of such pollutants*."

The argument for "new controls" contained in the case of NRDC v. EPA was subsequently supported in the case of *Defenders of Wildlife v. Browner*, in which it was concluded that section 402(p)(3)(B) of the CWA "replaces" the requirements of 301(b) of the CWA with the MEP standard for MS4 discharges, and that it creates a "lesser standard" than section 301(b) of the CWA establishes on other types of discharges. Thus, MEP is a technology-based standard established by Congress in Section 402(p)(3)(B)(iii) of the CWA. As established in the *1999 National Pollution Discharge Elimination System Regulations for Revisions of Water Pollution Control Program Addressing Storm Water Discharges* (64 FR No. 235), MEP is, "*…the statutory standard that establishes the level of pollutant reduction that operators of regulated MS4s must achieve*," (i.e., not water quality standards).

In addition to indicating that MEP is the statutory requirement, the EPA also clearly stated that MEP is only applicable to the six (6) minimum controls measures in 64 FR No. 235, which states, "*The first component, reduction to the MEP, would be realized through implementation of the six minimum measures*." The description of MEP continues in 64 FR No. 235, with "*EPA envisions application of the MEP standard as an iterative process. MEP should continually adapt to current conditions and BMP effectiveness and should strive to attain water quality standards*." The iterative process, mentioned is also defined in 644 FR. No 235 with the following, "*…implement an iterative process of using BMPs, assessment, and refocused BMPs, leading toward the attainment of water quality standards*."

Therefore, compliance is determined by the successful implementation of the six MCMs in accordance with the conditions established in the operating permit, BMPs designed to reduce pollutants to the MEP and the utilization of the iterative process. Thus, MEP is first the development and successful implementation of the six (6) Minimum Control Measures. The development and successful implementation of the 6 MCMs is realized through the development/implementation of effective Best Management Practices designed or developed to reduce pollutants directly or indirectly into the MS4. Effective Best Management Practices is realized through their corresponding measurable goals. The operating permit requires measurable goals to be developed to evaluate the Best Management Practice. In the event that a measurable goal determines that a BMP is not effective, the permittee is then subject to the iterative

process where they are required to replace or revise the ineffective BMP with a new or revised BMP. Finally MEP is realized with the Qualitative Monitoring Program as it places requirements onto the permit holders to obtain water samples to determine water quality trends that are to be used to determine the effectiveness of the SWMP as a whole and its goal to reduce pollutants to the MEP and attainment Missouri's Water Quality Standards.

MEASURABLE GOALS

Measureable goals are designed objectives or goals that quantify the progress of program implementation and performance of BMPs. They are objective markers or milestones that the co-permittees use to track the progress and effectiveness of BMPs in reducing pollutants to the MEP. At a minimum, measurable goal should contain descriptions of actions that will be taken to implement each BMP, what you anticipate to be achieved by each goal, and the frequency and dates for such actions to be taken. BMPs and measurable goals are the mechanisms that are used to establish a clear and specific baseline against which future progress at reducing pollutants to the MEP can be measured.

There are a number of different ways the co-permittees can establish measureable goals. It is recommended that the below categories when developing goals:

- **Tracking implementation over time** – Where a BMP is continually implemented over the permit term, a measurable goal can be developed to track how often, or where, this BMP is implemented.
- **Measuring progress in implementing the BMP** – Some BMPS are developed over time, and a measurable goal can be used to track this progress until the BMP implementation is completed.
- **Tracking total numbers of BMPs implemented** – Measureable goals can be used to track BMP implementation numerically (e.g., the number of wet detention basins in place or the number of people changing their behavior due to the receipt of educational materials).
- **Tracking program/BMP effectiveness** – Measurable goals can be developed to evaluate BMP effectiveness, for example, by evaluating a structural BMP's effectiveness at reducing pollutant loading, or evaluating a public education campaign's effectiveness at reaching and informing the target audience to determine whether it reduces pollutants to the MEP. A measurable goal can also be a BMP design objective or performance standard.
- **Tracking environmental improvement** – The ultimate goal of the NPDES stormwater program is environmental improvement, which can be a measurable goal. Achievement of environmental improvement can be assessed and documented by ascertaining whether state water quality standards are being attained, or by tracking trends or improvements in water quality (chemical, physical, and biological) and other indicators, such as the hydraulic or habitat condition of the waterbody or watershed.

Additionally, it is recommended that measurable goals include, where appropriate, the following items:

- The activity, or BMP, to be completed;
- A schedule or date of completion; and
- A quantifiable target to measure progress toward achieving the activity or BMP.

Measurable goals that include these items (not necessarily all three) are easy quantifiable, which leads to being easily tracked, and ultimately leading to a clear demonstration of reducing pollutants to the MEP. However, just because a co-permittee has a measureable goal, it does not equate that it is effective as a measurable goal. In order to help in the selection of measurable goals that will work for the co-permittee, it is recommended that the below criteria is used in selecting measurable goals:

- **Consider the objective for each minimum measure** – The BMP that you chose should work toward one or more common objectives related to stormwater quality improvement and reducing pollutants to the MEP. Objectives should be based on what is known about existing pollutant sources and problems in the watershed and what is required by the minimum measure. The objective can be something the co-permittee can quantify or it can be a goal or purpose statement.
- **Review the programs that are already in place for each minimum measure** – Use a self-audit/self-analysis. Coordination with other agencies, non-profit groups, citizen groups, etc… to identify existing initiatives that can be used as part of the stormwater management program.
- **Corresponding BMP –** Select BMPs that can be utilized for more than one minimum control measure each other and work toward meeting each minimum measure. These BMPs should address the minimum measures objective identified above and meet the regulatory requirement in the minimum measure. Likewise, when a BMP can be utilized for more than one minimum control, the measurable goal can also be used on more than one minimum measure.
- **Milestones for implementation –** Measurable goals should include a timeframe and a quantity to measure, if possible. To assist in this, the co-permittees should consider the following questions:
    - When will BMP be implemented?
    - What and when can institutional, funding, and legal issues, if any, need to be resolved before implementation can occur?
    - How will progress of implementation be tracked? (Spreadsheets or databases are very useful in tracking progress.
    - How can the BMP be measured to demonstrate pollutants are being reduced to the MEP? Changes in behavior, number of BMPs implemented, or documented improvements in water quality are results that can demonstrate this.

- **Evaluation and Effectiveness of each BMP** – Co-permittees will need to ascertain what effects individual and collective BMPs have on water quality and associated indicators. Instream monitoring, such as physical, chemical, and biological monitoring is ideal because it allows the MS4 to determine if the BMP is improving water quality resulting from management efforts. Intermediate goals can provide documentation of progress toward the measurable goal. Ultimately, the evaluation method that is used by the MS4 permit holder for each BMP should lead to a determination of the environmental benefits of each minimum measure and overall effectiveness of the SWMP in reducing pollutants to the MEP.

MINIMUM CONTROL MEASURES (MCMS)

The Phase II rule defines a small MS4 stormwater management program as being comprised of six (6) Minimum Control Measures (MCMs) that, when administered in concert, are expected to result in the reduction of the discharge of pollutants into receiving water bodies. This operating permit requires the co-permittees to design their programs to do the following: reduce the discharge of pollutants to the MEP, protect water quality, and satisfy the appropriate water quality requirements of the Clean Water Act per 40 CFR 122.34(a).

Proper implementation of the measures will improve water quality as indicated in 64 FR. No. 235, which states, "*Absent to the contrary, EPA presumes that a small MS4 program that implements the six minimum measures in today's rule does not require more stringent limitations to meet water quality standards. Proper implementation of the measures will significantly improve water quality*." The department considers narrative effluent limitations requiring the implementation of BMPs to be the most appropriate in accordance with 40 CFR 122.44(k)(2) and (3).

The national menu of BMPs for each specific MCM can be found at:
https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#edu

Public Education and Outreach

Terms and conditions related to this MCM are in accordance with 40 CFR 122.34(b)(1). Below guidance is per 40 CFR 122.34(b)(1)(ii) and are not requirements, but is highly encouraged.

- Storm water educational materials provided by your State, Tribe, EPA, environmental, public interest or trade organizations, or other MS4s may be used.
- The public education program should inform individuals and households about the steps they can take to reduce storm water pollution, such as ensuring proper septic system maintenance, ensuring the proper use and disposal of landscape and garden chemicals including fertilizers and pesticides, protecting and restoring riparian vegetation, and properly disposing of used motor oil or household hazardous wastes.
- It is recommended that the program inform individuals and groups how to become involved in local stream and beach restoration activities as well as activities that are coordinated by youth service and conservation corps or other citizen groups.
- It is recommended that the public education program be tailored, using a mix of locally appropriate strategies, to target specific audiences and communities. Examples of strategies include:

- Distributing brochures or fact sheets (like those already created by the state or EPA),
- Recreational guides,
- Alternative information sources (web sites, bumper stickers, refrigerator magnets, and posters/place mats),
- Sponsoring speaking engagements before community groups,
- Library of educational material,
- Volunteer citizens/tasks force
- Storm drain stenciling (e.g., "Do Not Dump – Drains to River"),
- Stormwater hotlines for the reporting of polluters
- Economic incentives,
- Tributary signage
- Providing public service announcements,
- Implementing educational programs targeted at school age children, and
- Conducting community-based projects such as storm drain stenciling, and watershed and beach cleanups.

- In addition, EPA recommends that some of the materials or outreach programs be directed toward targeted groups of commercial, industrial, and institutional entities likely to have significant storm water impacts. For example, providing information to restaurants on the impact of grease clogging storm drains and to garages on the impact of oil discharges.
- It is also recommended that the outreach program is tailored to address the viewpoints and concerns of all communities, particularly minority and disadvantaged communities, as well as any special concerns relating to children.

Public education and outreach is needed due to the fact that an informed and knowledgeable community is crucial to the success of a stormwater management program since it helps ensure greater support which allows the public to gain a greater understanding of the reasons why it is necessary and important. Public support is particularly beneficial when operators of small MS4s attempt to institute new funding initiatives for the program or seek volunteers to help implement the program.

In addition, Measurable Goals are required in this operating permit, which are intended to gauge permit compliance and program effectiveness. Successful and obtainable measureable goals reflect the needs and characteristics of the operator and area the served by its small MS4 and are chosen using an integrated approach that fully addresses the requirements and intent of the program. Examples of measureable goals are as follows:

- BMP – Stormwater Public Education for radio or television.
- Measurable Goal – Increase the number of dog owners who pick up after their pets.
- Achievement/Progress Determination: Conduct a survey at the beginning, during, and at the end of the permit term to gauge any change.

Public Participation/Involvement

This MCM is required in accordance with 40 CFR 122.34(b)(2). Below guidance is per 40 CFR 122.34(b)(2)(ii) and is not a requirement, but is highly encouraged.

- It is recommended that the public be included in developing, implementing, and reviewing your storm water management program and that the public participation process should make efforts to reach out and engage all economic and ethnic groups.
- Opportunities for members of the public to participate in program development and implementation include:
  - Serving as citizen representatives on a local storm water management panel,
  - Attending public hearings,
  - Working as citizen volunteers to educate other individuals about the program,
  - Assisting in program coordination with other pre-existing programs, or
  - Participating in volunteer monitoring efforts. (Citizens should obtain approval where necessary for lawful access to monitoring sites.)

Public can provide valuable input and assistance to the co-permittees; therefore, it is encouraged that the public be given opportunities to play an active role in both the development and implementation of the program. An active and involved community is crucial to the success of a stormwater management program because it allows for broader public support, which means citizens who participate in the development and decision making process are partially responsible for the program may be less likely to raise legal challenges and more likely to take an active role. An active public can also result in shorter implementation times due to fewer obstacles in the form of public and legal challenges and increase sources in the form of citizen volunteers.

Example BMPs for this program can include, but are not limited to the below:

- Public meetings/citizen panels: allow citizens to discuss various viewpoints and provide input concerning appropriate stormwater management policies and BMPs.
- Volunteer water quality monitoring: gives citizens first-hand knowledge of the quality of local water bodies and provides a cost-effective means to collecting water quality data.

- Volunteer educators/speakers: can conduct workshops encourage public participation, and staff special events.
- Storm-drain stenciling: important and simple activity that can be conducted by citizens (especially students).
- Community clean-ups: can be conducted along local waterways, beaches, and around storm drains.
- Citizen watch groups: can aid local enforcement authorities in the identification of polluters.
- "Adopt a Storm Drain" program: encourages individuals or groups to keep storm drains free of debris and to monitor what is entering local waterways through the storm drains.

Measurable goals for this program can include, but are not limited to the below:
- BMP – Volunteer water quality monitoring.
- Measurable Goal – Increase the number of citizen/groups conducting water quality monitoring.
- Achievement/Progress Determination: Determine number of citizens/groups conducting water quality monitoring at the beginning, during, and at the end of the permit term. Determine if there has been an increase along with any relevant data to be used.

Illicit Discharge Detection and Elimination (IDDE)
This MCM is required in accordance with 40 CFR 122.34(b)(3). Below guidance is per 40 CFR 122.34(b)(3)(iv) and is not a requirement, but is highly encouraged.
- It is recommended that the plan to detect and address illicit discharges include the following four components:
  - Procedures for locating priority areas likely to have illicit discharges;
  - Procedures for tracing the source of an illicit discharge;
  - Procedures for removing the source of the discharge; and
  - Procedures for program evaluation and assessment.

- It is recommended that the plan contain:
  - Visually screening outfalls during dry weather and
  - Conducting field tests of selected pollutants as part of the procedures for locating priority areas.

- Illicit discharge education actions may include storm drain stenciling,
- A program to promote, publicize, and facilitate public reporting of illicit connections or discharges, and
- Distribution of outreach materials.

Discharges from MS4s often include waste and wastewater from non-stormwater sources. A study conducted in 1987 in Sacramento, California, found that almost one-half of the water discharged from a local MS4 was not directly attributable to precipitation runoff. A significant portion of these dry weather flows were from illicit and/or inappropriate discharges and connections to the MS4.

Illicit discharges enter the system through either direct connections (e.g., wastewater piping either mistakenly or deliberately connected to the storm drain) or indirect connections (e.g., infiltration into the MS4 from cracked sanitary systems, spills collected by drain outlets, or paint or used oil dumped directly into a drain). The result is untreated discharges that contribute high level pollutants, including heavy metals, toxics, oil and grease, solvents, nutrients, viruses, and bacteria to receiving waterbodies. Pollutant levels from these illicit discharges have been shown in EPA studies to be high enough to significantly degrade receiving water quality and threaten aquatic, wildlife, and human life.

The Illicit Discharge Detection and Elimination (IDDE) plan is dependent upon several factors, including the availability of the co-permittee's resources, size of staff, and degree and character of illicit discharges. As guidance only, the four steps of a recommended plan are outlined below:

Locate Problem Areas – It is recommended that the priority areas be identified for detailed screening of the system based on the likelihood of illicit connections (e.g., areas with older sanitary sewer lines) Methods that can locate problem areas include:
- Visual Screening,
- Water sampling from manholes and outfalls during dry weather,
- The use of infrared and thermal photography,
- Cross-training field staff to detect illicit discharges, and
- Public complaints.

Find the Source – Once a problem area or discharge is found, additional efforts usually are necessary to determine the source of the problem. Methods that can find the source of the illicit discharge include:
- Dye-testing buildings in problem areas,
- Dye- or smoke-testing buildings at the time of sale,
- Tracing the discharge upstream in the storm sewer,
- Employing a certification program that shows that buildings have been checked from illicit connections,

- Implementing an inspection program of existing septic systems, and
- Using video to inspect the storm sewer.

Remove/Correct Illicit Connections – Once the source is identified, the offending discharger should be notified and directed to correct the problem. Education efforts in resolving the problem should occur before taking legal action; however, each co-permittee needs to have the ability to enforce the IDDE plan.

Document Actions Taken – As a final step, all actions taken under the IDDE plan should be documented. This illustrates that progress is being made to eliminate illicit connections and discharges. Documented action should be included in reports as required by your operating permit and may include:

- Number of outfalls screened,
- Any complaints received and corrected,
- Number of discharges and quantities of flow eliminated, and the number of dye- or smoke-test conducted.

Measurable goals can include, but are not limited to the below example:

- BMP – 24 Hour Hotline
- Measurable Goal – Respond within 24 hours or less upon receipt of a citizen complaint.
- Achievement/Progress Determination: May require the development of a compliant tracking system to log times calls were received and time response was implemented.

Construction Site Runoff Control

This MCM is required in accordance with 40 CFR 122.34(b)(4). Below guidance is per 40 CFR 122.34(b)(4)(iii) and is not a requirement, but is highly recommended.

- Examples of sanctions to ensure compliance may include non-monetary penalties, fines, bonding requirements and/or permit denials for non-compliance.
- It is recommended that procedures for site plan review include the review of individual pre-construction site plans to ensure consistency with local sediment and erosion control requirements.
- Procedures for site inspections and enforcement of control measures could include steps to identify priority sites for inspection and enforcement based on the nature of the construction activity, topography, and the characteristics of soils and receiving water quality.
- It is encouraged that the co-permittees provide appropriate educational and training measures for construction site operators, if not already provided.
- The co-permittees may wish to require a storm water pollution prevention plan for construction sites within your jurisdiction that discharge into your system, if not already required.
    - See §122.44(s) (NPDES permitting authorities' option to incorporate qualifying State, Tribal and local erosion and sediment control programs into NPDES permits for storm water discharges from construction sites).
    - Also see §122.35(b) (The NPDES permitting authority may recognize that another government entity, including the permitting authority, may be responsible for implementing one or more of the minimum measures on your behalf.)

Polluted stormwater runoff from construction sites often flows to MS4 and ultimately is discharged into local waterbodies. Of the pollutants that have the potential to be discharged, sediment is usually the main point of concern. According to the 2000 National Water Quality Inventory, States and Tribes report that sediment is one of the most widespread pollutants affecting assessed rivers and streams, second only to pathogens (bacteria). Sources of sediment include agriculture, urban runoff, construction and forestry. However, sediment runoff raters from construction sites are typically 10 to 20 times greater than those of agricultural lands and 1,000 to 2,000 times greater than those from forest lands.

During a short time period, construction sites can contribute more sediment to streams than can be deposited naturally during several decades. The resulting siltation and contribution of other pollutants from construction sites can cause physical, chemical, and biological harm to Missouri’s waters.

Some BMPs for the construction program include:

Regulatory Mechanism – Through the development of ordinances or other regulatory mechanism, the co-permittees will need to establish a construction program that controls polluted runoff from construction sites with a land disturbance of greater than or equal to one acre. Because there may be limitations on regulatory authority, the co-permittees are required to satisfy this minimum control measure only to the MEP and allowable State, Tribal, or local law.

Site Plan Review – Co-permittees will need to include, if not already, in its construction program requirements for the implementation of appropriate BMPs on construction sites to control erosion and sediment and other waste at the site. To determine if a construction site is in compliance with such provisions, co-permittees can review the site plans submitted by the construction site before ground is broken.

Site plan reviews can aid in compliance and enforcement efforts since it can alert the co-permittees early in the process to the planned use or non-use of proper BMPs and provides a way to track new construction activities. The tracking of sites is useful not only for the MS4 operator recordkeeping and reporting purpose, which are required under this permit, but also for members of the public interested in ensuring that sites are in compliance.

Inspections and Penalties – Once construction commences, BMPS should be in place and co-permittees enforcement activities should begin. To ensure that the BMPs are properly installed, the co-permittees are required in this operating permit to develop procedures for site inspection and enforcement of control measures to deter infractions. Procedures can include steps to identify priority sites for inspection and enforcement based on the nature and extent of the construction activity, topography, and the characteristics of soli and receiving water quality. Inspections will give the co-permittees an opportunity to provide additional guidance and education, issue warnings, or assess penalties.

Information Submitted by the Public – A final consideration, but is highly recommended, is that the co-permittee's SWMP contain procedures for the receipt and considerations of public inquiries, concerns, and information submitted regarding local construction activities, if not already considered. This provision can reinforce the public participation component of the co-permittees' SWMP and recognize the crucial role that public can play in identifying instances of non-compliance.

The co-permittees are required to only consider the information submitted, and may not need to follow-up and respond to every complaint or concern. Although some form of enforcement action or reply is not required, co-permittees should demonstrate acknowledgement and consideration of the information submitted.

Measurable goals for this program can include, but are not limited to the below:

- BMP – Education of construction site operators and contractors about proper selection, installation, inspection, and maintenance of BMPs.
- Measureable Goal – 80% will have attended erosion/sediment control training for all projects that occurred in the MS4's jurisdiction during the permit term.
- Achievement/Progress Determination: This goal could be tracked by documenting attendance at local, State, or Federal training programs. Attendance can be encouraged by decreasing permitting fees for those contractors who have been trained and provide proof of attendance when applying for permits.

Post-Construction Runoff Control

This MCM is required in accordance with 40 CFR 122.34(b)(5). Below guidance is per 40 CFR 122.34(b)(5)(iii) and is not a requirement, but is highly encouraged.

- If water quality impacts are considered from the beginning stages of a project, new development and potentially redevelopment provide more opportunities for water quality protection.
- It is recommended that the BMPs chosen:
  - Be appropriate for the local community,
  - Minimize water quality impacts, and
  - Attempt to maintain pre-development runoff conditions (i.e., reasonably mimic).

- In choosing appropriate BMPs, it is encouraged that the co-permittees in locally-based watershed planning efforts, which the co-permittees are currently doing, and attempt to involve a diverse group of stakeholders including interested citizens.
- When developing a program that is consistent with this measure's intent, it is recommended that the co-permittees adopt a planning process that:
  - Identifies the municipality's program goals (e.g., minimize water quality impacts resulting from post-construction runoff from new development and redevelopment),
  - Implementation strategies (e.g., adopt a combination of structural and/or non-structural BMPs),
  - Operation and maintenance policies and procedures, and
  - Enforcement procedures.

- The development of this program should consider assessing existing ordinances, policies, programs and studies that address storm water runoff quality.
- In addition to assessing these existing documents and programs, you should provide opportunities to the public to participate in the development of the program.

- Non-structural BMPs are preventative actions that involve management and source controls such as:
  - Policies and ordinances that provide requirements and standards to direct growth to identified areas,
  - Protect sensitive areas such as wetlands and riparian areas, maintain and/or increase open space (including a dedicated funding source for open space acquisition),
  - Provide buffers along sensitive water bodies,
  - Minimize impervious surfaces, and minimize disturbance of soils and vegetation;
  - Policies or ordinances that encourage infill development in higher density urban areas, and areas with existing infrastructure;
  - Education programs for developers and the public about project designs that minimize water quality impacts, and
  - Measures such as minimization of percent impervious area after development and minimization of directly connected impervious areas.

- Structural BMPs include:
  - Storage practices such as wet ponds and extended-detention outlet structures,
  - Filtration practices such as grassed swales, sand filters and filter strips, and
  - Infiltration practices such as infiltration basins and infiltration trenches.
- It is recommended that the co-permittees ensure the appropriate implementation of the structural BMPs by considering, if not already, some or all of the following:
  - Pre-construction review of BMP designs;
  - Inspections during construction to verify BMPs are built as designed;
  - Post-construction inspection and maintenance of BMPs; and
  - Penalty provisions for the noncompliance with design, construction or operation and maintenance.

- Storm water technologies are constantly being improved, and it is recommended that the co-permittees' requirements be responsive to these changes, developments or improvements in control technologies.

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 waterbodies. Many studies indicate that prior planning and design for minimization of pollutants in post-construction stormwater discharges is the most cost-effective approach to stormwater quality management.

The Phase II rule applies to redevelopment projects that alter the footprint of an existing site or building in such a way that there is a disturbance of equal to or greater than one acre of land. Redevelopment projects do not include such activities as exterior remodeling.

Guidelines and BMPs (both non-structural and structural) for the development and implementation of this program include, but are not limited to the below:

Planning Procedures – runoff problems can be addressed efficiently with sound planning procedures. Local master plans, comprehensive plans, and zoning ordinances can promote improved water quality in many ways, such as guiding the growth of a community way from sensitive areas to areas that can support it without compromising water quality.

Site-Based BMPs – these BMPs can include buffer strips and riparian zones preservation, minimization of disturbance and imperviousness, and maximization of open spaces.

Stormwater Retention/Detention BMPs – control stormwater by gathering runoff in wet ponds, dry basins, or multi-chamber catch basins and slowly release it to receiving water bodies or drainage systems. The practices can be designed to both control stormwater volume and settle out particulates for pollutant removal.

Infiltration BMPs – are designed to facilitate the percolation of runoff through the soil to ground water resulting in the reduction of stormwater quantity, which reduces the mobilization of pollutants. Examples are:
- Basins/trenches,
- Dry wells, and
- Porous pavement.

Vegetative BMPs – are landscaping features that, with optimal design and good soil conditions, remove pollutants, and facilitate percolation of runoff resulting in the maintenance of natural site hydrology, promoting healthier habits, and increase aesthetic appeal. Examples are:
- Grassy swales,
- Filter strips,
- Artificial wetlands, and
- Rain gardens.

Measurable goals for this program can include, but are not limited to the below:
- BMP – Reduce/Replace road surface areas directly connected to storm sewer systems (using traditional curb and gutter infrastructure) with stormwater conveyance approaches such as grassy swales and similar.
- Measureable Goal – Reduce/Replace new development by 20% and re-development by 10% during the permit term.
- Achievement/Progress Determination: Ensure that 20% of new projects and 10% of re-development projects use alternative stormwater conveyance systems vs. traditional curb and gutter approach. This can be tracked by linear feet of curb and gutter not installed in projects that would have historically used them.

Pollution Prevention/Good Housekeeping
This MCM is required in accordance with 40 CFR 122.34(b)(6). Below guidance is per 40 CRFR 122.34(b)(6)(ii) and is not a requirement, but is highly encouraged.

- EPA recommends that, at a minimum, you consider the following in developing your program:
  - Maintenance activities and schedules, and long-term inspection procedures for structural and non-structural storm water controls to reduce floatables and other pollutants discharged from your separate storm sewers;
  - Controls for reducing or eliminating the discharge of pollutants from streets, roads, highways, municipal parking lots, maintenance and storage yards, fleet or maintenance shops with outdoor storage areas, salt/sand storage locations and snow disposal areas operated by you, and waste transfer stations;
  - Procedures for properly disposing of waste removed from the separate storm sewers and areas listed above (such as dredge spoil, accumulated sediments, floatables, and other debris); and
  - Ways to ensure that new flood management projects assess the impacts on water quality and examine existing projects for incorporating additional water quality protection devices or practices.
- Operation and maintenance should be an integral component of all storm water management programs.
- This measure is intended to improve the efficiency of these programs and require new programs as needed.
- Properly developed and implemented operation and maintenance programs reduce the risk of water quality problems.

This program for municipal operations is a key element of any small MS4 stormwater management program. This measure requires the co-permittees to examine and subsequently alter their own actions to help ensure a reduction in the amount and type of pollution that:
- Collects on the street, parking lots, open spaces, and storage and vehicle maintenance areas and is discharged into local waterways; and
- Result from actions such as environmentally damaging land development and flood management practices or poor maintenance of storm sewer system.

While this plan is meant primarily to improve or protect receiving water quality by altering municipal or facility operations, it also can result in a cost savings for the co-permittees, since proper and timely maintenance of storm sewer systems can help avoid repair costs from damage caused by age and neglect.

Some guidelines and BMPs for this plan include:

Maintenance activities, maintenance schedules, and long-term inspection procedures – for structural and non-structural controls to reduce floatables and other pollutants discharge from the storm sewers.

Controls for reducing or eliminating the discharge of pollutants – from areas such as roads and parking lots, maintenance and storage yards (including salt/sand and snow disposal areas), and waste transfer stations. These controls could include programs that promote recycling (to reduce litter), minimize pesticide use, and ensure the proper disposal of animal waste.

Procedures for the proper disposal of waste – removed from separate storm sewer systems and areas listed in the Controls for reducing or eliminating the discharge of pollutants, including dredge spoil, accumulated sediments, floatables, and other debris.

Ways to ensure that new flood management projects assess the impacts on water quality – and examine existing projects for incorporation of additional water quality protection devices or practices. It is encouraged coordination with flood control managers for the purpose of identifying and addressing environmental impacts from such projects.

Measurable goals for this program can include, but are not limited to the below:
- BMP –Incorporate the use of road salt alternatives for highway deicing and reduce the use of traditional road salt.
- Measureable Goal – Reduce road salt usage by 50% in permit term.
- Achievement/Progress Determination: Use alternative deicing for roads and highways leading to the reduction of traditional road salt by 50% by the end of the permit term.

PESTICIDE RULE:
The department has developed a Pesticide General Permit #MOG-870000 for point source discharges resulting from the application of pesticides. This permit has been developed as a result of federal requirements under NPDES.

The general permit authorizes the discharge of pesticides that leave a residue in water when such applications are made into, over or near waters of the United States. The department has determined that entities most likely affected by this permit include public health entities, including mosquito or other vector control districts and commercial applicators that service this sector. Others potentially affected by this permit include resource and land management entities such as public and private entities managing public land, park areas and university campuses, as well as utilities maintaining easements and right-of-ways, golf courses and other large residential developments which maintain a large grounds area. In addition, permits may be required for applications involving pesticide use for agricultural related activities when pesticides are applied to crops grown in or near a water of the United States.

The department is collaborating closely with the Missouri Department of Agriculture, which already administers the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) along with the Missouri Pesticide Use Act.

The permittee/facility is subject to the pesticide rule. To determine if a permit is required, see general permit #MOG-870000 located at http://dnr.mo.gov/env/wpp/permits/wpcpermits-general.htm. The thresholds listed in Table 1 of the pesticide general permit will assist in determining if a permit is required. If a permit is required, the permittee/facility shall apply for either the Pesticide General Permit or a site-specific pesticide permit from the department.

STORMWATER MANAGEMENT PROGRAM AND PLAN (SWMP):
The SWMP is a documented implementation plan describing a schedule of MS4 program activities including prohibitions of practices, implementation of required practices, development of standards for urban growth, maintenance procedures, education, trainings, inspections and other management practices to prevent or reduce the pollution of waters of the state.

This permit in accordance with 10 CSR 20-6.200 and 40 CFR Parts 9, 122, 123 and 124 requires the permittee to develop and implement a SWMP. The SWMP shall address the six minimum control measures - public education and outreach, public involvement/participation process, illicit discharge detection and elimination, construction site stormwater runoff control, post-construction stormwater management and pollution prevention/good housekeeping for municipal operations. In addition, the SWMP addresses monitoring requirements and TMDL implementation plan components. The SWMP also includes, but is not limited to, BMPs, pertinent local regulations, policies, procedures, interim milestones, measurable goals, measures of success, responsible persons/positions for each of the measurable goals, and any applicable TMDL assumptions and requirements.

Please see Attachment A – SWMP, which is the permittees' SWMP at the time of issuance.

SWMP ORDINANCES:
To the extent allowable under state or local law, ordinances (or other regulatory mechanisms if a non-traditional MS4) are required to be developed, implemented and enforced within five years of initial permit issuance under the following sections, in accordance with 40 CFR 122.34(b):

1. Illicit discharge detection and elimination – to prohibit non-stormwater discharges into the storm sewer system, and implement appropriate enforcement procedures and actions;
2. Construction site stormwater runoff control – to require erosion and sediment controls at construction sites, as well as sanctions designed to ensure compliance; and
3. Post-construction – to address post-construction runoff from new development and redevelopment projects, and sanctions designed to ensure compliance. The "Missouri Guide to Green Infrastructure: Integrating Water Quality into Municipal Stormwater Management" (May 2012) was written specifically to aid MS4s in developing and implementing the post-construction runoff program. The guide can be viewed at http://www.dnr.mo.gov/env/wpp/stormwater/mo-gi-guide.htm

EPA, the department and certain MS4s have developed compliant model ordinances that may be adapted for use by other interested MS4s.

SWMP REPORTING FREQUENCY:
The previous version of this operating permit and general permits prior, required annual reporting of the SWMP; however, the reporting frequency is being changed to biennial (2nd and 4th year of the operating permit) in accordance with 40 CFR 122.34(g)(3).

WATER QUALITY STANDARDS

As noted previously, the nature of the MS4 program is technology-based, which is in accordance with Section §402(p)(3)(B)(iii) of the CWA with the establishment of the technology-based standard MEP. Many in the MS4 community believe that MEP is the only standard applicable for compliance determination, which for the most part (specifically for the six (6) minimum control measures), is correct. Given the litigious nature surrounding the "agreeability" of MS4 compliance with WQS, MS4 permits have been the subject of court cases for several years.

40 CFR 122.34(a)(1) clearly requires that the MS4 permit will require the MS4 permit holder to, "*…develop, implement, and enforce a storm water management program designed to reduce the discharge of pollutants from your MS4 to the maximum extent practicable (MEP), to protect water quality, and satisfy the appropriate water quality requirements of the Clean Water Act.*" While this regulation seems to be in contradiction to Section §402(p)(3)(B)(iii) of the CWA due to the fact that it appears to require the permittee to "…*protect water quality*" and "*satisfy the appropriate water quality requirements.*.." it actually is not; however, has been mistakenly applied to require strict, immediate compliance with WQS even in previously issued Missouri MS4 Master General Permits.

As noted in 64 FR No. 235, "*The Court, did, however, disagree with the EPA's interpretation of the relationship between CWA sections 301 and 402(p). The Court reasoned that MS4s are not compelled by section 301(b)(1)(C) to meet all State water quality standards, but rather the Administrator or the State may rely on section 402(p)(3)(B)(iii) to require such controls.*" The discussion continues with, "*…the 1996 Policy describes how permits would implement an iterative process using BMPs, assessment, and refocused BMPs leading toward attainment of water quality standards. The ultimate goal of the iteration would be for water bodies to support their designated uses.*.." and "*EPA also believes the iterative approach toward attainment of water quality standards represents a reasonable interpretation of CWA section 402(p)(3)(B)(iii).*"

A break-down of 40 CFR 122.34(a) is given in 64 FR No. 235, as follows, "*The first component, reduction to the MEP, would be realized through implementation of the six minimum measures. The second component, to protect water quality, reflects the overall design objective for municipal programs based on CWA section 402(p)(6). The third component, to implement other applicable water quality requirements of the CWA, recognizes the Agency's specific determination under the CWA section 402(p)(3)(B)(iii) of the need to achieve reasonable further progress toward the attainment of water quality standards according to the iterative BMP process, as well as the determination that State or EPA officials who establish TMDLs could allocate waste loads to MS4s, as they would other point sources.*"

303(d) LIST, TOTAL MAXIMUM DAILY LOAD (TMDL)

Section 303(d) of the CWA requires that each state identify waters that are not meeting water quality standards. Water quality standards protect such beneficial uses of water as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock and wildlife. The 303(d) List helps state and federal agencies keep track of waters that are impaired but not addressed by typical water pollution control programs. Federal regulations require permitting authorities to develop TMDLs to address impaired waters listed per Section 303(d) of the CWA. A TMDL is a calculation of the maximum amount of a given pollutant that a body of water can absorb before its water quality is impaired.

Federal regulation 40 CFR 122.34(a) establishes the requirements applicable to all MS4s with, "*Your NPDES MS4 permit will require at a minimum that you develop, implement, and enforce a storm water management program designed to reduce the discharge of pollutants from your MS4 to the maximum extent practicable (MEP), to protect water quality, and to satisfy the appropriate water quality requirements of the Clean Water Act.*" EPA translated this regulation into three parts in 64 FR No. 235, as follows, "*The first component, reductions to the MEP, would be realized through implementation of the six minimum measures. The second component, to protect water quality, reflects the overall design objective for municipal programs based on CWA section 402(p)(6). The third component, to implement other applicable water quality requirements of the CWA, recognizes the Agency's specific determination under CWA section 402(p)(3)(B)(iii) of the need to achieve reasonable further progress toward attainment of water quality standards according to the iterative BMP process, as well as the determination that State or EPA officials who establish TMDLs could allocate waste loads to MS4s, as they would to other point sources.*"

The above citation of 64 FR No. 235 clearly states that MEP is specific to the six (6) MCMs and clearly establishes that Wasteload Allocations (WLAs) are applicable to MS4s. However, unlike other traditional point sources that utilize treatment facilities, the EPA clearly indicated that attainment of the WLA is to be conducted via "*the iterative BMP process*." Thus, requiring any condition for the attainment of water quality standards in addition to the MCMs is going beyond MEP but the process for attainment of the WLA is still achieved with BMPs using the iterative process of establishing BMPs, evaluating the BMPs, and refocusing on BMPs.

However, just because a WLA for any given pollutant(s) of concern (POC) has been established in a TMDL for a MS4, additional BMPs or modifications to BMPs for the six MCMs should not be required as a trigger action. Rather, the MS4 permit holder subject to an effective and approved TMDL should first make a determination if the implementation of their MCMs is adequately meeting the requirements and assumptions of the TMDL. As noted in 64 FR No. 235, "*At this time, EPA determines that water quality-based controls, implemented through the iterative process today are appropriate for the control of such pollutants and will result in reasonable further progress towards the attainment of water quality standards*." While potentially rare this does indicate that no further action may be necessary to implement the requirements and assumptions of the TMDL as the MS4 community may, through successful implementation to the MEP for each of the MCMs, have already demonstrated "*reasonable further progress*." This, rightfully so, places the burden of support on the MS4 community; however, in order for the MS4 community to continue operating only under the six MCMs, the determination of beneficial use re-attainment must be reviewed and timely approved by applicable program staff (i.e., the MS4 program coordinator and Watershed Protection Section staff).

If the requirements and assumptions of the TMDL are not being met, then the MS4 will need to, at a minimum, develop BMPs that target the given POC with the goal or design for the reduction of the pollutant. Due to the nature of stormwater controls via the iterative process, subsequent determinations can and should be made by the MS4 community to determine if "*reasonable further progress*" has resulted in the attainment of the WLA.

In addition to the initial determination or additional BMPs as required in the operating permit, integrated planning actions may be considered as actions taken to specifically restore a waterbody's beneficial uses. Regardless, if the MS4 permit holder uses integrated planning or BMPs design to reduce pollutants, other factors need to be considered in accordance with 64 FR No. 235, which states, "*If the permitting authority (rather than the regulated small MS4 operator) needs to impose additional or more specific measures to protect water quality, then that action will most likely be the result of an assessment based on a TMDL or equivalent analysis that determines sources and allocations of pollutant(s) of concern. EPA believes that the small MS4's additional requirements, if any, should be guided by its equitable share based on a variety of considerations, such as cost effectiveness, proportionate contribution of pollutants, and ability to reasonably achieve Wasteload reductions. Narrative effluent limitations in the form of BMPs may still be the best means of achieving those reductions.*"

PART IV – ADMINISTRATIVE REQUIREMENTS

COST ANALYSIS FOR COMPLIANCE:
Pursuant to Section 644.145, RSMo, when issuing permits under this chapter that incorporate a new requirement for discharges from publicly owned combined or separate sanitary or storm sewer systems or publicly owned treatment works, or when enforcing provisions of this chapter or the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq., pertaining to any portion of a publicly owned combined or separate sanitary or storm sewer system or [publicly owned] treatment works, the Department of Natural Resources shall make a "finding of affordability" on the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under this chapter and the Federal Water Pollution Control

Act. This process is completed through a cost analysis for compliance. Permits that do not include new requirements may be deemed affordable.

The Department is not required to determine Cost Analysis for Compliance because the permit contains no new conditions or requirements that convey a new cost to the facility. The only potential new condition is the Qualitative Monitoring Program; however, the permit holders' are under their CAM Agreement, which requires water monitoring. Water sampling and monitoring established and required in the CAM Agreement satisfies the requirements of the Qualitative Monitoring Program.

DEFINITIONS
All definitions contained in 10 CSR 20-6.200 shall apply to this permit and are incorporated herein by reference. For convenience, simplified explanations of some regulatory/statutory definitions have been provided, but in the event of a conflict, the definition found in the regulation takes precedence.

Control Measure as used in this permit refers to any Best Management Practice or other method used to prevent or reduce the discharge of pollutants to waters of the state.

Director refers to the Director of staff, Water Protection Program, Missouri Department of Natural Resources.

Discharge when used without a qualifier, refers to "discharge of a pollutant" as defined at 40 CFR 122.2.

Illicit Connection means any man-made conveyance connecting an illicit discharge directly to a municipal separate storm sewer.

Illicit Discharge refers to any discharge to a municipal separate storm sewer that is not entirely composed of stormwater, except discharges authorized under an NPDES permit (other than the NPDES permit for discharges from the MS4) and discharges resulting from emergency fire-fighting activities.

Load Allocation is similar to wasteload allocation, except refers to nonpoint source pollutants; whereas, wasteload allocation pertains to point source pollutants. Per EPA, load allocation refers to the portion of the loading capacity attributed to (1) the existing or future nonpoint sources of pollution, and (2) natural background sources. Wherever possible, nonpoint source loads and natural loads should be distinguished.

MS4 is an acronym for "Municipal Separate Storm Sewer System" and is used to refer to a Large, Medium, or Small MS4 (e.g., "the Joplin Small MS4").

Permittee(s) or permit holder(s), as used in this permit refers to the holder(s) of this operating permit.

Representative Outfalls: Representative outfalls can be outfalls that discharge to the primary stem of principal watercourses in separate sub-regional watersheds and are representative of various land uses. Representative outfalls are listed in the permit as a subset of ALL of the MS4's outfalls.

Site-specific Permit also means individual permit (per EPA's definition) and one that is specific to the permittee's facility or discharges.

Stormwater means stormwater runoff, snow melt runoff, and surface runoff and drainage.

Stormwater Management Program and Plan (SWMP) refers to a comprehensive documented program and plan to manage the quality of stormwater discharged from the municipal separate storm sewer system.

Wasteload allocation means the amount of pollutants each point source discharger is allowed by the department to release into a given stream after the department has determined the total amount of pollutants that may be discharged into that stream without endangering its water quality. Point sources are typically permitted.

PUBLIC NOTICE:
The Department shall give public notice that a draft permit has been prepared and its issuance is pending. Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest in and water quality concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and permittee must be notified of the denial in writing.

The Department must issue public notice of a pending operating permit or of a new or reissued statewide general permit. The public comment period is the length of time not less than 30 days following the date of the public notice which interested persons may submit written comments about the proposed permit.

For persons wanting to submit comments regarding this proposed operating permit, then please refer to the Public Notice page located at the front of this draft operating permit. The Public Notice page gives direction on how and where to submit appropriate comments.

DATE OF FACT SHEET: NOVEMBER 4, 2015; MARCH 25, 2016 (minor revisions due to Public Notice comments).

COMPLETED BY:

MICHAEL ABBOTT, MS4 COORDINATOR
MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
OPERATING PERMITS SECTION – STORMWATER AND CERTIFICATION UNIT
(573) 526-1139
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ATTACHMENT A - SWMP

Attachment A contains the most recent copy of the permittees' SWMP prior to public notice and issuance of the operating permit. The Attachment of the SWMP is not to equate to Department approval of the SWMP. In accordance with the operating permit, Item 3 under Part D – STORMWATER MANAGEMENT PROGRAM (SWMP), the permittees have one (1) year of the effective date of the operating permit to revise their SWMP, if necessary, and submit it to the Department.

Please see the next pages for the permittee's SWMP.

Show-Me STORMWATER management

JOINT STORMWATER MANAGEMENT PROGRAM

MS4 PERMIT #MO-0136557

Coverage for:

Boone County, Missouri

Columbia, Missouri

University of Missouri (MU)

Prepared by:

Boone County Resource Management

Columbia Public Works Department

MU Department of Environmental Health and Safety

December 2015

JOINT STORMWATER MANAGEMENT PROGRAM

Boone County/Columbia/MU

Table of Contents

4.1 REQUIREMENTS

This Joint Stormwater Management Plan (SWMP) has been developed in accordance with The Stormwater Phase II Final Rule requirements specified in section 4.1.4 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, 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 SECTION 4.1 OF THE PERMIT:

- Good housekeeping practices will be followed to prevent solid waste from entering waters of the state to the maximum extent practicable,
- Fueling facilities will adhere to underground storage and spill prevention regulations, including Spill Prevention Control and Countermeasures (when applicable),
- Substances regulated by the Resource Conservation and Recovery Act and the Comprehensive Environmental Response, Compensation and Liability Act will be managed accordingly,
- All paints, solvents, petroleum products and waste products will be stored so that these materials are not exposed to stormwater,
- Containment systems will be constructed of materials compatible with the substances contained and shall prevent the contamination of groundwater.

This plan contains Best Management Practices (BMPs) and Measurable Goals (MGs) for the six Minimum Control Measures (MCMs) described in Section 4.2 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)

BACKGROUND INFORMATION

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^2, with an annexation rate of 0.6 mi^2 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), and Hartsburg (103), and 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 19th, while the last frost is around April 10th. (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^2 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 fo 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)).

Waterbody Name	Pollutant	Source	Miles/acres impaired	TMDL
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.

4.2 MINIMUM CONTROL MEASURES

MCM 1: PUBLIC EDUCATION AND OUTREACH

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 MCM1 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 , www.showmeboone.com/stormwater, http://ehs.missouri.edu/env/stormwater.html , and 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.

MCM 2 - PUBLIC INVOLVEMENT/PARTICIPATION

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.

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MCM 3 - ILLICIT DISCHARGE DETECTION AND ELIMINATION

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 if 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.

MCM 4 - CONSTRUCTION SITE STORMWATER RUNOFF CONTROLS

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.

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

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.

MCM 6 - POLLUTION PREVENTION/GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

All permitees' 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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Water Protection Program

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION BRANCH
PO BOX 176 JEFFERSON CITY, MO 65102

FORM M – APPLICATION FOR STORM WATER PERMIT (FORM K OR L MUST BE INCLUDED) UNDER THE GENERAL PERMIT: SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)

1. NAME OF MUNICIPALITY/AREA(S) TO BE COVERED BY THIS PERMIT

   City of Columbia / County of Boone / University of Missouri

2. PHYSICAL LOCATION OF MUNICIPALITY/AREA(S) (ADDRESS ASSIGNED)

   See Attached

3. TOTAL AREA OF MUNICIPALITY/AREA (S) ____ ACRES OR _____ SQUARE MILES. See Attached

4. A STORM WATER MANAGEMENT PROGRAM (SWMP) MUST BE DEVELOPED FOR THIS MUNICIPALITY/AREA. (THIS PROGRAM MUST BE DEVELOPED IN ACCORDANCE WITH REQUIREMENTS & GUIDELINES SPECIFIED WITHIN THE GENERAL PERMIT FOR STORM WATER DISCHARGES FROM MS4 ACTIVITIES. THE APPLICATION WILL BE CONSIDERED INCOMPLETE IF THE SWMP HAS NOT BEEN DEVELOPED IN ACCORDANCE WITH THE TERMS OF THE GENERAL PERMIT. **A COPY OF THE SWMP MUST BE SUBMITTED ALONG WITH THIS APPLICATION.)**

5. SUMMARIZE THE MEASURES FROM THE SWMP THAT WILL BE USED FOR PUBLIC EDUCATION AND OUTREACH. (ATTACH ADDITIONAL SHEETS IF NECESSARY)

   See Attached MCM 1 Table

6. SUMMARIZE THE MEASURES FROM THE SWMP THAT WILL BE USED FOR PUBLIC INVOLVEMENT AND PARTICIPATION. (ATTACH ADDITIONAL SHEETS IF NECESSARY)

   See Attached MCM 2 Table

7. SUMMARIZE THE MEASURES FROM THE SWMP THAT WILL BE USED FOR ILLICIT DISCHARGE DETECTION AND ELIMINATION. (ATTACH ADDITIONAL SHEETS IF NECESSARY)

   See Attached MCM 3 Table

8. SUMMARIZE THE MEASURES FROM THE SWMP THAT WILL BE USED FOR CONSTRUCTION SITE STORM WATER RUNOFF CONTROL. (ATTACH ADDITIONAL SHEETS IF NECESSARY)

   See Attached MCM 4 Table

9. SUMMARIZE THE MEASURES FROM THE SWMP THAT WILL BE USED FOR POST CONSTRUCTION STORM WATER MANAGEMENT. (ATTACH ADDITIONAL SHEETS IF NECESSARY)

See Attached MCM 5 Table

10. SUMMARIZE THE MEASURES FROM THE SWMP THAT WILL BE USED FOR POLLUTION PREVENTION AND GOOD HOUSEKEEPING. (ATTACH ADDITIONAL SHEETS IF NECESSARY)

See Attached MCM 6 Table

11. THE MUNICIPALITY/AREA(S) IS WITHIN 100 FEET OF: (CHECK EACH THAT APPLIES) FOR THOSE IDENTIFIED AS PRESENT, PLEASE IDENTIFY THEIR LOCATION IN AN ATTACHMENT.

☑ WATER CLASSIFIED IN CSR 20-7.031 WATER QUALITY STANDARD AS A PUBLIC DRINKING WATER SUPPLY LAKE (L1), OUTSTANDING NATIONAL OR STATE RESOURCE WATERS, OR STREAMS DESIGNATED FOR COLD-WATER SPORT FISHERY;

☐ STREAMS, LAKES, OR RESERVOIRS IDENTIFIED AS CRITICAL HABITAT FOR ENDANGERED SPECIES AS DETERMINED BY THE MISSOURI DEPARTMENT OF CONSERVATION AND/OR THE US FISH AND WILDLIFE SERVICE; OR

12. IS THE DISCHARGE FROM THE MS4 WITHIN 100 FEET OF WATERS CLASSIFIED AS MAJOR RESERVOIRS (L2) OR PERMANENT FLOW STREAMS (P), EXCEPT THE MISSOURI AND MISSISSIPPI RIVERS, OR WITHIN TWO STREAM MILES UPSTREAM OF BIOCRITERIA REFERENCE LOCATIONS AS DEFINED IN 10 CSR 20, CHAPTER 7?

☑ YES ☐ NO

IF YES, PLEASE LIST THESE RECEIVING WATERS IN AN ATTACHMENT.

13. IS ANY PART OF THE AREA(S) DEFINED AS WETLAND?

☑ YES ☐ NO

NOTE: A CLEAN WATER ACT, SECTION 404 PERMIT MAY BE REQUIRED FOR THE DEVELOPMENT IN WETLAND AREA(S) FROM THE US ARMY CORPS OF ENGINEERS.

14. DOES ANY OF THE STORM WATER DISCHARGE TO A SINKHOLE, LOSING STREAM, OR ANY OTHER TOPOGRAPHICAL FEATURE THAT WOULD BE A DIRECT CONDUIT TO GROUND WATER?

☑ YES ☐ NO

IF YES, PLEASE IDENTIFY THE LOCATION(S) OF THESE GEOLOGIC FEATURES IN AN ATTACHMENT.

15. I CERTIFY THAT I AM FAMILIAR WITH THE INFORMATION CONTAINED IN THIS APPLICATION, THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, SUCH INFORMATION IS TRUE, COMPLETE AND ACCURATE, AND IF GRANTED THIS PERMIT, I AGREE TO ABIDE BY MISSOURI CLEAN WATER LAW AND ALL RULES, REGULATIONS, ORDERS AND DECISIONS, SUBJECT TO ANY LEGITIMATE APPEAL AVAILABLE TO AN APPLICANT UNDER THE MISSOURI CLEAL WATER LAW OF THE MISSOURI CLEAN WATER COMMISSION (ATTACH ADDITIONAL PAGES IF ADDITIONAL SIGNATURES ARE REQUIRED FOR A CO-PERMIT).

NAME(S) AND OFFICIAL TITLE(S)	TELEPHONE NUMBER(S)
See Attached	
SIGNATURE(S)	DATE SIGNED

Attachments for Form M – Application for Storm Water Permit Under the General Permit: Small Municipal Separate Storm Sewer System (MS4)

2. Physical Location of Municipality/Area(s) (Address Assigned)

The area consists of Boone County in its entirety with the following exceptions:

A. The Municipalities of Ashland, Clark, Centralia, Hallsville, Harrisburg, Hartsburg, Huntsdale, McBaine, Pierpont, Rocheport, Sturgeon
B. State and federal lands for which none of the parties has jurisdiction. Examples include Rock Bridge State Park, Finger Lakes State Park, and Mark Twain National Forest

3. Total Area of Municipality/Area(s)

The total area covered by this permit application is 691.15 square miles (Boone County Assessor) as follows:

City of Columbia:	65.09 square miles, exclusive of the Columbia campus of the University of Missouri and Boone County Property within Columbia City limits.
Boone County:	613.49 square miles, exclusive of Columbia City property, University of Missouri (MU) property, the property of ten 11 municipalities, and state and federal holdings.
MU:	12.57 square miles, of which 7.53 square miles are surrounded by the City of Columbia

4. Storm Water Management Programs

The Joint Storm Water Management Program for Columbia, Boone County and MU is attached.

5. Summary of Measures to Implement MCM 1

See attached table.

6. Summary of Measures to Implement MCM 2

See attached table.

7. Summary of Measures to Implement MCM 3

See attached table.

8. Summary of Measures to Implement MCM 4

See attached table.

9. Summary of Measures to Implement MCM 5

See attached table.

10. Summary of Measures to Implement MCM 6

See attached table.

11. Areas Within 100 Feet of Specially Classified Waters

The following waters in the application area are classified as outstanding state resource waters (from 10 CSR 20-7 Table E):

Water body	Length	Location
Bass Creek	1 mile	in Three Creeks Conservation Area
Bonne Femme Creek	2 miles	Three Creeks Conservation Area
Devils Ice Box Cave Branch	1.5 miles	Rock Bridge State Park
Gan's Creek	3 miles	Rock Bridge State Park
Turkey Creek	4.6 miles	in Three Creeks Conservation Area

There are no public drinking water supply lakes (L1); outstanding national resource waters; streams designated for cold-water sport fishery in the application area.

12. Discharges to Permanent Flow Streams

The following are permanent flow streams (P) in Boone County:

Bonne Femme Creek
Little Bonne Femme Creek
Perche Creek
Hinkson Creek
Sugar Branch

14. Discharges to Sinkholes, Losing streams, or Any Other Topographical Features That Would be a Direct Conduit to Ground Water

Sinkholes:

See Attached Table

Losing Streams:

Stream Name	Miles	From	To
Trib. to L. Bonne Femme Cr.	1.0	SE/SE/NW/ 01-47N-13W	SE/NE/NW 12-47N 13W
Trib. to Clear Creek	1.0	SE/SW/SW 31-48N-12W	SW/SE/SW 30-48N-12W
Trib. to Gans Creek	1.0	SE/SW/NE 06-47N-12W	NE/NE/NW 07-47N-12W
Slate Creek	1.5	SE/SW/SE 34-46N-12W	NW/NE/SE 09-45N-12W
Trib. to Jamerson Creek	2.0	NE/SE/SE 21-46N-12W	SW/NE/SW 29-46N-12W
Bonne Femme Creek	4.0	NW/NE/NW 10-47N-12W	NE/NE/SW 20-47N-12W
Trib. to Bonne Femme Creek	1.5	SW/NE/SE 29-47N-12W	SE/SE/NW 30-47N-12W
Trib. to Fowler	1.5	SW/SW/NW 13-46N-12W	SE/NE/SW 24-46N-12W
Bass Creek	0.5	SW/NW/NE 28-47N-12W	SE/NW/NW 28-47N-12W
Fox Hollow Branch	1.5	NE/NW/SE 07-46N-12W	NW/SW/NW 12-46N-13W

15. Certifications

I certify that I am familiar with the information contained in this application, that to the best of my knowledge and belief, such information is true, complete and accurate, and if granted this permit, I agree to abide by Missouri Clean Water Law and all rules, regulations, orders and decisions, subject to any legitimate appeal available to an applicant under the Missouri Clean Water Law of the Missouri Clean Water Commission.

This certification applies to those responsibilities of the University of Missouri. The University cannot accept responsibility for issues that are under the jurisdiction of the City of Columbia or Boone County.

University of Missouri:

Gary Ward	Vice Chancellor, Operations	(573) 882-4097
Name	Title	Phone

Signature 7-21-2015
Date

15. Certifications

I certify that I am familiar with the information contained in this application, that to the best of my knowledge and belief, such information is true, complete and accurate, and if granted this permit, I agree to abide by Missouri Clean Water Law and all rules, regulations, orders and decisions, subject to any legitimate appeal available to an applicant under the Missouri Clean Water Law of the Missouri Clean Water Commission.

This certification applies to those responsibilities of the City of Columbia. The City cannot accept responsibility for issues that are under the jurisdiction of the University of Missouri or Boone County.

City of Columbia:

Mike Mathes	City Manager	(573) 874-7214
Name	Title	Phone

[signature]	7-20-15
Signature	Date

15. Certifications

I certify that I am familiar with the information contained in this application, that to the best of my knowledge and belief, such information is true, complete and accurate, and if granted this permit, I agree to abide by Missouri Clean Water Law and all rules, regulations, orders and decisions, subject to any legitimate appeal available to an applicant under the Missouri Clean Water Law of the Missouri Clean Water Commission.

This certification applies to those responsibilities of Boone County. The County cannot accept responsibility for issues that are under the jurisdiction of the City of Columbia or the University of Missouri.

Boone County:

Daniel K. Atwill	Presiding Commissioner	(573) 886-4305
Name	Title	Phone

Signature

7-28-15
Date

Attachments for Form M: MCM Summaries (Application questions 5-10)

5. BMPs for MCM 1: Public Education and Outreach

BMP	MEASURABLE GOALS	STATUS	RESPONSIBLE PERMITTEE
Identify target audience	Target municipal inspectors, contractors, developers, engineers, residents, and schools annually	Ongoing	All Permittees
Select education topic annually	Select specific topic to focus on for year	Ongoing	All Permittees
Develop education materials	Develop brochures, fact sheets, and public service announcements	Ongoing	All Permittees
Distribute education & outreach materials	Prepare and distribute at events. Review and update as necessary	Ongoing	All Permittees
Maintain Hinkson Creek GIS Habitat Viewer	Maintain viewer; review and update as necessary	Ongoing	All Permittees
Maintain stormwater websites	Maintain websites; review and update as necessary	Ongoing	All Permittees
Conduct educational outreach activities	Staff community events, make presentations to citizen's groups, present and distribute materials to schools and industry groups	Ongoing	All Permittees
Collect used tires	Collect every other year	Ongoing	All Permittees
Collect Household Hazardous Waste	Hold collection event annually	Ongoing	All Permittees

6. BMPs for MCM 2: Public Involvement/Participation

BMP	MEASURABLE GOALS	STATUS	RESPONSIBLE PERMITTEE
Observe all public notice requirements	Allow citizens and civic groups to provide input concerning policies	Ongoing	All Permittees
Involve public/stakeholders in policy development	Hold public hearings/stakeholder meetings when properties	Ongoing	All Permittees

	are annexed or request a change in zoning, during the platting process, and throughout the project design stage		
Select education topic annually	Select specific topic to focus on for year	Ongoing	All Permittees
Present public involvement/participation activities	Promote Adopt-A-Spot/Adopt-A-Road programs, environmental volunteer programs, public service announcements, and community clean-up events	Ongoing	All Permittees
Social networks/website updates	Establish and maintain social networks and websites	Ongoing	All Permittees

7. BMPs for MCM 3: Illicit Discharge Detection & Elimination

BMP	MEASURABLE GOALS	STATUS	RESPONSIBLE PERMITTEE
Maintain storm sewer system map with all pipes, inlets and associated attributes	Review and update digital maps as necessary	Ongoing	All Permittees
Implement/enforce IDDE ordinance/regulatory mechanism	Implement, maintain, and enforce IDDE ordinances/regulatory mechanisms. Review and update as necessary	Ongoing	All Permittees
Non-stormwater discharges as significant contributors	Evaluate on a case-by-case basis to determine whether such discharges may be directed to the storm sewer system	Ongoing	All Permittees
Implement plan to detect and address incidental non-stormwater discharges	Implement plan to detect and address non-stormwater discharges which may include on-site inspections, smoke and dye testing, CCTV inspections, and public watch and reporting programs	Ongoing	All Permittees

Inform public employees, businesses, and general public of hazards associated with IDDE	Include this information as an element in the outreach, education and municipal training programs	Ongoing	All Permittees

8. BMPs for MCM 4: Construction Site Stormwater Runoff Control

BMP	MEASURABLE GOALS	STATUS	RESPONSIBLE PERMITTEE
Require MDNR land disturbance permit for sites one acre and greater	Enforce sanctions to ensure compliance to the maximum extent practicable under state or local law	Ongoing	All Permittees
Implement/maintain/enforce land disturbance requirements/regulatory mechanisms	Implement/maintain/enforce requirements and/or regulatory mechanisms to control runoff from all construction sites. Review and update as necessary	Ongoing	All Permittees
Erosion and sediment controls for construction sites	Implement stormwater design manuals. Review and update as necessary	Ongoing	All Permittees
Require and review Stormwater Pollution Prevention Plans (SWPPP)	Require construction site operators to control waste and erosion on construction sites	Ongoing	All Permittees
Hold public hearings/stakeholder meetings	Implement procedures for receipt and consideration of information submitted by public	Ongoing	All Permittees
Conduct site inspections	Inspect locally permitted sites regularly	Ongoing	All Permittees

9. BMPs for MCM 5: Post-construction Stormwater Management in New Development and Redevelopment

BMP	MEASURABLE GOALS	STATUS	RESPONSIBLE PERMITTEE
Identify structural/non-structural strategies	Water quality improvement projects, BMP monitoring projects, LEED building standards, etc.	Ongoing	All Permittees

Implement/maintain stormwater management/ water quality manual or equivalent	Review and update as necessary	Ongoing	All Permittees
Implement/maintain stormwater management ordinance/MU Stormwater Master Plan	Review and update as necessary	Ongoing	All Permittees
Implement/maintain stream buffer ordinance/MU Stormwater Master Plan	Review ordinance/master plan and revise standards as necessary	Ongoing	All Permittees
Ensure adequate long-term operation and maintenance of BMPs	Inspect according to schedule	Ongoing	All Permittees
Maintain operation and maintenance schedule	Maintain inventory, maintenance and inspection schedules of BMPs	Ongoing	All Permittees

10. BMPs for MCM 6: Pollution Prevention/Good Housekeeping

BMP	MEASURABLE GOALS	STATUS	RESPONSIBLE PERMITTEE
Establish operation and maintenance schedule	Maintain hazardous materials management and SPCC operation and maintenance schedules	Ongoing	All Permittees
Identify employee groups to train	All impacted employees	Ongoing	All Permittees
Implement training presentation	Update and implement training presentations associated with pollution prevention/good housekeeping measures	Ongoing	All Permittees
Schedule/conduct pollution prevention training	All impacted employees trained	Ongoing	All Permittees

Attachment for Form M: Sinkholes in Boone County (Application question 14)

DNR SINKHOLE	TOWNSHIP	YDIR	RANGE	XDIR	SECT	LATITUDE	LONGITUDE
395	45	N	12	W	5	38.70489502	-92.30158997
397	45	N	12	W	5	38.70524216	-92.3015976
396	45	N	12	W	5	38.70595932	-92.3014679
398	45	N	12	W	5	38.70622253	-92.30335999
308	45	N	12	W	9	38.6898613	-92.27797699
309	45	N	12	W	23	38.66458511	-92.25521088
310	45	N	12	W	23	38.67055893	-92.24372864
403	46	N	11	W	8	38.7866745	-92.18347931
307	46	N	13	W	13	38.76302338	-92.34307098
306	46	N	13	W	13	38.7634201	-92.34223175
387	47	N	12	W	5	38.87687683	-92.29251099
155	47	N	12	W	5	38.88573074	-92.2936554
154	47	N	12	W	6	38.88948441	-92.31335449
226	47	N	12	W	7	38.86275864	-92.30952454
221	47	N	12	W	7	38.86285782	-92.31272888
224	47	N	12	W	7	38.86293411	-92.30753326
216	47	N	12	W	7	38.86303329	-92.31400299
217	47	N	12	W	7	38.86302948	-92.31102753
215	47	N	12	W	7	38.86326599	-92.32614899
213	47	N	12	W	7	38.86352921	-92.31523132
211	47	N	12	W	7	38.86367416	-92.31072998
209	47	N	12	W	7	38.86435318	-92.30818176
207	47	N	12	W	7	38.86474991	-92.30639648
204	47	N	12	W	7	38.86489868	-92.32293701
205	47	N	12	W	7	38.86491776	-92.32429504
200	47	N	12	W	7	38.86528778	-92.3061676
202	47	N	12	W	7	38.86542511	-92.30801392
198	47	N	12	W	7	38.86566925	-92.32382965
210	47	N	12	W	7	38.86580276	-92.31474304
195	47	N	12	W	7	38.86588669	-92.31020355
188	47	N	12	W	7	38.86649704	-92.31062317
191	47	N	12	W	7	38.866539	-92.32601929
187	47	N	12	W	7	38.86652374	-92.30888367
185	47	N	12	W	7	38.86674881	-92.32415009
184	47	N	12	W	7	38.86676407	-92.32492065
181	47	N	12	W	7	38.86716843	-92.31704712
179	47	N	12	W	7	38.86741638	-92.31156921
176	47	N	12	W	7	38.86746216	-92.31020355
183	47	N	12	W	7	38.86746979	-92.30712128
177	47	N	12	W	7	38.86748886	-92.31616974

Attachment for Form M: Sinkholes in Boone County (Application question 14)

DNR SINKHOLE	TOWNSHIP	YDIR	RANGE	XDIR	SECT	LATITUDE	LONGITUDE
175	47	N	12	W	7	38.86782455	-92.30770111
174	47	N	12	W	7	38.86793518	-92.31484985
173	47	N	12	W	7	38.86817932	-92.31758881
170	47	N	12	W	7	38.86826324	-92.30583191
169	47	N	12	W	7	38.86853409	-92.31613159
168	47	N	12	W	7	38.86856461	-92.31521606
165	47	N	12	W	7	38.86993027	-92.31860352
164	47	N	12	W	7	38.87031555	-92.32678986
163	47	N	12	W	7	38.87041092	-92.3267746
162	47	N	12	W	7	38.8711319	-92.32674408
219	47	N	12	W	8	38.86257553	-92.29125214
218	47	N	12	W	8	38.86263657	-92.29954529
225	47	N	12	W	8	38.86265945	-92.29772186
220	47	N	12	W	8	38.8627243	-92.30085754
214	47	N	12	W	8	38.86302948	-92.29827118
212	47	N	12	W	8	38.86356735	-92.29967499
208	47	N	12	W	8	38.86455536	-92.29935455
203	47	N	12	W	8	38.86495209	-92.298172
201	47	N	12	W	8	38.86504745	-92.30011749
199	47	N	12	W	8	38.86540985	-92.3009491
194	47	N	12	W	8	38.86600876	-92.30131531
193	47	N	12	W	8	38.86604309	-92.29670715
192	47	N	12	W	8	38.86621094	-92.30522919
189	47	N	12	W	8	38.86639404	-92.30466461
206	47	N	12	W	8	38.86672974	-92.29303741
197	47	N	12	W	8	38.86711884	-92.29750061
178	47	N	12	W	8	38.86750793	-92.2961731
186	47	N	12	W	8	38.86761475	-92.28778839
384	47	N	12	W	8	38.86761856	-92.28814697
171	47	N	12	W	8	38.86817551	-92.2984314
167	47	N	12	W	8	38.86940002	-92.29904175
166	47	N	12	W	8	38.86949539	-92.30123138
385	47	N	12	W	8	38.8697052	-92.28968048
386	47	N	12	W	8	38.87468719	-92.29360199
388	47	N	12	W	8	38.87617493	-92.29017639
250	47	N	12	W	16	38.85943222	-92.28431702
258	47	N	12	W	17	38.8580246	-92.29611969
255	47	N	12	W	17	38.85871887	-92.28899384
256	47	N	12	W	17	38.85889816	-92.29980469
252	47	N	12	W	17	38.85931778	-92.3044281
251	47	N	12	W	17	38.859478	-92.30506897

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DNR SINKHOLE	TOWNSHIP	YDIR	RANGE	XDIR	SECT	LATITUDE	LONGITUDE
247	47	N	12	W	17	38.85946655	-92.29694366
253	47	N	12	W	17	38.85979843	-92.30139923
244	47	N	12	W	17	38.85990143	-92.30229187
243	47	N	12	W	17	38.85991669	-92.30358124
245	47	N	12	W	17	38.85997009	-92.30502319
246	47	N	12	W	17	38.86009979	-92.28898621
238	47	N	12	W	17	38.86037827	-92.29821014
241	47	N	12	W	17	38.86156845	-92.29453278
230	47	N	12	W	17	38.86183167	-92.30085754
227	47	N	12	W	17	38.86214828	-92.30400848
268	47	N	12	W	18	38.85352707	-92.31578064
267	47	N	12	W	18	38.85432053	-92.30821991
266	47	N	12	W	18	38.85486221	-92.30845642
265	47	N	12	W	18	38.85494232	-92.30789185
264	47	N	12	W	18	38.85506821	-92.30916595
263	47	N	12	W	18	38.85523224	-92.30725861
262	47	N	12	W	18	38.8555603	-92.30998993
261	47	N	12	W	18	38.85564041	-92.30913544
260	47	N	12	W	18	38.85603714	-92.30956268
259	47	N	12	W	18	38.85666656	-92.30713654
257	47	N	12	W	18	38.85871506	-92.32633209
254	47	N	12	W	18	38.85970688	-92.30797577
249	47	N	12	W	18	38.8598175	-92.31250763
248	47	N	12	W	18	38.8598938	-92.31887054
240	47	N	12	W	18	38.86040497	-92.325737
239	47	N	12	W	18	38.860466	-92.31467438
242	47	N	12	W	18	38.86061096	-92.32485199
237	47	N	12	W	18	38.86085892	-92.32339478
236	47	N	12	W	18	38.86100769	-92.31389618
235	47	N	12	W	18	38.86128998	-92.32608795
231	47	N	12	W	18	38.8614769	-92.31234741
229	47	N	12	W	18	38.86174774	-92.32349396
234	47	N	12	W	18	38.86187363	-92.32209778
228	47	N	12	W	18	38.86200714	-92.30641937
233	47	N	12	W	18	38.86210632	-92.32540131
223	47	N	12	W	18	38.86252213	-92.30628967
222	47	N	12	W	18	38.86264801	-92.32286835
276	47	N	12	W	21	38.83512497	-92.27470398
275	47	N	12	W	21	38.83525467	-92.27401733
274	47	N	12	W	21	38.83546829	-92.27244568
273	47	N	12	W	21	38.84065628	-92.27126312

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DNR SINKHOLE	TOWNSHIP	YDIR	RANGE	XDIR	SECT	LATITUDE	LONGITUDE
272	47	N	12	W	21	38.84223557	-92.27098846
271	47	N	12	W	21	38.84260941	-92.27579498
270	47	N	12	W	21	38.84329605	-92.27490234
269	47	N	12	W	21	38.84345627	-92.28498077
285	47	N	12	W	28	38.82569122	-92.28546906
277	47	N	12	W	28	38.83141708	-92.27075958
300	47	N	12	W	29	38.81902695	-92.29653168
299	47	N	12	W	29	38.81902695	-92.29516602
298	47	N	12	W	29	38.81907272	-92.29820251
297	47	N	12	W	29	38.81926727	-92.30052948
296	47	N	12	W	29	38.81943512	-92.29722595
295	47	N	12	W	29	38.81963348	-92.29458618
294	47	N	12	W	29	38.81993866	-92.29792023
293	47	N	12	W	29	38.82059479	-92.29999542
292	47	N	12	W	29	38.82239151	-92.29567719
291	47	N	12	W	29	38.82378006	-92.28868866
290	47	N	12	W	29	38.82413483	-92.28967285
289	47	N	12	W	29	38.82423401	-92.29172516
288	47	N	12	W	29	38.82462311	-92.29101563
287	47	N	12	W	29	38.82500076	-92.28820801
286	47	N	12	W	29	38.82544708	-92.28779602
284	47	N	12	W	29	38.82596588	-92.29075623
283	47	N	12	W	29	38.8263855	-92.29143524
282	47	N	12	W	29	38.8264122	-92.29257965
281	47	N	12	W	29	38.82677078	-92.29302216
280	47	N	12	W	29	38.8273735	-92.29843903
278	47	N	12	W	29	38.82817459	-92.2947464
279	47	N	12	W	29	38.82817841	-92.29359436
305	47	N	12	W	32	38.81377792	-92.30062866
304	47	N	12	W	32	38.81507492	-92.29724884
303	47	N	12	W	32	38.81575012	-92.29826355
302	47	N	12	W	32	38.81598282	-92.29114532
412	47	N	12	W	32	38.81840515	-92.30324554
301	47	N	12	W	32	38.81840897	-92.2959671
158	47	N	13	W	2	38.87943268	-92.34796143
157	47	N	13	W	2	38.87979126	-92.34656525
156	47	N	13	W	2	38.88001251	-92.34774017
196	47	N	13	W	12	38.86591339	-92.32789612
190	47	N	13	W	12	38.86644363	-92.33058929
182	47	N	13	W	12	38.86715317	-92.32875061
180	47	N	13	W	12	38.86729431	-92.33036041

Attachment for Form M: Sinkholes in Boone County (Application question 14)

DNR SINKHOLE	TOWNSHIP	YDIR	RANGE	XDIR	SECT	LATITUDE	LONGITUDE
172	47	N	13	W	12	38.86830521	-92.33020782
414	47	N	13	W	13	38.85188293	-92.34472656
415	47	N	13	W	13	38.85196304	-92.34505463
232	47	N	13	W	13	38.86156845	-92.33348083
161	47	N	13	W	21	38.83559036	-92.39796448
160	47	N	13	W	21	38.83594131	-92.39785767
159	47	N	13	W	22	38.84436798	-92.3757782
413	47	N	13	W	24	38.84057617	-92.33737183
422	48	N	12	W	19	38.92089844	-92.30919647
407	48	N	12	W	30	38.91736221	-92.30913544
420	48	N	12	W	30	38.91869736	-92.3092041
421	48	N	12	W	30	38.9201355	-92.30886841
140	48	N	13	W	17	38.94802856	-92.41248322
137	48	N	13	W	17	38.94817734	-92.41116333
132	48	N	13	W	17	38.94961166	-92.41361237
131	48	N	13	W	17	38.94992828	-92.41112518
130	48	N	13	W	17	38.95062637	-92.4123764
417	48	N	13	W	20	38.9372673	-92.41397095
419	48	N	13	W	27	38.91566086	-92.36649323
399	48	N	13	W	27	38.91625214	-92.36682129
106	48	N	14	W	2	38.98403931	-92.47040558
105	48	N	14	W	2	38.98451996	-92.46942902
104	48	N	14	W	2	38.98498917	-92.4699707
103	48	N	14	W	2	38.98517609	-92.46609497
102	48	N	14	W	2	38.98522568	-92.46712494
100	48	N	14	W	2	38.98606491	-92.46709442
101	48	N	14	W	2	38.98621368	-92.46560669
99	48	N	14	W	2	38.98630524	-92.467453
98	48	N	14	W	2	38.98644257	-92.46715546
97	48	N	14	W	2	38.98719788	-92.46602631
96	48	N	14	W	2	38.98734283	-92.46801758
95	48	N	14	W	2	38.98744202	-92.46538544
94	48	N	14	W	2	38.98809052	-92.4683609
375	48	N	14	W	4	38.97525787	-92.49871826
13	48	N	14	W	7	38.96625137	-92.53565216
10	48	N	14	W	7	38.96692276	-92.53459167
8	48	N	14	W	7	38.96774673	-92.53466797
6	48	N	14	W	7	38.96818542	-92.53491211
5	48	N	14	W	7	38.96868134	-92.53647614
4	48	N	14	W	7	38.96895981	-92.53385162
3	48	N	14	W	7	38.96976089	-92.53922272

Attachment for Form M: Sinkholes in Boone County (Application question 14)

DNR SINKHOLE	TOWNSHIP	YDIR	RANGE	XDIR	SECT	LATITUDE	LONGITUDE
2	48	N	14	W	7	38.97170639	-92.54239655
1	48	N	14	W	7	38.97256088	-92.54107666
401	48	N	14	W	7	38.97265625	-92.54212189
26	48	N	14	W	8	38.96060944	-92.5225296
23	48	N	14	W	8	38.96068192	-92.52542114
366	48	N	14	W	8	38.96108627	-92.52690887
405	48	N	14	W	8	38.96131134	-92.52924347
404	48	N	14	W	8	38.96217346	-92.52896118
21	48	N	14	W	8	38.96241379	-92.52310181
22	48	N	14	W	8	38.96263504	-92.52306366
20	48	N	14	W	8	38.96310806	-92.52243042
19	48	N	14	W	8	38.96389389	-92.52375793
423	48	N	14	W	8	38.96413803	-92.52636719
17	48	N	14	W	8	38.96416473	-92.52336884
18	48	N	14	W	8	38.96419907	-92.52508545
15	48	N	14	W	8	38.96478271	-92.52363586
16	48	N	14	W	8	38.9656105	-92.52603912
14	48	N	14	W	8	38.96593475	-92.52703094
406	48	N	14	W	8	38.96637726	-92.52970886
12	48	N	14	W	8	38.96645355	-92.53147125
9	48	N	14	W	8	38.96687317	-92.53039551
7	48	N	14	W	8	38.96809006	-92.52902222
147	48	N	14	W	15	38.9457016	-92.49411011
145	48	N	14	W	15	38.94639969	-92.49239349
144	48	N	14	W	15	38.94701004	-92.49221039
143	48	N	14	W	15	38.94709778	-92.49442291
142	48	N	14	W	15	38.94755554	-92.49041748
141	48	N	14	W	15	38.94805145	-92.49156189
139	48	N	14	W	15	38.94827271	-92.4942627
138	48	N	14	W	15	38.94834518	-92.4947052
136	48	N	14	W	15	38.94845581	-92.49079895
134	48	N	14	W	15	38.94871902	-92.49485016
135	48	N	14	W	15	38.94876862	-92.49391174
133	48	N	14	W	15	38.9490242	-92.49539948
127	48	N	14	W	15	38.95207214	-92.49143219
126	48	N	14	W	15	38.95223236	-92.4925766
124	48	N	14	W	15	38.95233917	-92.49378204
128	48	N	14	W	15	38.95328522	-92.49346161
120	48	N	14	W	15	38.95434189	-92.49333954
119	48	N	14	W	15	38.95463181	-92.49227142
117	48	N	14	W	15	38.95468903	-92.49427795

Attachment for Form M: Sinkholes in Boone County (Application question 14)

DNR SINKHOLE	TOWNSHIP	YDIR	RANGE	XDIR	SECT	LATITUDE	LONGITUDE
118	48	N	14	W	15	38.95471573	-92.49302673
129	48	N	14	W	15	38.95474243	-92.49402618
115	48	N	14	W	15	38.95506287	-92.49429321
116	48	N	14	W	15	38.95520782	-92.49567413
114	48	N	14	W	15	38.95600128	-92.49488831
113	48	N	14	W	15	38.95669937	-92.49349213
112	48	N	14	W	15	38.95675278	-92.49568176
368	48	N	14	W	15	38.95752335	-92.49491882
110	48	N	14	W	15	38.95856476	-92.48902893
109	48	N	14	W	15	38.95856476	-92.48961639
111	48	N	14	W	15	38.9589119	-92.48990631
108	48	N	14	W	15	38.95906067	-92.48939514
107	48	N	14	W	15	38.95914841	-92.48832703
372	48	N	14	W	16	38.94610596	-92.50496674
66	48	N	14	W	16	38.94641876	-92.50460815
378	48	N	14	W	16	38.94675064	-92.50413513
60	48	N	14	W	16	38.94717026	-92.50467682
61	48	N	14	W	16	38.94743729	-92.504776
377	48	N	14	W	16	38.94750214	-92.50328827
59	48	N	14	W	16	38.94778061	-92.51448822
376	48	N	14	W	16	38.94786453	-92.50302124
58	48	N	14	W	16	38.94787216	-92.50029755
57	48	N	14	W	16	38.94788361	-92.50501251
369	48	N	14	W	16	38.94844437	-92.50263977
371	48	N	14	W	16	38.94872284	-92.50191498
370	48	N	14	W	16	38.94930649	-92.50183868
50	48	N	14	W	16	38.94984436	-92.50154877
53	48	N	14	W	16	38.94985199	-92.51342773
49	48	N	14	W	16	38.95035553	-92.50441742
51	48	N	14	W	16	38.95039368	-92.50052643
48	48	N	14	W	16	38.95104218	-92.50406647
47	48	N	14	W	16	38.9515152	-92.50547028
125	48	N	14	W	16	38.95263672	-92.49755096
45	48	N	14	W	16	38.95277405	-92.50585175
44	48	N	14	W	16	38.95322418	-92.50387573
123	48	N	14	W	16	38.95343399	-92.49881744
41	48	N	14	W	16	38.95350647	-92.50566864
40	48	N	14	W	16	38.95407104	-92.5043335
122	48	N	14	W	16	38.95420456	-92.49965668
38	48	N	14	W	16	38.9545784	-92.50263214
121	48	N	14	W	16	38.95497513	-92.49755096

Attachment for Form M: Sinkholes in Boone County (Application question 14)

DNR SINKHOLE	TOWNSHIP	YDIR	RANGE	XDIR	SECT	LATITUDE	LONGITUDE
36	48	N	14	W	16	38.95502853	-92.50214386
35	48	N	14	W	16	38.9559021	-92.50324249
33	48	N	14	W	16	38.95644379	-92.50204468
31	48	N	14	W	16	38.95711517	-92.50097656
29	48	N	14	W	16	38.95820236	-92.50212097
11	48	N	14	W	16	38.95849228	-92.50697327
365	48	N	14	W	16	38.95951843	-92.49880981
62	48	N	14	W	17	38.94684982	-92.51659393
56	48	N	14	W	17	38.94848633	-92.51657867
54	48	N	14	W	17	38.94903564	-92.51493073
52	48	N	14	W	17	38.9495697	-92.51490784
55	48	N	14	W	17	38.94964981	-92.51694489
46	48	N	14	W	17	38.95184708	-92.52098083
43	48	N	14	W	17	38.95298767	-92.51516724
42	48	N	14	W	17	38.95337677	-92.51622772
39	48	N	14	W	17	38.95426941	-92.52388
37	48	N	14	W	17	38.95522308	-92.52378845
34	48	N	14	W	17	38.95626831	-92.52523041
32	48	N	14	W	17	38.95731354	-92.51850891
28	48	N	14	W	17	38.95813751	-92.52531433
30	48	N	14	W	17	38.95827103	-92.52313232
27	48	N	14	W	17	38.95964432	-92.51935577
25	48	N	14	W	17	38.95994186	-92.52022552
24	48	N	14	W	17	38.9601326	-92.51895905
69	48	N	14	W	21	38.93762207	-92.50888824
70	48	N	14	W	21	38.93763351	-92.50319672
68	48	N	14	W	21	38.93881607	-92.50430298
67	48	N	14	W	21	38.94161606	-92.50714874
65	48	N	14	W	21	38.94373322	-92.50095367
64	48	N	14	W	21	38.94400024	-92.5002594
149	48	N	14	W	21	38.9443779	-92.49697876
379	48	N	14	W	21	38.94478226	-92.50543976
367	48	N	14	W	21	38.94507217	-92.51119232
373	48	N	14	W	21	38.94509125	-92.50518799
63	48	N	14	W	21	38.94514465	-92.50093842
374	48	N	14	W	21	38.94577026	-92.50512695
153	48	N	14	W	22	38.94091415	-92.4928894
152	48	N	14	W	22	38.94189072	-92.49106598
151	48	N	14	W	22	38.94304657	-92.49273682
150	48	N	14	W	22	38.94406509	-92.49140167
148	48	N	14	W	22	38.94538498	-92.4949646

Attachment for Form M: Sinkholes in Boone County (Application question 14)

DNR SINKHOLE	TOWNSHIP	YDIR	RANGE	XDIR	SECT	LATITUDE	LONGITUDE
146	48	N	14	W	22	38.94544601	-92.49007416
339	49	N	13	W	19	39.01618576	-92.41583252
334	49	N	13	W	19	39.01665497	-92.41664124
380	49	N	13	W	19	39.01792908	-92.41681671
394	49	N	13	W	19	39.01886749	-92.41656494
393	49	N	13	W	19	39.01891327	-92.417099
323	49	N	13	W	19	39.01894379	-92.4154129
321	49	N	13	W	19	39.01997375	-92.41903687
320	49	N	13	W	19	39.02051163	-92.417099
317	49	N	13	W	19	39.0210228	-92.41622162
341	49	N	13	W	20	39.01486969	-92.40387726
416	49	N	13	W	20	39.01564789	-92.40301514
338	49	N	13	W	20	39.01594925	-92.40396118
337	49	N	13	W	20	39.01609802	-92.41419983
336	49	N	13	W	20	39.01628113	-92.40339661
335	49	N	13	W	20	39.01665878	-92.41424561
333	49	N	13	W	20	39.01678467	-92.4131546
332	49	N	13	W	20	39.01686859	-92.4002533
330	49	N	13	W	20	39.01740646	-92.40019226
329	49	N	13	W	20	39.01769638	-92.39700317
328	49	N	13	W	20	39.01807785	-92.40163422
327	49	N	13	W	20	39.01820374	-92.40213013
325	49	N	13	W	20	39.01832581	-92.41378021
326	49	N	13	W	20	39.01837158	-92.40052032
324	49	N	13	W	20	39.01838303	-92.41310883
331	49	N	13	W	20	39.01847076	-92.40990448
322	49	N	13	W	20	39.01905823	-92.41464996
381	49	N	13	W	20	39.01984406	-92.41334534
319	49	N	13	W	20	39.02053833	-92.41433716
318	49	N	13	W	20	39.02111816	-92.41105652
316	49	N	13	W	20	39.02122116	-92.39890289
315	49	N	13	W	20	39.02189255	-92.40209198
382	49	N	13	W	21	39.01783371	-92.39575958
410	49	N	13	W	22	39.02262115	-92.37042999
418	49	N	13	W	27	39.00151062	-92.36878967
409	49	N	13	W	27	39.00212097	-92.36852264
364	49	N	13	W	29	39.00522614	-92.4145813
363	49	N	13	W	29	39.00786972	-92.41485596
362	49	N	13	W	29	39.00858688	-92.41472626
359	49	N	13	W	29	39.00944519	-92.41465759
356	49	N	13	W	29	39.01107025	-92.4140625

Attachment for Form M: Sinkholes in Boone County (Application question 14)

DNR SINKHOLE	TOWNSHIP	YDIR	RANGE	XDIR	SECT	LATITUDE	LONGITUDE
353	49	N	13	W	29	39.01109314	-92.39854431
351	49	N	13	W	29	39.01154709	-92.40013123
347	49	N	13	W	29	39.01196671	-92.39865875
345	49	N	13	W	29	39.01295471	-92.40048218
343	49	N	13	W	29	39.01305771	-92.39965057
361	49	N	13	W	30	39.00878143	-92.4199295
360	49	N	13	W	30	39.0089798	-92.42092896
358	49	N	13	W	30	39.00926208	-92.41977692
357	49	N	13	W	30	39.01010132	-92.41899109
354	49	N	13	W	30	39.01132965	-92.41744995
352	49	N	13	W	30	39.01150131	-92.41941833
350	49	N	13	W	30	39.01167297	-92.41788483
355	49	N	13	W	30	39.0118866	-92.41909027
349	49	N	13	W	30	39.01189804	-92.41887665
348	49	N	13	W	30	39.01198578	-92.41620636
346	49	N	13	W	30	39.0126152	-92.41744995
344	49	N	13	W	30	39.01305771	-92.41710663
342	49	N	13	W	30	39.01344681	-92.41985321
400	49	N	13	W	30	39.01435471	-92.42190552
340	49	N	13	W	30	39.01475906	-92.41564941
408	49	N	14	W	26	39.01157761	-92.45912933
93	49	N	14	W	35	38.98905945	-92.46683502
91	49	N	14	W	35	38.98993683	-92.46691132
90	49	N	14	W	35	38.99131775	-92.46266174
92	49	N	14	W	35	38.99156189	-92.46614075
88	49	N	14	W	35	38.99176025	-92.46161652
402	49	N	14	W	35	38.99210739	-92.46003723
89	49	N	14	W	35	38.99228287	-92.46339417
86	49	N	14	W	35	38.99295425	-92.46658325
87	49	N	14	W	35	38.99316406	-92.46736145
84	49	N	14	W	35	38.99326324	-92.4622345
85	49	N	14	W	35	38.99342728	-92.45967102
81	49	N	14	W	35	38.99383545	-92.46231079
82	49	N	14	W	35	38.99385834	-92.46765137
83	49	N	14	W	35	38.99395752	-92.46652222
78	49	N	14	W	35	38.99694443	-92.46561432
79	49	N	14	W	35	38.9970665	-92.4640274
76	49	N	14	W	35	38.99716187	-92.46268463
77	49	N	14	W	35	38.99716949	-92.46136475
75	49	N	14	W	35	38.99778748	-92.46107483
391	49	N	14	W	35	38.99792862	-92.46969604