CITY OF KANSAS CITY, MISSOURI

National Pollutant Discharge Elimination System (NPDES)

Municipal Separate Storm Sewer System (M4) Permit

MO-0130516

May 1, 2020 - April 30, 2021

KANSAS CITY
MISSOURI

October 2021

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS

APWA	American Public Works Association
ARAP	Assumptions & Attainment Plan
Archibus	Archibus Environmental & Risk Management System
BMPs	Best Management Practices for stormwater
BOD	Biochemical oxygen demand
CERC	Columbia Environmental Research Center
City	City of Kansas City, Missouri
COD	Chemical oxygen demand
EPA	U.S. Environmental Protection Agency
GIS	Geographical Information System
HHW	Household Hazardous Waste
KCEEN	Kansas City Environmental Education Network
MARC	Mid-America Regional Council
MCMs	Minimum Control Measures
MDNR	Missouri Department of Natural Resources
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollution Discharge Elimination System
Permit	MO State Operating Permit MO-0130516
PHFs	Pesticides, herbicides, and fertilizers
SPCC	Spill prevention control and countermeasures
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TSD	Treatment, storage and disposal
USACE	U.S. Army Corp of Engineers

CERTIFICATION

As required in Part H, Section 1 of Missouri State Operating Permit No. MO-0130516, annual reports shall be signed in accordance with 40 CFR 122.22 and 10 CSR 20-6.010(2)(B) and include the following 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 information submitted is, 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 fines and imprisonment for knowing violations.

Terry Leeds, Director

KC Water

City of Kansas City, Missouri

10/27/21

Date

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INTRODUCTION

This report is submitted to the Missouri Department of Natural Resources (MDNR) by the City of Kansas City, Missouri (the City) pursuant to the conditions of the National Pollutant Discharge Elimination System (NPDES) Missouri State Operating Permit MO-0130516 (the Permit) for stormwater discharges from its municipal separate storm sewer system (MS4). The report documents permit activities conducted during May 1, 2020 through April 30, 2021 (the reporting period).

As required in the Permit, the City submitted to MDNR an updated plan for its Stormwater Management Program in August 2019 (2019 SWMP). The plan was prepared to ensure its compliance with condition specified in the renewed permit issued in September 2018. During the reporting period, the City re-evaluated its permit implementation and its long-term plans. The City is in the process of making adjustments to its 2019 SWMP for improved compliance with the permit terms. The City is planning to submit an updated SWMP (2021 SWMP) to MDNR for review and approval within the next reporting cycle (May 1, 2021 through April 30, 2022).

The report is organized to match the layout of the requirements in the Permit and include activities identified in the 2019 SWMP. For each of the nine minimum control measures (MCMs) required in the Permit, a list of relevant Best Management Practices (BMPs) is provided with a description of individual BMPs, a summary of compliance status, assessment of BMPs, implementation status, plan for the next reporting period, any planned changes to SWMP, and a summary of monitoring results, where applicable.

SECTION 1. TOTAL MAXIMUM DAILY LOAD

Total Maximum Daily Load (TMDL) (Permit Ref. C.)

Status: Not applicable

No Total Maximum Daily Load (TMDL) had been established that include MS4 wasteload allocations by the end of the reporting period. The Permit requires action from the permittee when the receiving stream has an approved or established TMDL.

SECTION 2. MINIMUM CONTROL MEASURES (MCMs)

1. Public Education and Outreach of Stormwater Impacts

The City has ongoing public education and outreach programs to inform the public about the impacts of stormwater discharges on waterbodies and steps the public can take to reduce pollutants in stormwater runoff as identified in the SWMP. The following are highlights of MCM 1 activities including BMPs.

1.1 Inform the public (Permit Ref. E.1-a.i.)

Measurable Goal: Ongoing use of the available public outreach resources to provide relevant information.

Status: Goal met through multiple public education and outreach efforts.

BMP 1: City's *What's on Tap?* newsletter to its water customers every other month. The newsletter is a tool for wide-spread dissemination of educational messages and information. During the reporting period, a new section, KC Education Station, was added to highlight outreach activities.

BMP 2: City's website to provide information on stormwater management and water quality matters. The City continued to improve its website, including its education page (https://www.kcwater.us/education/). The page currently lists various links and resources covering teacher resources, community outreach, water quality, tours, printed materials, videos, and water quality grants.

BMP 3: City's ongoing public water quality education program. During the reporting period, the City's public education and outreach program added a new curriculum to the list of lessons provided along with national and state standard alignments in science. Previously, the water quality education program provided four curricula offered to a variety of grade levels. The program has been expanded to provide individual curricula for every grade from kindergarten through 12th grade. The education program initiated development of a school district partnering strategy.

BMP 4: Use of Social Media to promote and inform about stormwater activities and outreach. KC Water continued to inform citizen of public education and outreach and stormwater runoff mitigation through social media. KC Water uses Twitter, Facebook, Instagram, YouTube and LinkedIn to promote clean water messages. During the reporting period, KC Water created 58 posts on Twitter, 30 post on Instagram, and 47 on Facebook relating to stormwater and education and outreach.

Continuous Improvement: The City will continue to educate and reach out to the public by enhancing and improving its existing programs and exploring new opportunities and venues. Under the school district partnering strategy, the City would support school districts to provide water quality education for all grades. The education program has started to evaluate candidate school districts for implementation of this strategy and started to develop a memorandum of understanding template for partnering school district.

1.2 Pollutants related to pesticides and pollutants related to used oil (Permit Ref. E.1-a.ii.)

Measurable Goal: Efforts were carried during the reporting period. Specific measurable goal will be defined in the upcoming updated 2021 SWMP.

Status: The requirement was addressed through multiple efforts.

BMP 1: Use of the *KC to the Sea* curriculum in City schools. The curriculum was designed to help educate 4th through 6th grade students on the role of stormwater management in protecting the water quality in local rivers, lakes, and streams. Students measure the amount of water in gallons from a square yard and then estimate those gallons in larger impervious surfaces. During the reporting period, 20 lessons were taught to a total of 1,048 students in 13 public schools, one private schools, one Montessori school, and three nonprofit groups. In response to COVID, ten lessons were taught in person, nine lessons were taught virtually, and one lesson being taught in a hybrid of in-person and virtual.

BMP 2. Freddy the Fish, Trash Tally, and Water Testing. City staff taught ***the Freddy the Fish*** class to young children. The purpose is to educate them about various pollutants brought by human activities that Freddy will encounter during his adventure. Pesticides, oil and gasoline are among the listed pollutants. Eight lessons were taught to 225 students in four public schools, two charter schools, one Christian school, and one nonprofit group. In response to COVID, two lessons were taught in-person and six lessons were taught virtually.

Trash Tally is a program targeted for 3rd Graders. It incorporates graphs and storm drain locations, and it is usually a prelude to a litter pickup or other service project. Students are educated about the movement of stormwater down towards storm drains, as well as the types of trash commonly found in the runoff (oil, chemicals, metals are on the list). During the reporting period, a trash tally lesson was taught to 12 students, in-person at a public school.

A Water Testing lesson is designed to introduce students to various components and substances found in our waterways and how they can be used to determine water quality. Students learn about the general testing methods, assessment tools, data collection and evaluation of water pollution. Connections are made as to how stormwater runoff negatively impacts these waterways. A water testing lesson was taught to 32 students, in-person at a private school.

BMP 3: Adult Water Lessons. The City created a new lesson that builds on the ***KC to the Sea*** curriculum. This lesson adds in more information about stormwater runoff, the wastewater consent decree and infrastructure, and expanded information on pollutants in runoff. During the reporting period, three lesson presentations were provided to 51 adults from three nonprofit groups. One lesson was taught in-person and two were taught virtually.

Continuous Improvement: The City will continue to conduct various programs to educate both children and adults.

1.3 Activities and materials specific to targeted audiences and pollutants (Permit Ref. E.1-a.iii.)

Measureable Goal:

- Completion of annual requests for proposals, review, administration and award of grants.
- Active implementation, participation and support of efforts.

Status: Goals met.

BMP 1. Public Education Activities. A list of public education activities is listed in TABLE 1. below.

Table 1. A list of public education activities

Programs/ Partnerships	Achievement During this Report Period
KC Green	In 2008, four KC Green Teams were created under Administrative Regulation 5-5 Green Solutions and Sustainability: Education and Outreach, Green Infrastructure, Regulation and Policy, and Resource Management. To effectively execute the mission of each team, City staff members from various departments volunteer their time. • The Green Infrastructure Team continued to work on identifying, tracking, and supporting green infrastructure capital projects. • The Regulation and Policy Team prepared a new Tree Preservation Administrative Regulation (AR) for tree canopy preservation and enhancement in departmental activities. The City adopted it in September 2020. The AR provides policies and procedures for tree removal and replacement within City property and City right-of-way and expand the tree canopy based on recommendations in the Urban Forestry Master Plan and the Climate Protection Plan. The Team is drafting a new ordinance addressing tree canopy preservation in development within the city. As part of the process, existing codes will be updated and brought into compliance to ensure developers are protecting the existing tree canopy and planting new trees. • The Resource Management Team received a grant from the Mid America Regional Council (MARC) Solid Waste Management District to improve procurement processes within the City. The grant will be used to audit current practices, create training materials for city staff, identify Key Performance Indicators to measure success, and work with the Procurement Department and vendors to ensure that sustainable products are widely promoted. The goal of this grant is to reduce the amount of hard to recycle items procured and promotion of more sustainably sourced products. • The Education & Outreach team partnered with Solid Waste to hold the Fall Hard to Recycle Event on November 7, 2020 at Manual Career & Technical Center. A total of 197 cars dropped off 6000 pounds of household hazardous waste, 1200 tires, 48 tons leaf/brush/bulky/trash, 6,857 pounds of electronics and one ton of glass. In addition, four tons of paper documents were brought and shredded. The Team partnered with Parks & Recreation Department and KC Water for Earth Day 2021. Thirty volunteers including City staff and neighborhood residents removed 63 large blue bags of trash and five tires from the Swope/ Elmwood Neighborhood. • The KC Green Infrastructure Team provided continued support for the City's Green Stormwater Infrastructure (GSI) Manual and GSI Story Map. These resources are being used to inform green infrastructure project design and were made available on KC Water's web site at https://www.kcwater.us/programs/green-stormwater-infrastructure-gsi/
Green Infrastructure Tours	• KC Water offers educational tours of its public green infrastructure facilities and Green Storm Infrastructure demonstration parking lot at its Swope Campus headquarters. • KC Water hosted two tours of the Swope Campus, reaching 13 people.

Water Education for Kansas City (WE KC Program)	Programs target students/youth at each level of learning. During the reporting period these lessons were provided: • What is Water: Pre-K: a new program offered to teach younger students about the importance of water and the importance of keeping it clean. The lesson was taught through an online format with 147 students. • Freddy the Fish: Grade Kindergarten: See E.1-a.ii.1. BMP 2 • Trash Tally: Grade 3: E.1-a.ii.1. BMP 2 • Hitchhiking with H20: Grade 4: This program was developed to prepare students for a better understanding of *KC to the Sea* by expanding on the properties of water. Students are introduced to characteristics of water and types of water pollution. The lesson engages students in discussion and debate regarding point and non-point pollution. Five lessons were taught online reaching 261 students from one public school and one charter school. • KC to the Sea: Grades 4-6: See E.1-a.ii. BMP 1 • Water Testing Grade 8-12: See E.1-a.ii.1. BMP 2 • Adult Lessons- All adults: See E.1-a.ii. BMP 3 • Macro Monitoring: Grades 6-12: Through this lesson, students learn how human activities can affect the water quality of rivers and streams, which can support a broad variety and abundance of life. They learn to analyze maroinvertebrate samples in the classroom to assess the water quality of a stream. If a field trip option is available, the students can capture and evaluate their own macroinvertebrates at a nearby creek or stream. Macro Monitoring was taught to 56 students at two table events with a nonprofit organization and 10 adults for an in-person lesson.
Water Quality Small Grant Program	**See TABLE 2.** Administer the annual Water Quality Education grant program
Stormwater Table Events	Stormwater table events are community outreach at tabling events with informative posters on stormwater runoff and stormwater mitigation. There were three outreach events, reaching about 56 people.
Stormdrain Marking	KC Water works with students to mark storm drains around the city with markers that teach runoff leads to the river. Five students and adults participated in marking drains.
Stormwater Presentations	• KC Water provides presentations regarding stormwater runoff, pollution, and improved water quality to various groups of all ages. During this reporting period, six presentations were given to 77 people with non-profits, homeowners associations, and volunteers. In response to COVID, one was given in-person and five were given virtually.

Community Litter Pickups	• KC Water works with all age groups to provide an educational litter pickup. • These events feature a talk on watersheds, pollution, and stormwater runoff along with safety instructions for proper trash collection. • 19 Events were completed 447 people collecting over 140 bags of trash. - Ten youth groups and schools with 255 students participated in educational litter pickups collecting over 37 bags of trash. - Two neighborhood groups with 43 people participated in educational litter pickups collecting over 15 bags of trash. - Two college groups with 18 people participated in educational litter pickups collecting over 13 bags of trash. - Three nonprofits with 72 people participated in educational litter pickups collecting over 4 bags of trash. - Project Blue River Rescue event with 29 adults collected over 15 bags of trash with two tires removed. - Elmwood Earth Day trash bash with 30 adults collected 56 bags of trash along with 5 tires.
The Mid America Regional Council (MARC) Water Quality Public Education Program	• KC Water continues to be a leading stakeholder for this program. • "Don't Leave It Behind" Personal Protective Equipment (PPE) Campaign: From August to October 2020, the Water Quality Public Education Committee ran an online media campaign to inform metro area residents about the importance of properly disposing of PPE during the COVID-19 pandemic. The campaign was posted on Facebook, Instagram, Twitter, YouTube and Pinterest as well as its home page of the public education website CleanWaterKCMetro.org where it was viewed 10,713 times by 7,159 visitors. Online media campaign garnered a total of 2,162,304 impressions, 211, 996 views, and 3,796 clicks. • Plan It Native Partnership Messaging: The 2020 Plant It Native Conference, hosted by Deep Roots, promoted native landscapes for a healthy planet. A video presentation on the importance of picking up PPE was shown at the virtual 2020 event in addition to a $1000 sponsorship. • Education and outreach campaign: - continued to distribute brochures with a variety of education messages including Build Your Own Rain Garden, Know your Roots, Pick Up After Your Pet, Making and Using Compost, Use Lawn Chemicals Wisely, Keep Sediment Out of Our Water, Protect Our Streams and more. - continued to distribute "Do Not Mow/Native Planting" signage for constructed green stormwater sites, - continued to give away portable, refillable pet waste bag dispensers with "Pick Up After Your Pet" message. - continued to distribute storm drain inlet markers for local municipalities. - continued to distribute automotive trash bags with the "Stop Littering" imprinted message.

BMP 2: **Water quality education in the Era of Covid-19.** During the COVID pandemic, interactions were limited with schools, community groups, outreach events and social gatherings. KC Water shifted to create more online content and reach people through more online presentations. Lessons were able to be taught in an outdoor setting with social distancing and mask mandates being followed. Online lessons made up approximately 40% of all outreach being completed during the reporting period. 29 of 72 outreach efforts were completed online with an additional lesson being taught in a hybrid of in-person and online.

BMP 3: Active participation and financial support for MARC's Water Quality Education Committee (WQEC). The City continues to be a leading stakeholder and sponsor for MARC's water quality education effort. KC Water staff attended three quarterly meetings during the reporting period. Also see Table 1. A List of public education activities for details.

BMP 4. Continue City's participation and support for American Public Works Association's (APWA) efforts to improve and update various development standards that benefit water quality. The City continued to participate in the efforts by the Kansas City Metropolitan Chapter of APWA to revise stormwater-related standards that include *APWA Division II. Sec. 2600 Storm Sewers* and *Sec. 5600 Storm Drainage Systems & Facilities*.

Continuous Improvement: The City will continue various programs and activities. The City will also go through the appropriate process to adopt the updated APWA standards and manual as needed.

1.4 Public reporting of illicit discharges or water quality impacts (Permit Ref. E.1.a.iv.)

Measureable Goal: Ongoing use of the resources to provide relevant information.

Status: Goal met.

BMP 1: Promote, publicize, and facilitate public reporting of illicit discharges. The City uses a centralized system – 311 to provide a hotline for residents to report a problem, request a service, or track a City service, including addressing illicit discharges. During the reporting period, a new app, myKCMO, was implemented to make the system readily accessible for different communication devices. Residents can download the app through App Store, Google Play, or web app, or simply call 311 or (816)513-1313 to ask for services. The twitter account is Follow@KCMO311.

https://www.kcmo.gov/city-hall/311

Each request is assigned a case number, logged by category and routed to the appropriate City department for follow-up and resolution.

Continuous Improvement: Continue to use these resources to address this requirement and look for opportunities to increase effectiveness.

2. Public Involvement and Participation

The City developed and implemented several public involvement/participation programs to connect public with the SWMP. These efforts promoted volunteer activities for stream clean-up to improve water environment.

2.1 Public involvement in the development of the SWMP (Permit Ref. E.2.a.i.)

Measureable Goal: Public participation in the development of the SWMP.

Status: Goal met.

BMP 1. Opportunities for public involvement in the development of the SWMP. During the reporting period, the City started to update its 2019 SWMP. The City re-evaluated its permit implementation and its long-term plans, and is making adjustments to the 2019 SWMP for improved compliance with the permit terms.

Continuous Improvement: Continue to implement the 2019 SWMP and continue to update the 2019 SWMP; The updated plan, 2021 SWMP, will be submitted to MDNR for review and approval.

2.2 Public participation in implementation activities (Permit Ref. E.2.a.ii.)

BMP 1. Work cooperatively with non-governmental organizations on educating and training students on stormwater management, water quality, and water quality testing and KC to the Sea curriculum

Measureable Goal: Active participation and support of efforts.

Status: Goal met.

Through KC Water's Water Quality Small Grant Program, KC Water continued to work with various non-governmental organizations, including Friends of Kaw Point Park, Bridging the Gap, Stonelion Puppet Theater, and Little Blue River Watershed Coalition.

KCEEN: KC Water participates in the Kansas City Environmental Education Network hosted by Mid America Regional Council. The mission of KCEEN is to improve environmental education for students throughout the Kansas City region by raising awareness, providing opportunities for action, and coordinating information and resources. KCEEN serves pre-K through 12 educators through professional development opportunities and events.

MEEA: KC Water participates in the Missouri Environmental Education Association. This group meets to promote environment education and support EE educators such as KC Water with our stormwater lessons. The Justice, Equity, Diversity, and Inclusion work group (JEDI) is a subcommittee that meets to talk about how to incorporate more accepting language and practices for equity and inclusion among all environmental educators in Missouri. Part of the group discussion focuses on how to support MEEA and MEAA membership to represent all groups through inclusive mission statement, hiring practices, and educator resources, including KC Water's stormwater lessons that can also be region specific to list a few.

Continuous Improvement: The City will continue the above practices for public involvement and participation.

BMP 2. Administer KC Water's Annual Water Quality Education Grant (WQEG) program

Measurable Goal: Completion of another round of solicitation, review, and award of grants.

Status: Goal met.

During the reporting period, KC Water continued to work with the organizations that received the grant in 2020. See Table 2 for the achievements made.

In March 2021, KC Water selected seven proposals from twelve organizations to provide a total $97,599 in grant money to support projects and activities related to water quality protection, improvement, and education. The organizations and their proposals were:

- Bridging the Gap; *Business Outreach and Stream Clean-up Project*
- *Project* Heartland Conservation Alliance: *Green Guard Stewardship Training*
- Hickman Mills School District: *The Water Fair*
- Little Blue River Watershed Coalition: *Cleaning the Blue, the Little Blue, and Mighty MO Too*
- Missouri River Relief: *Kansas City Missouri River Cleanup*
- Pembroke Hill School District: *Water Week at Pembroke Hill*
- StoneLion Puppet Theatre: *Puppets for the Water*

Continuous Improvement: KC Water will continue to administer this program.

Table 2. WQEG program achievement summary

Organization	Achievements
Bridging the Gap (Be the Solution to Storm Drain Pollution)	• Reached out to businesses about how their operations may impact water quality • Identified three high priority stream areas to host litter pickups • Completed three clean-ups, recruited 68 volunteer • Prior to the litter pickups, volunteers recruited from the surrounding area were educated on the connection between storm drains and watersheds and given a "call to action" to make changes on their own properties to protect water quality
Friends of Kaw Point Park (Watershed Education and Activities)	• In a partnership that crosses the state line, KC Water funded the Kansas City, KS based Friends of Kaw Point Park to teach of their "Runoff to Rivers" classes. • Reaching 95 students in five classes. The curriculum consists of five lessons aligned to the Next Generation Science Standards for grades 5 -12 and meets science requirements for those grade levels. The lessons introduce students to the concept of watersheds and how stormwater runoff impacts water quality in local streams, take students to a stream site to measure water pollutants and collect and identify macroinvertebrates, discuss how water quality problems become issues and affect the aquatic life, and figure out solutions are discussed and debated.
StoneLion Puppet Theatre (*StoneLion 2020 KC Water Education Program)*	• Expanded environmental education through the art of puppetry

	• Performed shows with puppets to teach about stormwater pollution - Three shows- one in-person and two virtual with 394 attendees. - Nine workshops- two in-person and seven virtual with 205 attendees - One in-person performance with 48 attendees.
Little Blue River Watershed Coalition	LBRWC connects citizens to their rivers and streams by using hands on projects to demonstrate best management practices that make a difference in stream health. • Focused on 30 days of cleanup to celebrate 30 years of river cleanups. - Advertised the '30 days of river cleanups to celebrate 30 years of Project Blue River Rescue' thru e-mails, social media, and partner newsletters with a total of over 3,500 impressions - With health department restrictions, fewer than 100 students, corporate employees, group and family members cleaned one site on the Missouri River and 10 sites on the Blue River. - Collected about one ton of trash, several tires, car battery, and household hazardous waste such as oil and paint. About 500 lbs. of that came from the banks of the Missouri River at Berkley Riverfront Park.

3. Illicit Discharge Detection and Elimination

The City's efforts include implementing and enforcing a program that detects and eliminates illicit discharge to the MS4 system. A key aspect of the efforts is maintaining the system mapping in the geographic information systems (GIS). The City is making progress in implementing procedures to manage non-stormwater sources.

3.1 Maintain and update a storm sewer map Permit (Ref. E.3.a.i.)

Measureable Goal: Add all new outlets as established to the KC Water GIS and systematically review historical system for gaps

Status: Goal met.

BMP 1: Maintain the geographical information system (GIS) for outfall mapping. The City maintains the GIS that map constructed outfalls and all receiving waterbodies. The City's data sources for the outfalls information include:

- City-wide watershed studies conducted between 1997 and 2007
- Levee sewer outfall inspection reports conducted prior to 2002
- Investigations conducted under the City's Combined Sewer Overflow Program
- Data for the City's wastewater sewer systems
- Construction As-built drawings

BMP 2: Update the GIS. As KC Water receives As-Builts from various sources, newly-constructed outfalls are added to the map. In addition, KC Water may also make a correction or addition on the outfall locations if a review of archived As-Builts or easement indicates any error. Such a review is usually conducted per a customer's request for information.

Continuous Improvement: KC Water will continue to use a systematic approach to update and maintain the GIS for storm sewer system mapping.

3.2 Prohibit illicit discharges and implement enforcement procedures and actions (Ref. E.3.a.ii.)

Measureable Goal: Efforts were carried during the reporting period. Specific measurable goal will be defined in the updated 2021 SWMP.

Status: The Permit requirement was addressed through continuing to implement the ordinance.

BMP 1: Continue to implement the City ordinance. The City adopted an ordinance for Stormwater Discharge Control Regulations (Chapter 61. Article III.) in 2007. The article specifically regulates the contribution of pollutants to the stormwater drainage system by any user, prohibits illicit connections, and establishes legal authority to carry out all inspections, surveillances, monitoring and enforcement procedures necessary.

Continuous Improvement: The City will continue to implement the ordinance.

3.3 Inspection and investigation procedures for illicit discharges (Permit Ref. E.3.a.iii.)

Measurable Goal: Resolution of potential illegal connections and related issues.

Status: Goal met.

BMP 1: Conduct the inspection following the established procedure. KC Water is responsible for investigating reports of illicit discharges. A written procedure was developed for illicit discharge investigation in 2013. It continued to follow the procedure for investigation. The investigation procedure follows the manual, *Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessments,* developed by the Center for Watershed Protection and Robert Pitt. During the reporting period, KC Water investigated eight incidents of suspicious illicit discharges. All were resolved.

Continuous Improvement: KC Water will continue to investigate any reported incidents per the established procedure and implement enforcement procedures and actions as specified in the ordinance.

3.4 Conduct a field screening program (Permit Ref. E.3.a.iv.)

Measurable Goal: Complete a minimum of 100 screenings annually.

Status: Goal met.

BMP 1. Conduct field screening of the major outfalls. KC Water had completed the field screening of the major outfalls in the watersheds north of the Missouri River in previous years and has been in the process of assessing those located south of the River since 2018. During the reporting period, KC Water continued to screen the outfalls in the watersheds south of the River and those functioning as a component of the City's separate storm sewer system. A total of 100 outfalls were screened.

The field inspector utilized the City's GIS to identify the sites for screening and followed the procedure established previously.

Continuous Improvement: Continue to implement the established program

3.5 Procedures to minimize, contain, and respond to spills (Permit Ref. E.3.a.v.)

Measurable Goal: Continue the established procedures.

Status: Goal met.

BMP 1: Implement the established guidelines to address spills. The Fire Department implements the following guidelines that address the potential impact on stormwater from a spill:

- HazMat Response General Operational Guideline for Fuel Spills. The Guideline encourages using dry absorption as the preferred method to clear a spill and taking measures to protect stormwater drains. It also provides direction on how to properly dispose of water and avoid discharge into storm drains if flushing is the option.
- HazMat response General Operational Guideline for First Responders. The Guideline requires the flush water must be confined after it has been used and then disposed of properly.

The Fire Department responded to a total of 353 incidents, of which 337 are for fluid cleanup and 16 are for hazardous materials handling during the reporting period. Hazardous material-related incidents referred to here may not necessarily be about liquid spills (e.g., chemical odors emitted from structures). Also note the total number does not include incidents that may have fluids spilled but were classified as a higher level of calls (i.e., emergency calls for injuries in vehicular accidents, etc.).

Continuous Improvement: The Fire Department will continue to implement the guidelines.

3.6 Limit exfiltration from municipal sanitary sewers (Permit Ref. E.3.a.vi.)

Measureable Goal: To be defined in the upcoming 2021 SWMP.

Status: The Permit requirement continues to be addressed through KC Water's programs to limit exfiltration from sanitary sewers.

BMP 1: KC Water maintains the City's sanitary sewer system through a joint effort by different divisions.

Wastewater Maintenance Division

161	miles of sewers televised
403	miles of sewers cleaned
1,632	feet of public sewers repaired
4,974	feet of private sewers repaired
106	manholes repaired

Smart Sewer Program

101	miles of sewers televised
91	miles of sewers cleaned
8,553	feet of lateral repaired, replaced/rehabilitated
168,380	feet of sewer main repaired/replaced/rehabilitated
1,131	inlets repaired/replaced/rehabilitated

Collection Systems

33	miles of sewers televised
33	miles of sewers cleaned
33,898	feet of sewer line rehabilitated
125	sewer repair jobs
5	manholes repaired

Continuous Improvement: The City will continue to implement the above programs to limit exfiltration and overflows from sanitary sewers, and will improve the data tracking through GIS tools in development.

3.7 Proper management of materials or wastes (Permit Ref. E.3.a.)

Measurable Goal: Reported quantities from various efforts and programs

Status: Ongoing

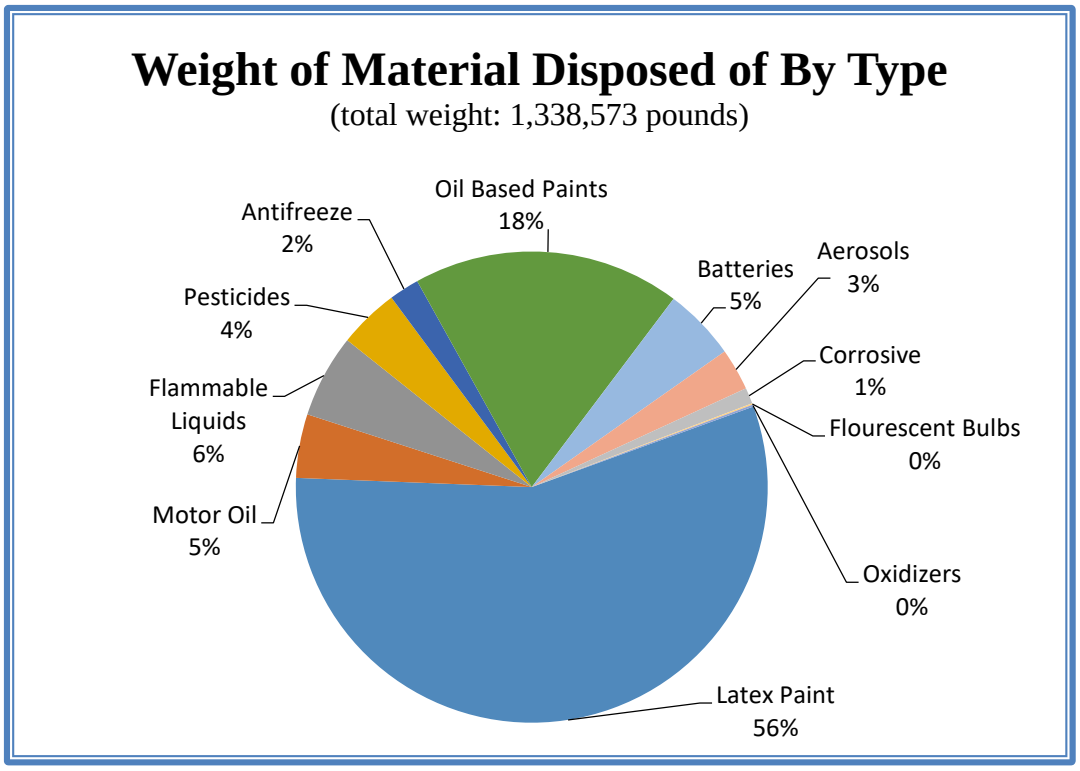
BMP 1. The City's operation of several waste management programs. The City operates multiple programs that encourage proper disposal, as well as preventing and addressing illegal dumping. See Table 3, Figures 1 and 2 for details.

Table 3. Comprehensive solid waste management program achievements

Quantity (in Ton)	Programs
	KC Recycles (FY 2020/21)
621	Community recycling drop-off centers (3)
71	Hard to Recycle (electronic appliance)
	Bulky Items Collection (FY 2020/21)
1,455	Bulky items
	Leaf and Brush Collection (FY 2020/21)
1,436	Curbside
15,000	Drop-off centers (3)
	Illegal Dumping Cleanup *(*FY 2020/21)
884	Material collected
	25 cameras placed at 18 locations
	Neighborhood Cleanup Assistance (FY 2020/21)
103	Tires collected in neighborhoods and during special events, or received at drop-off centers (# = 25,854)
	Number of dumpsters placed: 371
	Number of trucks for Neighborhood Clean-up: 220 trucks in 16 weekends

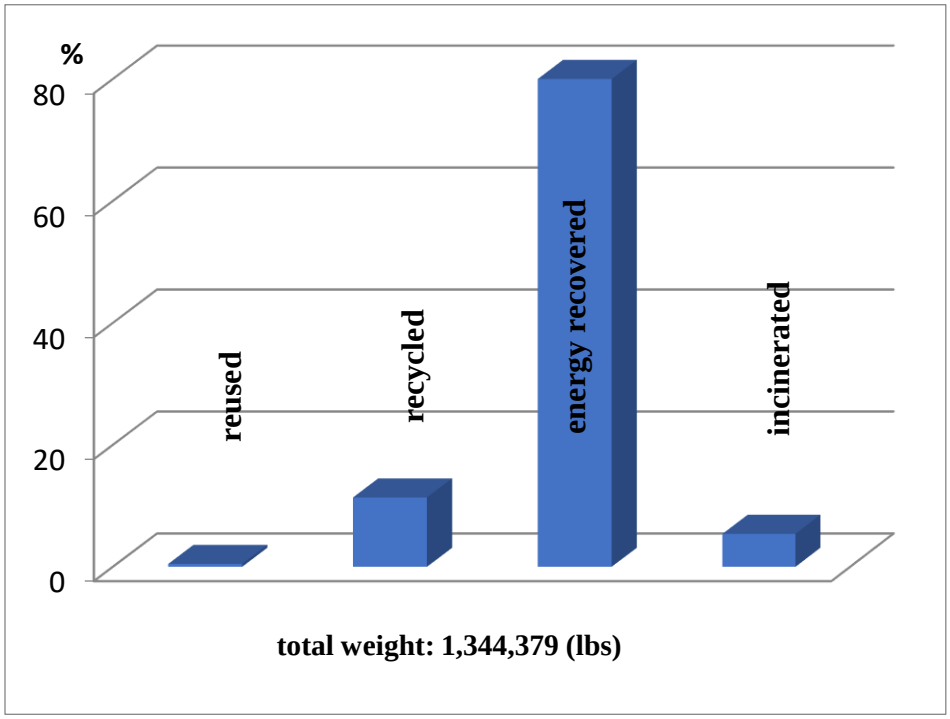
Quantity	Household Hazardous Waste (HHW) (Calendar Year 2020)	
659	HHW Facility	11,899 vehicles participated
76	Mobile Outreach	1,154 vehicles participated
3.2 tons	Total materials reused in Swap Shop	
76 tons	Total materials recycled	
556 tons	Total materials sent for energy recovery	
36 tons	Total materials incinerated	

Figure 1. Material by type disposed of by Household Hazardous Waste (HHW) facility in 2020



- Total weight of the materials disposed of (not collected) was 1,338,573 pounds, or about 669 tons.
- Total weights are only for materials that were reused, recycled, used for energy recovery, or material incinerated.
- Percentages reflect the HHW numbers associated with Kansas City, Independence, Lee's Summit and the MARC participating communities.

Figure 2. Distribution of material managed by HHW facility in 2020



Continuous Improvement: The Solid Waste Division of Public Works will continue to operate its various solid waste management programs. For the Household Hazardous Waste Facility, KC Water is conducting a study for management of and physical updates to the facility. The result of the study will be used to guide its future operation and management.

4. Construction Site Runoff Control

The City's efforts include development and enforcement of actions to reduce pollutants in stormwater runoff to the MS4 system, from construction activities on land disturbances sites that disturb one or more acres or disturb less than one acre when part of a larger common plan of development or sale that will disturb a cumulative total of one or more acres over the life of the project. The City's SWMP addressed this control measure and the efforts made during the reporting period are documented below.

4.1 Ordinances to require erosion and sediment control BMPs (Permit Ref. 4.a.i.)

Measureable Goal: Ongoing implementation of City ordinance as any development occurs.

Status: Goal met.

BMP 1: Continue to implement City ordinance. The City implements the City Code Chapter 63 Erosion and Sediment Control. Division 4 of this chapter is about enforcement which includes enforcement activities, suspension or revocation of permit, action against the security, as well as fines and penalties. See the link below.

https://library.municode.com/mo/kansas_city/codes/code_of_ordinances?nodeId=COORKAMIVOII_CH63ERSECO

Continuous Improvement: The City will continue its current practice.

4.2 Control construction site waste (Permit Ref. 4.a.ii.)

Measureable Goal: Efforts were carried during the reporting period. Specific goals will be defined in the upcoming 2021 SWMP.

Status: The Permit requirement continues to be addressed through City's requirement for waste management at construction sites.

BMP 1; City-funded construction projects. For City-funded capital projects, the City developed a template of Stormwater Pollution Prevention Plan (SWPPP) to address sediment and erosion controls. The Plan contains requirements to manage construction site-related wastes, including but limited to, solid waste, liquid waste, concrete waste (washout area), hazardous waste, etc.

BMP 2: Private construction projects. For private construction projects (≥1 acre), the City's Land Development Division with City Planning & Development Department requires that construction site operators comply with the City's erosion control requirements as well as the requirements of the Missouri Department of Natural Resources.

Continuous Improvement: The City will continue to ensure that waste management is required for all ≥1 acre construction projects.

4.3 Review construction site stormwater pollution prevention plans (SWPPPs) (Permit Ref. 4.a.iii.)

Measureable Goal: Efforts were carried during the reporting period. Specific measurable goal will be defined in the upcoming 2021 SWMP.

Status: Completed for City-funded projects.

BMP 1: SWPPPs for City-funded construction projects. For City-funded construction projects, KC Water reviews each SWPPP. During the reporting period, KC Water reviewed 32 SWPPPs submitted by project managers from different City Departments.

BMP 2: SWPPPs for Private construction projects. For privately-funded construction projects (≥1 acre), the Land Development Division of City Planning & Development Department reviews the Site Disturbance Plans that are submitted as part of the construction plans for the proposed development. Developers are required to obtain land disturbance permits from MDNR and to develop and implement a SWPPP per their permit requirement. The Land Development Division requires that the SWPPP be kept available and current on site for City inspectors to view during inspections.

Continuous Improvement: The City will continue the current practices.

4.4 Procedures to address public reporting of the discharge of pollutants (Permit Ref. 4.a.iv.)

Measureable Goal: Efforts were carried during the reporting period. Specific measurable goal will be defined in the upcoming 2021 SWMP.

Status: The Permit requirement continues to be addressed through using the 311 system.

BMP 1. City's 311 System for Centralized Reporting The City has a centralized 311 system to provide residents an access to report problems, and request and track City services, including addressing illicit discharges from construction sites. Once the report is logged into the system, the appropriate department or division will be assigned to investigate the issue. The department or division will close the issue in the system after the issue is resolved, The public can track the status online. See 1.4 BMP 1. for more details.

During the report period, 12 cases related to sediment or erosion control were logged in the 311 database and four cases were closed.

Continuous Improvement: The City will continue the current practices to address all public reporting.

4.4 Procedures for inspection and enforcement (Permit Ref. 4.a.v.)

Measureable Goals:

- For City-funded projects, KC Water provides monthly oversight inspections for active sites.
- For privately-funded projects, the Land Development Division of City Planning & Development Department provides a minimum of two inspections; additional inspections are as needed, depending on the scope and scale of the project.

Status: Continue to conduct inspections.

BMP 1: City-funded projects. KC Water provided monthly oversight inspection. The inspector identifies the status of the project through the City's e-Builder system and/or receives the notice from a project manager. Inspection starts the 1st month when the inspector is aware of the project, and does not stop until several months after 100% of the construction. Each project manager carries the responsibility for keeping the e-Builder system updated.

If there is any issue identified during the inspection, the inspector sends notification to the relevant project manager, who subsequently will inform the contracted construction manager. If the issue does

not get resolved within a reasonable timeframe, the project manager can withhold the payment to the contractor until the issue is resolved.

During the reporting period, KC Water conducted 242 inspections for 32 sites. Issues identified during the inspection were all resolved in time.

BMP 2: Private construction projects (>1 acre). No change related to site inspection or enforcement procedure was made. The Land Development Division continued to conduct biweekly inspections on sites with active permits. More than 2,718 inspections were conducted during the reporting period. However, enforcement actions were not tracked in Compass KC.

BMP 3: Privately-funded projects (< 1 acre). The Division of Inspections with City Planning & Development Department conducts investigations and enforces the ordinance. During the reporting period, the Division conducted 14,071 inspections with 435 failed erosion control inspections, and investigated 51 complaints that contained the word erosion in the description, and 17 complaints that contained the word mud in the description. However, the number of violations, or other forms of enforcement actions were not tracked.

Continuous Improvement: The City will seek improvement to its current practices and utilize the new online service to track record.

4.5 Compliance with the erosion and sediment control ordinance (Permit Ref. 4.a.vi.)

Measureable Goal: Efforts were carried during the reporting period. Specific measurable goal will be defined in the upcoming 2021 SWMP.

Status: The Permit requirement continues to be addressed through a joint effort by individual City Departments for City-funded projects and City Planning & Development Department's oversight of private projects.

BMP1: City-funded projects. The department that manages the construction work is responsible for the compliance with the erosion and sediment control ordinance. KC Water provides regular oversight inspections to ensure compliance.

BMP 2: Privately-funded projects. City Planning & Development Department is responsible for compliance with the ordinance that outlines the enforcement options.

Continuous Improvement: The City will continue its current practice.

4.6 Education and training for site operators (Permit Ref. 4.a.vii.)

Measureable Goal: Provide periodic training.

Status: Goal met.

BMP 1: Plan to host city-wide online training. During the reporting period, the City was in the process of preparing a city-wide online training for the topic of sediment and erosion control. The training is designed to target City project managers that oversee capital construction projects and inspectors with responsibility for inspecting construction sites that involves City land disturbance activities.

BMP 2: Training for site inspectors. During the reporting period, the staff with oversight inspection for capital project sites, took five webinars regarding sediment and erosion control-related topics. The City did not conduct any specific sediment and erosion control-related training to site operators.

Continuous Improvement: The City will provide on-line training for both project managers from multiple departments that are responsible for managing capital construction projects, and inspectors that are responsible for inspecting construction sites involving land disturbance activities.

5. Post-Construction Stormwater Management in New Development and Redevelopment

The City developed, implemented, and enforced a program to address the quality of long-term stormwater runoff from new development and redevelopment projects that disturb one or more acres or disturb less than one acre when part of a larger common plan of development or sale that will disturb a cumulative total of one or more acres over the life of the project. This program ensured that stormwater controls are in place that have been designed, developed, and implemented to minimize water quality impacts.

5.1 Ordinances to address post-construction runoff (Permit Ref. 5.a.i.)

Measureable Goal: Ongoing implementation of the requirements during development reviews.

Status: Goal met.

BMP 1: The City enacted a revised Zoning and Development code in 2009. The revised version promotes more open space and greater natural resource protection by incorporating the Stream Buffer Regulations and Conservation and Open Space Development Regulations. No significant stormwater-related changes have been made in the reporting period.

Continuous Improvement: The City will continue to implement and enforce the Zoning and Development code.

5.2 A plan for long-term operation and maintenance of selected BMPs (Permit Ref. 5.a.ii.)

Measureable Goal: Efforts were carried during the reporting period. Specific measurable goal will be defined in the upcoming 2021 SWMP.

Status: The Permit requirement was addressed through multiple efforts to operate and maintain the City's BMPs.

BMP 1; For new development or redevelopment-related BMPs, CP&D continues to use three covenants applicable to stormwater BMP maintenance scenarios. These covenants include: *Stormwater Detention Covenant for Maintenance*; *Stormwater Detention & BMP Covenant for Maintenance*; and *Conveyance of Easement for BMPs*. These documents require developers or property owners to take responsibility for maintenance, repair, and restoration of detention basins or BMP structures.

Currently CP& D does not track its reviews of BMP easements, covenants, or BMP maintenance agreements in Compass KC, the City's new permitting system.

BMP 2: Continue to maintain the stormwater green infrastructure installed on City properties. The maintenance responsibility may vary. Generally, General Services Department helps to maintain these green infrastructures, or individual department who owns the property has the maintenance responsibility. The KC Green Infrastructure Team is drafting a maintenance proposal aiming to develop a system for maintaining city-owned green infrastructure sites in a consistent approach.

BMP 3: For green infrastructure built through other stormwater projects, maintenance responsibility may vary. Examples of other stormwater projects include those funded by Public Improvement Advisory Committee. Any of the following may be designated or used for long-term

maintenance: the KC Water Green Solutions team, City's contractors, other City departments, or through memorandums of understanding between departments.

Continuous Improvement: The City will conduct an in-depth evaluation of the existing BMP operation and maintenance practices, and continue to seek improvement to the current practices.

5.3 Strategies to minimize water quality impacts (Permit Ref. 5.a.iii.)

Measureable Goal: Efforts were carried during the reporting period. Specific measurable goal will be defined in the upcoming 2021 SWMP.

Status: Multiple efforts are in place to minimize water quality impacts.

BMP 1: The City Planning & Development Department requires macro/micro stormwater drainage study for a development. A developer must submit a stormwater drainage study for a plat application as required by the City Code Chapter 66, Section 43 Preliminary plat and Section 45 Review of final plat by City Council. A general stormwater management plan must be submitted for the entire development when the preliminary plat is submitted. The plan must depict the concept for stormwater detention, BMPs, volume controls, or treatment areas as appropriate. A macro/micro drainage study must be submitted for the entire development when the first plat is submitted; a detailed micro drainage study must be submitted for approval before the issuance of any building permits; a macro storm drainage study for the entire development must be submitted with a micro stormwater drainage study for each phase during final platting. Refer to Permit Ref. 5.a.i for required adherence to Stream Buffer Ordinance and BMP manual.

BMP 2: The City continued to require developments' adherence to the adopted APWA Design Criteria and Supplements. The criteria includes the Manual of Best Management Practices for Stormwater Quality. The City also requires development's compliance with stream buffer regulations during the initial planning stages of new development/redevelopment, as well as during the construction of the projects. These criteria require developments to mitigate their potential impacts on water quality under post-construction conditions by including permanent water quality BMPs, stream buffers, and easement or covenants with maintenance provisions for sites within the MS4 area. In addition, KC Water provides guidance for implementation and design of BMPs during the plan review and approval process when requested.

Multiple City departments worked together to revise the APWA 5600 design criteria for *Storm Drainage Systems & Facilities* and APWA 2600 Specifications for Storm Sewers. Updated APWA 2600 Specifications are in the process of being adopted. Instead of adopting updated APW 5600 Design Criteria, commentary on enforcement of the currently adopted criteria have been distributed.

In November 2019, City Council passed Resolution #190760, which provided direction to implement the Green Stormwater Infrastructure (GSI) Manual on capital projects with an emphasis on inter-departmental integration, coordination of design, and construction of public improvements. The manual provides design recommendations, construction specifications, details, and also provides establishment and maintenance procedures for green infrastructures. The City continues to use the GSI manual on capital projects and encourages its use for other City capital improvements.

BMP 3: The City has adopted a stream setback ordinance and a companion conservation development ordinance. The ordinances are intended to protect life and property and promote healthy stream corridors while providing flexibility and development options in stream corridors and City-wide. The stream setback and conservation development ordinances became effective in 2009 and apply to new development, redevelopment, and construction and infrastructure projects near streams.

Stream setbacks are based on the stream's actual characteristics, including the 100-year floodplain or flood conveyance; adjacent steep slopes (greater than 15 percent grades) and mature, native vegetation (such as woodlands). Three zones are specified, with more restrictions closer to the stream. For details, see the 2009 MS4 report.

BMP 4: The City adopted the 2018 Urban Tree Master Plan. KC Green Team, which consists mainly of staff from different City departments, championed the 2018 Urban Tree Master Plan. The plan was adopted by City Council in February of 2020. During the reporting period, the team created a new administrative regulation for tree canopy preservation and enhancement in City departmental activities. The goal was to provide policies and procedures for tree removal and replacement within City property and City right-of-way, and to expand the tree canopy based on recommendations in the Urban Tree Master Plan and the Climate Protection Plan. This AR was adopted in September of 2020.

KC Green Team is in the process of drafting a new ordinance addressing tree canopy preservation in development within the city. As part of the process, existing codes will be updated and brought into compliance to ensure developers are protecting the existing tree canopy and planting new trees.

BMP 5: City Ordinance Chapter 28 addresses Floodplain Management. In Article IV. Provisions for Flood Hazard Reduction Sec. 28-51., general standards are set for:

1) Storage, material, and equipment. Specifically, the storage or processing of materials within the special flood hazard area that are in time of flooding buoyant, flammable, explosive, or could be injurious to human, animal, or plant life is prohibited.
2) Storage of other material or equipment may be allowed if not subject to major damage by floods, if firmly anchored to prevent flotation, or if readily removable from the area within the time available after a flood warning.
3) Hazardous materials. All hazardous material storage and handling sites shall be located out of `the floodplain.

Continuous Improvement: The City will continue with the current processes in place and refine or create new processes as needed or identified. In addition, the City will continue to review the updated APWA 5600 and 2600 draft standards and work on adopting the updated version.

5.4 Inspect post-construction BMPs (Permit Ref. E.5.a.iv.)

Measureable Goal: All facilities inspected prior to occupancy; inspect one-fifth of private stormwater facilities annually.

Status: Goals partially met – work in progress.

BMP 1: KC Water continues to administer the Detention Basin Credit program to encourage the use of detention/retention basins. Routine inspections were conducted to the listed basins and owners of the properties can receive the credit in their monthly stormwater bills. During the reporting period, KC Water inspected seven detention/retention basins. The department focused its effort on addressing the issues and corrective actions were taken to three basins. There are 99 basins on the inspection list.

Continuous Improvement: KC Water will increase the number of the inspection of private stormwater detention/retention basins, and in the meantime, will continue to address the issues identified through inspection.

6. Pollution Prevention and Good Housekeeping for Municipal Operations

The City currently have multiple efforts to practice pollution prevention and good housekeeping for City's municipal operations.

6.1 Employee training to prevent or reduce stormwater pollution (Permit Ref. 6.a.i.)

Measureable Goal: Efforts were carried during the reporting period. Specific measurable goal will be defined in the updated 2021 SWMP.

Status: The Permit requirement continues to be addressed through ongoing multiple training efforts.

BMP 1: Employee training related to sediment and erosion control at construction sites. For employee training related to sediment and erosion control at construction sites, refer to Section 4.6 for details.

BMP 2: Employee training related to municipal operations. KC Water uses three training videos for stormwater pollution prevention education for employees regarding municipal operations. These videos are produced by Excal Visual, and the titles are: *Stormwatch; A Drop in the Bucket,* and *Rain Check.* Each video is designed for stormwater pollution prevention for employees working outdoors with materials, wastes and operational activities that could potentially impact the quality of the stormwater runoff.

During the reporting period, KC Water purchased the license for online access to the three videos. KC Water made one of the videos - *A Drop in the Bucket,* available online to City employees. This move facilitates the employees training and overcame the challenges caused by the pandemics.

BMP 3: Job function related training. The City's Office of Environmental Quality provided City employees with trainings on Parts Washer, and Spill Prevention, Control and Countermeasure (SPCC). During the reporting period, 118 employees received training on Parts Washer, and 64 employees received SPCC training.

BMP 4: Training/information videos developed by the City. During the reporting period, the City made the following four videos available on its YouTube channel and received over a hundred views. The videos were designed to educate about stormwater infrastructure design recommendations, construction specifications, and establishment and maintenance procedures for green infrastructures

1) Introduction to using the Green Stormwater Infrastructure Specifications: SpecsIntact Software: https://youtu.be/r_GguR7FJ6Q, 24 views.
2) Introduction to the Green Stormwater Infrastructure Manual and Tools: https://youtu.be/0uE45Yd3tD4, 78 views.
3) Sustainability training https://youtu.be/oAeC76NVGt8, 14 views.
4) Sustainability training https://youtu.be/rVAbJ7tEhQA, 13 views.

KC Water also posted on its website a story map for the City's Green Stormwater Infrastructures: https://kcws.maps.arcgis.com/apps/Cascade/index.html?appid=8be27e83d420431e9679ca283f249655&folderid=33103bf3deef48bd899be072950d9a32

Continuous Improvement: The City will continue to provide training and education to its employees based on their job responsibilities.

6.2 BMP maintenance to reduce floatables and other pollutants (Permit Ref. 6.a.ii.)

Measureable Goal: Efforts were carried during the reporting period. Specific measurable goal will be defined in the updated 2021 SWMP.

Status: The Permit requirement continues to be addressed through multiple efforts to reduce floatables and other pollutants.

BMP 1: City departments continues to maintain green infrastructure facilities constructed on their properties. The continuing maintenance allow the established green infrastructure to function at an optimal level. Currently, individual department maintains its own BMP site, or has the site maintained by General Services or contractors.

BMP 2: KC Water's Prevntative Maintenance Division inspected and maintained the public detention basins. These public basins include the ones at 8801 James A Reed Rd., 6013 North Strathbury Road, 300 Chestnut Trafficway, 3913 North Kensington Road, Stillwell Avenue, and Gardner Avenue (now a retention basin). Contracting service was used to inspect and maintain the detention wetland on 81st St. and Troost Ave. The City owns and the City's Board of Police Commissioners maintains multiple detention basins at several police department patrol stations that include Central, Metro, South, East Patrol, and Shoal Creek stations.

BMP 3; KC Water maintains an inventory of BMP facilities constructed on City owned properties. The inventory is mapped in the City's Geographic Information System (GIS) for tracking and for facilitation of operation and maintenance.

Continuous Improvement: The City will continue to conduct inspections and maintenance as described above.

6.3 Controls for reducing or eliminating the discharge of pollutants (Permit Ref. 6.a.iii.)

City implemented measures for reducing or eliminating the discharge of pollutants from street, roads, municipal parking lots, maintenance and storage yards, waste transfer station, fleet or maintenance shops with outdoor storage areas, and salt/sand storage locations and snow disposal areas the City operates.

6.3.1 Management of deicing chemicals (Permit Ref. 6.a.iii.1.)

Measureable Goals: Amount of deicing materials used annually.

Status: Goal met.

BMP 1: Management and improvements to the City's deicing storage facilities. The City's Public Works Department maintains the deicing chemical and material storage facilities. There are three districts and two outlying salt storage facilities. The facilities vary in size, and their storage capacities range from 6,000-12,000 tons of materials. Rock salt is stored in dome structures at two locations. The domes were constructed on asphalt slabs and consist of wooden and concrete structural materials, capable of containing deicing chemicals during periods of extended storage. The three additional salt storage facilities are **Cover-All** buildings with ten-foot high concrete walls constructed on an asphalt slab. Salt brine and calcium chloride solutions are also used as deicing agents for the public streets, and both are stored in tanks. During the reporting period, the City used a total of 54,000 gallons of salt brine, 4,800 gallons of liquid calcium chloride, and 27,000 tons of salt to keep the City streets safe for cars and passengers.

Continuous Improvement: The Public Works Department will replace one existing dome with a Cover-All building and may add an additional cover-all building north of the river in the future when funding is available.

BMP 2: General Services Department's practice. The City's General Services Department, which manages about 160 City sites, used deicing material mostly sourced from the Public Works Department (the amount was included in the above 6.3 BMP 1). In addition, it applied a total of two tons of ice-melt, sourced from a retail vendor, on the sidewalks of the buildings for pedestrians' safety.

Continuous Improvement: The department will continue the practice to ensure pedestrians' safety.

6.3.2 Street sweepings (Permit Ref. 6.a.iii.2.)

Measureable Goals:

- Sweep City streets according to schedule (approx. 20,000 curb miles annually)
- Two seasonal collections per year (one in the fall, one in the spring)

Status: Goal partially met – work in progress

BMP 1: MyKCMO app. During the report period, the City launched a street-cleaning campaign which includes myKCMO app for residents to request cleaning. The myKCMO app is free and available on Google Play and Apple App stores. If anyone notices a location in need of a spot cleanup, they can snap a photo and upload it to the myKCMO app to request the City service. This allows the City's street sweeping service to be used more effectively.

The City uses Elgin Eagles and Curb Tender's mechanic sweepers**.** A total of 11,310 miles of streets were swept with a collection of 1,750 tons of debris.

BMP 2: Leaf and Brush Collection. The City collected 1,436 tons of leaf and brush through its curbside collection and 15,000 tons of leaf and brush through its three collection centers during the reporting period.

Continuous Improvement: The City is addressing the stormwater funding challenges and working towards resource allocation to meet the goals.

6.3.3 Street design/construction/maintenance practices (Permit Ref. 6.a.iii.3.)

Measureable Goal: Efforts were carried during the reporting period. Specific measurable goal will be defined in the upcoming 2021 SWMP.

Status: The Permit requirement continues to be addressed through following the established procedures

BMP 1: Follow the APWA standards with the supplements. For street design, construction and maintenance, the City follows the Kansas City Metropolitan Chapter of the APWA standards with the supplements for all its relevant projects. See the following link:

https://www.kcmo.gov/city-hall/departments/public-works/public-works-design-construction-standards

During the reporting period, the City was reviewing the following two standards: APWA Section 2100 – Clearing and Site Preparation, and SR-1 Drawings; proposal for changes were made. The proposed changes will allow better protection of storm sewer pipes in terms of the structural integrity and sealing of joints, thus reducing the chances of leakages.

Continuous Improvement: The City will solicit public comment from the building trade community about its proposed changes to the current construction standards, and adopt the changes once approved. The City will move toward adopting the 2012 version Stormwater BMP Manual by MARC, and will be in the process of adopting the 2020 Green Infrastructure Manual for development and redevelopment projects within its combined sewer overflow area, which will bring a positive message to the development community about the City's overall direction for stormwater management. The City will continue to review its various relevant standards on a regular base to seek improvement.

6.3.4 Stormwater inlet cleaning (Permit Ref. 6.a.iii.4.)

Measureable Goals: Complete 15,000 cleanings per year

Status: Goal partially met

BMP 1: KC Water's stormwater inlet cleaning program. KC Water inspected and cleaned 13,474 stormwater inlets that included 1,649 inlets cleaned through 311 service requests. In addition, KC Water also repaired 265 stormwater inlets.

Continuous Improvement: KC Water will continue to maintain the stormwater inlets.

6.4 Storage of paints and petroleum products; spill prevention and management (Permit Ref. 6.a.iv.)

Measureable Goal: Efforts were carried during the reporting period. Specific measurable goal will be defined in the upcoming 2021 SWMP.

Status: The Permit requirement continues to be addressed through following the established procedure.

BMP 1: The City's Environmental Management System (EMS). The City implements the EMS, which was updated in 2020, as good environmental stewardship for all of its organizational activities. Chapter 5. Chemical Management specifically addresses management of chemicals, including storage of paints, solvents, petroleum-related products.

BMP 2: Relevant topics addressed in the EMS. EMS Chapter 6 Waste Management addresses specific requirements for latex paint, used oil contaminated materials, as well as used oil. EMS Chapter 5 Section 04 addresses tank management. Regarding spill prevention, Section 5.04.02.a. specifically states for Portable Tanks' Condition**,** all portable tanks should be in "good" condition. Section 5.04.04.c.3. for petroleum Tank Requirements, Spills and Overfill Prevention states, both new and existing tanks must be equipped with catchment basins and one of the following: Automatic shutoff devices; Overfill alarms; Ball float valves.

Chapter 5 Section 04 also addresses spill and overfill prevention requirements. Chapter 5 Section 05 addresses spill prevention, control and countermeasures (SPCC).

Chapter 7 addresses spill prevention and response. It specifies job training and provides clear performance direction.

Chapter 5 Section 04 addresses tank management with regards to containment system material, Section 5.04.02.d. states: Portable Tanks should be made of, or lined with, a material that will not react with the substance being stored. Section 5.04.03.a. states (for aboveground and on-ground storage tanks) tanks shall be designed and built in accordance with recognized good engineering standards for the material of construction being used. The tank construction material shall be compatible with the liquid to be stored.

Chapter 5 Section 04 addresses tank management with regards to minimizing the contamination of groundwater, Section 5.04.04.e Release Detection states: All underground storage tanks must meet the federal release detection requirements.

BMP 3: The City's Office of Environmental Quality's annual inspections. The Office of Environmental Quality conducted annual inspection at 353 sites that are either owned or operated by the City. The inspection was done in compliance with the EMS and tracked in the Archibus Environmental and Risk Management System (Archibus). An automated report is generated on monthly a basis to provide a summary of environmental compliance recommendations for each department.

Continuous Improvement: The City continues using and following the EMS and Archibus, respectively

6.5 Reduce pollutants related to pesticides, herbicides, and fertilizers (PHFs) (Permit Ref. 6.a.v.)

Measureable Goal: Efforts were carried during the reporting period. Specific measurable goal will be defined in the upcoming 2021 SWMP.

Status: The Permit requirement continues to be addressed through multiple efforts to reduce the usage of PHFs and implementation of BMPs.

BMP 1: City's EMS usage. There are multiple chapters in the City's EMS that address the application of pesticides, herbicides, or fertilizers (PHFs). Section 2.05.01 states that pesticides, used throughout City facilities and its landscapes, are regulated by the Missouri Department of Agriculture, which certifies commercial, noncommercial, and public pesticide applicators.

Section 5.07.06 specifies persons engaged to apply pesticides for commercial, noncommercial, private, and public entities are certified. It states that City departments that apply or utilize the services of those who apply PHFs should put into place BMPs to reduce their run-off before and after the products have been applied.

Section 9.03.03 lists chemicals that are not allowed in the storm water system. The list includes herbicides and pesticides.

BMP 2: Practices within the City's General Services Department. The department manages about 160 City sites. It does not use PHFs to maintain lawn or other landscape.

BMP 3: City's Parks & Recreation Department parkway maintenance activities. The Parks & Recreation Department crew maintain over 40 miles of park roads; hundreds of parking lots; 12,000 acres of parkland in 220 parks; 135 miles of boulevards, parkways, and streets, and over 100 miles of trails and bikeways. Herbicides and fertilizers are used sparingly and only as needed on specific areas which require a higher level of maintenance.

BMP 4: Parks & Recreation Department's maintenance of park lands. The Parks & Recreation Department crew continue to maintain, improve, and protect thousands of acres of land that provide wildlife habitat and contribute to reducing stormwater runoff and water pollution throughout the City. These properties include:

a) More than 6,500 acres protected as woodlands throughout the park system
b) More than 165 acres in the reduced mowing program
c) More than 290 acres of natural areas on 36 sites, consisting of restored and remnant prairies, glades, butterfly gardens, bio-swales, and rain gardens

In addition, the Parks & Recreation Department conducted the following tasks:

a) Planted 1,500 trees
b) Maintained more than 400,000 trees on the City's owned land
c) Established 11 perennial native plant beds
d) Eliminating 65 annual plant beds

BMP 5: The Parks & Recreation Department's maintenance of golf courses. The Parks & Recreation Department crew and contractors continue to use environmental BMPs and procedures to manage its five golf courses: Hodge Park, Shoal Creek, Swope Memorial, Minor Park, and Heart of America. They are required to have commercial applicator license. The contracted management teams from Kemper Sports and Orion Management Solutions continue to reduce pesticide and fertilizer usage at the above courses by:

a) Maintaining a native buffer near water bodies and sensitive areas wherever possible
b) Allowing the outer rough areas that were once mowed and irrigated at each course to return to their native habitats (approximately 15 to 20 acres)

In addition, Shoal Creek Golf Course is designated as a *Certified Audubon Sanctuary* through the International Audubon Cooperative Sanctuary Program for golf courses. This ecologically-based program promotes both responsible land management and conservation of natural resources.

BMP 6: Certification requirement for pesticide/herbicide/fertilizer application. For the approximately 30 acres of BMP sites that KC Water maintains, staff or contractors are required to have a Missouri Pesticide Applicator License. For the Parks & Recreation Department's property maintenance, the Department requires its general supervisors, landscape technicians, and one of its Conservation Corps maintenance workers to have Pesticide/Herbicide Applicator licenses. For maintenance of the levee systems, KC Water required that contractors be certified for commercial application of pesticides and herbicides.

Continuous Improvement: The City will continue to improve current practices regarding pesticide, herbicide, and fertilizer management.

7. Industrial and High Risk Runoff

The City implements programs to monitor and control pollutants in stormwater discharges to the MS4 from industrial and high risk runoff facilities.

7.1 Identify facilities that discharge into the MS4 (Permit Ref. 7.a.i.)

Measureable Goal: Review list and add or remove facilities, as warranted.

Status: Goal met.

BMP 1: City's management of municipal waste sites. The City ceased operations of all solid waste dump sites in 1974. The closed sites were operated by the City during various periods from 1950 to 1974. The 87th Street site is within the boundary of the MS4-served area and is thus subject to the MS4 permit. The site has been closed from dumping since 1972. The Office of Environmental Quality, in consultation with several departments, continues to monitor this inactive site for compliance with the MS4 Permit and in general for issues that may pose a threat to public health or safety, threaten environmental protection, or that may create a nuisance condition.

The Office of Environmental Quality performed periodic walk-through inspections for 87th Street site. Visual observations during the inspection include evaluations for: (1) cap integrity and vegetative cover; (2) water ponding on the cap surface of the site; (3) fill material exposure; and (4) evaluate continued active seepage present at this site. The inspection results are documented and further investigations undertaken if warranted.

The Office of Environmental Quality established a maintenance program for the City's dump sites. All maintenance activities are geared toward maintaining the integrity of the site cap and minimizing the infiltration of water into the interred waste. The program may include surface waste removal and cap maintenance.

Continuous Improvement: The Office of Environmental Quality will continue periodic site inspections, consider remedial options and determine a course of action (if necessary), and implement the maintenance plans based on the results of the inspections.

BMP 2: Hazardous waste treatment, storage, and disposal (TSD) facilities; Title III Section 313 facilities; other facilities that contribute a substantial loading of pollutants to the MS4. During the reporting period, the inventory of the facilities remained the same as the one of previous year. There were 10 TSD facilities and 25 Title III Section 313 facilities with one belong to both categories.

Continuous Improvement: KC Water will continue to update the inventory as needed.

7.2 Inspections and enforcement control measures (Permit Ref. 7.a.ii.)

Measureable Goal: Complete a minimum of 30 inspections per year.

Status: Goal met.

BMP 1: KC Water's inspection of industrial and high risk dischargers. KC Water inspected a total of 30 sites following the established procedure. The inspected sites included 25 private industrial sites, and five commercial site. Inspection priority was given to the facilities depending on:

- Time since last inspection

- A history of stormwater issues
- The nature of the site operation
- Public complaints

BMP 2: Office of Environmental Quality's inspection of municipal operations. The Office of Environmental Quality conducted annual environmental inspection at all municipal owned or operated sites. The Office worked closely with KC Water to address stormwater requirement for each individual site.

BMP 3: Inspection and enforcement for industrial and business operations. Enforcement procedures were being developed to address any potential violations of stormwater regulations by industrial and business operations.

Continuous Improvement: KC Water will continue to evaluate the inventory for inspection priority, conduct the inspections based on the evaluation result, and further develop enforcement procedures for continuous practices.

7.3 Monitor high risk-runoff Facilities (Permit Ref. 7.a.iii.)

Measureable Goal: Annual review of self-assessment reporting.

Status: Goal met.

BMP 1: KC Water continued to implement the Stormwater Self-assessment Program. The program was created in 2008 with the intent to help high-risk industrial operations to take preventive measures, improve housekeeping practices, and utilize BMPs to minimize stormwater pollution. KC Water continued to implement the Stormwater Self-assessment Program at 17 participating facilities.

BMP 2: Stormwater sampling program: During the reporting period, KC Water was able to collect one round of samples at three selected locations. The data results are in Table 4. All of the results, except that alkalinity for one sample (Commerce-11-10-2020) was slightly lower, were within the ranges of the levels shown for the stormwater runoff in local urban areas.

Table 4. Data summary of stormwater monitoring at the selected industrial areas

Parameter	Unit	Reporting Limit	Method Detection Limit	HWY210-11-10-2020	SKI-11-10-2020	Commerce-11-10-2020	Average	Range of stormwater runoff*
Conductivity	us/cm	3	3	305	244	436	328	NA
pH	SU	1.00	1.00	7.8	7.5	7.8	7.7	NA
Alkalinity	mg/L	5	2	63	61	28	51	32-177
Biochemical Oxygen Demand (BOD)	mg/L	2.2	2.2	7.8	8.3	6.8	7.6	3-21
Chemical Oxygen Demand (COD)	mg/L	20	5	48	47	37	44	7-803
Ammonia	mg/L	0.1	0.1	1.3	0.1	0.1	0.5	<0.13-4.72
Total Oil and Grease[AC]	mg/L	5.2	2.8	ND	ND	ND	NA	<1.4-24
Total Phenols[AC]	mg/L	0.05	0.016	ND	ND	ND	NA	<0.002-0.56
Total Dissolved Solids (TDS)	mg/L	1	1	186	149	266	200	22-4,940
Total Solids (TS)	mg/L	2.5	2.5	210	160	250	207	160-1,800
Total Suspended Solids (TSS)	mg/L	2.5	2.5	6	12	6	8	8-879
Volatile Suspended Solids (VSS)	%	1	1	67	50	67	61	NA
Turbidity	NTU	0.02	0.01	13.4	16.7	11.4	13.8	NA
Calcium	mg/L	2.00	0.0075	24.3	27.3	12.2	21.3	NA
Silver, dissolved	mg/L	0.020	0.0011	ND	ND	ND	NA	<0.0007-0.0053
Cadmium, dissolved	mg/L	0.005	0.0002	ND	ND	ND	NA	<0.00011-0.078
Chromium, dissolved	mg/L	0.005	0.0004	ND	ND	ND	NA	<0.00026-0.02
Copper, dissolved	mg/L	0.005	0.00073	ND	ND	ND	NA	<0.00053-0.025
Nickel, dissolved	mg/L	0.005	0.00051	ND	ND	ND	NA	<0.0004-0.019
Lead, dissolved	mg/L	0.005	0.0019	ND	ND	ND	NA	<0.00214-0.064
Zinc, dissolved	mg/L	0.005	0.00062	0.0219	0.0144	0.0195	0.0186	<0.00016-0.272
Silver	mg/L	0.02	0.001	ND	ND	ND	NA	NA
Arsenic	mg/L	0.0100	0.0021	ND	ND	ND	NA	NA
Cadmium	mg/L	0.005	0.0002	ND	ND	ND	NA	<0.00011-0.136

Table 4 (Cont'd)

Parameter	Unit	Reporting Limit	Method Detection Limit	HWY210-11-10-2020	SKI-11-10-2020	Commerce-11-10-2020	Average	Range of stormwater runoff*
Chromium	mg/L	0.005	0.0004	ND	ND	ND	NA	<0.00026-0.110
Copper	mg/L	0.010	0.00073	0.00594	ND	ND	0.00222	0.00053-0.035
Magnesium	mg/L	1.00	0.019	2.59	3.14	ND	1.913	NA
Nickel	mg/L	0.005	0.00051	ND	ND	ND	NA	<0.0004-0.018
Lead	mg/L	0.01	0.0019	ND	ND	ND	NA	<0.00214-0.12
Zinc	mg/L	0.01	0.00062	0.0249	0.0325	0.0363	0.031	0.01-0.473
Mercury	mg/L	0.0002	0.00002	ND	ND	ND	NA	<0.000025-0.0002

***The ranges listed here were extracted from the ranges found for the stormwater runoff samples collected from representative residential, industrial, and commercial areas in the City from year 2005 to year 2015 per Part VI. Monitoring and Reporting Requirement**
**** average is calculated based on detected values and half of the detection limits for those under their detection limits**
[AC]Analyzed by a contracted laboratory
[A] Value is average of two or more analysis
[J] Estimated value, value may not be accurate

Continuous Improvement: KC Water will continue to implement the Stormwater Self-assessment Program and continue the monitoring.

7.4 Municipal operations (Permit Ref. 7.b.)

Measureable Goal: Maintain the existing inventory of facilities.

Status: Goal met.

BMP 1: Maintain a list of municipal operations. The inventory of the industrial and high-risk runoff facility includes a list of 73 municipal operations. Of those, ten carry State NPDES permits, 29 sites have the City's Stormwater No-exposure Certificates, and eight operations continue to implement the Stormwater Self-assessment Program.

Pollution prevention and good housekeeping measures will continue to be monitored at all municipal owned or operated sites. KC Water created a Stormwater Self-assessment Program in 2008. The program requires City facilities to establish good housekeeping measures and take steps to prevent pollution. KC Water continues to

work with the Office of Environmental Quality to address pollution prevention and good housekeeping measures at all City facilities every year.

Continuous Improvement: KC Water will update the list as needed.

8. Flood Control Projects and Devices

The City through KC Water assess the impacts new flood control projects on water quality in relation to MS4 activities. The City evaluates existing flood control devices to determine potential improvements. The City also implements retrofits of flood control devices owned and operated by the City that have been determined to be feasible.

8.1 Assess the water-quality impacts in the design of new flood control projects (Permit Ref. 8.a.)

Measureable Goal: Efforts were carried during the reporting period. Specific measurable goal will be defined in the upcoming 2021 SWMP.

Status: The Permit requirement continues to be addressed through efforts to assess the water-quality impacts.

BMP 1: Review of flood control projects. The flood control projects in which the City is involved are collaborative efforts with U.S. Army Corps of Engineers (USACE). Project design shall include an Environmental Assessment and/or an Environmental Impact Statement(s). The Stormwater Engineering Division of KC Water reviews the designs and provides input. The impact on water quality is one of the key elements considered in the review process.

Continuous Improvement: The City will continue the current practices.

BMP 2: Flood control project inspection. During the reporting period, Dodson Flood Risk Reduction Project was in fifth and final Phase. This phase included constructing the tie-in levee to connect the Boone Creek Levee to the existing Bannister Levee. It also included continued construction on the earthen levee embankment from Prospect Avenue to the previously constructed flood wall (Phase I) near 85th Street and Bruce R. Watkins Drive.

The pre-final inspection for the project was held on February 23, 2021. A punch list was developed which the contractor has been working on completing since this date. The list includes planting of aquatic plants in the detention area located on the river side of the Levee and the planting of native grasses in the detention area located on the land side of the floodwall.

The borrow area located on the river side of the levee was designed and constructed to maintain the water quality of the Blue River. The borrow area was at least 30-feet from the riverward toe of the levee. Hard points were installed on the levee side of the borrow areas to prevent erosion toward the levee during high flows. After the levee construction was completed, the borrow area has become part of a required wetland mitigation plan that required connecting the borrow area to the River and selectively vegetating the site with the appropriate wetland and upland plant species. Grasses in the mitigation areas will not be fertilized. A number of trees were also planted on the slopes and on the top of the bank of the detention area. The trees will enhance the quality of the habitats. The other borrow area located on the land side of the levee were planted with native grasses and managed in a similar environmentally responsible manner.

Another feature of the project is the levee stone slope protection. It is included on the riverside of the levee to prevent or minimize erosion of the levee slope during rain or high river events. Stone slope protection included for the gate structure, outfall channels and storm flow channels with the potential for high velocity flows which could cause erosion.

Continuous Improvement: The project is slated to be completed in 2021. The delay in completion from projected 2020 to 2021 is due to rain events and some corrective work at the new outfall structures.

8.2 Retrofit existing flood control devices to reduce stormwater pollutants (Permit Ref. 8.b.)

Measureable Goal: Efforts were carried during the reporting period. Specific measurable goal will be defined in the upcoming 2021 SWMP.

Status: The Permit requirement continues to be addressed through ongoing efforts to assess the impacts and conduct retrofitting where applicable.

BMP 1 Coordination for flood control retrofit projects. KC Water entered into an agreement with the USACE for the Lower Brush Creek Ecosystem Restoration Feasibility Study in February 2019.

Through Section 1135 of the **Water Resources Development Act**, USACE will review the need to modify any portions of Brush Creek between the Paseo Blvd. bridge and the confluence with the Blue River (inclusive of Lake of the Enshrines) in order to improve environmental quality and provide ecosystem restoration.

Potential modifications could:

- Address issues with sediment management within the Lake of the Enshriners
- Reduce goose habitat, while providing/improving habitat for native species of flora and fauna within and adjacent to the stream
- Improve water quality
- Provide ancillary improvements to flood control

Currently the feasibility study is under way. The study will present conceptual designs for ecosystem restoration, provide analysis of the costs, benefits, and environmental impacts of the alternatives, and recommend a selected plan. The City can subsequently elect to partner with the USACE to proceed with design and construction of the selected plan.

Continuous Improvement: KC Water will continue to partner with USACE to complete the feasibility study.

BMP 2: Town Fork Creek Watershed Study. During the previous reporting period, KC Water conducted an analysis for a pilot study in the Town Fork Creek watershed. This is part of the Town Fork Creek Phase II Watershed study, a federally cost-shared Section 22 Planning Assistance to state's study with the USACE Kansas City District. The analysis is to explore the feasibility of separating stormwater from a combined sewer system in the watershed, seeking alternative approaches using green infrastructure (e.g., bio-swales, bio-retentions) to manage and convey stormwater runoff. Conceptual BMPs were developed for a small pilot study area. Then, an initial hydrology and hydraulics modeling exercise was conducted using these BMPs to determine the feasibility of managing stormwater without the use of an extensive, subsurface storm sewer network. The final Stormwater Surface Drainage Analysis Report was completed July 2019. No progress was made during the reporting period.

Continuous Improvement: KC Water will evaluate the study result.

BMP 3. Indian Creek Watershed Study. In the previous years, KC Water had secured the 3.1 acre flood-damaged commercial properties (400-600 W 103rd St.) abutting Indian Creek. Building structures had been demolished, and the asphalt surface been removed. During the reporting period, design options were evaluated to convert the area into a green space that will have stormwater best management features and provide a public education venue. The best management practices included in this project will help to treat stormwater runoff from adjacent parking areas that were constructed prior to adoption of the City's BMP requirements.

Once the design is complete, KC Water will bid the project and anticipates that construction will commence during the next reporting period. The budget for the project is approximately $700,000.

Continuous Improvement: KC Water will continue to seek the opportunities to protect water quality in association with flood control projects.

8.3 Include the procedures in the SWMP document (Permit Ref. 8.c.)

Measureable Goal: To be defined in the upcoming 2021 SWMP.

Status: The Permit requirement was addressed.

BMP 1: **Procedures in SWMP**. The 2019 SWMP includes the required procedures.

Continuous Improvement: The access to the required procedure will continue to be included in the future version of the SWMP.

9. Monitoring

KC Water conducts monitoring on the quality of representative stormwater discharges and biological assessment at selected stream sits. The purpose of these monitoring efforts are to assess the MS4 impact.

9.1 Collect stormwater samples from stormwater discharges (Permit Ref. 9.a.i & ii.)

Measureable Goals: Stormwater samples are to be taken from runoff resulting from three qualified storm events at six designated locations.

Status: Goal met.

BMP 1: Stormwater discharge monitoring. For each of the six designated sites, monitoring was done for three storm events with at least one month apart.

Continuous Improvement: The City will continue to implement the monitoring program.

9.2 Sample testing and recordkeeping (Permit Ref. 9.a.iii.)

Measureable Goals: Complete sample testing; finalize the data, and conduct data analysis and interpretation.

Status: Met goals

BMP 1: Sample testing. Monitoring included field measurements and sample collection. Samples were analyzed by KC Water Laboratory for physicochemical and microbiological parameters. All field sampling, measurements, sample handling, laboratory analysis, and data validation, as well as a quality assurance and quality control, follow the updated sampling plan for the MS4 stormwater discharge monitoring program and Standard Operational Procedures developed by KC Water Laboratory.

Samples were analyzed for the parameters required in the Permit. See Table 5 for data and Table 6 for a summary of the data results.

Continuous Improvement: Continue to implement the program.

BMP 2: Sample results and data analysis. Storm event data records are maintained and include all analytical results, the date and duration (in hours) of the storm event(s), rainfall measurements or estimates (in inches) of the storm event that generated the runoff that was sampled, and the duration (in hours) between the storm event sampled and the end of the previous measurable (>0.1 inch rainfall) storm event.

Table 5. Stormwater runoff monitoring data

Location (land use represented)	Parameter (unit)	pH (SU)	Cond (µs/cm)	BOD (mg/L)	COD (mg/L)	O&G (mg/L)	*E. coli.* (MPN/100mL)	TSS (mg/L)	NO2+NO3 (mg/L)	TKN mg/L)	Diss-P (mg/L)	TP (mg/L)
	Detection limit	NA	3	2	6	3	10	2.5	0.035	0.28	0.016	0.016
	Sampling Date											
SE 59th Terr. & Sterling Ave. (residential)	07/15/2020	7.9	82	5.4	54	ND	17,325	68	>0.812	1.2	0.072	0.114
	10/23/2020	7.6	177	49.1	160	ND	>2419.6	136	>0.562	1.15	0.710	0.810
	01/06/2021	8.2	427	16	43	ND	24,196	47	0.748	0.76	0.163	0.280
W. 135th St & Wyandotte St. (industrial)	07/15/2020	8.0	399	19.8	181	ND	14,136	158	>1.04	1.54	0.117	0.189
	10/23/2020	7.7	961	26.5	74	ND	2,613	84	0.858	ND	0.150	0.180
	04/16/2021	8.5	184	14.9	128	ND	15,531	160	ND	2.04	0.260	0.378
NW 107th Terr. & Pomona Ave. (industrial)	07/29/2020	7.9	388	6.3	NT	ND	4,611	16	ND	0.73	ND	0.176
	10/23/2020	8.2	281	8.6	47	ND	>2419.6	86	>0.653	0.64	0.160	0.230
	01/06/2021	8.2	1,724	4.6	44	ND	2,909	63	1.558	0.7	0.075	0.202
NE 51st Terr. & N. Michigan Ave. (residential)	07/20/2020	6.9	112	3.8	NT	ND	21,300	79	ND	0.7	0.082	0.251
	10/23/2020	8.0	98	45.3	122	ND	9,208	16	>0.544	ND	0.840	0.860
	01/06/2021	8.1	538	8.7	46	ND	4,352	50	ND	0.76	0.173	0.306
W. 133rd St & Inverness Dr. (commercial)	07/15/2020	7.5	405	6.6	61	ND	495	28	1.118	0.92	0.114	0.186
	10/23/2020	7.7	52	9.5	41	ND	1,267	8	>0.450	ND	0.120	0.150
	04/16/2021	8.5	164	8.8	74	17.6	1,169	36	ND	1.12	0.230	0.170
NW Barry Rd. & NW Barrybroke Dr. (commercial)	07/20/2020	8.1	76	12.2	NT	19.1	6,488	28	ND	0.53	0.124	0.176
	10/23/2020	8.2	117	7.2	28	ND	8,164	36	>0.431	ND	ND	0.080
	03/23/2021	8.1	1,950	4.9	87	ND	4,352	26	1.533	0.92	0.088	0.170

Table 6. A summary of stormwater runoff monitoring data

Data summary	Parameter (unit)										
	pH (SU)	Cond (µs/cm)	BOD (mg/L)	COD (mg/L)	O&G (mg/L)	*E. coli.* (MPN/100mL)	TSS (mg/L)	NO2+NO3 (mg/L)	TKN (mg/L)	Diss-P (mg/L)	TP (mg/L)
	Detection limit										
	NA	3	2	6	3	1	2.5	0.035	0.28	0.016	0.016
	Result										
Sample count	18.0	18	18	15	18	18	18	18	18	18.000	18.000
Minimum	6.9	52	3.8	28	ND	ND	8	ND	ND	ND	0.080
Maximum	8.5	1,950	49.1	181	19.1	24,196	160	1.558	2.04	0.840	0.860
Average (Geometric mean for e. coli)	8.0	452	14.3	79	3.4	4,907	63	0.583	0.79	0.194	0.273

ABBREVIATIONS
Cond-conductivity; BOD-biochemical oxygen demand; COD-chemical oxygen demand; O&G-oil & grease; TSS-total suspended solids; NO2+NO3 -nitrate and nitrite; TKN-total Kjeldahl nitrogen; Diss-P - phosphorus, dissolved; TP-phosphorus, total
NT: not tested; NA: not available; ND: below detection limit

For NDs, average is computed with half value of the method detection limit.

[M]Estimated value, matrix interference

[J]Estimated value, value may not be accurate

Continuous Improvement: The City will continue the practices.

9.3 Biological assessments (Permit Ref. 9.b.)

Measureable Goals: Once in the spring and once in the fall during the five year permit cycle

Status: Ongoing effort.

BMP 1: Conduct biological assessments. During the reporting period, a collaborative agreement between KC Water and the Columbia Environmental Research Center (CERC) of U.S. Geological Survey ended after the completion of the bio-assessment program per the requirement in the previous permit. The streams covered in the assessment include: East Fork Shoal Creek, Line Creek, Round Grove Creek, Brush Creek, Hickman Mills Creek, Searcy Creek, Buckeye Creek, North Brush Creek, Fishing River, Little Blue River, and Prairie Creek. The report was reviewed and finalized, with no change to the conclusion in the draft report, which was presented in the previous report.

KC Water was in the process of developing a sampling plan to address the current permit requirements.

Continuous Improvement: KC Water will submit the sampling plan to MDNR for review in the fall of 2021, and will communicate with MDNR to finalize the plan by the end of 2021. In the spring of 2022, KC Water will seek and decide contracting service to implement the plan.

9.4 Methodology of sample collection analysis (Permit Ref. 9.c.)

Measureable Goal: Efforts were carried during the reporting period. Specific measurable goal will be defined in the upcoming 2021 SWMP.

Status: The Permit requirement was addressed by using the required methods.

BMP 1: Using required methods for sample collection and analysis. The analytic methods utilized in sample testing are consistent with the methods specified in 40 CRF 136. Below is a list of the parameters and corresponding testing methods.

- Total suspended solids: SM 2540 D
- Specific conductivity: SM 2510 B
- Chemical oxygen demand: SM 5220 D
- Biochemical oxygen demand: SM5210 B
- Oil & grease: EPA 1664 W
- *E. coli*. SM 9223 B
- Total Kjeldahl nitrogen: SM 4500-Norg B
- Nitrate + nitrite: EPA 300.0
- Dissolved phosphorus, total phosphorus: SM 4500-P

Continuous Improvement: KC Water will continue to use the standard methods for sample collection and analysis.