

OCT - 1 2013



City of Warrensburg, Missouri

Municipal Separate Storm Sewer System (MS4)

Permit MO-R040056

Five-Year Plan May 2013 - May 2018

**City of Warrensburg
Five-Year Stormwater Management Plan
Table of Contents**

Executive Summary	1
General Information	2
Minimum Control Measure #1 – Public Education	
Summary	3
Best Management Practices	3
Measurable Goals	3
Person/Department Primarily Responsible	4
Additional Measures	4
Spill Prevention, Control and/or Management	4
Decision Process	4
Interim Milestones and Implementation Schedule	5
Minimum Control Measure #2 – Public Involvement and Participation	
Summary	6
Best Management Practices	6
Measurable Goals	6
Person/Department Primarily Responsible	6
Additional Measures	7
Spill Prevention, Control and/or Management	7
Decision Process	7
Interim Milestones and Implementation Schedule	7
Minimum Control Measure #3 – Illicit Discharge Detection and Elimination	
Summary	8
Best Management Practices	8
Measurable Goals	9
Person/Department Primarily Responsible	10
Additional Measures	10
Decision Process	10
Interim Milestones and Implementation Schedule	10
Minimum Control Measure #4 - Construction Site Stormwater Runoff Control	
Summary	12

Best Management Practices	12
Measurable Goals	13
Person/Department Primarily Responsible	13
Decision Process	13
Interim Milestones and Implementation Schedule	13
 Minimum Control Measure #5 – Post-Construction Site Stormwater Runoff Control	
Summary	14
Best Management Practices	14
Measurable Goals	16
Person/Department Primarily Responsible	16
Additional Measures	16
Decision Process	16
Interim Milestones and Implementation Schedule.....	16
 Minimum Control Measure #6 – Pollution Prevention/Good Housekeeping for Municipal Operations	
Summary	17
Best Management Practices	17
Measurable Goals	18
Person/Department Primarily Responsible	18
Additional Measures	18
Spill Prevention, Control and/or Management	18
Decision Process	19
Interim Milestones and Implementation Schedule	19
 Appendix A: MO Form K: Application for Individual Small MS4 General Permit	
	20
 Appendix B: MO Form M: Application for Storm Water Permit Under the General Permit: Small Municipal Separate Storm Sewer System (MS4)	
	27
 Appendix C: Compliance Letter from University of Central Missouri...	
	30
 Appendix D: Outline for Comprehensive Storm Water Management Plan.....	
	32

Executive Summary

The City of Warrensburg received its first Municipal Separate Storm Sewer Permit in 2003 (MO-R040056) and received a renewal permit in 2008. The Director of Public Works is responsible for implementing the stormwater program. The City's stormwater program is funded through the City's Capital Improvement Program and general revenue budget.

The City recently formed a Stormwater Management Committee that includes the Public Works Director, two additional employees from the Public Works Department and one employee from the Community Development Department. The City is currently working on development of an engineered and designed comprehensive stormwater management master plan.

This plan includes the Stormwater Management Plan and the permit application for the permit term 2013-2018. The City will use this plan as a guidance document to work toward compliance with the six minimum control measures.

The purpose of this plan is to provide information related to the efforts of the City of Warrensburg to reduce nonpoint source pollution through public education and participation, illicit discharge detection and elimination, construction site runoff control, post-construction runoff control and good housekeeping in municipal operations.



General Information

The City of Warrensburg is located in Johnson County, Missouri. The population of Warrensburg is 19,110 (based on the 2010 Census). The University of Central Missouri (U.C.M) has a population of 11,400 students during the months of August through May. The land area of Warrensburg, including the U.C.M. campus, is approximately 8.5 square miles.

Precipitation. The average total rainfall for the City is 28.9 inches. The majority of the rainfall occurs between April and September. The average seasonal snowfall is 16 inches and the greatest snow depth at any one time during the period of record (1895-2013) was 23 inches. On the average, eight days have at least one inch of snow on the ground, but the number varies greatly from year to year.

Watersheds. The watersheds that affect the City include the East Postoak Creek, Postoak Creek, Bear Creek and an unnamed tributary.

East Postoak Creek borders the southwestern corner of Warrensburg and flows 1.36 miles north to join Postoak Creek. The basin is developed in unglaciated Pennsylvania cyclical deposits of limestone, siltstone, sandstone, clay, shale and coal. Stream bottoms are predominately hardpan clay with gravel in riffle areas. East Postoak Creek is not a 303d listed watershed.

Postoak Creek borders the west portion of Warrensburg and flows to the northeast 4.5 miles and connects with the Blackwater River. The basin is developed in unglaciated Pennsylvania cyclical deposits of limestone, siltstone, sandstone, clay, shale and coal. Stream bottoms are predominately hardpan clay with gravel in riffle areas. Postoak Creek is not a 303d listed watershed.

Bear Creek borders the east portion of Warrensburg and flows to the northeast approximately five miles and connects to the Blackwater River. The basin is developed in unglaciated Pennsylvania cyclical deposits of limestone, siltstone, sandstone, clay, shale, and coal. Stream bottoms are predominantly hardpan clay with limited gravel at riffle areas. Bear Creek is not a 303d listed watershed.

An unnamed tributary collects a small portion of the middle north boundaries of Warrensburg. It also discharges into the Blackwater River.

Industrial Activities. Industries within the corporate boundaries of Warrensburg have applied for individual stormwater permits and are currently regulated through the state.

University of Central Missouri. Currently the City does not have the statutory authority to regulate the University of Central Missouri in matters pertaining to stormwater issues. However, the University of Central Missouri complies with all local MS4 requirements and works cooperatively with the University in controlling and preventing stormwater runoff on all current and planned developments on campus.

Minimum Control Measure #1 – Public Education

Summary: The City of Warrensburg is striving to develop a public education program through distribution of educational materials to the community and conducting outreach activities. The focus of these activities is to educate the public with activities discussing the impact of stormwater discharges on water bodies and steps the public can take to reduce pollutants in stormwater runoff.

Best Management Practices:

- The City plans to educate citizens on stormwater impacts by inserting information into sewer bills that are mailed City-wide.
- Information will also be placed in the “Burg”, a bi-annual community information magazine published by the City’s Parks and Recreation Department.
- City staff will make public presentations on stormwater quality protection to community groups to ensure awareness of potential pollutants.
- Education seminars and the dissemination of information will also be established within the school district.
- The City will issue press releases related to stormwater issues.
- The University of Central Missouri’s participation in the City’s stormwater runoff education efforts will include going door-to-door to hang flyers by their volunteers on the Stream Team. The results of the Stream Team’s outfall testing will also be submitted to the local newspapers, both print and online, and to the local radio station.
- The City’s Public Works Department has developed an inspection and maintenance program of all stormwater structures that prevent pollution from entering the stormwater system.
- A stormwater management education page will be added to the City’s website to address pollutants and ways the public can help reduce pollution in stormwater.

Measurable Goals:

- Sewer billing inserts will be established on a quarterly basis.
- Information published twice a year in the “Burg” magazine will contain information that is weather-specific.
- Staff public presentations will occur at minimum, twice a year.
- School district presentations and literature handouts will occur in the spring time frame of each year to raise awareness within school aged children of pollution.
- A baseline survey will be established in 2013 to determine public perceptions of stormwater and stream pollution causes and responsibility and annual surveys will be conducted thereafter to gauge any changes in the public’s views.
- The results of the Stream Team’s outfall testing will be published as available but not less than quarterly and all potentially negative impacts will be reported immediately. Inspections to identify pollution prevention structures will be conducted annually starting in January and continuing through March of each year.

- The Public Works Department's stormwater structure inspections will occur regularly as part of their work schedule and as part of an established annual schedule.
- The City's stormwater management education web page will be established in summer, 2013, and will be updated regularly as new education events and activities are announced and reported on.
- Full implementation of the City's Stormwater Management Program, along with annual reports, will be finalized in 2014.

Person/Department Primarily Responsible:

- The Public Works Department will be responsible for working with the Stream Team and publishing the results of their outfall testing in the local media through the City's marketing department. The Public Works Department currently works with the school district in providing other educational topics and will incorporate the stormwater information into these existing programs.

Additional Measures:

- The City plans to contact business owners and homeowners located near waterways and provide them with informational flyers educating them on waste disposal to prevent pollution.
- In the City's own facilities, regular stormwater education seminars will be conducted to inform employees about illicit discharges into the City's storm drain system.
- Employees will continue to inspect and record the condition of grates, inlet structures, and outfalls on a weekly basis to ensure large debris is being kept out of the City's storm drain system.
- All fueling facilities will have educational flyers posted in the vicinity to raise awareness of local and federal laws. All hazardous materials will be managed and stored according to local, state and federal regulations.
- Additional information will be generated through the development of the City's Stormwater Management Master Plan.

Spill Prevention, Control and/or Management:

- Informational flyers will be distributed to business owners with information about spill prevention and the steps to follow in the event of a spill emergency.
- Spill prevention flyers will be mailed annually to all sewer customers within the City.
- In the spring of each year, the Public Works Department, through the City's marketing department, will submit a press release to the local newspaper to educate community members about spill prevention and how to properly contain and clean up after a spill.

Decision Process:

- All areas pertaining to this Minimum Control Measure were developed by members of the City of Warrensburg's Stormwater Management Committee,

which consists of trained staff from the Public Works and Community Development departments.

Interim Milestones and Implementation Schedule:

- In the summer of 2013 an initial baseline survey of a sample population of citizen's views of stormwater pollution will be conducted and annual surveys will be performed thereafter.
- Educational information will be sent to the school district in the fall of 2013.
- All information used and/or collected will be compiled into an annual report and kept on file for at least three years.

Minimum Control Measure #2 – Public Participation/Involvement

Summary: The City of Warrensburg is striving to actively involve the public in the development and implementation of the stormwater program, which includes new policies and ordinances.

Best Management Practices:

- The City will participate in community group activities by conducting educational talks for community groups and the local schools as events become available.
- The City will invite community and school groups to participate in hands-on events such as storm drain inlet labeling, stream cleanups and other stormwater quality events to spur interest in involvement of new stormwater policies and ordinances.
- The City will talk with residents and disseminate stormwater quality literature to gain participation into stormwater groups and give them needed information to make educated and informed decisions when policies and ordinances are being established/discussed.
- Establish a public committee to invite community members to be involved in policies and Best Management Practices. Committee will review and assess stormwater ordinances and make recommendations for any necessary changes to comply with MS4 regulations and permit requirements.
- The City will establish a hotline that can be used to report concerns of pollution.

Measurable Goals:

- The City will participate at minimum annually within the community with topics including household pollution prevention, stormwater pollution, effects of pollution with other topics being added as necessary.
- Hands-on educational events for community groups will begin in fall of 2013 and will be held at a minimum of once per year, with attendance being recorded.
- During the dissemination of literature, twice a year, at large community events the City will record how many handouts are distributed to the public.
- Attendance and topics discussed during quarterly public meetings will be recorded for all meetings and submitted on the annual report.
- All calls received on hotline will be annotated in a log and will have a response time of 3 business days or less with amount of calls and summaries being reported on annual report.

Person/Department Primarily Responsible:

- The Public Works Department will be responsible for implementation of this minimum control measure.

Additional Measures:

- The City's stormwater management education webpage will be used to announce upcoming community events inviting public participation and input.
- Additional information will be generated through the development of the City's Stormwater Management Master Plan.

Spill Prevention, Control and/or Management:

- Informational flyers will be distributed to business owners with information about spill prevention and the steps to follow in the event of a spill emergency.
- Spill prevention flyers will be mailed annually to all sewer customers within the City.

Decision Process:

- All areas pertaining to this Minimum Control Measure were developed by members of the City of Warrensburg's Stormwater Management Committee, which consists of trained staff from the Public Works and Community Development departments.

Interim Milestones and Implementation Schedule:

- Stormwater quality education literature will be disseminated at large community events starting in summer of 2013.
- The City's stormwater management education webpage will be established by summer of 2013 and will be updated regularly.

Minimum Control Measure #3 – Illicit Discharge Detection and Elimination

Summary: The City of Warrensburg along with the University of Central Missouri is striving to develop, implement and enforce a program to detect and eliminate illicit discharges into the MS4.

Best Management Practices:

- A storm sewer system map showing sewer inlets and outflows is reviewed annually, with updates being made as new information becomes available. These maps are displayed prominently for public viewing and City staff will be available during regular business hours to assist the public with questions and concerns as they arise.
- A local ordinance to enforce the requirements of illicit discharge was adopted by the Warrensburg City Council and the ordinance is posted on the City's website for public review.
- Staff will monitor illicit discharge activity by conducting a minimum of 3 water tests quarterly in various parts of the City and reporting pollution samples to the Missouri Department of Natural Resources immediately.
- In an effort to educate residents as to their location, all storm drain inlets will be permanently labeled starting in the fall of 2013.
- Through personal interaction and public education efforts, staff will educate residents through annual press releases and community education events on the importance of storing used oil in plastic or metal containers with secure lids, also inform residents about utilizing recycling programs in the community and encourage residents to dispose of their used oil and other pollutants at Johnson County's annual Hazardous Waste Disposal Program or other local approved drop off site.
- Sanitary sewer inspections to look for points of ex-filtration or direct connections to the storm drain system to ensure there is no contamination into the stormwater system and all detections of contamination will be followed up on and scheduled for repair.
- Smoke testing is performed by City staff on an annual basis to ensure there are no sanitary sewer issues that could lead to contamination.
- In an effort to control and prevent illegal dumping, the City currently has several ordinances in place that impose fines and provide staff with appropriate tools to discourage this type of activity, these ordinances are reviewed annually to ensure accuracy and verify if any updates need to be made.
- The City uses a vertical bar design on storm drain inlet openings to prevent trash, debris and other materials from entering the storm sewer system inspected on an annual basis.
- City staff efforts to reduce pollution in the storm sewer system include increasing the number of trash and recycle containers in the City's downtown and other high pedestrian traffic areas which are emptied twice weekly.

- The City will establish a community education program that will address the effects of pesticides, fertilizers and other toxic materials on the City's storm sewer system and will be publicized on an annual basis.
- The University of Central Missouri's trained Stream Team members will perform assessments of all outfalls (18) at least annually to monitor for pollution/contamination that will be immediately reported to Department of Natural Resources.
- The City establishes and maintains data on all industrial discharges in the City and ensures updated stormwater permits both from the City and the Missouri Department of Natural Resources to maintain compliance. This program also regulates the industrial discharges and actively locates possible illicit discharge sources by visual a walk through and inspections on facilities.
- The City will perform in-stream assessments on a minimum of 4 waterways per quarter with results being published in local media and any results that identify pollution being reported to Department of Natural Resources Immediately

Measurable Goals:

- The City's stormwater map is completed with updates as new commercial and residential developments are available with map being reviewed and approved annually.
- The City's Illicit Discharge Detection and Elimination Ordinance was adopted by the Warrensburg City Council in March, 2013.
- Trained City staff currently conducts water sampling and report pollution samples to both the Missouri Department of Natural Resources and to the Johnson County Health Department, as well as report all findings (whether it is a sample with pollution or not) on the annual report.
- Storm drain inlet labeling will begin in fall of 2013 with the amount completed being reported in our annual report.
- Annual press releases done by the City will be submitted as copies with the annual report as well as the amount of hazardous waste collected under the annual Hazardous Waste Disposal Program.
- Sanitary sewer inspections are conducted on an annual basis by the Public Works Department with all deficiencies being reported in the annual report.
- The City's inflow and infiltration study will be completed in the summer of 2013 and will provide staff with valuable information regarding the separation of the sanitary and storm drainage systems, results will be included in the City's annual report.
- City Ordinances pertaining to illegal dumping are already in place and used by Public Works and Community Development staff to prevent pollution from entering the storm drain system and reviewed annually to ensure accuracy.
- All vertical bar design structures used in storm drains are inspected annually with repairs being made as needed. The number of repairs and any pollution concerns will be reported with City annual report.
- Recycling containers were placed in the City's downtown area in 2012 and residents have been utilizing the Sheltered Workshop's Recycling Center for the

past 6-8 years. Measurement of this goal is in the amount of recyclables collected and will be reported in the annual report.

- The City's community education program addressing the effects of pesticides, fertilizers and other toxic materials will begin in spring of 2013 with educational materials being submitted with the annual report with the amount of items distributed being identified in the annual report.
- Starting in the fall of 2013, the University of Central Missouri's Stream Team members will perform not less than one in-stream assessment each quarter for a total sample of 25% of all outfalls.
- The City's Pretreatment Program reviews each industry's Stormwater Permit and BMP's on an annual basis with negative findings reported immediately and all other findings being reported with annual report.
- Stream assessments will be conducted quarterly and results immediately released to the local media for publication. Any pollution/contamination findings will be immediately reported to Department of Natural Resources.

Person/Department Primarily Responsible:

- The Public Works Department will be responsible for responding and following up on illicit discharge complaints both from the community and from industrial facilities within the City limits.

Additional Measures:

- All reported water and other substances discharged from public and private properties that go into the City's stormwater system will be investigated by City staff to ensure no harmful pollutants enter the system.
- All spill cleanup operations on City streets will be monitored by the Public Works Department to prevent pollutants from entering the storm drains.
- City employees, especially those working on the City's streets, alleys, right-of-way and other public areas, will be trained in knowing which substances can and which cannot enter the City's storm drainage system.
- The City operates four fueling facilities and displays the rules, regulations and spill prevention checklists at each one.
- Detection of illegal discharging into the City's storm drainage system from outside the City's boundaries will be reported to the Missouri Department of Natural Resources and/or the Johnson County Public Health Department.

Decision Process:

- All areas pertaining to this minimum control measure were developed by members of the City of Warrensburg's Stormwater Management Committee, which consists of trained staff from the City of Warrensburg's Public Works and Community Development Departments as well as the University of Central Missouri.

Interim Milestones and Implementation Schedule:

- Inspections conducted on an annual basis or as needed on structures designed to prevent pollution from entering the storm drainage system.

- A monitoring schedule established to inspect all storm drain inlets.
- The community hotline calls will be tracked to identify specific issues and response time will be within two business days.
- Water quality results from the Stream Team will be published in the local media within one week of the results.

Minimum Control Measure #4 – Construction Site Stormwater Runoff Control

Summary: The City of Warrensburg is striving to develop, implement and enforce a program to reduce pollutants in stormwater runoff from construction activities that result from land disturbance.

Best Management Practices:

- The Warrensburg City Council enacted a Land Disturbance Ordinance that cites the American Public Works Association's *Manual of Best Management Practices for Stormwater Quality (October, 2012 edition)* as a stormwater management design standard.
- The Land Disturbance Ordinance established a Land Disturbance Permit which accomplishes the following:
 - Jobsite visits by City staff to educate and answer questions of owners, developers and contractors regarding land disturbance permit application and onsite erosion control BMP's within 1st week of construction.
 - Requires submittal of a Storm Water Pollution Prevention Plan prior to land disturbance outlining description and location of erosion controls, schedule of erosion control installations and duration of project activity.
 - Requires construction site inspections according to the following schedule:
 - After erosion controls are established according to the SWMP Plan and prior to the approval of the Land Disturbance Permit application;
 - Once each week after Land Disturbance Permit is issued and for the duration of the construction period;
 - Each time a building inspector is on a construction site for construction-related inspections;
 - Once each week after building construction is complete and until permanent erosion control is established on the site;
 - As needed in response to citizen complaints.
 - Requires a temporary driveway to prevent mud, silt and pollutants from entering streets and the storm drain system.
 - Requires protection of all nearby stormwater inlets prior to land disturbance.
 - Established regular City inspections of the erosion controls prior to, during and after the land disturbance is completed.
 - Establishes corrective measures for owners or contractors who fail to install or maintain erosion control measures.
 - Establishes City staff training on permit requirements and onsite erosion control BMP's.

Measurable Goals:

- The Warrensburg City Council adopted the Land Disturbance Ordinance in February, 2013.
- Updated information regarding Land Disturbance permit information will be posted on the City's Stormwater Management page by summer, 2013. All contractor violations will be annotated in the annual report. Stop work order will be issued for non-compliance of the Storm Water Pollution Prevention Plan.

Person/Department Primarily Responsible:

- The Community Development Department, and more specifically, the Building Inspection Division, will be responsible for reviewing and approving Land Disturbance permits and conducting inspections on construction jobsites. The Public Works Department will also review and approve Land Disturbance Permit applications and perform final inspections on individual construction sites as well as new developments.

Decision Process:

- All areas pertaining to this minimum control measure were developed by members of the City of Warrensburg's Stormwater Management Committee, which consists of trained staff from the City of Warrensburg's Public Works and Community Development Departments as well as the University of Central Missouri.

Interim Milestones and Implementation Schedule:

- City staff implemented the Land Disturbance Permit requirements on April 1, 2013.

Minimum Control Measure #5 – Post-Construction

Summary: The City of Warrensburg is striving to develop, implement and enforce a program to address post-construction stormwater runoff from development and redevelopment projects that result in land disturbance.

Best Management Practices:

- The Warrensburg City Council enacted a Post Construction Stormwater Control Ordinance.
- The City will use zoning as a way for land classification. There will be limits on developments in certain areas as well as keeping large industrial buildings away from streams or flood prone areas.
- The City will explain to Contractors/Developers the importance of reducing impervious surfaces to allow for a more natural storm water runoff reducing the need for storm water structures by 80%.
- The City will review conceptual designs from developers to address stormwater runoff and help them understand how to comply with the following areas:
 - Identify low impact designs that can be incorporated into site plan
 - Identify pollutants of concern in development area to ensure stormwater runoff will not be contaminated.
 - Identify pollution prevention measures
 - Materials storage area to be covered on site so that stormwater will not become contaminated with chemicals or other unnatural items.
 - Storm drainage markings will be included on all new storm drains in development.
 - If in a high pedestrian use area, look at the addition of trash receptacles to help eliminate littering.
 - Proof of on-going maintenance by contractor/developer
 - Contractor/developer must ensure vegetation growth in developed area to prevent soil runoff before final contract acceptance.
 - Inspection requirements for storm systems to ensure they are performing as required.
- The City shall require the use of site run-off control alternatives as follows to return the disturbed land to pre-construction runoff quality and capture 90% of storm events (1”) through one of the following methods:

Technology	Advantages	Disadvantages
Detention <ul style="list-style-type: none"> • Wet Pond • Dry Pond 	<ul style="list-style-type: none"> • Water quality benefits (more with a wet pond) • Can provide some infiltration 	<ul style="list-style-type: none"> • Requires maintenance to prevent clogging • Space requirements (more with

	<ul style="list-style-type: none"> • Provide downstream protection (flooding, erosion, scour) • Amenity to development id design is attractive or looks natural (usually wet ponds) • Structure longevity 	<p>wet)</p> <ul style="list-style-type: none"> • Benefits to the watershed are hard to quantify • Difficult to locate ponds for optimal performance • Throughout the watershed • Limited water quality benefits
Infiltration <ul style="list-style-type: none"> • Basins • Porous pavement • Trenches • Permeable patios 	<ul style="list-style-type: none"> • Maintain pre-development water volumes • Use with detention to control flows • Can put small trenches in parking lots 	<ul style="list-style-type: none"> • Space requirements • More maintenance than detention • Long-term maintenance and monitoring
Vegetation <ul style="list-style-type: none"> • Drain to grass • Use planters • Runoff spreader with wooded filter strip or vegetated area • Vegetated terraces 	<ul style="list-style-type: none"> • Water quality benefits • Attractive • Provide some infiltration 	<ul style="list-style-type: none"> • Implementation requires public education
Surface Drainage <ul style="list-style-type: none"> • Ditches • Swales 	<ul style="list-style-type: none"> • Low Cost • Attractive, natural look • Provide infiltration and volume reduction 	<ul style="list-style-type: none"> • Can easily be filled in and made ineffective • May erode without proper controls • Requires maintenance
Filters	<ul style="list-style-type: none"> • Increase water quality • Can reduce volume • Can work well with steep slopes • Reduce flow 	<ul style="list-style-type: none"> • Requires maintenance • High to medium installation cost
Pollution Prevention <ul style="list-style-type: none"> • Good housekeeping • Site Design • Rooftops drain to grass • Stream buffers • Reforestation 	<ul style="list-style-type: none"> • Water quality benefits • Low cost 	<ul style="list-style-type: none"> • Implementation requires public education
Bioretention/infiltration Device	<ul style="list-style-type: none"> • Low maintenance • Works well with steep grades • Water quality benefits • Reduce flow • Can work for commercial applications • Provides volume reduction • Attractive with flowering plant • Low installation and maintenance cost • Suitable for large lots or whole subdivisions 	<ul style="list-style-type: none"> • Requires behavior modification

Measurable Goals:

- The Warrensburg City Council adopted the Post Construction Stormwater Control Ordinance in February 2013.
- Annual reporting of new developments will be annotated in the annual report.
- Track the amount of usage of alternative stormwater control measures used in place of traditional stormwater measures in all development and re-development. The amount alternative methods will be reported on the annual report.
- Track area of green space used for bio-retention, bio-filter or other storm water retention and quality measures.
- The amount of alternative storm water runoff measures will be addressed in the annual report.

Person/Department Primarily Responsible

- The Community Development Department, and more specifically, the Building Inspection Division, will be responsible for reviewing and approving the stormwater measures that will be put in place and inspections on construction jobsites. The Public Works Department will also perform final inspections on individual construction sites as well as new developments.

Additional Measures:

- The Land Disturbance Ordinance and permit requirements are posted on the City's website.
- Updated information regarding Land Disturbance permit information will be posted on the City's Stormwater Management page by Summer, 2013.
- Additional information will be generated through the development of the City's Stormwater Management Master Plan.

Decision Process:

- The Community Development Department, and Public Works Department will be responsible for reviewing and approving Land Disturbance Permits and conducting inspections on construction jobsites.

Interim Milestones and Implementation Schedule:

- City staff implemented the Land Disturbance Permit requirements on April 1, 2013.

Minimum Control Measure #6 – Good Housekeeping for Municipal Operations

Summary: The City of Warrensburg is striving to develop and implement an operation and maintenance program that includes personnel training with the goal of preventing or reducing pollutant runoff from Municipal operations.

Best Management Practices:

- The City currently requires a Stormwater Management Plan and will now also require a Land Disturbance Permit from all contractors working on City Capital Improvement Projects (CIP's).
- The Public Works and Parks and Recreation staff will conduct reviews of their maintenance areas and develop recommendations for modifications to continue to achieve good housekeeping practices.
- The Parks and Recreation Department will promote pet waste collection for residents at each of its parks to prevent fecal bacteria from entering the waterways.
- City staff training for all departments in Good Housekeeping.
- City staff conducts plan reviews for stormwater management plans for construction, demolition and development sites.
- City staff currently perform all fleet maintenance under overhead cover.
- City staff perform cleaning of vehicles under cover and all water and cleaning agents are directed toward approved sanitary drainage.
- Vehicle bays in the Public Works and Parks and Recreation maintenance areas are outfitted with oil and sediment traps.
- The body and tires of all City vehicles are cleaned on a routine schedule to prevent mud and pollutants from depositing on streets.
- Employees or contractors performing excavation in public areas maintain work areas with silt fencing, straw, mulch and storm inlet protection where appropriate.
- City streets are cleaned at least once every three months, downtown streets are cleaned twice a week and after large community events.
- Regular inspection and maintenance of the storm drainage system to prevent grass, tree limbs, debris and pollutants from obstructing the flow of storm water.
- City staff regularly clean out debris from catch basins, streams and ditches.
- City staff routinely inspect alleys and other public areas and notify owners and tenants of trash and nuisance violations.
- Employees and mowing contractors will be trained on keeping grass and other vegetation out of the streets to prevent accumulation in storm drains.
- Employees performing maintenance on mowers, City vehicles, weed eaters, snowblowers and other equipment will have review training in proper handling and disposal of oil, gasoline, lubricants and other liquids.
- Regular inspection of the City's sanitary and stormwater piping system provides staff with advance notice of problems as well as solving existing ones. Structures

in need of minor repairs are made at the time of observation and major repairs are placed on a priority list.

Measurable Goals:

- Land Disturbance Permits required for all CIP projects started on April 1, 2013.
- The Public Works and Parks and Recreation Departments will develop recommendations for modifications to achieve good housekeeping practices by summer, 2013.
- The Parks and Recreation Department will start a program to promote pet waste collection by summer, 2013.
- Staff training for the Public Works, Parks and Recreation and Community Development Departments will be organized by summer, 2013 with bi-annual training opportunities

Person/Department Primarily Responsible:

- The Public Works Department will be responsible for organizing and conducting new training programs for all departments and for maintaining existing practices to ensure good housekeeping operations continue.

Additional Measures:

- Employee notifications regarding good housekeeping practices will be emailed regularly to City employees and posted on the City's employee web page.
- The City's Code Enforcement Officer currently organizes community groups to pick up trash and debris along rights-of-way areas, streets and sidewalks.
- In the spring and fall of each year, the City sponsors a bulky waste and limb collection program. This program is advertised on the City's website, radio station and in the newspaper.
- The City sponsors a Christmas Tree Chipping Program that provides residents a place to discard their Christmas tree. The chipped trees are made available to the City and its residents for re-use in landscaping projects.
- Additional information will be generated through the development of the City's Stormwater Management Master Plan.

Spill Prevention, Control and/or Management:

- Spill prevention, control and management will be a topic of discussion in the employee training programs conducted for all departments.
- Spill prevention, control and management training will be emphasized for employees performing maintenance on mowers, City vehicles, weed eaters, snowblowers and other equipment will have review training in proper handling and disposal of oil, gasoline, lubricants and other liquids.
- Spill prevention flyers information will be emailed regularly to City employees and posted on the City's employee web page.
- Proper procedures for spill prevention, control and management will be included with permit application materials for all contractors working for the City on capital improvement projects.

Decision Process:

- All areas pertaining to this minimum control measure were developed by members of the City of Warrensburg's Stormwater Management Committee, which consists of trained staff from the Public Works and Community Development Departments.

Interim Milestones and Implementation Schedule:

- The Land Disturbance Permit requirements for contractors performing work for City properties became effective April 1, 2013.
- Public Works and Parks and Recreation staff will perform reviews of their maintenance areas and develop recommendations for modifications to achieve good housekeeping practices by summer, 2013.
- The Parks and Recreation Department will begin promoting pet waste collection for residents at each of its parks by Summer, 2013.
- Staff training in Good Housekeeping for all City departments will begin by Fall, 2013.
- Employees and mowing contractors will be trained on keeping grass and other vegetation out of the streets starting in 2013 and annually thereafter.
- Employees performing maintenance on mowers, City vehicles, weed eaters, snowblowers and other equipment will have review training in proper handling and disposal of oil, gasoline, lubricants and other liquids annually.

APPENDIX A



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 WATER PROTECTION PROGRAM, WATER POLLUTION BRANCH
 PO BOX 176, JEFFERSON CITY, MO 65102
FORM K - APPLICATION FOR INDIVIDUAL SMALL MS4 GENERAL PERMIT (FORM M MUST ALSO BE SUBMITTED)

FOR AGENCY USE ONLY	
CHECK NUMBER	
DATE RECEIVED	FEE SUBMITTED

THIS IS FOR A STORMWATER ONLY DISCHARGE PERMIT.

1.00
 a. This municipality/area is now operating a separate storm sewer system under Missouri Operating Permit Number (NPDES) MO - 0400E or
 b. This is a new permit;

2.00 NAME OF MUNICIPALITY/AREA MS4

Warrensburg Small MS4

2.10 ADDRESS (HEADQUARTERS PHYSICAL LOCATION) STREET CITY STATE ZIP CODE
 102 South Holden Warrensburg, MO 64093

3.00 OWNER

NAME City of Warrensburg	TELEPHONE NUMBER 660-747-9131
-----------------------------	----------------------------------

ADDRESS STREET CITY STATE ZIP CODE
 Same

4.00 CONTINUING AUTHORITY

NAME Same	TELEPHONE NUMBER
--------------	------------------

ADDRESS STREET CITY STATE ZIP CODE

5.00 MUNICIPALITY/ AREA CONTACT

NAME Marvin Coleman	PHONE 660-747-9131
	FAX

TITLE
 Director of Public Works

6.00 FOR EACH KNOWN STORMWATER OUTLET GIVE LEGAL DESCRIPTION (ATTACH ADDITIONAL SHEETS AS NECESSARY)
 Stormwater Outlet Number ____ ¼ ____ ¼ ____ Sec. ____ T ____ R ____ County See Attached
 Lat ____ Long ____

6.10 FOR EACH KNOWN STORMWATER OUTLET LIST THE NAME OF THE RECEIVING WATER

Outlet Number ____ Receiving Water See Attached
 Outlet Number ____ Receiving Water ____
 Outlet Number ____ Receiving Water ____

7.00 ATTACH A USGS 1" - 2000' SCALE MAP SHOWING THE LOCATION OF THE MUNICIPALITY/AREA IN RELATION TO THE LOCAL ROAD SYSTEM. INDICATE ON THE MAP THE MUNICIPALITY/AREA BOUNDARIES, THE RECEIVING STREAM(S); ALL KNOWN STORMWATER OUTLETS; AND THE MAP SECTION, TOWNSHIP, AND RANGE.

8.00 I CERTIFY THAT I AM FAMILIAR WITH THE INFORMATION CONTAINED IN THE 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.

NAME AND OFFICIAL TITLE (TYPE OR PRINT) Marvin Coleman Director of Public Works	PHONE 660-747-9131
--	-----------------------

SIGNATURE 	DATE SIGNED 04-13-2013
---------------	---------------------------

INSTRUCTIONS FOR FILLING OUT FORM K – APPLICATION FOR SMALL MS4 GENERAL PERMIT

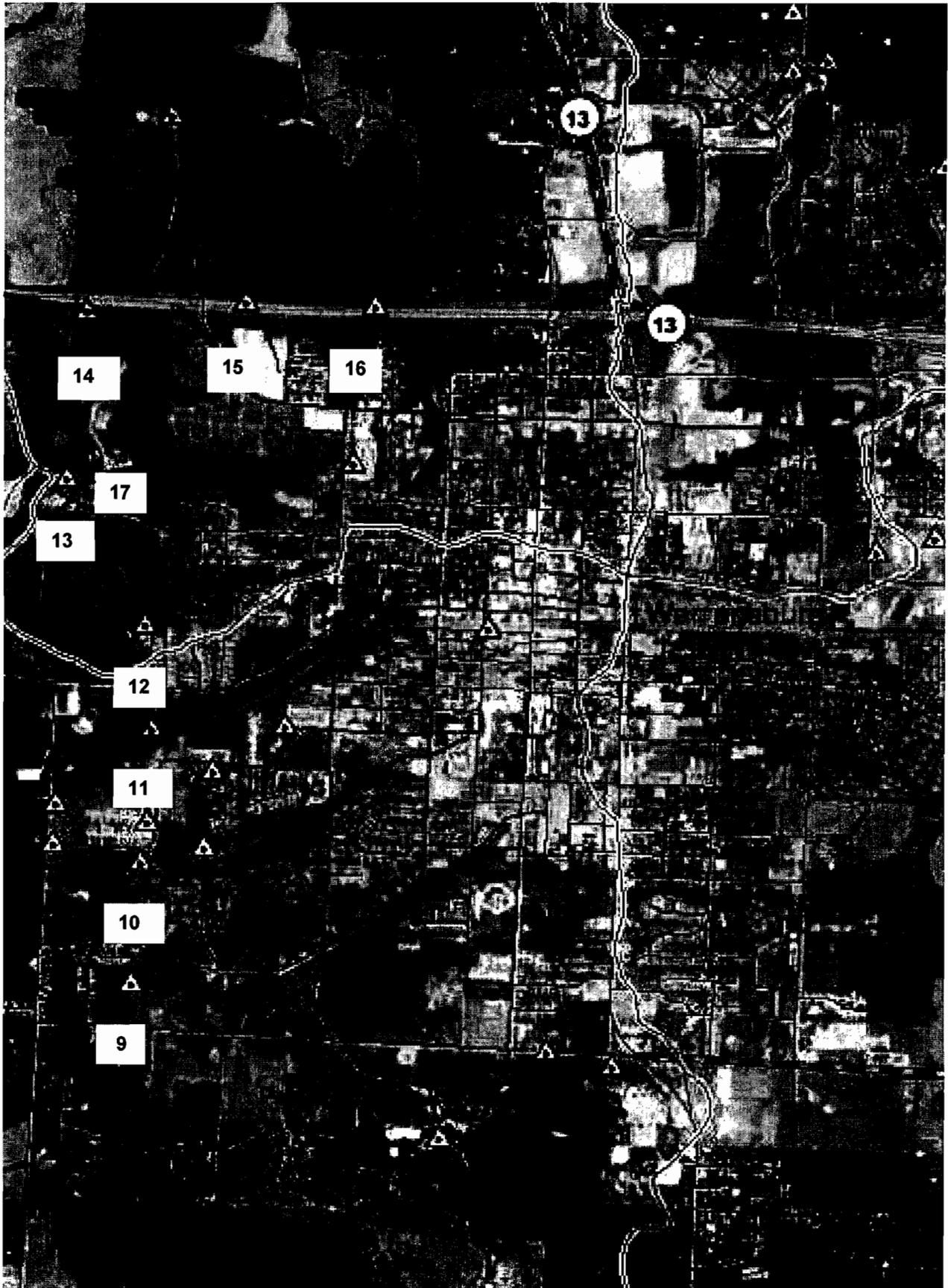
General permit fees (\$150) shall be submitted with Form K – Application for general permit for small MS4. Persons with more than one (1) non-continuous area shall obtain a general permit for each specific area. Where there are multiple releases from a single operating area, one (1) application may cover all facilities and releases.

Form M must also be submitted.

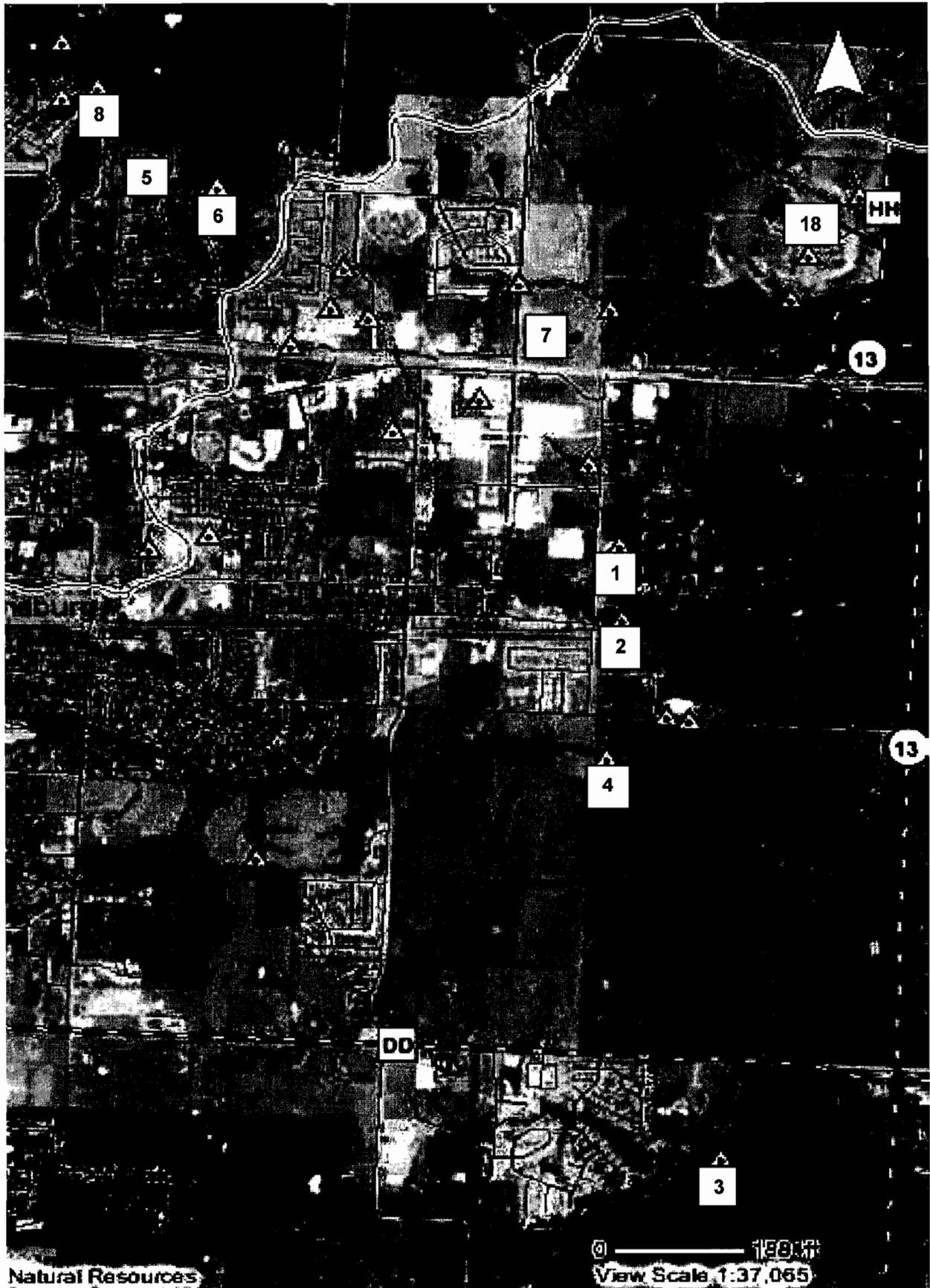
- 1.00 Fill out either item (a.) or item (b.) as applicable.
- 2.00 Name of municipality/area MS4 to be permitted – by what name is this area known locally? Examples: Columbia MS4, Fenton MS4, Joplin MS4, State Highway 5 MSF, Federal Medical Prison MS4, etc.
- 2.10 Give the street address of each municipality/area's headquarters. If the municipality/area's headquarters lacks a street name or route number, give the most accurate alternate geographic information.
- 3.00 Owner – legal name and address of owner.
- 4.00 Continuing authority – permanent organization which will serve as the continuing authority for the operation, maintenance, and modernization of the separate storm sewer system.
- 5.00 Contact person for this permit/application.
- 6.00 A stormwater outlet is the point(s) at which stormwater is discharged to a receiving stream. This may be the point(s) where water leaves the municipality/area. Outlets location(s) should be given in terms of the legal description. Sufficient information should be submitted so the stormwater outlet(s) may be located by department staff.
- 6.10 Receiving water(s) -- the name of the stream(s) to which the stormwater is directed and any down gradient point at which a continuous flowing stream or permanent waterbody is reached.
- 7.00 A map showing the municipality/area in relation to the local roads and receiving water(s). Attach a 1" – 2000' scale USGS topographic map that can be obtained from the department's Geological Survey & Resource Assessment Division in Rolla, MO. (573) 368-2125.
- 8.00 Signature – all applications must be signed as follows and the signature must be original. For a municipal, state, federal, or other public entity, the signature must be by either a principal executive officer or by an individual having overall responsibility for environmental matters at the municipality/area.

If there are any questions concerning this form, please contact the Water Protection Program, Water Pollution Branch at PO Box 176, Jefferson City, MO 65102 or by telephone at (573) 751-6825.

OUTFLOW MAP



OUTFLOW MAP



OUTFLOW DESCRIPTIONS

Legal Description

Outlet #001

SW ¼ , NW ¼ , Sec. 20, T46N, R25W, Johnson County
Latitude - Longitude: 384602 – 0934203 (Changed by
City Staff)
Unnamed Tributary to Bear Creek (U)
10300104-050001
Bear Creek ©, 00933

Outlet #002

SW ¼ , NW ¼ , Sec. 20, T46N, R25W, Johnson County
Latitude - Longitude: 384547 – 0934204 (Changed by
City Staff)

Unnamed Tributary to Bear Creek (U)
10300104-050001
Bear Creek ©, 00933

Outlet #003

SW ¼ , NW ¼ , Sec. 32, T46N, R25W, Johnson County
Latitude - Longitude: 3844243 - 9341429
Unnamed Tributary to Bear Creek (U)
10300104-050001
Bear Creek ©, 00933

Outlet #004

SW ¼ , NW ¼ , Sec. 29, T46N, R25W, Johnson County
Latitude - Longitude: 3845258 - 09342032
Unnamed Tributary to Bear Creek (U)
10300104-050001
Bear Creek ©, 00933

Outlet #005

SW ¼ , NW ¼ , Sec. 18, T46N, R25W, Johnson County
Latitude - Longitude: 384708 – 0934335 (Changed by
City Staff)
Unnamed Tributary to Blackwater Creek (U)
10300104-050002
Blackwater Creek (P), 00891

Outlet #006

SW ¼ , NW ¼ , Sec. 18, T46N, R25W, Johnson County
Latitude - Longitude: 3846532 - 09343122
Unnamed Tributary to Blackwater Creek (U)
10300104-050002
Blackwater Creek (P), 00891

Outlet #007

SE ¼ , SW ¼ , Sec. 17, T46N, R25W, Johnson County
Latitude - Longitude: 384636 - 0934205 (Changed by
City Staff)
Unnamed Tributary to Bear Creek (U)
10300104-050002
Bear Creek ©, 00933

Outlet #008

SW ¼ , NW ¼ , Sec. 13, T46N, R26W, Johnson County
Latitude - Longitude: 3847084 - 09343338
Unnamed Tributary to East Fork Post Oak Creek (U)
10300104-050002
Blackwater Creek (P), 00891

Outlet #009

SW ¼ , NW ¼ , Sec. 26, T46N, R26W, Johnson County
Latitude - Longitude: 3844545 - 09345362
Unnamed Tributary to East Fork Post Oak Creek (U)
10300104-030002
East Fork Post Oak Creek (C), 00932

Outlet #010

SW ¼ , NW ¼ , Sec. 26, T46N, R26W, Johnson County
Latitude - Longitude: 3845123 - 09345351
Unnamed Tributary to East Fork Post Oak Creek (U)
10300104-030002
East Fork Post Oak Creek ©, 00932

Outlet #011

SW ¼ , NW ¼ , Sec. 26, T46N, R26W, Johnson County
Latitude - Longitude: 3845314 - 09345331
Unnamed Tributary to East Fork Post Oak Creek (U)
10300104-030002
East Fork Post Oak Creek ©, 00932

Outlet #012

SW ¼ , NW ¼ , Sec. 23, T46N, R26W, Johnson County
Latitude - Longitude: 3845464 - 09345346
Unnamed Tributary to East Fork Post Oak Creek (U)
10300104-030002
Post Oak Creek (P), 00928

OUTFLOW DESCRIPTIONS

Outlet #013

SW ¼ , NW ¼ , Sec. 23, T46N, R26W, Johnson County
Latitude - Longitude: 3846075 - 09345487
Unnamed Tributary to Post Oak Creek (U)
10300104-030001
Post Oak Creek (P), 00928

Outlet #014

SW ¼ , NW ¼ , Sec. 23, T46N, R26W, Johnson County
Latitude - Longitude: 384633 - 0934547 (Changed by
City Staff)
Unnamed Tributary to Post Oak Creek (U)
10300104-030001
Post Oak Creek (P), 00928

Outlet #015

SW ¼ , NW ¼ , Sec. 23, T46N, R26W, Johnson County
Latitude - Longitude: 3846331 - 09345172
Unnamed Tributary to Post Oak Creek (U)
10300104-030001
Post Oak Creek (P), 00928

Outlet #016

SW ¼ , NW ¼ , Sec. 23, T46N, R26W, Johnson County
Latitude - Longitude: 3846325 - 09344541
Unnamed Tributary to Post Oak Creek (U)
10300104-030001
Post Oak Creek (P), 00928

Outlet #017

SE ¼ , SE ¼ , Sec. 17, T46N, R25W, Johnson County
Latitude - Longitude: 384615 - 0934550 (Added by
City Staff)
Unnamed Tributary to Post Oak Creek (U)
10300104-030001
Post Oak Creek (P), 00928

Outlet #018

NW ¼ , SW ¼ , Sec. 16, T46N, R25W, Johnson County
Latitude - Longitude: 384643 - 0934115 (Added by
City Staff)
Unnamed Tributary to Bear Creek (U)
10300104-050002
Bear Creek ©, 00933

APPENDIX B



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 Warrensburg

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

102 South Holden Warrensburg, MO 64093

3. TOTAL AREA OF MUNICIPALITY/AREA (S) _____ ACRES OR 8.5 SQUARE MILES.

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

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

See Attached

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

See Attached

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

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

See Attached

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

See Attached

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 CLEAN 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) Marvin Coleman, Director of Public Works	TELEPHONE NUMBER(S) 660-747-9135
SIGNATURE(S) 	DATE SIGNED 04/10/2013

APPENDIX C



Public Safety
306 Broad Street
Warrensburg, MO 64093
Office 660-543-4123
FAX 660-543-4163

August 6, 2013

Missouri Department of Natural Resources
Water Pollution Control Program
NPDES Permits and Engineering Section
P.O. Box 176 Jefferson City MO 65102-0176

RE: University of Central Missouri Compliance with Warrensburg MS4 Permit

To Whom It May Concern:

The University of Central Missouri (UCM) is a state owned and operated institution with a student population of over 11,000. Since the university is located within the city of Warrensburg, it is beneficial and necessary for the university and the city to partner on public safety and environmental issues.

The University of Central Missouri makes every effort to comply with regulatory permits issued to the City of Warrensburg that directly affect the university. Since the university does not own an MS4 System, we work with the City of Warrensburg to ensure the requirements of their permit are met.

Please contact me at (660) 543-4161 or Sam Hafley, Environmental/Hazmat Coordinator, at (660) 543-4839, if you have any questions. Thank you.

Sincerely,

John Merrigan, Ph.D.
Vice President of Finance

Cc: Mr. Henry Setser, Chris Bamman, Sam Hafley – UCM
Phil Adlich, City of Warrensburg

APPENDIX D

Outline for Comprehensive Storm Water Master Plan

- I. Phase I – Data Gathering
 - a. Field Visits
 - b. Existing Studies – Analysis
 - c. Define “system”
 - i. Pipes (min. size)
 - ii. Open channels
 - d. Existing maps
 - i. Create map
 - ii. Watershed based
 - iii. FEMA
 - e. Public Involvement
 - i. Information gathering
 - ii. Comment on potential policies
 - iii. Identification of “problems”
- II. Phase II-V – Analysis and Report by Basin
 - a. Hydraulic capacity of the system
 - b. Definition of a “problem”
 - i. Is street flooding, etc a problem?
 - ii. “Design storm”
 - iii. Private v. public
 - iv. Define key stakeholders
 - c. Prioritization
 - d. Cost estimating
 - e. Water quality issues
 - f. Design manual
 - i. Engineering procedures for public improvements
 - ii. Procedures for private development
 - 1. discharges – quantity and quality
 - 2. grading control
 - iii. BMP’s
 - g. Policies
 - i. Stream/easement preservation corridors
 - ii. Existing FEMA floodplains
 - iii. Grading
 - iv. Regulation/ordinances
 - v. Funding
 - h. Capital improvement program

Approach for Basic Storm Water Master Plan

Introduction: The City of Warrensburg has a desire to undertake a basic analysis of their storm water system. This analysis would focus on several areas of handling storm water including, but not limited to: an inventory of the system, a basin-by-basin analysis of the hydrology and hydraulics (H&H) of the system, potential improvements, needs analysis and development recommendations. The master plan will be prepared in five separate authorizations. The first authorization will encompass the data collection and overview of the entire system. The second through fifth authorizations will included the analysis and recommendations for the basins in the four quadrants of the City.

Scope: The following scope is proposed:

1. Inventory: Consultant will perform a combination of office and field inventory activities.
 - a. Existing topographic information will be analyzed to determine all basin watersheds within the City. Consultant will utilize any existing mapping available. If this mapping does not exist, USGS topographic information will be superimposed on city maps.
 - b. Existing system mapping will be analyzed by Consultant to develop a basin-by-basin inventory of existing infrastructure. This effort will attempt to coordinate with any existing structure numbering system the City has instituted and will likely develop a “reach” numbering system for open channel components. This will be the framework for modeling the system.
 - c. Field investigations will be performed to provide a simple condition assessment of infrastructure elements 18” and greater as well as confirm any open channel elements. An inventory form will be completed for each element and will involve basic information such as size, material and condition (visual rating basis).
2. Basin Analysis. Consultant will perform technical analyses of the system in the four quadrants of the City to develop an understanding of storm water runoff flows in each basin as follows.
 - a. Prepare existing storm flows for 2, 10 and 100 year return frequencies based on existing development patterns. These hydrologic calculations will be prepared using appropriate USACE HEC products and will use appropriate rainfall duration and intensity information for Warrensburg. The model will be established in such a manner to anticipate and determine future flows based on proposed development.
 - b. Analyze existing system components for capacity for major open channels. Appropriate USACE HEC models will be utilized for this analysis. The expected outcome will result in a listing of under capacity components in the system along with defined storm water impact areas (floodplains). This is not intended to be a full or extensive modeling of the entire enclosed system.
 - c. Identify system deficiencies and cost to correct, and prioritize improvements.

3. Reporting. Consultant understands that one of the goals of this effort is to demonstrate and justify the need for funding improvement of, and maintenance to, the storm water system. Consultant will support this effort with the following services:
 - a. Make a presentation of findings to the City Manager and/or the City Council.
 - b. Assist Warrensburg Public Works in developing a “needs list” for maintenance of the storm water infrastructure system.