Municipal Separate Storm Sewer System (MS4)

ANNUAL REPORT

NOVEMBER 2017

KPDES PERMIT NO. KYS000001
AI NO. 8235

PARTIAL REPORTING YEAR 1
07.2016 - 06.2017

COMPILED AND SUBMITTED BY:
Louisville and Jefferson County
Metropolitan Sewer District
700 West Liberty Street
Louisville, KY 40203

REPORTING TO:
Kentucky Division of Water
Surface Water Permits Branch
300 Sower Boulevard
Frankfort, KY 40601

CO-PERMITTEES:
City of Anchorage
City of Jeffersontown
City of St. Mathews
City of Shively
Louisville Metropolitan Government

msd
Safe, clean waterways

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Cover photo: Canoeists on Beargrass Creek startle a great blue heron from its perch.

Photo courtesy**:** John Nation

EXECUTIVE SUMMARY

Objective

The objective of the MS4 Annual Report is to provide information to the Kentucky Division of Water (KDOW) on how items in the Metropolitan Sewer District's (MSD) Municipal Separate Storm Sewer System (MS4) permit (Kentucky Pollutant Discharge Elimination System (KPDES) Permit KYS000001) have been addressed for compliance in the reporting year between July 1, 2016, and June 30, 2017.

Purpose

As a river city, and a community with approximately 760 miles of streams and 38 miles of Ohio River shoreline, the purpose of MSD's MS4 program, as outlined in the Stormwater Quality Management Plan (SWQMP), is to address the KPDES MS4 Phase 1 program requirements as specified in MSD's MS4 permit ("the MS4 permit"). The Kentucky Division of Water (KDOW) regulates MSD's MS4 Program ("the MS4 program"). The SWQMP does not establish new regulatory requirements, but is to be utilized as a guide for compliance with the permit.

The SWQMP describes activities in the functional areas of responsibility that help protect and improve the water quality in our streams, as outlined in the current effective permit. Schedules for compliance are outlined in the SWQMP. This MS4 Annual Report is intended to provide a snapshot of permit compliance for Permit Year 1 (PY 1) to KDOW. This document also provides MSD the opportunity to utilize adaptive management to adjust the SWQMP, as necessary. If program technologies change or programmatic approaches to MS4 compliance are modified, making alterations to the SWQMP through the annual reporting process is a mechanism to achieve change without full permit modification and negotiation.

The focus areas included in the MS4 permit that are addressed in Chapter 2 of the MS4 Annual Report are as follows: Public Education, Outreach, Participation & Learning Experiences (PEOPLE), Illicit Discharge Detection and Elimination (IDDE), Industrial Stormwater Program (IP), Construction Site Stormwater Runoff Controls (CS), Post-Construction Stormwater Runoff Controls (PC), Good Housekeeping and Pollution Prevention (GH/P2), Monitoring Programs (M), Program Assessment and Reporting (PAR), Total Maximum Daily Loads (TMDL), and Co-permittee reports. Applicable fact sheets are provided in Chapter 2. The Co-permittee Program Reports are provided without comment in **Chapter 3**.

MSD has achieved compliance with the MS4 permit activities, with the following highlights:

- Facilitated, attended, or engaged the public at over 50 events. (PEOPLE)
- Responded to and addressed 85 illicit discharge investigation requests. (IDDE)
- Performed over 50 inspections as part of the Industrial Stormwater Program section of the permit. (IP)

- Inspected over 14,500 active construction permits for compliance with the Erosion Prevention and Sediment Control (EPSC) Ordinance. (CS)
- Reviewed performance of water quality Best Management Practices (BMPs) at over 45 sites. (PC)
- Performed 24 Stormwater Pollution Prevention Plan (SWPPP) compliance inspections at major MSD facilities. (GH/P2)
- Collected over 1,000,000 data points at Louisville streams to assess water quality. (M)

The MS4 Annual Report is a valuable tool to document, report, and track progress that ultimately helps protect and improve the water quality in our streams.

POINTS OF CONTACT BY AGENCY

MSD is the primary permittee for the MS4 program and is co-permitted with Louisville Metro, City of Anchorage, City of Jeffersontown, City of St. Matthews, and City of Shively. Points of contact including executive staff and MS4 program coordinators are provided below. The MSD Engineering Division organizational chart effective July 2017, including full-time MS4 program staff (page 13) is provided in **Appendix 1.0 – MSD Organizational Chart** (see page 13 of the Organizational Chart for staff details).

Louisville & Jefferson County MSD

Name	Agency	Role	Phone Number
Mayor Greg Fisher	Louisville Metro	Mayor	(502) 574-2003
James A. Parrott	Louisville & Jefferson County MSD	Executive Director	(502) 540-6533
Angela Akridge	Louisville & Jefferson County MSD	Chief Engineer	(502) 540-6136
David Johnson	Louisville & Jefferson County MSD	Development and Stormwater Services Director	(502) 540-6392
Wes Sydnor	Louisville & Jefferson County MSD	MS4 Program Manager	(502) 540-6274

Louisville Metro

Name	Agency	Role	Phone Number
Mayor Greg Fisher	Louisville Metro	Mayor	(502) 574-2003
Dirk Gowin	Public Works	Executive Administrator	(502) 574-5925
Mark Zoeller	Facilities Management	Assistant Director of Facilities Project Management	(502) 574-0104
Steve Goodwin	Louisville Zoo	Maintenance Manager	(502) 459-2181
Jason Canuel	Metro Parks	Assistant Director	(502) 485-8113

City of Anchorage

Name	Agency	Role	Phone Number
Mayor W. Thomas Hewitt	City of Anchorage	Mayor	(502) 245-4654
Renee Major	City of Anchorage	City Clerk/MS4 Coordinator	(502) 245-4654
Erwin Booth	City of Anchorage	Public Works	(502) 245-4654
Greg Smith	City of Anchorage	Stormwater/Drainage Officer	(502) 245-4654

City of Jeffersontown

Name	Agency	Role	Phone Number
Mayor Bill Dieruf	City of Jeffersontown	Mayor	(502) 267-8333
Matt Meunier	City of Jeffersontown	MS4 Coordinator	(502) 267-8333
Rob Huckaby	Stantec for City of Jeffersontown	Consultant	(502) 212-5046

City of St. Matthews

Name	Agency	Role	Phone Number
Mayor Richard J. Tonini	City of St. Matthews	Mayor	(502) 895-9444
Jim Birch	City of St. Matthews	City Engineer	(502) 899-2518
Kenan Stratman	City of St. Matthews	Public Works/Coordinator	(502) 899-2517

City of Shively

Name	Agency	Role	Phone Number
Mayor Sherry Sinegra Conner	City of Shively	Mayor	(502) 449-5000
John Haywood	City of Shively	MS4 Coordinator	(502) 449-4749
Rick Storm	BA Engineers for City of Shively	Consultant	(502) 775-5741

CHAPTER 1 INTRODUCTION

1.1 REGULATORY BACKGROUND

The Clean Water Act (CWA), enacted in 1972, was amended in 1987, to prohibit the discharge of any pollutant to the waters of the United States from a point source unless authorized by a National Pollutant Discharge Elimination System (NPDES) permit. Since the CWA amendment, there is increasing evidence that there are additional and more diffuse sources of surface water pollution. Specifically, stormwater runoff draining large surface areas (agriculture and urban lands) were found to be major causes of water quality impairment and contributors to non-attainment of designated beneficial uses.

The primary federal regulation pushing communities towards the goal of “fishable and swimmable water” is the Clean Water Act. Sections of the Clean Water Act which specifically are relevant to stormwater address:

- Regulation of stormwater discharges
- Water quality standards for water bodies receiving stormwater runoff
- Implications of non-attainment of water quality standards

The primary objective of the MS4 Permit is the reduction of pollutant discharges to the Maximum Extent Practicable (MEP) from stormwater runoff. MSD is to implement the practices, policies, procedures and stormwater controls contained in the permit and addressed in this plan throughout the regulated area. MSD is required to develop, administer, and update a Storm Water Quality Management Plan (SWQMP) and update as necessary to maintain compliance with the MS4 Permit.

1.2 STORMWATER QUALITY MANAGEMENT PLAN OVERVIEW

The latest MS4 Permit was issued with an effective date of February 1, 2017, for a term of five years. The majority of the permit requirement responses are provided in Chapter 2 of the MS4 Permit – “Stormwater Quality Management Plan”. This plan expands the Permit Tables to also include set verifiable performance measures for each activity. The programmatic elements performed in the SWQMP are documented in the MS4 Annual Report. This report shows activities and performance for the period of July 1, 2016, to June 30, 2017.

MSD is required to develop and implement a SWQMP with the objective of reducing the discharge of pollutants to the MEP. The SWQMP is a planning tool to define how the MS4 program will be administered. While it is not a part of the permit, it provides a more detailed description of the activities in the permit. The SWQMP addresses the Minimum Control Measures (MCMs).

The SWQMP covers the following:

- Public Education and Outreach (PEOPLE) – MSD will develop and implement a program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on water bodies and the steps the public can take to reduce pollutants in stormwater runoff.
- Public Involvement and Participation (PEOPLE) – MSD will provide representatives to local storm water management work groups, public hearings, and schools, and will assist with program coordination and monitoring efforts, per applicable state and federal requirements.
- Illicit Discharge Detection and Elimination Program (IDDE) – MSD will develop, implement and enforce a program to detect and eliminate illicit discharges into the Districts maintained and operated portions of the MS4.
- Industrial Stormwater Program (IP) – MSD will develop, implement, and enforce programs to minimize pollutants and stormwater pollution in runoff from developed and re-developed commercial and industrial sites.
- Construction Site Runoff Control (CS) – MSD will develop, implement and enforce a program to reduce pollutants in any stormwater runoff from construction activities that result in land disturbance of greater than or equal to one acre.
- Post-Construction Site Runoff Control (PC) – MSD will develop, implement and enforce a program that addresses stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre.
- Good Housekeeping/Pollution Prevention (GH/P2) – MSD will develop and implement an operations and maintenance program that includes a training component and has a goal of preventing or reducing polluted runoff from their daily operations, including maintenance.
- Monitoring (M) - MSD will develop and maintain a water quality monitoring network, and report on permit required pollutants in annual reporting.
- Performance Assessment and Reporting (PAR) – MSD will prepare timely and accurate reporting documents, track critical program elements, and make programmatic changes as needed based on trends in data as needed.

The SWQMP for the Fourth Permit Cycle was submitted to KDOW in July 2017. An annual review of the SWQMP is required as part of the MS4 Annual Report submittal. During this time, the prior year's activities and the need for changes in implementation strategies and schedules should be assessed. The MS4 permit specifies that the SWQMP may be modified over time by MSD to facilitate implementation of permit requirements. Modifications are to be made based on lessons learned and the effectiveness of the various BMPs. There are no recommended SWQMP modifications at this time.

1.3 REGULATORY SUBMITTAL REQUIREMENTS

From the effective MS4 permit, the following requirement for submittal of a MS4 Annual Report is stated:

2.5. Annual Reporting

Annual MS4 compliance reporting requirements shall also include a special section identifying approved TMDL(s) and special efforts or management practices to address the Pollutant(s) of Concern. As appropriate for the pollutant of concern, the permittee will identify measures taken to address in the following program areas:

- *Public Education, Outreach, Participation & Learning Experiences (PEOPLE)*
- *Illicit Discharge Detection and Elimination (IDDE)*
- *Industrial Stormwater Program (IP)*
- *Construction Site Stormwater Runoff Controls (CS)*
- *Post-Construction Site Stormwater Runoff Controls (PC)*
- *Good Housekeeping/Pollution Prevention (GH/P2)*
- *Monitoring (M)*
- *Performance Assessing and Reporting (PAR)*

The permittee shall include water quality trend analysis for the pollutant(s) of concern with other MS4 monitoring program data with annual compliance reports.

From the MS4 permit, Section 3 - "Reporting" identifies the following reporting requirements for permit compliance:

3.1. Reporting Requirements
The permittee shall prepare an annual system-wide report (Annual Report) to be submitted no later than November 15th of the year following the fiscal year covered by the report (July 1 - June 30). The Annual Report shall include at a minimum:

1. An overall evaluation of the stormwater quality management program developments and progress including: major findings such as water-quality improvements or degradation, major accomplishments, overall program strengths/weaknesses; and future direction of the program. The permittee shall state an overall assessment of the effectiveness of the SWQMP taking into account water quality/watershed improvements;

2. The number of illicit discharges discovered; describing discharge and resolution;

3. A summary of inspections and enforcement actions for regulatory programs;

4. A summary of installed BMPs for post-construction stormwater management for new and redevelopment;

5. A summary of pollution prevention and good housekeeping BMPs performed at the municipal operations;

6. The status of implementation and proposed changes to the stormwater quality management program, including assessment of controls and specific improvements or degradation to water quality;

7. Any improvements in water quality due to watershed activities; and

8. The Annual Report shall be submitted electronically. Permittees can access the system at the following web address:

The permittee shall retain records accumulated pursuant to this individual permit for no fewer than three years following the termination of this individual permit.

1.4 SUMMARY

The MS4 Annual Report is developed to meet regulatory requirements outlined in the MS4 permit, while also providing information to the public, regulators, media, and others on the activities being performed every day in this community that improve water quality to the Maximum Extent Practicable. The MS4 Annual Report documents the compliance with the PY 1 activities as outlined in the SWQMP.

MSD has achieved compliance with the MS4 permit activities, with the following highlights:

- Facilitated, attended, or engaged the public at over 50 events. (PEOPLE)
- Responded to and addressed 85 illicit discharge investigation requests. (IDDE)
- Performed over 50 inspections as part of the Industrial Stormwater Program section of the permit. (IP)
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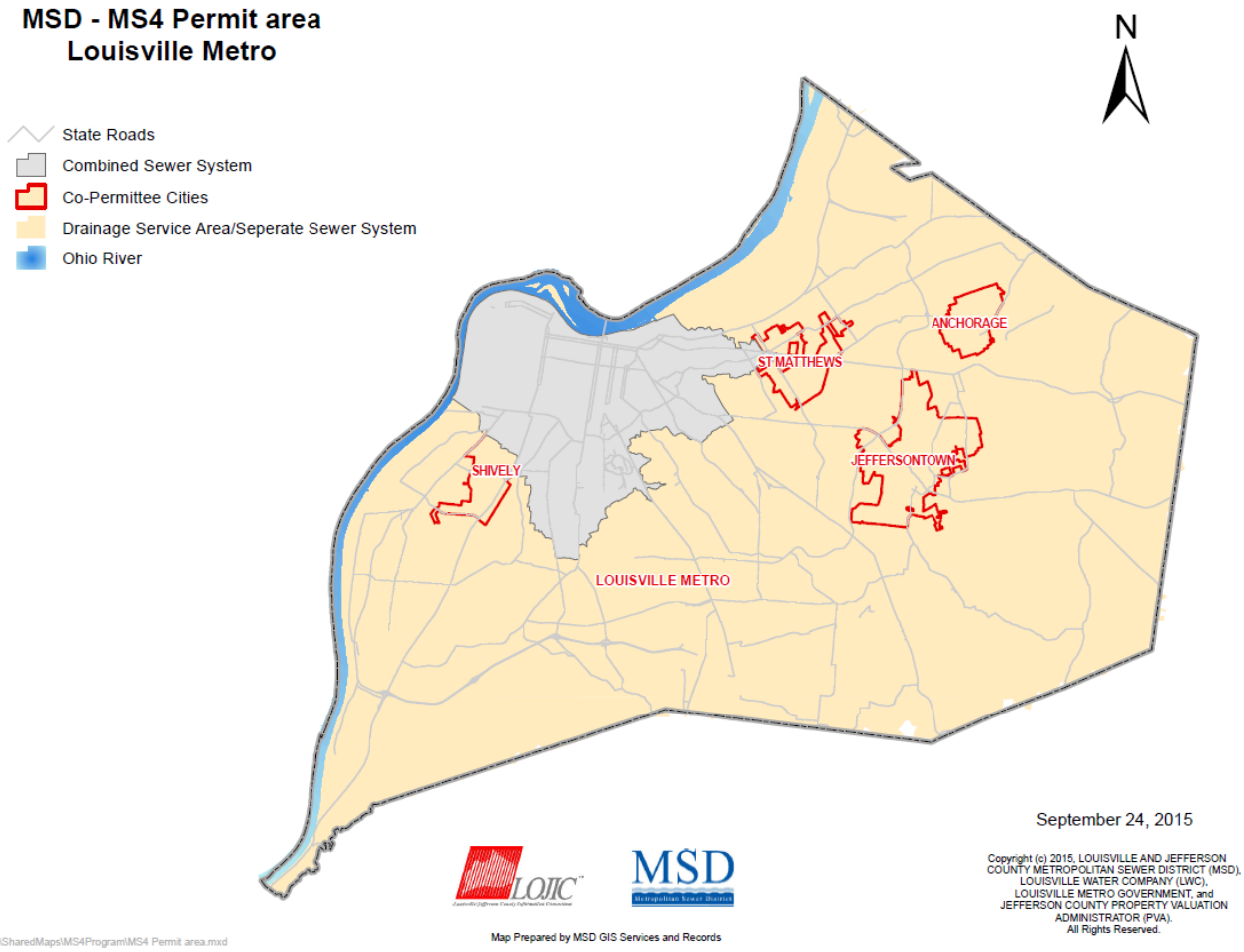
- Collected over 1,000,000 data points at Louisville streams to assess water quality. (M)

MSD and its co-permittees strive to provide the public with an understanding of complex water quality issues and regulatory programs that protect our waterways. MSD-administered regulatory programs are enforced through the following mechanisms: the Erosion Prevention and Sediment Control (EPSC) Ordinance to manage stormwater runoff from construction sites, the Hazardous Materials Ordinance (HMO) to manage stormwater runoff from industrial facilities and detect and eliminate illicit discharges, and the Wastewater/Stormwater Discharge Regulations (WDR) to manage post-construction stormwater runoff and detect and eliminate illicit discharges. Louisville Metro administers regulatory programs including ordinances and

codes enforcing waste disposal and other environmental protection requirements, and the Cornerstone 2020 Land Development Code (LDC).



1.5 PERMIT RENEWAL AND LONG-TERM PLANNING

Each permit cycle, MSD enhances and improves the program through planning activities, regulatory authority, environmental education programs and leadership. The requirements in the MS4 permit represent the Kentucky Division of Water's (KDOW's) determination of maximum extent practicable (MEP) for Louisville MSD and Jefferson County and co-permittee communities. The MS4 permit was most recently renewed in early 2017, with an effective date of February 1, 2017. This report represents activities performed in the period of July 1, 2016, to June 30, 2017. Therefore, there are portions of the reporting period that were regulated by an administrative extension of the previous permit cycle. The final activity summary table for the Third Permit Cycle and this extended period are included as **Appendix 1.6 – MSD Activity Summary Table (Third Permit Cycle Administrative Extension)**. The following table shows the Fourth Permit Cycle Activity Summary:

TABLE 1.1 PUBLIC EDUCATION, OUTREACH, PARTICIPATION, AND LEARNING EXPERIENCES (PEOPLE)									
PEOPLE	**General Public & Stakeholder Education Program**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.1.1	General Public-Mass Media Integration/Distribution	Report the number of potential households and estimate the numbers of households were reached.	The permittee shall integrate MS4 stormwater quality topics in to existing print mass media, local government cable channel, social marketing materials, and/or new materials with the intent of affecting behavior change.	☑	❑	❑	❑	❑	N/A
2.1.2	General Public-Direct Interaction	Permittee shall present educational materials to the public at least six (6) event days per year; update booth material annually. Provide summary of the educational activities in annual report	The permittee shall present the "Key Messages" at community events, through the use of a display booth, "enviroscape" or other direct personal integration approaches.	☑	❑	❑	❑	❑	N/A
2.1.3	General Public-Meeting Topic Integration	Permittee shall integrate water quality topics in MS4 public meetings at least six (6) events per year; provide summary of the events in the Annual Report	The permittee shall integrate MS4 stormwater quality topics, as feasible and appropriate into other MSD sponsored public meetings.	☑	❑	❑	❑	❑	N/A

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

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SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.1.4	Volunteer Programs Participation, Promotion or Support	Permittee shall have direct participation in at least three (3) events per year; and promote additional two (2) events per year, provide summary of volunteer opportunities the permittee participated, facilitate, or supported in the Annual Report	The permittee shall participate in, facilitate, encourage or support volunteer program opportunities on a case by case basis to optimize resources and potential to affect behavioral changes through participation events.	☑	❑	❑	❑	❑	N/A
2.1.5	MetroCall Hotline and MSD Customer Relations	Permittee shall provide a summary of MS4 complaints and comments received in the Annual Report	The permittee shall provide support to the 24-hour central reporting hotline "Metro Call" and internet communication channels for use by the public and MSD employees to report complaints, spills, and illegal dumping.	☑	❑	❑	❑	❑	N/A
2.1.6	Elected Officials	Permittee shall provide a summary of its attendance of meetings at Mayors and/or Council Member's discretion in the Annual Report	The permittee shall attend and participate at the discretion of Mayor's office and Louisville Metro Council members to address resident's concerns and questions.	☑	❑	❑	❑	❑	N/A
2.1.7	Public Speakers	Permittee shall provide public speakers to various community stakeholders at least six (6) events per year	The permittee shall provide speakers to various community stakeholder groups that could benefit from environmental stormwater information.	☑	❑	❑	❑	❑	N/A

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TABLE 1.1 PUBLIC EDUCATION, OUTREACH, PARTICIPATION, AND LEARNING EXPERIENCES (PEOPLE)									
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SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.1.8	News Media-Press Releases	Permittee shall provide at least two (2) press releases per year highlighting public participation opportunities	The permittee shall provide press releases to the local news media highlighting opportunities for the public to participate in outreach and involvement events to make a positive difference through behavior change.	☑	❑	❑	❑	❑	N/A
2.1.9	MSD Web Site	Permittee shall report summary of updates in the Annual Reports of Permit Years 2 and 4	The permittee shall review and revise the website with the "Key Messages" content and other related PEOPLE plan elements.		❑		❑		N/A
2.1.10	Behavior Change Assessment Survey	Permittee shall provide summary in the Annual Report of the Baseline Survey in Permit Year one (1) and the Behavior Assessment in Permit Year four (4)	The permittee shall perform a statistical survey to gauge the population's knowledge of stormwater quality issues and establish baseline to assess the changes in behavior and outreach program effectiveness. The permittee shall utilize the survey results to refocus and reprioritize PEOPLE activities.	☑			❑		N/A
2.1.11	Building Industry Association of Greater Louisville Land Development Committee Monthly Meetings and Developers Advisory Group	Permittee shall participate in at least 75% of the meetings annually	The permittee shall attend Building Industry Association of Louisville land development committee and Developer Advisory Group meetings to address concerns and comments from the local homebuilder professional and provide information regarding changes in procedures, checklist, regulations, etc.	☑	❑	❑	❑	❑	N/A

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2.1.12	Greater Louisville Inc. Environmental and Water Committees	Permittee shall participate in at least three (3) events per year	The permittee shall participate in committee meetings to address concerns and comments from key local development professionals and provide information regarding changes in construction procedures, checklist, regulations, etc.	☑	❑	❑	❑	❑	N/A
2.1.13	Construction Operators	Permittee shall evaluate educational materials and/or multimedia presentations for the construction industry related to point and non-point source pollution and stormwater pollution annually	The permittee shall make available educational materials and/or multimedia presentations for the construction industry related to point and non-point source pollution, green infrastructure and stormwater pollution prevention measures for operational procedures and erosion and sediment controls.	☑	❑	❑	❑	❑	N/A
2.1.14	Rain Garden Outreach	Permittee shall estimate handbook distribution and report in the Annual Report	The permittee shall maintain and update rain garden handbook with the intent of general public outreach. Consider expanding use to support residential, non-residential, professional, and non-professional audiences. The permittee shall evaluate changes and make updates at least every even numbered year.		❑		❑		N/A

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2.1.15	Green Infrastructure Demonstration Projects	Permittee shall provide a Summary Report of Green Infrastructure demonstration projects in the Annual Report	The permittee shall monitor previously identified and constructed projects in outreach efforts aimed at demonstrating the feasibility and effectiveness of green infrastructure including, but not limited to rain gardens, green roofs, pervious pavement, bio-swales and infiltration. Prioritize, select and implement projects to support a variety of residential, non-residential, professional and non-professional audiences in MSD and co-permittee areas. Where feasible collaborate and/or cooperate with local government agencies, schools, co-permittees and/or private properties with significant use and exposure to the general public.	☑	❑	❑	❑	❑	N/A
2.1.16	Public Notification of Major Program Changes	Permittee shall maintain and update as needed the notification system or program changes.	The permittee shall maintain a web site-based system to notify the public and affected stakeholders of proposed major program changes that will significantly impact stormwater runoff quality, negatively or positively. The public shall be given the opportunity to informally comment on proposed changes.	☑	❑	❑	❑	❑	N/A

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Cooperative Efforts (MSD provides supportive or other non-lead role)									
2.1.17	Jefferson County MS4 Workgroup-Communication	Permittee shall attend at least two (2) meetings per year	The permittee shall participate in the Jefferson County MS4 Co-Permittee Workgroup meetings discussing program progress, challenges, activity changes, shared activity requests communication needs and lesson learned.	☑	❑	❑	❑	❑	N/A
2.1.18	Louisville Metro Office of Sustainability	Permittee shall report its activities and support of the Louisville Metro Department of Sustainability initiatives in the Annual Report	The permittee shall continue to support Louisville Metro Office of Sustainability initiatives with development of guidance materials to be applied to new Metro Government Facilities incorporating green infrastructure	☑	❑	❑	❑	❑	N/A

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TABLE 1.2 ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)									
IDDE 1 Legal Prohibition/Control Authority									
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.2.1	Assess Legal Prohibition/Control Authority	Permittee shall evaluate, once per permit cycle proposed changes in Wastewater Stormwater Discharge Regulations (WDRs) for consideration by MSD Board	The permittee shall evaluate existing ordinances and regulations with an emphasis on Article 5 of the WDRs to determine if they are sufficient relative to MSD's ability to implement an effective IDDE program per 40 CFR. 122.26(b) (2). The permittee shall periodically update WDRs as needed to identify and eliminate risk of illicit discharges due to changes in technology, industrial management processes, regulations or program modifications. The permittee shall provide a summary of the adoption of such changes and information about implementation, and effective date in the Annual Report.	☑	❑	❑	❑	❑	☑
2.2.2	IDDE Source Investigation and Elimination Procedures	Permittee shall provide in the annual report, a summary of the process changes to IDDE investigations	The permittee shall develop and implement a formal plan of illicit discharge detection including how to trace the source of an illicit discharge and procedures for removing or eliminating them once they are located or reported. The plan should also include the enforcement procedures outlined in the WDRs for illicit discharge elimination, which includes ten (10) days from the receipt of the Notice of Violation; the source of the illicit discharge shall submit a mitigation plan for removal.	☑	❑	❑	❑	❑	☑
2.2.3	Public Illicit Discharge Report Investigation	Permittee shall provide in the annual report, a summary of the investigations of illicit discharges performed	The permittee shall continue to receive and investigate public reports of potential illicit discharges via customer service hotline, webpage reporting and MetroCall. The permittee shall update and perform customer service hotline staff training for receiving calls regarding potential illicit discharges and appropriate routing procedures.	☑	❑	❑	❑	❑	☑

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2.2.4	Dry Weather Screening	Permittee shall provide in the annual report, a summary of the dry weather screenings performed.	The permittee shall conduct dry weather screening of representative outfalls. The recommended level of effort is twenty percent (20%) of the major outfalls per year. However, all the major outfalls shall be addressed within the permit term. The permittee shall also conduct dry-weather screenings at ninety percent (90%) of large industrial outfalls of industrial facilities once per permit cycle.				❑		☑
2.2.5	Screening Follow-up	Permittee shall starting in Permit Year One (1) inspect at least 25% of suspect outfalls per year	After the initial follow-up to insure the illicit discharge has been mitigated, the permittee shall re-evaluate outfalls that were previously found to have had contaminated discharges to determine the current status of those outfalls.	☑	❑	❑	❑	❑	☑

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

TABLE 1.2 ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)									
IDDE 2 Management Activities									
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.2.6	Mapping - Stormwater Infrastructure Inventory	Permittee shall maintain a storm sewer system map.	The permittee shall continue to maintain the GIS Louisville Jefferson County Information Center (LOJIC) layers constituting its storm sewer system map, showing the location of all known major outfalls, and the names and location of all waters of the Commonwealth that receive discharges from those outfalls.	☑	❑	❑	❑	❑	☑
2.2.7	Non-Industrial IDDE Program Enforcement	Permittee shall report annually, including number of investigations, enforcement actions and referrals to KDOW, and follow-up investigations.	The permittee shall continue to utilize the Wastewater/Stormwater Discharge Regulations, related checklists and procedures for investigation of potential illicit discharges and elimination of illicit discharges.	☑	❑	❑	❑	❑	☑
2.2.8	Hazmat/Spill Unified Response Program	Permittee shall report, if necessary, any changes to the policies and programs and procedures, in the annual report	The permittee shall continue to maintain and enforce the ordinances, policies, programs and procedures for response and containing spills that may discharge into the MS4. The spill response procedures outlined in Section 95.07 of the Louisville Metro Code of Ordinances relating to hazardous materials shall continue to be implemented and enforced.	☑	❑	❑	❑	❑	☑
2.2.9	MVA Mitigation Kit Program	Permittee shall report metrics for kit distribution and after-use collection in the annual report	The permittee shall continue motor vehicle accident (MVA) mitigation kit distribution program to meet Fire Department and emergency response spill containment needs.	☑	❑	❑	❑	❑	☑

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

TABLE 1.2 ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)									
IDDE 2 Management Activities									
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.2.10	IDDE Identification SWPPP Training Integration	Training shall occur at least once per year and the permittee shall report in the annual report the date of training and the number of staff participating in training	The permittee shall integrate techniques and practices to assist staff identify potential illicit discharges into facility and system operations and maintenance training.	☑	❑	❑	❑	❑	N/A
Cooperative Efforts (MSD provides supportive or other non-lead role)									
2.2.11	KDOW Support	Permittee shall summarize and include in the annual report any assistance given to the Kentucky Division of Water (KDOW) by MSD	As KDOW requests, the permittee shall accompany KDOW on inspection of KPDES stormwater permitted facilities in Jefferson County	☑	❑	❑	❑	❑	N/A

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

TABLE 1.3 INDUSTRIAL PROGRAM REQUIREMENTS (IP)									
IP 1 Legal Prohibition/Control Authority									
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.3.1	Industrial IDDE Program Enforcement	Permittee shall summarize in the annual report the industrial enforcement actions and referrals to Kentucky Division of Water	For industrial properties, the permittee shall continue to utilize the Wastewater/Stormwater Discharge Regulations, Hazardous Materials Ordinance and related checklists and procedures for identification of potential illicit discharges and elimination of illicit discharges/ unauthorized stormwater discharges. The permittee shall perform analysis of industry property data layer in LOJIC cross linking with properties holding a Hazardous Materials (spill) Prevention Control (HMPC) Plan to identify potential sites that should be added to the program with consideration for High Risk Industrial Facilities designation (determined in other activities).	☑	❑	❑	❑	❑	☑
2.3.2	Industrial IDDE Program Enforcement (Legal Authority)	Permittee shall update as needed and maintain adequate legal authority to require compliance with this measure.	The permittee shall maintain adequate legal authority, per 401 KAR 5:060, Section 12(9)(b)3 and 40 CFR 122.26(b)(2), to require compliance and inspection of sites, inspection of priority industrial and commercial facilities, including establishing control measure requirements such as HMPC, Spill Prevention, Control and Countermeasure (SPCC) Plan and/or the Groundwater Protection Plan (GPP) for facilities that have a potential to discharge to the MS4 and enforce stormwater requirements.	☑	❑	❑	❑	❑	☑
2.3.3	Industrial Facility Inventory	Permittee shall update annually and made available to the KDOW upon request	The permittee shall maintain an inventory of all potential industrial and commercial sites/sources that could contribute pollutant loads to the MS4.	☑	❑	❑	❑	❑	N/A

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

TABLE 1.3 INDUSTRIAL PROGRAM REQUIREMENTS (IP)									
IP 2 Inventory and Inspection of Industrial Facilities									
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.3.4	"High Risk" Facility Definition	Review "High Risk" facility definition each permit cycle	The permittee shall identify Risk Factors to define facilities as "High Risk", "Moderate Risk" and "Low Risk".			❑			N/A
2.3.5	HRIF Inventory Update	Permittee shall summarize and report annually, the assessment and updates of any industrial facilities identified as "High", "Moderate", and "Low" risk	The permittee shall compare the datasets for local Approved HMPC Plan Facilities to the publicly available Facility data from local and state environmental and emergency response agencies to address the completeness and accuracy of High Risk Industrial Facilities identification. The permittee shall update the list of HRIFs at least once over the permit term, to account for the most recently available North American Industry Classification System (NAICS), Standard Industrial Classification (SIC) codes, Toxic Release Inventory (TRI) data, MSD's HMPC data and MSD's pretreatment program data with the goal of establishing a tiered list of industries to support priorities in MSD's industrial facility inspection program.			❑			N/A
2.3.6	High-Risk and Medium Risk Facilities	Permittee shall report the summary of prioritized inspections completed, and any enforcement resulting from the inspections.	Based on the results of the updated HRIF assessment, the permittee shall inspect high-risk facilities at least once every three (3) years and moderate risk facilities at least once every five (5) years.	☑	❑	❑	❑	❑	☑

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TABLE 1.3 INDUSTRIAL PROGRAM REQUIREMENTS (IP)									
IP 2 Inventory and Inspection of Industrial Facilities									
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.3.7	Industrial Facility Control Measures	Permittee shall report annually on control measures required of the high-risk industrial and commercial facilities to ensure compliance with this measure	The permittee shall require the High Risk industrial and commercial facilities to select, install, implement, and maintain control measures that promote prevention and source control for discharge of applicable pollutants of concern. This requirement may be addressed through Hazardous Materials (spill) Prevention Control (HMPC) Plan and/or federal programs such as SPCC Plan and/or the GPP that are already implemented at the industrial and commercial facilities. The permittee shall require the applicable facilities to identify the specific control measures, good housekeeping and maintenance procedures, and employee training necessary.	☑	❑	❑	❑	❑	☑
2.3.8	Enforcement / Inspections	Within six months of the permit issuance, the Permittee shall develop the required criteria or procedures to comply with this measure.	The permittee shall develop criteria or procedures for site inspections and enforcement including criteria to address how the MS4 will use enforcement authorities to ensure compliance with the industrial program requirements. The permittee shall enforce the procedures outlined in Section 95.11 of the Louisville Metro Code of Ordinances relating to hazardous materials.	☑	❑	❑	❑	❑	☑
2.3.9	MSD Plan Review	Permittee shall assess at least every three (3) years and report changes to process in the annual report	The permittee shall determine if existing triggers in the new development and redevelopment plan and plumbing systems review process are sufficient to include appropriate industrial stormwater quality specialists/inspectors in the plan approval process.	☑			❑		N/A

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TABLE 1.3 INDUSTRIAL PROGRAM REQUIREMENTS (IP)									
IP 2 Inventory and Inspection of Industrial Facilities									
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.3.10	Industrial & Commercial Community Outreach	The Permittee shall continue to identify materials developed and distribution estimates and summarize in the annual report	The permittee shall update as necessary and distribute outreach materials (brochure, fact sheets, etc.) to HMPC Facilities and other commercial operations of concern to promote illicit discharge elimination awareness.	☑	❑	❑	❑	❑	N/A
Cooperative Efforts (MSD provides supportive or other non-lead role)									
2.3.11	Third Party Oversight Inspection	Document training materials and the number of third party inspections conducted to be reported in the annual report	The permittee shall utilize third party inspections for development of recommendations of efficacy of permittee inspections and enforcement. Updates to training materials shall be administered for permittee personnel at least once per year, if necessary.	☑	❑	❑	❑	❑	N/A
2.3.12	KDOW Support	Permittee shall summarize and include in the annual report any assistance given to the KDOW by MSD	As KDOW requests, the permittee shall accompany KDOW on inspections of KPDES stormwater permitted facilities in Jefferson County.	☑	❑	❑	❑	❑	N/A

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TABLE 1.4 CONSTRUCTION SITE STORMWATER RUNOFF CONTROL REQUIREMENTS (CS)									
CS 1	**Legal Prohibition/Control Authority**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.4.1	Assess Legal Prohibition/Control Authority	Permittee shall summarize proposed changes enumerated by end of permit years one (1) and three (3) and report proposed changes in to Wastewater/Stormwater Discharge Regulations for consideration by MSD Board in the Annual Report	The permittee shall assess existing ordinance and regulations to identify changes needed to account for changes in standard of care (as directed by KDOW General Construction Permit KYR10), changes in technology, changes to development management process and related program needs in satisfaction 40 CFR 122.26(b)(15)(i) for construction activities that result in a land disturbance of greater than or equal to one acre and construction activity disturbing less than one acre that is part of a larger common plan of development that would disturb one acre or more.	☑		❑			☑
2.4.2	Implement Legal Prohibition/Control Authority	Permittee shall require routine inspections of active construction sites with reasonable potential to discharge to MS4. A summary of these inspections and any enforcement actions resulting from these inspections shall be included in the Annual Report	The permittee shall continue to enforce existing ordinances and regulations intended to limit construction phase stormwater quality impacts from new construction and significant redevelopment.	☑	❑	❑	❑	❑	☑
2.4.3	Site Plan Review	Permittee shall review plans as needed and report the number of plans reviewed in the Annual Report	The permittee shall conduct site plan reviews in accordance with the procedures outlined in Section 159.02 of the Louisville/Jefferson County Erosion Prevention and Sediment Control Ordinance to assess whether the plans include measures that address potential water quality impacts from construction prior to authorization of land disturbance.	☑	❑	❑	❑	❑	N/A

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TABLE 1.4 CONSTRUCTION SITE STORMWATER RUNOFF CONTROL REQUIREMENTS (CS)									
CS 1	**Legal Prohibition/Control Authority**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.4.4	Construction Site Inspection	Permittee shall continue to implement the criteria and/or procedures for site inspections.	The permittee shall develop and implement criteria and/or procedures for site inspection. The procedures shall include an Enforcement Response Plan outlined in Section 159.05 of the Louisville/Jefferson County Erosion Prevention and Sediment Control Ordinance.	☑	❑	❑	❑	❑	☑
2.4.5	Construction Site Inspection Frequency	Permittee shall report the number of inspections performed in the Annual Report	The permittee is required to conduct inspections bi-monthly of at least 90% of active sites.	☑	❑	❑	❑	❑	☑
2.4.6	Construction Site Inventory	Inventory continually updated as projects are permitted and projects are completed	The permittee shall maintain an inventory of all active public and private construction sites that result in a total land disturbance of greater than or equal to one acre and less than one acre that is part of a larger common plan of development. Inventory should include the project's name, address, contact person, inspection dates, and any enforcement actions issued to the project.	☑	❑	❑	❑	❑	N/A

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TABLE 1.4 CONSTRUCTION SITE STORMWATER RUNOFF CONTROL REQUIREMENTS (CS)									
CS 2 CS Management Activities									
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.4.7	Construction BMP Guidance Materials	Permittee shall update the Design Manual and Standards Specifications as needed and make the updates publicly available	As needed to account for changes in the KDOW general construction permit(s), the permittee shall update the guidance materials facilitating current technology use, local plan review/inspection requirements and related implications, Design Manual chapters and Standard Specifications sections to address EPSC and other construction phase (waste concrete, fueling and repairs operations, etc.) topics including BMP selection, feasibility, design considerations, operation, maintenance, inspection checklist and related matters.	☑	❑	❑	❑	❑	N/A
2.4.8	On-site SWPPP	Permittee shall document SWPPP procedures and expectations and make the procedures and expectations publicly available	The permittee shall continue the procedure for receiving Stormwater Pollution Prevention Plans (SWPPP) for qualifying construction sites.	☑	❑	❑	❑	❑	N/A
2.4.9	Construction Stormwater Runoff Control Program Inspection Refresher	Permittee shall complete refresher review with Construction inspectors annually, reporting the date and the number of attendees in the Annual Report	The permittee shall review inspector practices with individual MSD and contract inspectors to communicate/confirm oversight responsibilities, documentation requirements, and frequency of inspection, inspection standards and protocols. The refresher review (performed on-site) will include EPSC and non-EPSC construction stormwater control metrics, the most current KDOW General Construction Permit and the current USEPA MS4 Program Evaluation Construction Site Checklist.	☑	❑	❑	❑	❑	N/A

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TABLE 1.4 CONSTRUCTION SITE STORMWATER RUNOFF CONTROL REQUIREMENTS (CS)									
CS 2 CS Management Activities									
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.4.10	Construction Inspector Training	Permittee shall provide at least three (3) training opportunities annually reporting the date and the number of attendees in the Annual Report	The permittee shall continue construction inspector training program placing new emphasis on delivering similar messages and understanding between MSD inspectors (regular and contracted) and qualified local contractor inspectors.	☑	❑	❑	❑	❑	N/A
2.4.11	Local Utility Construction General Permit Entities	Permittee shall hold meetings with MSD's EPSC general permit holders as needed.	The permittee shall continue to coordinate policy level stakeholders from local utility agencies holding construction general permits from MSD to confirm inter-agency communication protocols and review changes to standard, policies, procedures, BMP operation expectations and related matters.	☑	❑	❑	❑	❑	N/A
2.4.12	MSD General Construction Permits Evaluations	Permittee shall evaluate all general permits by the end of Permit Year three (3); and report general construction permits issued by MSD in the annual report	Permittee shall evaluate all general permits by the end of Permit Year three (3); and report general construction permits issued by MSD in the annual report			❑			N/A
2.4.13	Enforcement Tracking Log/Database	Permittee shall summarize in the annual report. A summary of the tracked enforcement actions issued shall be included in the annual report.	The permittee shall continue to track enforcement actions issues (SWO/NOVs) to support follow-up inspections and issuance of penalties and/or Notice of Compliance.	☑	❑	❑	❑	❑	N/A

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TABLE 1.4 CONSTRUCTION SITE STORMWATER RUNOFF CONTROL REQUIREMENTS (CS)									
CS 2 CS Management Activities									
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.4.14	Third Party Oversight Inspection	Document training materials and the number of third party inspections conducted	The permittee shall utilize third party inspections for development of recommendations of efficacy of permittee inspections and enforcement. Updates to training materials shall be administered for permittee personnel at least once per year, if necessary.	☑	❑	❑	❑	❑	N/A
Cooperative Efforts (MSD provides supportive or other non-lead role)									
2.4.15	Plan Development Process Identification	Permittee shall make up-to-date guidance documents publicly available. A summary of the revised guidance materials shall be included in the Annual Report	The permittee shall review and update, as needed guidance materials identifying the process that developers must follow to obtain related construction permits, including process flow charts and checklists.	☑	❑	❑	❑	❑	N/A
2.4.16	Metro Construction Review Enforcement Coordination	Permittee shall hold at least one (1) conference every other year starting in Permit Year one (1)	The permittee shall coordinate program enforcement actions with Metro Inspections, Permits and Licensing (IP&L), as necessary, to support overall site compliance with an emphasis on Notices of Deficiency, Notices of Violation, and Stop Work Orders issued by MSD and implications on land disturbances and “in building” activities.	☑		❑		❑	N/A

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TABLE 1.5 POST-CONSTRUCTION (PC) STORMWATER RUNOFF CONTROL FOR NEW DEVELOPMENT AND REDEVELOPMENT									
PC 1	**Legal Prohibition/Control Authority**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.5.1	Assess Legal Prohibition/Control Authority	Permittee shall make assessments as needed, and report proposed changes in the WDR for consideration by MSD Board.	The permittee shall assess existing Wastewater/Stormwater Discharge Regulations and other relevant ordinances and regulations, to identify changes needed to account for changes in standard of care, changes in technology, changes to development management process and related program needs for new development and redevelopment projects that disturb greater than or equal to one acre and construction activity disturbing less than one acre, including projects less than one acre that are part of a larger common plan of development.	☑	❑	❑	❑	❑	☑
2.5.2	Implement Legal Prohibition/Control Authority	Permittee shall summarize enforcement actions in the annual report. The permittee shall include the number of inspections and enforcement actions	The permittee shall enforce existing ordinances and regulations intended to limit long-term stormwater quality impacts from new construction and significant redevelopment.	☑	❑	❑	❑	❑	☑
2.5.3	Site Plan Review	Permittee shall continue to conduct site plan reviews	The permittee shall conduct site plan reviews through procedures for reviewing development plans for compliance with stormwater management requirements.	☑	❑	❑	❑	❑	☑
2.5.4	Stormwater Infrastructure Inventory	Permittee shall update the GIS LOJIC System as data becomes available	The permittee shall continue to maintain the GIS-LOJIC layers incorporating system changes from new development plans, MSD projects and related system projects.	☑	❑	❑	❑	❑	N/A

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TABLE 1.5 POST-CONSTRUCTION (PC) STORMWATER RUNOFF CONTROL FOR NEW DEVELOPMENT AND REDEVELOPMENT									
PC 1	**Legal Prohibition/Control Authority**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.5.5	Post-Construction BMP Inventory Update	Permittee shall incorporate related data on an ongoing basis; Permittee shall assess data to identify and fill dataset gaps every other year	The permittee shall develop and maintain an inventory and map of post-construction stormwater controls, including retention ponds, detention basins, and stormwater quality treatment facilities. The permittee shall update LOJIC and HANSEN® datasets to reflect the location, extent, and condition of post-construction stormwater quality BMPs.	☑		❑			N/A
2.5.6	Post-Construction Inspector Training	At least two trainings per year for the inspectors of Post-Construction BMPs. Report in the annual report, the dates of training, # of attendees, and subject matter	The permittee shall provide training to the inspectors including internal staff that have been designated to inspect the effectiveness of the post-construction BMPs, as well as, the local residents who are required to provide operation and maintenance of privately-owned Post-Construction BMPs.	☑	❑	❑	❑	❑	N/A

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TABLE 1.5 POST-CONSTRUCTION (PC) STORMWATER RUNOFF CONTROL FOR NEW DEVELOPMENT AND REDEVELOPMENT									
PC 2	**PC Plan Maintenance and Update**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.5.7	Inspect "Credit" Basins	Permittee shall continue to perform spot check inspections for at least 50% of qualifying facilities annually and summarize for the annual report	The permittee shall inspect private flood control basins, (retention ponds) receiving a stormwater utility user fee credit (reduction) to determine ability to fulfill original, current, and projected drainage demands. Continue to enforce, per existing basin credits documentation requirements, necessary to fulfill maintenance agreements and long-term system integrity.	☑	❑	❑	❑	❑	N/A
2.5.8	Inspection Plan Procedures for Treatment BMPs	Permittee shall continue to perform spot check inspections for at least 20% of treatment BMPs annually. All BMPs should be inspected by the end of the permit cycle. A summary of this activity shall be included in the annual report	The permittee shall update inspection and oversight protocol for private stormwater quality treatment BMPs to facilitate long-term maintenance demands including requirements for qualified private inspection of private BMPs with local government oversight access inspection and controls, as needed.	☑	❑	❑	❑	❑	N/A
2.5.9	Post-Construction and Green Infrastructure BMP Guidance Materials	Permittee shall update the guidance materials specifically the Design Manual chapters and Standards Specifications sections and make the document publicly available	The permittee shall evaluate and update the guidance materials facilitating current technology use and to reflect local plan review, construction site inspection and post-construction inspection requirements. Design Manual chapters and Standard Specifications sections to address long-term BMP operation, inspection and maintenance including checklists. "Green Infrastructure" is a combination of natural and engineered infrastructure that is designed to reduce the environmental footprint of the system. In terms of stormwater, green infrastructure can effectively manage stormwater runoff through the use of infiltration, biofiltration, detention, and other stormwater management techniques.	☑	❑	❑	❑	❑	N/A

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TABLE 1.5 POST-CONSTRUCTION (PC) STORMWATER RUNOFF CONTROL FOR NEW DEVELOPMENT AND REDEVELOPMENT									
PC 2	**PC Plan Maintenance and Update**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.5.10	Plan Preparers & Reviewers Training (MSD Facilitates)	Permittee shall continue to offer at least two (2) events annually. A summary of workshops topics and attendance shall be submitted in the annual report	The permittee shall provide available content, such as EPA web casts, through periodic training classes, workshops and meetings for designers, planners, and developers including emphasis on green infrastructure, post-construction planning, and design procedures for structural and non-structural BMPs, pollutant removal and inspection. MSD shall incorporate comments from stakeholders in the plan review process from designers to internal MSD review staff to facilitate training sessions to address evolving technologies and lessons learned.	☑	❑	❑	❑	❑	N/A
2.5.11	Project DRI	Permittee shall provide program progress summarizing cost, number and type of projects in the annual report	The permittee shall continue to implement Drainage Response Initiative (DRI) program aimed at identifying and solving the local drainage problems in Jefferson County.	☑	❑	❑	❑	❑	N/A
2.5.12	User Fee Credits (Green Infrastructure Incentives) Program Planning	Permittee shall evaluate incentives as needed.	The permittee shall evaluate enhancements to the utility user fee credits program for green infrastructure and post- construction BMPs based on post-construction lessons learned.	☑	❑	❑	❑	❑	N/A
2.5.13	Stream Restoration Inspection and Maintenance	Permittee shall continue to provide in the annual report, summarized stream reaches and maintenance. Permittee shall assess or implement at least one restoration project per year starting in Permit Year two (2)	The permittee shall identify restored stream reaches that MSD has maintenance responsibilities. The permittee shall also determine status of restored reaches and identify, prioritize/schedule and implement maintenance needs. MSD shall prioritize, design, and implement restoration practices on at least one stream segment per year.		❑	❑	❑	❑	N/A

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TABLE 1.5 POST-CONSTRUCTION (PC) STORMWATER RUNOFF CONTROL FOR NEW DEVELOPMENT AND REDEVELOPMENT									
PC 2	**PC Plan Maintenance and Update**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.5.14	Certified/Qualified Construction BMP Inspector Program	Permittee shall continue to administer Qualified Post Construction Inspector training and include summary of activities in the annual report	The permittee shall enhance the Qualified Post Construction Inspector training program to identify and hold accountable third party private BMP inspectors to facilitate periodic operation and maintenance of private facilities resulting from the credits program, regulations changes and demonstration projects.	☑	❑	❑	❑	❑	☑
2.5.15	Stormwater runoff quality treatment standard for all new development and redevelopment projects	Permittee shall continue to administer a local treatment standard for addressing stormwater runoff quality.	The permittee shall continue to administer an on-site stormwater runoff quality treatment standard, to be adopted by ordinance or other regulatory mechanism for all new development and redevelopment projects at any location within Louisville Metro. The proposed local standard will require, in combination or alone, management measures that are designed, built and maintained to infiltrate, evapo-transpire, harvest and reuse stormwater runoff, or otherwise manage the stormwater runoff quality. The standard shall be based, at a minimum, on an analysis of precipitation records to determine the equivalent surface depth of runoff (e.g. 0.60 inches) produced from an 80th percentile precipitation event.	☑	❑	❑	❑	❑	☑

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

TABLE 1.5 POST-CONSTRUCTION (PC) STORMWATER RUNOFF CONTROL FOR NEW DEVELOPMENT AND REDEVELOPMENT									
PC 2	**PC Plan Maintenance and Update**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.5.16	Private BMP Maintenance Agreement Assessment/Long Term O & M	Permittee shall continue to require all new development and redevelopment projects to have this agreement	The permittee shall require all new development or redevelopment to establish and enter into a long-term maintenance agreement and maintenance plan approved management practices for property owners. Alternatively, the permittee may establish other enforceable mechanisms for requiring long-term maintenance of structural and non-structural BMPs. Such authorities shall allow the MS4, or its designee, to conduct inspections of the management practices and also account for transfer of responsibility in leases and/or deed transfers. The agreement shall also allow the MS4s, or its designee, to perform necessary maintenance or corrective actions neglected by the property owner/operator, and authority to recover costs from the property owner/operator when the owner/operator has not performed the necessary maintenance.	☑	❑	❑	❑	❑	☑
Cooperative Efforts (MSD provides supportive or other non-lead role)									
2.5.17	Green Infrastructure Demonstration Site(s)	Permittee shall report its role and activities, lessons learned, and overall project progress and summarize for the annual report	The permittee shall continue, in cooperation with Louisville Metro Mayor's administration, University of Louisville and other local agencies, to pursue development of stormwater quality and green infrastructure interpretative center(s) at strategic location(s) around Jefferson County with the intent of providing a positive highly visible platform to promote the viability and desirability of green infrastructure BMPs. Where feasible explore the opportunity for BMP evaluation and pre-/post-monitoring.	☑	❑	❑	❑	❑	N/A

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

TABLE 1.5 POST-CONSTRUCTION (PC) STORMWATER RUNOFF CONTROL FOR NEW DEVELOPMENT AND REDEVELOPMENT									
PC 2	**PC Plan Maintenance and Update**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.5.18	Rain Barrels Partnerships	Permittee shall report its role, lessons learned and overall programs progress and summarize for the annual report	The permittee shall explore the opportunity for MSD to continue program with Louisville Nature Center that provided public guidance to construct and maintain rain barrels.	☑	❑	❑	❑	❑	N/A
2.5.19	No Mow/Riparian Zone	Permittee shall report its role and activities, lessons learned, and overall project progress and summarize for the annual report	The permittee shall assess existing mowing areas as part of maintenance activities to determine if the original need or impetus still exists. Opportunities to adjust the mowing contracts to include or exclude mowing areas will be incorporated into those contracts as they are rebid or renewed. Areas that are removed from the mowing list will be considered for "no mow" signage and education.	☑	❑	❑	❑	❑	N/A
2.5.20	Urban Reforestation – MS4	Permittee shall report its role and activities, lessons learned, and overall project progress and summarize for the annual report	The permittee shall create a grant funding mechanism to provide incentives for the planting of trees in the MS4 area and improve tree canopy for the benefit of stream health and water quality. The co-permittee will budget to provide grant funding of private or public grantees to plant 1000 trees per year in the MS4. Funds will be administered in accordance with water quality goals, and on a first-come first-serve basis.	☑	❑	❑	❑	❑	N/A
2.5.21	Regional Basin Retrofit Analysis	Permittee shall by the end of Permit Year four (4) produce a technical memo outlining findings and recommendations	The permittee shall assess the regional flood control basins to determine if there is potential for enhancement to the basin or the outlet structure to provide additional capture for smaller water quality events. A technical memo and recommendation outline shall be provided prior to the end of Permit Year four (4).				❑		N/A

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

TABLE 1.6 GOOD HOUSEKEEPING/POLLUTION PREVENTION (GH/P2) PROGRAMS FOR MUNICIPAL FACILITIES									
GH/P2	**Plan Maintenance and Update**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.6.1	Stormwater Pollution Prevention Plans for MSD Operations	Permittee shall assess plans within six (6) months of major facility changes or at least once every two years by the facility superintendents and operation managers who make up the SWP3 Committee	The permittee shall periodically update and implement SWPPPs (also known as BMP Plans or Stormwater Plans) to control the discharge of pollutants from POTWs and other applicable MSD-owned facilities as defined in 40 CFR 122.26 including wastewater treatment plants and major operating facilities. SWPPPs will include provisions for maintenance activities on facility grounds, materials and equipment storage, security, preventative maintenance, risk identification and assessment, materials inventory, floor drain protection/controls, inspections and records.		❑		❑		N/A
2.6.2	Training on MSD Facility SWPPPs	Permittee shall starting in Permit Year one (1) utilize third party inspectors to address at least three (3) SWPPP issues annually and summarize training and attendance for the Annual Report	The permittee shall utilize third party inspectors working with the facility SWPPP Committees to perform routine training of key SWPPP issues	☑	❑	❑	❑	❑	N/A
2.6.3	Maintenance Staff Training on Pollution Prevention	Permittee shall report the number of staff attending related training and include in the Annual Report	The permittee shall provide training to key maintenance staff on good housekeeping activities related to stormwater quality in MSD operations including but not limited to: green infrastructure operation and maintenance, fleet and building maintenance, and stormwater conveyance/drainage system maintenance.	☑	❑	❑	❑	❑	N/A

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

TABLE 1.6 GOOD HOUSEKEEPING/POLLUTION PREVENTION (GH/P2) PROGRAMS FOR MUNICIPAL FACILITIES									
GH/P2	**Plan Maintenance and Update**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.6.4	Pesticides Management	Permittee shall track employees with related state certifications.	The permittee shall utilize Commonwealth of Kentucky pesticide management registration and certifications to qualify MSD employees applying pesticides. The permittee shall develop and maintain a list of pesticides used and stored, including storage locations.	☑	❑	❑	❑	❑	N/A
2.6.5	Incident Response Staff Training	Permittee shall continue to report incident response staff training participation	The permittee shall provide training to unified incident response staff on related stormwater issues including good housekeeping, IDDE, construction, post-construction BMP/controls and program management.	☑	❑	❑	❑	❑	N/A
2.6.6	MSD Capital Project Control	Permittee shall summarize changes to MSD Capital Project requirements, as necessary	The permittee shall, for MSD directed capital, rehabilitation and reconstruction projects, disturbing more than one acre, performed by a contractor, ensure the contract documents/agreements/work orders will include stipulations that require the work be designed/performed/implemented/constructed under the same standards for construction and post-construction stormwater quality that MSD requires of private development it regulates.	☑	❑	❑	❑	❑	N/A
2.6.7	MSD Stormwater Quality BMP Data	Permittee shall every other year assess datasets for completeness and ability to support staff scheduling stormwater-quality BMPs MSD is responsible for maintaining	The permittee shall update LOJIC and HANSEN® datasets to identify stormwater-quality BMPs located on MSD properties, rights-of-way and easements that MSD is responsible for operating and/or maintaining. The datasets will be updated in a manner to support ongoing prioritization and tracking of operation and maintenance.	☑		❑		❑	N/A

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

TABLE 1.6 GOOD HOUSEKEEPING/POLLUTION PREVENTION (GH/P2) PROGRAMS FOR MUNICIPAL FACILITIES									
GH/P2	**Plan Maintenance and Update**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.6.8	Catch Basin and Storm Sewer Cleaning	Permittee shall summarize and include in the Annual Report	The permittee shall continue to clean catch basins and sewers (closed pipe systems) to prevent debris from entering receiving streams and address drainage/flooding issues in MSD area based on known priorities and information gathered from the customer hotline.	☑	❑	❑	❑	❑	N/A
Cooperative Efforts (MSD provides supportive or other non-lead role)									
2.6.9	Channel Maintenance	Permittee shall summarize and include in the Annual Report	The permittee shall continue to maintain open channel system in MSD area based on priorities and information from the customer hotline including ditch cleanings, ditch regrading, drainage obstruction removals, erosion repairs, floodwall levee maintenance, headwall install/repair, concrete channel installation, tree removal, driveway apron restoration, routine mowing and closed pipe installations.	☑	❑	❑	❑	❑	N/A
2.6.10	Stormwater Pollution Prevention Plans for Co-Permittee Operations	Permittee shall assist in the review of at least one (1) facility annually	The permittee shall provide co-permittees with periodic 3rd-party technical assistance and/or review of the facility stormwater pollution prevention plans (SWPPPs, BMP plans, or Stormwater Plans and BMPs) and/or site visit/walkthrough to help identify opportunities to improve the effectiveness of the plans and their implementation.	☑	❑	❑	❑	❑	N/A

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

TABLE 1.7 MONITORING (M)									
M	**Monitoring Plan Maintenance and Update**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.7.1	Long-Term Monitoring Network (LTMN)	Permittee shall provide datasets electronically with annual report.	The permittee shall continue the existing program of the collection of long-term data on stream quality and habitat for at least 28 LTMN locations selected to support the various types of data collected. This program includes: **Continuous** – pH, conductivity, temperature, dissolved oxygen, and stream flow. **Quarterly** – Ambient monitoring for Total Suspended Solids (TSS); E. coli; Total Nitrogen (as N) Oil and Grease, Total Recoverable Copper and pH. **5/month (May-October)** - Recreational monitoring for E. coli. **Once Every Two Years** – Biological sampling and/or evaluation rotating to include: algae, fish and benthic macro invertebrates.	☑	❑	❑	❑	❑	N/A
2.7.2	Monitoring Summary	Permittee shall summarize and include in annual report	The permittee shall provide a summary of monitoring collection efforts and results in the annual report.	☑	❑	❑	❑	❑	N/A
2.7.3	Trend Analysis	Permittee shall, at least once per permit cycle, provide synthesis report	The permittee shall perform trend analysis to support long-term assessments of local waterways and program performance. Report analysis through the "Synthesis Reports" at least once every permit cycle.					❑	N/A

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

TABLE 1.7 MONITORING (M)									
M	**Monitoring Plan Maintenance and Update**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.7.4	Flow Estimate to Support Quarterly Ambient Monitoring	Permittee shall provide available data and include in annual reports	The permittee shall utilize total precipitation estimates over the previous twenty-four (24) hour period to estimate flow. When flow is measured with in stream gauging equipment, that data will be utilized rather than precipitation based estimates.	☑	❑	❑	❑	❑	N/A
2.7.5	Monitoring Location Maintenance	Permittee shall summarize activities and include in annual reports	The permittee shall continue its collaboration with United States Geological Survey (USGS) on flow gages and monitoring locations maintenance and data management.	☑	❑	❑	❑	❑	N/A
2.7.6	Precipitation Estimate	Permittee shall continue to make rain gage network data available on-line	The permittee shall continue to maintain the continuous rain gage network and on-line public access to that data.	☑	❑	❑	❑	❑	N/A
2.7.7	Water Quality Standards	Permittee shall apply the most stringent standard	The permittee shall compare stream monitoring analytical results to the applicable water quality standards for each parameter of the monitoring program. The most stringent applicable standard shall be used for comparison. Constituents that exceed applicable Water Quality Standards shall be highlighted. The permittee shall include a discussion of possible pollutant sources through the annual report.	☑	❑	❑	❑	❑	N/A
2.7.8	Location Mapping	Permittee shall maintain the monitoring stations reflected in mapping system	The permittee shall maintain the geo-coded monitoring station locations and descriptions through related geographic datasets and databases.	☑	❑	❑	❑	❑	N/A

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

TABLE 1.7 MONITORING (M)									
M	**Monitoring Plan Maintenance and Update**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.7.9	Sampling Methodology and Test Procedures	Permittee shall perform the sampling methodology to insure compliance with 40 CFR 122.26 and 136, and provide a summary of as-needed updates to the QAPP in the annual report	The permittee shall perform the sampling methodology according to the EPA stormwater application regulation at 40 CFR 122.26. The permittee shall perform the analyses according to the procedures approved under 40 CFR Part 136, unless other test procedures have been specified. The permittee shall assess the monitoring Quality Assurance Project Plan (QAPP), and update as needed.	☑	❑	❑	❑	❑	N/A
2.7.10	Annual Data Summary	Permittee shall provide a summary electronically with the annual report	The permittee shall submit a stormwater monitoring report annually. The monitoring reports shall include: status of implementation of the monitoring program, methods of evaluating data, graphical summaries of the data, and an explanation/discussion of the data for each component of the monitoring program. The monitoring data/results obtained each year will be submitted electronically with the Annual Report. A narrative data analysis shall be submitted annually within the Annual Report.	☑	❑	❑	❑	❑	N/A

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

TABLE 1.8 PERFORMANCE ASSESSMENT AND REPORTING (PAR)									
PAR	**Performance Assessment and Reporting**								
SWQMP ID	**Element Task**	**Frequency or Measure of Success**	**Activity Required**	**PY 1 6/17**	**PY 2 6/18**	**PY 3 6/19**	**PY 4 6/20**	**PY 5 6/21**	**Legal Auth**
2.8.1	Activity Measures Reporting	Permittee shall develop and retain Annual Reports for three years beyond permit term.	As described in the specific activity listings, the permittee shall compile information necessary to provide in the annual report. The metrics defined by "Measure of Success" shall be reported and kept for program assessment purposes. The permittee shall track the appropriate metrics through existing databases/spreadsheets to support staff assignments and budget development.	☑	❑	❑	❑	❑	N/A
2.8.2	PEOPLE	Permittee shall, by the end of Permit Year one (1), summarize tracking procedures and results and include with Annual Report.	The permittee shall continue activity tracking to support consistent coordination and integrated reporting in a way that enables the variety of MSD staff to report their individual activities, target audiences, and related metric.	☑	❑	❑	❑	❑	N/A
2.8.3	Illicit Discharge Trend Analysis	Permittee shall provide, during Permit Year Five (5) a report of trends and potential implications of IDDE investigations.	The permittee shall perform a trend analysis of illicit discharge investigations and enforcement actions over the term of the permit.					❑	N/A
2.8.4	Industrial/IDDE Compliance Actions Portal	Permittee shall maintain and report progress summarized in the Annual Report.	The permittee shall maintain a Compliance Actions Web Portal supplementing existing databases for functionality for internal use to expedite follow-up inspections of HRIFs.	☑	❑	❑	❑	❑	N/A
2.8.5	Post-Construction Inspection Portal	Permittee, shall maintain and report progress summarized in the Annual Report.	The permittee shall maintain a Compliance Actions Database for internal use to expedite follow-up inspections of private post-construction BMPs.	☑	❑	❑	❑	❑	N/A
2.8.6	Six-Level Program Assessment Methodology	Permittee shall continue to assess performance with the six-level program and report on progress in Annual Reports	The permittee shall continue to evaluate and report portions of the six-level program EPA began advocating in 2008 to assist MS4 programs in identifying success and future areas of focus.	☑	❑	❑	❑	❑	N/A

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

TABLE 1.8 PERFORMANCE ASSESSMENT AND REPORTING (PAR)									
PAR	**Performance Assessment and Reporting**								
2.8.7	Cooperative annual report	Permittee shall prepare and submit Annual Report in a timely manner	The permittee shall coordinate and cooperate with co-permittees in compilation of the annual compliance demonstration reports	☑	❑	❑	❑	❑	N/A

Schedule/Applicability Key: ❑ = Due in Permit Year (PY), ☑ = Scheduled/completed in PY

CHAPTER 2 MSD FOURTH PERMIT CYCLE PROGRAM (FACT SHEETS)

2.0 MSD ASSESSMENT & TRACKING APPROACH

The MS4 permit includes a table that outlines compliance measures for programmatic activities. Each item in this permit table was addressed in the narrative description provided in the SWQMP, submitted to KDOW in July 2017. For this report, a summary of activities and performance during the reporting year is provided in the following sections:

- Section 2.1 – Public Education, Outreach, Participation, and Learning Experiences (PEOPLE)
- Section 2.2 – Illicit Discharge and Detection (IDDE)
- Section 2.3 – Industrial Stormwater Program Requirements (IP)
- Section 2.4 – Construction Site Stormwater Runoff Control (CS)
- Section 2.5 – Post-Construction Controls (PC)
- Section 2.6 – Good Housekeeping/Pollution Prevention (GH/P2)
- Section 2.7 – Monitoring (M)
- Section 2.8 – Program Assessment and Reporting (PAR)

In each section, the needed information is delivered in the following format for each permit table item:

[Minimum Control Measure Heading] General Public – Direct Interaction					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
[ID #]	**[Permit language]** The permittee shall integrate MS4 stormwater quality topics in to existing print mass media, local government cable channel, social marketing materials, and/or new materials with the intent of affecting behavior change.	**[When does Measure Need to be Accomplished?]** Annually	**[Permit Language]** Report the number of potential households and estimate the numbers of households were reached.	**[Permit Year Achievement for the Specific Metric]** Materials integrated into over 4 media forums	**[Are we proposing a change to the SWQMP?]** No

[Narrative description of activities performed is provided here for each permit table item]

2.1 PUBLIC EDUCATION, OUTREACH, PARTICIPATION AND LEARNING EXPERIENCES (PEOPLE)

PEOPLE General Public & Stakeholder Education Program					
General Public – Mass Media Integration/Distribution					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.1	The permittee shall integrate MS4 stormwater quality topics in to existing print mass media, local government cable channel, social marketing materials, and/or new materials with the intent of affecting behavior change.	Annually	Report the number of potential households and estimate the numbers of households were reached.	Materials integrated into over 5 media forums and to 252,000 customer accounts.	No

MSD educates the public through mass media message integration and distribution including newspaper advertisements, MetroTV, MSD publications, press releases, brochures/flyers, and social media. The main forums for distribution of information on stormwater quality topics are provided below:

- **Local Media Advertisement**: For the current reporting period, MSD published 18 ads in the: Louisville Magazine, Business First, and the Courier Journal (Derby edition).
- **Television**: MetroTV (Channel 25 or *www.louisvilleky.gov/MetroTV*) runs MSD public meetings, how-to demonstrations, and stormwater informational topics. The current reporting period *totaled over 152 hours of air time.*
- **MSD Publications**:
    - **Streamline** – 12 issues per year *at www.louisvillemsd.org/publications*. During the reporting period, the *StreamLine* newsletter was sent monthly to approximately 988 recipients via electronic GovDelivery distribution. Print distribution included approximately 335 postal mailings. Additional print copies are made available for customers in the main office reception area.
    - **Bill Inserts** – Two bill inserts were published during this reporting period for the billing cycles of August/September and February/March, reaching approximately 252,000 customer accounts per distribution.
- **Press Releases**: See Activity 2.1.8 – News Media – Press Releases.
- **Social Media**: MSD updates its Facebook and Twitter accounts (@LouisvilleMSD), with campaigns to raise awareness for safe, clean waterways. Social analytics track followers and impressions on a monthly basis. At the close of this reporting period, MSD had 917 Facebook likes and 1,577 Twitter followers. During the reporting period, MSD averaged 1,007 impressions per post per month on Twitter. From January, 2017, through June, 2017, MSD averaged 553 impressions per post per month on Facebook.
- **Print Media**: On April 26, 2017, MSD's Executive Director published an Op-Ed in the Courier Journal discussing the need to reinvest in Louisville's stormwater, flood protection, and sewer infrastructure.

MSD will continue general public outreach through mass media in the next permit year.

PEOPLE General Public & Stakeholder Education Program					
General Public – Direct Interaction					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.2	The permittee shall present the "Key Messages" at community events, through the use of a display booth, "enviroscape" or other direct personal integration approaches.	Annually	Permittee shall present educational materials to the public at least six (6) event days per year; update booth material annually. Provide summary of the educational activities in annual report.	Participation at 37 events.	No

General public education through direct interaction at community events continues to be conducted using the key messages for stormwater quality as the primary focus.

MSD participated in approximately 37 outreach events throughout the community during the reporting period, including events such as: the Louisville Free Public Library's Summer Reading Program, River Sweep, and the Adventures in Water Festival. A detailed list of events is provided in **Appendix 2.1.2 – Outreach Events Summary**.

MSD will continue general public outreach through direct interaction events in the next permit year.

PEOPLE General Public & Stakeholder Education Program					
General Public – Meeting Topic Integration					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.3	The permittee shall integrate MS4 stormwater quality topics, as feasible and appropriate into other MSD sponsored public meetings.	Annually	Permittee shall integrate water quality topics in MS4 public meetings at least six (6) events per year; provide summary of the events in the Annual Report.	Key messages integrated in 19 events.	No

MSD facilitates and sponsors public meetings throughout the year to meet, interact and educate the public on a variety of topics and/or projects. As part of MSD's core values, MSD communicates the importance of public health, safety and protection, including messages related to the stormwater quality. Where feasible and appropriate, MSD incorporates stormwater quality topics and educational materials into MSD-sponsored public meetings and events held for other programs including the Integrated Overflow Abatement Plan (IOAP), Wet Weather Team and Pardon Our Dust. During the reporting period, events included:

- August 30, 2016 – Southwestern Pkwy CSO Storage Basin: Stakeholder Kickoff Meeting
- September 29, 2016 – Portland CSO Basin Interceptor Relocation: Pardon Our Dust
- October 11, 2016 – Story & Main CSO Basin: Update Meeting
- October 18, 2016 – Lexington & Payne CSO Basin: Update Meeting
- October 25, 2016 – CSO190 Green Infrastructure Phase 2: Construction Meeting
- November 1, 2016 – Southwestern Parkway CSO Basin: Stakeholder Meeting
- November 15, 2016 – I-64 & Grinstead CSO Basin: Advanced Design Meeting
- November 29, 2016 – Southwestern Parkway CSO Basin: Construction Meeting
- December 13, 2016 – Wet Weather Stakeholder Team Meeting
- January 3, 2017 – Clifton Heights CSO Basin Force Main Extension: Public Meeting
- January 10, 2017 – Southwestern Parkway CSO Basin: Stakeholder Meeting
- February 10, 2017 – Ohio River Tunnel: Stakeholder Meeting
- March 1, 2017 – Ohio River Tunnel: Stakeholder Meeting
- March 14, 2017 – Ohio River Tunnel: Stakeholder Meeting
- April 18, 2017 – Wet Weather Stakeholder Team Meeting
- April 18, 2017 – Southwestern Parkway CSO Basin: Construction Meeting
- May 30, 2017 – Clifton Heights CSO Basin Force Main Extension: Construction Meeting
- June 1, 2017 – Camp Taylor Sanitary Sewer Replacement Project: Construction Meeting
- June 27, 2017 – Portland CSO Basin: Construction Meeting

Over the reporting period, MSD initiated public meetings throughout Louisville Metro to communicate the Critical Repair and Reinvestment Plan. Over 1,400 community members attended one of 35 community meetings held. MSD received over 400 responses to the plan's survey. The Critical Repair & Reinvestment Plan Community Conversation report, updated June 1, 2017, is provided in **Appendix 2.1.3 – Critical Repair & Reinvestment Plan Community Conversation Report**.

MSD will continue general public outreach through topic integration in the next permit year.

PEOPLE General Public & Stakeholder Education Program					
Volunteer Programs Participation, Promotion or Support					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.4	The permittee shall participate in, facilitate, encourage or support volunteer program opportunities on a case by case basis to optimize resources and potential to affect behavioral changes through participation events.	Annually	Permittee shall have direct participation in at least three (3) events per year; and promote additional two (2) events per year, provide summary of volunteer opportunities the permittee participated, facilitate, or supported in the Annual Report.	Promoted nine events and participated in each of these nine events.	No

MSD promotes and facilitates local environmental responsibility in the community to encourage volunteer participation. MSD continues to promote, participate in and make community watershed related events available. Promotion of events continues to be determined on a case-by-case basis, but routinely includes the following organizations: Salt River Watershed Watch, Louisville Nature Center, Jefferson Memorial Forest Interpretive Center, and ORSANCO.

MSD promoted and participated in each of the following events:

- September 10, 2016 – Regeneration Fair
- September 20, 2016 – Salt River Watershed Watch Training Workshop
- September 29, 2016 - Canoemobile
- October 4, 2016 – Floyds Fork Educational Tour
- October 4, 2016 – Water Wonders
- March 3, 2017 – Home, Garden, & Remodeling Show
- April 17,19, 21, 2017 – Mayor's Give-A-Day
- June 17, 2017 – Family, Farm, & Forage Day
- June 17, 2017 – River Sweep

More information on public events is provided in **Activity 2.1.2 – General Public – Direct Interaction** and **Appendix 2.1.2 – Outreach Events Summary**.

MSD will continue general public outreach through volunteer programs in the next permit year.

PEOPLE General Public & Stakeholder Education Program					
MetroCall Hotline and MSD Customer Relations					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.5	The permittee shall provide support to the 24-hour central reporting hotline "Metro Call" and internet communication channels for use by the public and MSD employees to report complaints, spills, and illegal dumping.	Annually	Permittee shall provide a summary of MS4 complaints and comments received in the Annual Report.	Database maintained.	No

MSD's Customer Relations Call Center is staffed 24 hours per day, seven days per week and responds to customer calls and web requests for service. Requests are recorded and coded in the HANSEN®/MIDAS database and routed to the appropriate staff for follow-up. Responses are recorded in the database. The department also assists walk-in customers.

In FY15, MSD began implementation of the Effective Utility Management (EUM) program, which includes metrics for customer satisfaction. Through this program, MSD tracks customer data through four best practice areas: Minimize Customer Complaints, Achieve Target Level of Customer Service, Receive Positive Customer Perceptions, and Efficiently Deliver Customer Service. A summary of the Customer Satisfaction FY17 Year End Report is provided in **Appendix 2.1.5 – Customer Satisfaction FY17 Year End Report**.

For more information on customer calls specific to illicit discharges, see **Activity 2.2.3 – Public Illicit Discharge Report Investigation**.

MSD will continue supporting customer calls in the next permit year.

PEOPLE General Public & Stakeholder Education Program					
Elected Officials					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.6	The permittee shall attend and participate at the discretion of Mayor's office and Louisville Metro Council members to address resident's concerns and questions.	Annually	Permittee shall provide a summary of its attendance of meetings at Mayors and/or Council Member's discretion in the Annual Report.	41 meetings at the request of elected officials.	No

The Mayor's Office: MSD participates in Metro Council Committee and public meetings as requested by the Mayor's office or council representatives. Public meetings address residents' concerns and questions pertaining to sewers, drainage, flood control, water quality, and the MS4 program. Community suggestions and requests received at meetings are placed in the city tracking database for follow-up.

Metro Council District Meetings: Louisville Metro Council meetings are held bi-monthly and are shown on Louisville MetroTV Channel 25. Metro Council District Meetings are open and available to the public to attend. MSD staff attends Metro Council and District meetings as needed to address council members' concerns. Upcoming meetings with elected officials are often published in MSD board packets at:
http://msdrecords.louisvillemsd.org/openmsd/board.aspx.

For the current reporting period, MSD representatives participated at the request of and in support of Metro Government elected officials at approximately 41 meetings, as provided in **Appendix 2.1.6 – Elected Official Meetings**.

In addition, the Critical Repair and Reinvestment Plan community conversation messages held throughout the reporting period closely involved metro council members (see **Activity 2.1.3 – General Public – Meeting Topic Integration**).

MSD will continue supporting elected officials at meetings in the next permit year.

PEOPLE General Public & Stakeholder Education Program					
Public Speakers					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.7	The permittee shall provide speakers to various community stakeholder groups that could benefit from environmental stormwater information.	Annually	Permittee shall provide public speakers to various community stakeholders at least six (6) events per year.	Public speakers at 91 events.	No

MSD provides speakers to various community, special interest, and civic groups upon request to promote community awareness and involvement in stormwater quality topics and activities. MSD staff continues to attend and participate in community group meetings to educate and promote involvement of stakeholders in stormwater quality activities. Speaking events for community groups are determined on a case-by-case basis, but routinely include: home builders and contractors associations, school audiences, planning agencies, watershed agencies, neighborhood associations, community clubs, boy/girl scouts and other service organizations.

During the reporting period, public speaking events were held for numerous stakeholder groups, as provided in **Activities 2.1.2 General Public – Direct Interaction** and **2.1.3 General Public – Meeting Topic Integration**.

This included 37 direct interaction events, 19 additional public meetings where stormwater messages were integrated, and 35 Critical Repair and Reinvestment Plan meetings for a total of 91 events.

MSD will continue public outreach through meeting speakers in the next permit year.

PEOPLE General Public & Stakeholder Education Program					
News Media – Press Releases					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.8	The permittee shall provide press releases to the local news media highlighting opportunities for the public to participate in outreach and involvement events to make a positive difference through behavior change.	Annually	Permittee shall provide at least two (2) press releases per year highlighting public participation opportunities.	Nine press releases published.	No

MSD provides press releases to the local news media via GovDelivery. Press releases typically highlight MSD events and program updates. Stormwater public outreach and education is directed through the social media tools of Twitter and Facebook. Public service announcements are made at monthly MSD Board meetings, which are open to the press and members of the public.

The following press releases were distributed during the reporting period:

- August, 2016 – Aging Infrastructure and Heavy Rains Contribute to Street Cave-In
- September, 2016 – MSD to Install Floodwall Closure on Dixie Highway at Kosmodale
- November, 2016 – MSD to Honor its Military Veterans in Ceremony
- November, 2016 – With Flood Season Here, MSD to Test Floodwall Closure
- December, 2016 – MSD Breaks Ground on $60M Underground Shawnee Park Basin
- December, 2016 – MSD to Break Ground on $60M Underground Shawnee Park Basin
- January, 2017 – “Can You Dig it?” session to outline $250M in MSD projects for 2017
- March, 2017 – Value of Water – MSD Executive Director Tony Parrott speaks at Congressional Hearing
- May, 2017 – MSD Board Approves 2017 Preliminary Rate Resolution
- June, 2017 – Local Utilities Announce Shoreline Cleanup Event (Ohio River Sweep)

MSD also posts announcements on the Louisville MSD website, *www.louisvillemsd.org*, and on social media. Press releases and updates from MSD Board and public meetings are often picked up by local news media, providing earned media credit for MSD events and programs.

MSD will continue public education through press releases in the next permit year.

PEOPLE General Public & Stakeholder Education Program					
MSD Website					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.9	The permittee shall review and revise the website with the "Key Messages" content and other related PEOPLE plan elements.	PYs 2 & 4	Permittee shall report summary of updates in the Annual Reports of Permit Years 2 and 4.	Website updated.	No

The MSD website, *www.louisvillemsd.org*, includes key stories on the homepage and links to departmental pages.

The Stormwater Quality page, was included in the main page website redesign and updated in 2016. The page includes links to the Stormwater Quality Management Plan, the MS4 permit, and the MS4 Annual Report: *www.louisvillemsd.org/WaterQuality.*

MSD will continue to provide public education through website in the next permit year and assess the need for updates in permit years 2 and 4.

PEOPLE General Public & Stakeholder Education Program					
Behavior Change Assessment Survey					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.10	The permittee shall perform a statistical survey to gauge the population's knowledge of stormwater quality issues and establish baseline to assess the changes in behavior and outreach program effectiveness. The permittee shall utilize the survey results to refocus and reprioritize PEOPLE activities.	PYs 1 & 4	Permittee shall provide summary in the Annual Report of the Baseline Survey in Permit Year one (1) and the Behavior Assessment in Permit Year four (4).	Survey scheduled for PY 1.	No

During the previous permit cycle, MSD conducted phone surveys, focus groups, and online surveys to assess public knowledge and behavior. Analysis of the August 2015, survey results found favorable shifts in awareness of and attitudes towards a number of issues compared to the 2013, baseline, including waterway protection (+11.0%), willingness to take action (+6.3%), runoff and flooding given as reasons for polluted waterways (+25.8%) and rating the overall quality of local waterways as fair or poor (+19.3%). It finds unfavorable shifts in other areas, like lack of desire to use local waterways for recreational purposes due to pollution (+7.0%). Overall, citizens view the current state of Jefferson County's waterways as an issue and are willing to help combat waterway pollution, but still lack knowledge of relevant details, such as the causes of rainwater runoff pollution.

Renewal of a follow-up public survey is scheduled to be completed by June 30, 2018.

MSD will continue assessment of its public education program by conducting a behavior change survey in the remainder of this permit year and review results and trends in the next permit year.

PEOPLE General Public & Stakeholder Education Program					
Building Industry Association of Greater Louisville Land Development Committee Monthly Meetings and Developer Advisory Group					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.11	The permittee shall attend Building Industry Association of Louisville land development committee and Developer Advisory Group meetings to address concerns and comments from the local homebuilder professional and provide information regarding changes in procedures, checklist, regulations, etc.	Annually	Permittee shall participate in at least 75% of the meetings annually.	100% attended.	No

MSD attends the Building Industry Association of Greater Louisville (BIA Louisville), formerly the Homebuilders Association, Land Development Committee meetings to address concerns and comments from local homebuilder professionals and to provide information regarding changes in procedures, checklists, regulations, etc. MSD participates in these meetings regularly and anticipates that meetings will continue to play an important role in receiving information from the development community about their challenges to implement MSD's expectations.

For the reporting period, MSD attended 12 monthly meetings of BIA Louisville Land Development Committee.

MSD will continue participating in BIA Louisville meetings in the next permit year.

PEOPLE General Public & Stakeholder Education Program					
Greater Louisville Inc. Environmental and Water Committees					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.12	The permittee shall participate in committee meetings to address concerns and comments from key local development professionals and provide information regarding changes in construction procedures, checklist, regulations, etc.	Annually	Permittee shall participate in at least three (3) events per year.	Participated in 11 meetings.	No

MSD participates in committee meetings to address concerns and comments from key local development professionals and provide information regarding changes in construction procedures, checklists, regulations, etc. MSD participates in these meetings regularly, typically at least three annually, and anticipates that the venue will continue to play an important role in receiving information from the industrial, commercial and development communities about their challenges to implement MSD's expectations.

Greater Louisville, Inc. meetings are generally held on the second Wednesday of every month. A summary of meetings attended is provided in **Appendix 2.1.12 – Greater Louisville Inc. Environmental & Water Committee Summary**.

MSD will continue participating in Greater Louisville Inc. meetings in the next permit year.

PEOPLE General Public & Stakeholder Education Program					
Construction Operators					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.13	The permittee shall make available educational materials and/or multimedia presentations for the construction industry related to point and non-point source pollution, green infrastructure and stormwater pollution prevention measures for operational procedures and erosion and sediment controls.	Annually	Permittee shall evaluate educational materials and/or multimedia presentations for the construction industry related to point and non-point source pollution and stormwater pollution annually.	Materials updated and available.	No

On an annual basis, MSD evaluates and updates its educational materials and presentations related to point and non-point source pollution, green infrastructure and stormwater pollution geared toward the construction industr. MSD updated the Design Manual in recent years, including EPSC (Chapter 12) in 2015, and Green Infrastructure (Chapter 18) in 2016. Minimization of site disturbance as well as preservation and conservation of natural site design features are included in the Design Manual.

The manual is available at: www.msdlouky.org/insidemsd/standard-drawings.htm.

During this reporting period, the Construction Field Day was held on February 28, 2017, to educate the construction and development community.

MSD will continue to provide educational materials to construction operators during the next permit year.

PEOPLE General Public & Stakeholder Education Program					
Rain Garden Outreach					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.14	The permittee shall maintain and update rain garden handbook with the intent of general public outreach. Consider expanding use to support residential, non-residential, professional, and non-professional audiences. The permittee shall evaluate changes and make updates at least every even numbered year.	PYs 2 & 4	Permittee shall estimate handbook distribution and report in the Annual Report.	Handbook updated and available, with over 2,000 distributed.	No

MSD maintains and updates a rain garden handbook outlining best practices for design and construction of green BMPs. The handbook is written for non-technical audiences.

During the reporting period, MSD updated the rain garden handbook. The fourth edition includes an updated design guide and sample plant list. It is available at: http://louisvillemsd.org/GreenMSD

Residential rain gardens provide valuable on-site treatment to improve stormwater quality and limit the volume of stormwater that enters the sewer system. Installation of rain gardens at private residential properties continues to be encouraged through educational campaigns, demonstration projects, and incentives to residents. MSD continued to partner with the Kentucky Waterways Alliance Every Drop Program, which works with homeowners to install rain gardens and other practices in the Beargrass Creek watershed.

During the current reporting period, MSD worked with Jefferson County Public Schools (JCPS) to include over 2,000 rain garden handbooks in the science unit packages for each elementary school. Handbooks are also distributed at public outreach events with native seed packets.

MSD will continue to make the rain garden handbook available in the next permit year.

PEOPLE General Public & Stakeholder Education Program					
Green Infrastructure Demonstration Projects					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.15	The permittee shall monitor previously identified and constructed projects in outreach efforts aimed at demonstrating the feasibility and effectiveness of green infrastructure including, but not limited to rain gardens, green roofs, pervious pavement, bio-swales and infiltration. Prioritize, select and implement projects to support a variety of residential, non-residential, professional and non-professional audiences in MSD and co-permittee areas. Where feasible collaborate and/or cooperate with local government agencies, schools, co-permittees and/or private properties with significant use and exposure to the general public.	Annually	Permittee shall provide a Summary Report of Green Infrastructure demonstration projects in the Annual Report.	Green infrastructure demonstration project update provided in Activity 2.5.17 – Green Infrastructure Demonstration Sites.	No

MSD has constructed several highly visible green infrastructure demonstration projects to encourage the public to adopt green practices. Example projects include rain gardens, pervious pavement, bio-swales, tree boxes and infiltration trenches. MSD continues to collaborate with the Mayor's office, the Louisville Downtown Partnership, the University of Louisville (UofL), and Louisville Metro to implement projects and maximize public opportunities to raise public awareness. Projects often include signage that describes the practices. Sites are often included in green infrastructure tours for conferences and community groups. In the current reporting period, this included working with Louisville Downtown Management District to install porous pavement in downtown tree wells. These efforts have raised awareness of green infrastructure in the community. An update on green infrastructure demonstration projects is included in **Activity 2.5.17 – Green Infrastructure Demonstration Sites**.

MSD partners with Louisville Metro's Department of Sustainability to provide matching funding and support for green infrastructure projects. More information on this partnership is provided in **Activity 2.1.18 – Louisville Metro Office of Sustainability**.

During the reporting period, MSD conducted a rain garden workshop at Maupin Elementary on April 19, 2017. Activities included interactive demonstrations where students and teachers performed rain garden maintenance and prepared native seeds for planting. Participants learned about the value of native plants and the water quality benefits that rain gardens have on downstream waterways.

MSD will continue to maintain demonstration projects as outreach opportunities in the next permit year.

PEOPLE General Public & Stakeholder Education Program					
Public Notification of Major Program Changes					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.16	The permittee shall maintain a web site-based system to notify the public and affected stakeholders of proposed major program changes that will significantly impact stormwater runoff quality, negatively or positively. The public shall be given the opportunity to informally comment on proposed changes.	Annually, as needed	Permittee shall maintain and update as needed the notification system or program changes.	System in place.	No

MSD currently provides notification to the public and stakeholders regarding proposed program changes that will significantly impact stormwater quality negatively or positively through press releases, the Stormwater Quality website, and public MSD Board Meeting announcements. The website includes a form for public questions and comments. In addition, members of the public who wish to provide comment on pending MSD Board decisions may request to speak at board meetings. There were no major program changes during the reporting period.

MSD will continue to maintain the public notification system in the next permit year.

PEOPLE General Public & Stakeholder Education Program					
Cooperative Efforts (MSD provides supportive or other non-lead role)					
Jefferson County MS4 Workgroup – Communication					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.17	The permittee shall participate in the Jefferson County MS4 Co-Permittee Workgroup meetings discussing program progress, challenges, activity changes, shared activity requests communication needs and lesson learned.	Annually	Permittee shall attend at least two (2) meetings per year.	Nine co-permittee workgroup meetings held.	No

The Jefferson County MS4 Workgroup is comprised of Jefferson County MS4 communities that are co-permitted with MSD. The meetings, usually held at MSD, promote discussion among co-permitted communities on program progress, challenges, activity changes, shared activity requests, communication needs and lessons learned. MSD continues to lead and facilitate the Jefferson County MS4 Workgroup meetings at least twice per permit year.

During this reporting period, the group met nine times and updated the SWQMP, drafted interlocal agreement language and outlined shared costs. The MS4 Annual Report, co-permittee certification statements, and co-permittee invoices were developed. Training included a session on good housekeeping practices. Meeting agendas and attendance sheets are maintained on MSD's network. For the reporting period, MS4 Co-permittee Workgroup meetings were held on the following dates:

- July 21, 2016
- October 19, 2016
- January 12, 2017
- February 14, 2017
- March 16, 2017
- April 13, 2017
- May 24, 2017
- June 14, 2017 (call)
- June 28, 2017

MSD will continue to host co-permittee meetings in the next permit year.

PEOPLE General Public & Stakeholder Education Program					
Cooperative Efforts (MSD provides supportive or other non-lead role)					
Louisville Metro Office of Sustainability Assistance					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.1.18	The permittee shall continue to support Louisville Metro Office of Sustainability initiatives with development of guidance materials to be applied to new Metro Government Facilities incorporating green infrastructure.	Annually	Permittee shall report its activities and support of the Louisville Metro Department of Sustainability initiatives in the annual report.	Sustainability Plan in place and MSD project support ongoing.	No

Mayor Fischer created the Office of Sustainability in 2012, to enhance Louisville's quality of life and to create lasting environmental, economic and community vitality for both current and future generations of Louisville residents (www.louisvilleky.gov/Sustainability). The Office published the city's first comprehensive sustainability plan, Sustain Louisville, in March 2013, which charts the course for Louisville to be among the greenest cities in the country. The Sustain Louisville plan includes goals to improve waterway quality, incorporate sustainability into the Land Development Code (LDC) and the Comprehensive Plan, and expand green infrastructure incentives citywide. The Sustain Louisville 2016 Progress Report was published in 2017.

Through a grant from the Rockefeller Foundation, Louisville was selected to participate in the 100 Resilient Cities effort. This included the funding of a Resiliency Officer to build urban, environmental, and economic resilience.

With the aid of $50,000 in funding support and data and staff resources provided by MSD, Sustain Louisville was able to develop and prioritize tree planting locations for the Urban Tree Canopy Study, a two year study published in 2016, providing targeted, neighborhood-specific solutions to the issue of heat within the urban core of cities. MSD is working with Louisville Metro to develop a databse of trees planted throughout the city to allow stakeholders to better track progress toward the reforestation goals outlined in the Urban Tree Canopy Study.

For more information on Louisville Metro activities, see **Chapter 3** for co-permittee reports.

MSD will continue to support the Office of Sustainability in the next permit year.

2.2 ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)

IDDE 1 Legal Prohibition/Control Authority					
Assess Legal Prohibition/Control Authority					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.2.1	The permittee shall evaluate existing ordinances and regulations with an emphasis on Article 5 of the WDRs to determine if they are sufficient relative to MSD's ability to implement an effective IDDE program per 40 CFR. 122.26(b) (2). The permittee shall periodically update WDRs as needed to identify and eliminate risk of illicit discharges due to changes in technology, industrial management processes, regulations or program modifications. The permittee shall provide a summary of the adoption of such changes and information about implementation, and effective date in the Annual Report.	Annually, as needed	Permittee shall evaluate, once per permit cycle proposed changes in Wastewater Stormwater Discharge Regulations (WDRs) for consideration by MSD Board.	Revised WDR effective date 8/1/2013.	No

The Hazardous Materials Ordinance (HMO) and the Louisville Metro Integrated Emergency Incident Response program includes procedures to prevent, contain, and respond to spills that may discharge into a waterway or the municipal separate storm sewer. The Louisville Metro Emergency Management Agency (LMEMA), Louisville Metro Public Health & Wellness Department (LMPHW), Fire Departments, Police, Emergency Medical Services (EMS), Coast Guard, Environmental Protection Agency (EPA), United States Army Corps of Engineers (USACE), and MSD responders are on-call for hazardous materials incident response.

The MSD Wastewater/Stormwater Discharge Regulations (WDR) were revised to support the MS4 Post-Construction permit requirements and adopted by the MSD Board effective August 1, 2013. Article 5 of the WDR requires industrial facilities to abate and alleviate violations and implement control measures to mitigate non-stormwater discharges identified by MSD inspectors.

MSD will continue to periodically evaluate the effectiveness of the language in Article 5 of the WDR to support its ongoing efforts to identify and eliminate illicit discharges.

IDDE 1 Legal Prohibition/Control Authority					
IDDE Source Investigation and Elimination Procedures					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.2.2	The permittee shall develop and implement a formal plan of illicit discharge detection including how to trace the source of an illicit discharge and procedures for removing or eliminating them once they are located or reported. The plan should also include the enforcement procedures outlined in the WDRs for illicit discharge elimination, which includes ten (10) days from the receipt of the Notice of Violation; the source of the illicit discharge shall submit a mitigation plan for removal.	Annually	Permittee shall provide in the annual report, a summary of the process changes to IDDE investigations.	ERP, effective 1/23/12; Implementation Plan for Illicit Discharge Detection and Elimination and Industrial Programs 1/25/12; SOP IWD-01 effective 4/25/13.	No

In 2011, MSD developed an Implementation Plan for Illicit Discharge Detection and Elimination and Industrial Stormwater Programs and revised the existing Enforcement Response Plan (ERP) to facilitate enforcement with respect to eliminating illicit discharges. The ERP was revised concurrently with the WDR in 2012, and was approved by the MSD Board effective January 23, 2012. The effective ERP provides guidance to MSD's IWD and Legal Division staff on investigating and enforcing violations of the Wastewater/Stormwater Discharge Regulations (WDR) and Hazardous Materials Ordinance (HMO). The ERP specifies how enforcement actions are escalated in the event of noncompliance and allows for violations with aggravating circumstances to be recommended to receive harsher enforcement action.

The Implementation Plan for Illicit Discharge Detection and Elimination and Industrial Stormwater Programs was finalized on January 25, 2012. Additionally, MSD developed a Standard Operating Procedure (SOP) to complement the ERP and support staff implementation of the enforcement program, IWD-01: Industrial Facility Inspections. The SOP addresses inspection preparation, conducting inspections, and HANSEN® data entry. The SOP was finalized on April 25, 2013, and is still in effect.

MSD will continue to assess updates as needed to the WDR, ERP, and SOP to support IDDE source investigation and elimination procedures.

IDDE 1 Legal Prohibition/Control Authority					
Public Illicit Discharge Report Investigation					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.2.3	The permittee shall continue to receive and investigate public reports of potential illicit discharges via customer service hotline, webpage reporting and MetroCall. The permittee shall update and perform customer service hotline staff training for receiving calls regarding potential illicit discharges and appropriate routing procedures.	Annually	Permittee shall provide in the annual report, a summary of the investigations of illicit discharges performed.	85 Service calls addressed.	No

The MSD Industrial Waste Department (IWD) Incident Response staff conducts investigations of reported pollutant discharges by residents, businesses, and public agencies. This includes responding to reports that come in via the Customer Service 24-hour hotline, the MSD webpage, activities observed by staff while patrolling their assigned area, and referrals from other agencies. The program is authorized and administers compliance and enforcement under the MSD WDR.

In particular, MSD has updated and performed customer service hotline staff training for receiving calls regarding potential illicit discharges and appropriate routing procedures.

The HANSEN®/MIDAS database is used by both Louisville Metro and MSD to record inquiries and track response activity. The database format enables robust data analysis. See **Activity 2.1.5 – MetroCall Hotline and MSD Customer Relations** for more information on public calls to MSD customer service.

For the current reporting period, a total of 85 requests for investigations were made to IWD. Emergency response investigation case outcomes and enforcement actions resulting from these investigations are reported in **Activity 2.2.7 – Non-Industrial IDDE Program Enforcement**.

MSD will continue to receive and respond to service calls that suggest potential illicit discharges to mitigate these types of pollution sources.

IDDE 1 Legal Prohibition/Control Authority					
Dry Weather Screening					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.2.4	The permittee shall conduct dry weather screening of representative outfalls. The recommended level of effort is twenty percent (20%) of the major outfalls per year. However, all the major outfalls shall be addressed within the permit term. The permittee shall also conduct dry-weather screenings at ninety percent (90%) of large industrial outfalls of industrial facilities once per permit cycle.	Once per permit cycle	Permittee shall provide in the annual report, a summary of the dry weather screenings performed.	Not required in this reporting period.	No

MSD began outfall screening through an aerial infrared thermal imaging process beginning in the winter of 2013. Thermal screening during winter months allows optimal visibility and temperature conditions to identify thermal anomalies potentially associated with illicit discharges. Infrared thermal imagery methods allow MSD to identify and quantify the following types of possible illicit discharges: leaking sewage collection lines, non-stormwater discharges from outfalls and pipes, illegal connections to storm drainage ditches and systems, septic tank or degraded sanitary sewer discharges, non-stormwater industrial discharges, groundwater to surface water discharges, and force main exfiltration. A desktop analysis of thermal imagery for hotspots was performed along 150-foot stream buffers and industrial land uses in the MS4 system. This desktop analysis identified anomalies for field screening, which then identified illicit discharges.

Dry weather screening is augmented by SORP training with the intent that a large number of staff operating in the field will be able to recognize potential illicit discharges. Many MSD employees receive quarterly training and all staff attends SORP annual training which includes IDDE recognition and reporting (see **Activity 2.2.10 – IDDE Identification SWPPP Training Integration**).

During the previous permit cycle, thermal anomalies were again identified for stream buffered and industrial areas. In 2015, 225 anomalies were detected, 88 of those were field screened, and 9 were KPDES permitted discharges. There were no confirmed illicit discharges detected from the 2015 flyover.

MSD will perform an outfall screening using infrared video collection during fly-overs to detect illicit discharges at least once during this permit cycle.

IDDE 1 Legal Prohibition/Control Authority					
Screening Follow-up					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.2.5	After the initial follow-up to insure the illicit discharge has been mitigated, the permittee shall re-evaluate outfalls that were previously found to have had contaminated discharges to determine the current status of those outfalls.	Annually	Permittee shall starting in Permit Year One (1) inspect at least 25% of suspect outfalls per year.	100% Follow-up field investigations performed.	No

All potential illicit discharges identified through the customer service hotline are investigated as they are identified. As calls are received and documented by the Customer Relations Department, they are sent to the IWD for investigation and enforcement. IWD performs follow-up inspections for 100% of potential illicit discharges identified to confirm that they have been mitigated (see **Activity 2.2.3 Public Illicit Discharge Report Investigation** and **Activity 2.2.7 Non-Industrial IDDE Program Enforcement**). While this is a vital component to eliminating potential illicit discharges, MSD also performs a county-wide infrared thermal imagery screening in wintertime and executes field follow-up investigations to capture in greater depth and breadth information on potential illicit discharges (see **Activity 2.2.4 – Dry Weather Screening**).

After initial field screening investigations, MSD re-visits these outfalls to determine whether the illicit discharge has been mitigated or further enforcement action is needed.

MSD will continue to reassess outfalls with potential illicit discharges and confirme discharges through the flyover process outlined in **Activity 2.2.4 – Dry Weather Screening**.

IDDE 2 Management Activities					
Mapping - Stormwater Infrastructure Inventory					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.2.6	The permittee shall continue to maintain the GIS Louisville Jefferson County Information Center (LOJIC) layers constituting its storm sewer system map, showing the location of all known major outfalls, and the names and location of all waters of the Commonwealth that receive discharges from those outfalls.	Annually	Permittee shall maintain a storm sewer system map.	Mapping routinely updated.	No

MSD maintains an extensive drainage system electronic map through LOJIC. The data is utilized by many field and office staff throughout MSD for the daily implementation of their duties. This data maps the public drainage system, including pass-through drainage and public stormwater outfalls.

This process is ongoing as new plans come in and LOJIC is updated weekly. Information on LOJIC and its data is available at: *www.lojic.org*.

During the reporting period, MSD requested that co-permittees submit newly annexed areas. There is an on-going discussion about how annexation will be managed between MSD and Co-Permittee cities.

MSD will continue to maintain the LOJIC layers for outfalls and streams.

IDDE 2 Management Activities					
Non-Industrial IDDE Program Enforcement					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.2.7	The permittee shall continue to utilize the Wastewater/Stormwater Discharge Regulations, related checklists and procedures for investigation of potential illicit discharges and elimination of illicit discharges.	Annually	Permittee shall report annually, including number of investigations, enforcement actions and referrals to KDOW, and follow-up investigations.	ERI investigation outcomes and enforcement actions.	No

MSD will continue to enforce the WDRs, Hazardous Materials Ordinance (HMO) and related policies, regulations, and procedures for the enforcement of non-industrial illicit discharges. Incidents of possible illicit discharges are immediately investigated by the IWD and enforcement action is taken when necessary. This includes enforcement and non-enforcement actions by IWD and referrals to KDOW, Health Department, USACE, or other agencies.

Customer Service calls requesting investigations are provided in **Activity 2.2.3 – Public Illicit Discharge Report Investigation**. In addition, IWD records emergency response incident (ERI) cases, performs investigations, documents findings and issues enforcement actions or referrals to KDOW as needed. Comments by IWD on the investigation and enforcement actions taken are documented for each incident. During the reporting period, 14 of these investigations required enforcement action due to violations of the WDR or HMO. The following summarizes the outcomes from the ERI investigations:

- 29 No Further Action Required (NFAN)
- 1 Field Correction Notice (FCN)
- 11 Notices of Violation (NOVs)
- 9 Referred to KDOW
- 6 Referred to Metro Department of Public Health & Wellness

MSD will continue to enforce relevant ordinances and regulations to minimize the occurrence and impact of illicit discharges.

IDDE 2 Management Activities					
Hazmat/Spill Unified Response Program					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.2.8	The permittee shall continue to maintain and enforce the ordinances, policies, programs and procedures for response and containing spills that may discharge into the MS4. The spill response procedures outlined in Section 95.07 of the Louisville Metro Code of Ordinances relating to hazardous materials shall continue to be implemented and enforced.	Annually	Permittee shall report, if necessary, any changes to the policies and programs and procedures, in the annual report.	No changes to report.	No

The Louisville Metro Coordinated Response Program responds to hazmat incidents throughout the community. The IWD on-call personnel respond to the scene of hazardous materials incidents when paged by the responding fire department Incident Commander. IWD has developed a working relationship with Metro fire departments relative to releases to the public sewer system.

MSD will continue to maintain and when needed coordinate the improvement of ordinances, and improve MSD policies, programs and procedures for response and the containment of spills that may discharge into the MS4.

No changes were made during this reporting period.

IDDE 2 Management Activities					
MVA Mitigation Kit Program					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.2.9	The permittee shall continue motor vehicle accident (MVA) mitigation kit distribution program to meet Fire Department and emergency response spill containment needs.	Annually	Permittee shall report metrics for kit distribution and after-use collection in the annual report.	Materials purchased and disposal provided.	No

As part of MSD's efforts to detect and eliminate illicit discharges, the IWD Motor Vehicle Accident (MVA) Mitigation Program provides 18 fire departments in Louisville Metro with mitigation materials to prevent fluids released due to motor vehicle accidents from escaping into stormwater conveyances. MSD continues the MVA mitigation kit distribution program to meet Fire Department and emergency response containment needs.

MSD tracks the cost of the MVA mitigation kits that are distributed to the firehouses. The firehouses pick up kits for use in motor vehicle accidents to prevent wash-off from spills and drop off expended spill materials at MSD's Central Maintenance Facility (CMF).

Although after-use collection data is not available to be tracked, MSD does keep a record of the after-use collection dumpster. The dumpster is used for mitigation kit disposal, and collection occurs as the dumpster is filled, which is typically needed only on an annual or bi-annual basis.

MSD tracks the cost purchasing mitigation kits for the program on an annual basis. During the current reporting period, MSD spent $18,720 to purchase mitigation kits. Hauling and disposal of collected mitigation materials totaled $1,250.

MSD will continue to provide motor vehicle accident mitigation kits and after use collection in the next permit year.

IDDE 2 Management Activities					
IDDE Identification SWPPP Training Integration					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.2.10	The permittee shall integrate techniques and practices to assist staff identify potential illicit discharges into facility and system operations and maintenance training.	Annually	Training shall occur at least once per year and the permittee shall report in the annual report the date of training and the number of staff participating in training.	SORP training performed.	No

Training to recognize potential illicit discharges is incorporated into the Sewer Overflow Response Protocol (SORP) training received by all permanent and temporary employees, and some consultants on an annual basis. IDDE recognition and reporting has been easily integrated into the existing SORP training program so that all MSD staff is aware of the need to recognize and report illicit discharges. Additionally, MSD personnel responsible for implementation of the SORP receive more in-depth quarterly SORP training. See **Activity 2.6.3 – Maintenance Staff Training on Pollution Prevention** for a summary of staff training, including SORP.

MSD also conducts training specific to stormwater pollution prevention at MSD facilities. MSD has integrated facility and system operation and maintenance training with techniques and practices to assist staff in identifying potential illicit discharges. This activity provides MSD facility and office staff with the information needed to recognize potential illicit discharges during the normal course of their duties. This training is a more effective and efficient alternative to one-pass dry-weather field screening approaches for identifying potential illicit discharges. The training provides MSD personnel with instructions on who to notify in the event that a potential illicit discharge is observed. Responding professionals investigate, confirm, and mitigate potential source(s) as appropriate.

In the current reporting period, facility inspection training for Stormwater Pollution Prevention Plans (SWPPPs) included staff communication and SWPPP training on identification of potential illicit discharges and system operation and maintenance. See **Activity 2.6.2 – Training on MSD Facility SWPPPs** for more information on training. MSD also continued training the MS4 Co-permittees using the same SORP program that includes IDDE identification.

MSD will continue to administer SORP training to necessary personnel, and will pilot on-line training to optimize the learning experience in the next reporting year.

IDDE 2 Management Activities					
Cooperative Efforts (MSD provides supportive or other non-lead role)					
KDOW Support					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.2.11	As KDOW requests, the permittee shall accompany KDOW on inspection of KPDES stormwater permitted facilities in Jefferson County	Annually	Permittee shall summarize and include in the annual report any assistance given to the Kentucky Division of Water (KDOW) by MSD.	No requests.	No

Upon KDOW requests, MSD accompanies KDOW inspections of KPDES stormwater permit facilities in Jefferson County. The KDOW issues KPDES permits for all point-source and stormwater discharges from industrial facilities which include a program to monitor and control pollutants in stormwater discharges from landfills, hazardous waste treatment, disposal and recovery facilities and industrial facilities. The program identifies priorities and procedures for inspections and establishes the control measures for those discharges. The MSD industrial pretreatment and hazardous materials programs complement the KDOW permit and compliance programs for stormwater by referring potential illicit discharges from KPDES permitted facilities to KDOW for enforcement action.

During the reporting period, KDOW did not request MSD to conduct any joint inspections at permitted facilities. At the request of the EPA, KDOW and MSD conducted joint inspections at 5 industrial facilities with the EPA as the lead agency (KDOW attended 4 of these 5 joint inspections). MSD was present during inspections performed by EPA and KDOW staff at permitted facilities in Jefferson County. Follow-up from these inspections have led to additional coordination, communication, and training between MSD and co-permittees on their facilities.

MSD will continue to support KDOW on inspections of stormwater permitted facilities as requested.

2.3 INDUSTRIAL STORMWATER PROGRAM REQUIREMENTS (IP)

IP 1 Legal Prohibition/Control Authority					
Industrial IDDE Program Enforcement					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.3.1	For industrial properties, the permittee shall continue to utilize the Wastewater/Stormwater Discharge Regulations, Hazardous Materials Ordinance and related checklists and procedures for identification of potential illicit discharges and elimination of illicit discharges/ unauthorized stormwater discharges. The permittee shall perform analysis of industry property data layer in LOJIC cross linking with properties holding a Hazardous Materials (spill) Prevention Control (HMPC) Plan to identify potential sites that should be added to the program with consideration for High Risk Industrial Facilities designation (determined in other activities).	Annually	Permittee shall summarize in the annual report the industrial enforcement actions and referrals to Kentucky Division of Water.	Facility risks identified; 4 KDOW referrals.	No

MSD utilizes the MSD Wastewater/Stormwater Discharge Regulations (WDR), Hazardous Materials Ordinance (HMO), and Enforcement Response Protocol (ERP) to identify and eliminate illicit discharges from industrial facilities.

During the current reporting period, MSD continued inspections at industrial facilities identified in FY12, and FY13, as high (HRIF) and moderate (MRIF) risk. The purpose of the inspections was twofold: first to meet MS4 permit requirements and second, to validate the assumptions utilized by MSD in what it refers to as the MS4 Threat Matrix to categorize and prioritize facilities as HRIF, MRIF or low risk (LRIF). If an inspection determined the risk category should be changed based on field investigations or other data, the facility's risk category was changed to reflect actual conditions. MSD issued enforcement actions when violations were identified during the inspections.

During the current reporting period, MSD made four referrals to KDOW regarding facilities with designated Standard Industrial Classification (SIC) Codes that possibly required a KPDES Stormwater Permit or because MSD identified obvious violations of permit conditions during inspections.

MSD will continue to enforce the IDDE program through the WDRs.

IP 1 Legal Prohibition/Control Authority					
Industrial IDDE Program Enforcement (Legal Authority)					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.3.2	The permittee shall maintain adequate legal authority, per 401 KAR 5:060, Section 12(9)(b)3 and 40 CFR 122.26(b)(2), to require compliance and inspection of sites, inspection of priority industrial and commercial facilities, including establishing control measure requirements such as HMPC, Spill Prevention, Control and Countermeasure (SPCC) Plan and/or the Groundwater Protection Plan (GPP) for facilities that have a potential to discharge to the MS4 and enforce stormwater requirements.	Annually, as needed	Permittee shall update as needed and maintain adequate legal authority to require compliance with this measure.	Revised WDR effective date 8/1/2013.	No

The MSD WDRs were most recently revised in 2013, to support the MS4 Post-Construction permit requirements and became effective August 1, 2013.

Article 5 of the WDR requires industrial facilities to abate and alleviate violations and implement control measures to mitigate non-stormwater discharges identified by MSD inspectors. MSD will continue to periodically evaluate the effectiveness of the language in Article 5 of the WDR to support its ongoing efforts to identify and eliminate illicit discharges.

MSD will continue to update the WDRs as needed to support IDDE program enforcement.

IP 2 Inventory and Inspection of Industrial Facilities					
Industrial Facility Inventory					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.3.3	The permittee shall maintain an inventory of all potential industrial and commercial sites/sources that could contribute pollutant loads to the MS4.	Annually	Permittee shall update annually and made available to the KDOW upon request.	1,328 facility sources inventoried	No

MSD has developed an inventory of industrial/commercial sites/sources that could potentially contribute pollutants to the MS4. Currently, through the HMPC Program, MSD requires businesses such as gas stations, manufacturing facilities, hospitals, medical laboratories, cleaning establishments, pest exterminators, and state and local government offices that handle hazardous materials above their designated reportable quantities, to submit an HMPC plan. This list of facilities, referred to as the "HMPC Data Set" is updated as a part of MSD IWD's day-to-day activities and tracked in HANSEN®. The HMPC Data Set is the starting point for prioritization of facility risk categorization and is updated as existing facilities close, new facilities open and/or a facility's risk status changes due to inspection by MSD. New facilities must submit plans to the Metro Planning and Design Services Department where MSD reviews the plans to determine the need for pretreatment, a HMPC plan, as well as, their potential risk to the MS4.

As the MS4 Industrial Facility Inspection Program has matured, inspectors have discovered and inspected additional facilities for potential stormwater impacts. Some of these new facilities are not subject to the HMPC Program, and therefore were not identified in the original Industrial Facility Inventory. A running inventory of industrial facilities is kept, based on inspection records and knowledge of facilities that have closed.

During the current reporting period, MSD identified a total of 1,328 industrial facility sources that could impact the MS4.

Designated sites/sources inventoried are assessed for their risk; risk parameters are defined in **Activity 2.3.4 – High Risk Facility Definition** and an update on high-risk industrial facility inventory is provided in **Activity 2.3.5 – HRIF Inventory Update**.

MSD will continue to update the industrial facility inventory in the next permit year.

IP 2 Inventory and Inspection of Industrial Facilities					
"High Risk" Facility Definition					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.3.4	The permittee shall identify Risk Factors to define facilities as "High Risk", "Moderate Risk" and "Low Risk".	PY	Review "High Risk" facility definition each permit cycle.	High, moderate and low risks defined.	No

MSD has developed risk factors to define High Risk or HRIF facilities in the community. This process is complex and incorporates the experiences of the Industrial Waste Department (IWD) staff and metrics utilized by similar communities in the region. MSD has used this definition to sort and distinguish the hundreds of Significant Industrial Users (SIUs) and qualifying facilities already participating in the HMO requirements in a Threat Matrix. The Threat Matrix includes provisions for facilities classified as seemingly low risk based on categorical descriptions, but have a history of poor environmental performance, multiple spills, or history of non-compliance. The following questions are used to rank facilities:

- Is the facility outside the Combined Sewer Service Area?
- Is the facility classified by an MS4-targeted SIC code?
- Are Hazardous Materials stored in the Floodplain?
- Are Hazardous Materials stored within 250-ft. of a blue line stream?
- Has the facility had one or more incidents in the last 3 years?
- Does the facility have a KPDES Permit? (Excludes KYR10: Stormwater Construction permit)

A weighted scoring system is utilized to determine a facility's inspection risk category, which is defined by the following:

- High: Ranked 70% to 100%
- Moderate: Ranked 51% to 69%
- Low: Ranked 50% or below

MSD will continue to review industrial risk facility definition to facilitate effective Industrial Stormwater Program implementation once in this permit term.

IP 2 Inventory and Inspection of Industrial Facilities					
HRIF Inventory Update					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.3.5	The permittee shall compare the datasets for local Approved HMPC Plan Facilities to the publicly available Facility data from local and state environmental and emergency response agencies to address the completeness and accuracy of High Risk Industrial Facilities identification. The permittee shall update the list of HRIFs at least once over the permit term, to account for the most recently available North American Industry Classification System (NAICS), Standard Industrial Classification (SIC) codes, Toxic Release Inventory (TRI) data, MSD's HMPC data and MSD's pretreatment program data with the goal of establishing a tiered list of industries to support priorities in MSD's industrial facility inspection program.	Annually	Permittee shall summarize and report annually, the assessment and updates of any industrial facilities identified as "High", "Moderate", and "Low" risk.	Inventory completed in 2011 and most recently updated in 2016.	No

The Threat Matrix screening process supports the goal of establishing a tiered stormwater pollution risk of industries and supports the priorities of MSD's industrial facility inspection program. MS4 industrial facility inspections began in 2011, focusing largely on the high (HRIF) and medium (MRIF) risk industrial facilities. Inspections continued through 2013, which included several low risk industrial facilities (LRIFs). As inspections have progressed, MSD has notified KDOW of potential facilities needing KPDES permits. Some facilities closed prior to the scheduling of an inspection and, therefore were removed from the inventory. Other facilities have been removed due to field verification that they are not located within the MS4 service area. As facility inspections are conducted, the risk category is confirmed and updated as needed based on field verification.

During the previous permit cycle, MSD field verified the updated HRIF Inventory as of June 30, 2016. This consisted of 8 HRIF, 30 MRIF, and 1,290 LRIF, with a total of 1,328 facilities. All of the additional facilities were rated as LRIF based on the inspection conducted.

MSD will continue to assess industrial facility risk once over the permit term.

IP 2 Inventory and Inspection of Industrial Facilities					
High-Risk and Medium Risk Facilities					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.3.6	Based on the results of the updated HRIF assessment, the permittee shall inspect high-risk facilities at least once every three (3) years and moderate risk facilities at least once every five (5) years.	Annually	Permittee shall report the summary of prioritized inspections completed, and any enforcement resulting from the inspections.	4 HRIF, 2 MRIF, and 53 LRIF inspections performed.	No

MSD has completed inspections for high and moderate risk industrial facilities, as identified in the Threat Matrix. In addition to high and moderate risk facilities, MSD has also inspected many low risk facilities.

During the current reporting period, MSD performed 4 HRIF, 2 MRIF, and 53 LRIF inspections.

MSD will continue to perform high and medium risk inspections every three and five years, respectively.

IP 2 Inventory and Inspection of Industrial Facilities					
Industrial Facility Control Measures					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.3.7	The permittee shall require the High Risk industrial and commercial facilities to select, install, implement, and maintain control measures that promote prevention and source control for discharge of applicable pollutants of concern. This requirement may be addressed through Hazardous Materials (spill) Prevention Control (HMPC) Plan and/or federal programs such as SPCC Plan and/or the GPP that are already implemented at the industrial and commercial facilities. The permittee shall require the applicable facilities to identify the specific control measures, good housekeeping and maintenance procedures, and employee training necessary.	Annually	Permittee shall report annually on control measures required of the high-risk industrial and commercial facilities to ensure compliance with this measure.	HMPC Ordinance in place since 1985. Inspections and if necessary, enforcement actions.	No

During the current reporting period, MSD continued to administer the HMO; soliciting, reviewing and approving HMPC plans and verifying control measures through facility inspections. Additionally, MSD worked with high risk industrial and commercial facilities to implement and maintain control measures that promote prevention and source control for discharge of applicable pollutants.

During the previous reporting period, as part of the Hazardous Material Spill Prevention Control (HMPC) Plan program, MSD continued to inspect HMPC-exempt facilities in an effort educate property owners of the importance of good housekeeping practices to protect stormwater quality.

IP 2 Inventory and Inspection of Industrial Facilities					
Enforcement / Inspections					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.3.8	The permittee shall develop criteria or procedures for site inspections and enforcement including criteria to address how the MS4 will use enforcement authorities to ensure compliance with the industrial program requirements. The permittee shall enforce the procedures outlined in Section 95.11 of the Louisville Metro Code of Ordinances relating to hazardous materials.	Six months after permit issuance	Within six months of the permit issuance, the Permittee shall develop the required criteria or procedures to comply with this measure.	SOP developed.	No

MSD has developed and implemented inspection and enforcement procedures and authority to ensure compliance with the Industrial Stormwater Program requirements. In 2012, MSD revised its ERP to facilitate enforcement with respect to eliminating illicit discharges concurrently with revisions to the WDR. Both documents were approved by the MSD Board effective January 23, 2012. The effective ERP provides guidance to MSD's Industrial IWD and legal department staff on investigating and enforcing violations of the WDR and HMO) The ERP specifies that violations with aggravating circumstances are recommended to receive harsher enforcement action.

During the reporting period, the step-by-step SOP for industrial facility inspections and enforcement continued to be implemented by MSD. This SOP may be modified as necessary, to compliment the ERP and support staff implementation of the enforcement program. The SOP includes instructions for: inspection preparation, conducting inspections and HANSEN® data entry.

IP 2 Inventory and Inspection of Industrial Facilities					
MSD Plan Review					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.3.9	The permittee shall determine if existing triggers in the new development and redevelopment plan and plumbing systems review process are sufficient to include appropriate industrial stormwater quality specialists/inspectors in the plan approval process.	PYs 1 & 4	Permittee shall assess at least every three (3) years and report changes to process in the annual report.	Adequate triggers in place.	No

As a matter of routine business, the MSD Stormwater Department (Construction Plan Review) refers potential projects to the IWD for additional review. Periodically, MSD determines if triggers in the new development and redevelopment plan and plumbing systems review process are sufficient to include appropriate industrial stormwater quality specialists/inspectors in the plan approval process. The existing plan review triggers provide a means to involve the IWD. This task is intended to refresh associated staff with the indicators and/or checklists used to trigger their involvement and provide a basis for the expanded plan review process. A Pretreatment Inspector also attends weekly meetings with Plan Review staff to further coordination efforts.

New industrial facilities are incorporated into the industrial facility inventory, as discussed in **Activity 2.3.3 – Industrial Facility Inventory**.

IP 2 Inventory and Inspection of Industrial Facilities					
Industrial & Commercial Community Outreach					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.3.10	The permittee shall update as necessary and distribute outreach materials (brochure, fact sheets, etc.) to HMPC Facilities and other commercial operations of concern to promote illicit discharge elimination awareness.	Annually	The Permittee shall continue to identify materials developed and distribution estimates and summarize in the annual report.	Brochures developed and distributed.	No

MSD developed outreach materials focused toward industrial/commercial sectors in order to promote awareness of related stormwater quality issues, including a Hazardous Materials Use and Spill Prevention Control Plan (HMPC) brochure. In addition, information is available on the MSD website specific to stormwater awareness for the industrial/commercial sectors.

MSD sends letters to businesses that appear to be required to submit a HMPC Plan concerning the schedule for submission. Businesses which believe they should be exempt from a submission are required to submit an exemption request form as described in the letter. The HMPC Plan must be submitted on an application form provided by MSD. MSD IWD personnel review and approve plans and inspect the facility to verify the plan accurately identifies control measures. Plans that are considered to be deficient are returned to the facility for correction and resubmission. Once approved, businesses are responsible for implementing their plan including initiation of a training program for employees within their business. MSD developed an Industrial Users Working Group to share information.

During the current reporting period, the following brochures were distributed to support industrial and commercial facility education of stormwater impacts:

- Maintaining Healthy Waterways (Causes and Prevention of Fish Kills) brochure
- Environmentally Responsible Best Management Practices flyer series
- Hazardous Materials Use and Spill Prevention Control (HMPC) Plan booklet
- Pool Manners Flyer
- Stormwater Program Brochure
- Keeping Our Waterways Safe Brochure

IP 2 Inventory and Inspection of Industrial Facilities					
Cooperative Efforts (MSD provides supportive or other non-lead role)					
Third Party Oversight Inspection					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.3.11	The permittee shall utilize third party inspections for development of recommendations of efficacy of permittee inspections and enforcement. Updates to training materials shall be administered for permittee personnel at least once per year, if necessary.	Annually	Document training materials and the number of third party inspections conducted to be reported in the annual report.	Third party inspections conducted.	No

In response to EPA recommendations stemming from the 2012 EPA MS4 Stormwater Program Audit, third party reviews mirroring construction EPSC inspector refresher training began for the Industrial Stormwater Program in 2013. MSD's IWD staff is accompanied by a third party consultant on field inspections at MSD facilities to support consistent inspection methodology.

Five third party inspections were completed with IWD staff in April through June of 2017. Classroom training is planned during this permit year to review field inspection results and provide training to new staff.

In addition, MSD accompanied EPA Enforcement on 5 inspections in 2017.

IP 2 Inventory and Inspection of Industrial Facilities					
Cooperative Efforts (MSD provides supportive or other non-lead role)					
KDOW Support					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.3.12	As KDOW requests, the permittee shall accompany KDOW on inspections of KPDES stormwater permitted facilities in Jefferson County.	Annually	Permittee shall summarize and include in the annual report any assistance given to the KDOW by MSD.	No requests.	No

As KDOW makes requests, MSD will accompany KDOW on inspection of KPDES stormwater permit facilities in Jefferson County. KDOW issues KPDES permits for all point-source and stormwater discharges from industrial facilities. The KPDES permits include a program to monitor and control pollutants in stormwater discharges from landfills, hazardous waste treatment, disposal and recovery facilities and industrial facilities. The program identifies priorities and procedures for inspections and establishes and implements the control measures for those discharges. The MSD industrial pretreatment and hazardous materials programs complement the KDOW permit and compliance programs for stormwater by referring potential illicit discharges from facilities with a KPDES permit to KDOW for enforcement action. MSD will report these activities to KDOW. MSD will continue to offer training to local industry for technical assistance in developing and implementing Facility HMPC and compliance with local requirements.

During the reporting period, KDOW did not request MSD to conduct any joint inspections at permitted facilities, although KDOW and MSD conducted joint inspections at five industrial facilities when conducting inspections with the EPA as the lead agency. MSD was present during inspections performed by EPA and KDOW staff at permitted facilities in Jefferson County. Follow-up from these inspections have led to additional coordination, communication, and training between MSD and co-permittees on their facilities.

Referrals made by MSD to KDOW are provided in **Activity 2.3.1 – Industrial IDDE Program Enforcement**.

MSD will continue to support KDOW as requested on inspections of stormwater permitted facilities.

2.4 CONSTRUCTION SITE STORMWATER RUNOFF CONTROL REQUIREMENTS (CS)

CS 1 Legal Prohibition/Control Authority					
Assess Legal Prohibition/Control Authority					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.1	The permittee shall assess existing ordinance and regulations to identify changes needed to account for changes in standard of care (as directed by KDOW General Construction Permit KYR10), changes in technology, changes to development management process and related program needs in satisfaction 40 CFR 122.26(b)(15)(i) for construction activities that result in a land disturbance of greater than or equal to one acre and construction activity disturbing less than one acre that is part of a larger common plan of development that would disturb one acre or more.	PYs 1 & 3	Permittee shall summarize proposed changes enumerated by end of permit years one (1) and three (3) and report proposed changes in to Wastewater/Stormwater Discharge Regulations for consideration by MSD Board in the Annual Report.	Effective WDR became final August 1, 2013.	No

MSD's Erosion Prevention and Sediment Control (EPSC) Ordinance was adopted in 2000. In 2011, MSD began reviewing the legal controls to identify changes needed to account for the changes in standard of care as directed by KDOW General Construction Permit, changes in technology, changes to development management processes and related program needs in satisfaction of 401 KAR 5:060, Section 12(a)(b)(4)a, b and 40 CFR 122.26(b)(15)(i) for construction activities that result in a land disturbance of greater than or equal to one acre and construction activity disturbing less than one acre that is part of a larger common plan of development that would disturb one acre or more. MSD continues to implement regulations for construction activities greater than 2,000 square feet.

MSD pursued changes to the EPSC Ordinance through the Wastewater/Stormwater Discharge Regulations (WDRs) and MSD's existing regulatory authority. The changes became effective August 1, 2013, and include post-construction related matters. The 2013 version of the WDRs are still in effect. There were no changes to the EPSC Ordinance or construction regulations during the reporting period.

During the last permit cycle, KDOW released the updated KYR10 General Permit for Stormwater Discharges from Construction Sites, effective December 1, 2014.

MSD continues to assess existing policies, regulations, and updates as well as coordinating with KDOW to assess updates, as needed.

CS 1 Legal Prohibition/Control Authority					
Implement Legal Prohibition/Control Authority					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.2	The permittee shall continue to enforce existing ordinances and regulations intended to limit construction phase stormwater quality impacts from new construction and significant redevelopment.	Annually	Permittee shall require routine inspections of active construction sites with reasonable potential to discharge to MS4. A summary of these inspections and any enforcement actions resulting from these inspections shall be included in the Annual Report.	Over 14,500 inspections performed.	No

MSD performs construction site inspections through its Construction Inspection Program. Data is tracked for private construction sites by enforcement inspectors in the EPSC and Enforcement Log database. The types of inspections performed include: EPSC compliance; subdivision site disturbance; general permit release; enforcement request (which are typically referrals from field inspectors); Customer Service Request (CSR); builder-bond for individual construction sites that are not in bonded subdivisions. Compliance and enforcement actions are taken where deficiencies are noted by inspectors, including issuing Field Correction Notices (FCNs) for required remedial actions; Notice of Violations (NOVs) for failure to comply with a correction notice; Stop Work Orders (SWOs) for non-compliant practices; and fines.

Construction Inspection Program inspectors also inspect MSD construction projects. Inspection notes are recorded in log books and enforcement actions are documented and referred to the Enforcement Division. MSD construction projects are inspected daily by a staff of inspectors. Construction inspectors may perform up to five inspections in a day. Large capital projects are required to have an on-site contract inspector.

Enforcement activities resulting from the site inspections below are reported in **Activity 2.4.13 – Enforcement Tracking Log/Database**.

The approximate number of inspections performed by the construction inspectors is provided in the table below.

MSD will continue to track inspections and administer enforcement of pertinent regulations and ordinances.

July 1, 2016 -June 30, 2017 Data from EPSC Enforcement Log Application	**Approximate Number of Inspections**
Builder Bond Inspection	1,592
HANSEN® Service Request	78
Enforcement Request	87
Subdivision Inspection	9,134
WM EPSC Inspection	3,825
Total	**14,716**

CS 1 Legal Prohibition/Control Authority					
Site Plan Review					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.3	The permittee shall conduct site plan reviews in accordance with the procedures outlined in Section 159.02 of the Louisville/Jefferson County Erosion Prevention and Sediment Control Ordinance to assess whether the plans include measures that address potential water quality impacts from construction prior to authorization of land disturbance.	Annually	Permittee shall review plans as needed and report the number of plans reviewed in the Annual Report.	322 Const. Permits Issued.	No

Per the EPSC Ordinance, MSD requires a construction permit and plan review for projects with greater than 2,000 square feet of disturbance.

Prior to the issuance of a permit, MSD typically performs multiple reviews. MSD conducts site plan reviews for the construction permits issued. During the current reporting period, 322 construction permits were issued.

MSD will continue to review and issue applicable permits for construction, based on the amounts of disturbance, site specifics, and ordinance requirements.

CS 1 Legal Prohibition/Control Authority					
Construction Site Inspection					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.4	The permittee shall develop and implement criteria and/or procedures for site inspection. The procedures shall include an Enforcement Response Plan outlined in Section 159.05 of the Louisville/Jefferson County Erosion Prevention and Sediment Control Ordinance.	Annually	Permittee shall continue to implement the criteria and/or procedures for site inspections.	SOPs in place.	No

To ensure compliance with approved plans, MSD inspects land disturbing activities for compliance with Section 159.05 of the EPSC Ordinance. The intent of the ordinance is to pursue and secure negotiated compliance wherever practicable and effective prior to alternative enforcement measures being invoked.

MSD's Engineering Development and Stormwater Services and Technical Services groups EPSC inspection staff, as well as contract inspectors, have been trained and have passed a qualifying exam. This program is administered by Jefferson County Public Schools, with materials documenting procedures and expectations to comply with Section 159.05 of the ordinance.

In 2013, MSD developed the following Standard Operating Procedures (SOPs) to document protocols for construction site inspections and oversight:

- EPSC Construction Site Inspection (SOP CS-01) documents how inspections are conducted and documented as well as how enforcement procedures are implemented and tracked
- EPSC Inspector Field Verification Training (SOP CS-02) documents oversight inspection review responsibilities, frequency and standards

In 2015, MSD updated the Standard Operating Procedures to include third party inspector verification and training.

During the previous permit cycle, updates were made to the SOPs, including adding the state e-notification process for the general construction permit. More information on the inspector oversight and training program is provided in **Activity 2.4.9 – Construction Stormwater Runoff Control Program Inspector Refresher**. Additionally, MSD reorganized the majority of construction inspectors for capital and private projects under a single Construction Inspection group. Large capital projects are required to have an on-site contract inspector which MSD performs oversight inspections.

MSD will continue to implement procedures, policies, and protocols in accordance with the MS4 permit, and other relevant regulations.

CS 1 Legal Prohibition/Control Authority					
Construction Site Inspection Frequency					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.5	The permittee is required to conduct inspections bi-monthly of at least 90% of active sites.	Annually	Permittee shall report the number of inspections performed in the Annual Report.	Oversight inspections of self-inspections performed.	No

MSD verifies inspections of active construction sites more frequently than on a bi-monthly basis, which includes inspections following a half-inch rain event. MSD's inspection team conducts inspections for all permitted active construction sites, which includes oversight of the property owner's self-inspection records. Some construction sites are inspected on a more frequent basis based on site drainage characteristics or impact to sensitive features/streams.

MSD also monitors rain events through the rain gauge system and Telog software. MSD has a number of rain gauges located around Louisville Metro.

MSD maintains an electronic database of inspections to assign inspectors and track activities. MSD inspects at least 90% of active construction sites. More information on construction inspections performed over the course of the reporting period is provided in **Activity 2.4.2 – Implement Legal Prohibition/Control Authority**.

MSD will continue to inspect active sites in accordance with permit requirements.

CS 2 CS Management Activities					
Construction Site Inventory					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.6	The permittee shall maintain an inventory of all active public and private construction sites that result in a total land disturbance of greater than or equal to one acre and less than one acre that is part of a larger common plan of development. Inventory should include the project's name, address, contact person, inspection dates, and any enforcement actions issued to the project.	Annually	Inventory continually updated as projects are permitted and projects are completed.	Project inventory database maintained.	No

MSD tracks active construction sites greater than 2,000 sq. ft. per the EPSC Ordinance, and the inspection team conducts inspections for all permitted active construction sites. Sites are tracked using the Home Building and Service Request Inspection Report in the EPSC Enforcement Log database. The database catalogs construction site project name, address, primary contact and inspection dates and tracks any enforcement actions issued.

The number of active sites varies daily based on the number of site disturbance permits issued (new sites added) and released to/from the system. In addition, MSD adjusts the frequency of construction site inspections based on site drainage characteristics or impact to sensitive features/streams with more frequent inspections to protect sensitive areas. More information on construction inspections performed over the course of the reporting period is provided in **Activity 2.4.2 – Implement Legal Prohibition/Control Authority**.

MSD will continue to maintain an inventory of construction sites for management of applicable regulations and standards.

CS 2 CS Management Activities					
Construction BMP Guidance Materials					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.7	As needed to account for changes in the KDOW general construction permit(s), the permittee shall update the guidance materials facilitating current technology use, local plan review/inspection requirements and related implications, Design Manual chapters and Standard Specifications sections to address EPSC and other construction phase (waste concrete, fueling and repairs operations, etc.) topics including BMP selection, feasibility, design considerations, operation, maintenance, inspection checklist and related matters.	Annually, as needed	Permittee shall update the Design Manual and Standards Specifications as needed and make the updates publicly available.	Provided updated information at the 2017 Construction Field Day.	No

MSD updated the Design Manual in recent years, including EPSC (Chapter 12) in 2015, and Green Infrastructure (Chapter 18) in 2016. Minimization of site disturbance as well as preservation and conservation of natural site design features are included in the Design Manual. MSD held stakeholder workshops to solicit feedback on potential changes to the Design Manual. The proposed Chapter 18, Crosswalk, and Stormwater Unit Memorandum (proprietary devices) were also made available for public comment.

The Design Manual is available to the public at: *www.msdlouky.org/insidemsd/standard-drawings.htm.*

For information on contractor training/education, see **Activity 2.1.13 – Construction Operators**.

MSD will continue to offer training and opportunities for engagement with the design and construction community in the next reporting period.

CS 2 CS Management Activities					
On-site SWPPP					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.8	The permittee shall continue the procedure for receiving Stormwater Pollution Prevention Plans (SWPPP) for qualifying construction sites.	Annually	Permittee shall document SWPPP procedures and expectations and make the procedures and expectations publicly available.	EPSC Ordinance effective 2000; SWPPP memorandum effective 2008.	No

Effective July 14, 2008, MSD instituted a requirement and procedure for receiving SWPPPs for qualifying construction sites. MSD notified the development community that SWPPPs should be submitted to the KDOW as well as to MSD as part of the construction plan submittal. This requirement was intended to reduce confusion associated with pre-existing MSD requirements for a "BMP Plan" and KDOW's KPDES General Construction (KYR10) Permit language references to a "SWPPP." Certified developers, homebuilders and related stakeholders were sent letters indicating the requirement for SWPPPs.

Through its EPSC Ordinance, MSD requires that qualifying construction plan submittals include a SWPPP, as shown on MSD's Site Plan Review Checklist. SWPPPs must be prepared for sites disturbing greater than one acre. The site plan checklist is available on MSD's website at: *www.msdlouky.org/insidemsd/pdfs/chklist2.pdf.*

Additionally, MSD provides a sample site grading and SWPPP plan sheet as guidance to developers on the website at: *www.msdlouky.org/insidemsd/standard-drawings.htm*.

MSD will continue to administer requirements for SWPPPs on construction sites.

CS 2 CS Management Activities					
Construction Stormwater Runoff Control Program Inspection Refresher					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.9	The permittee shall review inspector practices with individual MSD and contract inspectors to communicate/confirm oversight responsibilities, documentation requirements, and frequency of inspection, inspection standards and protocols. The refresher review (performed on-site) will include EPSC and non-EPSC construction stormwater control metrics, the most current KDOW General Construction Permit and the current USEPA MS4 Program Evaluation Construction Site Checklist.	Annually	Permittee shall complete refresher review with Construction inspectors annually, reporting the date and the number of attendees in the Annual Report.	Trained 19 inspectors at sessions between May and June 2017.	No

MSD staff reviews inspector practices annually with individual MSD and contract inspectors to communicate and confirm oversight responsibilities, documentation requirements, inspection frequency, and inspection standards and protocols. For more information on standard operating procedures for inspections and oversight, see **Activity 2.4.4 – Construction Site Inspection**.

MSD performs third party on-site EPSC inspector refresher trainings in a one-on-one audit style format at various construction sites. Refresher training involves the consultant's trainer observing and documenting MSD's EPSC inspectors as they perform inspections.

During the current reporting period, MSD contracted with a third-party consultant to continue on-site EPSC inspector refresher trainings, conducted between May 9, 2017, and June 28, 2017. 19 inspectors were trained.

MSD will continue to administer third-party training of inspectors in the next reporting period.

CS 2 CS Management Activities					
Construction Inspector Training					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.10	The permittee shall continue construction inspector training program placing new emphasis on delivering similar messages and understanding between MSD inspectors (regular and contracted) and qualified local contractor inspectors.	Annually	Permittee shall provide at least three (3) training opportunities annually reporting the date and the number of attendees in the Annual Report.	Training conducted.	No

MSD partners with Jefferson County Public Schools (JCPS) to facilitate construction inspector training. The training was one of the first programs in the state focused on increasing the knowledge and accountability of private construction contractors. The training course has been a useful point of reference to improve the quality of inspections performed and provide creditability to the resulting BMP improvements and maintenance identification. Classes are held based on demand. Minimum enrollment of five attendees is required to feasibly conduct a class. The class requires passing an exam.

During the reporting period, the following training dates were held. The estimated number of individuals trained is provided below. Participants fluctuate based on certification renewal and the economy.

MSD will continue to offer and provide relevant training opportunities for EPSC in the next reporting period.

Contractor EPSC Training:

- 6/21/2016
- 7/12/2016
- 7/20/2016
- 8/16/2016
- 9/20/2016
- 10/18/2016
- 11/15/2016
- 12/13/2016
- 2/1/2017
- 2/28/2017
- 3/28/2017
- 5/2/2017
- 5/23/2017
- 6/20/2017

Homebuilder EPSC Training:

- **6/21/2016**
- **8/16/2016**
- **10/18/2016**
- **12/13/2016**
- **2/28/2017**
- **4/27/2017**
- **5/2/2017**

Construction Field Day:

- 2/28/2017

Certified Plan Reviewer/Preparer Training:

- 6/6/2017

Training Audience	Estimated Number of Individuals Trained
Contractor EPSC Training (JCPS)	423
Homebuilder EPSC Training (JCPS)	85
MSD Inspector EPSC Training	19
Certified Plan Reviewer/Preparer	10
Total	**537**

CS 2 CS Management Activities					
Local Utility Construction General Permit Entities					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.11	The permittee shall continue to coordinate policy level stakeholders from local utility agencies holding construction general permits from MSD to confirm inter-agency communication protocols and review changes to standard, policies, procedures, BMP operation expectations and related matters.	Annually, as needed	Permittee shall hold meetings with MSD's EPSC general permit holders as needed.	Meetings held as needed.	No

MSD routinely coordinates with policy level stakeholders from local utility agencies holding construction general permits from MSD to confirm inter-agency communication protocols and review changes to standards, policies, procedures, BMP operation expectations and related matters. Some of the general permit holders include, but are not limited to, the following: Metro Louisville, Metro Parks, Jefferson County, LG&E, MSD, and LWC.

During the previous permit cycle, informal meetings were held with 5 of the general permit holders: Metro Louisville, LG&E, MSD (Operations and Maintenance Staff), City of Jeffersontown and LWC. On March 1, 2017, MSD conducted an EPSC general permit training for Louisville Metro Parks Staff. There were no changes proposed for the general permits during the reporting period.

MSD will continue to engage with general permit holders to minimize disruption, as well as ensure that proper practices are being maintained on construction sites.

CS 2 CS Management Activities					
MSD General Construction Permits Evaluations					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.12	Permittee shall evaluate all general permits by the end of Permit Year three (3); and report general construction permits issued by MSD in the annual report	Evaluate general permits by end of PY 3. Reported annually.	Permittee shall evaluate all general permits by the end of Permit Year three (3); and report general construction permits issued by MSD in the annual report.	N/A for this reporting period.	No

In PY 3, MSD will evaluate all General Construction Permits issued by MSD to utilities and other entities to determine adequacy with revisions to the KDOW general construction permits, changes in MSD organization and practices, MSD standards, etc. This is not to be confused with entities holding general construction permits issued by the KDOW. This activity is focused on entities that MSD has issued a general permit per its local EPSC ordinance.

MSD will review relevant permits prior to the end of PY 3.

CS 2 CS Management Activities					
Enforcement Tracking Log/Database					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.13	The permittee shall continue to track enforcement actions issues (SWO/NOVs) to support follow-up inspections and issuance of penalties and/or Notice of Compliance.	Annually	Permittee shall summarize in the annual report. A summary of the tracked enforcement actions issued shall be included in the annual report.	Enforcement actions tracked. Nearly $40,000 in fines levied.	No

MSD tracks enforcement actions where Notice of Violations (NOVs) and Stop Work Orders (SWOs) were issued to support follow-up inspections and issuance of penalties and/or Notice of Compliance via its enforcement tracking database. The EPSC Enforcement Log database catalogs construction sites project name, address, primary site contact and inspection dates as well as tracks any enforcement actions issued for the site.

For more information on the number and type of construction site inspections, see **Activity 2.4.2 – Implement Legal Prohibition/Control Authority**.

During the reporting period, MSD issued $39,399 in fines.

During the reporting period, MSD issued approximately 1,128 FCNs, 45 NOVs, and 45 SWOs. MSD will continue to track enforcement on construction sites and issue corrective actions in accordance with the WDRs.

CS 2 CS Management Activities					
Third Party Oversight Inspection					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.14	The permittee shall utilize third party inspections for development of recommendations of efficacy of permittee inspections and enforcement. Updates to training materials shall be administered for permittee personnel at least once per year, if necessary.	Annually	Document training materials and the number of third party inspections conducted.	Inspections conducted at 37 sites.	No

During the reporting period, MSD utilized a third-party consultant to perform oversight inspections with MSD construction inspection staff. 19 inspectors were trained this year across 37 unique construction sites from May 9, 2017, through June 28, 2017. The third-party consultant produced a memo summarizing the results of the oversight inspection. This memo documents the methodology in which the trainings were conducted and incorporates applicable SOPs.

MSD will perform third party inspections in the next reporting period.

CS 2 CS Management Activities					
Cooperative Efforts (MSD provides supportive or other non-lead role)					
Plan Development Process Identification					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.15	The permittee shall review and update, as needed guidance materials identifying the process that developers must follow to obtain related construction permits, including process flow charts and checklists.	Annually, as needed	Permittee shall make up-to-date guidance documents publicly available. A summary of the revised guidance materials shall be included in the Annual Report.	Updated Guidance Materials .	No

MSD reviews and updates guidance materials as needed to identify the process that developers must follow to obtain related construction permits, including process flow charts and checklists. Over the years, several documents have been utilized to communicate with the Development Community the complex process of construction plan approval involving several Metro Louisville government agencies, utilities, and MSD. The means of communication includes, but is not limited to: the MSD Design Manual, PowerPoint presentations, handbooks, memorandums, and web pages.

In 2014, the plan review checklists were updated to include green infrastructure requirements to reflect the green infrastructure requirements adopted August 1, 2013, through the WDRs. Updates to Chapter 18 of the Design Manual, also referred to as the Green Infrastructure Design Manual, were available for public comment in June 2016. The version of Chapter 18 incorporating these comments was finalized and effective on June 30, 2016.

MSD will review guidance material, and respond to comments from those involved with the Plan Development Process to determine where enhancements are needed. This guidance material is available to the development community at: http://louisvillemsd.org/what-we-do/stormwaterdrainage.

CS 2 CS Management Activities					
Cooperative Efforts (MSD provides supportive or other non-lead role)					
Metro Construction Review Enforcement Coordination					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.4.16	The permittee shall coordinate program enforcement actions with Metro Inspections, Permits and Licensing (IP&L), as necessary, to support overall site compliance with an emphasis on Notices of Deficiency, Notices of Violation, and Stop Work Orders issued by MSD and implications on land disturbances and “in building” activities.	PYs 1, 3, & 5	Permittee shall hold at least one (1) conference every other year starting in Permit Year one (1).	Frequent communication with Develop Louisville staff.	No

MSD coordinates construction program enforcement actions with Develop Louisville (formerly Metro Inspections, Permits and Licenses), as necessary, to support overall site compliance with an emphasis on Notices of Deficiency (NODs), NOVs and SWOs issued by MSD with implications on land disturbance and "in building" activities. MSD’s enforcement policies allow MSD to issue a SWO to halt work on land disturbing activities that have failed to comply with EPSC requirements, while Develop Louisville has responsibility for applying enforcement on activities on or inside the structures.

MSD and Develop Louisville regularly communicate, when appropriate, to make each other aware of enforcement activities that halt work. MSD also routinely coordinates with Develop Louisville field staff. Continual communication is occurring between MSD and Metro inspection staff in an effort to educate and streamline inspection requirements. Currently, there is not an official system for documenting these field conferences since the field conferences occur as a matter of common business practice.

MSD regularly coordinates construction program enforcement actions with Develop Louisville. This includes education and coordination on green infrastructure features such as rain gardens and no-mow areas, which use native plants to provide stormwater uptake and increase infiltration rates. MSD coordinates with Develop Louisville on these green infrastructure practices so that violations are not issued by Develop Louisville for these features.

Develop Louisville staff were present at MSD’s annual Construction Field Day on February 28, 2017. Additionally, MSD attends weekly Develop Louisville staff meetings.

MSD will continue to coordinate, communicate, and engage with Develop Louisville to ensure that policies and regulations are clear, and followed for construction sites.

2.5 POST-CONSTRUCTION CONTROLS (PC)

PC 1 Legal Prohibition/Control Authority					
Assess Legal Prohibition/Control Authority					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.1	The permittee shall assess existing Wastewater/Stormwater Discharge Regulations and other relevant ordinances and regulations, to identify changes needed to account for changes in standard of care, changes in technology, changes to development management process and related program needs for new development and redevelopment projects that disturb greater than or equal to one acre and construction activity disturbing less than one acre, including projects less than one acre that are part of a larger common plan of development.	Annually, as needed	Permittee shall make assessments as needed, and report proposed changes in the WDR for consideration by MSD Board.	Revised WDRs effective August 1, 2013.	No

Changes made in the previous term are still valid. In 2011, MSD began an assessment of the existing EPSC Ordinance, WDRs and other relevant ordinances and regulations to identify changes to address post-construction regulations for new and redevelopment projects. MSD drafted changes requiring green infrastructure, and responded to public comments on the proposed WDRs in July 2013. The MSD Board approved modifications to the existing WDRs, and Article 6, Post-Construction became effective on August 1, 2013. As part of the WDR update, MSD updated supporting program elements including the Design Manual and Standard Drawings, development plan review checklists, and internal procedures. The WDRs also impact the IDDE and Industrial Stormwater Programs (see **Activity 2.2.1 – Access Legal Prohibition/Control Authority**).

MSD continued to review the Land Development Code (LDC) with respect to green infrastructure. MSD has reviewed and provided input on proposed Round 1 changes and Round 2 changes to the LDC Improvement Committee. Round 1 amendments and proposed Round 2 improvements, are available at: *https://louisvilleky.gov/government/planning-design/land-development-code-improvement-committee.* MSD continues to be engaged with the LDC process by promoting green infrastructure, and providing input to the review process.

MSD will continue to review and enhance the WDRs for water quality improvements, as necessary.

PC 1 Legal Prohibition/Control Authority					
Implement Legal Prohibition/Control Authority					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.2	The permittee shall enforce existing ordinances and regulations intended to limit long-term stormwater quality impacts from new construction and significant redevelopment.	Annually	Permittee shall summarize enforcement actions in the annual report. The permittee shall include the number of inspections and enforcement actions.	46 inspections performed; Property owners notified of results; Follow-up performed.	No

Previously, MSD and Metro Louisville regulated post-construction stormwater runoff controls through the LDC and Design Manual, which include requirements for floodplains and setbacks. Effective August 1, 2013, MSD's WDR amendments authorized the MSD Design Manual as the standard for green infrastructure stormwater plan review and approval. The MSD Design Manual requires property owners to sign a Long-Term Operation and Maintenance (LTMA) agreement and provide an annual self-inspection report. MSD continued performing post-construction inspections to confirm that property owners were maintaining green infrastructure.

MSD also provides green infrastructure incentives, including a construction offset stipend and credit on the user's stormwater utility fee for implementing green infrastructure on private property. Where projects are not maintained, property owners can forfeit and re-pay stipend and credit funds.

For the current reporting period, MSD received 4 annual self-inspection reports. MSD issued pending enforcement/warning letters to 36 projects that required attention from the property owner. 46 of the 222 active green infrastructure sites were inspected. Letters of warning for self-inspection non-response notified property owners of maintenance and self-inspection reporting requirements, including use of a Qualified Post-Construction Inspector (QPCI) (see **Activity 2.5.14 – Certified/Qualified Post-Construction BMP Inspector Training**).

MSD will continue to perform inspections and follow-up enforcement on private property BMPs.

PC 1 Legal Prohibition/Control Authority					
Site Plan Review					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.3	The permittee shall conduct site plan reviews through procedures for reviewing development plans for compliance with stormwater management requirements.	Annually	Permittee shall continue to conduct site plan reviews.	Reviewed plans for 108 permits.	No

MSD continues to review development plans for compliance with stormwater management requirements outlined in the MSD Design Manual. Per the WDR amendments effective August 1, 2013, MSD incorporated green infrastructure requirements into plan reviews. MSD continues to use the Preliminary Plan Checklist, Site Plan Checklist, and Subdivision Review Checklists.

In the previous permit cycle, MSD began tracking plans reviewed with post-construction BMPs in HANSEN®. MSD updates the Long-Term Maintenance Agreement (LTMA) on an as-needed basis.

For the current reporting period, 108 permits were listed and reviewed including green infrastructure. The number of plans reviewed with green infrastructure has increased over time as new development has occurred, and as green infrastructure standards have gone into effect. Since August 1, 2015, all developments disturbing one acre or greater are required to include green infrastructure.

MSD will continue to review development plans for compliance with WDRs and other relevant ordinances.

PC 1 Legal Prohibition/Control Authority					
Stormwater Infrastructure Inventory					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.4	The permittee shall continue to maintain the GIS-LOJIC layers incorporating system changes from new development plans, MSD projects and related system projects.	Annually	Permittee shall update the GIS LOJIC System as data becomes available.	GIS-LOJIC layers are updated routinely.	No

MSD routinely maintains the GIS Louisville and Jefferson County Information Consortium (LOJIC) layers, incorporating system changes from new development plans, MSD projects, and related system projects. MSD has extensive sets of geographic and attribute data managed in the LOJIC and HANSEN® databases. This data was developed through an intense plan conversion and field data collection effort and has been maintained to include changes, improvements and modifications. MSD manages changes from new development through the plan review and approval process, as new development projects are approved for construction.

Much of the LOJIC data is publically available through a series of interactive mapping tools administered by LOJIC such as the "LOJIC Online Map" available at: *www.lojic.org/main/apps/index.htm*. More information about LOJIC is available at: *www.lojic.org*.

LOJIC updates and maintenance will be ongoing in the next reporting period.

PC 1 Legal Prohibition/Control Authority					
Post-Construction Site BMP Inventory Update					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.5	The permittee shall develop and maintain an inventory and map of post-construction stormwater controls, including retention ponds, detention basins, and stormwater quality treatment facilities. The permittee shall update LOJIC and HANSEN® datasets to reflect the location, extent, and condition of post-construction stormwater quality BMPs.	PYs 1 & 3	Permittee shall incorporate related data on an ongoing basis; Permittee shall assess data to identify and fill dataset gaps every other year.	Baseline assets and green infrastructure inventory updated.	No

MSD maintains an asset inventory in the HANSEN® database that includes all MSD assets and some private stormwater controls. During the previous permit cycle, MSD completed an inventory and evaluation program of the existing volume control stormwater basins and riparian restoration areas. Contracts for these projects include evaluation of "credit" basins that are privately owned as well as regional flood control basins. Stream restoration areas were evaluated for current water quality and riparian habitat with recommendations for enhancements.

While MSD already had several datasets with basin information, reconciling them was necessary to better support operation and maintenance agreement needs assessments, credit basin inspections, retrofit analyses, and treatment BMP inspections (presented in the **Activities 2.5.7 through 2.5.9 and 2.5.16**). MSD completed an update to the datasets for regional flood control basins and credited detention basins and integrated results into HANSEN®. This activity identified gaps in the data that were filled, for a significant portion of the basins, with field visits and other research.

In 2014, MSD began tracking green infrastructure in HANSEN® and the GIS. Construction inspections are performed by MSD staff which then automatically creates an annual Self-Monitoring inspection to be performed by the person or company responsible for maintenance of the site.

During the previous permit cycle, MSD created a green infrastructure protocol that describes MSD internal project management procedures including: design approval, procurement, tracking, and post-construction inspection.

MSD continues to track green infrastructure in HANSEN® and the GIS, consistent with the protocol developed in the previous permit cycle. New post-construction control asset types continue to be added to the HANSEN® database in order to record and report on BMPs installed and to process inspection and work order schedules.

PC 1 Legal Prohibition/Control Authority					
Post-Construction Inspector Training					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.6	The permittee shall provide training to the inspectors including internal staff that have been designated to inspect the effectiveness of the post-construction BMPs, as well as, the local residents who are required to provide operation and maintenance of privately-owned Post-Construction BMPs.	Annually	At least two trainings per year for the inspectors of Post-Construction BMPs. Report in the annual report, the dates of training, # of attendees, and subject matter.	Weekly plan review training held, 5 QPCI sessions held with 13 certified.	No

MSD provides training to internal staff much more frequently than the minimum requirement. This primarily takes place at weekly MSD plan review staff meetings. Additional training across MSD departments takes place at least twice annually. Emphasis is placed on design and inspection of green infrastructure as well as lessons learned through demonstration projects, private development and redevelopment activities. Training for inspectors in other departments has been enhanced to include additional water quality controls (riparian buffers, bioswales, pervious pavement, etc.).

MSD expanded inspector training to support WDR requirements that annual green infrastructure self-inspections must be completed by a Qualified Post-Construction Inspector (QPCI). In addition to the QPCI course that is available to the public (see **Activity 2.5.14 – Certified/Qualified Post-Construction BMP Inspector Program**), MSD requires that its inspectors attend QPCI training that is held internally, and pass an exam. A public listing of available QPCI inspectors was published in 2016, to facilitate contact between property owners and qualified inspectors to complete private property annual maintenance inspection reports.

A listing of qualified inspectors is available at: *http://lifelonglearning4u.com/msd/QPCIP-InspSvcs.htm*.

The majority of training is conducted at weekly plan review meetings. During the current reporting period, the following training sessions occurred:

- Plan review meetings, scheduled weekly (see **Activity 2.5.10 – Plan Preparers and Reviewers Training**)
- QPCI Training was held on the following dates with a total of 13 trained: 9/22/2016, 10/27/2016, 3/30/2017, 5/17/2017, 6/22/2017

MSD will continue to offer training for Plan Reviewers and for QPCI.

PC 2 PC Plan Maintenance and Update					
Inspect "Credit" Basins					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.7	The permittee shall inspect private flood control basins, (retention ponds) receiving a stormwater utility user fee credit (reduction) to determine ability to fulfill original, current, and projected drainage demands. Continue to enforce, per existing basin credits documentation requirements, necessary to fulfill maintenance agreements and long-term system integrity.	Annually	Permittee shall continue to perform spot check inspections for at least 50% of qualifying facilities annually and summarize for the annual report.	Inspections performed, letters sent.	No

MSD promotes and encourages stormwater utility customers to participate in its credits policy, where the user has the option to receive a rate reduction by operating and maintaining retention/detention basins. MSD continues to inspect these stormwater control systems to monitor effectiveness and the adequacy of the maintenance schedule. This process includes communication with the property owner to identify maintenance and improvements necessary to fulfill long-term system integrity. MSD staff continues to spot inspect at least 50% of qualifying facilities annually.

During the current reporting period, MSD inspected 101 of 188 credited basins, or 54% of basins, exceeding the goal of inspecting 50% of basins annually. MSD sent letters of correction to all basins with deficiencies, and follow-up inspections were performed.

MSD will continue to inspect and provide necessary enforcement for flood control basins.

PC 2 PC Plan Maintenance and Update					
Inspection Plan Procedures for Treatment BMPs					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.8	The permittee shall update inspection and oversight protocol for private stormwater quality treatment BMPs to facilitate long-term maintenance demands including requirements for qualified private inspection of private BMPs with local government oversight access inspection and controls, as needed.	Annually, as needed	Permittee shall continue to perform spot check inspections for at least 20% of treatment BMPs annually. All BMPs should be inspected by the end of the permit cycle. A summary of this activity shall be included in the annual report.	Regulations administered, inspections occurred at 46 sites.	No

During the previous permit cycle, MSD developed an inspection and oversight protocol for private stormwater quality treatment BMPs. Requirements for long term performance were incorporated into the WDRs, Article 6, Section 6.04, Post-Construction (long-term) BMP Self-Inspections, and became effective August 1, 2013.

As the number of public and private stormwater quality treatment BMPs increases, more consistent procedures to inspect for proper construction, operation and maintenance have been implemented. Procedures for inspections are available on MSD's website: *www.louisvillemsd.org*. The revised procedures include applicable checklists and review items to address issues including private green infrastructure inspection responsibilities, inspector qualifications, frequency, and documentation.

During the current reporting period, oversight inspections were conducted for 46 of the total 222 green infrastructure sites. This meets the goal inspecting at least 20% of active treatment BMPs during the reporting period. Notices were sent to property owners with green infrastructure BMPs with deficiencies.

MSD will continue to perform inspections and necessary enforcement of installed BMPs.

PC 2 PC Plan Maintenance and Update					
Post-Construction and Green Infrastructure BMP Guidance Materials					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.9	The permittee shall evaluate and update the guidance materials facilitating current technology use and to reflect local plan review, construction site inspection and post-construction inspection requirements. Design Manual chapters and Standard Specifications sections to address long-term BMP operation, inspection and maintenance including checklists. “Green Infrastructure” is a combination of natural and engineered infrastructure that is designed to reduce the environmental footprint of the system. In terms of stormwater, green infrastructure can effectively manage stormwater runoff through the use of infiltration, biofiltration, detention, and other stormwater management techniques.	Annually, as needed	Permittee shall update the guidance materials specifically the Design Manual chapters and Standards Specifications sections and make the document publicly available.	Continued implementing the latest version of the design manual. Evaluation is on-going.	No

In June 2011, MSD issued guidance for green infrastructure through updates to the MSD Design Manual. Chapter 18 of the Design Manual, also referred to as the Green Infrastructure Design Manual, was developed to address green infrastructure design, long-term operation, inspection, and maintenance. Both vegetative and non-vegetative practices are included. The Manual provides engineering worksheets that outline the process for sizing, constructing and maintaining the GMPs. Each fact sheet includes construction details, design, operation and maintenance checklist.

During the previous permit cycle, MSD updated Chapter 18 and added sections describing plan development standards, aggregate specifications, green infrastructure forms, and infiltration testing specifications. MSD also updated Chapter 13-Plant Guide, which includes information on native and cultivar plants for use in green infrastructure, updated plant list, example green infrastructure planting plans, and invasive species list. The Design Manual is publicly available at: *http://louisvillemsd.org/GreenMSD*

The update process included significant public input through stakeholder workshops, a stakeholder comment and review period, and a public comments and review period (see **Appendix 2.5.9 – Green Infrastructure Design Manual**).

MSD will continue to review design guidance, and plans to update existing manuals as new expertise and lessons learned are gained from green infrastructure implementation.

PC 2 PC Plan Maintenance and Update					
Plan Preparers & Reviewers Training (MSD Facilitates)					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.10	The permittee shall provide available content, such as EPA web casts, through periodic training classes, workshops and meetings for designers, planners, and developers including emphasis on green infrastructure, post-construction planning, and design procedures for structural and non-structural BMPs, pollutant removal and inspection. MSD shall incorporate comments from stakeholders in the plan review process from designers to internal MSD review staff to facilitate training sessions to address evolving technologies and lessons learned.	Annually	Permittee shall continue to offer at least two (2) events annually. A summary of workshops topics and attendance shall be submitted in the annual report.	7 Training sessions offered.	No

MSD provides available content at least twice a year, such as EPA webcasts, through periodic training classes, workshops and meetings for designers, planners, and developers. Training includes: emphasis on green infrastructure, post-construction planning, design procedures, and inspection.

During the current reporting period, MSD hosted the following events:

- EPA ORD: Lessons Learned in Green Infrastructure Webinar – 8/16/2016
- Webinar: Potential Threats from Harmful Algal Blooms in the Southeast – 2/15/2017
- Creating a Culture of Clean Water: Residential Engagement for Ecosystem Impact – 3/9/2017
- Source Molecular Webinar – Microbial Source Tracking – 3/30/2017
- EPA Webinar – Sponsorship: A Unique Tool for Funding Land Conservation Projects with the CWSRF – 4/13/2017
- US EPA & WEF Webinar: DC Water's Environmental Impact Bond – 5/11/2017
- US EPA & WEF Webinar: Washington DC's Stormwater Retention Credit Program – 5/23/2017

MSD will continue to offer opportunities for training, based upon what is available from various resources.

PC 2 PC Plan Maintenance and Update					
Project DRI					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.11	The permittee shall continue to implement Drainage Response Initiative (DRI) program aimed at identifying and solving the local drainage problems in Jefferson County.	Annually	Permittee shall provide program progress summarizing cost, number and type of projects in the annual report.	107 Project DRI projects completed for nearly $3 Million.	No

The standard for Project DRI priorities remains uniform – projects that solve drainage problems for the greatest number of people have the highest priority. Project DRI projects are tracked in LOJIC and HANSEN®.

Phase 4 of Project DRI began in July 2012, and extended through the summer of 2015. Phase 1, 2, and 3 included the completion of almost 170 projects investing $9 million in Louisville Metro drainage infrastructure.

Phase 5 of the DRI began in July 2015. There are approximately 166 projects planned to be completed by July 2018, with a total construction dollar values of approximately $8.4 million.

During the reporting period, 107 projects were completed with a total construction value of $2,964,629.

In addition to efforts that are associated specifically with Project DRI, MSD's crews perform routine and preventive maintenance for the Louisville Metro drainage infrastructure. This work entails the routine cleaning of more than 30,000 catch basins, mowing of over 16 miles of large channels and the levee, removal of obstructions in the system, repair of cave-ins over storm facilities, and scheduled cleaning of concrete and earthen ditches.

MSD will continue to administer the Project DRI program based on available funding.

PC 2 PC Plan Maintenance and Update					
User Fee Credits (Green Infrastructure Incentives) Program Planning					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.12	The permittee shall evaluate enhancements to the utility user fee credits program for green infrastructure and post- construction BMPs based on post-construction lessons learned.	Annually, as needed	Permittee shall evaluate incentives as needed.	Program continued to be administered.	No

MSD assessed the feasibility of implementing a utility user fee credits program for green infrastructure and post-construction BMPs. MSD determined that an incentive policy was viable, and developed and adopted a credit policy that became effective August 1, 2011, in advance of the permit requirement. The incentives program promotes stormwater utility customers to participate through the option to receive a short-term incentive, known as a stipend, to offset construction costs. It also provides a long-term (10-year renewable) incentive through drainage service charge reductions, known as credits, for incorporating and maintaining green stormwater best management practices on their property. Owners are required to sign a LTMA in order to receive the stormwater credits.

The MSD rates rentals and charges program that included green infrastructure incentives, became effective August 1, 2011. More information about the policy and green infrastructure program is publicly available at: *www.msdlouky.org/insidemsd/rates.htm*. During the reporting period, MSD transitioned the stipend program from a "right-sizing" model, to one that incorporates benefits to residual CSO Average Annual Overflow Volume (AAOV) reductions.

During this reporting period, MSD began producing a technical memo evaluating the post-construction use credit program's progress to date. This technical memo is expected to help guide the future of the program by guiding MSD's incentive selection to produce the maximum benefit for both MSD and its customers.

MSD will continue to administer the green incentive program based on AAOV priorities, and available budget.

PC 2 PC Plan Maintenance and Update					
Stream Restoration Inspection and Maintenance					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.13	The permittee shall identify restored stream reaches that MSD has maintenance responsibilities. The permittee shall also determine status of restored reaches and identify, prioritize/schedule and implement maintenance needs. MSD shall prioritize, design, and implement restoration practices on at least one stream segment per year.	Start in PY 2	Permittee shall continue to provide in the annual report, summarized stream reaches and maintenance. Permittee shall assess or implement at least one restoration project per year starting in Permit Year two (2).	7 stream reaches maintained.	No

During the previous permit cycle, an inventory of restored reaches was performed to evaluate the overall condition, and to identify potential maintenance factors. The evaluation considered the extent and severity of erosion, bank instability, trash/litter, invasive species, and riparian corridor condition. Restored stream reaches were prioritized for maintenance activities based upon these factors. Additionally, MSD performs stream assessments as part of other projects related to sewers.

During the reporting period, MSD maintained 7 stream restoration reaches. Planning efforts for stream restoration projects are underway.

MSD will continue to identify and restore stream reaches in the next permit year. Design for two stream restoration projects is currently underway. At least one of these restoration projects will be constructed in PY 2.

In this permit year, MSD maintained reaches on the following waterways:

- Fern Creek/ Watterson Trail
- Little Bee Lick Creek
- 6025 Shean Ct. Ditch
- Riverport Wetland
- Mud Creek
- Bruce Creek
- Drive-In Branch

PC 2 PC Plan Maintenance and Update					
Certified/Qualified Post-Construction BMP Inspector Program					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.14	The permittee shall enhance the Qualified Post Construction Inspector training program to identify and hold accountable third party private BMP inspectors to facilitate periodic operation and maintenance of private facilities resulting from the credits program, regulations changes and demonstration projects.	Annually	Permittee shall continue to administer Qualified Post Construction Inspector training and include summary of activities in the annual report.	Administration of the QPCI Training Program is on-going. 5 QPCI sessions held, 13 individuals certified	No

Effective August 1, 2013, MSD's WDRs enabled MSD to develop and require a QCPI training course to educate third-party inspectors on evaluating the performance of water quality BMPs. MSD continued to partner with the Jefferson County Public Schools (JCPS) through a training agreement for conducting QCPI classes in the reporting period. During the reporting period, five QPCI sessions were held, and 13 individuals were certified through this program.

See **Activity 2.5.6 – Post-Construction Inspector Training for dates of QPCI training**.

MSD will continue to offer opportunities for training and certification of QPCIs, and will continue to evaluate participation in the National Green Infrastructure Certification Program (NGICP).

PC 2 PC Plan Maintenance and Update					
Stormwater Runoff Quality Treatment Standard for all New Development and Redevelopment Projects					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.15	The permittee shall continue to administer an on-site stormwater runoff quality treatment standard, to be adopted by ordinance or other regulatory mechanism for all new development and redevelopment projects at any location within Louisville Metro. The proposed local standard will require, in combination or alone, management measures that are designed, built and maintained to infiltrate, evapo-transpire, harvest and reuse stormwater runoff, or otherwise manage the stormwater runoff quality. The standard shall be based, at a minimum, on an analysis of precipitation records to determine the equivalent surface depth of runoff (e.g. 0.60 inches) produced from an 80th percentile precipitation event.	Annually	Permittee shall continue to administer a local treatment standard for addressing stormwater runoff quality.	Administration/ enforcement for treatment standard compliance is on-going.	No

MSD developed an on-site stormwater runoff quality treatment standard in 2011, to treat the 80th percentile storm event. The standard is based on an analysis of long-term precipitation records from the National Weather Service (NWS) station at the Louisville International Airport. It was determined and verified that the equivalent surface depth of runoff produced from an 80th percentile precipitation event is 0.60 inches.

This standard was incorporated into the Chapter 18 Green Infrastructure Design Manual and enabled by the WDR updates for development projects disturbing one or more acres. The local standard requires management measures that are implemented to infiltrate, evapotranspire, harvest and reuse stormwater runoff, or otherwise manage the stormwater runoff quality. The design manual requires calculation of a site's water quality volume and provides ways through green infrastructure to manage that volume.

MSD's post-construction treatment standard is available in the Green Infrastructure Design Manual, Section 18.2. The Green Infrastructure Design Manual is publicly available at: *www.msdlouky.org/insidemsd/standard-drawings.htm.*

MSD will continue to review plans and issue permits for site developments that implement water quality BMPs, as regulated.

PC 2 PC Plan Maintenance and Update					
Private BMP Maintenance Agreement Assessment/Long Term O & M					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.16	The permittee shall require all new development or redevelopment to establish and enter into a long-term maintenance agreement and maintenance plan approved management practices for property owners. Alternatively, the permittee may establish other enforceable mechanisms for requiring long-term maintenance of structural and non-structural BMPs. Such authorities shall allow the MS4, or its designee, to conduct inspections of the management practices and also account for transfer of responsibility in leases and/or deed transfers. The agreement shall also allow the MS4s, or its designee, to perform necessary maintenance or corrective actions neglected by the property owner/operator, and authority to recover costs from the property owner/operator when the owner/operator has not performed the necessary maintenance.	Annually	Permittee shall continue to require all new development and redevelopment projects to have this agreement.	LTMAs in place, and administered .	No

MSD developed a Long-Term Maintenance Agreement (LTMA) as part of its Green Infrastructure Incentives Program. The MSD Board approved the green incentives program, effective August 1, 2011. The LTMA allows MSD to conduct inspections, account for transfer of responsibility in leases or deed transfers and perform maintenance or corrective actions that were not addressed by the property owner/operator.

Effective August 1, 2013, Section 6.03 of the WDRs enabled MSD to develop, implement, and administer a water quality standard, requiring all new development and redevelopment projects of one acre or greater to enter into a long-term maintenance agreement. The agreement includes responsibilities, inspection, operation and maintenance schedules. These agreements also allow MSD to conduct oversight inspections, account for transfer of responsibility in leases or deed transfers, and perform maintenance or corrective actions that were not addressed by the property owner/operator. See **Activity 2.5.8 – Inspection Plan Procedures for Treatment BMPs** for more information on green infrastructure follow-up inspections performed by MSD.

MSD will continue to maintain a database of LTMAs, and will administer programmatic activities such as inspections accordingly.

PC 2 PC Plan Maintenance and Update					
Cooperative Efforts (MSD provides supportive or other non-lead role)					
Green Infrastructure Demonstration Site(s)					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.17	The permittee shall continue, in cooperation with Louisville Metro Mayor's administration, University of Louisville and other local agencies, to pursue development of stormwater quality and green infrastructure interpretative center(s) at strategic location(s) around Jefferson County with the intent of providing a positive highly visible platform to promote the viability and desirability of green infrastructure BMPs. Where feasible explore the opportunity for BMP evaluation and pre-/post-monitoring.	Annually	Permittee shall report its role and activities, lessons learned, and overall project progress and summarize for the annual report.	Projects constructed.	No

MSD has constructed several highly visible green infrastructure demonstration projects to encourage the public to adopt the green practices. Example projects include rain gardens, pervious pavement, bio-swales, tree boxes and infiltration trenches. MSD continues to collaborate with local entities to implement projects and maximize public opportunities to raise public awareness. MSD is partnered with EPA Office of Research and Development (EPA ORD) in a Cooperative Research and Development Agreement (CRADA) to assess performance of green infrastructure, from a quantity and quality perspective.

MSD installed or worked with partners to implement 19 green demonstration projects during program development. During the current reporting period, MSD began a partnership with Churchill Downs, Inc. to construct a system of infiltration practices intended to control runoff from a 22 acre parking at Churchill Downs. MSD intends to promote this partnership with tours and media content to help explain the value of green infrastructure in Louisville.

MSD continues to monitor the effectiveness of the original green infrastructure demonstration projects, including a monitoring agreement with EPA ORD.

PC 2 PC Plan Maintenance and Update					
Cooperative Efforts (MSD provides supportive or other non-lead role)					
Rain Barrels and Louisville Nature Center					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.18	The permittee shall explore the opportunity for MSD to continue program with Louisville Nature Center that provided public guidance to construct and maintain rain barrels.	Annually	Permittee shall report its role, lessons learned and overall programs progress and summarize for the annual report.	Promotes Nature Center and commercial vendors.	No

MSD continues to collaborate with the Louisville Nature Center (LNC) to provide public guidance to install and maintain rain barrels.

The demand for rain barrels continues to increase in Louisville Metro. MSD plans to continue encouraging the use of rain barrels in various outreach efforts. Currently, the LNC provides assembled rain barrels for purchase. LNC volunteers and staff do the assembly work and proceeds benefit the LNC. More information is available at: *www.louisvillenaturecenter.org*.

MSD will continue to maintain partnerships with entities that support its mission.

PC 2 PC Plan Maintenance and Update					
No Mow/Riparian Zone					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.19	The permittee shall assess existing mowing areas as part of maintenance activities to determine if the original need or impetus still exists. Opportunities to adjust the mowing contracts to include or exclude mowing areas will be incorporated into those contracts as they are rebid or renewed. Areas that are removed from the mowing list will be considered for "no mow" signage and education.	Annually	Permittee shall report its role and activities, lessons learned, and overall project progress and summarize for the annual report.	No mow zones maintained.	No

In April of 2017, MSD led an effort to reforest a floodprone vacant property on Bartley Drive along Cedar Creek. As part of this effort, MSD solicited volunteers to install native plants and vegetation as well as bare-root saplings. MSD has designated this property as a “No Mow” zone, and installed two signs alerting the neighborhood that the area is intended to be a managed native revegetation zone. MSD plans to continue performing similar projects as opportunities arise.

MSD continues to evaluate mow vs. no-mow areas to determine feasibility of removing properties from mowing contracts.

PC 2 PC Plan Maintenance and Update					
Urban Reforestation – MS4					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.20	The permittee shall create a grant funding mechanism to provide incentives for the planting of trees in the MS4 area and improve tree canopy for the benefit of stream health and water quality. The co-permittee will budget to provide grant funding of private or public grantees to plant 1000 trees per year in the MS4. Funds will be administered in accordance with water quality goals, and on a first-come first-serve basis.	Annually	Permittee shall report its role and activities, lessons learned, and overall project progress and summarize for the annual report.	Tree partnership and planting projects completed. Over 2500 trees distributed through the Louisville Nature Center.	No

During this reporting period, MSD partnered with the Louisville Nature Center and the Salt River Watershed Watch to fund tree giveaways for private property. Additionally, MSD provided in-kind services to the Louisville Nature Center by delivering trees to homeowners that participated in the Nature Center's tree giveaway program. During the reporting period, over 2,500 trees were distributed.

MSD will continue to work with partners and urban reforestation grantees to allow for the planting of 1,000 trees in the next reporting period.

PC 2 PC Plan Maintenance and Update					
Regional Basin Retrofit Analysis					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.5.21	The permittee shall assess the regional flood control basins to determine if there is potential for enhancement to the basin or the outlet structure to provide additional capture for smaller water quality events. A technical memo and recommendation outline shall be provided prior to the end of Permit Year four (4).	PY 4	Permittee shall by the end of Permit Year four (4) produce a technical memo outlining findings and recommendations.		No

MSD evaluated 19 regional flood control basins to determine stormwater quality treatment incorporation/retrofit feasibility in 2012. MSD explored opportunities to cost-share, provide incentives or otherwise finance the projects. Retrofits were also considered as an off-site alternative to meet post construction requirements for new projects. The assessment report identified facilities with high, moderate and low retrofit potential/benefit.

During the previous permit cycle, MSD modeled two private property credit basins to assess feasibility for stormwater retrofit opportunities. Modeling and assessment of these properties is ongoing. MSD does not have authority via local regulations to require private BMP owners to retrofit their facilities; this includes regional facilities that are privately held. However, MSD has implemented a financial incentive program, effective August 1, 2011, to promote these partnership opportunities. While it is premature to project outcomes, MSD is committed to developing a framework that encourages incorporation and retrofit of privately held regional BMPs to address stormwater quality in addition to the existing flood control benefits. Furthermore, the updated WDRs, effective August 1, 2013, require installation of green infrastructure BMPs for new development and redevelopment of one acre or greater. Regional flood control basin retrofits will also be considered as an off-site alternative to meet post-construction requirements for new projects.

MSD continues to evaluate the list of prioritized basins for retrofit opportunities. In PY 4 a technical memorandum will be developed to outline the findings and recommendations.

2.6 GOOD HOUSEKEEPING/POLLUTION PREVENTION (GH/P2)

GH/P2 Plan Maintenance and Update					
Stormwater Pollution Prevention Plans for MSD Operations					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.6.1	The permittee shall periodically update and implement SWPPPs (also known as BMP Plans or Stormwater Plans) to control the discharge of pollutants from POTWs and other applicable MSD-owned facilities as defined in 40 CFR 122.26 including wastewater treatment plants and major operating facilities. SWPPPs will include provisions for maintenance activities on facility grounds, materials and equipment storage, security, preventative maintenance, risk identification and assessment, materials inventory, floor drain protection/controls, inspections and records.	PYs 2 & 4	Permittee shall assess plans within six (6) months of major facility changes or at least once every two years by the facility superintendents and operation managers who make up the SWP3 Committee.	SWPPPs updated, as needed.	No

MSD's Water Quality Treatment Centers (WQTCs) are issued discharge permits for wastewater that have included requirements for stormwater BMPs since the 1980s, and are required to have groundwater protection plans, hazardous materials spill plans and disaster response plans. MSD also maintains internal standards manuals and inspection programs for employee health and safety and emergency preparedness and response.

In June 2014, MSD updated and signed the SWPPPs for the following facilities: Central Maintenance Facility, Cedar Creek WQTC, Derek R. Guthrie WQTC, Floyds Fork WQTC, Hite Creek WQTC, Jeffersontown WQTC, and Morris Forman WQTC. This effort included good housekeeping trainings for facility staff, the development of inspection forms, facility inspections, recommendations for good housekeeping practices, and the development of work orders.

During the previous permit cycle, MSD updated the SWPPPs to include facility changes and to reflect changes on SWPPP committees. The Jeffersontown WQTC was removed from service in December 2015, and therefore a SWPPP is no longer needed.

MSD will continue to monitor major changes at facilities and update the SWPPPs appropriately.

GH/P2 Plan Maintenance and Update					
Training on MSD Facility SWPPPs					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.6.2	The permittee shall utilize third party inspectors working with the facility SWPPP Committees to perform routine training of key SWPPP issues	Annually	Permittee shall starting in Permit Year one (1) utilize third party inspectors to address at least three (3) SWPPP issues annually and summarize training and attendance for the Annual Report.	Implemented SWPPPs and training occurred at 8 sessions, with 99 employees trained.	No

During the reporting period, SWPPP and MS4 program education were performed at MSD facilities. This classroom style training presented an overview of the SWPPP process including: inspections, good housekeeping practices, work order completion, forms, and document maintenance. These trainings will be adapted to cross-train staff regarding good housekeeping practices at the regional WQTCs. 99 employees were trained in eight training sessions.

During the reporting period, SWPPP trainings were conducted at the major facilities. Multiple training sessions were held at the Morris Forman WQTC to accommodate the multiple shifts at the treatment center. The trainings occurred on the following dates:

- Central Maintenance Facility: 5/26/2017
- DRG WQTC: 4/26/2017
- Cedar Creek WQTC: 6/21/2017
- Floyds Fork WQTC: 5/31/2017
- Morris Forman WQTC: 5/16/2017, 5/17/2017 (two sessions), 5/24/2017

Training will continue to be implemented on an annual basis with the intent of reaching as many Operations staff with SWPPP responsibilities, as possible.

GH/P2 Plan Maintenance and Update					
Maintenance Staff Training on Pollution Prevention					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.6.3	The permittee shall provide training to key maintenance staff on good housekeeping activities related to stormwater quality in MSD operations including but not limited to: green infrastructure operation and maintenance, fleet and building maintenance, and stormwater conveyance/drainage system maintenance.	Annually	Permittee shall report the number of staff attending related training and include in the Annual Report.	Staff training conducted, with nearly 1,200 trained and 127.5 hours offered.	No

The MSD Training Department maintains records of employees with state herbicide certifications and ensures that re-certifications are obtained. MSD provided the following training during the permit year and tracked the number of employees trained and number of hours of training for each training session, as follows:

- 8 Hour Hazmat Refresher
- Basic Crane Training
- Basin Cleaner (Atlas)
- Combination Sewer Cleaner
- Crawler Carrier
- CSO/Gate Regulator
- Drainage Repair and Regrade
- Erosion Control
- Hazardous Communications (GHS Standard)
- Jet Rodder
- Job Preplanning
- Mini Excavator
- Mini Excavator (Job Site Coaching)
- Plate Truck/Atriculating Boom Crane
- Sewer Cleaning and Maintenance
- SORP Annual Overview
- SORP Quarterly Field Training
- Telespection
- TV LIS & OZIII Telespection Camera Training
- Traffic Control
- Trench Excavation Safety/Competent Person

During the reporting period, the above-listed trainings included 1,172 attendees and accounted for 127.5 total training hours offered.

Note: The equipment and other related training covers safety and environmental concerns. More information on SORP training is provided in **Activity 2.2.10 – IDDE Identification SWPPP Training Integration**.

MSD will continue to offer training to support good housekeeping techniques and principals in the next reporting period.

GH/P2 Plan Maintenance and Update					
Pesticides Management					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.6.4	The permittee shall utilize Commonwealth of Kentucky pesticide management registration and certifications to qualify MSD employees applying pesticides. The permittee shall develop and maintain a list of pesticides used and stored, including storage locations.	Annually	Permittee shall track employees with related state certifications.	Employees trained as needed.	No

MSD contracts with Louisville Metro Department of Public Health and Wellness (LMDPHW) to apply pesticides for mosquito control. Louisville Metro applies pellets in catch basins to control mosquitos.

Although MSD does not manage pesticide treatment or application, it does use herbicides. MSD employees that apply herbicide are certified to do so by the state. MSD maintains a database of chemicals used and stored, including storage locations. The MSD Training Department maintains records of employees with state certifications and ensures that re-certifications are obtained (see **Activity 2.6.3 – Maintenance Staff Training on Pollution Prevention**).

MSD did not offer herbicide training during the current reporting period. Employees with herbicide application certificates are retrained once every 3 years to maintain their certifications.

MSD will continue to offer these opportunities for training based on need.

GH/P2 Plan Maintenance and Update					
Incident Response Staff Training					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.6.5	The permittee shall provide training to unified incident response staff on related stormwater issues including good housekeeping, IDDE, construction, post-construction BMP/controls and program management.	Annually	Permittee shall continue to report incident response staff training participation.	Employees trained at 6 sessions.	No

MSD provides training to unified incident response staff on related stormwater issues including good housekeeping, IDDE, construction, post-construction, BMP/controls and program management. The training provides information to the incident response staff to support their recognition of the controls while responding to incidents.

The Industrial Waste Department (IWD) staff is trained on IDDE, MS4 permit administration, and Industrial Stormwater Program updates and implementation. The staff is assessed in the field during an inspection, and participates in a classroom style training.

MSD IWD Staff Trainings during the reporting period included the following:

- TRANSCAER (Transportation Community Awareness and Emergency Response) Training – 7/26/2016
- 8 Hour Annual Refresher Hazardous Waste Operations and Emergency Response Training – 10/17/2016, 10/27/2016, 11/2/2016, 11/3/2016, 11/7/2016, 11/8/2016
- Train the Trainer: Ethanol Emergency Response Seminar - 4/11/2017
- National Incident Management System Training Course 100 – 3/14/2017, 3/30/2017
- National Incident Management System Training Course 200 – 3/30/2017, 4/26/2017
- National Incident Management System Training Course 700.A – 3/30/2017, 4/28/2017

MSD will continue to offer training for incident response, including good housekeeping protocols for those activities.

GH/P2 Plan Maintenance and Update					
MSD Capital Project Control					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.6.6	The permittee shall, for MSD directed capital, rehabilitation and reconstruction projects, disturbing more than one acre, performed by a contractor, ensure the contract documents/agreements/work orders will include stipulations that require the work be designed/performed/implemented/constructed under the same standards for construction and post-construction stormwater quality that MSD requires of private development it regulates.	Annually, as needed	Permittee shall summarize changes to MSD Capital Project requirements, as necessary.	MS4 standards followed on MSD Capital Projects.	No

MSD capital construction projects are required to uphold the same requirements as those required of private development. Each project is required to obtain land disturbance permits and corresponding inspections. While the state requirement is for land disturbance of more than one acre, the MSD requirement applies to any project that disturbs 2,000 square feet of land.

Post-construction BMPs are required for all projects disturbing one acre of land or greater, including MSD capital projects. Requirements are enforced through the Wastewater/Stormwater Discharge Requirements (WDRs), effective August 1, 2013.

MSD capital projects are reviewed identically to private development projects. MSD reviews projects to meet the requirements set forth in the Design Manual, WDR's, EPSC and Floodplain Management Ordinances. The reviews and permits are tracked in the Project Activity Tracking system and HANSEN®.

MSD will continue to subject its own projects to the rigorous review process that is administered for private construction.

GH/P2 Plan Maintenance and Update					
MSD Stormwater Quality BMP Data					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.6.7	The permittee shall update LOJIC and HANSEN® datasets to identify stormwater-quality BMPs located on MSD properties, rights-of-way and easements that MSD is responsible for operating and/or maintaining. The datasets will be updated in a manner to support ongoing prioritization and tracking of operation and maintenance.	PYs 1, 3, & 5	Permittee shall every other year assess datasets for completeness and ability to support staff scheduling stormwater-quality BMPs MSD is responsible for maintaining.	Dataset maintained as needed.	No

MSD continuously updates the LOJIC and HANSEN® datasets to identify stormwater-quality BMPs located on properties, rights-of-way and easements that MSD is responsible for operating and/or maintaining. The datasets are updated in a manner to support ongoing prioritization and tracking of operation and maintenance. HANSEN® software is used to record and track complaints, inspections, work orders and enforcement cases, including reports of illicit discharges. MSD and Louisville Metro infrastructure and property assets are geocoded in the HANSEN® database, and the asset data tables are linked in the LOJIC GIS.

A major (multi-year) system update was rolled out in 2013, to HANSEN®. The upgrade included tracking to identify inspection of private and public stormwater quality BMPs. The LOJIC and HANSEN® system have been updated to track green infrastructure practices at the site local level and individual practice location level. Practices are characterized in a way to match the types of green infrastructure presented in the Chapter 18 Design Manual. The system supports tracking of property owner contacts at project onset and some physical characteristics including contributing drainage area. Mechanisms that continue to be expanded include: tracking MSD spot maintenance inspections, credit inspections and related operation and maintenance inspection metrics. Further progress will be reported in future MS4 Annual Reports.

During the previous permit cycle, MSD developed a green infrastructure tracking protocol. While MSD continues to refine its tracking system, green infrastructure sites are tracked within LOJIC and HANSEN®, including routine inspections. Operation and maintenance is performed based on the results of those inspections.

More information on green infrastructure project tracking is available in **Activity 2.5.4 – Stormwater Infrastructure Inventory** and **Activity 2.5.5 – Post-Construction BMP Inventory Update**.

MSD will continue to track green infrastructure installations and refine processes to improve efficiency of performance assessments.

GH/P2 Plan Maintenance and Update					
Catch Basin and Storm Sewer Cleaning					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.6.8	The permittee shall continue to clean catch basins and sewers (closed pipe systems) to prevent debris from entering receiving streams and address drainage/flooding issues in MSD area based on known priorities and information gathered from the customer hotline.	Annually	Permittee shall summarize and include in the Annual Report.	Over 5,000 work orders completed for maintenance of storm sewers and catch basins in the MS4 areas.	No

Catch basin and storm sewer cleaning is tracked in HANSEN® by work orders. Catch basins and storm sewers outside the combined sewer (inside the MS4) service area were cleaned as issued by work orders and tracked in HANSEN® by activity codes CBC, CBCL, V, FLUSH, RC and SF. The following table includes the storm sewer cleaning performed during the report year:

Activity	Combined Sewer Area			MS4 Area			Total		
	Costs	Footage	Work Orders	Costs	Footage	Work Orders	Costs	Footage	Work Orders
Catch Basin Cleaning	$167,760	-	21,127	$73,045	-	4,872	$240,805	-	25,999
Catch Basin Cleaning - Customer Request	$4,937	-	1,344	$980	-	273	$5,917	-	1,617
Total Catch Basin Cleaning	$172,697	-	22,471	$74,025	-	5,145	$246,722	-	27,616
Flush Asset	$3,479	29,111	358	$232	8,464	135	$3,711	37,576	493
Root Cutting	$9,239	10,892	188	$-	356	4	$9,239	11,248	192
Routine (PM) Sewer Flushing	$1,390	21,685	418	$-	-	-	$1,390	21,685	418
Vactor	$3,778	1,058	607	$2,317	130	89	$6,094	1,188	696
Total Storm Sewer Cleaning	$17,885	62,747	1,571	$2,549	8,950	228	$20,434	71,697	1,799
Total Catch Basin & Storm Sewer Cleaning	$190,582	62,747	24,042	$76,574	8,950	5,373	$267,156	71,697	29,415

During the current reporting period, there were 5,373 work orders for catch basin and storm sewer cleaning in the MS4 service area.

MSD will continue to maintain the storm sewer system, and track those maintenance activities for reporting.

GH/P2 Plan Maintenance and Update					
Channel Maintenance					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.6.9	The permittee shall continue to maintain open channel system in MSD area based on priorities and information from the customer hotline including ditch cleanings, ditch regrading, drainage obstruction removals, erosion repairs, floodwall levee maintenance, headwall install/repair, concrete channel installation, tree removal, driveway apron restoration, routine mowing and closed pipe installations.	Annually	Permittee shall summarize and include in the Annual Report.	7,283 work orders created to maintain 270,000 linear feet of drainage ways.	No

The following summarizes work orders for channel maintenance during the reporting period:

Activity	Combined Sewer Area			MS4 Area			Total		
	Costs	Footage	Work Orders	Costs	Footage	Work Orders	Costs	Footage	Work Orders
Areas Trimmed	$15,049	0	176	$1,559	150	88	$16,608	150	264
Debris Removal	$46,931	2	809	$5,516	-	25	$52,447	2	834
Ditch Cleaning	$67,044	7,755	27	$659,359	195,982	426	$726,403	203,737	453
Ditch Regrading	$53,286	2,049	24	$992,142	48,243	438	$1,045,429	50,292	462
Drainage Obstruction Removal	$1,799	1	10	$126,884	310	342	$128,683	311	352
Driveway Apron Restoration	$3,844	-	2	$608,451	3,671	140	$612,295	3,671	142
Erosion Repair	$3,481	-	6	$202,479	794	171	$205,960	794	177
Floodwall/ Levee Maintenance	$232	-	48	$11,700	-	61	$11,932	-	109
Headwall Installation/ Repair	$-	-	-	$30,284	2	22	$30,284	2	22
Install Concrete Channel	$12,499	80	1	$104,227	2,219	37	$116,726	2,299	38
Pipe Installation	$17,285	89	4	$320,905	2,271	60	$338,191	2,360	64
Routine Mowing	$434,147	5,602	2,657	$940,944	16,366	3,884	$1,375,090	21,968	6,541
Storm Line Repairs	$6,452	34	3	$-	1	1	$6,452	35	4
Trash/ Debris Pickup	$7,599	0	5	$-	-	-	$7,599	0	5
Tree Removal	$9,478	-	5	$169,140	-	78	$178,618	-	83
Subtotal	***$679,126***	***15,612***	***3,777***	***$4,173,591***	***270,010***	***5,773***	***$4,852,717***	***285,622***	***9,550***
Hot Spots	$95,751	-	96	$122,870	-	1,510	$218,621	-	1,606
Storm Events	$16,267	-	13	$-	-	-	$16,267	-	13
Subtotal	***$112,018***	***-***	***109***	***$122,870***	***-***	***1,510***	***$234,888***	***-***	***1,619***
Total	**$791,144**	**15,612**	**3,886**	**$4,296,460**	**270,010**	**7,283**	**$5,087,604**	**285,622**	**11,169**

During the reporting period, 7,283 work orders were created to maintain 270,000 linear feet, amounting to nearly $4.3 Million for drainage ways outside of the combined sewer system.

MSD will continue to maintain drainage channels, and document the details for reporting.

GH/P2 Plan Maintenance and Update					
Cooperative Efforts (MSD provides supportive or other non-lead role)					
Stormwater Pollution Prevention Plans for Co-Permittee Operations					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.6.10	The permittee shall provide co-permittees with periodic 3rd-party technical assistance and/or review of the facility stormwater pollution prevention plans (SWPPPs, BMP plans, or Stormwater Plans and BMPs) and/or site visit/walkthrough to help identify opportunities to improve the effectiveness of the plans and their implementation.	Annually, as needed	Permittee shall assist in the review of at least one (1) facility annually.	One Co-Permittee site reviewed as part of a joint inspection with EPA Region 4.	No

Upon request by a co-permittee, MSD provides third-party technical assistance and/or review of the facility stormwater pollution prevention plans (SWPPPs, BMP plans, or Stormwater Plans and BMPs) and/or site visits or walkthroughs to help identify opportunities to improve the effectiveness of the plans and their implementation. The permit requires at a minimum that MSD shall assist in the review of at least one facility annually if requested.

During the reporting period, MSD accompanied KDOW and US EPA on a site evaluation at the Louisville Metro Road Salt Storage Facility on Newburg Road. MSD offered assistance to Louisville Metro by sharing its facility SWPPPs for reference.

MSD will continue to respond to requests for inspection support, and will proactively seek opportunities to provide assistance to Co-Permittees.

2.7 MONITORING (M)

M Monitoring Plan Maintenance and Update					
Long-Term Monitoring Network (LTMN)					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.7.1	The permittee shall continue the existing program of the collection of long-term data on stream quality and habitat for at least 28 LTMN locations selected to support the various types of data collected. This program includes: • **Continuous** – pH, conductivity, temperature, dissolved oxygen, and stream flow. • **Quarterly** – Ambient monitoring for Total Suspended Solids (TSS); E. coli; Total Nitrogen (as N) Oil and Grease, Total Recoverable Copper and pH. • **5/month (May-October)** - Recreational monitoring for E. coli. • **Once Every Two Years** – Biological sampling and/or evaluation rotating to include: algae, fish and benthic macro invertebrates.	Annually	Permittee shall provide datasets electronically with annual report.	Monitoring data collected.	No

Continuous: Continuous monitoring data was collected at 28 LTMN stations on 15-minute intervals for pH, specific conductance, temperature, and dissolved oxygen. Stream flow data was collected by USGS under cooperative agreement at 25 LTMN locations. USGS reviews data annually on a water year basis for October through September of the previous permit year. Modifications to the Long Term Monitoring Network locations are adjusted as needed to accommodate MSD capital project construction.

Biological: Biological samples were collected at 27 LTMN locations. Benthic macroinvertebrate communities and habitat were sampled in May 2015. Fish communities and aquatic habitat data were collected in September and October 2015. MSD collected algal samples in September and October 2015, using KDOW protocols. Fish, benthic macroinvertebrate, algae community samples and aquatic habitat assessments were collected as scheduled in 2017, and will be reported in the PY2 MS4 Annual Report.

Quarterly Monitoring: Between July 1, 2016, and June 30, 2017, MSD collected quarterly water quality samples in July 2016, October 2016, February 2017, and April 2017.

Bacteria Monitoring: Trained MSD staff collected and analyzed five *E. coli* samples within a 30-day period during the six-month recreational season in 2016 (July to October), and 2017 (May and June). The sample period coincides with the MS4 reporting period. *E. coli* samples were analyzed in MSD's laboratory using EPA approved methods. Bacteria monitoring data and analytical method information are provided in **Appendix 5C – Quarterly Monitoring Data and Appendix 5D – Raw LIMS Data**.

M Monitoring Plan Maintenance and Update					
Monitoring Summary					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.7.2	The permittee shall provide a summary of monitoring collection efforts and results in the annual report.	Annually	Permittee shall summarize and include in annual report.	Monitoring completed.	No

See **Chapter 5 – Monitoring** for includes a detailed description of environmental data collection activities and monitoring data assessment for permit required parameters and analytes.

M Monitoring Plan Maintenance and Update					
Trend Analysis					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.7.3	The permittee shall perform trend analysis to support long-term assessments of local waterways and program performance. Report analysis through the "Synthesis Reports" at least once every permit cycle.	Once per permit cycle	Permittee shall, at least once per permit cycle, provide synthesis report.	State of the Streams Report completed in 2016.	No

MSD completed and published a *State of the Streams: 2016 Water Quality Synthesis Report* (*www.louisvillemsd.org/WaterQuality*). This report includes a watershed based assessment of eleven watersheds that are partially or completely within the MSD service area. The State of the Streams report included a long-term status and trends assessment of monitoring data collected between 1999, and 2014, including stream flow, fish, benthic macroinvertebrate and algal communities, aquatic habitat quality and water quality. The State of the Streams report was written in an accessible manner with extensive use of photographs, graphs, charts, and call out boxes to highlight the status and trends in water quality throughout Jefferson County watersheds.

State of the Streams: 2016 Water Quality Synthesis Report is provided in **Appendix 2.7.3 – State of the Streams Report**.

M Monitoring Plan Maintenance and Update					
Flow Estimate to Support Quarterly Ambient Monitoring					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.7.4	The permittee shall utilize total precipitation estimates over the previous twenty-four (24) hour period to estimate flow. When flow is measured with in stream gauging equipment, that data will be utilized rather than precipitation based estimates.	Annually	Permittee shall provide available data and include in annual reports.	Flow data collected by USGS.	No

USGS collects stream flow measurements every 5 to 15 minutes from 24 gauges and gauge height at one (1) site. USGS performs a quality assurance review and publishes final flow data and stream statistics. Provisional and final data are available for download on the USGS National Water Information System (NWIS) website: *http://waterdata.usgs.gov/ky/nwis*.

In addition to instantaneous flow data, USGS provides a variety of flow statistics such as long term daily and monthly mean flow, which are computed using all available final data for the duration for which the gauge has been active. For this MS4 Annual Report, daily flow data and long term monthly mean data were analyzed to characterize flow on the day of sample collection as wet or dry. Final daily mean flow data were not available for this report. Provisional flow data were used to evaluate wet and dry conditions between July 1, 2016, and June 30, 2017.

USGS Flow Monitoring Data is provided in **Appendix 5A and 5B – Continuous Monitoring Data**.

M Monitoring Plan Maintenance and Update					
Monitoring Location Maintenance					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.7.5	The permittee shall continue its collaboration with United States Geological Survey (USGS) on flow gauges and monitoring locations maintenance and data management.	Annually	Permittee shall summarize activities and include in annual reports.	Sites maintained.	No

MSD continues to collaborate with USGS on the operation of 25 flow gauges throughout the MSD service area. USGS maintains flow gauges, manages flow data, and provides access to the data through the National Water Information System website (*http://waterdata.usgs.gov/ky/nwis)*.

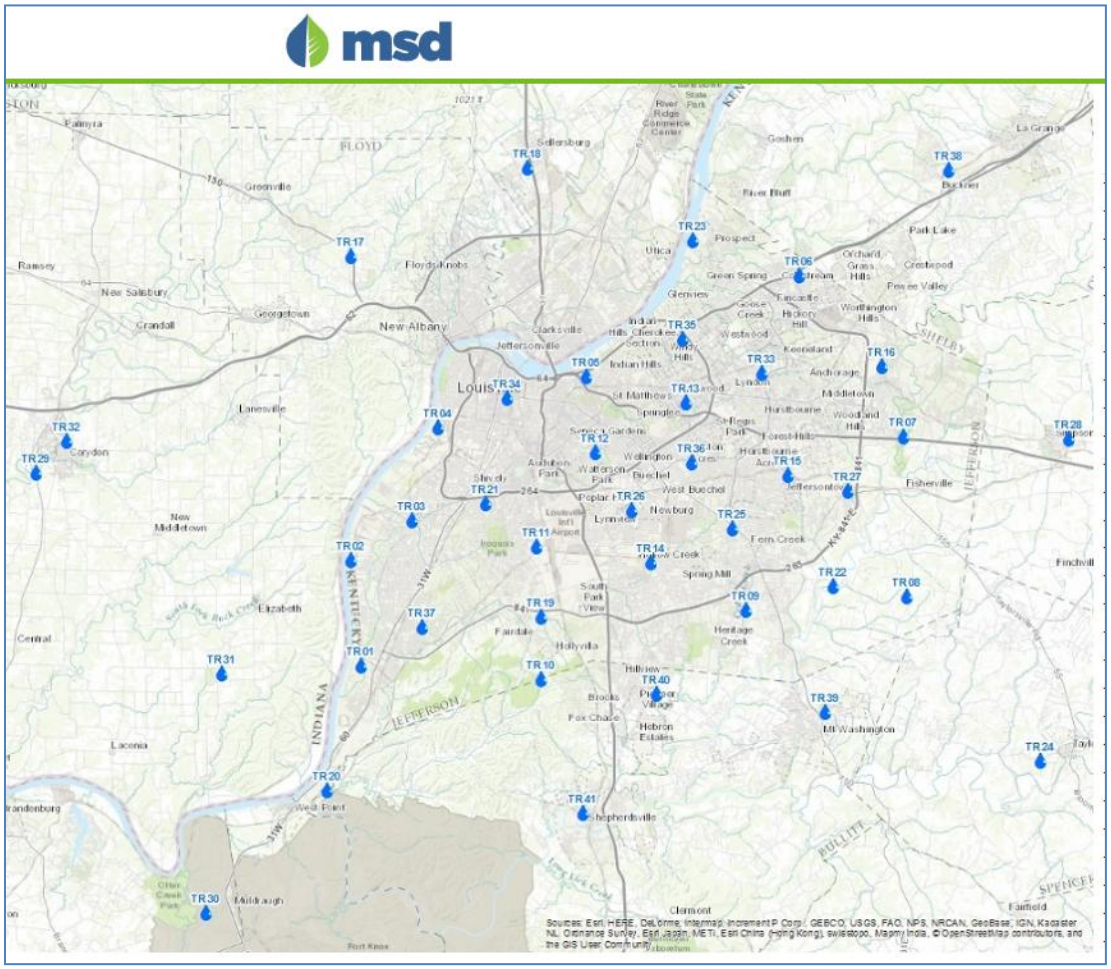
MSD continues to collaborate with USGS on the operation of 24 water quality sondes throughout the MSD service area. Through its contract with USGS, MSD operates and maintains the sondes and USGS provides on-line access to provisional (i.e., as collected) water quality data through the National Water Information System website (*http://waterdata.usgs.gov/ky/nwis)*. USGS reviews and finalizes the data annually and delivers the final sonde water quality data.

M Monitoring Plan Maintenance and Update					
Precipitation Estimate					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.7.6	The permittee shall continue to maintain the continuous rain gauge network and on-line public access to that data.	Annually	Permittee shall continue to make rain gauge network data available on-line.	Data available on website.	No

MSD continues to maintain a rain gauge network and provides on-line public access to that data. This rain gauge network data is currently available on MSD's website (*raingauge.louisvillemsd.org*).

Eight additional rain gauge locations were added to the MSD inventory in 2016, bringing the total number of stations to 41.

MSD will continue to maintain the rain gauge network in the next reporting period.



M Monitoring Plan Maintenance and Update					
Water Quality Standards					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.7.7	The permittee shall compare stream monitoring analytical results to the applicable water quality standards for each parameter of the monitoring program. The most stringent applicable standard shall be used for comparison. Constituents that exceed applicable Water Quality Standards shall be highlighted. The permittee shall include a discussion of possible pollutant sources through the annual report.	Annually	Permittee shall apply the most stringent standard.	Comparison completed; source evaluation performed using wet vs. non-wet.	No

MSD compared analytical results of the stream monitoring to the most stringent applicable water quality standards for each parameter of the monitoring program. Constituents that exceed applicable Water Quality Standards were highlighted. The comparison with water quality criteria and parameters without numeric criteria are provided in **Chapter 5 – Monitoring** of this report.

The determination of possible pollutant sources is a very complex undertaking, particularly in dynamic and urbanized watersheds where numerous factors influence water quality and the magnitude of those influences varies with storm, season and site specific factors. Therefore, an analysis that considers the flow conditions under which samples were collected, the types of land uses, and amount of impervious surfaces draining to each monitoring station was performed. This analysis provides a relative indication of whether specific pollutants or conditions are associated with wet weather and stormwater or non-storm conditions. Water quality data collected by MSD were analyzed and reported in the context of whether the samples were collected under “wet” or “dry” conditions. This analysis of stream conditions is available in **Appendix 2.7.3 – State of the Streams Report** (see **Activity 2.7.3 – Trend Analysis**).

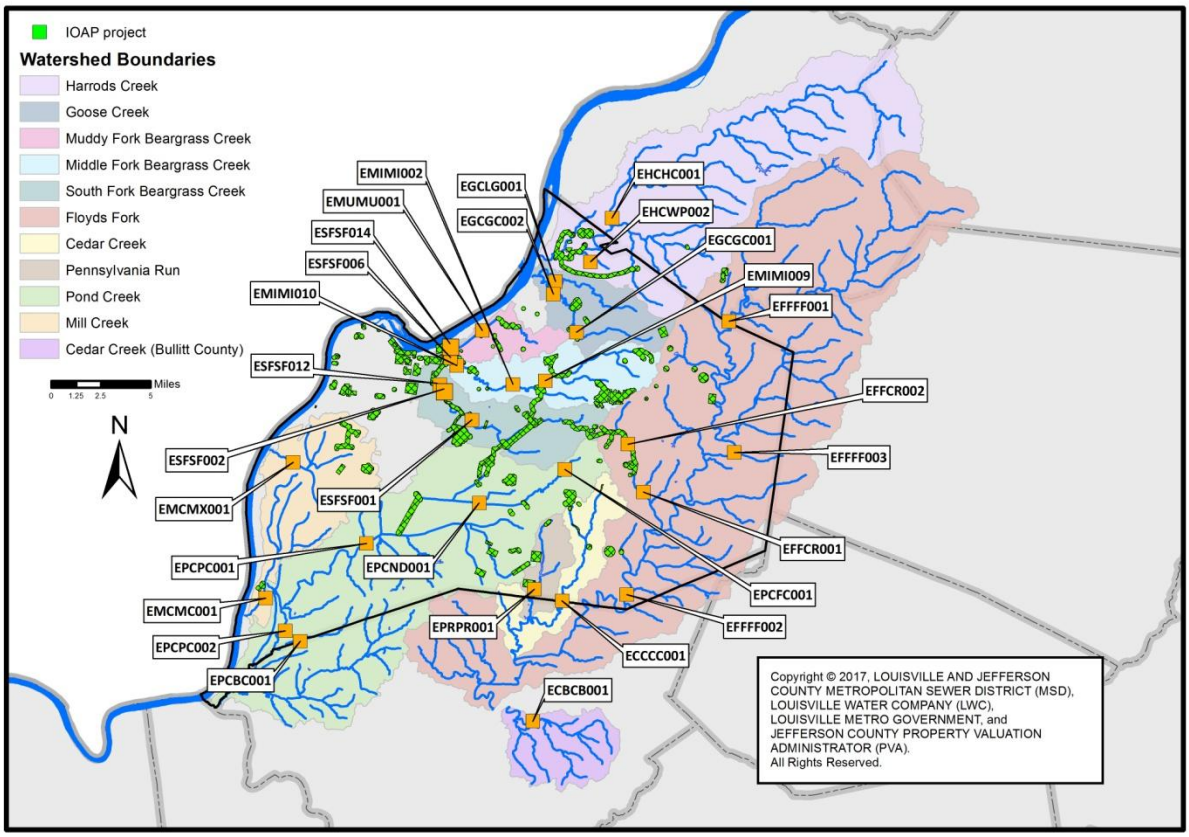
When data indicate that illicit discharges may be present that are causing or contributing to exceedances of applicable water quality standards, follow-up investigation will be performed per IDDE procedures.

In addition, MSD is in the early stages of water quality model development for major watersheds in the county for pollutant source identification and water quality impact assessment. Progress and results will be communicated in future reports.

The comparison to water quality standards is reported in **Chapter 5 – Monitoring** of this report.

M Monitoring Plan Maintenance and Update					
Location Mapping					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.7.8	The permittee shall maintain the geo-coded monitoring station locations and descriptions through related geographic datasets and databases.	Annually	Permittee shall maintain the monitoring stations reflected in mapping system.	Location data maintained in LOJIC.	No

The LOJIC database maintains geocoded LTMN monitoring station locations and descriptions.



M Monitoring Plan Maintenance and Update					
Sampling Methodology and Test Procedures					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.7.9	The permittee shall perform the sampling methodology according to the EPA stormwater application regulation at 40 CFR 122.26. The permittee shall perform the analyses according to the procedures approved under 40 CFR Part 136, unless other test procedures have been specified. The permittee shall assess the monitoring Quality Assurance Project Plan (QAPP), and update as needed.	Annually	Permittee shall perform the sampling methodology to insure compliance with 40 CFR 122.26 and 136, and provide a summary of as-needed updates to the QAPP in the annual report.	Procedures followed.	No

Sampling methodology is conducted according to the EPA stormwater application regulations. Analyses are conducted according to procedures approved under 40 CFR Part 136 or similar methods.

Analytical methods are included with raw monitoring data in **Appendix 5D – Raw LIMS Data**.

MSD will review, evaluate, and revise the Quality Assurance Project Plan (QAPP), as needed.

M Monitoring Plan Maintenance and Update					
Annual Data Summary					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.7.10	The permittee shall submit a stormwater monitoring report annually. The monitoring reports shall include: status of implementation of the monitoring program, methods of evaluating data, graphical summaries of the data, and an explanation/discussion of the data for each component of the monitoring program. The monitoring data/results obtained each year will be submitted electronically with the Annual Report. A narrative data analysis shall be submitted annually within the Annual Report.	Annually	Permittee shall provide a summary electronically with the annual report.	Data provided.	No

Monitoring data assessment is reported in **Chapter 5 – Monitoring** of this report.

2.8 PERFORMANCE ASSESSMENT AND REPORTING (PAR)

PAR Performance Assessment and Reporting					
Activity Measures Reporting					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.8.1	As described in the specific activity listings, the permittee shall compile information necessary to provide in the annual report. The metrics defined by "Measure of Success" shall be reported and kept for program assessment purposes. The permittee shall track the appropriate metrics through existing databases/spreadsheets to support staff assignments and budget development.	Annually	Permittee shall develop and retain Annual Reports for three years beyond permit term.	Annual report submitted and posted on website.	No

MSD compiles the information necessary to prove compliance in the MS4 Annual Report. Metrics defined by the Frequency or Measures of Success per the permit are reported in the fact sheets (see table above) in this section (Program Assessment & Reporting) and kept for program assessment purposes. MSD utilizes other metrics tracked through existing databases/spreadsheets to support staff assignments and budget development. Previous MS4 Annual Reports are available on MSD's stormwater website at *www.louisvillemsd.org/WaterQuality*.

As applicable, some data, including raw and analyzed monitoring data, is provided electronically or made available through web applications and not submitted in hard-copy format (see **Chapter 5 – Monitoring**). In addition, MSD maintains large GIS datasets and programmatic data in the LOJIC and HANSEN® databases, respectively. MSD's MS4 Annual Reports will be retained in electronic form for at least three years beyond the permit term.

Tracking for the various metrics is performed by the various MSD departments, utilizing a variety of databases and tools. MS4 Program staff compiles data for inclusion in the MS4 Annual Reports.

MSD will continue to track and report data as outlined in the SWQMP.

PAR Performance Assessment and Reporting					
PEOPLE					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.8.2	The permittee shall continue activity tracking to support consistent coordination and integrated reporting in a way that enables the variety of MSD staff to report their individual activities, target audiences, and related metric.	Annually	Permittee shall, by the end of Permit Year one (1), summarize tracking procedures and results and include with Annual Report.	MS4-Calendar tracking system in place.	No

This activity supports gathering pertinent data from a wide variety of staff and MSD business units involved in the stormwater public education and outreach activities. Targeted public education and outreach events and activities have been identified for MSD to disseminate stormwater messages. In addition, MSD receives requests for tours or event attendance from the public. As requests are made for MSD support at events and tours, individual activities and staffing are assessed to determine whether staffing of the event is feasible. More information on public education and outreach activities can be found in **Section 2.1 – PEOPLE** of this report.

In the previous permit cycle, MSD created an MS4 Calendar resource in their email/scheduling system, Microsoft Outlook. The resource can be copied on scheduled events and viewed as a calendar to easily locate outreach events and other trainings or meetings for compliance tracking. This system allows MSD staff from multiple departments to easily copy the shared calendar and send a follow-up response to the event to track materials and attendees.

MSD will continue to utilize the MS4 calendar to track activities, including access for staff to document and track events.

PAR Performance Assessment and Reporting					
Illicit Discharge Trend Analysis					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.8.3	The permittee shall perform a trend analysis of illicit discharge investigations and enforcement actions over the term of the permit.	PY 5	Permittee shall provide, during Permit Year Five (5) a report of trends and potential implications of IDDE investigations.	Completed for previous permit term.	No

MSD conducted two thermal imagery flyovers during the PY 3 and PY 5 of the previous permit (**Activity 2.2.4 – Dry Weather Screening**), followed by digital imagery analysis to identify thermal anomalies.The data provides locations for targeted field investigations. Results of the two illicit discharge screenings, investigations and enforcement activities have been compared below.

Infrared thermal imagery methods allow MSD to identify and quantify the following types of possible illicit discharges: leaking sewage collection lines, non-stormwater discharges from outfalls and pipes, illegal connections to storm drainage ditches and systems, septic tank or degraded sanitary sewer discharges, non-stormwater industrial discharges, groundwater to surface water discharges, and force main exfiltration. Low findings for confirmed illicit discharges are attributed to MSD's robust reporting program and employee training practices over the last 20 years.

Findings	Total Digitally Detected Anomalies	IDDE (confirmed)	Ground-water	Shallow Ponds	Permitted	Notice of Violation	Referrals (Board of Health, Water Company)
2013 Anomalies	142	2	26	18	33	0	4
2015 Anomalies	225	0	46	16	9	0	1

Referrals to KDOW are provided in **Activity 2.3.1 – Industrial IDDE Program Enforcement** and requests from KDOW are provided in **Activity 2.2.11 – KDOW Support** and **Activity 2.3.12 – KDOW Support**.

MSD recognizes the efficiencies in digital detection as an alternative to dry weather screening and will perform inspections once per permit cycle.

PAR Performance Assessment and Reporting					
Industrial/IDDE Compliance Actions Portal					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.8.4	The permittee shall maintain a Compliance Actions Web Portal supplementing existing databases for functionality for internal use to expedite follow-up inspections of HRIFs.	Annually	Permittee shall maintain and report progress summarized in the Annual Report.	Plan developed for HANSEN® improvements and implementation schedule defined.	No

During the current reporting period, MSD reviewed current data collection processes and developed a plan to improve the current industrial facility inspections tracking system. Currently, MSD uses the Threat Matrix spreadsheet in conjunction with HANSEN® to collect and maintain data (see **Activity 2.3.1 – Industrial IDDE Program Enforcement**).

In 2013, MSD designed a customized table in its HANSEN® Asset Data Management system to host the data contained in the spreadsheet version of the Threat Matrix, which assesses facility risk into low, moderate and high risk categories. HANSEN® does not currently include a mechanism to score facilities based on inspection results. Therefore, Industrial Waste Department (IWD) staff has been entering inspection information into both HANSEN® and the spreadsheet version of the Threat Matrix.

In 2014, MSD developed an Industrial Inspection Compliance Actions Portal Implementation Plan Memo for HANSEN® improvements to modify HANSEN® to include risk assessment and scoring capability.

MSD will continue to enhance the HANSEN® database to improve efficiency and data integrity.

PAR Performance Assessment and Reporting					
Post-Construction Inspection Portal					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.8.5	The permittee shall maintain a Compliance Actions Database for internal use to expedite follow-up inspections of private post-construction BMPs.	Annually	Permittee, shall maintain and report progress summarized in the Annual Report.	Plan developed for HANSEN® improvements and implementation schedule defined.	No

MSD currently tracks post-construction (green infrastructure) sites and inspections in HANSEN®. In 2013, MSD updated its HANSEN® Asset Data Management system to track long-term inspections for green infrastructure projects. This process begins at the plan review stage where a green infrastructure application is added for sites with proposed green infrastructure practices. After the project is reviewed and constructed, a green infrastructure license is issued in HANSEN® to track the long-term operation of the project, triggering annual self-inspection documentation from the property owner and follow-up inspections by MSD every five years. Letters requesting self-inspection reports from property owners and notifying them of MSD inspections are currently sent manually. For inspections performed where significant deficiencies are observed, MSD notifies the property owner of those deficiencies and requests that a maintenance plan be submitted to MSD. Further enforcement actions, including reversal of stormwater credits and green infrastructure stipends (when applicable) can occur if deficiencies are not addressed by the property owner. For more information on green infrastructure inspections, see **Activity 2.5.2 – Implement Legal Prohibition/Control Authority.**

MSD plans to continue to update HANSEN® to include automated features and design a mobile user interface for data collection during inspections. HANSEN® will continue be used to track green infrastructure inspections and enforcement.

MSD will continue to utilize developed portals and will enhance the HANSEN® database as needed to ensure program documentation is maintained.

PAR Performance Assessment and Reporting					
Six-Level Program Assessment Methodology					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.8.6	The permittee shall continue to evaluate and report portions of the six-level program EPA began advocating in 2008 to assist MS4 programs in identifying success and future areas of focus.	Annually	Permittee shall continue to assess performance with the six-level program and report on progress in Annual Reports.	N/A for this reporting period.	No

MSD will utilize the EPA Six-Level Program Assessment framework to develop a baseline measurement of the MS4 Program prior to the end of PY 2.

PAR Performance Assessment and Reporting					
Cooperative Annual Report					
SWQMP ID	**Activity Required**	**Schedule**	**Frequency or Measure of Success**	**Result**	**Propose Change**
2.8.7	The permittee shall coordinate and cooperate with co-permittees in compilation of the annual compliance demonstration reports	Annually	Permittee shall prepare and submit Annual Report in a timely manner.	First annual report completed.	No

MSD coordinates and cooperates with co-permittees to compile annual compliance reports. Ultimately, the co-permittees are responsible for their own MS4 Annual Reports, just as they are for their portions of the SWQMP. MSD continues to provide leadership and assistance to the co-permittees as they compile the reports and utilize MS4 program partner opportunities.

In the last permit cycle, MSD requested co-permittees to sign certification statements for reporting consistency (see **Chapter 3** for co-permittee certification statements and MS4 Annual Reports). The certification statements were signed and submitted by the co-permittees with their MS4 Annual Reports.

CHAPTER 3 CO-PERMITTEE PROGRAM REPORTS

CO-PERMITTEE CERTIFICATION
MS4 STORMWATER QUALITY MANAGEMENT PLAN
KPDES PERMIT NUMBER KYS000001

LOUISVILLE METRO is designated as a co-permitte covered by the Municipal Separate Storm Sewer System (MS4) permit that has been issued by the Kentucky Division of Water under the Kentucky Pollutant Discharge Elimination System (KPDES) program. **LOUISVILLE METRO** has prepared the attached annual compliance report for the reporting period of **July 1, 2016 to June 30, 2017**.

Under the terms of KPDES Permit No. KYS000001, and implemented through a Memorandum of Understanding with Louisville and Jefferson County Metropolitan Sewer District, **LOUISVILLE METRO** certifies that it has responsibility for the following:

- Construction oversight and permitting in addition to that provided through Louisville MSD by the Erosion Prevention and Sediment Control Ordinance, Chapter 159;
- Implement education and outreach at the applicable levels of neighborhood and local community that compliment the education and outreach provided by MSD tailored to local waterbodies pollutants of concern;
- Inspection, operation, maintenance and/or applicable certification that permanent (also known as post-construction) water quality devices, controls, and management practices are operating effectively;
- Road maintenance including snow and ice removal related stormwater management activities;
- Preparation and implementation of fleet and facility stormwater pollution prevention;
- Report and refer potential illicit discharges observations by municipal employees or other reports from residents to MSD for investigation and potential enforcement;
- Preparation and timely submittal of annual compliance demonstration report to MSD according to agreed upon formats and standards; and
- Administration of other codes and ordinances including, but not limited to, solid waste management, animal control and land development

Certification: that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the above statements are, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false

LOUISVILLE METRO

Name: Patrick Stevens

Signature:

Title: Environmental, Health & Safety Coordinator

Date: 10/17/17

3.1 LOUISVILLE METRO GOVERMENT

(JULY 1, 2016 – JUNE 30, 2017)

The following report covers the three primary departments of Louisville Metro Government that have direct impact with the MS4 Program. With the recent development of a Louisville Metro Government department wide MS4 Committee, additional department's initiatives and contributions will be added.

As one of the co-permittees with MSD on the Kentucky Pollution Discharge Elimination System (KPDES) Large Municipal Separate Storm Sewer System (MS4) stormwater discharge permit, it is necessary for Louisville Metro Government to fulfill applicable permit requirements. Through an interlocal agreement with MSD, the primary co-permittee on the KPDES MS4 permit, Louisville Metro Government is not responsible for performing certain tasks required as these tasks are overseen and implemented by MSD.

1. LOUISVILLE METRO GOVERNMENT – PARKS

Public Education, Outreach, Participation, and Learning Experiences (PEOPLE)

- Newsletter

Frequency or Measure of Success	Activity Required
Permittee shall report the number of newsletter recipients	Louisville Metro Government – Parks shall employ its monthly newsletter at least twice during the year to discuss pollution prevention information.

- Louisville Metro Government – Parks sent out their monthly newsletter to discuss pollution prevention, recycling issues and other environmental issues. Newsletter was sent out quarterly to all Louisville Metro Government residents.

ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)

- Training session(s) for applicable staff

Frequency or Measure of Success	Activity Required
Permittee shall report number of staff trained per year	Louisville Metro Government – Parks shall require staff to attend training on the recognition and reporting of illicit discharges as provided by MSD.

- Louisville Metro Government – Parks ensures that appropriate employees attend the Erosion Prevention and Sedimentation (EPSC) training class. Topics covered include pre-construction planning, design procedures for structural and non-structural Best Management Plans, pollutant removal and inspections.

CONSTRUCTION SITE STORMWATER RUNOFF CONTROL REQUIREMENTS (CS)

- City construction projects to follow construction site BMP requirements

Frequency or Measure of Success	Activity Required
Permittee shall summaries the contracts, city code officer inspection log of sites and will include with the annual report	Louisville Metro Government – Parks shall require all contracts specify compliance with the Erosion Prevention and Sediment Control Program requirements and require that in-house projects be inspected for compliance.

- Louisville Metro Government – Parks follows guidance materials for EPSC plan and inspections. Inspections of Louisville Metro Government – Parks construction sites are conducted by Louisville Metro Government inspectors through the use of a checklist provided by MSD to assist the inspectors and developers on proper procedures and requirements.

POST-CONSTRUCTION STORMWATER RUNOFF CONTROL FOR NEW DEVELOPMENT AND REDEVELOPMENT (PC)

- Tree-green space replacement to provide future ground cover

Frequency or Measure of Success	Activity Required
Permittee shall continue the memorandum-for-record filed yearly by participating departments	Louisville Metro Government – Parks shall maintain or increase the total amount of trees or other green space/grounds covered on its properties, in accordance with appropriated resources.

- In FY 2015 Louisville Metro Government completed a comprehensive tree canopy analysis that established Louisville's land is 37% covered by trees. With the ultimate goal set at 45%, 5% higher than the American Forests recommendation, Louisville Metro Government – Parks continues to maintain current green spaces and increases ground cover by green spaces in every available opportunity.

GOOD HOUSEKEEPING/POLLUTION PREVENTION FOR MUNICIPAL OPERATIONS

- Municipal Facility SWPPPs

Frequency or Measure of Success	Activity Required
Permittee shall revise SWPPPs as needed and retain the revised SWPPPs on file	Louisville Metro Government – Parks shall maintain and revise, as needed, MS4 SWPPPs for applicable "industrial" type facilities.

- With the recent development of a Louisville Metro Government department wide MS4 committee each departments properties will be systematically reviewed to determine the need of SWPPPs and any currently in place SWPPPs will be reviewed and updated as needed.

STAFF TRAINING

Frequency or Measure of Success	Activity Required
Permittee shall retain copies of training records and training references as provided	Louisville Metro Government – Parks shall train staff, as needed, on the SWPPP requirements.

- As part of the Louisville Metro Government department wide MS4 Committee, an established training program is in the process of being created to ensure that all applicable employees are trained on SWPPP requirements.

PARKS GROUND MAINTENANCE

Frequency or Measure of Success	Activity Required
Permittee shall continue the memorandum-for-record filed yearly by the department	Louisville Metro Government – Parks shall develop and implement a Pesticide, Herbicide and Fertilizer (PHF) Program which includes required certification of applicators, reporting on the number of certifications, procedures for the storage and proper use of PHFs and the corresponding measures to protect MS4s and receiving waters from the PHFs.

- Louisville Metro Government – Parks requires all employees that work in the application of pesticides and herbicides on their golf courses and park locations to be properly trained and certified as required.

MONITORING (M)

- Louisville Metro Government, and its agencies (Parks), have an inter-local agreement with MSD, the primary Co-Permittee on this MS4 permit; the responsibilities are divided according to the Part I, Section A.

PERFORMANCE ASSESSMENT AND REPORTING (PAR)

- Louisville Metro Government, and its agencies (Parks), have an inter-local agreement with MSD, the primary Co-Permittee on this MS4 permit; the responsibilities are divided according to the Part I, Section A. Louisville Metro Government – Parks shall submit its annual report to MSD for submittal to the Division of Water in the appropriate time frame developed by MSD.

2. LOUISVILLE METRO GOVERNMENT – PUBLIC WORKS & ASSETS

Public Education, Outreach, Participation, and Learning Experiences (PEOPLE)

- Website

Frequency or Measure of Success	Activity Required
Permittee shall report the number of hits received on an annual basis and revise as needed	Louisville Metro Government – Public Works & Assets shall maintain the website, www.louisville.gov, as it addresses littering, water quality, recycling, snow removal, pollution prevention and air quality.

- The Solid Waste Management Division of Louisville Metro Government – Public Works & Assets provides presentations and publications to encourage the establishment of residential compost piles for yard waste and annually publishes reminders to residence to keep leaves out of the street gutter. The Louisville Metro Government website, www.louisville.gov, addresses littering, water quality, snow removal, recycling issues, pollution prevention and air quality.

ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)

- Mapping

Frequency or Measure of Success	Activity Required
Permittee shall complete and submit to the Division of Water within 24 months of the effective date of this permit	Louisville Metro Government – Public Works & Assets shall develop and maintain a store-sewer system map, showing the location of all known major outfalls, as defined herein, and the names and location of all waters of the Commonwealth that receive discharge from those outfalls. If this mapping is completed using Geographical Information Systems (GIS) or Computer Aided Drafting (CAD) software, the permittee shall provide to the Division of Water, at a minimum, the MS4 boundary and the mapping infrastructure in either ESRI shape file format geo-referenced AutoCAD drawings.

- Louisville Metro Government – Public Works & Assets continually updates the stormwater asset inventory data and supplies it to the Louisville-Jefferson County Information Consortium GIS system.

- Training session(s) for applicable staff

Frequency or Measure of Success	Activity Required
Permittee shall report number of staff trained per year	Louisville Metro Government – Public Works & Assets shall require staff to attend training on the recognition and reporting of illicit discharges as provided by MSD.

- Louisville Metro Government – Pubic Works & Assets ensures that appropriate employees attend the Erosion Prevention and Sedimentation (EPSC) training class. Topics covered include pre-construction planning, design procedures for structural and non-structural Best Management Plans, pollutant removal and inspections.

CONSTRUCTION SITE STORMWATER RUNOFF CONTROL REQUIREMENTS (CS)

- City construction projects to follow construction site BMP requirements

Frequency or Measure of Success	Activity Required

Frequency or Measure of Success	Activity Required
Permittee shall summaries the contracts, city code officer inspection log of sites and will include with the annual report	Louisville Metro Government – Public Works & Assets shall require all contracts specify compliance with the Erosion Prevention and Sediment Control Program requirements and require that in-house projects be inspected for compliance.

- Louisville Metro Government – Pubic Works & Assets follows guidance materials for EPSC plan and inspections. Inspections of Louisville Metro Government – Public Works & Assets construction sites are conducted by Louisville Metro Government inspectors through the use of a checklist provided by MSD to assist the inspectors and developers on proper procedures and requirements.

POST-CONSTRUCTION STORMWATER RUNOFF CONTROL FOR NEW DEVELOPMENT AND REDEVELOPMENT (PC)

- Tree-green space replacement to provide future ground cover

Frequency or Measure of Success	Activity Required
Permittee shall maintain records of trees removed and planted by participating departments	Louisville Metro Government – Pubic Works & Assets shall maintain or increase the total amount of trees or other green space/grounds covered on its properties, in accordance with appropriated resources.

- In FY 2015 Louisville Metro Government completed a comprehensive tree canopy analysis that established Louisville's land is 37% covered by trees. With the ultimate goal set at 45%, 5% higher than the American Forests recommendation, Louisville Metro Government – Public Works & Assets continues to maintain current green spaces and increases ground cover by green spaces in every available opportunity.

GOOD HOUSEKEEPING/POLLUTION PREVENTION FOR MUNICIPAL OPERATIONS

- Municipal Facility SWPPPs

Frequency or Measure of Success	Activity Required
Permittee shall revise SWPPPs as needed and retain the revised SWPPPs on file	Louisville Metro Government – Public Works & Assets shall maintain and revise, as needed, MS4 SWPPPs for applicable "industrial" type facilities.

- With the recent development of a Louisville Metro Government department wide MS4 committee each departments properties will be systematically reviewed to determine the need of SWPPPs and any currently in place SWPPPs will be reviewed and updated as needed.

STAFF TRAINING

Frequency or Measure of Success	Activity Required
Permittee shall retain copies of training records and training references as provided	Louisville Metro Government – Public Works & Assets shall train staff, as needed, on the SWPPP requirements.

- As part of the Louisville Metro Government department wide MS4 Committee, an established training program is in the process of being created to ensure that all applicable employees are trained on SWPPP requirements.

METRO GOVERNMENT ENVIRONMENTAL PROGRAM

Frequency or Measure of Success	Activity Required
Permittee shall revise the Environmental Program and manual as needed	Louisville Metro Government – Public Works & Assets shall make recommendations to incorporate the Mayor's Green Initiative Strategies within the Metro Environmental Program Manual, as needed.

- Louisville Metro Government – Public Works & Assets supports the Mayor's Green Initiative Strategies through assisting other Louisville Metro Government departments in environmental education and outreach programs and other established environmental initiatives. I.E.- Litter-Free Louisville, Operation Brightside, Community-Wide Planting Days, increasing tree canopies, and supporting the Green Infrastructure Incentives.

MONITORING (M)

- Louisville Metro Government, and its agencies (Public Works & Assets), have an inter-local agreement with MSD, the primary Co-Permittee on this MS4 permit; the responsibilities are divided according to the Part I, Section A.

PERFORMANCE ASSESSMENT AND REPORTING (PAR)

- Louisville Metro Government, and its agencies (Public Works & Assets), have an inter-local agreement with MSD, the primary Co-Permittee on this MS4 permit; the responsibilities are divided according to the Part I, Section A. Louisville Metro Government – Public Works & Assets shall submit its annual report to MSD for submittal to the Division of Water in the appropriate time frame developed by MSD.

3. LOUISVILLE METRO GOVERNMENT – ZOO

Public Education, Outreach, Participation, and Learning Experiences (PEOPLE)

- Environmental Outreach Events

Frequency or Measure of Success	Activity Required
Permittee shall conduct at least four environmental outreach event annually	Louisville Metro Government – Zoo shall conduct annual environmental outreach events such as the Earth Day event, night safaris, School-at-the-Zoo, Wetland Program or an effective equivalent.

- Louisville Metro Government – Zoo continues to conduct their annual environmental outreach events that include Earth Day events, educational night safaris, Zoo-at-the-School and Wetland Programs.

ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)

- Training session(s) for applicable staff

Frequency or Measure of Success	Activity Required
Permittee shall report number of staff trained per year	Louisville Metro Government – Zoo shall require staff to attend training on the recognition and reporting of illicit discharges as provided by MSD.

- Louisville Metro Government – Zoo ensures that appropriate employees attend the Erosion Prevention and Sedimentation (EPSC) training class. Topics covered include pre-construction planning, design procedures for structural and non-structural Best Management Plans, pollutant removal and inspections.

- Stormwater Improvements

Frequency or Measure of Success	Activity Required
Permittee shall retain project reports and documents	Louisville Metro Government – Zoo shall continue to partner with MSD on identified improvements to the drainage and monitoring systems for control of flow and contamination of Stormwater from facilities.

- Louisville Metro Government – Zoo follows guidance materials for EPSC plan and inspections. Inspections of Louisville Metro Government – Zoo construction sites are conducted by Louisville Metro Government inspectors through the use of a checklist provided by MSD to assist the inspectors and developers on proper procedures and requirements.

CONSTRUCTION SITE STORMWATER RUNOFF CONTROL REQUIREMENTS (CS)

- City construction projects to follow construction site BMP requirements

Frequency or Measure of Success	Activity Required
Permittee shall summaries the contracts, city code officer inspection log of sites and will include with the annual report	Louisville Metro Government – Zoo shall require all contracts specify compliance with the Erosion Prevention and Sediment Control Program requirements and require that in-house projects be inspected for compliance.

➢ Louisville Metro Government – Zoo follows guidance materials for EPSC plan and inspections. Inspections of Louisville Metro Government – Zoo construction sites are conducted by Louisville Metro Government inspectors through the use of a checklist provided by MSD to assist the inspectors and developers on proper procedures and requirements.

POST-CONSTRUCTION STORMWATER RUNOFF CONTROL FOR NEW DEVELOPMENT AND REDEVELOPMENT (PC)

- Louisville Metro Government, and its agencies (Zoo), have an inter-local agreement with MSD, the primary Co-Permittee on this MS4 permit; the responsibilities are divided according to the Part I, Section A.

GOOD HOUSEKEEPING/POLLUTION PREVENTION FOR MUNICIPAL OPERATIONS

- Municipal Facility SWPPPs

Frequency or Measure of Success	Activity Required
Permittee shall revise SWPPPs as needed and retain the revised SWPPPs on file	Louisville Metro Government – Zoo shall maintain and revise, as needed, MS4 SWPPPs for applicable “industrial” type facilities.

➢ With the recent development of a Louisville Metro Government department wide MS4 committee each departments properties will be systematically reviewed to determine the need of SWPPPs and any currently in place SWPPPs will be reviewed and updated as needed.

STAFF TRAINING

Frequency or Measure of Success	Activity Required
Permittee shall retain copies of training records and training references as provided	Louisville Metro Government – Zoo shall train staff, as needed, on the SWPPP requirements.

➢ As part of the Louisville Metro Government department wide MS4 Committee, an established training program is in the process of being created to ensure that all applicable employees are trained on SWPPP requirements.

METRO GOVERNMENT ENVIRONMENTAL PROGRAM

Frequency or Measure of Success	Activity Required
Permittee shall revise the Environmental Program and manual as needed	Louisville Metro Government – Zoo shall make recommendations to incorporate the Mayor's Green Initiative Strategies within the Metro Environmental Program Manual, as needed.

- Louisville Metro Government – Zoo supports the Mayor's Green Initiative Strategies through assisting other Louisville Metro Government departments in environmental education and outreach programs and other established environmental initiatives. I.E.- Litter-Free Louisville, Operation Brightside, Community-Wide Planting Days, increasing tree canopies, and supporting the Green Infrastructure Incentives.

MONITORING (M)

- Louisville Metro Government, and its agencies (Zoo), have an inter-local agreement with MSD, the primary Co-Permittee on this MS4 permit; the responsibilities are divided according to the Part I, Section A.

PERFORMANCE ASSESSMENT AND REPORTING (PAR)

- Louisville Metro Government, and its agencies (Zoo), have an inter-local agreement with MSD, the primary Co-Permittee on this MS4 permit; the responsibilities are divided according to the Part I, Section A. Louisville Metro Government – Zoo shall submit its annual report to MSD for submittal to the Division of Water in the appropriate time frame developed by MSD.

CO-PERMITTEE CERTIFICATION
MS4 STORMWATER ANNUAL REPORT
KPDES PERMIT NUMBER KYS000001

THE CITY OF ANCHORAGE is designated as a co-permittee covered by the Municipal Separate Storm Sewer System (MS4) permit that was issued by the Kentucky Division of Water under the Kentucky Pollutant Discharge Elimination System (KPDES) program. **THE CITY OF ANCHORAGE** has prepared the attached annual compliance report for the reporting period of **July 1, 2016 to June 30, 2017.**

Under the terms of KPDES Permit No. KYS000001 [Part I.A.2], and implemented through an inter-local agreement with Louisville and Jefferson County Metropolitan Sewer District dated April 17, 2014, **THE CITY OF ANCHORAGE** certifies that it has responsibility for the following:

- Construction oversight in addition to the regulatory inspections conducted by Louisville MSD pursuant to the Erosion Prevention and Sediment Control Ordinance, Chapter 159;
- Drainage system and outfall mapping;
- Drainage system operation and maintenance;
- Road maintenance and upkeep, including snow and ice removal and related stormwater management activities;
- Drafting and implementing fleet and facility stormwater pollution prevention plans;
- Reporting and refering potential illicit discharges observations by municipal employees or other reports from residents to MSD for investigation and potential enforcement;
- Inspection, operation, maintenance and/or applicable certification that permanent (also known as post-construction) water quality devices, controls, and management practices are operating effectively;
- Implementation of education and outreach within the City of Anchorage to compliment the education and outreach provided by MSD which is tailored to local water bodies pollutants of concern;
- Preparation and timely submittal of annual compliance demonstration report to MSD according to agreed upon formats and standards; and

Certification: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the above statements are, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

CITY OF ANCHORAGE
Name: Renee M. Major
Title: City Administrative Officer

Signature: Renee Major
Date: 28 June 2017

3.2 CITY OF ANCHORAGE

The KPDES Large MS4 stormwater discharge permit program requirements are classified into seven Program Elements, each designated with an acronym. The Program Elements include: Illicit Discharge Detection and Elimination (IDDE), Construction Site Runoff Controls (CS), Post-construction Controls (PC) Good Housekeeping/Pollution Prevention (GH), Public Education/Outreach Programs (PE), Monitoring (M) and Reporting (R).

The Co-Permittees individually and collectively continue to perform the required activities specified in KPDES Permit # KYS000001. This subsection will focus on those activities for which the City of Anchorage, Kentucky was responsible during the permit period and will document the compliance tasks performed by City of Anchorage during the period of July 1, 2016– June 30, 2017.

3.2.1 Illicit Discharge Detection and Elimination (IDDE)

The City of Anchorage has an interlocal agreement with MSD, the primary Co-Permittee on the MS4 permit, to perform certain IDDE tasks. Therefore, only those tasks performed by the City of Anchorage are listed in this report. MSD performs illicit discharge investigation and follow up throughout Louisville Metro, including the City of Anchorage. Previously, most of the City of Anchorage did not have sanitary sewers. With the June 2008 completion of the Hazelwood Extension of its sanitary sewer, the City of Anchorage brought 95 properties previously on septic systems onto an MSD-operated sewer system. Of the approximate 800 residences in Anchorage, 425 residences are now estimated to be on MSD-operated sewer systems. Recently, MSD installed a gravity interceptor sewer in the southwest quadrant of Anchorage. The Anchor Estates Pump Station Elimination Project eliminated three pump stations in Anchorage, adding approximately 30 septic-tank properties to new sewer service, and providing future expansion for other areas on the south side of Anchorage. The project was completed August 2016. Presently, the City of Anchorage has obtained approval to extend the sewer service to two additional residences and provide future expansion of sewer service to the east/southeast quadrant of the City. With an additional 73 residences to be added in the future.

3.2.1.1 Illicit Discharge / Illegal Dumping Ordinance IDDE-4

The City of Anchorage enforces its illegal dumping ordinance and posts signs that prohibit dumping at locations that are problem areas. City of Anchorage staff investigates areas regularly and responds to resident complaints. In the past year, the City has had no occasion to report illicit dumping or discharge to MSD.

3.2.1.2 Provide education on the revised Wastewater Discharge Regulations IDDE-5

The City of Anchorage provides education on their local ordinance(s) that prohibit illicit connections and illegal dumping. Anchorage has no waste water treatment plants, but does have three (3) pumping stations. The City of Anchorage has marked all Catch Basins throughout the City with markers informing the public that there is no dumping into the basins and that these basins drain to local creeks. Currently, there are a total of 111 No Dumping Decals located throughout the City. All commercial properties and the Anchorage school

system have marked all their Catch Basins. The City of Anchorage monthly newsletter periodically contains information on the prohibition of dumping into catch basins and drains, and proper disposal of leaf and grass debris.

3.2.2 Construction Site Runoff Controls (CS)

The City of Anchorage has an interlocal agreement with MSD, the primary Co-Permittee on the MS4 permit, to perform certain CS program tasks. MSD administers the Erosion and Sediment Control Ordinance. The City of Anchorage requires contractors to show proof of EPSC Certification before they can obtain a Zoning Compliance Certificate. A copy of their certification is attached to their building permit. The City's Public Works department checks worksites to insure EPSC measures are in place. The City's Flood Safety Officer reviews residential building plans for any increase in impervious surface that will exceed 20% of the lot size. During this term, the Flood Safety Office reviewed 27 sites for drainage issues or potential problems. Anchorage ordinances require any lot with more that 20% impervious to retain excess runoff on site.

3.2.2.1 Erosion Prevention and Sediment Control Plan (EPSC) CS-1

An EPSC Plan with provisions for Best Management Practices (BMPs) to keep sediment on-site (silt fences, staked bales, sediment ponds, gravel mats, etc.) and to capture sediment that would enter local or on-site drainage systems is required for any new development within the City of Anchorage. Fifty-three (53) trenching permits were issued by the City Forester in the last year for various projects from new homes to fence and cable wire installations. Any stockpiled soils are required to be contained by silt fencing. Thirty-six (36) Zoning Compliance Certificates were issued for building projects where contractor or sub was required to be EPSC certified.

The City of Anchorage has an approved EPSC General Permit issued by MSD for Public Works activities.

3.2.2.2 Training for Operators CS-3

The City of Anchorage ensures that appropriate staff members attend training for equipment operators and construction managers that describes the proper installation and maintenance of construction site BMPs. The Director of Anchorage Public Works attended the EPSC training class and became re-certified in November 2014.

3.2.2.3 Scheduled Inspections of BMPs CS-5

The City of Anchorage city officials check construction sites to ensure that the EPSC Ordinance is being followed. The Public Works Director visits all construction projects to review compliance with permits. The City of Anchorage reviews plans to ensure the proposed work does not increase or inappropriately divert storm water runoff. The City of Anchorage requires a specific drainage retention plan approval when the construction plans call for a 20% or more impervious area or if neighboring properties are affected.

3.2.3 Post Construction Controls (PC)

The City of Anchorage has an interlocal agreement with MSD, the primary Co-Permittee on the MS4 permit, to perform certain PC program tasks. MSD performs the PC-1, Watershed Planning, Post Construction tasks on behalf of the City of Anchorage. The City of Anchorage Flood Safety Officer reviews construction plans and meets with contractors and homeowners where there may be runoff issues. The City's Flood Safety Officer met with 27 property owners this year to review and remedy storm water/drainage/impervious surface issues. Storm water retention is discussed with contractors and homeowners for projects increasing impervious surface in excess of 20% of the lot size. Bio-swale, rain garden, rain barrel, and other information is discussed with and given (when requested) to contractors and homeowners. This information is also readily available at Anchorage City Hall.

3.2.3.1 Pilot BMP Project PC-2

Over the permit term, the City of Anchorage was required to complete a minimum of three BMP Pilot Projects. Anchorage adopted and continues a policy to not install curbs on city streets so that runoff filters through nearby pervious areas. Residents are required to outlet downspouts into yards or channel to French drains, bio swales, dry wells, etc., to filter runoff before it enters a stream. The City's Annual Canopy Campaign is an effort to repopulate the tree canopy within the City of Anchorage, especially adjacent to roadways. The Annual Canopy Campaign takes place each fall. Through this program, the City pays for one half the cost of a canopy-type tree as determined by the City Forester and Forestry Board and professional planting of the tree selected by the residents. These trees are designated for the right-of-ways only. Last year, residents planted 51 canopy trees and an additional 15 dogwood trees. The City also offers a Spring Tree Give-away Program. In 2017, 300 one-inch caliper trees were given free of charge to Anchorage residents for planting anywhere on their properties. The City of Anchorage has a tree preservation ordinance that requires one tree replacement for every one to three trees removed depending on the trunk caliper of the replacement tree. The City of Anchorage has an on-going hazardous tree removal program for trees in the City's right-of-ways. Dead or dying trees are removed, and other trees are pruned, as needed. Trees removed by the Anchorage Public Works Department are chipped and taken to a mulch operation which turns it into compost and mulch. The City of Anchorage has been a "Tree City USA" for 28 years and achieved the Growth Award status level for seven years by continuing to provide increased awareness and public education of accepted urban forestry practices.

3.2.3.2 Built-Upon Area Reductions PC-3

The City of Anchorage adopted the Land Development Code provisions of Cornerstone 2020. Many provisions in the Land Development Code version that Anchorage follows favor smaller homes on larger lots than traditional zoning allows so that there is a reduction in impervious surface. The streets are narrower and easements adjacent to the drainage swales are wider in order save trees and to provide more green space. The City of Anchorage's floor-area-to-open-space ratio requirement requires more open space than Louisville Metro's floor-area-to-open-space ratio. Residents are required to outlet downspouts into yards or French drains, rain gardens, bio swales, etc. to filter runoff before it enters a stream. The City of Anchorage requires lots with more than 20% of impervious surface to have alternative measures in place to retain on the lot excess stormwater created by the additional impervious surface. Often recommended are rain gardens, dry wells, French drains, retention ponds, bio swales, etc.

3.2.3.3 Source Controls PC-4

City of Anchorage facilities have approved HMPC plans. The City of Anchorage maintains salt storage in a covered building. The salt under roof is also covered with tarps. The City of Anchorage has a refueling area for Public Works vehicles. The area is diked so that spills are controlled and maintained. A spill management system controls any spilled fuel in the dike area, and allows rainwater to be removed without causing erosion to the ground. Employees are required to stay with vehicles while refueling. In addition, a sign is posted reminding employees of this policy. The City of Anchorage investigates downspout connectivity to the streams. Residents are required to daylight their downspout or direct to a French drain rather than flow entering the stream directly.

3.2.4 Good Housekeeping / Pollution Prevention (GH)

By agreement with the Anchorage Fire Department, all public works vehicles that are heavily soiled (dirt, salt, asphalt, etc.) must be washed inside the Anchorage Firehouse. The Firehouse has a containment pit to catch the material so it can be disposed of properly. City policy dictates that any vehicle cleaned outside is washed with an environmentally safe soap only.

3.2.4.1 Street Maintenance GH-1

The City of Anchorage follows the EPSC General Permit requirements. Street maintenance in Anchorage is performed on an as-needed basis. During any roadway repair all remaining unused material is swept up and disposed of properly. Staked bales and silt fencing are used to minimize impacts of construction. Public roads are constructed without curbs, allowing the runoff to be filtered through the nearby grasses.

3.2.4.2 Street Sweeping GH-2

The City of Anchorage picks up trash along all of the roadways within its city limits monthly or more often, if needed. An annual Litter Abatement spreadsheet can be reviewed with the Public Works Director showing miles of road cleaned, number of bags collected and total cost. The City of Anchorage uses a leaf vacuum to keep the culverts and ditch lines clear of leaves during the fall and maintaining a list by month of ditch areas cleaned/restored. Leaves collected throughout the fall are taken to a mulch operation which turns leaves into compost and mulch. Road culverts are cleaned weekly in the fall to remove leaves. A City of Anchorage stormwater management and control ordinance requires property owners to maintain both natural and man-made drainage channels on their properties. It is unlawful for to deposit leaves, grass clippings, or other forms of debris in the drainage channels.

3.2.4.3 Catch Basin Cleaning GH-3

Catch basins were checked and cleaned by hand 51 times including before and/or after rain events. During this term, all catch basins were inspected and serviced while in the field documenting data for a new outflow map of the City. Outlets are plugged so that debris cannot get into the stream. This debris is taken to a landfill.

3.2.4.4 Storm Sewer Cleaning GH-4

Storm sewer cleaning is performed on an as-needed basis. Anchorage Public Works only needed to perform 3 culvert inspections this year. Through an agreement with the Anchorage Fire Department, blocked Anchorage culverts are flushed with a high-pressure hose and the debris collected. Debris is taken to a landfill, as needed. During this term, no culverts required flushing.

3.2.4.5 Channel Maintenance GH-5

Grass drainage channels in Anchorage are mowed no lower than 6-inches. Debris is removed from channels and sent to a landfill. Concrete channels are cleaned of sediment manually. Staked hay bales and silt fencing are required during channel maintenance where heavily accumulated siltation needs removal. Anchorage Public Works inspected 18 channels this year.

3.2.4.6 Pollution Prevention for De-Icing GH-6

The City of Anchorage inspects and adjusts its two salt spreaders distribution rates before and during any long-term snow events. Salt spreaders are adjusted to minimize the amount of overspray. The salt is pre-wetted with calcium chloride and Magic O, a distillers' by-product combined with magnesium chloride, as an additive to salt and brine. Anchorage uses a brine road pre-treatment mixed with Magic O for ice and snow weather conditions. Regular salt treated with Magic O melts ice in weather as low as zero degrees, reducing the total amount of regular salt used to remove snow in Anchorage. Pushing the snow off the roadway is the preferred method for snow removal. The City applied 4 tons of salt, zero gallons of Magic O, and zero gallons of brine this year. The City of Anchorage Public Works does yearly Internet research and employees attend training to learn about new application technologies.

3.2.4.7 BMP Inspections GH-7

Good Housekeeping/Pollution Prevention BMPs are inspected regularly by the Public Works Director.

3.2.4.8 BMP Maintenance GH-8

Good Housekeeping / Pollution Prevention BMPs are maintained on a regular basis. The Public Works crew inspects the building and grounds on a daily basis to assure materials and stock are stored properly.

3.2.4.9 Pollution Prevention for Herbicides and Pesticides GH-9

In the last seven years, the City of Anchorage has used no pesticides and only minimal herbicides, and is committed to continue on this course. No herbicides or pesticides are stored.

3.2.4.10 Continuation of Existing Programs GH-10

An outside contractor continues to collect municipal waste, yard waste and recyclables weekly. The yard waste is taken to a compost site. The City, under the direction of Jefferson County, requires recyclable paper bags for yard waste. Approximately 84% of the City of Anchorage residents participate in the recycling program. The City of Anchorage utilizes a private contractor to reclaim its used oil and antifreeze. The City maintains a collection tank for used oil. This year, 90 gallons of oil and zero gallons of antifreeze were reclaimed and removed.

3.2.5 Public Education/Outreach Programs (PE)

In a large metropolitan area, the impact of the actions of the citizens can cause great harm to the environment if the actions are careless or uninformed, or can have great benefit if the actions are positive. Individual behavior repeated by many people has a cumulative effect.

3.2.5.1 Public Education Programs PE-1

Water quality issues are discussed in the monthly newsletter and on the City of Anchorage's website at www.cityofanchorage.org. The website includes information on the City of Anchorage's Tree Preservation Program and the Storm water Management ordinance. The newsletter has contained information on the recycling program, leaf pick-up schedules, rain gardens, swimming pool drainage, and mosquito control. This year, 16 articles in the city's newsletter contained information relating to recycling, yard waste, lawns, drainage, and forestation. This year at the annual city meeting, the City provided an information booth offering rain barrel, storm water management brochures, and other water quality printed information. Approximately 150 residents attended this event. The City of Anchorage continues to offer the "Forestry Handbook," which is free, to Anchorage residents. The City works with developers who install innovative "green" storm water control, and encourage the developers to allow the City and other organizations to observe the installation, and become more educated about rain gardens, retention ponds, and other storm water retention and water quality. Throughout the year, City Council was advised on four separate occasions of storm water and drainage related issues.

3.2.5.2 Earth Day PE-2

The City of Anchorage does not have separately planned activities for Earth Day, but they do celebrate Arbor Day. Coordinated through the Anchorage Forestry Board, Arbor Day's celebration focuses on tree-related activities often coordinated with the Anchorage Public School. Past activities have included identifying tree species, clearing invasive plants, spreading wood chips on the Anchorage horse trails, the Emerald Ash Bore, replacing dying trees, and identifying tree diseases and decline This year 300 free trees were given to Anchorage residents for planting on their properties.

3.2.5.3 Litter Control PE-3

The City supplies the garbage bags and is responsible for disposing of the collected debris. In addition, the City's Public Works Department regularly collects litter and debris from public right-of-ways.

3.2.5.4 Internal Training PE-5

The City Administrative Officer and Public Works Director have attended MS4 presentations by MSD staff. All public works employees will receive SWQMP training three to four times a year. Training will be in the area of IDDE, IDE-4, CS, CS-3 etc. Other areas of training will be spill prevention, disposal of contaminates, etc.

3.2.6 Monitoring (M)

The City of Anchorage has an interlocal agreement with MSD to perform the Monitoring requirements of the MS4 permit.

3.2.7 Reporting (R)

The City of Anchorage provides information on implementation of the MS4 permit requirements to MSD. The City of Anchorage has an interlocal agreement for MSD to prepare the Annual Report.

3.3 Financial

This section is a summary of the City of Anchorage's SWQMP budget for FY 2017 as amended June 2017:

City of Anchorage FY 2017 Total Operating Budget: $2,839,339				
Drainage	**Bridge/Culvert Repair**	**City Drainage Officer**	**Forestry Budget**	**Litter Cleanup**
$6,700	**$86,125**	**$1,500**	**$39,846**	**$944**

CO-PERMITTEE CERTIFICATION
MS4 STORMWATER QUALITY MANAGEMENT PLAN
KPDES PERMIT NUMBER KYS000001

THE CITY OF JEFFERSONTOWN, KY is designated as a co-permittee covered by the Municipal Separate Storm Sewer System (MS4) permit that was issued by the Kentucky Division of Water under the Kentucky Pollutant Discharge Elimination System (KPDES) program. THE CITY OF JEFFERSONTOWN, KY has prepared the attached annual compliance report for the reporting period of **July 1, 2017 to June 30, 2018**.

Under the terms of KPDES Permit No. KYS000001 and implemented through an interlocal agreement with Louisville and Jefferson County Metropolitan Sewer District, THE CITY OF JEFFERSONTOWN, KY certifies that it has responsibility for the following:

- Construction oversight in addition to the regulatory inspections conducted by Louisville MSD pursuant to the Erosion Prevention and Sediment Control Ordinance, Chapter 159;
- Drainage system and outfall mapping;
- Drainage system operation and maintenance;
- Road maintenance and upkeep, including snow and ice removal and related stormwater management activities;
- Drafting and implementing fleet and facility stormwater pollution prevention plans;
- Reporting and refering potential illicit discharges observations by municipal employees or other reports from residents to MSD for investigation and potential enforcement;
- Inspection, operation, maintenance and/or applicable certification that permanent (also known as post-construction) water quality devices, controls, and management practices are operating effectively;
- Implementation of education and outreach within the City of ____ to compliment the education and outreach provided by MSD which is tailored to local water bodies pollutants of concern;
- Preparation and timely submittal of annual compliance demonstration report to MSD according to agreed upon formats and standards; and

Certification: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the above statements are, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

CITY OF Jeffersontown
Name: Bill Dieruf
Title: Mayor

Signature: [signature]
Date: 10/2/17

3.3 CITY OF JEFFERSONTOWN

The City of Jeffersontown has an interlocal agreement with MSD, the primary Co-Permittee on the MS4 permit, to perform certain tasks. This subsection will focus on those activities for which the City of Jeffersontown, Kentucky was responsible during the permit period and will document the compliance tasks performed by City of Jeffersontown during the period of July 1, 2016 – June 30, 2017.

3.3.1 PUBLIC EDUCATION, OUTREACH PARTICIPATION AND LEARNING EXPERIENCES (PEOPLE)

3.3.1.1 PUBLIC EDUCATION PROGRAMS PE-1

The City of Jeffersontown continues to provide downloadable information, services, and participation opportunities available to the public through the Jeffersontown website, http://www.jeffersontownky.gov/. These include articles and handouts on recycling and yard waste, as well as pollution prevention activities, catch basin cleaning, and general dumping requirements. Jeffersontown has continued to update the City's website to create a more fluid page that will engage residents and visitors and supply them with current information. It also includes alerts using Code Red. Currently, the City has 777 registered email addresses which receive newsletters, 5,110 (4,446 in 2016) Facebook page followers, 497 Twitter followers (395 in 2016), and 463 (344 in 2016) Instagram followers. These followers receive all messages by the City, although stormwater messages are periodically included in the posts and are able to reach a greater number of residents through the City's main outreach platforms. The City also participated in community events to further public education and outreach. The two events the City participated in were the Gaslight Festival and the Chamber Jeffersontown Business Expo.

The City will continue to implement the "Clean-N-Green Jeffersontown" program (formerly the "Spruce Up Jeffersontown" program), initiated in 2009, to include public education on the effects of litter, trash, and illegal dumping. This program supplies garbage bags and clean-up materials to volunteers, and provides disposal of the collected debris.

The City has found that working with various groups already actively engaged in the community has been the most beneficial for raising public awareness, as well as promoting public involvement. Jeffersontown has identified various groups to seek out an opportunity to work with, along with organizations that approached the City with community service projects. This past reporting period, the City worked with church groups/camps, Boy Scout troops, and businesses actively doing a community service project. These groups performed projects such as picking up trash and debris around designated areas in the City, picked up trash and debris along the bike/pedestrian trail, as well as walked several streams and drainage ways to collect trash and debris. This approach has appeared to be a better strategy to engage the community in the importance of water quality issues, and promote the mission of the "Clean-N-Green" program.

Other notable programs promoted by the City are as follows:

"Gaslight Clean Up"- This is a Citywide clean-up day aimed at not only litter control but education of the importance of a clean community and the impact litter/trash has on the environment and the effects to water quality. Various groups assist with the Gaslight Clean Up event, including church groups, Boy Scouts, and various businesses. On average, four (4) to seven (7) groups participate in clean-up efforts, with between ten (10) and twenty-five (25) people per group.

"Gutter Gremlins" - Street sweeping all around the City and clearing drainage ways allows catch basins to function properly and minimizes flooding in neighborhoods and streets. In most instances, maintaining an effective drainage system will also minimize the possibility of erosion and sediment deposits. The City of

Jeffersontown, on average, cleans 350 miles of roadway each year through the Litter Abatement Program. In addition, the street sweeping crew has sought to clean every street throughout Jeffersontown at least once this past year, not just the main thoroughfares, in an effort to maintain water quality. The visibility of the street sweeper also raises awareness of litter control.

"Bright Spot" – This program explores places that could become a bright spot for the City instead of areas that may hold water (which may become mosquito breeding grounds), begin or continue to erode, or otherwise be unattractive. Establishing landscaping and vegetation relative to these features enhances the visual quality of community while providing a balance between surface runoff and stormwater management planning. In the past year, the City partnered with a home owners association (HOA) to replace a large signature entrance sign and restored impervious surface back to vegetation.

"Tree Treasure Program" - This is an educational and sponsorship program that supports planting trees throughout the City and along riparian ways. Developing a strategy for plantings will create a stable environment to promote good stewardship of the land. This program continues to grow as people become aware of the significance of trees and the benefits provided by them. In the past year, a total of 11 trees were planted in two area parks and along a street.

"Recycle-Reuse-Renew Environmental Educational Program"- This program contains educational materials and interactive field trips to teach students about protecting wetlands and floodplains from erosion, stormwater runoff, and pollutants. Students also learn about air quality issues and climate changes impact on communities. The City has distributed fliers to the schools and churches in an effort to increase awareness of these effects on our community and environment. In coming years the City would like to expand this into the field trips once the bike/pedestrian trails get complete and connected. No grants have been secured for these trails at this time, but the City is moving forward to appropriate funds to install a few this fiscal year.

"Jefferson Gardens"- This program includes community gardening to promote a healthy lifestyle, while gardens help promote the absorption of storm water runoff (i.e. rain gardens). Native plants infiltrate greater amounts of stormwater and filter pollutants. This gardening program will develop a strategy for the utilization of the concept for stormwater management procedures. The City has made progress on expanding this program by reaching out to community groups such as the Reserve Officer Training Course (ROTC), Boy Scouts of America and other school service projects to connect them with the importance of keeping the streams, channels, ditches, and drains free of debris and pollutants from dumping. Through the City-sponsored Farmer's Market, flyers and handouts have been distributed to increase awareness of community gardens and the proper maintenance of them during off-seasons. The City is working with Blackacre Nature Preserve to develop additional programs and education opportunities that promote gardens and placement of gardens that would benefit water quality and stormwater management principles. The Blackacre community garden is the largest in Jefferson County with over 300 plots and has organic and non-organic sections, as well as seasonal and year-round gardening.

3.3.1.2 "GASLIGHT CLEAN UP" PE-2

The City of Jeffersontown organizes "Gaslight Clean Up" which promotes national Earth Day efforts. The residents pick up litter and clean creeks throughout the City. As previously mentioned, Jeffersontown works with various groups and civic organizations on volunteer clean-up efforts, such as the ROTC, the Boy Scouts of America, local church groups, and school service project groups. The City supplies garbage bags and was responsible for properly disposing of collected debris. Various groups assist with the Gaslight Clean Up event, including church groups, Boy Scouts, and various businesses. On average, four (4) to seven (7) groups participate in clean-up efforts, with between ten (10) and twenty-five (25) people per group.

3.3.1.3 LITTER CONTROL PATROL PE-3

The City also provides litter abatement five (5) days a week by utilizing work release programs to perform roadside cleanup. There are typically 3-4 inmates in a crew for roadside maintenance activities. Municipal employees routinely inspect high traffic areas to gauge program success, as well as to target new areas in need of attention. City employees are also utilized in collection efforts. In 2016, there were approximately 2,300 trash bags collected through the Litter Abatement Program.

See the expanded "Spruce Up Jeffersontown" program as described in 3.3.5.3 Catch Basin "Gutter Gremlins" GH-3 below. Note also Gaslight Clean Up; Recycle, Reuse, and Renew Environmental Educational Program; Bright Spot; and Jefferson Gardens, as previously mentioned in 3.3.1.1 Public Education Programs PE-1.

3.3.1.4 INTERNAL TRAINING OF CITY OFFICIALS AND EMPLOYEES PE-4

The City of Jeffersontown's mayor, City administrator, and maintenance director have attended MS4 presentations and meetings held with MSD staff. These include the co-permittee coordination meetings held throughout the year, as well as Kentucky Stormwater Association (KSA) sponsored quarterly meetings and the Annual KSA Conference, which were attended by Mr. Matt Meunier as the City representative.

In recent years, Jeffersontown had a series of employee training materials developed, in association with a third-party facility inspection, at the City's Public Works Department located at 10317 Grant Avenue. The training materials cover a wide variety of issues pertinent to stormwater awareness for municipal employees. Additionally, the City utilizes available MSD materials for municipal employee and public education. The City employs a Safety Director, Mr. Brian Spurling, who has overseen training and safety meetings for municipal Public Works employees. Mr. Spurling has attended safety conferences with KLC, state agencies, equipment safety meetings, and has educated the Public Works Department during meetings and in every day practice.

3.3.1.5 EXTERNAL TRAINING PE-5

The City of Jeffersontown is in the process of developing educational material that will be used to engage students. The City is pursuing a partnership or sponsorship with members of the community to provide certain amenities to the developing bike/pedestrian trail system in the City. The goal of the partnership is to develop story boards and signs that will educate the biking/walking community about various water quality issues and stormwater management issues including floodplains, erosion and sediment control, stream water quality, and environmental awareness. The City will also continue to seek out funding opportunities and grants as they pursue this project and will be developing a budget in the upcoming year for the project.

The City has six (6) employees who have attended the EPSC certification training course. The City also provides brown bag luncheons on new trends and activities that could benefit the City and community. During this reporting period, City officials received external training on such topics as municipal facilities management, municipal field and maintenance activities, public education and outreach, and overall stormwater quality strategies. This external training, given to department heads, was then distributed to other City employees, in a "train-the-trainer" system. The City is continuing to find ways to connect with key employees and first responders to increase awareness of stormwater management and the things that impede these efforts.

City officials attended training sessions and a conference through the Kentucky American Planning Association (KY APA) Chapter, and attended multiple American Public Works Association (APWA) luncheons which were related to stormwater management.

3.3.1.6 KENTUCKY STORMWATER ASSOCIATION (KSA) PE-6

The City of Jeffersontown regularly attends Kentucky Stormwater Association (KSA) meetings, and actively participates in KSA discussions. Mr. Matthew Meunier, Director of Community Development & Assistant to the Mayor, has attended each quarterly KSA meeting this period, as well as the past Annual KSA meetings in August 2012, August 2013, June 2014, July 2015, and June/July 2016. KSA provides members with training on MS4 water quality topics, industry trends, new technologies, and shared experiences from across the state of Kentucky. It also provides an opportunity for members to interact with state and federal regulators. KSA routinely coordinates with the Kentucky Division of Water (KDOW) on current and upcoming regulations, and for education and outreach opportunities. Membership in KSA has helped keep the City of Jeffersontown knowledgeable about MS4 topics which may affect the City.

3.3.1.7 KENTUCKY TRANSPORTATION CABINET (KYTC) – PUBLIC EDUCATION MATERIALS PE-7

The City of Jeffersontown utilizes existing educational materials whenever feasible, including KYTC's MS4 Toolkit Resources, MSD-developed educational content, EPAs Educational Toolkit, and other educational stormwater materials. Jeffersontown feels that utilizing KYTC, MSD, and EPA educational materials allows for the dissemination of proven educational content, as well as facilitates a regionally consistent message.

3.3.1.8 JEFFERSONTOWN – COALITION OF NEIGHBORHOODS PE-8

In 2002, the City of Louisville was divided into eight Coalition of Neighborhoods as part of a county-wide, grassroots, non-profit group to promote environmental, economic, and community development. Jeffersontown has been implementing a Coalition of Neighborhoods program throughout the City to promote a variety of efforts to benefit the overall stormwater program, including litter control, community beautification, and neighborhood stormwater management.

Home owners associations (HOAs) are active in Jeffersontown, and efforts continue to be implemented to further coordinate with these groups. Three HOA meetings were attended in the reporting year by public works officials.

3.3.2 ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)

3.3.2.1 MAPPING IDDE-1

Jeffersontown retained a professional consultant to assist with mapping the City's stormwater infrastructure in 2012. Mapping and collection of stormwater outfalls and proximal infrastructure has been compiled into a geographic information system (GIS) to facilitate Citywide sharing, tracking, and simplified infrastructure updates. City staff have been actively involved with the mapping process, and employees have received hands-on training for mapping and system screening efforts. Citywide mapping was completed in January 2014, with annexations being mapped in 2016. The mapping identified areas for the City to monitor for issues and "trouble spots". The City is continuing to consider enhancements to the Monticello Place detention basin and other areas which could increase water quality benefits. Monticello Place detention basin is an active basin owned by a private Home Owners Association. Any consideration for improvements or maintenance made to the basin would be a public-private relationship.

3.3.2.2 ILLICIT DISCHARGE / ILLEGAL DUMPING ORDINANCE IDDE-2

The City of Jeffersontown enforces the MSD Wastewater/Stormwater Discharge Regulations ordinance, effective November 26, 2013, which applies to incorporated cities in Jefferson County. The regulations prohibit non-stormwater discharges to the MS4, prevent illicit discharges and improper disposal of chemicals and other materials which degrade water quality, and provide enforcement mechanisms.

The City posts signs that prohibit dumping at locations that experience habitual problems. City staff investigate problem dumping areas regularly and respond to resident complaints. The City has established a database entry portal called Community Awareness Tracking System to serve as a first line quick response system used to track complaints and concerns from the community in an effort to minimize the response time to various issues. It controls the proper direction of the particular issue to the appropriate department and is web based. The service request entry system is available on the City website.

Outfall inspections were completed in July 2016 and February 2017 at eight (8) locations. No major problems were observed. Small blockages and buildups were noted in the July 2016 inspections, but were resolved and not noted in the February 2017 inspections.

In 2013, the City executed a Memorandum of Agreement (MOA) with MSD that contains provisions for the enforcement of illicit discharges. This MOA outlines the roles and responsibilities for how investigations will take place, when parties will get involved, and how countermeasures are deployed in the event of an active spill. This agreement will help with appropriate countermeasures and cleanup to larger incidents, as MSD is better equipped to manage such events, should they occur. The Interlocal Agreement is in place as of August 2016.

3.3.2.3 PROVIDE EDUCATION ON ILLICIT DISCHARGE DETECTION AND ELIMINATION IDDE-3

The City of Jeffersontown previously published a bi-monthly newsletter which periodically contained information on the proper disposal of leaf debris and other ways in which water quality if affected. Costs associated with the newsletter became prohibitively expensive. Consequently, the City developed an e-newsletter system where residents can subscribe to various newsletters through email regarding City events and news. Subscription services are available on the City's updated website. Text message alerts are also available. Alerts are also available on the City's social media Facebook page and Twitter newsfeed. Currently, the City has 777 registered email addresses which receive newsletters, 5,110 (4,446 in 2016) Facebook page followers, 497 Twitter followers (395 in 2016), and 463 (344 in 2016) Instagram followers. These followers receive all messages by the City, although stormwater messages are periodically included in the posts and are able to reach a greater amount of residents through the City's main outreach platforms. As more constituents embrace tablets, smart-phones, and other handheld devices, the City believes this will be a more effective and efficient system moving forward. This is anticipated as a more effective method for the City to communicate with citizens not only during storm events but as an educational tool to keep people informed.

3.3.2.4 CO-PERMITTEE IDDE-4

The City of Jeffersontown attends and actively participates in quarterly co-permittee meetings. Jeffersontown staff and other co-permittees discuss common IDDE problems, detection strategies, educational and outreach measures, and opportunities for more program consistency countywide.

3.3.3 CONSTRUCTION SITE STORMWATER RUNOFF CONTROL (CS)

3.3.3.1 JEFFERSONTOWN/MSD PARTNERSHIP CS-1

The City of Jeffersontown has continued to partner with MSD through a formal Interlocal Agreement. This agreement, entered into in 2013, outlines the roles and responsibilities for both Jeffersontown and MSD.

The City has a working relationship with MSD for the development review process which includes construction inspection and coordinated approval of construction plans including drainage improvements. MSD is the permitting agency for all development construction and they perform site inspections until such time as the bonds and construction is completed. Once it is completed, the City begins to provide the management oversight and drainage maintenance responsibilities. On all City-funded drainage projects, the City maintains the best management practices (BMPs) for erosion protection and sediment control (EPSC) and general construction inspection services. The City receives an approved EPSC permit from MSD for each project, along with general information under our general permit with the Department of Water (DOW) and MSD.

3.3.3.2 EROSION PREVENTION AND SEDIMENT CONTROL (EPSC) PLAN CS-2

The City has continued to work with MSD on the development of educational handouts that highlight the basic requirements for EPSC practices. Additionally, Jeffersontown has developed a binder containing resource materials and other information that is used to educate contractors, developers, and the general public. The City also relies on KYTC's Environmental Resource Handbook, which contains numerous one-page factsheets on EPSC activities.

The City of Jeffersontown follows the provisions of the Louisville and Jefferson County Erosion Prevention and Sediment Control ordinance, Ord. No. 186, Series 2007. The ordinance was adopted on November 21, 2000 and is intended to conserve, preserve, and enhance the natural resources throughout Jefferson County by controlling degradation caused by soil erosion and sedimentation from land disturbing activities. The required EPSC measures follow the requirements of the KPDES Permit and outlines design standards, maintenance procedures during construction, and enforcement procedures.

3.3.3.3 SCHEDULED INSPECTION OF MAINTENANCE OF BMPS CS-3

A City of Jeffersontown official inspects construction sites to ensure that the EPSC Ordinance is being followed. Jeffersontown staff continue to work with MSD to ensure a consistent, standardized checklist is used for construction site inspections. As previously mentioned, Jeffersontown has an interlocal agreement with MSD for approval of EPSC plans, as well as monitoring and inspection of active construction sites.

The City manages and maintains a general permit with MSD and KDOW regarding construction site runoff. Also, the City has six employees certified with EPSC BMP design specifications, on-site requirements, and compliance enforcement. Certificates are valid for three (3) years.

3.3.3.4 CONSTRUCTION DEVELOPMENT PLAN PROCESS CS-4

The City of Jeffersontown continues to work with MSD to review and update guidance materials for developers regarding construction permits and procedures, as needed. The City works with MSD to review EPSC Plans, as part of the application and construction drawings, for approval. If required, a pre-construction site meeting will be held before a site disturbance permit will be issued. A checklist for EPSC Detailed Construction Plans is available on the MSD website.

3.3.3.5 COLLABORATIVE GUIDANCE AND TRAINING CS-5

The City of Jeffersontown continues to work with MSD to help educate design engineers on appropriate erosion prevention and sediment control (EPSC) measures most appropriate for the various construction site conditions. Jeffersontown will continue to encourage engineers and contractors to take the EPSC training certification courses offered by MSD.

3.3.4 POST CONSTRUCTION CONTROLS (PC)

3.3.4.1 PILOT BMP PROJECTS PC-1

Over the previous permit term, the City of Jeffersontown was required to complete a minimum of three BMP Pilot Projects. One of the projects the City of Jeffersontown implemented was a no-mow forest restoration area on a steep slope of Veteran's Park above Chenoweth Run. Also, the wooded riparian buffer along Chenoweth Run is protected in City easements. Lastly, approximately 80% of City of Jeffersontown's grass channels have at least a ten-foot buffer strip, which filters runoff before it reaches the stream and helps improve water quality. The City will continue to provide oversight for these ongoing projects.

In association with these and other post-construction BMPs, Jeffersontown has developed an appropriate checklist to aid in the review of post-construction BMPs. Copies of these completed checklists will be provided to the Community Development Director for incorporation into the development file for developments with applicable post-construction BMPs.

The City has been in the process of expanding Veterans Park, as referenced above. This project will adjoin Chenowith Run and will seek to reconnect park visitors to nature and the local waterway. The City anticipates installing educational signage to further promote water quality awareness.

Also referenced above is Jeffersontown's commitment to working with local HOAs to identify projects to improve water quality for private detention/retention systems. Monticello Place is the most recent study performed by the City with the focus on partnering with HOAs on stormwater enhancement projects.

3.3.4.2 BUILT-UPON AREA REDUCTIONS PC-2

The City of Jeffersontown has adopted and observes the water quality provisions of Cornerstone 2020 which represents a vision of the next twenty years of Louisville and Jefferson County's metro government, including the City of Jeffersontown, to make the area more attractive, mobile, efficient and environmentally aware. A primary vision of this community plan is to protect environmental resources as the population of the area increases.

3.3.4.3 SOURCE CONTROLS PC-3

The City of Jeffersontown's Public Works Department has an approved Hazardous Materials Use and Spill Prevention Control (HMPC) Plan to cover such items as salt storage areas and refueling areas. All dumpsters located within the City of Jeffersontown must be covered and fenced. The City continues to monitor these point source areas and maintains a high level of control for possible runoff.

In 2013, the City finalized and adopted a Stormwater Municipal Operations Plan (SMOP) for the Public Works Facility located at 10317 Grand Avenue. This plan contains information regarding water quality with respect to municipal operations at the facility, as well as general recommendations for municipal operations in the field. The plan also contains training logs, outfall inspection sheets, and facility

maintenance inspection sheets to document activities on the site. In the process of developing this plan, Jeffersontown reviewed a copy of MSD's facility stormwater pollution prevention plan (SWPPP), which was developed for MSD's central maintenance facility.

The City has updated all documents utilized to record the various activities of the City. Checklists were updated and created to track activities, and proper procedures for various activities such as stormwater management, hazardous material, point source places were developed. In 2013, the City retained a professional consultant to perform a third-party review of the Public Works Department facility for stormwater quality considerations. From this review, Jeffersontown received an observations and findings report, an ongoing facility plan for stormwater, and educational materials for municipal employees reporting to the site. These materials will include checklists to document compliance and will be used to enhance current operations at this facility in the future.

3.3.4.4 COLLABORATIVE GUIDANCE AND TRAINING PC-4

The City of Jeffersontown will work with MSD on developing and implementing a post-construction runoff control checklist that will be used for new developments implementing post-construction stormwater management controls. This checklist will be utilized to ensure compliance with applicable standards prior to the bond release for the development.

The City of Jeffersontown encourages people involved with stormwater to attend the MSD Qualified Post-Construction Inspector Program (QPCIP). Certification allows a person to perform inspections and oversee maintenance activities for stormwater quality BMPs.

3.3.5 GOOD HOUSEKEEPING / POLLUTION PREVENTION FOR MUNICIPAL OPERATIONS (GH)

3.3.5.1 STREET MAINTENANCE GH-1

Street maintenance in Jeffersontown is performed on an as-needed basis and follows EPSC General Permit requirements. Appropriate EPSC measures, such as silt fencing and catch basin inlet protection are used during maintenance activities.

In 2016, there were approximately 2,300 trash bags collected through the Litter Abatement Program.

3.3.5.2 STREET SWEEPING GH-2

The City of Jeffersontown performs vacuum sweeping five (5) days per week, except in winter months. City of Jeffersontown vacuum-sweeps all heavily traveled roads more often, but has also swept residential and side-roads during this past year. City of Jeffersontown swept 330 line miles of roadway in 2016 multiple times, collecting around 180 tons of debris. Woody debris that is collected is sent through the chipper-shredder for easier disposal. The debris collected during street sweeping is sent to a landfill.

3.3.5.3 CATCH BASIN "GUTTER GREMLINS" GH-3

During 2013, the City mapped its entire storm sewer infrastructure, including all catch basins. Jeffersontown catch basins are vacuum-cleaned as needed, although an effort is made to clear catchbasins prior to a storm event to prevent flooding from clogged drains. The collected debris is sent to a landfill.

In the past, the City has collaborated with MSD to implement the "FROG No Dumping! Drains to our Creeks" program, whereby the City placed decals on catch basins promoting the no dump provisions. This was in conjunction with the City's annual "Spruce Up" Jeffersontown clean program, which is a communitywide event to pick up litter, clean debris from streams and other parts of the City. Inspections are made of catch basins, detention basins and drainage courses to make sure they are free of debris that would impede positive drainage.

The City has expanded efforts through the "Spruce Up" program aimed at educating the public on the importance of minimizing erosion and sediment deposits, litter, and the importance of a clean and green community. This expanded program was titled *"Clean~n~Green" – Growing and Shaping our Vibrant City"*. The program was expanded to include several additional programs beside litter control. Notable programs include:

"Gaslight Clean Up" - This City-wide clean-up day is aimed at not only litter control but educating residents of the importance of a clean community and the impact litter and trash has on the environment and the effects to water quality.

"Gutter Gremlins" - By sweeping the City and clearing drainageway and roadway debris, catch basins can function properly and minimize flooding in neighborhoods and streets. In a most instances, maintaining an effective drainage system will minimize the possibility of erosion and sediment deposits.

"Bright Spot" - This program explores places that could become a "bright spot" for the City instead of an area that may hold water, continue to erode or otherwise be unattractive. By developing "green" features, the City has enhanced community pride while providing a balance between surface runoff and storm water management planning. In the past year, the City partnered with a HOA to replace a large signature entrance sign and restored impervious surface back to vegetation.

"Tree Treasure Program" - This is an educational and sponsorship program that supports planting trees throughout the City and along riparian ways. Developing a strategy for plantings will create a stable environment to promote good stewardship of the land. In the past year, a total of 11 trees were planted in two area parks and along a street.

"Recycle-Reuse-Renew Environmental Educational Program" - This program will create educational materials and interactive field trips to teach students more about wetlands, floodplains, erosion, stormwater runoff, and pollutants, along with an understanding of air quality issues and the impact of climate changes on communities.

"Jefferson Gardens" - This program promotes community gardening to help residents develop a healthy lifestyle through flower and vegetative gardening. Gardens also promote infiltration of storm water runoff (i.e. rain gardens). This program will develop a strategy for the utilization of this concept inside of the storm water management procedures of the City.

3.3.5.4 STORM SEWER CLEANING GH-4

Jeffersontown storm sewers are vacuumed as needed, especially prior to a rain event. The City is working to develop inspection standards for drainage easements and stormwater channels. A draft checklist has been created, and will be updated as needed, as conveyance systems are inspected and maintained. The online citizen request tracker has been used to target areas where maintenance is needed.

3.3.5.5 CHANNEL MAINTENANCE GH-5

The City of Jeffersontown has a fulltime drainage crew that maintains concrete channels as needed. Grass channels are maintained on a regular schedule. The debris removed during drainage channel maintenance is sent to a landfill, although large woody debris is shredded first. A draft checklist has been created, and will be updated as needed as drainage ditches and channels are inspected. The online citizen request tracker has been used to target areas where maintenance is needed.

3.3.5.6 POLLUTION PREVENTION FOR DE-ICING GH-6

The City of Jeffersontown calibrates their salt spreaders as needed and inspects de-icing equipment at least annually. Brine pretreatment is applied at the beginning of the storm to minimize the amount of salt required. Sand and salt are also used as needed to maintain motorist safety. There are seventeen (17) de-icing trucks used by the City, which are cleaned after every event.

Jeffersontown has focused on investing in infrastructure that will reduce potential pollutant exposure and releases to the drainage system. Construction on the new salt storage facility was completed at the beginning of August 2016. This sizeable project will help reduce salt loss and pollutants from reaching nearby streams.

3.3.5.7 BMP INSPECTIONS AND MAINTENANCE GH-7

Good Housekeeping / Pollution Prevention BMPs are inspected monthly by the Public Works/Maintenance Director. Inspections are tracked using a log which is kept in the Stormwater Municipal Operations Plan binder at the Public Works Facility. BMPs inspected include the fuel storage tanks, fuel island, salt barn, vehicle impound lot, AGG piles, oil storage facility, drains in the workshop, and spoil piles. Good Housekeeping / Pollution Prevention BMPs are regularly maintained, however, if a problem is discovered during the monthly inspection, immediate action is taken. During the reporting period (July 2016-June 2017), no problems were observed.

A Spill Inventory Form is utilized by the City to track spills and cleanup actions taken. In the reporting period (July 2016-June 2017), no spills were reported.

The City employs Safety Director, Mr. Brian Spurling, who holds regular training sessions for Public Works employees to enhance oversight of various construction projects, safety, and stormwater quality within the City. On average, stormwater quality is discussed quarterly. The City utilizes various training materials, including an easy-to-follow training manual with nine categories, focused on such topics as vehicle maintenance and refueling, deicing operations, illicit discharges, and spill response. The education system is designed to be flexible by allowing new materials to be regularly delivered over the course of the year. Alternatively, new/seasonal employees can review the entire training program when first hired to provide a comprehensive review of stormwater quality initiatives.

3.3.5.8 POLLUTION PREVENTION FOR HERBICIDES AND PESTICIDES GH-8

Appropriate Jeffersontown employees are licensed by the Commonwealth of Kentucky for herbicide and pesticide application. Currently, there is one (1) licensed employee who performs all herbicide and pesticide applications for the City.

3.3.5.9 CONTINUATION OF EXISTING PROGRAMS GH-9

The City of Jeffersontown has a contractor collect municipal waste, yard waste and recyclables weekly. Over sixty-four (64%) percent of residents within the City participate in the recycling program. which is an increase of nine (9%) percent from last year. The City's sanitation provider, Rumpke, started a program called "Look Who's Recycling in Jeffersontown" to provide an incentive for residents who submit a pledge to recycle. The City of Jeffersontown picks up appliances with Freon and has a contractor properly manage and recycle these appliances. The City also utilizes Louisville Metro's used oil and waste program, and maintains a collection tank for used oil.

The City has continued to implement the "Spruce Up" Jeffersontown program which includes educating the public on the effects of litter, trash, and illegal dumping. The program provides beautification efforts to promote a healthy lifestyle and balance between the environment and everyday living. It educates the community on erosion and sediment control, floodplains and floodways, pollution of streams and water quality efforts to protect wildlife and the human element. The expanded program is called "Jeffersontown Clean ~n~ Green".

See the expanded "Spruce Up Jeffersontown" program as described in 3.3.5.3 Catch Basin "Gutter Gremlins" GH-3 above. Note the Gutter Gremlins Program; Gaslight Clean Up; Recycle, Reuse, and Renew Environmental Educational Program; Bright Spot; and Jefferson Gardens outreach efforts.

3.3.5.10 STORMWATER POLLUTION PREVENTION PLANS FOR CO-PERMITTEE OPERATIONS GH-10

The City regularly attends co-permittee meetings with MSD and will continue to actively participate in the co-permittee partnership and explore opportunities to collaborate and share resources, as well as participate in peer reviews for program enhancements. In the past year, there were at least eight meetings and one conference call. The City or its designated representative was present for all meetings.

A major project occurring in the City of Jeffersontown which may affect water quality is the Jeffersontown Water Quality Treatment Center Elimination Plan. Instead, a pump station will be installed. Work was expected to be completed in December 2015. The wastewater treatment plant which is being taken offline lies in an area prone to flooding which had the potential to degrade water quality if flooding occurred.

A Master Plan for Veterans Park, adjacent to the site where the wastewater treatment plant is being removed, has been developed and takes into account water quality. Taylor, Siefker, Williams Design Group gave presentation of the conceptual plan for the New Veterans Park layout to the City Council on January 20, 2015.

3.3.6 MONITORING (M)

The City of Jeffersontown has an interlocal agreement with MSD to perform the monitoring requirements of the MS4 permit. Watershed monitoring performed on Chenoweth Run characterized the water quality of the stream within the City of Jeffersontown MS4 area.

3.3.7 PERFORMANCE ASSESSMENT AND REPORTING (PAR)

The City of Jeffersontown has an interlocal agreement for MSD to prepare the Annual Report. The City of Jeffersontown has provided information on the implementation of the MS4 permit requirements of the City to MSD for this report.

City personnel provide quarterly updates on the Stormwater Program to the City Council. Stormwater was discussed in committee reports approximately 16 times in this reporting year.

3.3.8 BUDGET: PERSONNEL, CAPITAL PROJECTS, AND SUPPORT SERVICES

The City of Jeffersontown estimates the following summary to support the stormwater program:

Personnel/ Staffing
City Hall Staff - MS4 Coordinator – Director of Community Development/Assistant to the Mayor
Public Works Director
Fifteen (15) full-time employees as of August 2015

Capital Projects & Drainage Related Projects (2016-17)

Drainage:	$300,000
MS4 Program:	$25,000

(Outfall screening; catch basins and drainage ways maintenance; community outreach)

Co-permittee Commitment

Jeffersontown portion of co-permittee responsibilities (annual fee)	$33,868

PICTURES, CHECKLISTS, CHARTS AND REPORTS ARE AVAILABLE UPON REQUEST.

CO-PERMITTEE CERTIFICATION
MS4 STORMWATER QUALITY MANAGEMENT PLAN
KPDES PERMIT NUMBER KYS000001

THE CITY OF ST MATTHEWS is designated as a co-permittee covered by the Municipal Separate Storm Sewer System (MS4) permit that was issued by the Kentucky Division of Water under the Kentucky Pollutant Discharge Elimination System (KPDES) program. **THE CITY OF ST MATTHEWS** has prepared the attached annual compliance report for the reporting period of **July 1, 2016 to June 30, 2017**.

Under the terms of KPDES Permit No. KYS000001 and implemented through an interlocal agreement with Louisville and Jefferson County Metropolitan Sewer District, **THE CITY OF ST MATTHEWWS** certifies that it has responsibility for the following:

- Construction oversight in addition to the regulatory inspections conducted by Louisville MSD pursuant to the Erosion Prevention and Sediment Control Ordinace, Chapter 159;
- Drainage system and outfall mapping;
- Drainage system operation and maintenance;
- Road maintenance and upkeep, including snow and ice removal and related stormwater management activities;
- Drafting and implementing fleet and facility stormwater pollution prevention plans;
- Reporting and refering potential illicit discharges observations by municipal employees or other reports from residents to MSD for investigation and potential enforcement;
- Inspection, operation, maintenance and/or applicable certification that permanent (also known as post-construction) water quality devices, controls, and management practices are operating effectively;
- Implementation of education and outreach within the City of St. Matthews to compliment the education and outreach provided by MSD which is tailored to local water bodies pollutants of concern;
- Preparation and timely submittal of annual compliance demonstration report to MSD according to agreed upon formats and standards; and

Certification: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the above statements are, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

CITY OF ST. MATTHEWS
Name: KENAN STRATMAN Signature:
Title: PUBLIC WORKS DIRECTOR Date: 10/14/17

3.4 CITY OF ST. MATTHEWS

The City of St. Matthews, Kentucky has an interlocal agreement with MSD, the primary Co-Permittee on the MS4 permit, to perform required activities specified in the KPDES Permit No. KYS000001to reduce discharge of pollutants and prohibit illicit discharges. The City of St. Matthews was incorporated as a sixth-class city in March of 1950. Since that time, the City's limits have expanded as several neighborhoods been annexed. Since 2000, all residences annexed into the City of St. Matthews, by an ordinances passed by the city council, still pay a storm water fee to MSD. For these specific areas, the City of St. Matthews is not responsible for storm drainage. These areas, and the date they were annexed are as follows:

- Springlee – September 2000
- Plymouth Village – July 2000
- Fairmead – September 2000
- Cherrywood – September 2000
- Broadfields – July 2000
- Springwood – July 2014
- Ormond – February 2017

This subsection will focus on those activities for which the City of St. Matthews was responsible during the permit period and will document the compliance tasks performed by St. Matthews during the period of July 1, 2016– June 30, 2017.

3.4.1 Public Education/outreach programs (PE)

The Permit included requirements for support of existing programs plus several new initiatives to increase public awareness of water quality issues and to promote a sense of stewardship for the streams in Jefferson County. The City of St. Matthews has an interlocal agreement with MSD, the primary Co-Permittee on the MS4 permit, to perform certain public education program tasks. Therefore, only those tasks performed by the city are listed in this report.

3.4.1.1 Public Education Programs PE-1

The City of St. Matthews publishes and distributes a newsletter at least four times per year to all residential property owners within the city limits. This newsletter is an excellent vehicle with which to provide information to the citizens and to alert them to issues and programs that affect the community. In the past, small narratives have been periodically provided to inform residents of drainage problems and ways to report them. The City implements an annual drainage improvement program to address surface drainage concerns throughout the city. Typically, drainage projects affecting approximately one block have a public information meeting prior to finalizing the design to solicit input from the public on the problems as well as possible solutions.

The City will continue to utilize its newsletter to provide details about the leaf pickup and yard waste bag/sticker program available to its citizens. Specific program details include scheduled leaf pickup dates for areas of town, and phone number/contacts for problems or requests for additional pickups.

The City has revamped its website. www.stmatthews.org/. The website provides another," at your fingertip," source for property and business owners to find the specific information such as leaf pickup, storm damage pickup, recycling programs, etc.. A featured link informs property owners how to choose the correct tree in order to reduce utility costs while maintaining pedestrian and vehicular safety.

Within the website, there is a link for property owners to place a request for a tree to be planted in the R/W at their house. This program not only greens up the city, it gives its residents a viable option to help improve the area at no cost to themselves individually.

3.4.1.2 Earth Day PE-2

The City of St. Matthews at this time does not hold separate Earth Day activities.

3.4.1.3 Litter Control PE-3

The City of St. Matthews has not organized specific events, but uses its public works crew to maintain litter control on streets and public properties. The city has hired employees to empty public garbage cans located within public parks and right of way and empties a minimum of twice a week.

The City has initiated a program to install signs and waste receptacles at City parks and community centers to inform/remind the public they are responsible for cleaning up after their pets. The major city owned public parks now have waste receptacles and bags on site for pet owners' use while on the property. These will be placed at strategic locations within the facilities to maximize availability by the public.

3.4.1.4 Internal Training PE-4

The City of St. Matthews Mayor and City Engineer have attended MS4 presentations by MSD staff. MSD attended a city council meeting during this reporting period to inform city council members and citizens about the MS4 program and the roles the co-permitees play.

3.4.1.5 Children Training PE-5

Annually the City of St. Matthews hosts an elementary school to show then the "insides" of City Hall and how the government operates. A separate break-out session related to public works and maintenance is given. During this session the Director of Public Works provides a 15 min informative session to each of the 3 classes on what happens to water that goes into the drain.

The City is in the planning session of developing an outdoor class room at Community Center Park. The outdoor class room will be located in the city park, next to an existing wetland. The class room can be utilized by local science teachers to aid in the understanding of the environment.

3.4.1.6 City Festival/Informational Propaganda PE-6

Beginning in the 2015/2016 reporting period the City provided handouts and other informational material in the City Tent displayed at the various social events. The two main events that provide information is at the Halloween Festival (held in October at Brown Park) and the City Street Fair (held May).

3.4.2 ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)

The IDDE program is intended to detect and eliminate illicit connections and improper disposal to the MS4. St. Matthews has an interlocal agreement with MSD, the primary Co-Permittee on the MS4 permit, to perform certain IDDE tasks. Therefore, only those tasks performed by the City of St. Matthews are listed in this report. MSD performs illicit discharge investigation and follow-up through out Louisville Metro, including the City of St. Matthews.

In 2011 the City of St. Matthews contracted with HDR to develop a GIS system to map the City's drainage facilities. The interactive site can be used to display all pipes, direction of flow, and sizes. Many of the systems which constructions plans were available can be accessed from the site. Beginning in the 2017 – 2018 reporting period the City will look at the possibility of updating the site.

3.4.2.1 Illicit Discharge / Illegal Dumping Ordinance IDDE-4

In 2008 the City of St. Matthews put together a hotline list and distributed the list to all its residents via a Newsletter sent to residents four times a year. The intention was to provide a quick and easy to use reference for residents. The hotline provides a directory for city personnel from police to council members. Amongst those numbers on the list is a direct line for individuals to report illegal dumping or illegal discharge into the storm sewer system. The goal is to simplify the reporting process of this illegal act, and to inform the appropriate people so that quick action can be taken. The city has also added this directory of numbers to the St. Matthews website. http://www.stmatthewsky.org/

The City has two fulltime employees that are dedicated to Code Enforcement. A part of their daily duties are associated with investigating and enforcing our illegal dumping ordinance.

Signs are posted in areas which continue to be problem areas. City maintenance staff performs inspections at these sites throughout the year in an effort to reduce dumping & improve enforcement.

3.4.2.2 Provide Education on the Revised Wastewater Discharge Regulations IDDE-5

The City of St. Matthews publishes and distributes a newsletter at least four times per year to all residential property owners within the city limits. This newsletter is an excellent vehicle with which to provide information to the citizens and to alert them to issues and programs that affect the community. In the past, small narratives have been periodically provided to inform residents of drainage problems and ways to report them.

In 2009 the City of St. Matthews added a "Green" page to its website. The "Green" page provides links to various websites, including http://www.louisvillegreen.com, http://www.stormwater.kytc.ky.gov/ http://msdlouky.org, & http://rumpke.com, all of which provide educational material about the Wastewater Discharge Regulations. During this past year, a new section/link was added specifically for education. The link is to the KYTC stormwater webpage "If its on the ground, its in your water."

The City of St. Matthews City Engineer and Director of Public Works/MS4 Coordinator have attended all MS4 presentations and meetings held with MSD and other co-permittees staff. Information is then relayed to appropriate staff (ie Public Works and City Council).

Annually the City of St. Matthews hosts an elementary school to show then the "insides" of City Hall and how the government operates. A separate break-out session related to public works and maintenance is given. During this session the Director of Public Works provides a 10 min informative session on what happens to water that goes into the drain.

The City is in the planning session of developing an outdoor class room at Community Center Park. The outdoor class room will be located in the city park, next to an existing wetland. The class room can be utilized by local science teachers to aid in the understanding of the environment.

3.4.3 Construction Site Runoff Controls (CS)

Sedimentation and erosion from land disturbing activities can have severe impacts to stream systems. The City of St. Matthews has an interlocal agreement with MSD, the primary Co-Permittee on the MS4 permit to perform certain CS program tasks. MSD administers and enforces the Erosion & Sediment Control Ordinance. Therefore, only those tasks performed by City of St. Matthews are listed in this report.

3.4.3.1 Erosion Prevention and Sediment Control Plan (EPSC) CS-1

St. Matthews obtains EPSC and Site Disturbance Permits from MSD on applicable projects constructed with Public Works crews and projects bid out. The City holds themselves and their contractors to the same EPSC standards as private contractors working within the City.

Before a building permit is granted, the developer needs to pay a review fee to MSD for plan approval on all storm and sanitary design. MSD is responsible for all sanitary systems located within St. Matthews, but it does not maintain the storm water system (with the exception of the six areas annexed after 2000). Prior to any approvals, MSD confirms with the City of St. Matthews that there are not any existing complaints or reported problems in the project area.

3.4.3.2 Scheduled Inspections of BMP's CS-5

The City of St. Matthews has an interlocal agreement with MSD, the primary Co-Permittee on the MS4 permit, however MSD administers approval and inspection on EPSC and Site Disturbance Permits for construction projects within the City. For private construction, a city official or representative periodically inspects sites for compliance with the EPSC Ordinance.

Should a violation occur, St. Matthews will request MSD's assistance to bring the site into compliance.

3.4.4 Post Construction Controls (PC)

Best Management Practices for managing the increase in impervious area and controlling the subsequent increases in runoff quantity, velocity and pollutant migration include planning for on-site capture systems, protecting stream corridors, and implementing regulations and policies. The City of St. Matthews has an interlocal agreement with MSD, the primary Co-Permittee on the MS4 permit, to perform certain PC program tasks. Therefore, only those tasks performed by the City of St. Matthews are listed in this report.

3.4.4.1 Pilot BMP Projects PC-2

The City of St. Matthews is known as an urban environment populated with many mature trees and the City intends to keep it that way. Following the ice and wind storms in 2008, the City increased its tree planting efforts in an effort to maintain this atmosphere. During this reported cycle, the city has planted approximately 117 two to three-inch diameter trees. The City's maintenance crews planted the new trees in public parks and in public rights of way. Should residents want a tree in front of their house, inside the City R/W, they can request a tree on the City's website.

In years past, the City of St. Matthews developed a Storm Water Drainage Master Plan in order to provide a separate storm sewer system for its residents. The City is in its final stages of development of the Master Plan and continuously maintains the areas previously constructed. The plan is continuously updated to handle ongoing issues. The following are a list of projects performed during the last reporting period.

JULY 2016	ST MATTHEWS AVE	STORM SEWER	1 CB
AUGUST 2016	MACON AVE	STORM SEWER	2 CB
SEPT 2016	WILTSHIRE	STORM SEWER	1 CB
NOV 2016	IOLA RD	STORM SEWER	20' PIPE/1 CB
SEPT 2016	SHERRIN/BROWNS ALLEY	STORM SEWER	534' PIPE/7CB
JUNE 2017	KY/WASHBURN ALLEY	STORM SEWER	685' PIPE/8CB

The City of St. Matthews has been actively replacing all open throat catch basins with grated type basins where possible. This program provides improved capture and removal of debris from grates, rather than allowing the debris to enter the separate storm sewer system. During this report period the City has replaced 3 open throat catch basin.

In November of 2015 the City of St. Matthews reconstructed a portion of the ditch along Trinity Hills. The area continuously flood as a resident had filled in the ditch and placed a structure in the easement. Continuous erosion and sediment deposits downstream were constant maintenance issues. The $78,000 project awarded to E/Z Construction reconstructed 200' of channel and included the instillation of diffusers to help reduce velocities in the channel.

The last phase of the City of St. Matthews revitalization project within Community Center Park was initiated in June of 2014 in an attempt to prolong the life of the park and promote a healthy life style. The project provided for stream bank modification and bank grading along approximately 2,660 feet of intermittent tributaries to Middle Fork Beargrass Creek and approximately 40 feet of ephemeral stream channel. The project also provided for the replanting of 260 trees and shrubs. The $508,000 construction contract awarded to Joe Asher Construction in July of 2015. Construction and stabilization was completed in March of 2016.

3.4.4.2 Built-upon Area Reductions PC-3

The City has a program to reduce the number of off-street parking pads within the public right of way. This activity will reduce the amount of impervious surfaces and replace with grass; thus decreasing surface runoff and providing additional filtering of runoff before entering the separate storm sewer systems.

This program provides property owners wanting this service an easy and free solution. Once the resident contacts the City; City forces will remove the pad, haul away the material, regrade the area, & then restore the disturbed area back to turf. During this report period, two property owner participated in this program. To date there have been 21 pads removed from the City right of way, including the 3 green-up during this report period. The program was advertised in the newsletter a few years ago. To help shed light on the program the newsletter will run another article.

During this report period the City has embarked on a revitalization project for the City Hall Campus. The project provides for a complete campus parking and circulation over hall. With the construction of 9,000 SF library addition and new parking lots, the design implements “green technologies” to reduce the overall impervious footprint. The project optimizes parking lot layout and is designed with pervious pavements and a water quality unit to service the site.

3.4.4.3 Source Control PC-4

Dumpsters in St. Matthews are required to be fenced for litter control. All garbage cans that are proposed or replaced within the city parks are equipped with lids to limit animal access and to reduce litter resulting from wind. Twice a week, City forces empty the trash in all public trash cans to decrease the occurrence of cans over flowing. All City salt storage facilities are covered with permanent roofs. New developments and redevelopments within the City of St. Matthews require downspouts to discharge onto surface areas or rocked French drains rather than tied directly to the storm sewers. The City (Public Works, Fire & Rescue, and Police) refuel all vehicles at commercial fueling stations to limit the occurrence of unmanaged spills.

3.4.5 Good Housekeeping / Pollution Prevention (GH)

3.4.5.1 Street Maintenance GH-1

The City of St. Matthews abides by the EPSC General Permit regulations. Street maintenance is performed on an as-needed basis, the city utilizes Louisville Metro’s annual contract to resurface local streets. All storm drainage projects are finalized with resurfacing to assure

positive drainage. St. Matthews uses inlet protection (stone bags and magnetic inlet filters) and/or silt fence on its storm sewer projects to minimize soil and debris entering the storm sewer system. Throughout the year, on an as needed basis, city crews remove storm debris from public rights-of-way and transport to the landfill.

3.4.5.2 Street Sweeping GH-2

The majority of the City's streets are not curbed. This drainage system allows water to run-off into adjacent yards and into small yard inlets. The small yard inlets or catch basins allow time for the storm water runoff to infiltrate the greenscape prior to entering the storm sewer system. The City uses a private street sweeping company, Sweep All, to clean all curbed streets. This reduces the amount of pollutants that enter the separate storm sewer system by removing sediment and debris from streets and disposing of them properly. Street sweeping is performed on an as needed basis (min of 2 times per year)

3.4.5.3 Catch Basin Cleaning/ Repair GH-3

Storm sewers are cleaned as needed by city employees or contract services. The usual problem areas are routinely checked. During the fall months, when catch basin blockages are at their highest, City forces use vacuum systems to remove leaves throughout the community's rights of way. Debris is transported to a landfill. This report period, the city retained records for removing approximately 41– 30 cubic yard dumpsters of mulched leaves. The leaf collection period runs from Nov – December .

3.4.5.4 Storm Sewer Cleaning GH-4

Storm sewers are cleaned as needed by city employees or contract service. Debris is transported dirrectly to a landfill or place in a dumpster and transported. Below is a list of storm sewer cleanings or repairs performed this report period:

April 17	Massie Ave	Cleared Several Entrance Pipe	2 TONS

3.4.5.5 Channel Maintenance GH-5

Public Works performs drainage channel maintenance as needed. Maintenance is done during periods of low flow and low frequency. Problem areas are routinely checked and maintained. The debris is transported to a landfill. The following are the areas cleaned and the amount of material removed.

JULY 2016	WARWICK PARK	DITCH CLEANING	60 TONS
SEPT 16	WACKER CREEK	DITCH CLEANING	40 TONS
April '17	COMMUNITY PARK	DITCH CLEANING/FALLEN TREE	10 280TONS

3.4.5.6 Pollution Prevention for De-icing GH-6

Beginning in the winter of 2007, the City of St. Matthews began experimenting with the use of Geomelt, a natural anti-icing fluid derived from sugar beets in its street salting program. The use of this material is expected to allow a reduction of the use of salt as well as fewer applications, which translates into a much more environmentally friendly solution to snow and ice response that uses less fuel and causes less wear and tear on equipment.

During this reporting period, the City used 100 TONS OF SALT & 0 GAL. OF BEET JUICE between January 2016 and March 2017. Beet Juice was not used because the salt was mixed the year before.

3.4.5.7 BMP Inspection GH-7

Good Housekeeping / pollution Prevention BMP's are inspected by public works and construction personnel.

3.4.5.8 BMP Maintenance GH-8

Maintenance activities are performed by city crews and contract services.

3.4.5.9 Pollution Prevention for Herbicides and Pesticides GH-9

City of St. Matthews uses "Round-up" sparingly on weeds. These chemicals are not bought or stored in bulk by the City of St. Matthews. No pesticides are used. The lack of necessary license limits us to certain operations.

3.4.5.10 Continuation of Existing Programs GH-10

The City contracts out the collection of municipal waste, yard waste, and recyclables weekly to Rumpke. The City has operated a leaf collection program citywide since 1990 to assist residents in the collection and disposal of leaves during the fall season. This activity provides the residents a strong incentive to rake leaves in a timely manner and is important in that it dramatically reduces sediment and debris from the separate storm sewer systems and its discharge waters.

This program provides for two leaf pickups along each residential street throughout the City during the fall months. The Fall Newsletter identifies an approximate schedule for each street. Signs are posted approximately 1 week in advance of the pickup to provide residents time to rake leaves to the front of their properties.

- During this reporting period, the City filled approximately 41 – 30 cubic yard dumpsters. This yard waste material was collected and placed in steel dumpsters and was picked up and removed by Rumpke.

3.4.6 Monitoring (M)

St. Matthews has an interlocal agreement with MSD, the primary Co-Permittee on the MS4 Permit. St. Matthews provides an annual report which documents the compliance tasks performed during the individual permit periods.

3.4.7 Reporting (R)

St. Matthews has an interlocal agreement with MSD, the primary Co-Permittee on the MS4 Permit. St. Matthews provides an annual report which documents the compliance tasks performed during the individual permit periods.

3.4.8 Financial

This Section provides a summary of the SWQMP Financing. St. Matthews utilizes the SWQMP as a business plan to guide the various agencies and departments in how they will implement the various requirements of the MS4 Permit. While there are interlocal agreements between MSD and St. Matthews, including compensation for the monitoring program, finances are managed separately.

St. Matthews Annual Operating Budget for 2015 ($,000)						
	Fiscal Year					
	2012	2013	2014	2015	2016	2017
Total Operating Budget	10,195	10,200	11,517	13,145	13,145	15,919
Estimated Stormwater Operating Budget*	1,682	750	900	725	1,000	600

3.4.8.1 ST. MATTHEWS

*Includes operating budgets for stormwater related efforts.

Annual Capital Budget ($,000)						
	Fiscal Year					
	2012	2013	2014	2015	2016	2017
MS4 Capital Budget	680	TBD	1,500	750	700	300

Historical Estimated Full Time Equivalents (FTEs)						
	Fiscal Year					
	2012	2013	2014	2015	2016	2017
Stormwater Staff Position (FTE) *	15	13	13	14	15	14

* includes staff from various departments including drainage, engineering, public works, maintenance.. Staff with a portion of their time related to stormwater are consolidated.

CO-PERMITTEE CERTIFICATION
MS4 STORMWATER QUALITY MANAGEMENT PLAN
KPDES PERMIT NUMBER KYS000001

THE CITY OF SHIVELY is designated as a co-permittee covered by the Municipal Separate Storm Sewer System (MS4) permit that was issued by the Kentucky Division of Water under the Kentucky Pollutant Discharge Elimination System (KPDES) program. **THE CITY OF** SHIVELY has prepared the attached Stormwater Quality Management Plan for the permit cycle effective February 1, 2017.

Under the terms of KPDES Permit No. KYS000001 and implemented through an interlocal agreement with Louisville and Jefferson County Metropolitan Sewer District, **THE CITY OF** SHIVELY certifies that it has responsibility for the following:

- Construction oversight in addition to the regulatory inspections conducted by Louisville MSD pursuant to the Erosion Prevention and Sediment Control Ordinace, Chapter 159;
- Drainage system and outfall mapping;
- Drainage system operation and maintenance;
- Road maintenance and upkeep, including snow and ice removal and related stormwater management activities;
- Drafting and implementing fleet and facility stormwater pollution prevention plans;
- Reporting and refering potential illicit discharges observations by municipal employees or other reports from residents to MSD for investigation and potential enforcement;
- Inspection, operation, maintenance and/or applicable certification that permanent (also known as post-construction) water quality devices, controls, and management practices are operating effectively;
- Implementation of education and outreach within the City of SHIVELY to compliment the education and outreach provided by MSD which is tailored to local water bodies pollutants of concern;
- Preparation and timely submittal of annual compliance demonstration report to MSD according to agreed upon formats and standards; and

Certification: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the above statements are, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

CITY OF SHIVELY
Name: JOHN HAYWOOD
Title: DIRECTOR PUBLIC WORKS

Signature: [signature]
Date: 6-28-17

3.5 CITY OF SHIVELY

The Co-Permittees individually and collectively continue to perform the required activities specified in KPDES Permit # KYS000001. This section will focus on those activities for which the City of Shively was responsible during the permit period and will document the compliance tasks performed by City of Shively during the period of July 1, 2011 – June 30, 2012.

3.5.1 ILLICIT DISCHARGE DETECTION AND ELIMINATION (IDDE)

* City crews graded 300 feet of roadway ditch along Elgin Way.

3.5.1.1 ILLICIT DISCHARGE / ILLEGAL DUMPING ORDINANCE IDDE-4

The City of Shively enforces its illegal dumping ordinance.

- The city's Code Enforcement Board, is continuing to cite residents with debris blocking their drainage ditches.
- City crews abated 225 abandoned properties.

3.5.1.2 PROVIDE EDUCATION ON THE REVISED WASTEWATER DISCHARGE REGULATIONS IDDE-5

The City of Shively posts "no dumping" signs at two locations within the city.

3.5.2 CONSTRUCTION SITE RUNOFF CONTROLS (CS)

The City of Shively has an interlocal agreement with MSD, the primary Co-Permittee on the MS4 permit, to perform certain CS program tasks.

3.5.2.1 EROSION PREVENTION AND SEDIMENT CONTROL PLAN (EPSC) CS-1

The City of Shively has an approved EPSC General Permit issued by MSD for Public Works activities.

3.5.2.2 SCHEDULED INSPECTIONS OF BMPS CS-5

A City of Shively Code Enforcement Officer inspects construction sites as needed.

3.5.3 POST CONSTRUCTION CONTROLS (PC)

3.5.3.1 PILOT BMP PROJECTS PC-2

Shively continued a practice of not installing paved curbs and gutters on residential streets. Grass swales are used to collect street runoff.

3.5.3.2 BUILT-UPON AREA REDUCTIONS PC-3

Shively adopted the provisions of Cornerstone 2020.

3.5.3.3 SOURCE CONTROLS PC-4

The City of Shively facilities have approved HMPC plans. De-icing salts are either stored in a building or they are covered.

3.5.4 GOOD HOUSEKEEPING / POLLUTION PREVENTION (GH)

The components of the drainage system require routine inspections and maintenance. The City of Shively performed the following activities during the permit year:

- Augured approximately 2,500 feet of drainage pipe.
- Cleaned approximately 3,000 feet of curbing.
- Cleaned and maintained 5,000 feet of drainage ditches.
- The City of Shively contracted with Hall Contracting to grade 1,700 feet of roadside ditches and replace 28 driveway culvert pipes on Jenlee Lane, Neblett Avenue and Hampstead Drive. The project was completed in June 2017 at a cost of 65,296.25.

3.5.4.1 STREET MAINTENANCE GH-1

Street maintenance by Shively is performed on an as-needed basis. The City of Shively follows the EPSC General Permit requirements.

3.5.4.2 STREET SWEEPING GH-2

The City of Shively manually collects debris along Dixie Highway as needed. The City of Shively cleans curb and gutter roads within the city on an average of twice per year. Debris removed from streets and gutters is sent to a landfill.

3.5.4.3 CATCH BASIN CLEANING GH-3

Catch basins are manually cleaned as needed. The debris is taken to a landfill.

3.5.4.4 STORM SEWER CLEANING GH-4

Storm sewers are cleaned as needed with a pressure auger. Debris is collected and sent to a landfill.

3.5.4.5 CHANNEL MAINTENANCE GH-5

Silt is removed from drainage ditch channels as needed. Silt is generally removed by hand to minimize the impact to the channel, though equipment is sometimes used when necessary. Debris removed from drainage channels is sent to a landfill.

3.5.4.6 POLLUTION PREVENTION FOR DE-ICING GH-6

The City of Shively calibrates salt spreaders as needed. Salt is pre-wetted with liquid calcium chloride to maximize effectiveness. De-icing salts are stored in a building. The city added 900 sq. ft. to the existing salt storage building.

3.5.4.7 BMP INSPECTIONS GH-7

Good Housekeeping/Pollution Prevention BMPs are inspected regularly by the City of Shively Maintenance Director.

3.5.4.8 BMP MAINTENANCE GH-8

Good Housekeeping/Pollution Prevention BMPs are regularly maintained.

3.5.4.9 POLLUTION PREVENTION FOR HERBICIDES AND PESTICIDES GH-9

The City of Shively does not use pesticides. Herbicides are used sparingly.

3.5.4.10 CONTINUATION OF EXISTING PROGRAMS GH-10

The city collects municipal waste once per week and collects yard waste and recyclables weekly. The number of garbage pick up days was reduced from twice a week to once a week to encourage recycling. The City of Shively recycles newspaper, plastic, aluminum cans and glass. A private contractor picks up used oil from the City of Shively's maintenance facility.

3.5.5 PUBLIC EDUCATION/OUTREACH PROGRAMS (PE)

The City of Shively has an interlocal agreement with MSD, the primary Co-Permittee on the MS4 permit, to perform certain public education program tasks. Therefore, only those tasks performed by the City of Shively are listed in this report.

The City of Shively offers educational materials at the annual Easter Egg Hunt, Trunk or Treat and Ligh Up Shively.

3.5.5.1 PUBLIC EDUCATION PROGRAMS PE-1

The City of Shively maintained a website, www.shivelyky.org. Public education also takes place through quarterly newsletters which address services including recycling, leaf pick-up, appliance and junk pickup days and catch basin cleaning.

3.5.5.2 EARTH DAY PE-2

The City of Shively does not hold separate Earth Day activities. Community-wide Earth Day celebrations at the Louisville Zoo are sponsored by Louisville Metro.

3.5.5.3 LITTER CONTROL PE-3

Cane Run Elementary and Butler High School have Adopt-A-Stream programs. The Business Association cleans up litter along the Watterson Expressway interchange and along a one-mile section of Dixie Highway.

3.5.5.4 INTERNAL TRAINING PE-5

The city's public works director attended quarterly meetings with MSD (URS), MSD's Storm Water Overflow Detection Training.

3.5.6 MONITORING (M)

The City of Shively has an interlocal agreement with MSD to perform the Monitoring requirements of the MS4 permit. Watershed monitoring performed on the Mill Creek Cutoff characterized the water quality downstream from the City of Shively MS4.

3.5.7 REPORTING (R)

The City of Shively has an interlocal agreement for MSD to perform the Annual Reporting function. Shively provided MSD with the information regarding its MS4 program activities for this Annual Report.

CHAPTER 4 TOTAL MAXIMUM DAILY LOADS

4.1 BACKGROUND

The Kentucky Division of Water (KDOW) uses monitoring data they collect as well as data collected by other agencies to assess whether waterbodies are attaining their designated uses with respect to water quality standards. The term “waterbody” refers to a stream, river, pond, or lake. For streams and rivers, the extent of the waterbody is reported in miles from the downstream confluence (mile 0.0) to the upper extent of the assessment. For ponds and lakes, the assessment is reported in acres. The Division of Water assigns the extent of the assessment based on the location of monitoring station(s), changes in land use, location of major tributaries and other factors.

Designated uses that apply to some or all Jefferson County waterbodies include:

- Warm Water Aquatic Habitat (WAH) – fish and other aquatic life.
- Primary Contact Recreation (PCR) – swimming.
- Secondary Contact Recreation (SCR) – wading and boating.
- Fish Consumption (FC) – contaminants in fish consumed by humans.
- Drinking Water Supply (DWS) – protects the quality of water used for potable supplies at the point of intake.

The KDOW assesses each designated use separately. Results are placed into one of three designated use attainment categories:

- Full Support (FS): the designated use is fully supported, the use is not impaired.
- Partial Support (PS): the designated use is partially supported, the waterbody is impaired.
- Non-Support (NS): the designated use is not supported, the waterbody is impaired.

KDOW places each assessed waterbody into one of five assessment categories, which are summarized on **Table 4.1.1**. Good quality waterbodies are placed into Category 1 or 2, because monitoring data shows that all assessed designated uses are fully supported. Waterbodies that have not been monitored or assessed are placed into Category 3. Waterbodies with one or more designated use impairments are placed into Category 5 until a Total Maximum Daily Load (TMDL) is completed and approved for the impairment(s). Once the TMDL is completed for all the impaired uses, the waterbody is moved to Category 4, if impairment still exists. If the waterbody is monitored and found to be attaining all the designated uses after a TMDL is completed, it is moved to Category 2C.

Note that a waterbody can be listed in only one (1) category that reflects the worst-case assessment if impairments are found. Therefore, if a waterbody is classified as Full Support for Warm Water Aquatic Health, but Partial Support (i.e., impaired) for Primary Contact Recreation, it is included in Category 5. If a waterbody is classified as Full Support for one or more designated uses and the other uses are classified as Not Assessed, the waterbody is classified as Full Support (i.e., not impaired).

Table 4.1.1 – Assessment Categories

Category	Definition
1	All designated uses for water body fully supporting.
2	Assessed designated use(s) is/are fully supporting, but not all designated uses assessed.
2B	Segment currently supporting use(s), but 303(d) listed & proposed to EPA for delisting.
2C	Segment with an EPA approved or established TMDL for the following use(s) now attaining Full Support. TMDL approval #____
3	Designated use(s) has/have not been assessed (insufficient or no data available).
4A	Segment with an EPA approved or established TMDL for the listed uses not attaining full support. TMDL approval # _____
4B	Nonsupport segment with an approved alternative pollution control plan (e.g. BMP) stringent enough to meet full support level of all uses within a specified time.
4C	Segment is not meeting full support of assessed use(s), but this is not attributable to a pollutant or combination of pollutants.
5	TMDL is required.
5B	Segment does not support designated uses based on evaluated data, but based on Kentucky listing methodology insufficient data are available to make a listing determination. No TMDL needed.
Definitions	
WAH	Warm Water Aquatic Habitat (fish and other aquatic creatures)
PCR	Primary Contact Recreation (swimming)
SCR	Secondary Contact Recreation (wading and boating)
FC	Fish Consumption (contaminants in fish consumed by humans)
DWS	Drinking Water Supply (Applies at the Ohio River intakes – Mile 600.6 and 594.7)
FS	Fully supports the use
PS	Partially supports the use and is considered to be impaired
NS	Non-support of the use and is considered to be impaired
Source: KDOW 2014 Integrated Report to Congress on the Condition of Water Resources in Kentucky, Volume 1, Executive Summary	

Approximately every two years, KDOW publishes an Integrated Report. Volume I includes a description of the monitoring and assessment procedures and results for all waterbodies that were monitored and assessed. Volume II includes only the impaired waters list (also known as the 303(d) List), which is a subset of the results presented in Volume I. These reports are required by the Clean Water Act.

The 303d List is issued as a draft subject to public comment and is finalized after responding to public comments and approval by USEPA. The draft 303(d) List includes the following categories:

- De-listing Requests – monitoring and assessment data show that designated uses are currently attained, or that the original listed was in error.
- Draft New Listings – monitoring and assessment performed since the last report have identified new impairments.
- Draft Current Year Listings – the compiled list of waterbodies that have one or more impairments.

USEPA may request more information, approve, or deny changes to waterbody status that are proposed by KDOW. The Final 303d List is published as Volume II of the Integrated Report and includes 303d listed waterbodies and Total Maximum Daily Loads (TMDLs) planned for public notice during the next two years.

KDOW is responsible for developing Total Maximum Daily Loads (TMDLs), i.e., waterbody clean-up plans, for the Kentucky waterbodies that are included on the 303d List. The 2014 Integrated Report is the most recent final document and was used to prepare this chapter of the MS4 Annual Report (*http://water.ky.gov/waterquality/Pages/IntegratedReport.aspx*).

The assessment status of Jefferson County waterbodies is summarized on **Table 4.1.2**.

Table 4.1.2 – 2014 Assessment Status of Jefferson County Waterbodies

Category [(1) (2)]	Stream Count	Stream Miles	Lake Count	Lake Acres
2 - Assessed designated use(s) is/are fully supporting, but not all designated uses assessed.	1	29.9	5	46.3
2B, 5 - Segment currently supporting some use(s), but 303(d) listed & proposed to EPA for de-listing; TMDL is required for other use(s). [(3)]	3	21.5	-	-
4A - Segment with an EPA approved or established TMDL for the listed uses not attaining full support.	3	20.5	-	-
5 - TMDL is required.	47	270.2	2	54.5
Totals	**54**	**342.1**	**7**	**100.8**

Notes

1. As of the 2014 Integrated Report, no waterbodies were assessed as Category 1. All designated uses for water body fully supporting.
2. The 2014 Integrated Report does not specifically identify waterbodies in Category 3. Designated use(s) has/have not been assessed (insufficient or no data available). However, these waterbodies as well as assessed waterbodies can be viewed in the Kentucky Water Health Portal mapping application: *http://watermaps.ky.gov/WaterHealthPortal/*
3. Waterbodies classified as "2B, 5" will be reclassified per USEPA approval in the next Integrated Report cycle.

In the sections that follow, the status of Jefferson County waterbodies, as reported by the approved KDOW 2014 Integrated Report are described in more detail.

4.2 JEFFERSON COUNTY WATERBODIES THAT FULLY SUPPORT DESIGNATED USES

The following Jefferson County waterbodies were assessed and shown to be fully supporting designated uses in the 2014 Integrated Report. Note that designated uses identified as Category 3 were not assessed.

Table 4.2.1 – Jefferson County Waterbodies Meeting Designated Uses

Waterbody	Size	Units	WAH	PCR	SCR	FC	DWS	Assessment Category	Assessment Date
Harrods Creek 3.4 to 33.3	29.9	Miles	2-FS	2-FS	2-FS	3	3	2	3/17/2011
Long Run Lake	30	Acres	2-FS	3	3	3	3	2	3/29/2011
Miles Park Pond #4	3.9	Acres	3	3	3	2-FS	3	2	1/31/2008
Waggners Lake	4.8	Acres	3	3	3	2-FS	3	2	9/25/2007
Waterson Lake	4.3	Acres	3	3	3	2-FS	3	2	3/4/2009
Willow Pond	3.3	Acres	3	3	3	2-FS	3	2	10/7/2005

Definitions	
WAH	Warm Water Aquatic Habitat (fish and other aquatic creatures)
PCR	Primary Contact Recreation (swimming)
SCR	Secondary Contact Recreation (wading and boating)
FC	Fish Consumption (contaminants in fish consumed by humans)
DWS	Drinking Water Supply (Applies at the Ohio River intakes – Mile 600.6 and 594.7)
FS	Fully supports the use
PS	Partially supports the use and is considered to be impaired
NS	Non-support of the use and is considered to be impaired

4.3 JEFFERSON COUNTY WATERBODIES WITH APPROVED TMDLS

This section provides an assessment of the Total Maximum Daily Loads (TMDLs) requirements in the MS4 permit, Section D.1.c. KDOW is responsible for preparing TMDLs for impaired waters and **Table 4.3.1** below shows the TMDLs that have been approved and published by KDOW for waterbodies in Jefferson County. TMDL documents are available at: *http://water.ky.gov/waterquality/Pages/ApprovedTMDLs.aspx.*

Table 4.3.1 – Approved TMDLS

Title	303(d) Impairment	Year Approved	County
Harrods Creek Dissolved Oxygen TMDL	Organic Enrichment	1995	Oldham, Jefferson
Development of a Total Phosphorus TMDL for Chenoweth Run (Phase I)	Nutrients	1997	Jefferson
Development of an Ultimate Oxygen Demand TMDL for Floyds Fork and its Tributaries	Organic Enrichment	1997	Jefferson, Shelby
Final TMDL for Fecal Coliform – Six Stream Segments within the Beargrass Creek	Fecal Coliform	2012	Jefferson
Total Maximum Daily Load for E. Coli and Fecal Coliform – 18 Stream Segments within the Floyds Fork Watershed – Bullitt, Henry, Jefferson, Oldham, Shelby and Spencer Counties, Kentucky	E. coli, Fecal Coliform	2014	Bullitt, Henry, Jefferson, Oldham, Shelby, Spencer

The 1997 TMDLs for Floyds Fork and Chenoweth Run and the 1995 TMDL for Harrods Creek address wastewater facilities and do not include wasteload allocations for stormwater or load allocations for nonpoint sources. The 2012 TMDL for Beargrass Creek includes wasteload allocations for sanitary sewer overflows, combined sewer overflows, MS4 stormwater, other permitted sources, and wasteload and load allocations for groundwater sources. The 2014 Bacteria TMDL for Floyds Fork includes a margin of safety, sanitary wastewater facilities, future growth, MS4 stormwater, and load allocations for nonpoint sources. Waterbodies that have been moved to Category 4 are shown on **Table 4.3.2**.

Table 4.3.2 – Jefferson County Waterbodies in Category 4 – TMDL Approved

Waterbody	Size	Units	WAH	PCR	SCR	FC	DWS	Assessment Category	Assessment Date
Middle Fork Beargrass Creek 2.0 to 2.9	0.9	Miles	2-FS	4A-NS	3	3	3	4A	3/3/2009
Middle Fork Beargrass Creek 2.9 to 15.3	12.4	Miles	2-FS	4A-NS	3	3	3	4A	3/3/2001 - 3/3/2009
Muddy Fork of Beargrass Creek 0 to 7.2	7.2	Miles	2-FS	4A-NS	3	3	3	4A	3/12/2001

Definitions	
WAH	Warm Water Aquatic Habitat (fish and other aquatic creatures)
PCR	Primary Contact Recreation (swimming)
SCR	Secondary Contact Recreation (wading and boating)
FC	Fish Consumption (contaminants in fish consumed by humans)
DWS	Drinking Water Supply (Applies at the Ohio River intakes – Mile 600.6 and 594.7)
FS	Fully supports the use
PS	Partially supports the use and is considered to be impaired
NS	Non-support of the use and is considered to be impaired

Notes

1. Three additional waterbodies have been addressed by the approved Beargrass Creek TMDLs identified on Table 4.3.1. However, these waterbodies have aquatic life designated use impairments that were not addressed by the approved TMDL, so they remain on the 303(d) List (i.e., Category 5).
2. The Floyds Fork TMDL identified on Table 4.3.1 was approved by USEPA after the 2014 Integrated Report was published. Therefore, this TMDL is not reflected in the 2014 Integrated Report.

The 2014 Integrated Report, Volume II identified the waterbodies shown on **Table 4.3.2** that were anticipated to be addressed by TMDLs issued for public notice in 2014, and 2015.

Table 4.3.3 – Current TMDL Status

Waterbody	Segment	County	Pollutant	Public Notice Year	Quarter
Chenoweth Run [1]	0.0 to 5.2	Jefferson	Fecal Coliform	2014	1st
Chenoweth Run [1]	5.2 to 9.2	Jefferson	Fecal Coliform	2014	1st
Floyds Fork [1]	11.6 to 24.2	Jefferson	Fecal Coliform	2014	1st
Floyds Fork [1]	24.2 to 34.1	Jefferson	Fecal Coliform	2014	1st
Long Run [1]	0.0 to 10.0	Jefferson	Fecal Coliform	2014	1st
Northern Ditch [3]	0.0 to 7.3	Jefferson	Fecal Coliform	2014	3rd
Pennsylvania Run [1]	0.0 to 3.3	Jefferson	Fecal Coliform	2014	1st
Pope Lick Creek [1]	2.0 to 5.2	Jefferson	Fecal Coliform	2014	1st
Southern Ditch [3]	0.0 to 5.9	Jefferson	Fecal Coliform	2014	3rd
Ohio River [2]	603.3 to 608.1	Jefferson	E. coli	2014	2nd
Ohio River [2]	608.1 to 609.2	Jefferson	E. coli	2014	2nd
Ohio River [2]	614.9 to 683.0	Jefferson, Hardin, Meade	E. coli	2014	2nd
Ohio River [2]	595.8 to 593.4	Jefferson	E. coli	2015	3rd
Ohio River [2]	604.3 to 603.1	Jefferson	E. coli	2015	3rd
Ohio River [2]	608.7 to 604.3	Jefferson	E. coli	2015	3rd
Ohio River [2]	614.0 to 608.7	Jefferson	E. coli	2015	3rd
Ohio River [2]	676.8 to 614.0	Jefferson, Hardin	E. coli	2015	3rd

Notes

1. These waterbodies were included in the Floyds Fork Bacteria TMDL, approved in 2014.
2. The Ohio River Bacteria TMDL is anticipated to include these waterbodies.
3. This TMDL was included in the 2014 Integrated Report, Volume II, but not on KDOW's List of TMDLs Being Written, available for download from http://water.ky.gov/waterquality/Pages/TMDLsDevelopment.aspx. It is included here for completeness.

The U.S. Environmental Protection Agency (EPA) (Region 5) has retained Tetra Tech, Inc., to provide consulting services for the development of the bacteria Total Maximum Daily Load (TMDL) for the Ohio River. The Ohio River Sanitation Commission (ORSANCO), which comprises the six states that lie along the river (Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia), and U.S. EPA (Regions 3 and 4) are also participating. ORSANCO is conducting the extensive monitoring program to provide the stream water quality data necessary to complete the project. ORSANCO's website states that the Ohio River Bacteria TMDL is scheduled to occur in 2017. *www.orsanco.org/programs/bacteria-tmdl*

4.4 303(D) LISTED WATERBODIES IN JEFFERSON COUNTY

The waterbodies shown on **Table 4.4.1** were included on the 2014 Impaired Waterbodies List (i.e., 303(d) List) because it was classified as impaired (Category 5) for one or more designated uses. In the future, these waterbodies may be moved to Category 4 after a TMDL is developed and approved, Category 2 if new monitoring and assessments show that the waterbody attains designated uses, or remain on Category 5 if one or more additional designated uses are impaired.

Table 4.4.1 – 303(d) Listed Waterbodies in Jefferson County

Waterbody	Total Size	Units	WAH	PCR	SCR	FC	DWS	Assess-ment Category	Assessment Date
Beargrass Creek 0.5 to 1.8	1.3	Miles	5-NS	3	3	3	3	5	3/3/2009
Big Bee Lick Creek 0 to 4.2	4.2	Miles	3	5-NS	3	3	3	5	5/15/2014
Blue Spring Ditch 0 to 2.1	2.1	Miles	2-FS	5-NS	3	3	3	5	2/22/2006 - 5/15/2014
Cane Run 0 to 7.3	7.3	Miles	2-FS	5-NS	3	3	3	5	2/11/2011
Cedar Creek 12.1 to 16.1	4	Miles	5-PS	3	3	3	3	5	4/7/2014
Cedar Creek 4.3 to 12.1	7.8	Miles	5-PS	5-NS	2-FS	3	3	5	4/7/2014
Chenoweth Run (Upper) 0 to 4.05	4.05	Miles	5-NS	3	3	3	3	5	4/4/2014
Chenoweth Run 0 to 5.25	5.25	Miles	4A-PS	5-NS	5-PS	3	3	5	3/12/2001 - 2/22/2011
Chenoweth Run 5.25 to 9.2	3.95	Miles	4A-PS	5-NS	5-NS	3	3	5	3/12/2001
Chickasaw Park Pond	1.5	Acres	3	3	3	5-PS	3	5	10/7/2005
Fern Creek 0 to 1.3	1.3	Miles	5-PS	5-NS	3	3	3	5	3/22/2001 - 5/15/2014
Fern Creek 1.3 to 4.4	3.1	Miles	5-NS	5-NS	3	3	3	5	5/2/2001 - 5/15/2014
Fern Creek 4.4 to 5.9	1.5	Miles	5-PS	5-NS	3	3	3	5	3/12/2001 - 5/15/2014
Fishpool Creek 0 to 1.9	1.9	Miles	2-FS	5-NS	3	3	3	5	5/16/2014
Floyds Fork 11.7 to 24.2	12.5	Miles	4A-NS	5-NS	2-FS	3	3	5	4/25/2014
Floyds Fork 24.2 to 34.1	9.9	Miles	2B(4A)	5-NS	2-FS	3	3	2B, 5	4/25/2014
Floyds Fork 34.1 to 40.1	6	Miles	2B(4A)	5-NS	5-NS	3	3	2B, 5	2/22/2011 - 4/28/2014
Floyds Fork 40.1 to 45.7	5.6	Miles	2B(4A)	5-NS	5-NS	3	3	2B, 5	4/28/2014
Goose Creek 0.3 to 3.6	3.3	Miles	5-PS	5-NS	3	3	3	5	3/3/2009
Goose Creek 3.6 to 13.0	9.4	Miles	5-PS	5-NS	3	3	3	5	3/3/2009

Waterbody	Total Size	Units	WAH	PCR	SCR	FC	DWS	Assess-ment Category	Assessment Date
Greasy Ditch 0 to 2.6	2.6	Miles	3	5-NS	3	3	3	5	5/15/2014
Harrods Creek 0 to 3.4	3.4	Miles	4A-NS	5-PS	2-FS	3	3	5	12/1/2005
Hite Creek 0 to 5.8	5.8	Miles	5-NS	3	3	3	3	5	4/9/2001
Little Bee Lick Creek 0 to 2.6	2.6	Miles	3	5-NS	3	3	3	5	10/23/2013
Little Goose Creek 0.0 to 9.5	9.5	Miles	2-FS	5-PS	3	3	3	5	3/12/2001
Long Run 0 to 9.9	9.9	Miles	2-FS	5-NS	3	3	3	5	2/24/2011
McNeely Lake	53	Acres	2-FS	3	3	5-NS	3	5	3/29/2011
Middle Fork Beargrass Creek 0 to 2.0	2	Miles	5-NS	4A-NS	3	3	3	5	3/13/2001
Mill Creek 0.0 to 9.9	9.9	Miles	5-NS	5-NS	3	3	3	5	3/13/2001
Mill Creek Cutoff 0 to 2.4	2.4	Miles	2-FS	5-NS	3	3	3	5	3/12/2001
Mud Creek 0 to 4.35	4.35	Miles	3	5-NS	3	3	3	5	5/15/2014
Northern Ditch 0 to 7.3	7.3	Miles	5-PS	5-NS	3	3	3	5	5/22/2014
Ohio River 595.8 to 593.4	2.4	Miles	2-FS	5-PS	3	5-PS	3	5	9/22/2014
Ohio River 603.1 to 593.4	7.3	Miles	2-FS	2-FS	3	5-PS	2-FS	5	9/22/2014
Ohio River 605.8 to 603.1	1.2	Miles	2-FS	5-PS	3	5-PS	3	5	9/22/2014
Ohio River 608.6 to 605.8	4.4	Miles	5-PS	5-PS	3	5-PS	3	5	9/22/2014
Ohio River 614.0 to 608.6	5.3	Miles	5-PS	5-PS	3	5-PS	3	5	9/22/2014
Ohio River 676.8 to 614.0	62.8	Miles	5-PS	5-NS	3	5-PS	3	5	9/23/2014
Pennsylvania Run 0 to 3.3	3.3	Miles	5-PS	5-NS	5-NS	3	3	5	4/8/2014
Pond Creek 5.2 to 8.1	2.9	Miles	5-NS	5-NS	3	3	3	5	5/22/2014
Pope Lick 0 to 2.1	2.1	Miles	3	5-NS	3	3	3	5	2/28/2011
Pope Lick 2.1 to 5.6	3.5	Miles	2-FS	5-NS	3	3	3	5	2/24/2011
South Fork Beargrass Creek 0.0 to 2.7	2.7	Miles	5-PS	4A-NS	3	3	3	5	3/3/2009
South Fork Beargrass Creek 2.7 to 13.6	10.9	Miles	5-NS	4A-NS	3	3	3	5	3/15/2001
South Long Run 0 to 3.6	3.6	Miles	5-PS	5-NS	3	3	3	5	4/8/2014
Southern Ditch 0 to 5.75	5.75	Miles	2-FS	5-NS	3	3	3	5	4/1/1998
Southern Ditch 5.75 to 9.00	3.25	Miles	3	5-NS	3	3	3	5	5/15/2014
UT of Blue Spring Ditch 0 to 2.5	2.5	Miles	3	5-NS	3	3	3	5	5/15/2014

Waterbody	Total Size	Units	WAH	PCR	SCR	FC	DWS	Assess-ment Category	Assessment Date
UT of Southern Ditch 0 to 2.6	2.6	Miles	5-NS	3	3	3	3	5	4/16/2004
Wetwoods Creek (Slop Ditch) 2.2 to 4.25	2.05	Miles	5-PS	5-NS	3	3	3	5	4/1/1998 - 5/16/2014
Wilson Creek 0 to 5.6	5.6	Miles	3	5-NS	3	3	3	5	5/15/2014

Definitions	
WAH	Warm Water Aquatic Habitat (fish and other aquatic creatures)
PCR	Primary Contact Recreation (swimming)
SCR	Secondary Contact Recreation (wading and boating)
FC	Fish Consumption (contaminants in fish consumed by humans)
DWS	Drinking Water Supply (Applies at the Ohio River intakes – Mile 600.6 and 594.7)
FS	Fully supports the use
PS	Partially supports the use and is considered to be impaired
NS	Non-support of the use and is considered to be impaired

4.5 DE-LISTED WATERBODIES

Documented improvements in stream water quality through water quality sampling can result in streams being removed from the 303(d) list where water quality standards are being met. Alternatively, some impairments or pollutants may be removed, but the waterbody continues to be on the 303(d) list because of other impairments. **Table 4.5.1** shows waterbodies or pollutants removed (i.e., de-listed) from the 303(d) list in Jefferson County. This list was derived from KDOW's TMDL program de-listed streams, available on the following website: *http://water.ky.gov/waterquality/Pages/DelistedStreams.aspx.*

MSD developed a de-listing strategy in 2014. The strategy focuses on removing impaired waterbodies from the 303(d) list (i.e. de-listing) if current monitoring data are sufficient and document that applicable surface water standards are met. The following factors are considered: the listed impairment, the data supporting the listed impairment, monitoring data, and the land uses upstream and near the listed impairment. Implementation of the de-listing strategy is ongoing. In 2015, MSD submitted a de-listing proposal for two stream segments in the Pond Creek watershed for un-ionized ammonia. The final 303(d) list and de-listed stream list for 2014, was published in 2016. Continued collaboration with KDOW on future stream de-listings is ongoing.

Table 4.5.1 – Waterbodies De-listed in 303(d)

Waterbody	River Miles/ Segment	Impairment	Approval Date
(Blue) Spring Ditch	0.0 to 2.1	Metals (Cadmium)	07/2007
(Blue) Spring Ditch	0.0 to 2.1	Metals (Zinc)	07/2007
Beargrass Creek	0.5 to 1.8	Cadmium	09/2011
Cane Run	0.0 to 7.6	Organic Enrichment/Low DO	06/1998
Cedar Creek	0.0 to 15.3	Pathogens	04/2003
Fern Creek	1.3 to 4.4	Metals (Cadmium)	07/2007
Fern Creek	4.4 to 5.9	Metals	07/2007
Fishpool Creek	0.0 to 5.4	Organic Enrichment/Low DO	06/1998
Fishpool Creek	0.0 to 5.4	Metals	06/1998
Fishpool Creek	0.0 to 5.4	Pathogens	06/1998
Goose Creek	0.0 to 4.5	Metals	06/1998
Goose Creek	0.3 to 3.6	Cadmium	09/2011
Goose Creek	3.6 to 13.0	Cadmium	09/2011
Goose Creek	4.5 to 11.7	Metals	06/1998
Harrods Creek	3.2 to 33.3	Fecal Coliform	07/2014
Harrods Creek	3.2 to 4.0	Organic Enrichment/Low DO	04/2003
Little Goose Creek	0.0 to 8.7	Metals	06/1998
Little Goose Creek	0.0 to 8.7	Organic Enrichment/Low DO	04/2003
McNeely Lake	53 acres	Nutrients	07/2007
Middle Fork Beargrass Creek	0.0 to 2.0	Cadmium	09/2011
Middle Fork Beargrass Creek	2.0 to 2.9	Cadmium	09/2011
Middle Fork Beargrass Creek	2.3 to 15.2	Organic Enrichment/Low DO	04/2003
Middle Fork Beargrass Creek	2.9 to 15.3	Cadmium	09/2011
Mill Creek	0.0 to 4.4	Turbidity	06/1998
Muddy Fork Beargrass Creek	0.0 to 6.9	Metals	06/1998
Muddy Fork Beargrass Creek	0.0 to 6.9	Organic Enrichment/Low DO	06/1998
Muddy Fork Beargrass Creek	0.0 to 6.9	Unknown Toxicity	06/1998
Ohio River	593.0 to 603.3	Fecal Coliform	09/2011
Ohio River	606.8 to 629.9	Chlordane	04/2003
Ohio River	609.7 to 617.6	Pathogens	05/2005
Pennsylvania Run	0.0 to 3.35	Nutrients	07/2007
Pond Creek/Southern Ditch	14.7 to 16.1	Metals	05/2005
Pond Creek/Southern Ditch	14.7 to 16.1	Organic Enrichment/Low DO	05/2005
South Fork Beargrass Creek	0.0 to 14.6	Metals	06/1998
South Fork Beargrass Creek	0.0 to 2.7	Cadmium	09/2011
Southern Ditch	0.0 to 5.5	Organic Enrichment/Low DO	04/2003

4.6 SPECIAL PROGRAM EFFORTS

KDOW developed the series of activities identified in the MS4 permit with knowledge of the TMDLs and 303(d) listed waterbodies, which had been finalized at the time the permit was developed. The activities were designed to improve stormwater quality throughout the MS4 area. Progress to implement MS4 program activities is reported throughout this report.

Additionally, a final TMDL for fecal coliform in Beargrass Creek was issued in 2012, and a final TMDL for fecal coliform and e. coli in Floyds Fork was issued in 2014. MSD will work with the KDOW to implement the MS4 wasteload allocations in this TMDL to the Maximum Extent Practicable.

4.7 REFERENCES

Kentucky Division of Water. 2015. Integrated Report to Congress on the Condition of Water Resources in Kentucky, 2014 Volume I. 305(b) Assessment Results with Emphasis on the Green River – Tradewater River Basin Management Unit and Statewide Update. *http://water.ky.gov/waterquality/Pages/IntegratedReport.aspx.*

Kentucky Division of Water. 2015. Integrated Report to Congress on the Condition of Water Resources in Kentucky, 2014 Volume II. 303(d) List of Surface Waters. *http://water.ky.gov/waterquality/Pages/IntegratedReport.aspx.*

Kentucky Division of Water. Water Health Portal Website: *http://watermaps.ky.gov/WaterHealthPortal/.* Accessed 9/13/2017

Kentucky Division of Water. Total Maximum Daily Load Program – Approved TMDLs Website: *http://water.ky.gov/waterquality/Pages/ApprovedTMDLs.aspx.* Accessed 9/13/2017

Kentucky Division of Water. Total Maximum Daily Load Program – Delisted Streams Website: *http://water.ky.gov/waterquality/Pages/DelistedStreams.aspx.* Accessed 9/13/2017

Ohio River Sanitation Commission (ORSANCO). Bacteria TMDL Website: *www.orsanco.org/programs/bacteria-tmdl/.* Accessed 9/13/2017

CHAPTER 5 MONITORING

5.1 INTRODUCTION

MSD is required to monitor stream segments in Jefferson County for stream health. It has been noted that Louisville has one of the most robust monitoring systems and programs in Kentucky. Using this established network, MSD is able to identify water quality trends, and adjust programs to improve water quality.

Chapter 5 provides an overview of MSD's monitoring program and the most recent final monitoring data. A description of the analysis of monitoring data is provided. Results, including comparison to applicable water quality criteria and characterization of water quality under wet and dry conditions, are presented as summaries and on a watershed basis. MSD collects and analyzes monitoring data based on the most recent Quality Assurance Project Plan (QAPP). The report period for each monitoring data set is shown on **Table 5.1.1**.

Table 5.1.1 – Monitoring Reporting Periods

Monitoring Data Set	Reporting Period	Notes
Stream Flow	**Final Data:** 10/1/2015 to 9/30/2016 **Provisional Data:** 10/1/2016 to 6/30/2017	The most recent final data from USGS were used in this report. Data that are currently in provisional status will be reported in the PY2 MS4 Annual Report.
Water Quality - Sonde	**Final Data:** 10/1/2015 to 9/30/2016 **Provisional Data:** 10/1/2016 to 6/30/2017	The most recent final data from USGS were used in this report. Data that are currently in provisional status will be reported in the PY2 MS4 Annual Report.
Water Quality - Quarterly	7/1/2016 to 6/30/2017	Quarterly sampling occurred in July, October, February, and April of this reporting period.
Recreation Season Bacteria	7/1/2016 to 10/31/2016 5/1/2017 to 6/30/2017	Per Kentucky Surface Water Standards, recreation season extends from May 1 to October 31 so reporting covers parts of two recreation seasons.
Fish Community & Aquatic Habitat	Fall 2015	Fish community data collected as scheduled in Fall 2017 will be reported in the PY2 MS4 Annual Report.
Benthic Macro-invertebrate Community & Aquatic Habitat	Spring 2015	Benthic macroinvertebrate community data collected as scheduled in Spring 2017 are being finalized and will be reported in the PY2 MS4 Annual Report.
Algal Community	Fall 2015	Algal community data collected as scheduled in Fall 2017 will be reported in the PY2 MS4 Annual Report.

5.2 MONITORING PROGRAM DESCRIPTION

MSD maintains a Long Term Monitoring Network (LTMN), shown on **Figure 5.2.1** and **Table 5.2.1**. It is designed around 28 sites purposefully distributed through the 11 watersheds that flow in or through Jefferson County.

Figure 5.2.1 – Map of Long Term Monitoring Network Locations

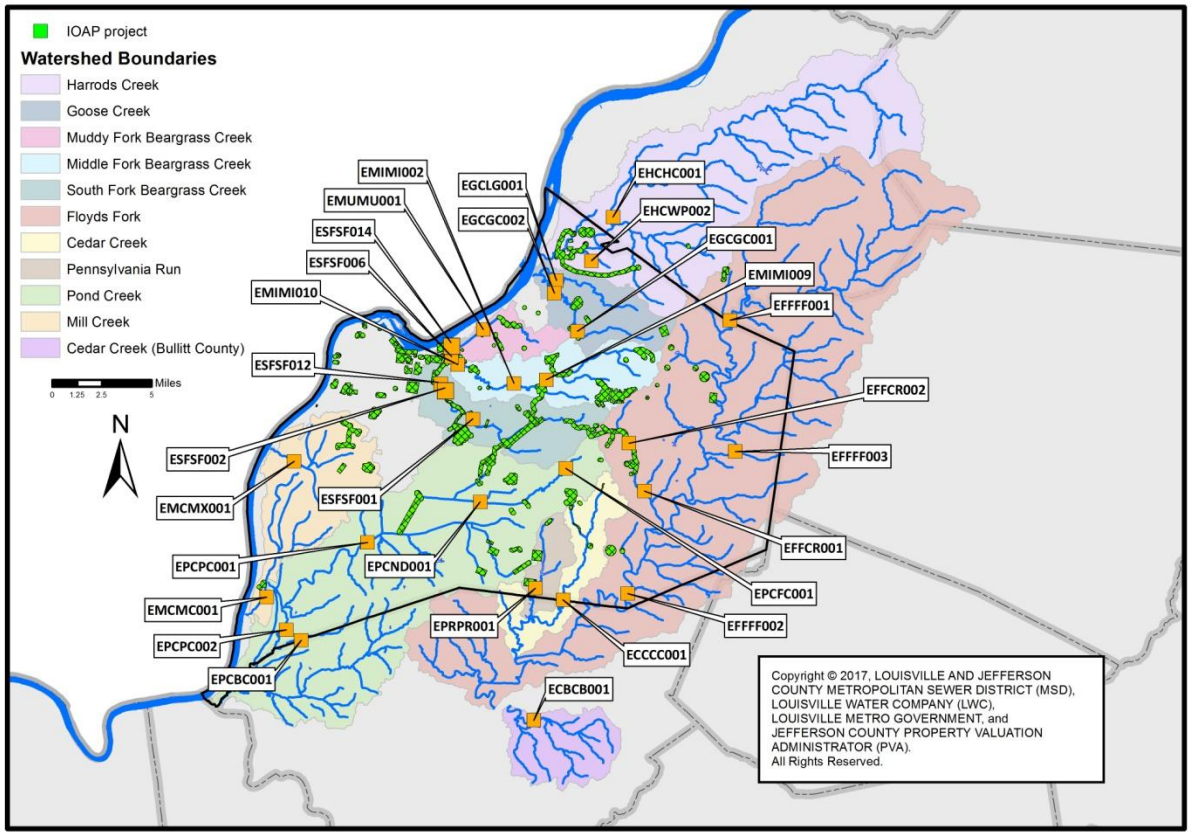


Table 5.2.1 lists monitoring sites and data collected at each site and the descriptions of each data set are provided in the sections that follow.

Table 5.2.1 – Long-Term Monitoring Network Locations

Number	MSD Site #	USGS Gauge	LTMN Location	Flow	Sonde	WQ	Biological (2015)
1	EHCHC001	03292470	Harrods Creek at Covered Bridge Road	1	1	1	1
2	EHCWP002	No Gauge	Wolf Pen Branch at 8200 Wolf Pen Branch Road (3)	No Gauge	1	1	1
3	EGCGC001	03292474	Goose Creek at Old Westport Road	1	1	1	1
4	EGCGC002	03292475	Goose Creek at US 42	1	1	1	1
5	EGCLG001	03292480	Little Goose Creek at US 42	1	1	1	1
6	EMUMU001	03293530	Muddy Fork of Beargrass Creek at Mockingbird Valley Road	1	1	1	1
7	EMIMI009	No Gauge	Middle Fork of Beargrass Creek at Browns Lane (3)	No Gauge	1	1	1
8	EMIMI002	03293000	Middle Fork of Beargrass Creek at Old Cannons Lane	1	1	1	1
9	EMIMI010	03293500	Middle Fork of Beargrass Creek at Lexington Road	1	1	1	1
10	ESFSF001	03292500	South Fork of Beargrass Creek at Trevilian Way	1	1	1	1
11	ESFSF002	03292550	South Fork of Beargrass Creek at Schiller Avenue Ramp (1)	Offline	Offline	Offline	1
12	ESFSF012	03292555	South Fork of Beargrass Creek at East Breckinridge Street (2) (4)	1	1	1	No Data
13	ESFSF006	No Gauge	South Fork of Beargrass Creek at Brownsboro Road (3)	No Gauge	1	1	1
14	ESFSF014	03293510	Beargrass Creek at River Road	1	1	No Data	No Data
15	EFFFF001	03297900	Floyds Fork at Ash Avenue	1	1	1	1
16	EFFFF003	03298000	Floyds Fork at Old Taylorsville Road	1	1	1	1
17	EFFFF002	03298200	Floyds Fork at Bardstown Road	1	1	1	1
18	EFFCR002	03298135	Chenoweth Run #1 at Ruckriegel Parkway	1	1	1	1
19	EFFCR001	03298150	Chenoweth Run #1 at Gelhaus Lane	1	1	1	1
20	ECCCC001	03298250	Cedar Creek at Thixton Lane	1	1	1	1
21	EPRPR001	03298300	Pennsylvania Run at Mount Washington Road	1	1	1	1
22	EPCFC001	03301900	Fern Creek at Bardstown Road	1	1	1	1
23	EPCND001	03301940	Northern Ditch at Preston Highway	1	1	1	1
24	EPCPC001	03302000	Pond Creek at Manslick Road	1	1	1	1
25	EPCPC002	03302030	Pond Creek at Pendleton Road	1	1	1	1
26	EPCBC001	03302050	Brier Creek at Bear Camp Road	1	1	1	1
27	EMCMX001	03294550	Mill Creek Cutoff at Cane Run Road	1	No Sonde	1	1
28	EMCMC001	03294570	Mill Creek at Orell Road	1	1	1	1
29	ECBCB001	03297800	Cedar Creek at State Highway 1442	1	1	1	1
			Total	**25**	**27**	**27**	**27**

Notes
1. Flow, sonde and water quality sampling was temporarily discontinued at Schiller Avenue in Q4 2014
2. This site was established in October 2015 to replace ESFSF002 and 03292550 during a nearby construction project. This new location is about 0.9 miles downstream of 03292550.
3. Sonde not telemetered. Provisional data housed at MSD.
4. Gauge height monitored.

MS4 Permit Update: The Kentucky State Division of Water issued an updated MS4 permit that is effective from February 1, 2017, to January 31, 2022. Therefore, this report spans two permits. The monitoring requirements for each permit are shown on **Table 5.2.2**.

Table 5.2.2 – Monitoring Parameters in MS4 Permits

Monitoring Data Set	Permit Period 8/1/2011 to 2/1/2017	Permit Period 2/1/2017 to 1/31/2022
Stream Flow	Continuous monitoring at 25 sites	Continuous monitoring at 28 sites
Water Quality - Sonde	Continuous monitoring at 25 sites	Continuous monitoring at 28 sites
Water Quality – Quarterly (1)	Ambient monitoring for **Total Suspended Solids (TSS);** Total Dissolved Solids (TDS); Fecal Coliform; **E. coli; Oil and Grease**; Biochemical Oxygen Demand (BOD5); Chemical Oxygen Demand (COD); Lead, Total Recoverable; Cadmium, Total Recoverable; **Copper, Total Recoverable**; Zinc, Total Recoverable; Dissolved Phosphorus; Total Phosphorus; Total Ammonia Nitrogen (as N); Total Kjeldahl Nitrogen (as N); Nitrate plus Nitrite Nitrogen (as N); and **pH**	Ambient monitoring for Total Suspended Solids (TSS); E. coli; Total Nitrogen (as N), Oil and Grease, Copper, Total Recoverable and pH. (2)
Recreation Season Bacteria	5/month (May-October) - Recreational monitoring for fecal Coliform. 1/month (May-October) – Recreational monitoring for E. coli.	5/month (May-October) - Recreational monitoring for E. coli. (3)
Biological Communities & Habitat	Once Every Two Years – Biological sampling and/or evaluation rotating to include: algae, fish, and benthic macro invertebrates.	Once Every Two Years – Biological sampling and/or evaluation rotating to include: algae, fish, and benthic macro invertebrates.

Notes
1. Water quality parameters in bold were included in 2011, and 2017, permits.
2. Total Nitrogen is calculated as the sum of Nitrate plus Nitrite Nitrogen and Total Kjeldahl Nitrogen
3. Recreation season monitoring is focused on E. coli since the fecal coliform criteria will no longer apply beginning November 1, 2019.

This chapter focuses on the permit parameters required in the new MS4 permit with minor exceptions for exceedances detected in previously required permit parameters.

Flow: USGS collects stream flow measurements every 5 to 15 minutes from 24 gauges and gauge height at one (1) site. USGS performs a quality assurance review and publishes final flow data and stream statistics. Provisional and final data are available for download on the USGS National Water Information System (NWIS) website: *http://waterdata.usgs.gov/ky/nwis*.

In addition to instantaneous flow data, USGS provides a variety of flow statistics such as long term daily and monthly mean flow, which are computed using all available final data for the duration for which the gauge has been active. For this report, daily flow data and long term monthly mean data were analyzed to characterize flow on the day of sample collection as wet or dry. Final daily mean flow data were not available for this report. Provisional flow data were used to evaluate wet and dry conditions between July 1, 2016, and June 30, 2017.

Continuous Monitoring: Temperature, dissolved oxygen, pH, and specific conductance data are collected by MSD and USGS at 27 cooperatively operated monitoring locations using probes called sondes. At 24 sites, provisional water quality data is sent via telemetry to USGS every 15 minutes. Data for the three sondes operated by MSD are stored in provisional status at MSD. Up to 35,136 records per year were collected for each parameter at each station during the year. Sondes are cleaned, calibrated, and maintained on a regular basis by MSD staff, which is trained annually by USGS.

USGS performs a quality assurance (QA) review of the provisional data collected during the past water year for the 24 telemetered sondes. Based on this review, some records may be adjusted or deleted due to issues with the monitoring probes such as fouling, sedimentation, and probe drift. A Memorandum of Understanding between MSD and USGS was signed on June 17, 2016, that includes a final data deliverables schedule.

Final sonde data collected between October 1, 2015, and September 30, 2016, were summarized and compared to water quality criteria for temperature, dissolved oxygen, and pH. Final specific conductance data for this time period were summarized. Final data are provided in **Appendix 5A and 5B – Continuous Monitoring Data**.

Provisional continuous monitoring data collected between October 1, 2016, and June 30, 2017, are summarized in **Appendix 5A and 5B – Continuous Monitoring Data**. The number of records and average concentration were calculated, but comparison to water quality criteria is not performed until final data is available. Final data collected between October 1, 2016, and June 30, 2017, will be incorporated into the next MS4 Annual Report. Provisional and final sonde monitoring data are available for download from USGS via the NWIS website: *http://waterdata.usgs.gov/ky/nwis*.

Quarterly Monitoring: Between July 1, 2016, and June 30, 2017, MSD collected quarterly water quality samples in July 2016, October 2016, February 2017, and April 2017. The 27 LTMN sites were sampled over a consecutive four-day period during each quarterly sampling event. Samples are collected by trained MSD staff and analyzed by MSD's laboratory using EPA approved methods. Samples were analyzed for the water quality parameters shown in **Table 5.2.2**. The analysis for comparing water quality criteria is discussed in **Section 5.3 – Data Analysis**. Quarterly data quality meetings with the MSD sampling staff, the laboratory, and the data analysis section has improved the timeliness and quality of the sample data. Quarterly monitoring data and analytical method information are provided in **Appendix 5C – Quarterly Monitoring Data**.

Bacteria Monitoring: Trained MSD staff collected and analyzed five *E. coli* samples within a 30-day period during the six-month recreational season in 2016 (July to October) and 2017 (May and June). The sample period coincides with the MS4 reporting period. *E. coli* samples were analyzed in MSD's laboratory using EPA approved methods. Bacteria monitoring data and analytical method information are provided in **Appendix 5C – Quarterly Monitoring Data and Appendix 5D – Raw LIMS Data**.

Biological Monitoring: MSD collected biological community samples using protocols developed by EPA and KDOW. Benthic macroinvertebrate communities and habitat were

sampled in May 2015. Concurrent data for stream temperature, dissolved oxygen, pH, and conductivity were also collected. Fish communities and aquatic habitat data were collected in September and October 2015. MSD collected algal samples in September and October 2015, using KDOW protocols. Algal communities were collected on tiles to provide a consistent way to collect samples at each site. Communities were evaluated on tiles collected at least 15 days after the tiles were placed at each site. Biological and habitat results reported in this monitoring chapter were derived from the 2016 Water Quality Synthesis Report, available from MSD's website: *www.louisvillemsd.org/WaterQuality*. Fish, benthic macroinvertebrate, algae community samples and aquatic habitat assessments were collected as scheduled in 2017, and will be reported in the PY2 MS4 Annual Report.

5.3 DATA ANALYSIS

Final water quality data collected via continuous monitoring, quarterly monitoring, and recreational season bacteria monitoring were compared to the applicable numeric water quality criteria shown in **Table 5.3.1**. This table is consistent with water quality criteria in Kentucky Surface Water Standards regulations found in 401 KAR 10:031 and available at: *http://lrc.ky.gov/kar/401/010/031.htm*.

Table 5.3.1 – Water Quality Criteria

Parameter	Units	Water Quality Criteria
Temperature	C	31.7 C (instantaneous maximum)
Dissolved Oxygen	mg/l	4.0 mg/l (instantaneous minimum), 5.0 mg/l (24-hour average)
pH	Std. units	6.0 to 9.0
Escherichia coli	MPN/100 ml	Geometric mean of 5 samples collected within 30 day period does not exceed 130 colonies/100 ml and less than 20% of samples exceed 240 colonies/100 ml
Copper	ug/l	Acute and Chronic Aquatic Life: calculated per equations in 401 KAR 10:031

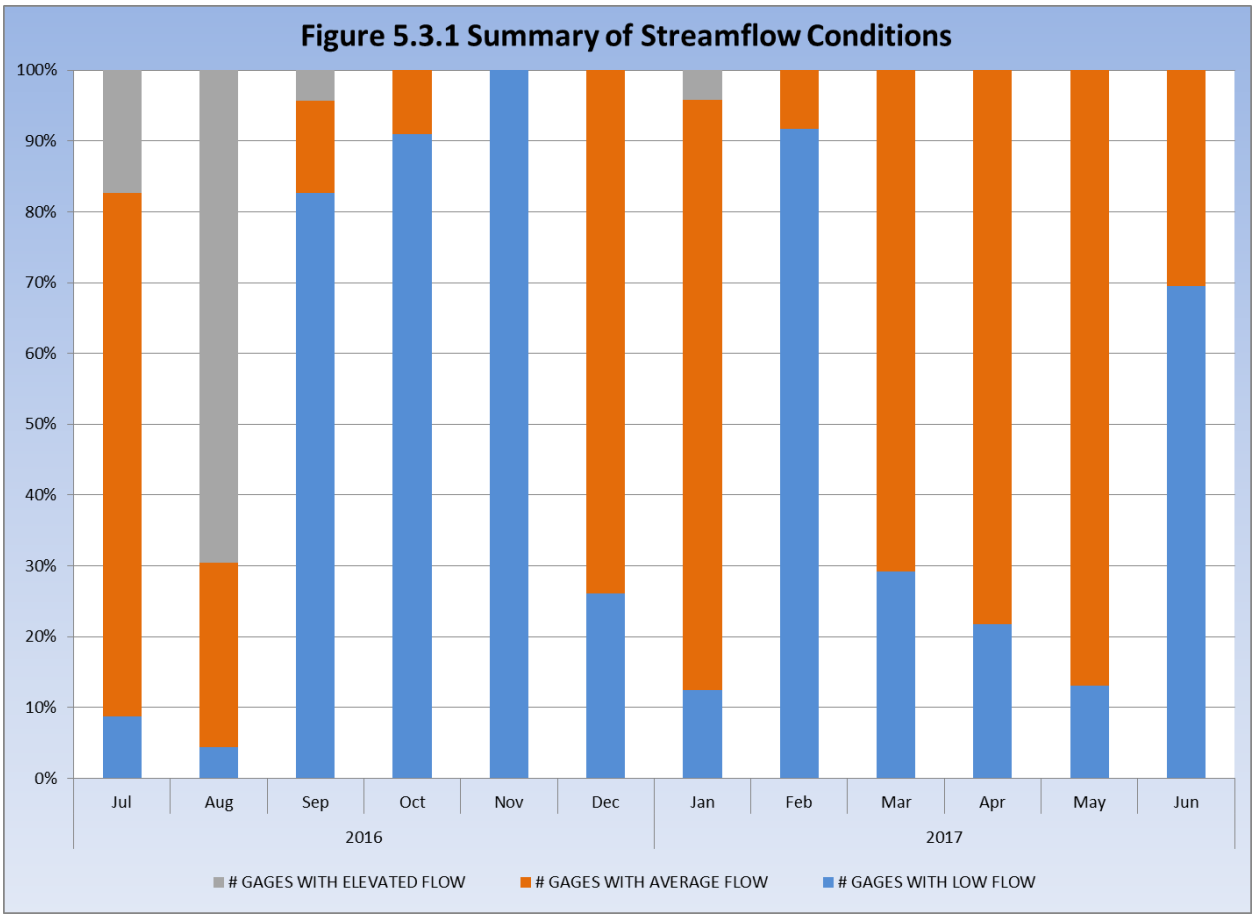
The remaining water quality parameters specified in the permit do not have a numeric water quality criterion and are instead managed through a narrative criterion or are monitored to provide a more thorough characterization of water quality. For parameters that do not have a numeric water quality criterion, the data are summarized in terms of range and average conditions. Raw data is provided in **Appendix 5A and 5B – Continuous Monitoring Data and 5D – Raw LIMS Data**.

Flow Characterization: Daily average flow data was collected between July 1, 2016, and June 30, 2017, and was used to characterize stream flow on the day of sample collection for this report. If the average stream flow on the day of sample collection was at least 50% greater than the long term monthly average stream flow, the sample was characterized as being collected under wet conditions; all other samples were characterized as being collected under dry conditions. For three locations, adjacent flow gauges were used to characterize flow on the day of sample collection as shown on Table 5.3.2.

Table 5.3.2 – Proxy Gauges for LTMN Sites Without Flow Gauges

LTMN Site without Flow Gauge	Proxy Flow Gauge
EHCWP002: Wolf Pen Branch at 8200 Wolf Pen Branch Road	**03292480**: Little Goose Creek at US 42
EMIMI009: Middle Fork of Beargrass Creek at Browns Lane	**03293000**: Middle Fork of Beargrass Creek at Old Cannons Lane
ESFSF006: South Fork of Beargrass Creek at Brownsboro Road	**03293500**: Middle Fork of Beargrass Creek at Lexington Road (1)
Notes: 1. Beargrass Creek at River Road (USGS Gauge # 03293510) is closer to Site ESFSF006, however Ohio River backwater strongly influences this site. Therefore, Gauge 03293500 was used as a more appropriate proxy site.	

Monthly stream flow was characterized to provide an overview of stream flow conditions for the report period. For 24 sites with sufficient flow data, the number of months during which stream flow was classified as low, average, and elevated was characterized by comparing average monthly stream flows during the report year with the long term monthly average stream flow. Stream flow was classified as “low” for months in which average stream flow was more than 50% below average monthly stream flow. Stream flow was characterized as “elevated” for months in which average stream flow was more than 50% higher than average monthly stream flow. Remaining stream flows were characterized as “average”. Results shown on **Figure 5.3.1** highlight the drier conditions during September 2016, October 2016, November 2016, February 2017, and June 2017. Wetter conditions were prevalent in August 2016. Average conditions were prevalent for the remainder of the report year.



Continuous Monitoring: Final dissolved oxygen data collected between October 1, 2015, and September 30, 2016, were compared to water quality criteria and results are shown in **Figure 5.4.1**. Dissolved oxygen data were aggregated on a daily basis for days that had at least 88 of a possible 96 records. USGS utilizes at least 88 records per day to classify a daily record as "complete". For each day with at least 88 records, the number of values less than 4.0 milligrams per liter (mg/l) dissolved oxygen and the daily average dissolved oxygen concentration were computed. Analyzed data are provided in **Appendix 5A and 5B – Continuous Monitoring Data**. For pH and specific conductance, the percent complete for final values and range of values was calculated. Final pH values were compared to water quality criteria.

For provisional data, the total number of records and average value for each sonde are presented. Final data between October 1, 2016, and June 30, 2017, is scheduled to become available by June 30, 2018, and will be analyzed and presented in the PY2 MS4 Annual Report. For this time period, the maximum number of records was 26,208 readings per parameter.

Quarterly Monitoring: Data were reviewed for quality assurance purposes, and final data from quarterly samples collected at 27 LTMN sites were compared to numeric criteria for pH and copper. For metals samples, hardness at the time of sample collection was used to calculate hardness-dependent criteria using equations in the Kentucky Surface Water Standards. If hardness data were not available, hardness from a nearby LTMN site was used to calculate hardness-dependent criteria. Sample concentrations were compared to the acute and chronic aquatic life criterion for all metals.

Bacteria Monitoring: Data were reviewed for quality assurance, and final data were compared to applicable criteria for *E. coli* bacteria during the recreational season (May 1 to October 31). *E. coli* bacteria results are reported on a monthly basis during the recreational season and on a quarterly basis for the remainder of the year.

Biological Monitoring: Narrative ratings that include “excellent”, “good”, “fair”, “poor” and “very poor” were developed by KDOW to characterize fish, benthic macroinvertebrate, algal communities as well as habitat quality. The narrative ratings are adapted for watershed size and ecological region of the state. LTMN sites were classified as “headwaters”, “wadeable” or “boatable” using these protocols. All LTMN sites except two are located in the Bluegrass ecological region. Brier Creek at Bear Camp Road and Pond Creek at Manslick Road are located in the Pennyroyal ecological region. Standard operating procedures (SOPs) documenting the narrative rating system is available through KDOW at the following website: *http://water.ky.gov/Pages/SurfaceWaterSOP.aspx*.

MSD collected biological community samples using protocols developed by EPA and KDOW. Fish community samples and habitat quality data were collected in September and October 2015. Concurrent data for stream temperature, dissolved oxygen, pH, and conductivity were also collected. Benthic macroinvertebrate community and aquatic habitat data were collected in May and June 2015. MSD collected algal samples in September and October 2015, using KDOW protocols. Algal communities were collected on tiles over a 15-day period to provide a consistent way to collect samples at each site. Benthic macroinvertebrate, algae, fish, and habitat results are summarized by watershed in **Section 5.5 – Watershed Summaries** of this report. All biological community sample results referenced were derived from the 2016 State of the Streams Report, included as **Appendix 2.7.3 – 2016 State of the Streams Report**.

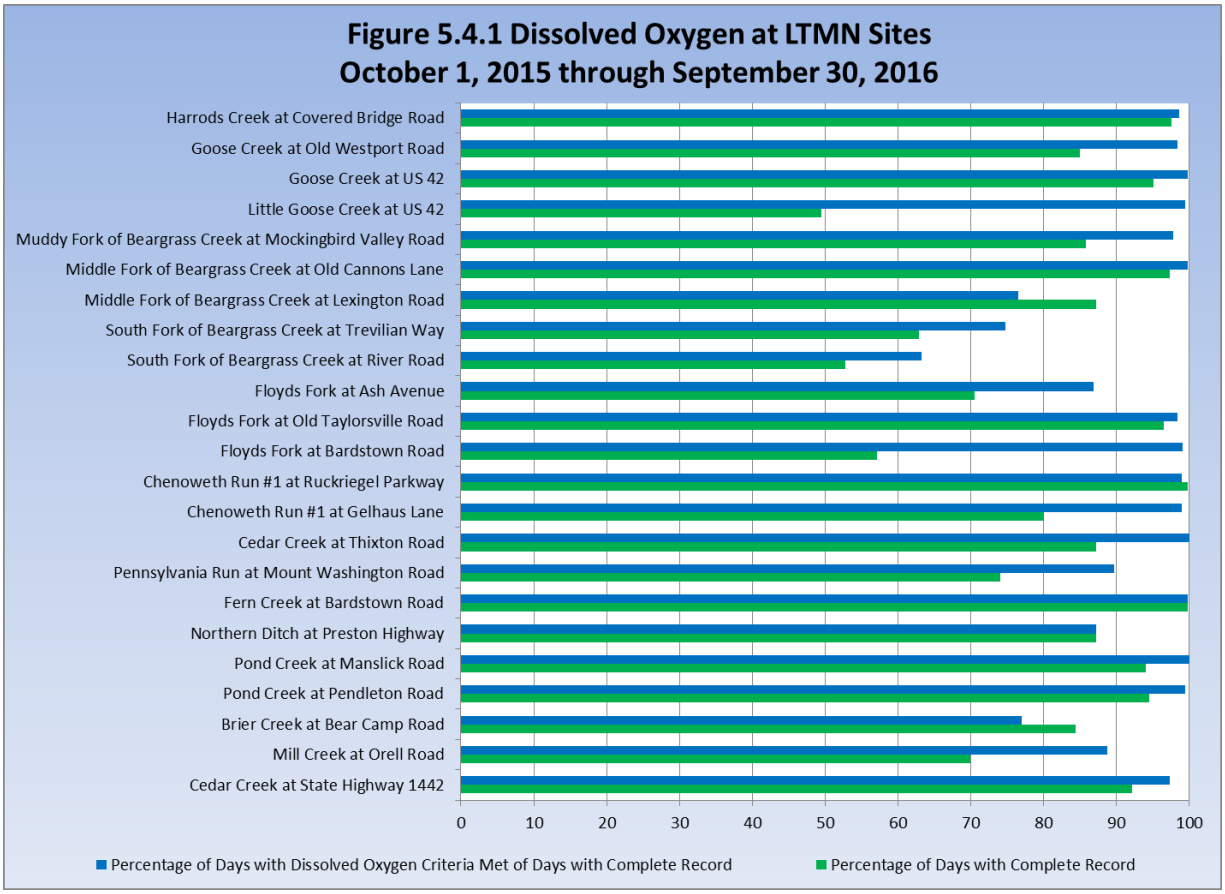
5.4 WATER QUALITY SUMMARY

Temperature: Water temperature is an important parameter for the overall health of a stream, since thermal loading can stress fish and other forms of aquatic life. Final continuous monitoring data collected between October 1, 2015, and September 30, 2016, were analyzed for temperature. The final temperature records ranged from 75% complete (26,280 records) to 100% complete (35,136 records) at 24 sites with continuous monitoring sondes, and most were above 90%. The temperature criterion of 31.7 degrees C was met 99% of the time in available data.

Dissolved Oxygen: Dissolved oxygen is an important indicator of the overall health of a stream. Water with low dissolved oxygen can stress fish and other forms of aquatic life. Final continuous monitoring data collected between October 1, 2015, and September 30, 2016, were

analyzed for dissolved oxygen by compiling the 15-minute data to a daily record. A daily record was considered complete if at least 88 of a possible 96 records per day were available.

The final dissolved oxygen record ranged from 49% complete (18,900 records) to 99% complete (34,964 records) at 23 sites with continuous monitoring sondes. Average concentrations of dissolved oxygen at the 23 sites with sondes ranged between 6.8 mg/l and 10.0 mg/l. However, low, and high readings were also observed, ranging from 0 mg/l to 22.0 mg/l. The number of days with complete records that met the criteria (i.e., no dissolved oxygen readings below 4.0 mg/l and average concentration above 5.0 mg/l) ranged between 63% and 100%. Results are shown in **Figure 5.4.1**. South Fork of Beargrass Creek at Schiller Avenue was taken off-line in 2015; therefore, it was not included in these statistics. Three sites (Wolf Pen Branch at 8200 Wolf Pen Branch Road, Middle Fork of Beargrass Creek at Browns Lane, and South Fork of Beargrass Creek at Brownsboro Road) are not telemetered. These sites produce provisional data (not finalized by USGS), and are not included in these statistics. South Fork of Beargrass Creek at East Breckinridge Street does not yet have USGS telemetry installed, so it is not included in these statistics. Mill Creek Cutoff at Cane Run Road does not have a sonde installed, and is therefore not included in these statistics. Sites with lower percentages of complete records are being evaluated in concert with USGS for relocation or modification.



pH: The degree to which a stream is acidic or alkaline is measured using a pH scale measured in standard units, which ranges from very acidic (pH of 0) to neutral (pH of 7) to very alkaline (pH of 14). Water that is too acidic or too alkaline stresses aquatic life. Final continuous monitoring data collected between October 1, 2015, and September 30, 2016, were analyzed for pH and results are shown in **Table 5.4.1**. The final pH record ranged from 63% to 99.9% complete at the 20 sites with final records. Most of the data is in provisional status for four additional sites. The pH criteria were met for more than 95% of the available record. The pH ranged from 6.2 to 9.9 Standard Units. All exceedances of the criteria were for elevated pH, indicating alkaline conditions.

Table 5.4.1 – Continuous pH Data at LTMN Sites

MSD Site #	Name	Percent Complete	Minimum pH	Maximum pH	Percent Criteria Met
EHCHC001	Harrods Creek at Covered Bridge Road	99.9%	7.50	9.00	100.0%
EGCGC001	Goose Creek at Old Westport Road	99.9%	7.30	9.30	97.0%
EGCGC002	Goose Creek at US 42	68.2%	7.60	9.20	100.0%
EGCLG001	Little Goose Creek at US 42	63.1%	7.70	9.20	97.7%
EMUMU001	Muddy Fork of Beargrass Creek at Mockingbird Valley Road	83.4%	6.70	8.20	100.0%
EMIMI002	Middle Fork of Beargrass Creek at Old Cannons Lane	91.3%	7.30	8.70	100.0%
EMIMI010	Middle Fork of Beargrass Creek at Lexington Road	97.7%	7.00	8.70	100.0%
ESFSF001	South Fork of Beargrass Creek at Trevilian Way	92.3%	6.90	8.80	100.0%
ESFSF014	Beargrass Creek at River Road	80.9%	6.50	9.00	100.0%
EFFFF002	Floyds Fork at Bardstown Road	81.9%	6.70	8.30	100.0%
EFFCR002	Chenoweth Run #1 at Ruckriegel Parkway	99.9%	7.00	8.90	100.0%
EFFCR001	Chenoweth Run #1 at Gelhaus Lane	86.2%	7.60	9.40	98.6%
ECCCC001	Cedar Creek at Thixton Lane	94.5%	7.20	9.30	99.0%
EPRPR001	Pennsylvania Run at Mount Washington Road	99.9%	6.70	9.90	95.3%
EPCFC001	Fern Creek at Bardstown Road	99.9%	6.80	8.80	100.0%
EPCND001	Northern Ditch at Preston Highway	92.8%	6.80	8.70	100.0%
EPCPC001	Pond Creek at Manslick Road	95.4%	6.70	9.00	100.0%
EPCPC002	Pond Creek at Pendleton Road	94.9%	6.90	9.00	100.0%
EPCBC001	Brier Creek at Bear Camp Road	99.9%	6.20	7.70	100.0%
EMCMC001	Mill Creek at Orell Road	79.1%	6.30	9.60	99.8%

Data from the following sites are being reviewed by USGS and was not included in **Table 5.4.1**: ESFSF012 South Fork Beargrass Creek at East Breckinridge Street; EFFFF001 Floyds Fork at Ash Avenue; EFFFF003 Floyds Fork at Old Taylorsville Road; ECBCB001 Cedar Creek at State Highway 1442. Any necessary adjustments to site location and setup to enhance data collection quality are being coordinated with the United States Geological Survey (USGS) on an on-going basis.

Quarterly pH data were compared to water quality criteria. All 103 field pH records collected during quarterly sampling between July 1, 2016, and June 30, 2017, met the water quality criteria for pH. Values for pH ranged between 6.69 and 8.75, and pH was similar under wet and dry conditions, as shown in **Table 5.4.2**.

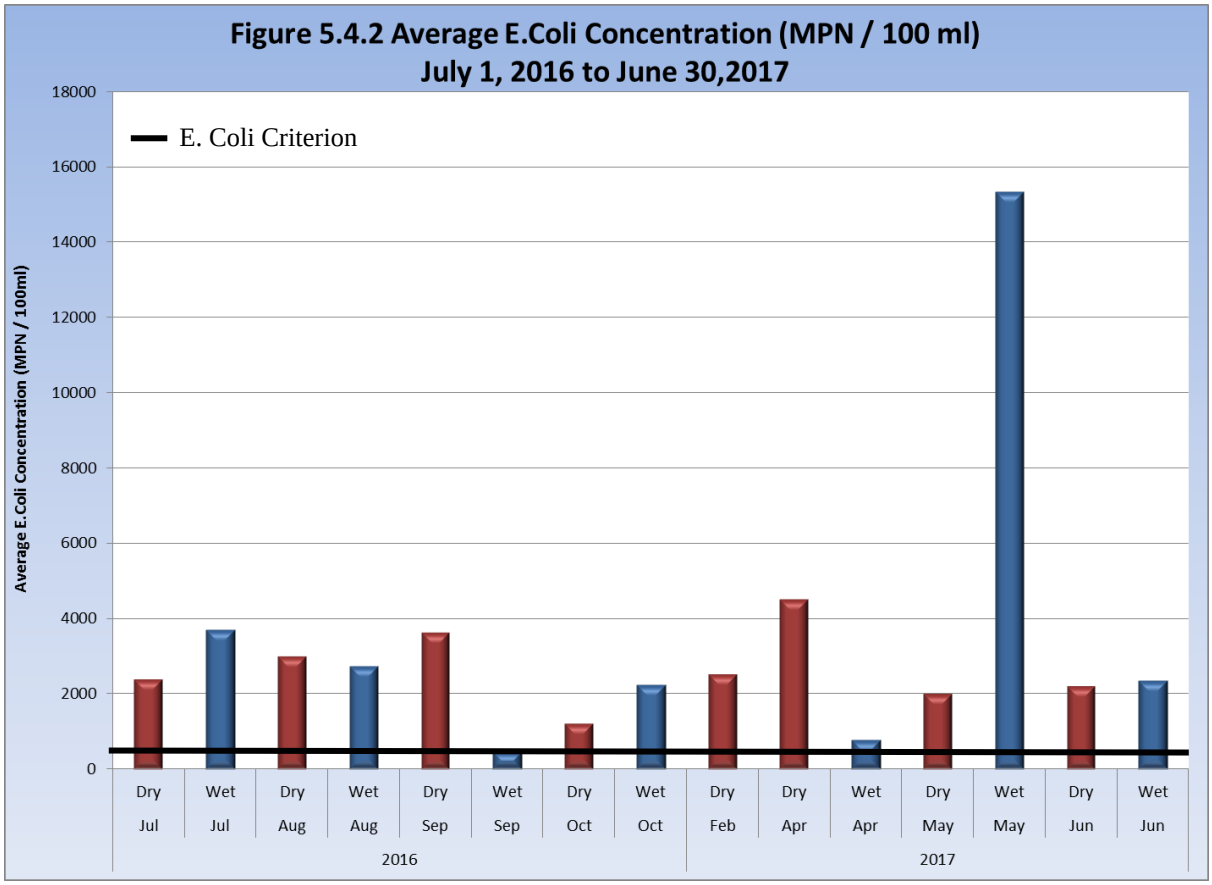
Table 5.4.2 – LTMN Results for pH

Parameter	Wet/Dry	Sample Count (7/1/2016-6/30/2017)	Minimum pH (SI Units)	Maximum pH (SI Units)
Field pH	Dry	98	6.69	8.75
	Wet	5	7.40	8.08
Total		103		

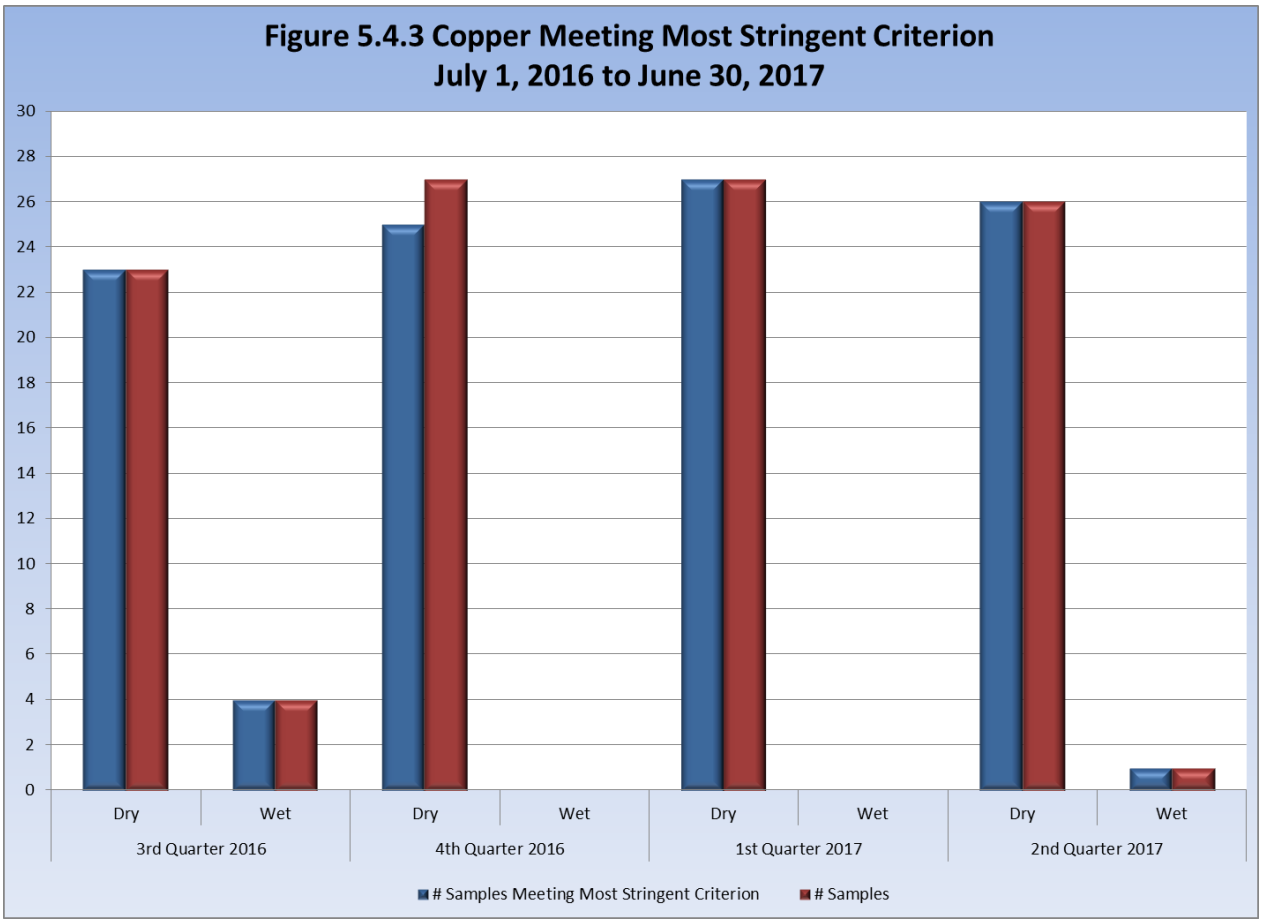
Bacteria: *E. coli* bacteria occur in the digestive tracts of humans and warm-blooded animals. *E. coli* bacteria do not reproduce outside the bodies of humans and animals. Thus, *E. coli* bacteria provide an indicator of fecal pollution that is not complicated by reproduction outside the hosts' digestive tracts. *E. coli* bacteria concentrations are measured as "Most Probable Number" (MPN) of bacteria in a 100 milliliter (ml) sample. As a reference, 100 ml is about 3.4 ounces.

Trained MSD staff collected and analyzed five *E. coli* samples within a 30-day period during the six-month recreational season in 2016 (July to October), and in 2017 (May and June). The sample period coincides with the MS4 reporting period. During the remainder of the year, one sample per quarter was collected in October 2016, January 2017, and April 2017. *E. coli* samples were analyzed in MSD's laboratory using EPA approved methods. Bacteria monitoring data and analytical method information are provided in **Appendix 5C – Quarterly Monitoring Data** of this report.

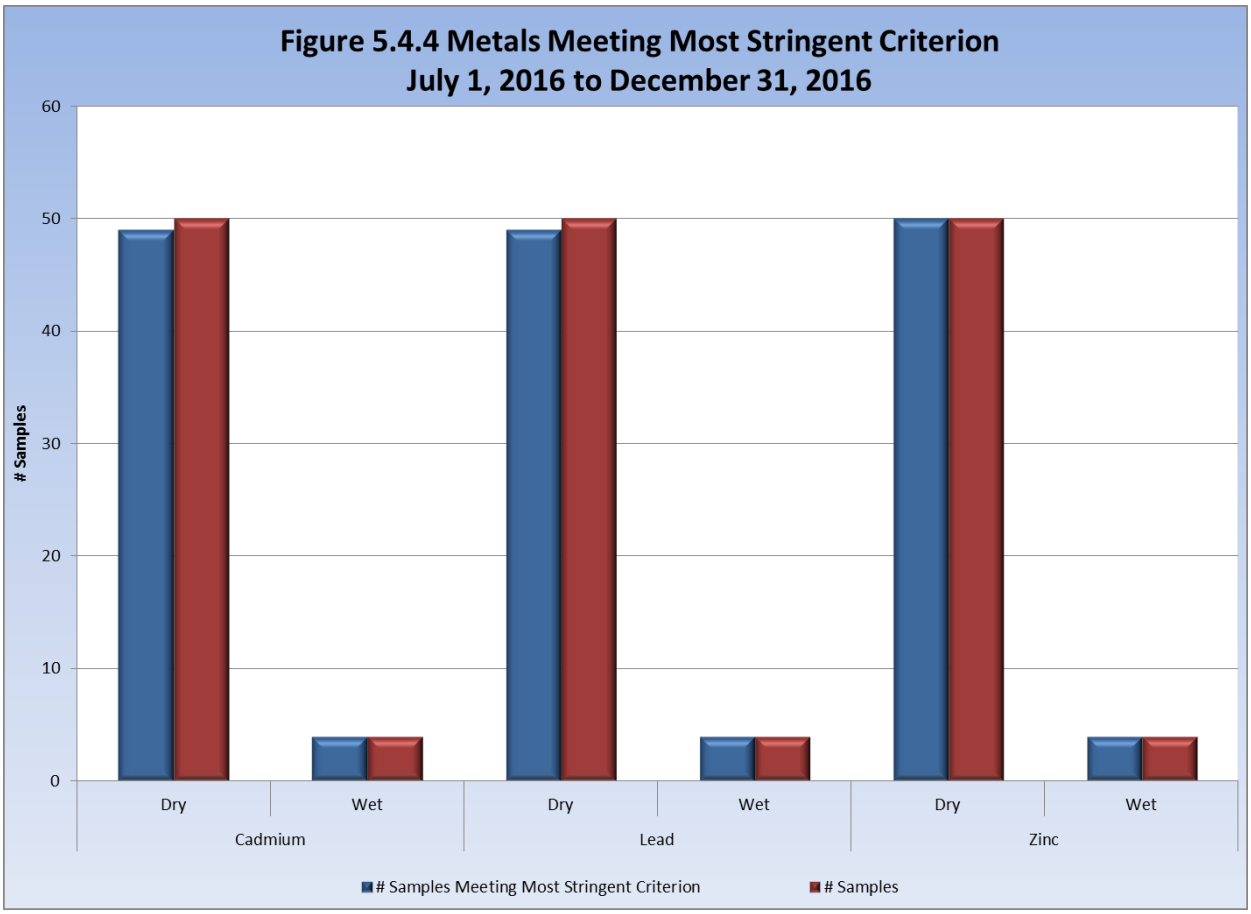
Data were reviewed for quality assurance and final data were analyzed for this report. During the reporting period, 865 *E. coli* bacteria samples were collected at the 27 LTMN monitoring sites, including 757 samples collected under dry conditions and 108 collected under wet conditions. *E. coli* bacteria concentrations ranged from 2 MPN/100 ml to 242,000 MPN/100 ml and average concentrations are summarized on **Figure 5.4.2**. This graph highlights the highly variable nature of bacteria concentrations and the tendency for concentrations to be higher when stream flows were higher. Per program objectives, exceedances to E. Coli criteria will be reviewed over time and programmatic adjustments will be made on an as-needed basis.



Metals: Between July 1, 2016, and June 30, 2017, 108 quarterly samples were analyzed for total recoverable copper, including 103 under dry conditions and five under wet conditions. Concentrations ranged from less than the Minimum Detection Limit to 18 parts per billion. Acute and chronic aquatic life criteria were met in 98% of the copper samples. One sample collected under dry conditions in Harrods Creek at Covered Bridge Road (EHCHC001) in October 2016, had an elevated copper concentration (18 ug/l) that exceeded the chronic aquatic life criterion of 17.37 ug/l. One sample collected under dry conditions at Fern Creek at Bardstown Road (EPCFC001) in October 2016, had an elevated copper concentration (14 ug/l) that exceeded the chronic aquatic life criterion of 12.97 ug/l. Copper values are represented in **Figure 5.4.3**. Per program objectives, exceedances to Copper criteria will be reviewed over time and programmatic adjustments will be made on an as-needed basis.



Between July 1, 2016, and December 31, 2016, 54 quarterly samples were analyzed for cadmium, lead, and zinc for all sites. A cadmium exceedance occurred during the October sample in 2016, at the Muddy Fork of Beargrass Creek at Mockingbird Valley Road (EMUMU001). There was also a lead exceedance during the October 2016, sample from Fern Creek at Bardstown Road (EPCFC001). These exceedances can be seen below in **Figure 5.4.4**. Per program objectives, exceedances to Metals criteria will be reviewed over time and programmatic adjustments will be made on an as-needed basis.



Monitoring results for parameters that do not have numeric water quality criteria are summarized in **Tables 5.4.3** and **5.4.4**. In general, concentrations under wet and dry conditions were similar. The concentrations documented on the following table are not unusual for streams in developed areas.

Table 5.4.3 – Summary for Parameters Without Numeric Water Quality Criteria

Parameter	Wet/Dry	Sample Count (7/1/2016-9/30/2016)	Minimum Concentration (mg/l)	Average Concentration (mg/l)	Maximum Concentration (mg/l)
Oil & Grease (Total)	Dry	103	1.00	1.26	8.00
	Wet	5	1.00	1.00	1.00
Field pH	Dry	81	6.69	7.73	8.75
	Wet	4	7.48	7.83	8.08
Total Nitrogen (TKN)	Dry	103	0.15	0.49	2.10
	Wet	5	0.32	0.50	0.79
Total Suspended Solids	Dry	103	1.50	10.50	151.00
	Wet	5	6.00	34.20	90.00

Specific conductance is a measure of the ability of water to conduct electricity due to the presence of salts, which can stress aquatic life when elevated. Sources include natural geology, road salt application, wastewater discharges, and pavement weathering. The final specific conductance record ranged from 62% to 99.9% complete at the 20 sites with final records. Most of the data is in provisional status for four additional sites. Specific conductance ranged from 54 to 4,430 micro-siemens per centimeter (uS/cm).

Table 5.4.4 – Continuous Monitoring Specific Conductance Results

MSD Site #	Site Name	Specific Conductance (uS/cm)			
		% Complete	Minimum	Average	Maximum
EHCHC001	Harrods Creek at Covered Bridge Road	99.7%	172	478	656
EGCGC002	Goose Creek at US 42	99.3%	123	575	892
EGCLG001	Little Goose Creek at US 42	62.6%	145	701	1650
EMUMU001	Muddy Fork of Beargrass Creek at Mockingbird Valley Road	93.3%	75	774	1750
EMIMI002	Middle Fork of Beargrass Creek at Old Cannons Lane	97.9%	83	691	2330
EMIMI010	Middle Fork of Beargrass Creek at Lexington Road	95.5%	83	669	1930
ESFSF001	South Fork of Beargrass Creek at Trevilian Way	99.3%	93	665	4430
ESFSF014	Beargrass Creek at River Road	69.5%	160	686	1800
EFFFF001	Floyds Fork at Ash Avenue	83.6%	149	488	694
EFFFF003	Floyds Fork at Old Taylorsville Road	94.8%	171	527	737
EFFFF002	Floyds Fork at Bardstown Road	93.4%	139	548	867
EFFCR002	Chenoweth Run #1 at Ruckriegel Parkway	99.9%	76	823	4050
EFFCR001	Chenoweth Run #1 at Gelhaus Lane	86.2%	79	689	2610
ECCCC001	Cedar Creek at Thixton Lane	99.3%	71	679	1180
EPRPR001	Pennsylvania Run at Mount Washington Road	99.4%	89	480	806
EPCFC001	Fern Creek at Bardstown Road	99.0%	72	749	2300
EPCND001	Northern Ditch at Preston Highway	98.2%	117	638	1400
EPCPC001	Pond Creek at Manslick Road	96.9%	107	614	2910
EPCBC001	Brier Creek at Bear Camp Road	98.1%	68	274	465
EMCMC001	Mill Creek at Orell Road	81.4%	54	245	891

Data from the following sites is being reviewed by USGS and was not included in **Table 5.4.4**: EGCGC001 Goose Creek at Old Westport Road; ESFSF012 South Fork Beargrass Creek at East Breckinridge Street; EPCPC002 Pond Creek at Pendleton Road; ECBCB001 Cedar Creek at State Highway 1442. Data from the following sites will remain provisional, and is not included in these statistics: EHCWP002 Wolf Pen Branch at 8200 Wolf Pen Branch Road (not telemetered), EMIMI009 Middle Fork of Beargrass Creek at Browns Lane (not telemetered), ESFSF006 South Fork of Beargrass Creek at Brownsboro Road (not telemetered), and EMCMC001 Mill Creek Cutoff at Cane Run Road (no sonde). ESFSF002 South Fork of Beargrass Creek at Schiller Avenue was taken offline in 2015, and is not included in these statistics.

Wet Weather Sampling: MSD's updated Stormwater Permit requires sampling of three wet weather events during the permit term of February 1, 2017, to January 31, 2022. MSD has defined a wet weather event based on at least 48 hours of dry conditions prior to sampling and

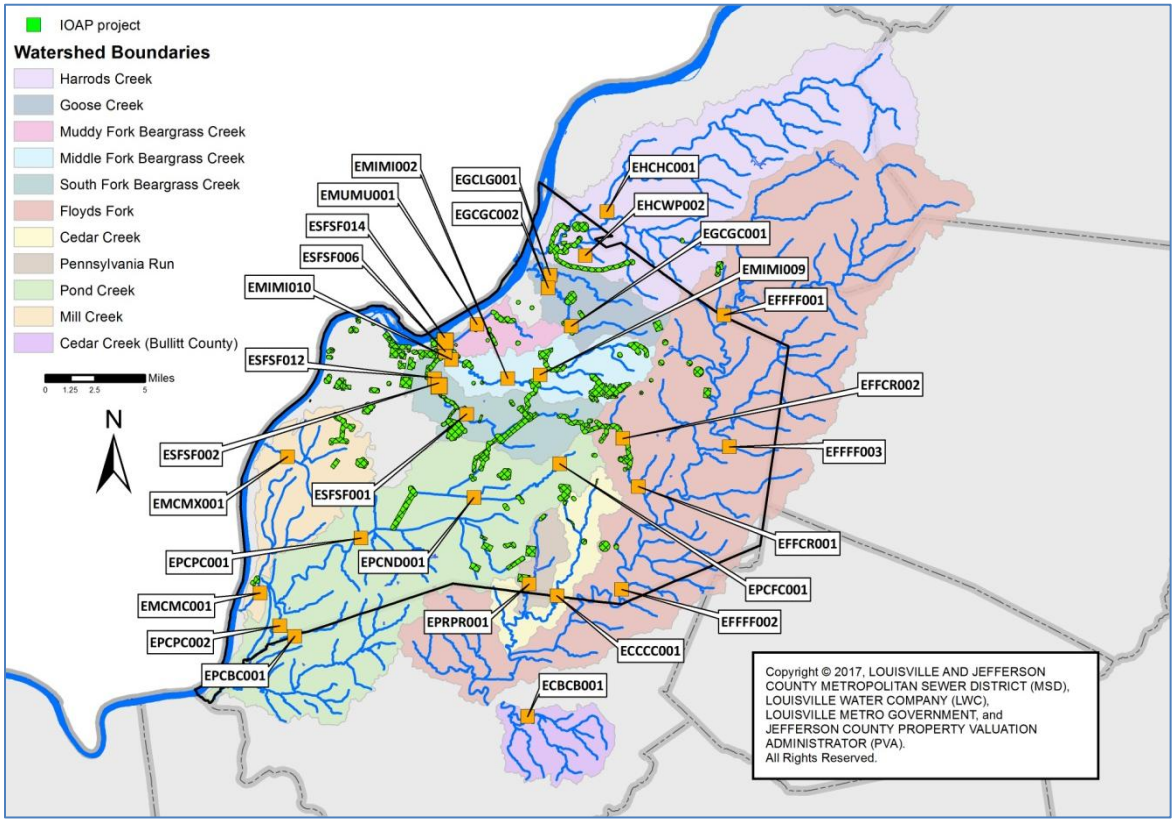
at least 0.5 inches of rain predicted in a 6-hour period across the service area. In 2017, a wet weather event was sampled between June 23, 2017, at 1:30 PM to June 25, 2017, at 3:30 AM. Samples were collected at Hour 0, 2, 4, 6, 12, 24, and 36 at 42 sites. The 42 sites include the 27 LTMN sites plus 15 additional sites in Middle Fork and South Fork Beargrass Creek above and below project areas. Thirteen two-person teams sampled Hours 0, 2, 4, and 6 and nine teams sampled Hours 12, 24, and 36. Samples were analyzed for fecal coliform, e. coli, ammonia nitrogen, nitrate, total Kjeldahl nitrogen, total nitrogen, ortho-phosphorus, total phosphorus, total suspended solids, BOD, COD, calcium, magnesium, hardness, cadmium, copper, lead, mercury, and zinc. A total of 6,346 water quality analyses were completed, including 229 analyses for each parameter.

Results show that concentrations of most parameters increased between Hour 0 and 6, then declined back to pre-storm levels. This is a typical pattern of water quality, highlighting that bacteria, nutrients, metals, and suspended solids are carried from land to the storm drainage system and then to streams during storm events. Fecal coliform and e. coli bacteria were elevated in some samples in all watersheds. Average bacteria concentrations were lower overall in Harrods Creek, Goose Creek, and Muddy Fork of Beargrass and higher overall in Middle Fork and South Fork of Beargrass Creek. The concentration of un-ionized ammonia met the water quality criteria in all but one sample. Metals were almost always lower than the acute aquatic life criterion. The criterion was exceeded in 2% or less of 229 analyses for cadmium, lead, mercury, and zinc. Copper was higher than the acute aquatic life criterion in 8.8% of analyses.

5.5 WATERSHED SUMMARIES

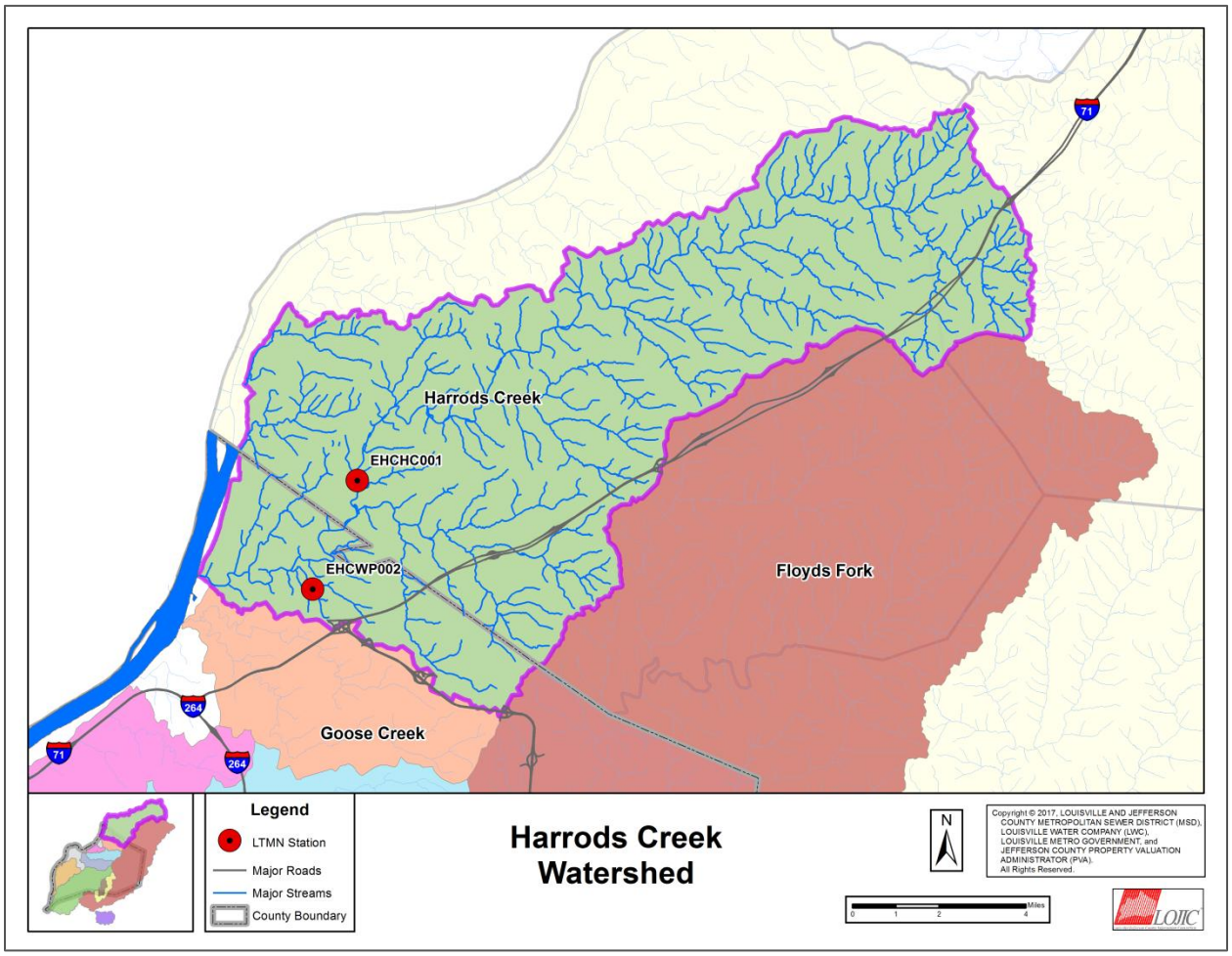
The following section provides a summary of water quality data for watersheds draining MSD's service area. A county-wide watershed map is shown again here as **Figure 5.5**.

Figure 5.5 – Watersheds of MSD Service Area



5.5.1 HARRODS CREEK WATERSHED

Figure 5.5.1 – Harrods Creek Watershed



Watershed Description: The small streams that eventually form Harrods Creek originate in Trimble County. Harrods Creek flows southwest through Oldham County and drains into the Ohio River in northern Jefferson County near Prospect. The Harrods Creek watershed drains approximately 92 square miles.

MSD has been monitoring water quality in Harrods Creek at Covered Bridge Road (EHCHC001) since 1999. There are 70.3 square miles of land draining to this site. This land is mostly agricultural and forest, with about 9% developed for urban and suburban uses. Approximately 1.3% of the land is covered by impervious surfaces.

MSD has been monitoring water quality in the Wolf Pen Branch (EHCWP002) tributary since 2002. Stream flow and continuous monitoring data are not collected at this location. There are 2.08 square miles of land draining to the monitoring site on Wolf Pen Branch. This land is a mix

of agricultural, forest, and 24% developed for urban and suburban uses. Approximately 7% of the land is covered by impervious surfaces.

Continuous Monitoring Results: Final continuous monitoring data were available between October 1, 2015, and September 30, 2016, in Harrods Creek at Covered Bridge Road. During this time period in Harrods Creek at Covered Bridge Road, the temperature data set was 100% complete and 100% of available values met the temperature criterion. The dissolved oxygen data set was 97.5% complete, average dissolved oxygen was 9.7 mg/l, and 98.6% of available values met the water quality criteria. The pH record was 99.9% complete and with pH values ranging from 7.5 to 9.0 standard units, 100% of available values met the water quality criteria. The specific conductance record was 99.7% complete and values ranged from 172 uS/cm to 656 uS/cm.

Quarterly Monitoring Results: At Harrods Creek at Covered Bridge Road and Wolf Pen Branch, all four samples were collected under dry conditions. Average TSS concentrations were 3.38 mg/l and 2.25 mg/l, respectively, in Harrods Creek and Wolf Pen Branch. Average TKN was 0.35 mg/l and 0.27 mg/l, respectively. The average oil and grease for Harrods Creek at Covered Bridge Road was 1.25 mg/l and below 1 mg/l for Wolf Pen Branch respectively.

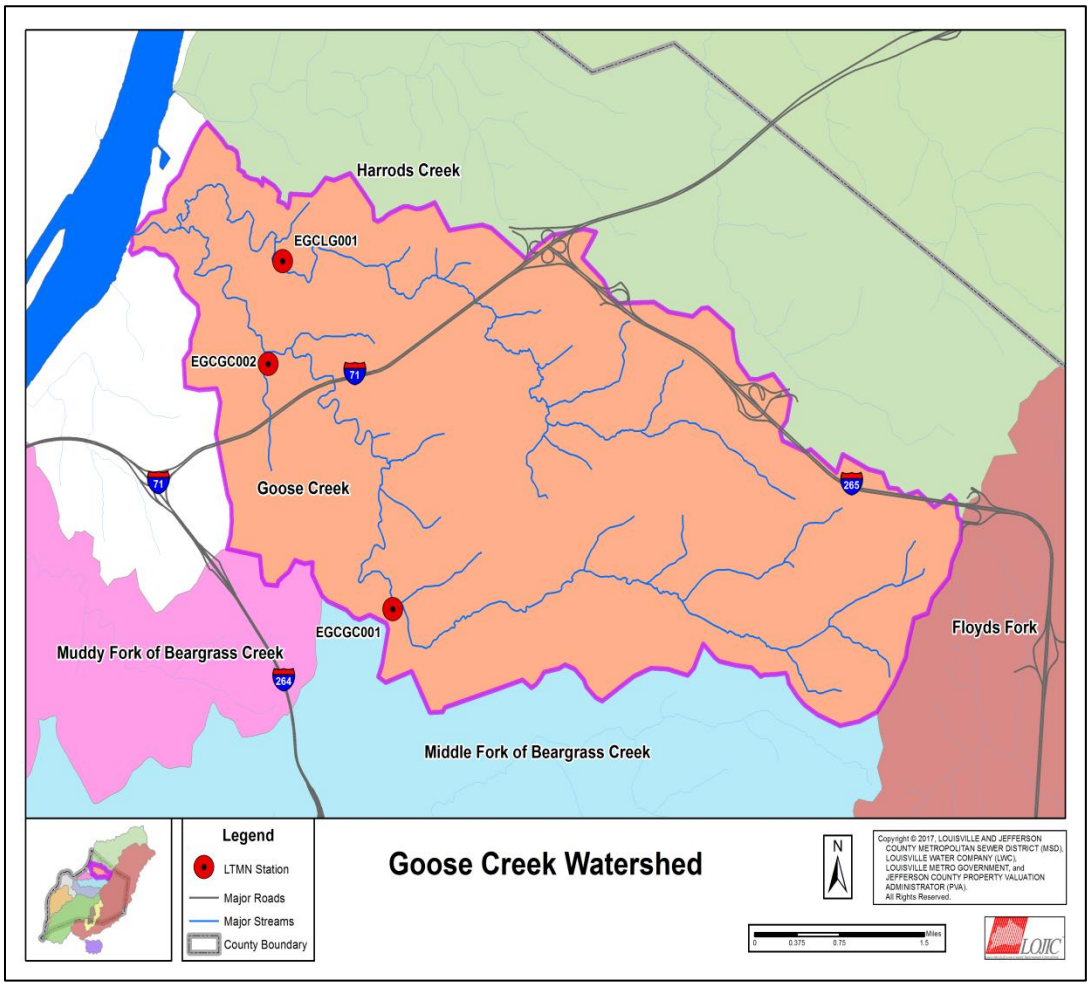
Quarterly samples were compared to hardness dependent chronic aquatic life criteria for copper. All quarterly samples were less than chronic aquatic life criteria, with the exception of one sample collected under dry conditions in Harrods Creek at Covered Bridge Road in October 2016, which had an elevated copper concentration (18 ug/l) that exceeded the chronic aquatic life criterion of 17.37 ug/l.

Bacteria Monitoring Results: Average (geometric mean) concentrations of *E. coli* bacteria ranged from 102 MPN/100 ml to 1,666 MPN/100 ml in samples collected at two monitoring locations in the Harrods Creek watershed. The water quality criteria for *E. coli* were met in two of six months during the recreational season in Harrods Creek and zero of six months in Wolf Pen Branch.

Biological Monitoring Results: Benthic communities were rated as “good” in Harrods Creek at Covered Bridge Road and “poor” in Wolf Pen Branch at 8200 Wolf Pen Branch Road, based on data collected in Spring 2015. Fish communities were rated as “fair” in Harrods Creek and Wolf Pen Branch, based on data collected in Fall 2015. Aquatic habitat quality was rated as “good” in both Harrods Creek and Wolf Pen Branch at in 2015. Algal communities were rated as “good” in Harrods Creek and in Wolf Pen Branch based on data collected in Fall 2015.

5.5.2 GOOSE CREEK WATERSHED

Figure 5.5.2 – Goose Creek Watershed



Watershed Description: The streams that form Goose Creek watershed, Little Goose Creek and Goose Creek, flow northwest from Anchorage to Glenview Acres. Goose Creek enters the Ohio River near Lime Kiln Lane and River Road. The Goose Creek watershed drains approximately 19 square miles.

MSD has been monitoring water quality in Goose Creek watershed at three sites since 2000: Goose Creek at Old Westport Road (EGCGC001), Goose Creek at US 42 (EGCGC002) and Little Goose Creek at US 42 (EGCLG001). There are 6.0 square miles of land draining to Goose Creek at Old Westport Road with 10% impervious surfaces. There are 10.1 square miles of land draining to Goose Creek at US 42 with 11% impervious surfaces. There are 5.8 square miles of land draining to the Little Goose Creek at US 42 with 18% impervious surfaces.

Continuous Monitoring Results: Final continuous monitoring data were available between October 1, 2015, and September 30, 2016, for three sondes in the Goose Creek watershed. During this time period, the temperature data were 98.6% complete in Goose Creek at Old Westport Road, 98.4% complete in Goose Creek at US 42, and 74.9% complete in Little Goose Creek with 100% of available values meeting the temperature criterion. The dissolved oxygen record was 85.0% complete with an average concentration of 9.5 mg/l in Goose Creek at Old Westport Road, and 98.4% of available values met the water quality criteria. In Goose Creek at US 42, the dissolved oxygen record was 95.1% complete, average dissolved oxygen was 9.2 mg/l, and 99.7% of available values met the water quality criteria. The dissolved oxygen data were 49.5% complete in Little Goose Creek at US 42, average dissolved oxygen was 9.9 mg/l, and 99.4% of available values met the water quality criteria. The pH record was 99.9% complete at Goose Creek at Old Westport Road, 68.2% complete in Goose Creek at US 42, and 63.1% complete in Little Goose Creek with 97% or more of available values meeting the pH criteria. At these three sites, pH ranged from 7.3 to 9.3 standard units. The specific conductance record was 99.3% complete in Goose Creek at US 42, and 62.6% complete in Little Goose Creek at US 42. Specific conductance ranged from 123 uS/cm to 1,650 uS/cm at these two sites. Specific conductance data for Goose Creek at Old Westport Road is being reviewed by USGS.

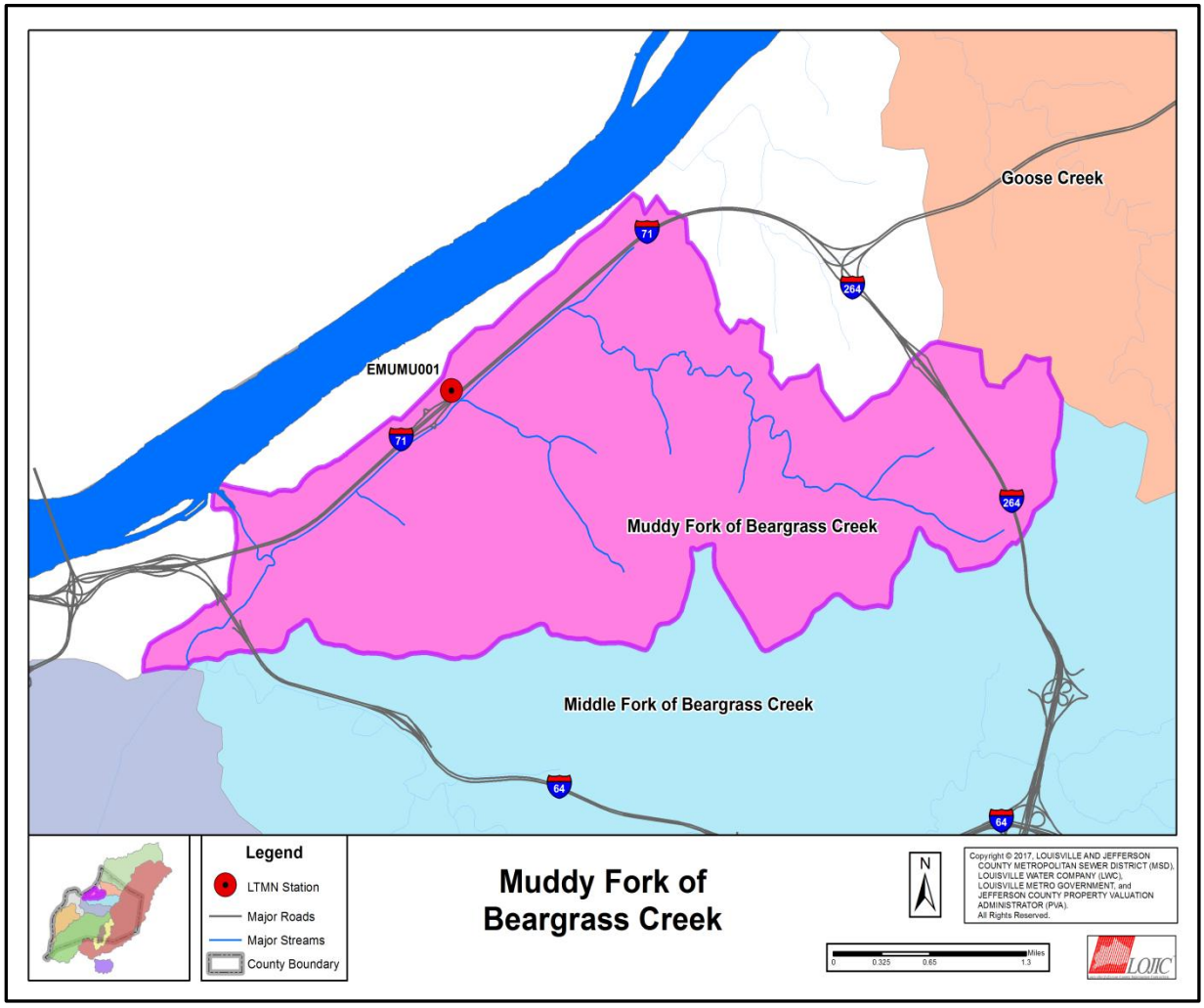
Quarterly Monitoring Results: At all sites, four samples were collected under dry conditions. Average TSS concentrations were 3.8 mg/l at Goose Creek at Old Westport Road and Goose Creek at US 42, and 13.8 at Little Goose Creek at US 42. Average TKN was 0.36 mg/l at Goose Creek at Old Westport Road, 0.51 mg/l at Goose Creek at US 42, and 0.66 mg/l at Little Goose Creek at US 42. The average oil and grease for Goose Creek at Old Westport Road was 1.38 mg/l and below 1 mg/l at Goose Creek at US 42 and at Little Goose Creek at US 42. Quarterly copper samples were less than the hardness dependent chronic aquatic life criteria.

Bacteria Monitoring Results: Average (geometric mean) concentrations of *E*. *coli* bacteria ranged from 45 MPN/100 ml to 1,755 MPN/100 ml in samples collected at three monitoring locations in the Goose Creek watershed. The water quality criteria for *E*. *coli* were met in zero of six months during the recreational season in Goose Creek at Old Westport Road, one of six months at Goose Creek at US 42, and two of six months at Little Goose Creek at US 42.

Biological Monitoring Results: Benthic communities were rated as “fair” at all three sites based on data collected in Spring 2015. Fish communities were rated as “good” at all three sites based on data collected in Fall 2015. Aquatic habitat quality was rated as “good” at all three locations, based on data collected in 2015. Algal communities were rated as “good” at all three sites based on data collected in Fall 2015.

5.5.3 MUDDY FORK OF BEARGRASS CREEK WATERSHED

Figure 5.5.3 – Muddy Fork of Beargrass Creek Watershed



Watershed Description: The Muddy Fork is one of three streams that join to form the larger Beargrass Creek watershed. The Muddy Fork flows west from Windy Hills toward the Ohio River, then southwest along Interstate 71 before joining with the South Fork to become Beargrass Creek near Mellwood Avenue and Story Avenue. The Muddy Fork of Beargrass Creek drains 9 square miles.

MSD has been monitoring water quality since 2002, in this watershed. The MSD monitoring station located at Muddy Fork at Mockingbird Valley Road (EMUMU001) drains 6.2 square miles. Approximately 9% of this watershed is covered by impervious surfaces.

Continuous Monitoring Results: Final continuous monitoring data were available between October 1, 2015, and September 30, 2016, at Muddy Fork at Mockingbird Valley Road. During

this time period, the temperature data set was 93.4% complete and 100.0% of available values met the temperature criterion. The dissolved oxygen data set was 85.8% complete, average dissolved oxygen was 8.6 mg/l, and 97.8% of available values met the water quality criteria. The pH record was 83.4% complete and with readings ranging from 6.7 to 8.2 standard units, 100% of available values met the water quality criteria. The specific conductance record was 99.3% complete and values ranged from 75 uS/cm to 1,750 uS/cm.

Quarterly Monitoring Results: At Muddy Fork at Mockingbird Valley Road, all four samples were collected under dry conditions. Average TSS concentrations were 24 mg/l. Average TKN was 0.49 mg/l. The average oil and grease for Muddy Fork at Mockingbird Valley Road was below 1 mg/l.

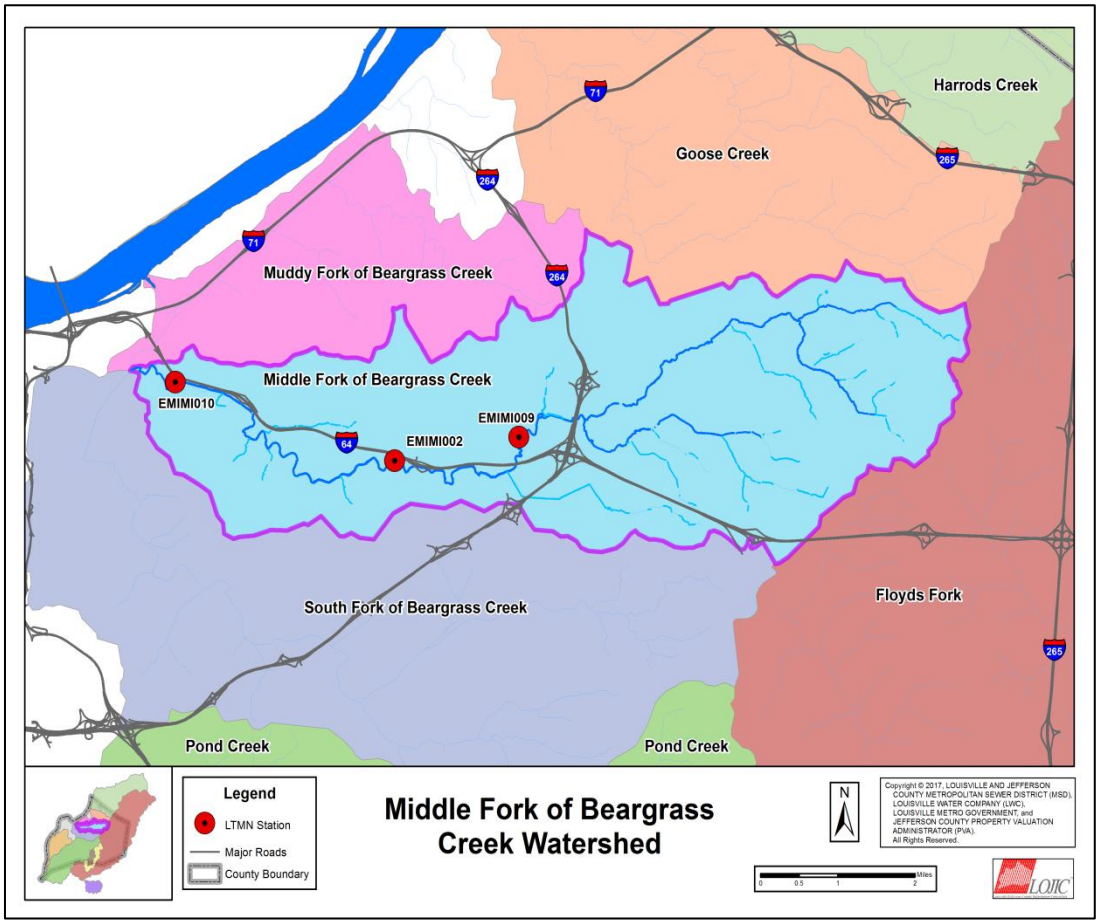
Quarterly copper samples were less than the hardness dependent chronic aquatic life criteria. During the fourth quarter 2016, there was a quarterly sample taken during dry conditions of cadmium at 4.3 ug/L that exceeded the chronic limit of 0.69 ug/L at Muddy Fork at Mockingbird Valley Road.

Bacteria Monitoring Results: Average (geometric mean) concentrations of *E*. *coli* bacteria ranged from 171 MPN/100 ml to 1,836 MPN/100 ml in samples collected at Muddy Fork at Mockingbird Valley Road. The water quality criteria for *E. coli* were met in zero of six months during the recreational season in Muddy Fork of Beargrass Creek.

Biological Monitoring Results: Benthic communities were rated as “poor,” based on data collected in Spring 2015. Fish communities were rated as “fair,” based on data collected in Fall 2015. Aquatic habitat quality was rated as “poor,” based on data collected in 2015. Algal communities were rated as “poor” based on data collected in Fall 2015.

5.5.4. MIDDLE FORK OF BEARGRASS CREEK WATERSHED

Figure 5.5.4 – Middle Fork of Beargrass Creek Watershed



Watershed Description: The Middle Fork of Beargrass Creek is one of three streams that join to form the larger Beargrass Creek watershed. The small streams that eventually form the Middle Fork of Beargrass Creek originate in Middletown and Douglas Hills. The Middle Fork of Beargrass Creek flows west across St. Matthews before joining the South Fork of Beargrass Creek near Irish Hill. There are just over 25 square miles of land in the Middle Fork of Beargrass Creek. Prominent features of this watershed include Cherokee Park, Seneca Park, and Cave Hill Cemetery. Combined sewers currently serve a portion of this part of Louisville.

Water quality data are collected at three locations in this watershed, listed from upstream to downstream: Browns Lane (EMIMI009), Old Cannons Lane (EMIMI002) and Lexington Road (EMIMI010). There are 15.2 square miles of land draining to the Browns Lane site; 18.9 square miles to the Old Cannons Lane site and 24.8 square miles to the Lexington Road site. Continuous monitoring data are collected at Old Cannons Lane and Lexington Road. Impervious surfaces cover about 23% of this watershed.

Continuous Monitoring Results: Final continuous monitoring data were available between October 1, 2015, and September 30, 2016, in the Middle Fork of Beargrass Creek at Old Cannons Lane and Lexington Road. During this time period, the temperature data set was 97.3% complete at Middle Fork of Beargrass Creek at Old Cannons Lane and 96.7% complete at Middle Fork of Beargrass Creek at Lexington Road. At Old Cannons Lane, the dissolved oxygen record was 97.3% complete, average dissolved oxygen was 9.2 mg/l, and the dissolved oxygen criteria were met 99.7% of the days with a complete record. At Lexington Road, the dissolved oxygen record was 87.2% complete, average dissolved oxygen was 8.2 mg/l, and the dissolved oxygen criteria were met 76.5% of the days with a complete record. The pH record was more than 90% complete and with values ranging from 7.0 to 8.7 standard units, 100% of values met the pH criteria at these two sites. The specific conductance record was more than 95% complete and specific conductance ranged from 83 uS/cm to 2,330 uS/cm at these two sites.

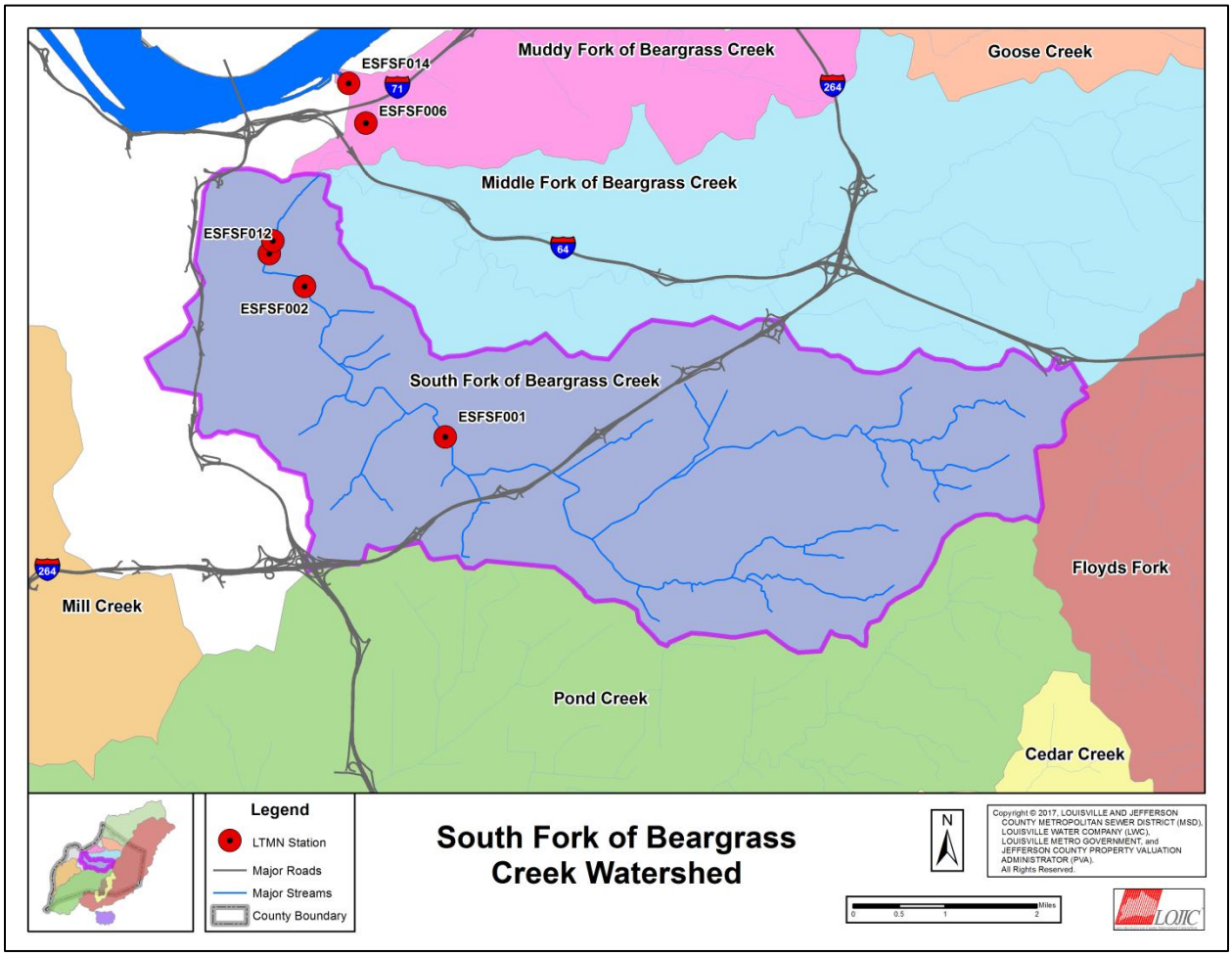
Quarterly Monitoring Results: At the Middle Fork of Beargrass Creek at Browns Lane, Old Cannons Lane, and Lexington Road, all four samples were collected under dry conditions. Average TSS concentrations were 4.9 mg/l at Old Cannons Lane, 6.1 mg/l at Browns Lane, and 8.0 mg/l at Lexington Road. Average TKN was 0.36 mg/l at Old Cannons Lane, 0.31 mg/l at Browns Lane, and 0.55 mg/l at Lexington Road. The average oil and grease for Middle Fork of Beargrass Creek at Old Cannons Lane was 2.5 mg/l and below 1 mg/l for Middle Fork of Beargrass Creek at Browns Lane and Middle Fork of Beargrass Creek at Lexington Road. Quarterly copper samples were less than the hardness dependent chronic aquatic life criteria.

Bacteria Monitoring Results: Average (geometric mean) concentrations of *E*. *coli* bacteria ranged from 155 MPN/100 ml to 2,495 MPN/100 ml in samples collected at three monitoring locations in the Harrods Creek watershed. The water quality criteria for *E*. *coli* were met in zero of six months during the recreational season in Browns Lane and Old Cannons Lane and one of six months in Lexington Road.

Biological Monitoring Results: Benthic communities were rated as “fair” at Browns Lane, at Old Cannons Lane, and at Lexington Road, based on data collected in Spring 2015. Fish communities were rated as “fair” at Browns Lane and at Old Cannons Lane and “poor” at Lexington Road, based on data collected in Fall 2015. Habitat quality was rated as “fair” at Browns Lane, “good” at Old Cannons Lane, and “fair” at Lexington Road, based on data collected in 2015. Algal communities were rated as “good” at Brown’s Lane and at Old Cannons Lane, “excellent” at Lexington Road based on data collected in Fall 2015.

5.5.5 SOUTH FORK OF BEARGRASS CREEK WATERSHED

Figure 5.5.5 – South Fork of Beargrass Creek Watershed



Watershed Description: The South Fork of Beargrass Creek is one of three streams that join to form the Beargrass Creek watershed. The small streams that eventually form the South Fork of Beargrass Creek originate in Jeffersontown and Hurstbourne Acres. The South Fork of Beargrass Creek flows west across Buechel before joining the Middle Fork of Beargrass Creek near Irish Hill. The South Fork then joins the Muddy Fork to become Beargrass Creek near the intersection of Interstates 71 and 64. There are about 25 square miles of land in the South Fork of Beargrass Creek watershed. Some streams in this watershed were straightened and several miles were enclosed in concrete channels in the past to reduce flooding.

MSD monitors water quality at five locations in this watershed, listed from upstream to downstream: Trevilian Way (ESFSF001), Schiller Avenue Ramp (ESFSF002), Breckinridge Street (ESFSF012), Brownsboro Road (ESFSF006), and River Road (ESFSF014).

There are 17.2 square miles of land draining to the Trevilian Way site. At the lower end, 22.8 square miles of land are draining to the Schiller Avenue site. There are 51.5 square miles of land draining to the Brownsboro Road site, which is below the confluence with the Middle Fork of Beargrass Creek. Impervious surfaces range from 28% to 32% at these monitoring sites.

Continuous Monitoring Results: Final continuous monitoring data were available between October 1, 2015, and September 30, 2016, at two sites in the South Fork Beargrass Creek watershed. Because of construction near the monitoring site, the Schiller Avenue Ramp sonde and flow gauge was temporarily moved to East Breckinridge Street. No final data were available for either of these sites during this reporting period.

During this time period, the temperature data set at Trevilian Way was 100% complete and River Road was 89.6% complete and temperature criterion was met in 100% of available values for these sites. At Trevilian Way, the dissolved oxygen data set was 62.8% complete, the average was 7.6 mg/l, and the criteria were met 74.8% of the days with a complete record. At the River Road, the dissolved oxygen data set was 52.7% complete, the average was 7.8 mg/l, and the criteria were met 63.2% of the days with a complete record. The River Road station is influenced by backwater from the Ohio River, which may contribute to frequent stagnant conditions and low dissolved oxygen. The pH record was 92.3% complete at Trevilian Way and 80.9% complete at River Road. The pH readings ranged from 6.5 to 9.0 standard units and the criteria was met in 100% of the records. The specific conductance record was 99.3% complete at Trevilian Way and 69.5% complete at River Road. Specific conductance ranged from 93 uS/cm to 4,430 uS/cm for these two sites. The maximum specific conductance value for all sondes during the reporting period was found in the South Fork of Beargrass Creek at Trevilian Way on January 25, 2016, after two snow storms several days earlier brought over 6 inches of snow. Warming temperatures on January 25, 2015, may have carried salt and snow melt runoff to Beargrass Creek.

Quarterly Monitoring Results: At the South Fork of Beargrass Creek at Trevilian Way, Brownsboro Road, and Breckinridge Street, all four samples were collected under dry conditions. Average TSS concentrations were 8.56 mg/l at Trevilian Way, 7.5 mg/l at Brownsboro Road, and 9.25 mg/l at Breckinridge Street. Average TKN was 0.80 mg/l at Trevilian Way, 0.64 mg/l at Brownsboro Road, and 0.96 mg/l at Breckinridge Street. The average oil and grease for South Fork of Beargrass Creek at Trevilian Way and Brownsboro Road was below 1 mg/l and 4 mg/l for South Fork of Beargrass Creek at Breckinridge Street. Quarterly copper samples were less than the hardness dependent chronic aquatic life criteria.

Bacteria Monitoring Results: Average (geometric mean) concentrations of *E. coli* bacteria ranged from 380 MPN/100 ml to 22,465 MPN/100 ml in samples collected at three monitoring locations in the South Fork of Beargrass Creek watershed. The water quality criteria for *E. coli* were met in zero of six months during the recreational season in Trevilian Way, Brownsboro Road, and Breckinridge Street.

Biological Monitoring Results: Benthic communities were rated as “poor” at Trevilian Way and “very poor” at Brownsboro Road and Schiller Avenue Ramp, based on data collected in Spring 2015. Fish communities were rated as “fair” at Trevilian Way, “poor” at Brownsboro Road and “no data collected” at Schiller Avenue Ramp, based on data collected in Fall 2015. Habitat

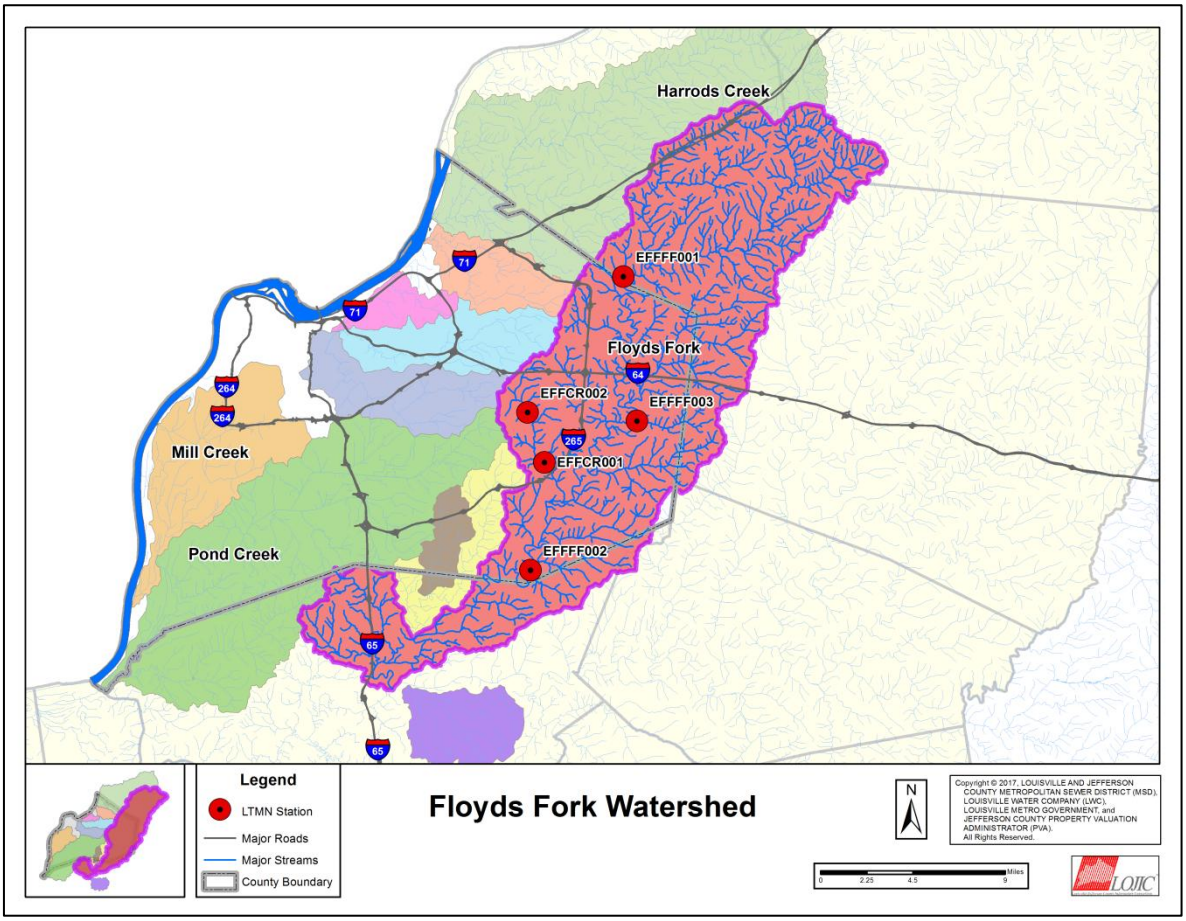
quality was rated as “poor” at Trevilian Way and Schiller Avenue Ramp and “good” at Brownsboro Road, based on data collected in 2015. Algal communities were rated as “good” at Trevilian Way, “fair” at Schiller Avenue Ramp, and “excellent” at Brownsboro Road based on data collected in Fall 2015.

Dry Weather Bacteria Source Tracking (BST) Sampling Event: MSD conducted a water-quality monitoring program in the reporting period, to provide a detailed assessment of human bacteria concentrations in the South Fork of Beargrass Creek at locations that have also shown elevated gradients of *E. coli* concentrations from upstream to downstream within the focus areas. A set of screening samples (upstream and downstream) was taken in each of the ten focus areas in the three stream sections to identify areas with the strongest indication of human sourced bacteria. The BST and *E. coli* data from the screening samples directed a fluid event-based approach for selected subsequent sampling runs on focus areas. Focus areas with a strong presence of human bacteria were sampled at shorter spacing (detailed) for *E. coli* every 100 to 400 yards apart depending on the focus area’s length. These detailed *E. coli* results were checked form increasing trends from upstream to downstream in the focus areas. Focus areas with a low presence of human bacteria were sampled a second time to confirm initial BST results. After all sampling events were completed on focus areas with a strong presence of human bacteria, the remaining low human bacteria focus areas were detail sampled for *E. coli* to collect historical dry-weather datasets that could be used in future assessments.

Results from the initial sampling events will be utilized to narrow the focus of future BST sampling to identify potential water quality impairments and hone in on the source of those impairments. Based on these results, programmatic modifications will be considered to address illicit discharges, perform system assessments, or enhance public outreach.

5.5.6 FLOYDS FORK WATERSHED

Figure 5.5.6 – Floyds Fork Watershed



Watershed Description: The small streams that form Floyds Fork originate in Oldham, Henry, and Shelby counties. Floyds Fork flows south through Oldham County, eastern Jefferson County, and northern Bullitt County where it drains into the Salt River near Shepherdsville. This watershed drains 257 square miles, and is the largest metro area watershed. Approximately 104 square miles of the Floyds Fork watershed lie within Jefferson County.

MSD monitors water quality at five locations in the Floyds Fork watershed. Along the main stem of Floyds Fork, monitoring stations are located at Ash Avenue (EFFFF001), Old Taylorsville Road (EFFFF003), and Bardstown Road (EFFFF002). The Ash Avenue site drains 80 square miles mostly in Henry and Oldham Counties. This monitoring location is downstream of the Ash Avenue wastewater treatment plant, which is operated by Oldham County. There are 138 square miles draining to the Old Taylorsville Road monitoring site (EFFFF003). This monitoring site is located downstream of the Floyds Fork Water Quality Treatment Center. There are 213 square miles draining to the Bardstown Road monitoring site (EFFFF002), near the border of Jefferson and Bullitt Counties. There are two monitoring sites on Chenoweth Run, at Ruckriegel

Parkway (EFFCR002) and Gelhaus Lane (EFFCR001), which drain 5.5 and 11.6 square miles, respectively. The Gelhaus Lane monitoring site is located downstream of the Jeffersontown Water Quality Treatment Center (WQTC), which was taken off line in January 2016.

Continuous Monitoring Results: Final continuous monitoring data were available between October 1, 2015, and September 30, 2016, at five sites in the Floyds Fork watershed. During this time period, the temperature data set was 95.3% complete at Ash Avenue, 96.7% at Old Taylorsville Road, 94.0% at Bardstown Road, 99.7% at Chenoweth Run at Ruckriegel Parkway, and 85.8% at Chenoweth Run at Gelhaus Lane. For Floyds Fork at Ash Avenue, Floyds Fork at Bardstown Road, and Chenoweth Run at Ruckriegel Parkway 100% of available values met the temperature criterion. At Floyds Fork at Old Taylorsville Road 99.7% of available values met the temperature criterion and 99.0% at Chenoweth Run at Gelhaus Lane, respectively.

In Floyds Fork at Ash Avenue, the dissolved oxygen record was 70.5% complete, average dissolved oxygen was 9.2 mg/l, and the dissolved oxygen criteria were met 86.8% of the days with a complete record. In Floyds Fork at Old Taylorsville Road, the dissolved oxygen data set was 96.4% complete, average dissolved oxygen was 9.5 mg/l, and the dissolved oxygen criteria were met 98.3% of the days with a complete record. In Floyds Fork at Bardstown Road, the dissolved oxygen data set was 57.1% complete, average dissolved oxygen was 10.0, and the dissolved oxygen criteria were met 99.0% of the days with a complete record. In Chenoweth Run at Ruckriegel Parkway, the dissolved oxygen data set was 99.7% complete, average dissolved oxygen was 9.6 mg/l, and the dissolved oxygen criteria was met 98.9% of the days with a complete record. In Chenoweth Run at Gelhaus Lane, the dissolved oxygen data set was 80.0% complete, average dissolved oxygen was 9.8 mg/l, and the dissolved oxygen criteria were met 99.0% of the days with a complete record.

The pH record was 81.9% complete, values ranged from 6.7 to 8.3 standard units and 100% met the criteria at Floyds Fork at Bardstown Road. At Ash Avenue and Old Taylorsville Road, the pH is being reviewed by USGS sufficient final data was not available for this analysis. The pH record was 99.9% complete in Chenoweth Run at Ruckriegel Parkway and 86.2% complete at Gelhaus Lane. Over 98% of the records met the pH criteria, and pH readings ranged from 7.0 to 9.4 standard units at these two sites.

In Floyds Fork at Ash Avenue, the specific conductance record was 83.6% complete, and the record was over 93% complete at Old Taylorsville Road and Bardstown Road. Specific conductance values ranged from 139 uS/cm to 867 uS/cm. In Chenoweth Run, the record was 99.9% complete at Ruckriegel Parkway and 86.2% complete at Gelhaus Lane. Specific conductance values ranged from 76 uS/cm to 4050 uS/cm in Chenoweth Run.

Quarterly Monitoring Results: At Floyds Fork at Ash Avenue, Floyds Fork at Old Taylorsville Road, Floyds Fork at Bardstown Road, and Chenoweth Run at Gelhaus Lane, all four samples were collected under dry conditions. At Chenoweth Run at Ruckriegel Parkway, three samples were collected under dry conditions and one sample was collected under wet conditions. Average TSS concentrations were 9.9 mg/l at Floyds Fork at Ash Avenue, 15.8 mg/l at Floyds Fork at Old Taylorsville Road, 12.1 mg/l at Floyds Fork at Bardstown Road, 12.9 mg/l at Chenoweth Run at Ruckriegel Parkway, and 7.1 mg/l at Chenoweth Run at Gelhaus Lane. Average TKN was 0.41 mg/l at Floyds Fork at Ash Avenue, 0.59 mg/l at Floyds Fork at Old

Taylorsville Road, 0.44 mg/l at Floyds Fork at Bardstown Road, 0.42 mg/l at Chenoweth Run at Ruckriegel Parkway, and 0.27 mg/l at Chenoweth Run at Gelhaus Lane. The average oil and grease for Floyds Fork at Ash Avenue, Floyds Fork at Old Taylorsville Road, Chenoweth Run at Ruckriegel Parkway, and Chenoweth Run at Gelhaus Lane was below 1 mg/l and 1.12 mg/l for Floyds Fork at Bardstown Road. Quarterly copper samples were less than the hardness dependent chronic aquatic life criteria.

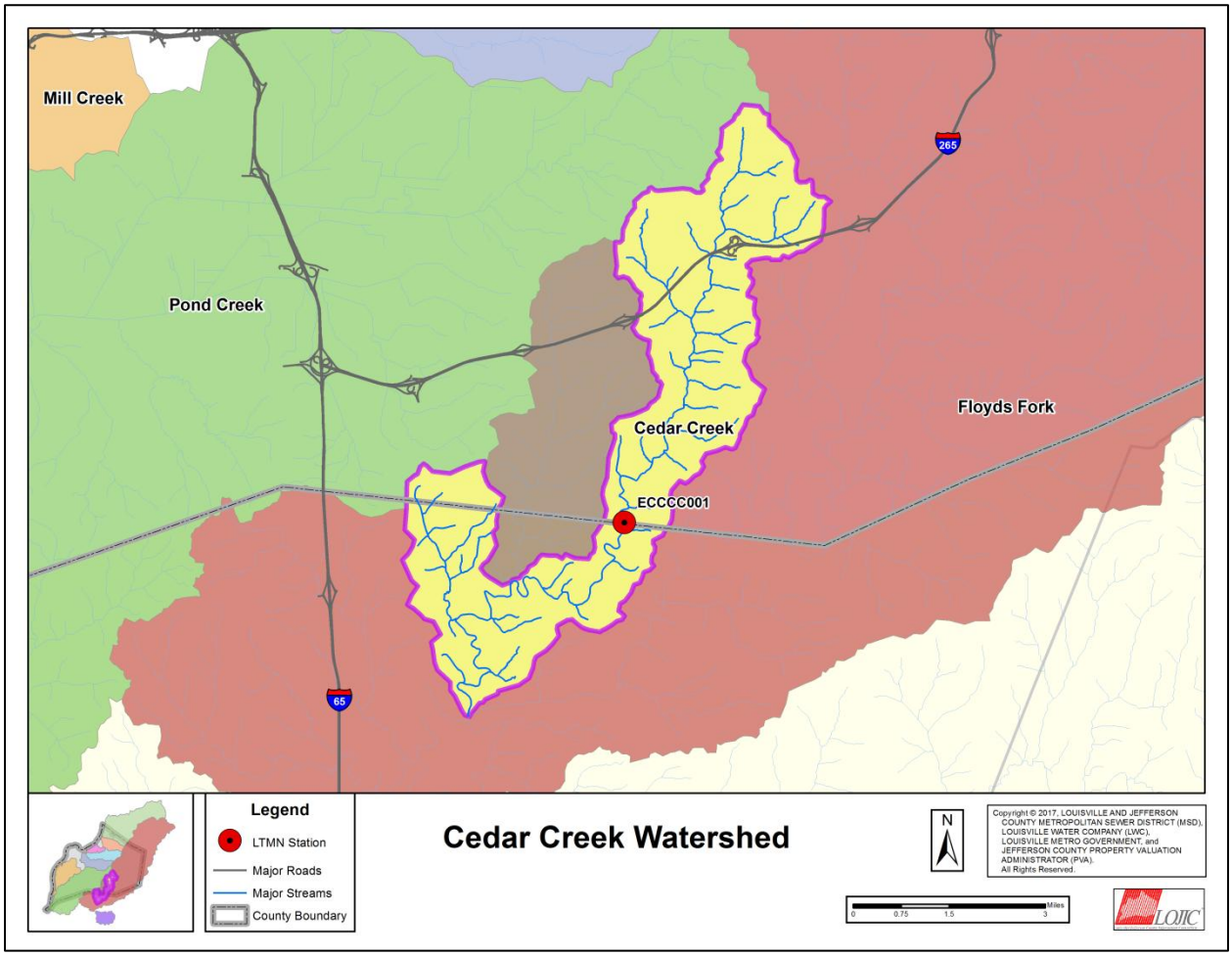
Bacteria Monitoring Results: Average (geometric mean) concentrations of *E. coli* bacteria ranged from 65 MPN/100 ml to 1,174 MPN/100 ml in samples collected at five monitoring locations in the Floyds Fork watershed. The water quality criteria for *E. coli* were met in zero of six months during the recreational season in Chenoweth Run at Ruckriegel Parkway, and were met in one of six months at Floyds Fork at Ash Avenue, Floyds Fork at Old Taylorsville Road, Floyds Fork at Bardstown Road, and Chenoweth Run at Gelhaus Lane.

Biological Monitoring Results: Benthic communities were rated as “fair” in Floyds Fork at Ash Avenue, “good” at Bardstown Road, and “excellent” at Old Taylorsville Road, based on data collected in Spring 2015. Fish communities were rated as “fair” in Floyds Fork at Ash Avenue and Bardstown Road and “good” at Old Taylorsville Road, based on data collected in Fall 2015. Aquatic habitat quality was rated as “good” at all three sites, based on data collected in 2015. Algal communities were rated as “poor” at Ash Avenue and “excellent” at Old Taylorsville Road and “fair” at Bardstown Road based on data collected in Fall 2015.

Benthic communities were rated as “fair” at Chenoweth Run at Gelhaus Lane and Ruckriegel Parkway, based on data collected in Spring 2015. Fish communities were rated as “fair” at both sites on Chenoweth Run, based on data collected in Fall 2015. Aquatic habitat quality was rated as “good” in Chenoweth Run at Ruckriegel Parkway and at Gelhaus Lane, based on data collected in 2015. Algal communities were rated as “good” at Ruckriegel Parkway and “excellent” at Gelhaus Lane based on data collected in Fall 2015.

5.5.7 CEDAR CREEK WATERSHED

Figure 5.5.7 – Cedar Creek Watershed



Watershed Description: The small streams that eventually form Cedar Creek in Jefferson County originate in the Fern Creek area and flow south. Cedar Creek empties into Floyds Fork in Bullitt County east of Shepherdsville. There are 11.1 square miles of land draining to the Cedar Creek monitoring site at Thixton Lane (ECCCC001). About 10% of this watershed is covered by impervious surfaces. This monitoring site is located downstream of the Cedar Creek WQTC.

Continuous Monitoring Results: Final continuous monitoring data were available between October 1, 2015, and September 30, 2016, Cedar Creek at Thixton Lane. During this time period, the temperature data set was 99.7% complete and 100% of available values met the temperature criterion. The dissolved oxygen data set was 87.2% complete, average dissolved oxygen was 9.9 mg/l, and 100% of available values met the water quality criteria. The pH data set was 94.5% complete, and with values ranging from 7.2 to 9.3 standard units, and 99.0% met

the pH criteria. The specific conductance record was 99.3% complete and values ranged from 71 uS/cm to 1,180 uS/cm.

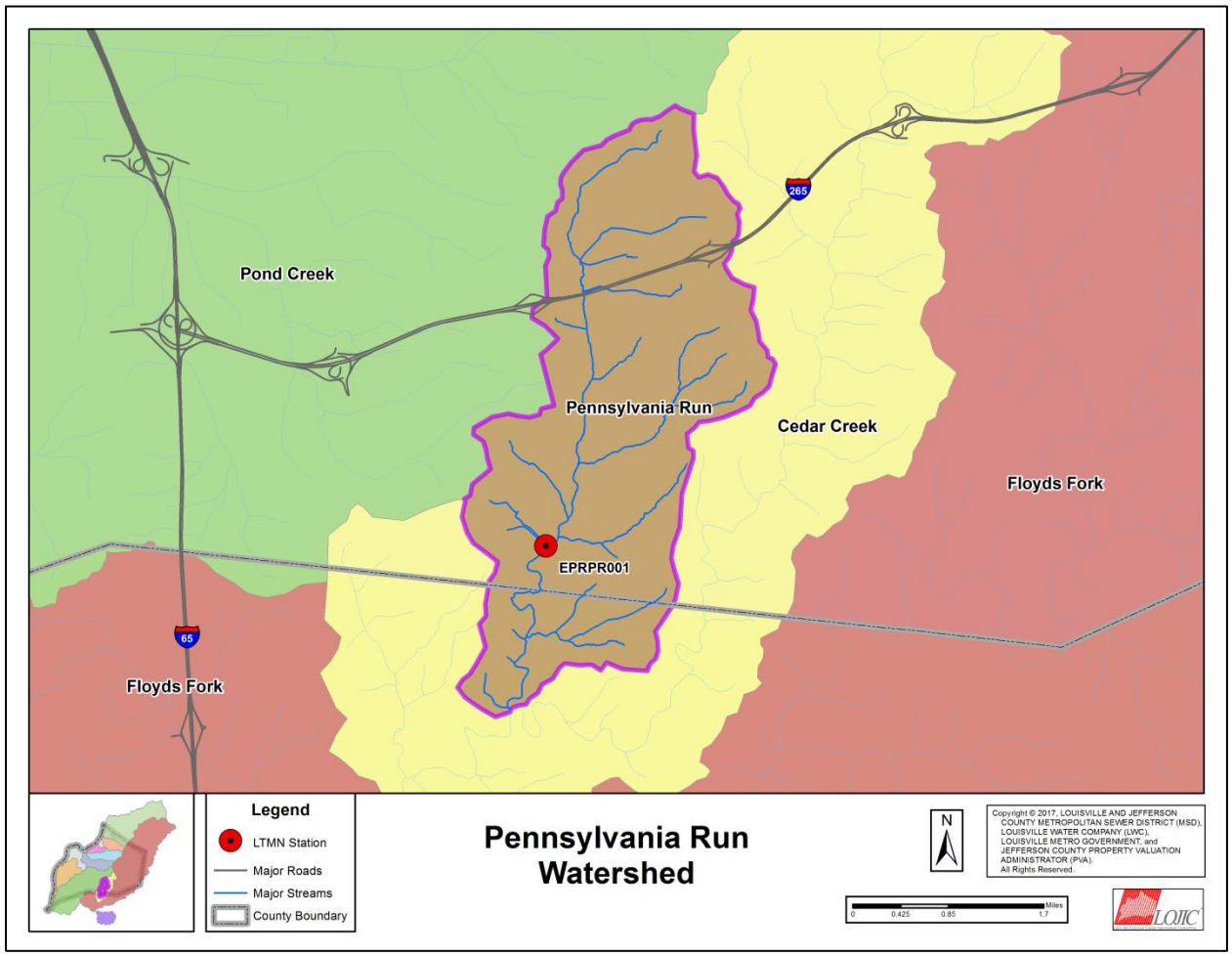
Quarterly Monitoring Results: All four quarterly samples were collected under dry conditions in Cedar Creek at Thixton Lane. Average TSS concentrations were 4.88 mg/l. Average TKN was 0.62 mg/l. The average oil and grease was below 1 mg/l. Quarterly copper samples were less than the hardness dependent chronic aquatic life criteria.

Bacteria Monitoring Results: Average (geometric mean) concentrations of *E. coli* bacteria ranged from 300 MPN/100 ml to 944 MPN/100 ml in samples collected at Cedar Creek at Thixton Lane. The water quality criteria for *E. coli* were met in zero of six months during the recreational season at this site.

Biological Monitoring Results: Benthic communities were rated as “fair,” based on data collected in May 2015. Fish communities were rated as “excellent,” based on data collected in Fall 2015. Aquatic habitat quality was rated as “good” at Thixton Lane, based on data collected in 2015. Algal communities were rated as “poor” in Fall 2015.

5.5.8 PENNSYLVANIA RUN WATERSHED

Figure 5.5.8 – Pennsylvania Run Watershed



Watershed Description: The small streams that eventually form Pennsylvania Run originate in the Highview area and flow south into McNeely Lake. Pennsylvania Run empties into Cedar Creek in Bullitt County east of Zoneton. MSD monitors water quality in Pennsylvania Run at Mount Washington Road (EPRPR001). This site drains 6.4 square miles of land and is located below McNeely Lake. Almost 9% of this watershed is covered by impervious surfaces.

Continuous Monitoring Results: Final continuous monitoring data were available between October 1, 2015, and September 30, 2016, in Pennsylvania Run at Mount Washington Road. During this period, the temperature data set was 99.7% complete and 100% of available values met the temperature criterion. The dissolved oxygen data set was 74.0% complete, the average was 9.3 mg/l and the criteria were met 89.7% of the days with a complete record. The pH record was 99.9% complete, and with values ranging from 6.7 to 9.9 standard units, 95.3% of values met the pH criteria. The elevated pH values were the highest of all pH readings during the report period. Elevated pH readings occurred sporadically between January and May of 2016, when

stream flows were low and trees had not yet leafed out. These conditions promote algal activity, which raises pH values. The specific conductance record was 99% complete and values ranged from 89 uS/cm to 806 uS/cm.

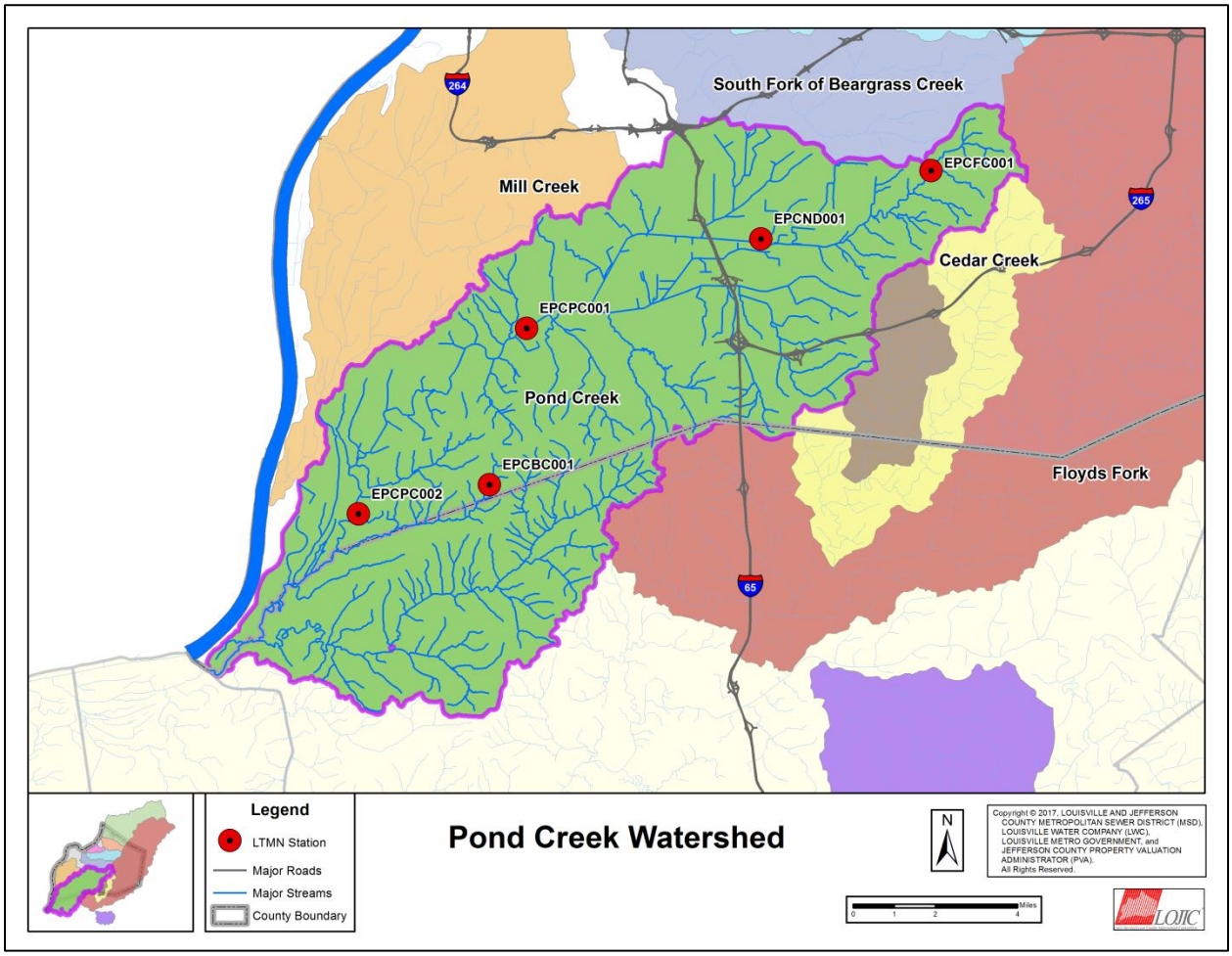
Quarterly Monitoring Results: At Pennsylvania Run at Mount Washington Road, all four samples were collected under dry conditions. Average TSS concentrations were 8 mg/l. Average TKN was 0.39 mg/l. The average oil and grease for Pennsylvania Run at Mount Washington Road was 1.5 mg/l. Quarterly copper samples were less than the hardness dependent chronic aquatic life criteria.

Bacteria Monitoring Results: Average (geometric mean) concentrations of *E. coli* bacteria ranged from 144 MPN/100 ml to 655 MPN/100 ml in samples collected at Pennsylvania Run at Mount Washington Road. The water quality criteria for *E. coli* were not met in the six months during the recreational season at this site.

Biological Monitoring Results: Benthic communities were rated as “fair,” based on data collected in Spring of 2015, Fish communities were rated “good” based on data collected in Fall of 2015. Aquatic habitat quality was rated as “fair,” based on data collected in 2015. Algal communities were rated as “good” based on data collected in Fall 2015.

5.5.9 POND CREEK WATERSHED

Figure 5.5.9 – Pond Creek Watershed



Watershed Description: The Pond Creek watershed drains about 126 square miles in southwestern Louisville, where it flows into the Salt River near West Point. Approximately 89 square miles are located in Jefferson County and 37 square miles are located in Bullitt County. Small streams in Jeffersontown and Fern Creek join to form Northern Ditch and small streams in Highview and Okolona join to form Southern Ditch. Northern Ditch and Southern Ditch join to form Pond Creek near Outer Loop. The Louisville International Airport, the Outer Loop Landfill, large industrial complexes, and Jefferson Memorial Forest are prominent features in this watershed.

The relatively flat portion of the Pond Creek watershed was once a pond, which gradually filled with silt and debris to form a flat plain with standing water and dense swamp vegetation. Parts of this area were known as “wet woods” in the past. Starting in the 1850s, a system of man-made ditches was developed to reduce flooding and to increase the amount of land suitable for

development, which continued to expand rapidly before and after World War II. Many of the streams in Pond Creek watershed have been extensively channelized, and large flat areas are now drained by Northern Ditch and Southern Ditch.

MSD monitors water quality in this large watershed at five locations, listed from upstream to downstream: Fern Creek at Bardstown Road (EPCFC001), Northern Ditch at Preston Highway (EPCND001), Pond Creek at Manslick Road (EPCPC001), Pond Creek at Pendleton Road (EPCPC002) and Brier Creek at Bear Camp Road (EPCBC001). The amount of land draining to each site in square miles, respectively, is 3.5, 11.1, 64.0, 80.3 and 4.1. The amount of land area draining to the monitoring sites on Fern Creek, Northern Ditch and Pond Creek that is covered by impervious surfaces ranges from 16% to 24%. The land draining to Brier Creek at Bear Camp Road is quite different from the other four sites. This small tributary drains steep, wooded areas southwest of Jefferson Memorial Forest, and land use consists mostly of forest and agriculture, and less than 1% is impervious surfaces.

Continuous Monitoring Results: Final continuous monitoring data were available between October 1, 2015, and September 30, 2016, at five monitoring sites in the Pond Creek watershed. During this time period, the temperature data set was more than 97% complete at all five sites. At Pond Creek at Pendleton Road, Brier Creek at Bear Camp Road, and Fern Creek at Bardstown Road 100.0% of available values met the temperature criterion. At Northern Ditch at Preston Highway 98.0% of available values met the temperature criterion and at Pond Creek at Manslick Road 98.6% of available values met the temperature criterion.

In Fern Creek at Bardstown Road, the dissolved oxygen data set was 99.7% complete, the average was 9.1 mg/l, and the criteria were met 99.7% of the days with a complete record. In Northern Ditch, the dissolved oxygen data set was 87.2% complete, the average was 9.5 mg/l and the criteria were met 87.1% of the days with a complete record. In Pond Creek at Manslick Road, the dissolved oxygen data set was 94.0% complete, the average was 7.9 mg/l and the criteria were met 100% of the days with a complete record. In Pond Creek at Pendleton Road, the dissolved oxygen data set was 94.5% complete, the average was 9.0 mg/l and the criteria were met 99.4% of the days with a complete record. In Brier Creek, the dissolved oxygen data set was 84.4% complete, the average was 8.0 mg/l and the dissolved oxygen criteria were met 77.0% of the days with a complete record.

The pH record was over 90% complete for all five sites and with pH values ranging from 6.2 to 9.0 standard units, 100% of the values at all five sites met the pH criteria. The specific conductance record was over 96% complete at Fern Creek, Northern Ditch, Pond Creek at Manslick Road, and Brier Creek. Specific conductance at these four sites ranged from 68 uS/cm to 2,910 uS/cm. The specific conductance record for Pond Creek at Pendleton Road is being reviewed by USGS.

Quarterly Monitoring Results: At Fern Creek at Bardstown Road and Brier Creek at Bear Camp Road, all four samples were collected under dry conditions. At Northern Ditch at Preston Highway, Pond Creek at Manslick Road, and Pond Creek at Pendleton Road, three samples were collected under dry conditions and one sample was collected under wet conditions.

Average TSS concentrations were 42.9 mg/l at Fern Creek at Bardstown Road, 26.6 mg/l at Northern Ditch at Preston Highway, 31.4 mg/l at Pond Creek at Manslick Road, 10.1 mg/l at Pond Creek at Pendleton Road, and 3.4 mg/l at Brier Creek at Bear Camp Road. Average TKN was 0.80 mg/l at Fern Creek at Bardstown Road, 0.52 mg/l at Northern Ditch at Preston Highway, 0.43 mg/l at Pond Creek at Manslick Road, 0.41 mg/l at Pond Creek at Pendleton Road, and 0.27 mg/l at Brier Creek at Bear Camp Road. The average oil and grease for Fern Creek at Bardstown Road, Northern Ditch at Preston Highway, Pond Creek at Manslick Road, and Brier Creek at Bear Camp Road was below 1 mg/l and 1.5 mg/l for Pond Creek at Pendleton Road.

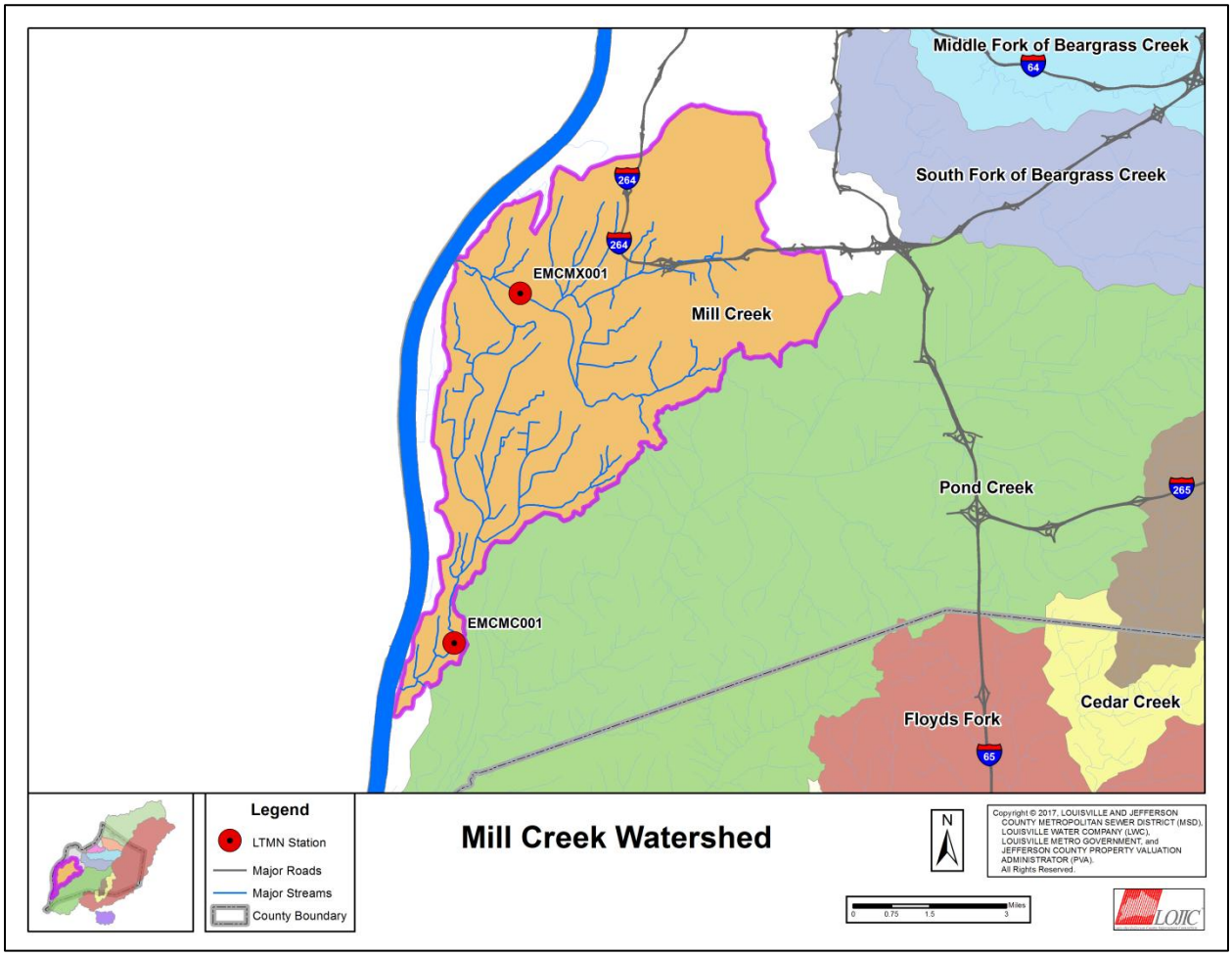
Quarterly metals samples were compared to hardness dependent chronic aquatic life criteria. All quarterly samples for metals were less than chronic aquatic life criteria for copper, with the exception of one sample collected under dry conditions in Fern Creek at Bardstown Road in October 2016, which had an elevated copper concentration (14 ug/l) that exceeded the chronic aquatic life criterion of 12.96 ug/l. In October 2016, there was also a sample of lead that exceeded the chronic limit of 5.20 ug/L at 9.44 ug/L in dry conditions in Fern Creek at Bardstown Road.

Bacteria Monitoring Results: Average (geometric mean) concentrations of *E*. *coli* bacteria ranged from 82 MPN/100 ml to 1,027 MPN/100 ml in samples collected at five monitoring locations in the Pond Creek watershed. The water quality criteria for *E. coli* were not met in the six months during the recreational season in Fern Creek, Northern Ditch, both Pond Creek sites. The *E. coli* criteria were met in two of six months during the recreational season in Brier Creek.

Biological Monitoring Results: Benthic communities were rated as “poor” in Fern Creek and Brier Creek, and “fair” in Northern Ditch, Pond Creek at Manslick Road and Pendleton Road based on data collected in Spring 2015. Fish communities were rated as “fair” in Fern Creek and Brier Creek, “good” in Northern Ditch at Preston Highway and “poor” in both Pond Creek sites based on data collected in Fall 2015. Habitat quality was rated as “fair” at Fern Creek at and Brier Creek, and “poor” Northern Ditch, Pond Creek at Manslick Road, and Pond Creek at Pendleton Road in 2015. Algal communities were rated as “good” in Fern Creek and, Northern Ditch, “good” in Pond Creek at Manslick Road, “poor” in Pond Creek at Pendleton Road, and Brier Creek at Bear Camp Road based on data collected in the Fall of 2015.

5.5.10 MILL CREEK WATERSHED

Figure 5.5.10 – Mill Creek Watershed



Watershed Description: The Mill Creek watershed drains about 34 square miles in western Louisville, near the Ohio River. The northern part of the watershed includes streams that drain to the Mill Creek Cutoff, which flows directly into the Ohio River near Shively. The southern part of the watershed flows south through Pleasure Ridge Park and then into the Ohio River near Watson Lane. Many of the streams in this watershed have been straightened or channelized in the past to reduce flooding and to increase the amount of land suitable for development.

MSD collects water quality and biological samples in Mill Creek Cutoff at Cane Run Road (EMCMX001) and Mill Creek at Orell Road (EMCMC001). MSD monitors water quality continuously in Mill Creek at Orell Road; Mill Creek Cutoff at Cane Run Road has a flow gauge but not a water quality sonde. There are 24.4 square miles draining to Mill Creek Cutoff at Cane Run Road and about 38% of the land in this subwatershed is covered by impervious surfaces.

There are 13.5 square miles draining to Mill Creek at Orell Road and about 21% of the land in this subwatershed is covered by impervious surfaces.

Continuous Monitoring Results: Final continuous monitoring data were available between October 1, 2015, and September 30, 2016, in Mill Creek at Orell Road. During this time period, the temperature data were 82.5% complete and 100% of available values met the temperature criterion. The dissolved oxygen data set was 69.9% complete, average dissolved oxygen was 8.3 mg/l and the dissolved oxygen criteria were met 88.7% of the days with a complete record. The pH record was 79% complete and with pH values ranging from 6.3 to 9.6 standard units, 99.8% of values met the criteria. The specific conductance record was 81.4% complete and values ranged from 54 uS/cm to 891 uS/cm.

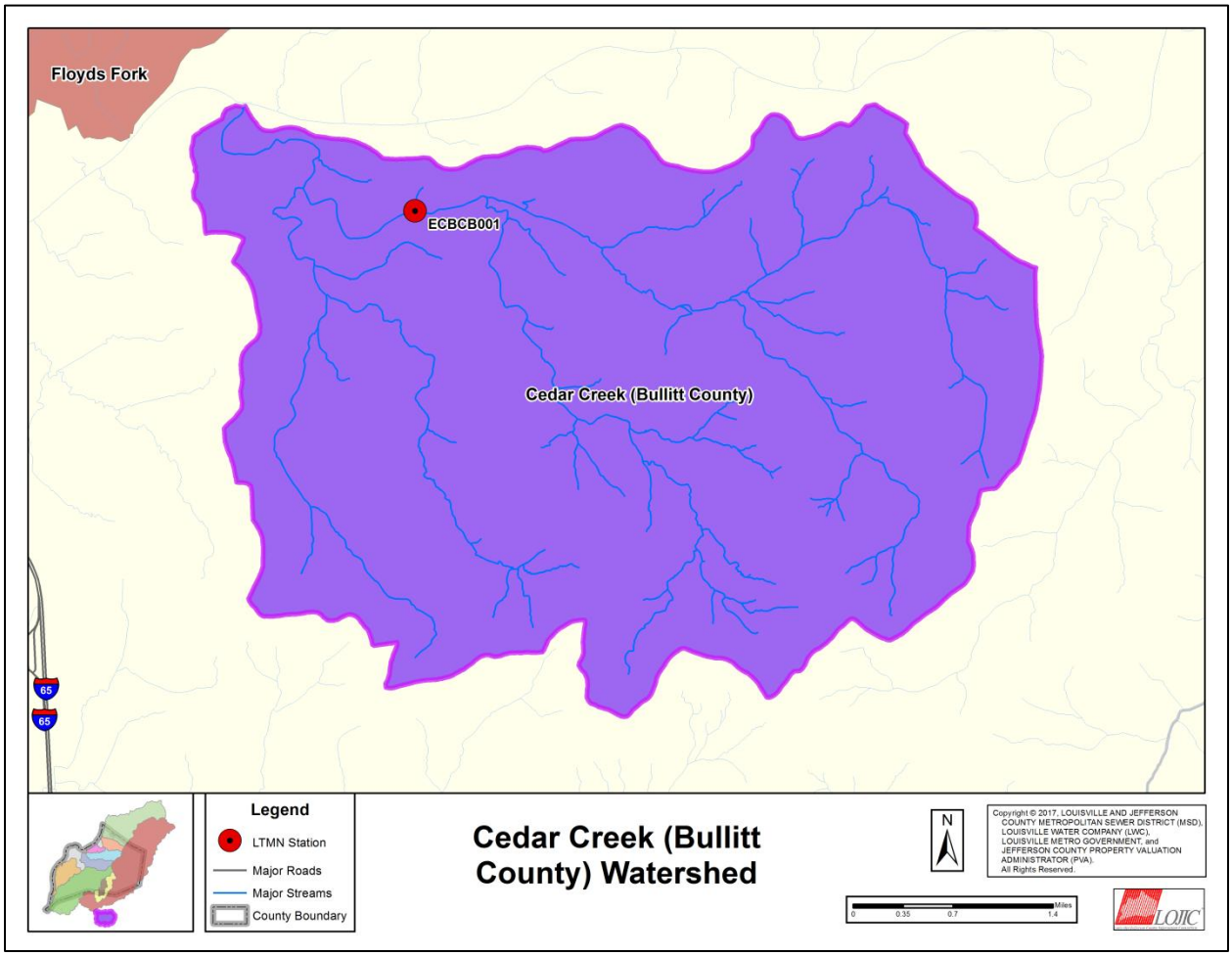
Quarterly Monitoring Results: At Mill Creek Cutoff at Cane Run Road, all four samples were collected under dry conditions. At Mill Creek at Orell Road three samples were collected under dry conditions and one under wet conditions. Average TSS concentrations were 11.8 mg/l and 14.3 mg/l, respectively, at Cane Run Road and Orell Road. Average TKN was 0.49 mg/l and 0.51 mg/l, respectively. The average oil and grease for Mill Creek Cutoff at Cane Run Road was 1.25 mg/l and below 1 mg/l for Mill Creek at Orell Road. Quarterly copper samples were less than the hardness dependent chronic aquatic life criteria.

Bacteria Monitoring Results: Average (geometric mean) concentrations of *E. coli* bacteria ranged from 52 MPN/100 ml to 1,327 MPN/100 ml in samples collected at two monitoring locations in the Mill Creek watershed. The water quality criteria for *E. coli* were met in two of six months during the recreational season at Cane Run Road and zero of six months at Orell Road.

Biological Monitoring Results: Benthic communities were rated as “poor” in the Mill Creek Cutoff and “Mill Creek at Orell Road, based on data collected in Spring 2015. Fish communities were rated as “poor” both sites, based on data collected in Fall 2015. Habitat quality at both locations was rated as “poor,” based on data collected in 2015. Algal communities were rated as “excellent” in the Mill Creek Cutoff and “good” in Mill Creek at Orell Road based on data collected in Fall 2015.

5.5.11 CEDAR CREEK WATERSHED (BULLITT COUNTY)

Figure 5.5.11 – Cedar Creek (Bullitt County) Watershed



Watershed Description: The small streams that eventually form Cedar Creek originate in the Cedar Grove area in Bullitt County. Cedar Creek flows north and empties into the Salt River east of Shepherdsville.

MSD monitors water quality in Cedar Creek at State Highway 1442 (ECBCB001). This site drains 12.1 square miles of land. This watershed is mostly forested and impervious area covers only 0.2% of the watershed.

Continuous Monitoring Results: Final continuous monitoring data were available between October 1, 2015, and September 30, 2016, in Cedar Creek at State Highway 1442. During this time period, the temperature data set was 99.5% complete and 100% of available values met the temperature criterion. The dissolved oxygen data set was 92.1% complete, average dissolved oxygen was 9.6 mg/l, and the dissolved oxygen criteria were met 97.3% of the days

with a complete record. The pH and specific conductance records for this site are being reviewed by USGS.

Quarterly Monitoring Results: At Cedar Creek at State Highway 1442, all four samples were collected under dry conditions. Average TSS concentrations were 4.7 mg/l. Average TKN was 0.32 mg/l. The average oil and grease for Cedar Creek at State Highway 1442 was 1.1 mg/l. Quarterly copper samples were less than the hardness dependent chronic aquatic life criteria.

Bacteria Monitoring Results: Average (geometric mean) concentrations of *E. coli* bacteria ranged from 91 MPN/100 ml to 546 MPN/100 ml in samples collected at Cedar Creek at State Highway 1442. The water quality criteria for *E. coli* were met in one of six months during the recreational season in Cedar Creek at State Highway 1442.

Biological Monitoring Results: In Cedar Creek at State Highway 1442 the benthic community was rated as “fair,” based on data collected in Spring 2015. Fish communities were rated as “excellent,” based on data collected in Fall 2015. Aquatic habitat quality was rated as “good” in 2015. Algal communities were rated as “excellent” based on data collected in Fall 2015.

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