

ANNUAL REPORT

# KANSAS CITY'S OVERFLOW CONTROL PROGRAM

REPORTING PERIOD: JANUARY 1, 2019 TO DECEMBER 31, 2019





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March 31, 2020

Greetings,

Please find enclosed the ninth annual report related to Kansas City's overflow control program. This report covers the annual reporting period from January 1, 2019, to December 31, 2019. Pursuant to the Consent Decree, this report has a required submittal date of no later than March 31, 2020.

Additionally, and as required by the Consent Decree, any report, plan, or other submission that the City is required to submit, including documents as required by its current NPDES Permits, shall be signed and certified by an official or authorized agent of the City.

By signing below, I certify under penalty of law that the document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted, and that 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 fine and imprisonment for knowing violations.

Please contact me if you have questions.

Best regards,

**Terry Leeds**  
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## I. ANNUAL REPORT PURPOSE AND SCOPE

On September 27, 2010, the United States District Court for the Western District of Missouri entered a consent decree in the case U.S. vs. The City of Kansas City, Missouri. The Consent Decree was amended for the first time by the parties and approved by the court on January 9, 2015 (Civil Action No. 4:10 -cv-0497-GAF). A second amendment was presented by the parties and approved by the courts on January 5, 2018 (Civil Action No. 4:10-cv-0497-GAF). A third amendment, in the form of a Non-Material Consent Decree Modification, was presented by the parties and approved on February 12, 2020. This Annual Report is submitted in accordance with Section IX.B of the Consent Decree and reflects the status of program implementation that occurred between January 1, 2019, and December 31, 2019.

In accordance with the Consent Decree's Section IX.A, this Annual Report also includes Kansas City's Semi-Annual Report on the progress of implementing control measures defined in Appendix A of the Consent Decree, as well as all other related activities.

## II. KANSAS CITY'S OVERFLOW CONTROL PROGRAM

Individual elements of the City's Overflow Control Plan (Plan) became part of an enforceable document with the entry of a Consent Decree in United States District Court. The Consent Decree is a culmination of nearly a decade of negotiation between the City, U.S. Environmental Protection Agency (USEPA) and the Missouri Department of Natural Resources (MDNR) related to reducing overflows. The Consent Decree includes requirements for capital construction, management, operations and maintenance of the City's sewer systems.

The occurrence of combined sewer overflows is not uncommon in combined sewer systems and is authorized pursuant to the terms of two of the City's National Pollutant Discharge Elimination System (NPDES) permits (Westside WWTP and Blue River WWTP). NPDES permits are issued by MDNR to Kansas City and implemented by the Water Services Department (Water Services) at each treatment facility.

The City and its regulatory partners have agreed to meet the objectives over a 25-year period from 2010 through 2035. The Plan involves a list of improvements that are structured to capture for treatment approximately 88 percent of total wet weather flow in the combined sewer system and eliminate separate sanitary sewer overflows during a five-year, 24-hour rainfall event. This implementation is referred to as the Overflow Control Program (OCP). Kansas City's Overflow Control program team implements the OCP to ensure compliance with the City's federal consent decree.

The Consent Decree components include:

- Capital projects targeted at reducing the occurrence Combined Sewer Overflows (CSO)
- Separate Sewer Overflow (SSO) Control Measures
- Nine Minimum Controls (NMC) Plan targeted at operationally reducing and addressing combined sewer overflows through a series of minimum control efforts
- Capacity, Management, Operation and Maintenance (CMOM) Plan targeted at reducing separate sewer system overflows by adequately operating and maintaining the sanitary sewer system
- Post-Construction Monitoring Plan aimed at long-term monitoring and assessment of overflow reduction Supplemental Environmental Project (SEP) Plan which includes the incorporation of best management practices and green infrastructure at two project locations, along with the initial SEP to reduce septic tank use in areas with public sewers; and
- Implementation of disinfection at all six of the City's wastewater treatment plants

### III. KANSAS CITY'S SEWER SYSTEM OVERVIEW

More than 150 years ago, Kansas City began building the basic sewer infrastructure that would allow the city to grow and prosper. Some of that infrastructure is still in use today.

Kansas City's overall sanitary sewer system comprises both combined and separate sewer systems totaling approximately 318 square miles. The combined sewer system consists of 58 square miles, primarily located in the oldest areas of the City. During moderate to heavy rainfall events, the system will reach capacity, overflow, and discharge a mixture of wastewater and rainwater overflows directly to receiving streams and rivers. By implementing control measures in accordance with Kansas City's Consent Decree, the occurrence of overflows will be reduced over time.

The remaining 260 square miles of Kansas City's sewer system are a separate sanitary system. A separate sanitary sewer system is only intended to collect and convey wastewater. Rainwater, however, can enter the system through inflow and infiltration (I/I) process through leaky sewer pipe joints, broken sewer pipes, manholes, and illicit stormwater direct connections causing the system to overload during rainfall events. When this system exceeds its wet weather capacity due to excessive I/I, it too overflows a mixture of wastewater and rainwater. Kansas City has one constructed sanitary sewer overflow (SSO) in the Line Creek Basin, which is being eliminated as part of the Overflow Control Program. In addition, five SSOs are located in the separate sanitary systems in the Brush Creek and Blue River South Basins. The City is actively working to eliminate these five SSOs through inflow and infiltration reduction measures. Two SSOs previously reported in the Blue River South Basin were eliminated as part of the Blue River South 4 and 5 I/I Reduction project completed in 2019.

### IV. REPORTING PERIOD ACTIVITY

The following specific milestones, as laid forth in Consent Decree Appendices A and D, were met during the reporting period from January 1, 2019, through December 31, 2019. Work continued on several other projects that began in previous reporting periods, including the continuation of inflow/infiltration reduction activities in areas north and south of the Missouri River. To date, all Consent Decree scheduled milestone dates have been met, with the exception of the completion of the Birmingham Relief Sewer Project which the City determined was not necessary and made the EPA aware of its findings in August 2018. Activities performed during the reporting period associated with Nine Minimum Controls (NMC) and Capacity, Management, Operations and Maintenance (CMOM) as laid forth in Consent Decree Appendices B and C, respectively, are documented in this annual report in accordance with Section IX.B. Requirements for NMC and CMOM were met for the reporting period.

#### A. APPENDIX A – PERFORMANCE MEASURES

##### **Lower Blue River Basin**

- Relief Sewer: Hardesty Ave and 31st Street
  - Consent Decree Required Start: 2020
  - Actual Start: January 2019
- Relief Sewer: Vineyard and Lawn Street
  - Consent Decree Required Start: 2020
  - Actual Start: January 2019
- Relief Sewer: 45<sup>th</sup> Street
  - Consent Decree Required Start: 2020
  - Actual Start: August 2019
- Sewer Separation: Outfall 054
  - Consent Decree Required Start: 2022
  - Actual Start Date: September 2019

- Dry Weather Sewer Line: Outfall 055
  - Consent Decree Required Start: 2020
  - Actual Start Date: August 2019

#### **Middle Blue River Basin**

- Sewer Separation: Outfalls 066 & 067
  - Consent Decree Required Completion Date: December 31, 2019
  - Actual Completion: October 2019

#### **Northeast Industrial District Basin**

- In-Line Storage: Gooseneck Arch Sewer Gate & Pump Station
  - Consent Decree Required Completion Date: Changed from December 31, 2019 to December 31, 2021\*
  - Current Forecast Completion Date: March 3, 2020

#### **North of the Missouri River Separate Sewer System**

- Birmingham Relief Sewer\*\*

\*Modified per recent non-material Consent Decree modification

\*\*Project was not implemented per discussion with EPA on 8/15/2018

## B. APPENDIX D – POST-CONSTRUCTION MONITORING PROGRAM

Flow monitoring was performed in accordance with the revised CSS Metering Plan approved by USEPA in December 2016 as well as the Middle Blue River Post-Construction Monitoring Plan submitted in December 2018. Post-construction flow monitoring is being performed at outfalls in the Middle Blue River basin and in the Turkey Creek/CID basin where construction has completed on various overflow control projects.

The City implemented its Long-Term Flow Monitoring Program for the outfalls listed below. Flow monitoring at the listed outfalls will continue for at least three recreation seasons or until basin compliance is verified. Data from the flow metering devices will be used to update the Program's system hydraulic model to simulate post-construction system response to rainfall events. Outfalls are listed as "continued" where post-construction related flow meters were installed in years prior to 2019. Outfalls listed as "commenced" had post-construction related flow meters installed in the 2019 calendar year.

- o Outfall BR039 (continued)
- o Outfall BR040 (continued)
- o Outfall BR059 (continued)
- o Outfall BR069 (continued)
- o Outfall BR063 (continued)
- o Outfall BR064 (continued)
- o Outfall W003 (continued)
- o Outfall BR056 (commenced)

In December of 2019 the City submitted two project-related flow-monitoring plans for major facilities. The Westside WWTP Flow Monitoring Plan and the Gooseneck Arch Sewer Automated Gate and 4 MGD Pump Station Post-Construction Flow Monitoring Plan were submitted to EPA in advance of Achievement of Final Operation for these two facilities projects.

## C. CITY MEETINGS WITH EPA AND MDNR

Historically the City conducts meetings with EPA or MDNR officials during the reporting period to provide updates on the status of Overflow Control Program implementation and to discuss the changes to the consent decree proposed by the City to be included in a 3rd Consent Decree Modification. However, in 2019 no meetings occurred.

## V. DATA MANAGEMENT AND PROJECT CONTROLS

Managing the large amount of data generated by the Overflow Control Program is a primary focus of the City of Kansas City, MO. During the reporting period, the City continued to increase and diversify the functionality of its Management Information System (MIS) to capture data pertaining to work activities, schedules and budgets for all Overflow Control projects. The MIS is currently being used to create and update project status reports, provide program financial summary information, forecast project costs and schedule information.

During the reporting period, the City continued to utilize Primavera scheduling tools for schedule management. This software enabled staff to more readily identify, update and track project progress, recognize potential challenges and enhance project team coordination. The result of these proactive, problem-solving efforts is more effective management of project scope, schedule, budget and risk profile.

The accumulation of data related to sewer system network characterizations, manhole inspections, sewer cleaning, and CCTV work in nine basins throughout the City continued during the reporting period. Water Services continued the process of storing this data in a virtual cloud network, as well as organizing, categorizing and distributing this information to design professionals involved with Overflow Control projects. Using this data, the City has developed a City-wide Annual Sewer Rehabilitation program based on Likelihood of Failure (LoF) and Consequence of Failure (CoF). The LoF and CoF scores are multiplied together, resulting in a business risk exposure measurement for the prioritization of rehabilitation efforts.



Updating the quality of the City's GIS data related to Overflow Control projects also continued during the reporting period. As CCTV information in the Overflow Control project areas was collected, it was subjected to a quality control check process before it was linked with the department's GIS information. These updates improved the quality of GIS information to provide more accurate accounting of where system assets are located.

During the reporting period, the City fully utilized an application and website built for Keep Out the Rain, the City's Private Inflow and Infiltration (I/I) Reduction Program. This data tool enabled Design Professionals performing private property building plumbing evaluations to record inspection information and schedule appointments with citizens who are eligible for the disconnection of prohibited I/I sources located on private property that are cost-effective for the City to remove for the public's benefit. This application also provided real-time analytics data to track program performance.

The City's Overflow Control Program uses a web-based document control system. This tool is utilized to track all facets of project delivery associated with construction, including submittals, correspondence, daily reports and payment applications. This application is utilized by design professionals, construction contractors, the City's program management team, and City staff involved in the implementation of Overflow Control Program projects.

## VI. PUBLIC OUTREACH

Below is a summary of public outreach activities for the City's Overflow Control Program completed during the reporting period. Additional information regarding these activities is in the discussion of NMC 7, which begins on page 29 in this report.

- Conducted 14 public meetings attended by 267 citizens about overflow control program related projects, City-wide.
- Hosted six scheduling events reaching 114 residents in support of Kansas City's Private Inflow and Infiltration Reduction Program, Keep Out the Rain.
- Published program-related information on the City's website at [kcmo.gov/smartsewer](http://kcmo.gov/smartsewer), through City of Kansas City, Missouri newsletter and social media channels and in neighborhood association newsletters.
- 38 media stories related to various aspects of the City's Overflow Control Program (television, radio and print) generating more than 3.9 million impressions.
- Ongoing engagement about Overflow Control Program projects and initiatives with residents via AlertKC (Nixle), Nextdoor, Twitter, Instagram and Facebook media channels.

## VII. IMPLEMENTATION OF OVERFLOW CONTROL MEASURES

### A. POST-CONSTRUCTION MONITORING PROGRAM

Post-construction monitoring activities completed in 2019, as defined in Appendix D of the Consent Decree, are summarized in this report beginning on page 53.

### B. GREEN INFRASTRUCTURE

#### I. ADDITIONAL GREEN INFRASTRUCTURE PROJECTS

Three additional green infrastructure pilot-scale projects located in the Lower Blue River Basin have moved forward into construction. These additional pilot-scale projects were not included in Appendix A of the Consent Decree, but are included in the City's Overflow Control Plan:

- East High School
- Veterans Administration (VA) Hospital and Linwood Green Park

#### ▪ Avenues of Life Mattress Business Training Center

The first phase of green infrastructure was substantially completed at East High School as a joint effort between Kansas City Public Schools and the City during the reporting period. The first phase of green infrastructure at East High School includes open bottom underground storage, removal of an asphalt parking lot and a rain garden. The second phase of green infrastructure at East High School was also substantially completed during the reporting period and includes a series of bioretention facilities. Remaining construction items include installation of plant material during the spring planting season. Achievement of full operations will be granted when the plant material installation is completed.

The design of green infrastructure improvements at the VA Hospital and Linwood Green Park site was completed in 2019 and construction began in late October 2019. Green infrastructure facilities at this site include a series of bioretention swales and bioretention basins. Construction is forecast to be completed by the end of 2020.

The design of green infrastructure at the Avenues of Life site was also completed in 2019 and construction began in October 2019. Green infrastructure facilities at the site include three bioretention basins and is forecast to be completed by the end of 2020.

The City continued coordination interdepartmentally and with private landowners on the design and construction of green infrastructure. These additional projects incorporating green infrastructure are not included in Appendix A of the Consent Decree, or the City's Overflow Control Plan; however, all are within the combined sewer system area.

- The Paseo Gateway/ Kansas City University, Intersection Improvement at The Paseo and Independence Avenue. This is a KC Parks and Recreation project that will separate approximately 35 acres of drainage area in the Northeast Industrial District basin and convey that to a new extended wet detention basin with real-time controls. It is anticipated that this project will complete design during the next reporting period.
- Wornall Road, 74<sup>th</sup> to 79<sup>th</sup> Street. This is a Public Works led project that is incorporating green infrastructure into intersection and parking lot improvements. The types of green infrastructure proposed include tree planters, pervious pavers, and underground storage. The project is in the Town Fork Creek basin. It is anticipated that this project will complete design during the next reporting period.
- West Bottoms Flats. This is a private development project that is incorporating pervious pavers and underground storage with real-time controls. The project is in the Central Industrial District basin. It is anticipated that this project will be constructed during the next reporting period.

#### **ii. CONSENT DECREE GREEN INFRASTRUCTURE PROJECTS**

During the reporting period, the city completed final design and bid solicitation for green infrastructure pilot projects located in the Northeast Industrial District and the Turkey Creek/Central Industrial District basins as required by the Consent Decree.

The green infrastructure improvements in the Northeast Industrial District completed final design and bid in 2019. Green infrastructure included with this project consists of a gravel wetland facility at Nicholson Park, and five bioretention facilities along Gardner Avenue. Construction began in mid-Spring 2019. Weather conditions and high stage of the Missouri River caused elevated groundwater levels at each green infrastructure site, resulting in a hold on construction from June 25, 2019 through the end of 2019. This project resumed construction in early 2020. The Achievement of Full Operation date for this project was extended from December 21, 2020 to December 21, 2021 by Non-Material Consent Decree Modification agreed upon and filed in February 2020.

Construction of the Turkey Creek/Central Industrial District Green Infrastructure project began in June 2019 and includes infiltration trenches, cisterns, permeable paver parking, infiltration dry wells, bioretention, and a bioretention swale. Construction is forecast to be completed by end of 2020.

*See Table 1 on page 11 for more information.*

## C. COMPLIANCE WITH PERMITS

The City strives to continuously maintain compliance with its current wastewater treatment plant NPDES permits, and to properly maintain the capacity, management, operation and maintenance of the City's collection system.

### **i. DISCHARGE MONITORING REPORTS**

A collection of the required discharge monitoring reports for the City's wastewater treatment plants, submitted to MDNR during the reporting period, is included in Attachment A of this report. The Wastewater Treatment Division of the Water Services Department submitted these reports, which are a part of the Missouri State Operating Permits MO-0024911, MO-0024929, MO-0024961, MO-0048305, MO-0049531, and MO-0048313.

### **ii. MONTHLY OPERATING REPORTS**

The City's Monthly Operating Reports, submitted as part of the City's current NPDES permits, are included in Attachment B of this report.

## VIII. COMBINED SEWER OVERFLOW CONTROL MEASURES – APPENDIX A

Combined sewer systems (CSS) make up approximately 58 square miles of the city's sewer system, running from the Missouri/Kansas state line on the west, 85th Street on the south, the Blue River on the east, and the Missouri River on the north. The area served by the CSS is subdivided into six principal basins: Brush Creek, Lower Blue River, Middle Blue River, Northeast Industrial District (NEID), Town Fork Creek, and Turkey Creek/Central Industrial District (TC/CID).

Field investigation activities for neighborhood sewer rehabilitation projects were completed to support the various projects in the combined sewer system. The combined work consists of sewer system network characterization and manhole inspections, sewer cleaning, and CCTV inspection of sanitary sewers in the NEID, Lower Blue River, and Turkey Creek/Central Industrial District combined sewer system basins. For more details on the quantities of these field investigations, see Section XI. Nine Minimum Controls-Appendix B.

The City's 25-year Overflow Control Program is being implemented in three stages, each with a primary control strategy. The early years of the program include repairs to the existing sewer systems and pilot-scale projects with a focus on developing and evaluating green infrastructure solutions. The middle years of the program will focus on maximizing the capacity within the existing system and analyzing the results of source volume reductions and pilot-scale projects. The later years of the program will address necessary improvements to the City's wastewater treatment plants and construction of structural storage solutions, which are currently planned as deep storage tunnels. Discussions held in 2018 between the City, EPA, and MDNR regarding the need for a 3rd Consent Decree Modification were resumed in late 2019 and included expanded renewal of existing assets and increased use of green infrastructure in lieu of deep tunnel storage.

The status of the projects in the combined sewer system basins is summarized in Table 1 below. The combined sewer system had 24 active projects during the reporting period. Nine (9) projects were under design, and 15 projects were either advertising for construction bids, under construction, or construction was recently completed.

**TABLE 1: PROJECT STATUS - COMBINED SEWER SYSTEM BASINS  
(THROUGH DECEMBER 31, 2019)**

Project Name	Description	Percent Complete through 12/31/2019 Planned Completion Date			CD AFO Date
Combined Sewer System		Pre-Design	Design	Construction AFO	
<i>Brush Creek Basin</i>					
Neighborhood Sewer Rehabilitation	Neighborhood sewer rehabilitation work in the Brush Creek Basin has been split into two (2) design projects and four (4) construction packages due to the size of the basin. These projects are being implemented to improve the reliability and performance of the combined sewer system and reduce basement backups. The projects involve identification of sewer system defects and the preparation of construction contract documents to rehabilitate sewer pipes that are 12-inches and smaller in diameter. Work also includes the rehabilitation of sewer pipes and manholes in a separate sewer system area located within the Brush Creek basin to reduce I/I flows contributing to SSOs.	100%	100%	Area 1 East <u>100%</u> Area 2 I&I <u>95%</u> February 2020 Area 1 West <u>90%</u> March 2020 Area 2 NSR <u>95%</u> February 2020	12/31/2020



Project Name	Description	Percent Complete through 12/31/2019 Planned Completion Date			CD AFO Date
Combined Sewer System		Pre-Design	Design	Construction AFO	
<b>Lower Blue River Basin</b>					
Neighborhood Sewer Rehabilitation	This project is being implemented to improve the reliability and performance of the combined sewer system and reduce basement backups. This project involves identification of sewer system defects, the preparation of construction contract documents, and the rehabilitation of manholes and sewer pipes 12-inches and smaller in diameter	<u>100%</u>	<u>100%</u>	North <u>20%</u> December 2020  South <u>10%</u> March 2021	North 12/31/2021  South 12/31/2021
15th Street Pump Station Upgrade and Sewer Separation	Design documents will be prepared for the separation of approximately 22 acres of combined sewer system and for improvements to the 15th Street Pump Station.	<u>100%</u>	<u>25%</u> February 2021	May 2022	12/31/2022
Relief Sewer Hardesty & 31st Street	Design documents will be prepared for the installation of approximately 3,500 linear feet of approximately 54-inch diameter relief sewer.	<u>100%</u>	<u>10%</u> March 2021	May 2022	12/31/2022
Relief Sewer Vineyard & Lawn Street	Design documents will be prepared for the installation of approximately 3,400 linear feet of approximately 48-inch diameter relief sewer.	<u>100%</u>	<u>10%</u> December 2020	February 2022	12/31/2022
Relief Sewer: 45 <sup>th</sup> Street	Design documents will be prepared for the conveyance of the combined sewer flow through a relief sewer from sewers located upstream of Outfall 048.	<u>50%</u> May 2020	March 2021	April 2022	12/31/2022
Sewer Separation 40th & Monroe	The project will separate approximately 220 acres and eliminate typical year overflows that are located in the tributary area contributing to Combined Sewer Outfalls 041, 043, 044, 045, 046, 047, 049, and 050 of the Lower Blue River Basin in Kansas City, Missouri.	<u>100%</u>	<u>40%</u> December 2020	February 2023	12/31/2023
Sewer Separation: Outfall 054	The project will separate approximately 35 acres of the combined sewer system and eliminate typical year overflows at Outfall 54.	<u>30%</u> July 2020	October 2021	December 2021	12/31/23
Dry Weather Sewer Line: Outfall 055	Design documents will be prepared for a 22-acre combined sewer neighborhood for the installation of relief sewers. This will reduce the frequency of overflows that occur at outfall 055.	<u>30%</u> May 2020	August 2021	August 2022	12/31/22
<b>Middle Blue River Basin</b>					
Sewer Separation: Outfalls 066 and 067	Design documents have been prepared for separation of approximately 270 acres of the combined system. The Consent Decree does not mandate separation of combined sewers upstream of Outfall 066; however, this 10-acre area was added to the Project because of its proximity to Outfall 067, its small size, and the relatively small number of known stormwater inflow connections. Upon completion of this separation work, both outfalls will not overflow in the typical year.	<u>100%</u>	<u>100%</u>	<u>100%</u>	12/31/2019
Diversion Structure 068 Storage Basin (formerly Relief Sewer Diversion Structure 068 to Blue River Sewer)	The Project is being designed to reduce combined sewer overflows at Outfall 068. A new open storage basin will be constructed in lieu of a relief sewer.	<u>100%</u>	<u>100%</u>	<u>10%</u> November 2020	12/31/2020
I/I Reduction Area 13	This project is being implemented to reduce water in basement occurrences in a separate sewer system area located within the Middle Blue River basin. The project will also increase the level of service achieved by downstream interceptor sewers.	<u>100%</u>	<u>35%</u> December 2020	February 2022	Non-Consent Decree Project

<b>Northeast Industrial District Basin</b>					
NEID Green Infrastructure Pilot Project	This project is designed to reduce combined sewer overflows and provide aesthetic, social and economic enhancements within the Northeast Industrial District. The design includes a gravel wetland facility and bioretention basins.	<u>100%</u>	<u>100%</u>	<u>10%</u> November 2020	12/31/2021*
Gooseneck Arch Sewer Gates and Pump Station Improvements	The project includes the construction of an adjustable crest gate inside a new gate structure situated over the existing 18 ft. by 21 ft. arch sewer to provide in-line storage of combined sewer flow utilizing a real-time control (RTC) system and a new 4-MGD submersible pump station. The pump station will deliver the stored volume to the Blue River Interceptor through a new force main.	<u>100%</u>	<u>100%</u>	<u>70%</u> April 2020	12/31/2021*
NEID Neighborhood Sewer Rehabilitation	Neighborhood sewer rehabilitation work in the Northeast Industrial District Basin consists of one (1) design project and two (2) construction packages due to the size of the basin. This project is being implemented to improve the reliability and performance of the combined sewer system and reduce basement backups. This project involves identification of sewer system defects, the preparation of construction contract documents, and the rehabilitation of manholes and sewer pipes 12-inches and smaller in diameter.	<u>100%</u>	<u>100%</u>	<u>80%</u> North April 2020 <u>70%</u> South June 2020	12/31/2020
<b>Turkey Creek/Central Industrial District Basin</b>					
Green Infrastructure Pilot Project	This green infrastructure pilot project is designed to reduce combined sewer overflows and to provide aesthetic, social and economic enhancements within the Central Industrial District. This includes infiltration trenches, cisterns, permeable paver parking, infiltration dry wells, bioretention, and a bioretention swale.	<u>100%</u>	<u>100%</u>	<u>30%</u> September 2020	12/31/2020
Neighborhood Sewer Rehabilitation	This project is being implemented to improve the reliability and performance of the combined sewer system and reduce basement backups. Two construction contracts will be issued for rehabilitation of manholes and sewer pipes that are 12-inches and smaller in diameter.	<u>100%</u>	<u>100%</u> January 2019	<u>30%</u> Area 1 November 2020 <u>25%</u> Area 2 January 2021	12/31/2021
Turkey Creek Basin Sewer Separation: 31st and Broadway	The project will separate approximately 35 acres of the combined sewer system and eliminate typical year overflows at outfall W006 by removing Diversion Structure 306.	<u>100%</u>	<u>75%</u> June 2020	January 2022	12/31/2022
<b>Westside WWTP</b>					
Westside Wastewater Treatment Plant Wet-Weather Improvements	This project involves the construction of wet weather treatment and disinfection facilities sized for 32 MGD. Facility upgrades for non-OCP work will also be completed.	<u>100%</u>	<u>100%</u>	<u>20%</u> June 2021	12/31/2020

\*Modified per Non-Material Modification signed 2/12/202

## IX. SEPARATE SEWER OVERFLOW CONTROL MEASURES – APPENDIX A

Kansas City's Separate Sanitary System (SSS) comprises nine drainage basins covering approximately 260 square miles of the City. The four SSS basins north of the Missouri River are the Northern and Northwestern watersheds and the Line Creek/Rock Creek and Birmingham/Shoal Creek basins. The five SSS system basins south of the Missouri River are the Blue River North, Round Grove, Blue River Central, Blue River South and Little Blue River basins.

Much of the early projects and program strategy in the separate sanitary sewer basins involve reducing the amount of inflow and infiltration (I/I) entering the SSS to reduce overflows from the system. This reduction in I/I is achieved by reducing or eliminating points of direct inflow into the system and reducing infiltration through collection system defects. A combination of I/I reduction, wet-weather storage, and treatment will be utilized to address system needs as outlined in the City's Overflow Control Plan. The subsequent planned departure of Johnson County Wastewater as a wholesale customer to Kansas City, MO will eliminate the need for storage at the 87th Street pump station site in the Blue River South Basin.

Field investigation activities for the I/I reduction projects are being completed through the City's OCP Program Management Services contract and two City-wide Sewer Cleaning and Closed-Circuit Television (CCTV) Inspection contracts. The combined work during this reporting period consists of sewer system network characterization and manhole inspections, sewer cleaning, and CCTV inspection of sanitary sewers in the Line Creek/Rock Creek, Northern basin, Little Blue River, Birmingham/Shoal Creek, Round Grove, and Buckeye Creek separate sewer system basins. For more details on the field investigations completed within the separate sewer systems during the reporting period see subsections b. – Collection Systems Operation and c. – Collection Systems Maintenance in Section XII – CMOM Plan Performance Criteria of this report. The status of the projects in the SSS basins is summarized in Table 2 below. The separate sanitary system had 13 active projects during the reporting period. Eight (8) projects were in design, and five (5) projects were either advertising for solicitation of construction bids, under construction, or completed construction in 2019.

**TABLE 2: PROJECT STATUS – SEPARATE SANITARY SEWER SYSTEM  
BASIN (THROUGH DECEMBER 31, 2019)**

Project Name	Description	Percent Complete through 12/31/2019 Planned Completion Date			CD AFO Date
Combined Sewer System		Pre-Design	Design	Construction AFO	
<i>Blue River South Basin Cont.</i>					
I/I Reduction Area 4	The project will focus on I/I reduction through rehabilitation of public sanitary sewers and manholes within the project area. There is an estimated 375,000 linear feet of sewer pipe and 1,900 manholes in the project area.	<u>100%</u>	<u>100%</u>	<u>100%</u>	12/31/2021
I/I Reduction Area 5	The project will focus on I/I reduction through rehabilitation of public sanitary sewers and manholes within the project area. There is an estimated 120,000 linear feet of sewer pipe and 600 manholes in the project area.	<u>100%</u>	<u>100%</u>	<u>0%</u> <u>May</u> <u>2021</u>	12/31/2021
<i>Line Creek/Rock Creek</i>					
I/I Reduction Area 3	The project focused on I/I reduction through rehabilitation of public sanitary sewers and manholes within the project area. There is an estimated 213,000 linear feet of sewer pipe and 1,000 manholes in the project area.	<u>100%</u>	<u>85%</u> March 2020	October 2022	12/31/2023
I/I Reduction Area 4	The project focused on I/I reduction through rehabilitation of public sanitary sewers and manholes within the project area. There is an estimated 246,000 linear feet of 6 -inch to 54-inch sewer pipe and 1,360 manholes in the project area.	<u>100%</u>	<u>60%</u> July 2020	October 2022	12/31/2023
<i>Round Grove</i>					
Round Grove Pump Station Rehabilitation	The project involves expansion of the Round Grove Pump Station to provide additional wet weather capacity up to a 60 MGD firm capacity. This will include new, larger pumps, new piping, and other facility capital improvements to accommodate the expansion and meet building code requirements.	<u>100%</u>	<u>100%</u>	<u>15%</u> March 2021	12/31/2022
Round Grove Supplemental I/I Reduction	This project is being implemented to reduce or eliminate the need for relief sewers upstream of the Round Grove Pump Station.	<u>100%</u> November 2019	<u>10%</u> January 2021	May 2022	Non Consent Decree Project
<i>Little Blue River</i>					
I/I Reduction Area 1	The project focuses on I/I reduction through rehabilitation of public sanitary sewers and manholes within the project area. There is an estimated 340,000 linear feet of sewer pipe and 1,400 manholes in the project area.	<u>100%</u>	<u>100%</u>	<u>0%</u> <u>May</u> <u>2021</u>	12/31/2021
I/I Reduction Area 2	The project focuses on I/I reduction through rehabilitation of public sanitary sewers and manholes within the project area. There is an estimated 310,000 linear feet of sewer pipe and 1,410 manholes in the project area.	<u>100%</u>	<u>100%</u>	<u>0%</u> March 2021	12/31/2021



Project Name	Description	Percent Complete through 12/31/2019 Planned Completion Date			CD AFO Date
Combined Sewer System		Pre-Design	Design	Construction AFO	
<b>Birmingham</b>					
I/I Reduction Area 2	The project focuses on I/I reduction through rehabilitation of public sanitary sewers and manholes within the project area. There is an estimated 238,000 linear feet of sewer pipe and 1,200 manholes in the project area.	<u>100%</u>	<u>35%</u> July 2020	March 2022	12/31/2023
I/I Reduction: North of the River	The project consists of field investigations, data analysis, preparation of construction contract documents, and rehabilitation of sewers, manholes and service lateral connections to achieve targeted infiltration and inflow reduction.	<u>100%</u> January 2020	Phase 1 August 2021  Phase 2 November 2021	Phase 1 March 2023  Phase 2 June 2023	12/31/2023
I/I Reduction Area 3	The project will focus on I/I reduction through rehabilitation of public sanitary sewers and manholes within the project area. There is an estimated 216,000 linear feet of sewer pipe and 975 manholes in the project area.	<u>100%</u> June 2019	<u>10%</u> April 2021	October 2022	12/31/2023
<b>Northern Basin</b>					
I/I Reduction Area 1	The project will focus on I/I reduction through rehabilitation of public sanitary sewers and manholes within the project area. There is an estimated 150,509 linear feet of sewer pipe and 778 manholes in the project area.	<u>50%</u> May 2020	<u>September</u> 2021	January 2023	12/31/23
I/I Reductions Area 2	The project will focus on I/I reduction through rehabilitation of public sanitary sewers and manholes within the project area. There is an estimated 239,769 linear feet of sewer pipe and 1069 manholes in the project area.	<u>50%</u> May 2020	September 2021	January 2023	12/31/23

## A. PRIVATE INFLOW/INFILTRATION REDUCTION PROGRAM

In 2019, the OCP continued to manage a Private I/I Reduction Program in conjunction with public sewer I/I reduction projects in select areas of each SSS basin. The focus of the program is to disconnect illicit private I/I sources when it is cost-effective to remove excessive I/I flows into the sanitary sewer system. Approximately 70,000 properties are targeted for private I/I evaluation in the City's SSS. Since the start of the City's Private I/I Reduction Program in 2016, through 2019 the City has performed a total of approximately 43,500 property evaluations.

Throughout 2019, three Design Professional firms continued to conduct building evaluations in search of illicit I/I sources on private property. Sixteen local plumbing contractors continued to perform disconnections of cost effective I/I sources identified by the Design Professionals.

During 2019, the following was accomplished under the City's Private I/I reduction program through voluntary participation by property owners:

- Building plumbing evaluations were attempted at approximately 10,000 private properties.
- Interior and exterior building plumbing evaluations were completed at approximately 6,000 private properties.
- Exterior-only building plumbing evaluations were completed at approximately 4,000 private properties.
- Approximately 1,500 cost-effective private I/I sources were identified at approximately 1,100 private properties.
- Approximately 1,100 property owner agreements to disconnect illicit sources were executed.
- Approximately 650 disconnection repairs were completed by plumbing contractors on private properties where I/I sources had been identified.

## X. SCHEDULED ACTIVITY FOR THE NEXT REPORTING PERIOD

The activities listed below are expected to occur during the next reporting period between January 1, 2020 and June 30, 2020. This list, however, should not be interpreted as an explanation of all activities that will occur in the first half of 2020. Certain Consent Decree and OCP activities (e.g., program management, NMC, CMOM, public participation, project planning, and data management) will continue for the duration of the Consent Decree but, are not explicitly discussed in this section.

- Requests for Qualifications/Proposals for the following OCP projects are scheduled to be developed and advertised for selection of Design Professional services:
  - Town Fork Creek/ 63<sup>rd</sup> Street Green Infrastructure Project
  - Mill Creek Streetcar Green Infrastructure Project
- Requests for bids proposals will be advertised for selection of Construction Contractors for the following OCP Projects:
  - I&I Reduction: Blue River South Basin 4 & 5 (Phase 2)
  - Sewer Separation: 31<sup>st</sup> Street and Broadway
- Water Services will issue a Notice to Proceed to Design Professionals or Construction Contractors for the following OCP project contracts:
  - I&I Reduction: North of River (Buckeye) (Design)
  - I&I Reduction: Northern Basin 2 (West) (Design)
  - I&I Reduction: Northern Basin 2 (East) (Design)
  - Relief Sewer: 45<sup>th</sup> Street (Design)
  - Dry Weather Sewer Line: Outfall 055 (Design)
  - I&I Reduction: Northern Basin 1 (Design)
  - I&I Reduction: Little Blue River Basin 1 (Construction)
  - I&I Reduction: Little Blue River Basin 2 (Construction)
  - I&I Reduction: Blue River South 4 & 5 (Phase 2) (Construction)
  - I&I Reduction: Blue River South 4 Additional Area (Design)
- Work will continue to implement the City's Private Inflow/Infiltration Reduction Program in conjunction with other I/I reduction projects in the SSS.
- Work will continue on the active OCP projects shown in Table 1 and Table 2 that were not completed in 2019.
- Flow monitoring will continue in accordance with the CSS Metering Plan approved by USEPA in December 2016.

## XI. NINE MINIMUM CONTROLS – APPENDIX B

This section focuses on documenting Nine Minimum Controls (NMC) program accomplishments during the reporting period in the combined sewer system area. Table 3 identifies each of the NMCs and summarizes work accomplished during the reporting period. Accomplishments for each control measure are explained in further detail in the applicable NMC section.

TABLE 3: 2019 NMC ACCOMPLISHMENTS SUMMARY

NMC	Description	Accomplishment
1	Proper Operation and Regular Maintenance Program	<ul style="list-style-type: none"> <li>Conducted routine maintenance procedures</li> <li>Conducted routine inspection schedules</li> <li>Carried out emergency response protocol and reported 49 dry weather overflows City-wide, 16 in the CSS</li> <li>Inspected flow regulating structures</li> <li>Conducted 90 miles of CCTV inspections in the CSS</li> <li>Cleaned 256 miles of CSS interceptor and collection lines</li> <li>Received and responded to 3,658 3-1-1 Action Center calls about the City's wastewater collection system</li> </ul>
2	Maximization of Storage in the Collection System	<ul style="list-style-type: none"> <li>Continued construction on Gooseneck Creek Arch Sewer Gate and Pump Station project</li> <li>Enhanced the real-time controls at the OK Creek Gate to increase operational reliability</li> </ul>
3	Review and Modification of Pretreatment Requirements	<ul style="list-style-type: none"> <li>Inspected 66 non-domestic FOG sources at Food Service Establishments</li> <li>Assessed non-domestic CSO discharge impacts</li> <li>Issued 20 citations for standards violations and self-reporting violations</li> </ul>
4	Maximization of Flow to the POTW for Treatment	<ul style="list-style-type: none"> <li>Contracted an In-Line Storage and Conveyance Operational Analysis study using real-time control to optimize existing system storage and capacity</li> <li>Commenced design of diversion structure improvements in the Town Fork Creek Basin to improve flow control and performance</li> <li>Began construction of improvements at Westside WWTP to increase treatment capacity to 60 MGD</li> </ul>
5	Elimination of CSOs during Dry Weather	<ul style="list-style-type: none"> <li>Conducted 7,587 inspections of the CSS diversion structures</li> <li>Repaired 242 localized sewer defects in the CSS</li> <li>Reported 16 dry weather overflows in the CSS</li> <li>Reported 3 dry weather overflows from CSOs</li> <li>Reported 2 pump station dry weather overflows</li> <li>Performed routine preventative cleaning of system</li> </ul>
6	Control of Solids and Floatable Material in CSOs	<ul style="list-style-type: none"> <li>Repaired or replaced 358 catch basins</li> <li>Inspected and cleaned 15,622 catch basins</li> <li>Conducted street sweeping of 5,649 lane miles</li> </ul>
7	Pollution Prevention Programs to Reduce Contaminants in CSOs	<ul style="list-style-type: none"> <li>Conducted street sweeping of 5,250 lane miles in the CSS</li> <li>Carried out Oil and Grease Management Program</li> <li>Conducted Solid Waste and Recycling activities</li> <li>Conducted Household Hazardous Waste Program</li> <li>Conducted Leaf and Brush Collection and Recycling Programs</li> <li>Conducted Public Education and Outreach Programs</li> <li>Made 10 presentations to more than 575 citizens and stakeholders</li> <li>Conducted 14 public meetings City-wide with approximately 267 residents</li> </ul>
8	Public Notification	<ul style="list-style-type: none"> <li>Provided CSO notification</li> <li>Distributed 24 media advisories for sewer overflows</li> <li>Conducted warning sign inspections</li> </ul>
9	Monitoring to Characterize CSO Impacts and the Efficacy of CSO Controls	<ul style="list-style-type: none"> <li>Identified and mapped CSO structures and outfalls</li> <li>Monitored water quality</li> <li>Mapped the location of green infrastructure facilities constructed by OCP and WSD</li> </ul>

## A. NMC 1- PROPER OPERATION AND REGULAR MAINTENANCE PROGRAM

### i. ORGANIZATION

Kansas City operates and maintains its wastewater systems through its Water Services Department. The Wastewater Line Maintenance Division and the Wastewater Treatment Division are primarily responsible for the operation and maintenance (O&M) of the City's CSS. The Stormwater Maintenance Division is responsible for street cleaning activities and replacement of catch basins in the CSS area.

The Wastewater Treatment Division is responsible for the O&M of the two wastewater treatment plants (WWTPs) within the CSS area (Blue River and Westside). Several Line Maintenance sections within the Wastewater Line Maintenance Division are responsible for the O&M of the City's CSS including:

- Sewer Investigation/CCTV Inspection Sections
- Sewer Cleaning Section
- Sewer Repair Section

### ii. RESOURCES

Water Services maintains adequate personnel and capital resources to maintain O&M activities throughout the CSS. Through the end of the reporting period, Water Services had 163 staff members in the Wastewater Line Maintenance Division. In fiscal year 2019 (May 1, 2018 through April 30, 2019), the operating expenses for sewer operations were as follows:

- Wastewater Treatment and Pumping: \$30,962,476
- Sewer Maintenance: \$31,583,667
- Administration and General: \$39,174,338
- Industrial and Household Hazardous Waste: \$1,593,859

### iii. LIST OF CRITICAL FACILITIES

Water Services maintains a list of critical CSS facilities, including diversion structures, flow splitters and outfalls. Diversion structures divert excess wet weather flow to receiving streams. Often, several diversion structures direct excess wet weather flow to the same outfall. Flow splitters are structures that divide flows within the CSS, but do not direct flow to receiving waters (one or more flow regulating structures are downstream of the flow splitting structure, upstream of the receiving waters). Attachment C contains a list of critical facilities. Inspection intervals vary from three (3) to 30 days, depending on the history of required cleaning. If inspections reveal the interval is not adequate, it is adjusted accordingly.

*Attachment C on page 58* lists the identification number, location, map number, and receiving stream of the CSOs and inspection intervals.

### iv. CSO SEWER MAINTENANCE MANUAL

The Wastewater Line Maintenance Division adheres to requirements outlined in the CSO Operations and Maintenance Manual, which is available in hard copy at Water Services' offices. The manual provides requirements to personnel for the proper operation and maintenance of the CSS, including:

- Routine inspection schedules
- Emergency response protocols
- Dry weather overflow reporting procedures
- Training and safety practices



#### **v. LOG OF MAINTENANCE ACTIVITIES**

Water Services currently uses the Hansen computerized maintenance management system (CMMS) to log maintenance activities. The system tracks maintenance activities with work orders initiated from various sources, including customer complaints, 3-1-1 Action Center calls, and investigation activities. Work orders are prioritized based on the critical nature of the defect utilizing a system that categorizes each order into one of three levels of severity. They are closed out upon completion of the work. Work orders track parameters, including:

- Date initiated
- Initiating party
- Date completed
- Line segment
- General supervisor
- All costs, including materials
- Labor hours, including overtime
- Permitting

*Table 4* shows a summary of the maintenance activities performed in the combined sewer system during the reporting period.

**TABLE 4: 2019 CSS MAINTENANCE ACTIVITIES**

Activity	Quantity
Sewer- Main Stoppages Opened	78 work orders
Sewer- Main Repairs	242 work orders
Sewer- Manhole Repair/Resurfacing	103 work orders
Sewer- Water in the Basement	955 work orders
Sewer CCTV	90 miles
Sewer Cleaning	256 miles

#### **vi. CLOSED CIRCUIT TELEVISION INSPECTION**

The Wastewater Line Maintenance Division maintains a CCTV inspection program. The division utilizes both internal resources and contractors to perform the work.

In 2019, approximately 90 miles (475,200 LF) of CSS were televised, which exceeded the Consent Decree requirement. Documentation for sewer mileage CCTV inspected is stored in Hansen and verified using WinCan software.

#### **vii. SEWER CLEANING**

The Wastewater Line Maintenance Division conducts sewer cleaning activities in-house and also uses outside contractors.

Water Services maintains a fleet of sewer cleaning equipment including:

- Jet trucks
- Jet-Vac trucks
- Rodding machines
- Easement machines
- Bucket machines

Local contractors are utilized for specialized cleaning services on large diameter sewers through contractual agreements. In 2019, approximately 256 miles of CSS were cleaned, which exceeded the Consent Decree requirements of 106 miles annually. This sewer cleaning mileage is documented in Hansen.

#### **viii. OVERFLOW AND BYPASS RESPONSE**

The Wastewater Line Maintenance Division has a documented protocol to guide actions following a dry weather overflow in both the combined and separate sanitary sewer systems. When a triggering overflow is recognized, staff responds quickly to control the release of wastewater and perform appropriate cleanup tasks. This activity is documented by Wastewater Line Maintenance supervisors and reported to MDNR in accordance with the City's plan and permits. In 2019, a total of 49 dry weather overflows were reported City-wide, 16 of which were in the combined sewer system.

#### **ix. EMERGENCY CONTACT**

The City maintains a 3-1-1 Action Center for reporting collection system problems. The Action Center can be reached by calling 3-1-1 in Kansas City, Missouri, or by calling (816) 513-1313. The Action Center is staffed from 7:00 a.m. to 7:00 p.m. during the regular business week. Emergencies can be reported outside of these hours via 3-1-1, which connects to dispatch after hours. During the reporting period, 3,658 3-1-1 calls related to wastewater collection system problems were received and responded to.

Emergency contact numbers are also posted on 88 combined sewer outfall signs. Each sign identifies the outfall by number and lists the emergency contact number. The signs solicit public reports of dry weather overflows. The emergency contact number directs the caller to the 3-1-1 Action Center. More information about the signs can be found in NMC 8 later in this document.

## **B. NMC 2 - MAXIMIZATION OF STORAGE IN THE COLLECTION SYSTEM**

### **i. COLLECTION SYSTEM INSPECTIONS**

All CSO diversion structures and flow splitters are inspected and cleaned regularly to identify overflows, remove debris and blockages, assess the operational status of the structure, and make needed repairs. Inspection crews can readily view detailed structure information such as inspection logs, inventory sheets, schematics, profiles, and sectional views. Inspections of all diversion structures occur at intervals ranging from three (3) to 30 days as shown on page 58 in Attachment C. During the reporting period, 7,587 inspections of the CSS diversion structures were performed. Tracking logs are documented in Hansen.

### **ii. DIVERSION STRUCTURE MODIFICATION**

Diversion Structure 122 was eliminated in 2019 by construction of the Sewer Separation: Outfalls 066 and 067 project. This follows removal of Diversion Structure 121 under the same project in 2018. However, three new temporary wet weather overflow structures were constructed in 2019 as part of the Sewer Separation: Outfalls 066 and 067 project. While hydraulic modeling shows that these temporary overflow structure do not activate during the typical year, these temporary overflow structures were installed to reduce the risk of basement backups in the event of severe surcharging during large storms such as the two-year or five-year storm events. Flow monitoring will be performed in 2020 and 2021 to confirm successful sewer separation and wet weather surcharge levels. If metering indicates acceptable levels of surcharge during larger wet weather events, these three newly constructed overflow structures will be removed, thereby fully converting Outfalls 066 and 067 to stormwater only outfalls. The three new overflow structures will temporarily be identified as diversion structures T105(@S127-095), T119(@S127-072), and T112(@S148-511) in the City's collection system database and in the Annual Report for reporting purposes only.

### **iii. REDUCE AND/OR ELIMINATE INFLOWS AND ENCOURAGE LOCALIZED UPSTREAM DETENTION**

The City actively identifies projects with the opportunity to produce multiple benefits by integrating green infrastructure that reduces and/or eliminates inflows or provides localized detention. Obstacles, opportunities, and project development process recommendations will be identified upon completion of these projects so that future projects can provide greater environmental benefits. Water Services staff members continually oversee and maintain green infrastructure improvements that are their responsibility. The Green Solutions Maintenance Crew, housed in the Preventative Maintenance Division, provides routine green infrastructure maintenance services, including trimming, mulching and weeding. Water Services' Senior

Landscape Architect and Landscape Technician provide inspection and assist with coordinating maintenance activities.

### **1. Water Services Capital Projects**

In addition to the Consent Decree and OCP additional green infrastructure projects, Water Services has one (1) other green infrastructure project currently in design and two (2) green infrastructure projects are currently advertising for construction bids or are currently in construction through the stormwater and wastewater divisions. These projects, listed in Table 5 below, are intended to reduce inflows or provide solutions for localized flooding. In addition, green infrastructure improvements are being evaluated for inclusion as part of other stormwater and wastewater projects currently in design.

As implementation of the OCP continues, additional projects will be implemented that will aid in reducing and/or eliminating inflows. These projects may also contain private inflow source reduction, including the disconnection of downspouts, sump pumps, and other sources of stormwater inflow from private property.

**TABLE 5: WATER SERVICES GREEN INFRASTRUCTURE PROJECTS UNDER DESIGN AND CONSTRUCTION (2019)**

Property/Project Name	Phase	Description/Type
89th & Lane	Bidding	Live channel bed
Loma Vista & Eastern	Construction	Enhanced detention basin
4012 & 4016 Cleveland Avenue	Design/ROW	Potential undetermined green infrastructure component

### **2. Other City-Wide Green Infrastructure Efforts**

Outside of Water Services, implementation of green infrastructure projects occurs in three primary ways: 1) through City capital project enhancements; 2) required private installations; and 3) voluntary private installations.

#### **iv. UPGRADE/ADJUST PUMP OPERATIONS AT INTERCEPTOR LIFT STATIONS**

Seven pump stations are located within the boundaries of Kansas City's CSS and operated and maintained by the Wastewater Treatment Division. Four pump stations (Turkey Creek, Santa Fe, Northeast Industrial District (NEID), and Blue River) function as primary pump stations to convey flow to the Blue River and Westside Wastewater Treatment Plants (WWTPs). Two of these stations, Blue River and NEID, are located at the Blue River Primary WWTP. These pump stations are operated according to the Wet Weather Operating Plan during wet weather events defined in NMC 4 during wet weather events and are periodically updated.

Flow control management includes provisions for additional system storage and selected sewer/storm water separation upstream of these stations to reduce overflow frequency. Two small pump stations in the CSS (12th and 15th Street stations) are operated to maximize storage in the upstream system during wet weather. As part of a current OCP project, following sewer separation, the redirection of the dry weather flow from the 15<sup>th</sup> Street Pump Station to the 12<sup>th</sup> Street Pump station and elimination of the 15<sup>th</sup> Street Pump Station is being considered.

In 2019, various design and construction was initiated, continued, or completed at pump stations, force mains, and pipelines including the new Gooseneck Pump Station, Turkey Creek Pump Station's OK Creek Gate Structure, Round Grove Pump Station, 15th Street Pump Station, and the new Chouteau Pump Station.

Continuous improvements are made to existing systems at all plants and stations as part of routine maintenance and capital upgrades and repairs. This enables continued reliability of system components during events requiring flow maximization.

#### **v. REMOVAL OF OBSTRUCTIONS TO FLOW**

Cleaning of existing interceptors to maintain available conveyance and storage capacity is a standard procedure performed by the Wastewater Utility's Preventative Maintenance Division. The division utilizes its crews and external contract cleaning crews on a continuous basis to remove and prevent accumulation of debris and sediment that restrict the flow. This information is tracked in the computerized maintenance management system.

### **C. NMC 3 - REVIEW AND MODIFICATION OF PRETREATMENT REQUIREMENTS**

The Regulatory Compliance Division regulates non-domestic discharges. The division is responsible for implementing and enforcing Chapter 60, Article IV of the Kansas City Code of Ordinances and several city-wide programs, including:

- Federal Pretreatment Program
- Surcharge Program for high-strength wastewaters
- Oil and Grease Management Program
- Annual review of pretreatment requirements

These activities incorporate the following control measures:

- Inventory non-domestic CSS discharges: Identification of significant industrial users (SIUs).
- Assess non-domestic CSO discharges: Implementation of the surcharge program to evaluate the impact of non-domestic wastewater.
- Evaluate feasible modifications: Periodic review of pretreatment requirements as necessary. No pretreatment requirements were modified in 2019.

#### **i. FEDERAL PRETREATMENT PROGRAM**

The Regulatory Compliance Division's administration of the Federal Pretreatment Program is subject to regular review by MDNR and the USEPA, Region VII. An annual report of the City's Pretreatment Program activities is filed with MDNR in March of each year. The 2018 Industrial Pretreatment Program Annual Report was submitted to the MDNR on March 29, 2019, and can be found in Attachment B.

The report includes the following information:

- Companies in significant non-compliance
- Inter-jurisdictional agreement status
- Permit activity
- Annual enforcement log
- Notices of violations

The Regulatory Compliance Division identifies the regulated discharge flow volume, potential pollutants of concern, drainage basins, and the pump station(s) serving each SIU. During the reporting period, there were 78 SIUs permitted under the program. Each SIU is inspected annually and monitored periodically for compliance with its wastewater discharge permit conditions.

#### **ii. SURCHARGE PROGRAM**

The Surcharge Program levies a surcharge fee for biological oxygen demand (BOD), total suspended solids (TSS), and/or fat, oil and grease (FOG) concentrations above that in "normal sewage" as defined in Chapter 60 of the City's Code of Ordinances. Food handling operations, such as restaurants, are most affected by this ordinance. The surcharge program also makes SIUs aware of the effects their discharge has on the sewer system and encourages them to reduce their waste discharge through modifications or improved housekeeping procedures.

#### **iii. OIL AND GREASE MANAGEMENT PROGRAM**

The Oil and Grease Management Program, through training, outreach, inspections, and enforcement, encourages non-domestic sources to limit the discharge of fats, oils and grease (FOG) into the sanitary sewer system. The primary non-domestic sources of FOG discharges are restaurants.

Water Services' Regulatory Compliance Division completes inspections of grease traps at food handling facilities. At the time of the inspections, facility personnel are informed about ordinance requirements regarding FOG discharges; if requirements are not met, there is a potential for enforcement actions. During the inspection, the inspector reviews cleaning records, outlines oil and grease best management practices, and may perform a sink test to determine if the lines are clogged with FOG. If a FOG issue is discovered during the inspection, the inspector will suggest one of the following maintenance improvement options:

- Shorter cleaning cycles
- Replacement of grease traps with grease interceptors

In 2019, there were 899 food service establishment inspections. There were no enforcement actions taken because of these inspections.

#### **iv. REVIEW OF PRETREATMENT REQUIREMENTS**

Every year, the Regulatory Compliance Division reviews the pretreatment program to determine whether changes are warranted. Economic and environmental impacts are considered when evaluating potential changes. These include an assessment of the non-domestic discharges to the CSS. In 2019, no changes to the pretreatment program were made.

### **D. NMC 4 - MAXIMIZATION OF FLOW TO THE POTW FOR TREATMENT**

#### **i. WASTEWATER TREATMENT PLANT (WWTP) PERFORMANCE AND FLOW CAPACITIES**

Capacity studies were performed for both the Blue River WWTP and Westside WWTP in 2006<sup>1</sup>. Plant stress tests were also performed on both plants<sup>2</sup>. The studies compared flows processed during wet weather and dry periods to determine the relationship between performance and flow.

Field stress testing results at the Blue River WWTP indicate that the various processes have different hydraulic capacities. Although it was believed that a theoretical maximum of 156-MGD was possible, further investigation has determined that 120-MGD is the actual maximum throughput capacity of the facility as a whole.

Current Blue River NPDES permitting identifies 120 MGD as the maximum treatment capability. Missouri does not make distinction between maximum monthly average flow and maximum day flow in our permits; Currently, a maximum day flow of 120 to 130 MGD is feasible for one or two days. The facility has never been permitted for more than 120-MGD via the NPDES program.

Stress testing has confirmed that 40 MGD is the peak capacity the Westside WWTP can process for multiple days without affecting process performance. Future plans include converting Blue River WWTP's secondary treatment system consisting of fixed film media components to activated sludge when necessitated by future regulatory requirements. This will also likely include optimizing wet weather capacity and treatment. Future design will incorporate the ability to manage more periodic wet weather flows without adversely affecting future secondary activated sludge NPDES treatment limits due the differing daily peaking factors between activated sludge and fixed film media secondary treatment systems

#### **ii. WET WEATHER OPERATING GUIDELINES FOR WWTPs**

##### **1. Blue River WWTP**

The Wet Weather Operating Guidelines for the Blue River WWTP summarize the operating procedures at the facility during wet weather events. The guidelines specify that the Blue River WWTP processes combined (primary plus secondary) wastewater only to the maximum capacity of the secondary treatment plant. The operating guidelines indicate that the secondary treatment plant has a maximum total capacity of 120 MGD. The primary treatment capacity of 220 MGD is not achievable due to the capacity limitation of secondary treatment. Operationally, plant staff prioritize flow from the NEID Sewer for treatment versus flow from the Blue River Interceptor during wet weather

## **2. Westside WWTP**

The Wet Weather Operating Guidelines summarize the procedure for operations at the facility during wet weather events. The ranges provide the following recommended conveyance rates for wet weather pump stations:

- Turkey Creek PS - 11.4-24 MGD
- Santa Fe PS - 4.5-15 MGD
- Line Creek PS - 12 MGD

As improvements to the Turkey Creek Pump Station and wet weather facilities for the Westside WWTP are completed, Water Services will reevaluate the pumping rates and peaking factors from these three pump stations during wet weather to determine how much additional flow can be pumped and handled at the Westside WWTP. Ranges are provided because KC Water continues to develop operating strategies based on routine improvements to maximize flows to Westside WWTP and Blue River WWTP.

*1 The Blue River Wastewater Treatment Plant Capacity Study dated March 2, 2006, and the Westside Wastewater Treatment Plant Capacity Study dated April 6, 2006.*

*2 Technical memorandums titled Blue River Wastewater Treatment Plant Stress Test Report dated August 2008 and Westside Wastewater Treatment Plant Stress Test Report dated December 2007.*

## **E. NMC 5 - ELIMINATION OF CSOs DURING DRY WEATHER**

The Wastewater Preventative Maintenance and Wastewater Treatment Divisions actively work to identify and eliminate opportunities for dry weather overflows (DWO). The measures taken include:

- Routine preventative cleaning of the combined sewer system
- Inspection to identify dry weather overflows
- Correction of primary causes of dry weather overflows
- Notification to MDNR when a dry weather overflow occurs

### **i. FLOW REGULATING STRUCTURE INSPECTION**

Flow regulating structures in the CSS include diversion structures and flow splitters. Routinely, these structures are inspected to verify proper functioning. Diversion structures direct excess wet weather flows to receiving waters. The inspection interval varies for each structure and is based on historical records of performance and the sensitivity of the area surrounding the structure. Flow splitters are structures that divide flows within the CSS, but do not direct flow to receiving waters. Attachment C, on page 58 of this report, lists the inspection intervals completed for each diversion structure and flow splitter in the CSS.

### **ii. DRY WEATHER OVERFLOW CORRECTIVE ACTION**

Water Services implements dry weather overflow (DWO) corrective actions to address operational problems believed to be the cause of overflows. The corrective actions include activity such as interceptor cleaning and line repair, equipment repair and replacement, changes in operational procedures, and identification of issues that require further evaluation. Water Services had previously developed and continues to revise as appropriate procedures to respond, remediate and report all dry weather and wet weather overflows immediately with an update of the details on the State of Missouri's website. This website was implemented in late 2019 and replaced the existing reporting mechanisms.

The Wastewater Preventative Maintenance Division's sewer repair program is responsible for repairing localized sewer defects linked to the occurrence of DWOs. Jet vacuum cleaning units remove materials that may restrict flow leading to blockages and DWOs at upstream locations. This action is taken immediately, as is practical, upon notification that a DWO has occurred.

### **iii. DRY WEATHER OVERFLOW NOTIFICATION**

The Wastewater Preventative Maintenance Division notifies MDNR within 24 hours of discovery of a DWO. Follow-up written reports are completed within five days of ending the overflow. In all occurrences, the area around the overflow is inspected and cleaned for any debris or contaminants in accordance with best management practices for such events. If vandalism causes a DWO, the standard manhole covers are replaced with bolt-down covers to deter future vandalism. In 2019, 16 dry weather overflows in the CSS were reported to MDNR, three (3) of which were from combined sewer outfalls.

The Wastewater Treatment Division notifies MDNR of DWOs that occur at either pump stations or treatment plants within 24 hours of discovery. Within five days of the occurrence, a follow-up written report is submitted to MDNR.

In 2019, dry weather overflows occurred on the following days and facilities:

- Santa Fe Pumping Station
  - June 2, 2019
- KCI Industrial Pumping
  - November 15, 2019

## **F. NMC 6 - CONTROL OF SOLIDS AND FLOATABLE MATERIAL IN CSOs**

### **i. PREVENTING EXTRANEEOUS SOLIDS AND FLOATABLES FROM ENTERING THE CSS**

Water Services and other City departments employ various measures that minimize extraneous solids and floatables from entering the CSS, including:

- Street Sweeping – Water Services sweeps streets on a routine schedule to reduce trash, silt and other debris. During 2019, Water Services swept a total of 5,649 lane miles, including 5,250 lanes miles in the combined sewer system area and 399 lane miles in the separate sewer system areas. The schedule for street sweeping runs from January 1 through December 31 each year. Program was suspended from May 1, 2019 till September 30, 2019 due to budgetary issues and was resumed on October 1, 2019. Upon resumption, street sweeping was prioritized to focus on areas that have historically produced the highest volume of debris. This approach was agreed upon in EPA's letter of November 22, 2019 and may be considered in future years.
- Repair and Clean Catch Basins – To maintain the proper function of stormwater inlets, the Stormwater Line Maintenance Division performs catch basin cleaning and repairs through its Catch Basin Replacement Program. This information is stored and tracked in Hansen. In 2019, 15,622 catch basins were inspected and cleaned and 358 were repaired or replaced.
- Construction Site Erosion Control – Soil erosion from construction activity can increase the quantity of turbidity, nutrients, metals and sediment in the sewer system and receiving waters. Sedimentation problems can potentially reduce the hydraulic capacity of sewer lines, leading to overflows. The implementation and enforcement of erosion control regulations can be an extremely effective method of reducing these constituents in the CSS. In 2019, the Regulatory Compliance Division inspected 34 City-contracted construction sites that were one acre or larger in size for compliance with sediment erosion control regulations. Construction work is required to conform to City engineering and construction standards for all public or private work.



## G. NMC 7 - POLLUTION PREVENTION PROGRAMS TO REDUCE CONTAMINANTS IN CSOs

Kansas City has a long-standing record of implementing pollution prevention measures and providing pollution prevention options to residents. The City continues to implement the following measures to help reduce pollution entering the combined sewer system and, in turn, rivers and streams:

- Street sweeping (See NMC 6)
- Oil and Grease Management Program (See NMC 3)
- Solid Waste and Recycling
- Household Hazardous Waste Program
- Leaf and Brush Collection and Recycling
- Public Education and Outreach Programs

### **i. SOLID WASTE AND RECYCLING**

Kansas City offers curbside pickup of solid waste, recycling, and bulky items to give residents a convenient way to dispose of unwanted waste and, ultimately, reduce illegal dumping. The City also manages three drop-off recycling centers used by businesses and residents of multi-family dwellings who may not have curbside recycling options available. In addition to these programs, the City also provides services for cleanup of illegal dump sites, a drop-off facility for waste tires, and reduced-cost dumpsters for neighborhood cleanups.

### **ii. HOUSEHOLD HAZARDOUS WASTE PROGRAM**

The Household Hazardous Waste (HHW) program is hosted by Water Services and consists of two subprograms: an HHW drop-off facility and HHW mobile collection events. In 2019, the program served 54 communities, including Kansas City, from five counties in the region.

The HHW drop-off facility acts as a central location for providing a cooperative regional collection system for Missouri communities in the Kansas City metropolitan area. The facility accepts various types of residential hazardous waste, such as automotive fluids, batteries, household cleaners, pesticides, herbicides, fertilizers and paint. It is open to the public on Thursdays, Fridays, and Saturdays, year-round; except City-observed holidays and the last two weeks of December. The Swap Shop is an ancillary facility of the drop-off facility where certain materials in good condition (such as paint) can be distributed and reused instead of being disposed. Operational hours for the Swap Shop are Tuesdays, Wednesdays and Saturdays from 9:00 a.m. to 4:00 p.m.; and Thursdays and Fridays from 9:00 a.m. to 6:00 p.m. Drop-off of household hazardous waste from participating communities occurs on Thursdays and Fridays between 9:00 a.m. and 6:00 p.m., and Saturdays from 9:00 a.m. to 4:00 p.m.

Mobile events throughout the City and the region provide convenient opportunities for proper disposal of HHW. These events typically occur on Saturdays from April 1 through October 31 and can be held in any city or county participating in the regional HHW program. The program provides a viable alternative to improper disposal of HHW in landfills, storm sewers, or sanitary sewer facilities. A total of 3,475 vehicles were served at the mobile events in 2019.

In 2019, the program collected a total of 1,334,743 pounds (667 Tons) of HHW materials, including 832,585 pounds coming from Kansas City residents.

### **iii. LEAF AND BRUSH COLLECTION AND RECYCLING**

The Leaf and Brush Recycling Program is a collaborative effort between Water Services and the City's Public Works Department. Water Services is responsible for the collection of curbside leaf and brush, and the Public Works Department runs the drop-off facilities. Water Services collects leaf and brush from residents three times a year, once in the spring and twice in the fall, on regularly scheduled trash pickup days at no charge. Residents are also allowed to drop off leaf and brush waste at the drop-off facility.

The leaf and brush collected are composted or mulched by a local company and made available to residents for free or for a small fee. Removal of excess leaf and brush from residences curtails illegal dumping of these materials down storm drains and into local creeks, streams and rivers. During the reporting period, 3,681 tons of leaf and brush materials were collected and recycled.

#### iv. PUBLIC EDUCATION AND OUTREACH PROGRAMS

Water Services provides additional outreach and education to encourage residents and business owners to minimize or eliminate contaminants from entering the sewer system. Descriptions of outreach and education initiatives, including those that are part of the City's Overflow Control Program, are provided below.

##### 1. Presentations, Conferences, and Tours

During the reporting period, ten presentations were made to more than 575 citizens and stakeholders about overflow control measures, wastewater and water quality. The presentations included groups such as professional associations, metropolitan planning and non-governmental organizations, schools and neighborhood groups. The following is a listing of the organizations and presentations given during the reporting period:

- Partnerships Matter – Bridging the Gap Volunteer Luncheon: January 17, 2019
- Indian Creek Flood Project – Center Middle School: January 23, 2019
- Water Quality and Litter – GreenWorks in KC: February 2, 2019
- NGICP Module 1: February 13, 2019
- Water Sustainability in KCMO – UMKC Environmental Students: April 1, 2019
- How Plants Reduce Stormwater – North KC Innovation Center: April 29 through May 3, 2019
- This is KC Water – Community Engagement University: May 21, 2019
- Planting for Water Quality – Ruiz Library: June 6, 2019
- This is KC Water – Community Engagement University: August 13, 2019
- Green Infrastructure – Marlborough Green Guard: August 18, 2019

##### 2. Public Meetings

Table 6 displays information about the public meetings held in 2019 in support of OCP projects. A total of 14 public meetings were held for OCP projects with approximately 267 residents in attendance. The public meetings listed below were held throughout the community, not just in the combined sewer system area.

**TABLE 6: OCP PROJECT PUBLIC MEETING INFORMATION (2019)**

Date	Project	Meeting Purpose	No. of Attendees
January 3, 2019	Diversion Structure 068 Storage Basin and Sewer Rehabilitation	Project Update	61
January 16, 2019	Waldo Neighborhood: Program Update	Program Update	17
January 26, 2019	Waldo Tower Neighborhood: Program Update	Program Update	41
February 11, 2019	Northeast Area and Gooseneck Creek North NSR	Project Update	13
February 14, 2019	Northeast Industrial District Green Infrastructure Project - Construction	Project Update	8
March 27, 2019	CID/West Bottoms – Green Infrastructure Project	Project Update	12
June 4, 2019	Turkey Creek Central Industrial District Area 1 NSR	Project Update	8
June 11, 2019	Turkey Creek Central Industrial District Area 2 NSR	Project Update	22
June 19, 2019	Water Main Replacement & NSR: W 37 <sup>th</sup> Street and Roanoke Drive	Project Update	2
July 9, 2019	Diversion Structure 068 Storage Basin and Sewer Rehabilitation	Project Update	29
October 10, 2019	Green Infrastructure Demonstration Project, VA Medical Center & Avenue of Life	Project Update	4
October 14, 2019	Lower Blue River NSR North Area Project	Project Update	3
October 17, 2019	Blue Valley Neighborhood Association	Program Update	15
December 5, 2019	Lower Blue River NSR South Area Project	Project Update	32
		TOTAL	267

In addition to the 14 public meetings pertaining to project information and program updates, outreach and scheduling events were also held in support of Kansas City's voluntary Private Inflow and Infiltration Program, Keep out the Rain. Table 7 displays information pertaining to these outreach efforts which total six scheduling events with 114 attendees. These public scheduling events are listed separately because they are part of a larger, coordinated outreach effort for the City's Keep Out the Rain Program.

TABLE 7: PUBLIC MEETING INFORMATION (2019)

Date	Project	Meeting Purpose	No. of Attendees
January 16, 2019	Keep Out the Rain	Scheduling Event	17
January 26, 2019	Keep Out the Rain	Scheduling Event	41
March 3, 2019	Keep Out the Rain	Scheduling Event	20
March 28, 2019	Keep Out the Rain	Scheduling Event	1
April 17, 2019	Keep Out the Rain	Scheduling Event	20
August 19, 2019	Keep Out the Rain	Scheduling Event	15
		TOTAL	114

### **3. Other Outreach**

During the reporting period, the City of Kansas City, Missouri continued to add OCP project information online. The City's website ([www.kcmo.gov/smartsewer](http://www.kcmo.gov/smartsewer)) provides general information about the Overflow Control Program, current projects and fact sheets. The fact sheets provide citizens information about each active OCP project, including what they should expect, why the project is being completed, and who they should contact with questions.

## **v. KC GREEN TEAM**

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.

### **1. Education and Outreach Team**

The Education and Outreach Team (EOT) organizes a variety of events and activities to educate City staff and residents about green solutions and sustainability within City operations and the City as a whole. For Earth Day, April 22, 2019, the EOT held a Recycling Reboot event at City Hall where they unveiled new recycling receptacles and provided new recycling educational materials. In addition, EOT members from Water and Parks partnered with over 50 employee volunteers for the 4th annual Trash Bash. The three-hour event removed approximately 1,600 pounds of trash and 20 tires from the neighborhood surrounding the Swope Campus, where Water and Parks are headquartered. In September 2019 the EOT hosted the KC Green Fair in Illus Davis Park. This biannual event is held in odd years and invites the public to learn about green programs in Kansas City. This year 22 vendors educated people on everyday actions they could implement to make their lives a little greener. KC Water brought their Water Bar and button making station.

### **2. Green Infrastructure Team**

The Green Infrastructure Team focuses on identifying, tracking, and supporting green infrastructure capital projects in Kansas City. In 2019, the team provided input and review for the City's Green Stormwater Infrastructure (GSI) Manual and GSI Story Map. Additionally, the team maintained a list of city-built GSI projects.

## **vi. STORMWATER: FROM KC TO THE SEA**

Since 2010, Water Services has worked to educate local 4th through 6th grade students via a curriculum titled Stormwater: From KC to the Sea. The five-day interactive curriculum teaches students how precipitation moves through a watershed, how stormwater becomes polluted, and how BMPs implemented on public and private property could improve water quality and reduce the quantity of stormwater entering the sewer system. During 2019, 4,164 students from 44 schools throughout the Kansas City metro area participated in the program.

## **vii. WE KC (WATER EDUCATION FOR KANSAS CITY)**

In 2016, Water Services launched the WE KC Program to expand the school age education program beyond Stormwater: From KC to the Sea. Through WE KC, Water Services will empower youth organizations and after-school groups to make good water quality choices for their future through hands-on learning and facilitation of stewardship projects. The program provides the technical assistance, hands-on learning tools, and supplies groups need to implement their own water education programs. Through WE KC in 2019, Water Services assisted 108 groups and schools with water quality related events and educational programs, reaching 7,520 people.

## **viii. REGIONAL WATER QUALITY EDUCATION PROGRAM (RWQEP)**

Water Services is one of 23 local governmental organizations that contribute funding and staff time to a Regional Water Quality Education Program (RWQEP) sponsored by Mid-America Regional Council (MARC). RWQEP allows metro area cities to pool resources and provides a regional approach to raising public awareness about water quality issues affecting Kansas City for the benefit of both MS4 and combined sewer cities.

During the past 16 years, the program has addressed several top NPS pollution issues facing our region. The program's theme — "Clean Water. Healthy Life." — focuses on changing behaviors to improve water quality, community health and quality of life. Each year, the Regional Water Quality Education Committee (WQEC), with MARC staff support, develops an NPS pollution-focused message that supports the program's theme and determines the most effective means for disseminating the message. The committee's education and outreach activities vary each year but typically consist of a media campaign, a mini-grant program, training, and education and outreach materials.

In 2019, the committee partnered with the KC Marathon. The Water Quality Public Education message logo was included on:

- All participant and volunteer shirts (approximately 11,000 shirts).
- All print marketing collateral.
- The race's start/finish truss.
- The Kansas City Marathon website, which linked to the Mid-America Regional Council website.
- The virtual race bag participant packets (with an audience of approximately 9,500 event participants).
- Signage in the Kansas City Marathon Finish Line Festival.
- All email marketing associated with the event, which linked to Water Quality Public Education and website.

Additionally, two emails were sent to the Sports Commission's e-marketing database (approximately 15,000 recipients). There was a Water Quality Public Education Committee complimentary booth space on race day at the Finish Line Festival (9,300 people). Another complimentary booth space was set up at the Kansas City Marathon Health & Fitness Expo at Union Station (12,000 people: a \$1,000 value). Water Quality Public Education Committee received four 15-second public address announcements before, during and after the event about picking up litter; and The Kansas City Marathon's monthly podcasts featured the 2019 KC Plog-a-thon and a message about keeping litter out of the rivers and streams. The partnership culminated with the Kansas City Marathon working alongside the Mid-America Regional Council to organize a plogging event in the summer of 2019.

On August 24, 2019, 81 "ploggers" participated in Kansas City's first plogging event. Plogging is a combination of jogging and picking up litter, a practice that has become popular as concern spreads about litter washing into storm sewers, rivers and streams. The inaugural Plog-a-thon, sponsored by MARC's Water Quality Public Education Committee with support from partners Run 816 and the KC Marathon, netted 283 pounds of litter along a three-mile course that wound through Westport, Mill Creek Park, the Plaza, Brush Creek and Main Street in Kansas City, Missouri.

The committee also launched a name the droplet contest to name the water droplet featured in its water quality education video series. The contest was a dual effort to promote water quality messages and name the droplet. The contest was promoted via social media yielding 128,211 impressions.

Also new in 2019, the committee worked with the Kansas City Art Institute Illustration Studio to design a set of playing cards geared toward elementary age children to convey water quality messages. Each set of cards features the water quality droplet and an action the player can take to keep the waterways clean.

- Collect rainwater to water your lawn/garden
- Pick up after your pet
- Only rain down the storm drain
- Oil and water don't mix
- Use lawn chemicals wisely
- Landscape with native plants
- Pick up trash and litter
- Protect our streams and
- Dispose hazardous waste properly.

#### **ix. PARTNERSHIPS IN PUBLIC OUTREACH TABLING EVENTS**

Water Services partnered with various schools and municipalities to host or participate in tabling events that raised awareness of water quality issues and promoted Science, Technology, Engineering and Math (STEM) education in the Kansas City region. Water Services tables used a combination of stormwater "Plinko", the stormwater frame, aquatic macroinvertebrates, watershed models, and BMP bean bag tosses to get students and families interested in the science and math of water quality. The following tabling events reached a total of 1,365 people during the reporting period.

- STEM in the Gym at Prairie Branch Elementary – March 5, 2019
- STEM in the Gym at Sni-A-Bar Elementary – February 21, 2019

- Academy Lafayette STEAM Night – March 27, 2019
- STEM in the Gym at Stony Point Elementary – April 2, 2019
- Blue at the Zoo – April 20, 2019
- Forward Together Picnic – June 8, 2019
- Public Health and Safety Fair – July 27, 2019
- Liberty School District Convocation – August 8, 2019
- North KC School District Convocation – August 13, 2019
- KC Green Fair – September 19, 2019
- STEM Fest for Educators – October 6, 2019

#### **WATER QUALITY SMALL GRANT PROGRAM**

In 2016, Water Services launched the Water Quality Small Grant Program to support local non-profits in projects and activities related to water quality protection, improvement, and education within the city limits of Kansas City, Missouri. This grant process will help streamline reporting procedures for those organizations WSD already supports and increase capacity for water quality education partnerships in groups with which it has not previously worked. In 2019, KC Water awarded 7 grants for programs and projects that reached more than 5,000 students and adults. The next grant round will begin in February of 2020.

The following organizations received grant funding through the 2019 Water Quality Small Grant Program:

##### Friends of Kaw Point Park

In 2016, in a partnership that crosses the state line, Water Services funded the Kansas City, Kansas based Friends of Kaw Point Park to set up a “hydro caching” project in Kansas City, Missouri. This project, which was designed to draw the geocaching audience into water quality, involved setting up 20 geocaches along local waterways and near constructed BMPs. Once the cache is discovered, the participant views an information card on the BMP or completes simple water quality test on the waterbody. Friends of Kaw Point Park continued this grant through 2019 with the addition of 10 caches and maintenance of the existing 20 caches. By the end of 2019, the caches had been logged a total of 819 times.

This grant also included teaching 13 “From Runoff to Rivers” classes in local middle and high schools. This curriculum provides students and adults in KCMO with hands-on experiences to learn how stormwater pollution impacts water quality which may impact public health in their community. 184 students in four schools were taught in 2019.

##### Healthy Rivers Partnership/ Little Blue River Watershed Coalition

#### **Project Blue River Rescue**

Project Blue River Rescue is an outreach event put on by Healthy Rivers Partnership and hosted by the Friends of Lakeside Nature Center, which is operated by the City’s Parks and Recreation Department. The event is sponsored by MDC and MDNR through the Missouri Stream Team Program and supported by many local governmental entities and businesses. The City’s Parks and Recreation,

Public Works, and Water Services Departments continue to provide facilities, volunteers, equipment, expertise, and assistance with program coordination.

On April 6, 2019, approximately 864 volunteers participated in this event. Nearly 35 tons of trash and approximately 600 used tires were collected and disposed of or recycled. In addition to trash removal, groups removed invasive honeysuckle from one and a half acres along the Blue River.

##### Little Blue River Watershed Coalition

#### **Blue at the Zoo**

Blue at the Zoo educates scouts and their accompanying adults about the adverse impacts of stormwater runoff and water pollution through nine different booths. Using hands-on learning opportunities, exhibits, and displays presented by agency, corporate, and municipal partners and outdoor educators, approximately 300 participants learned about watersheds, water pollution, and stream life and habitat — from the bugs and fish in the stream— to the snakes, turtles and raptors that live in the riparian corridor. Blue at the Zoo occurred on April 20, 2019.

#### StoneLion Puppet Theatre

StoneLion Puppet Theatre (SPT) is dedicated to expanding environmental education through the art of puppetry. SPT received a 2019 grant to perform one of three water quality-based puppet shows at 25 Kansas City public, private, and charter schools. The first show, “The Little Red Hen’s Garden,” focused on the effect of pesticides, herbicides, and fertilizers on waterways. The second show, “Down the Drain,” followed trash from the street to a stream and eventually to the ocean. The final show, “The Frog Prince” teaches students how one person can “toad-ally” make a positive impact on water quality. During 2019, StoneLion held 20 school assembly puppet shows reaching a total of 5,222 Kansas City area students. StoneLion also gave twenty classroom hands-on art workshops to give a more in-depth follow up to the school assembly performance. In order to receive the workshops, the school must have also had an assembly puppet show. Some workshops were scheduled prior to the puppet show but most were after. 485 students participated in the workshops.

Local artist Samuel Morrell was contracted to design and paint a sidewalk mural to the storm drain outside SLP studios at Truman Road and Olive Street. This design tied into the existing building mural highlighting the need for clean water and was approved by Megan Crigger of the Kansas City Arts Commission. Samuel researched the type of paint needed to make this a sustainable art piece throughout the weather. Work was completed on December 1, 2019.

StoneLion organized a two-day water festival with a new giant puppet show entitled “The Starfish” that was scheduled to take place on May 24 and 25, 2019 at Theis Park in Kansas City, Missouri. This free event would have had 52 exhibitors and environmental educators, food trucks and a Glo Festival featuring illuminated puppets and art sculptures focused on protecting our water. Unfortunately, Mother Nature did not cooperate, and the deluge resulted in Brush Creek not only flooding but overflowing the bridge onto Oak Street. The park had a foot of standing water in it and the event had to be delayed. The event was added to Kansas City’s Annual Big Picnic on July 21, 2019. The show went on to a crowd of 6,000.

#### Green Works KC

Mighty Missouri SOS involved setting up a tent at several public events in summer and fall 2019. Students, volunteers and staff sold products that have a direct connection to protecting or conserving water including reusable water bottles, shopping bags from repurposed materials, all-natural soap, all-natural insect repellent and local soda made with water from the Missouri River. Products have hang tags, label and signage to explain their connection to water. In addition, they had banners, signage and handouts to inform residents of actions they can take to protect and conserve water. To draw people to the tent they created a large spinning water game.

##### Events:

- Wanderfest, May 5th in our classroom space - huge success!
- Illuminated Waters May 24th - May 25th, 2019 at Theis Park - cancelled due to rain.
- Troostapalooza - September 21st at 31st and Troost - 90 minutes of event before torrential rains
- Repair Cafe - October 5th - successful although much smaller event due to the focus on repairs
- Tower East Holiday Shopping Event - November 24th in our classroom space - small event, but good attendance



Due to excessive inclement weather in 2019, Green Works KC will finish up their grant during 2020.

### Bridging the Gap

Bridging the Gap had four priorities for their 2019 grant:

1. Host four stream clean-up workdays in watershed areas identified by KC Water as “high priority.”
2. Work with KC Water to identify four retail districts significantly impacted by litter – near “high priority” streams; provide education to property/manager owners.
3. Continue the already-approved litter prevention social media campaign. We propose to repeat this year’s social media campaign to address stormwater solutions.
4. Continue to manage the Tool Lending Shed, which is a community resource for neighborhood leaders to borrow cleanup tools at no charge.

Due to excessive inclement weather in 2019, BTG will finish up their grant during 2020.

## H. NMC 8 - PUBLIC NOTIFICATION

### **i. COMBINED SEWER OVERFLOW PUBLIC NOTIFICATION PLAN**

The City recognizes the need to notify the public when a CSO occurs and has developed a notification plan. The purpose of the plan is to inform and educate the public of potential overflows in the urban waterways during and following storm events. The goals of the public notification program are to:

- Notify citizens when overflows are likely to occur
- Educate the public about the potential health impacts associated with overflows in waterways Educate the public about the potential danger and health impacts of high waters in waterways during heavy rainstorms
- Enable citizens to take appropriate steps to protect themselves and their families from such hazards

Water Services utilizes these methods to inform the public of the potential for CSOs:

- Signs – Two types of warning signs have been installed to notify citizens of the hazards of CSOs. The first type, a Pedestrian Warning Sign (PWS), has been posted at public access points to streams. It notifies citizens that the streams receive CSOs and to avoid contact with the water during and 72 hours after rainfall. For more information, citizens are encouraged to call the OCP information line that is staffed by Water Services employees. The process of replacing and relocating PWS signs began in late 2014 and was completed in 2015. After completion of sign replacement and relocation, there are 107 PWS locations. The second type of warning sign is posted at all outfall locations. The sign warns citizens to avoid contact with water and displays the City’s 3 -1 -1 Action Center phone number, so they can report dry weather overflows. The signs are printed in English and Spanish and are readable from approximately 20 feet. The Wastewater Line Maintenance Division is responsible for inspecting and maintaining the signs. Signs are inspected during overflow events and through routine inspections.
- Media Advisories – When a sewer overflow occurs during the recreation season, Water Services Communications distributes a media advisory to local media outlets. In 2019, eight (24) advisories were distributed.
- Website – In addition to providing notification directly to media outlets, the media advisories are also posted on the KC Water Services website at [www.kcwaterservices.org/news](http://www.kcwaterservices.org/news).

## I. NMC 9 - MONITORING TO CHARACTERIZE CSO IMPACTS AND THE EFFICACY OF CSO CONTROLS

The following sections summarize what has been completed to aid the City in assessing the effectiveness of the NMC and the control measures described in the Overflow Control Plan.

### **i. MAPPING CSS DRAINAGE AREA DIVERSION STRUCTURES AND OUTFALLS**

All CSS drainage areas have been mapped, and all diversion structures are inspected. As needed, maps are updated to include any changes to the diversion structures. Figure 1, which was originally included in the October 2008 report entitled “Capacity, Management, Operations and Maintenance Plan (CMOM) and Nine

Minimum Controls”, includes all the current outfalls and diversion structures. One (1) diversion structure was eliminated in 2019 and removed from this figure. Three (3) diversion structures were added in 2019 and added to this figure.

## **ii. RECEIVING WATER BODIES AND DESIGNATED USES**

Kansas City’s combined sewers overflow to numerous receiving streams. Primary receiving streams include the Kansas River, Missouri River, Blue River and Brush Creek. Town Fork Creek is a tributary to Brush Creek. Brush Creek is tributary to the Blue River, which is tributary to the Missouri River. The Missouri River at the Broadway Bridge in Kansas City drains a total of 484,100 square miles. That area includes 59,756 square miles of tributary to the Kansas River at De Soto, Kansas (approximately 30 miles upstream of the confluence of the Missouri River and Kansas River). All of Kansas City’s CSS basins are eventually tributary to the Missouri River, though they represent only 0.01 percent of the total Missouri River tributary area at Kansas City. The Downtown Airport, Central Industrial District, and the Northeast Industrial District are each directly tributary to the Missouri River. The Turkey Creek basin is the only Kansas City CSS basin tributary to the Kansas River. The remaining CSS basins in Kansas City — Lower Blue River, Brush Creek, Town Fork Creek, and Middle Blue River — are tributary to the Blue River.

Figure 2, which was originally included in the October 2008 report entitled “Capacity, Management, Operations and Maintenance Plan (CMOM) and Nine Minimum Controls”, shows streams that receive overflows from Kansas City’s CSS and indicates the current recreational water quality standard designated by the State of Missouri, or by the State of Kansas for the Kansas River. As of October 16, 2017, the Brush Creek and Town Fork Creek classifications were updated to Primary Contact recreational use, Whole Body Contact Class B. This figure defines in blue the CSS area directly tributary to the Missouri River, including those areas tributary via the Kansas River. It also shows all areas tributary to the Blue River. The map distinguishes between those tributary areas upstream of Kansas City’s CSOs, such as upstream of the points marked with red stars, and areas directly tributary to those stream reaches that receive CSOs. Within the Blue River basin, areas directly tributary to those stream reaches that receive CSOs include both CSS, shown in yellow, and SSS, shown in green.

Of the total area tributary to the Blue River, 74 percent is located upstream of those reaches of the Blue River, and its tributaries are impacted by overflows from Kansas City’s CSS. Kansas City’s CSS serves 10 percent of the total area tributary to the Blue River. The remaining 16 percent of the Blue River tributary area is served by separate storm and sanitary sewer systems in Kansas City.

## **iii. DEVELOPMENT OF OVERFLOW OCCURRENCE ESTIMATES**

The current performance of the CSS is estimated using updated baseline computer models initially developed as part of the Overflow Control Plan. Water Services recalibrates the models using sewer flow meter and rainfall data collected annually. As Shown in table 14-17 of the City’s 2012 OCP, the total estimated city-wide wet weather flow and total overflow volume for the typical year is 11.64 Billion gallons and 6.38 billion gallons, respectively.

Overflow frequency varies significantly, both within the individual basins and across the City. The estimated average overflow frequency at the 87 outfalls south of the Missouri River is more than 20 times in a typical year. A complete summary of the overflow frequency, volume, and duration for each outfall is found in the supporting documentation included in the City’s 2012 Overflow Control Plan.

## **iv. GENERAL DEVELOPMENT OF A LONG-TERM MONITORING PLAN FOR THE OVERFLOW CONTROL PROGRAM**

The City is implementing a Water Quality Monitoring Program (WQMP) that was developed in December of 2010 to address the requirements of Section II, Water Quality Monitoring Plan of the Post -Construction Monitoring Program Performance Criteria, included as Appendix D of the Consent Decree. The WQMP is being implemented City-wide and addresses water quality in both the CSS and SSS areas. Summary results from the WQMP for 2019 as shown in Table 8 in Appendix D of this report.

FIGURE 1: DIVERSION STRUCTURE, FLOW SPLITTER, AND OUTFALL LOCATIONS

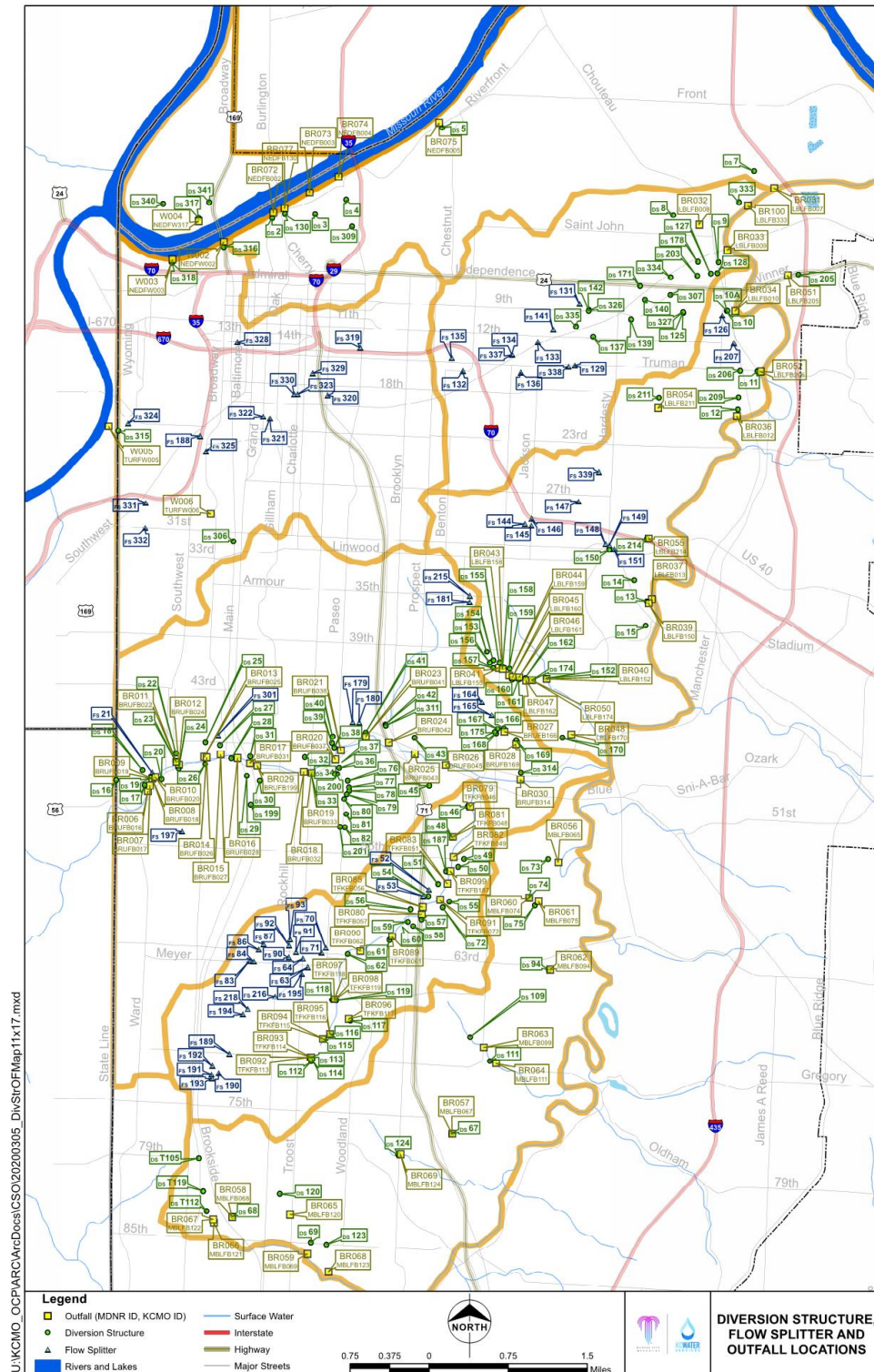
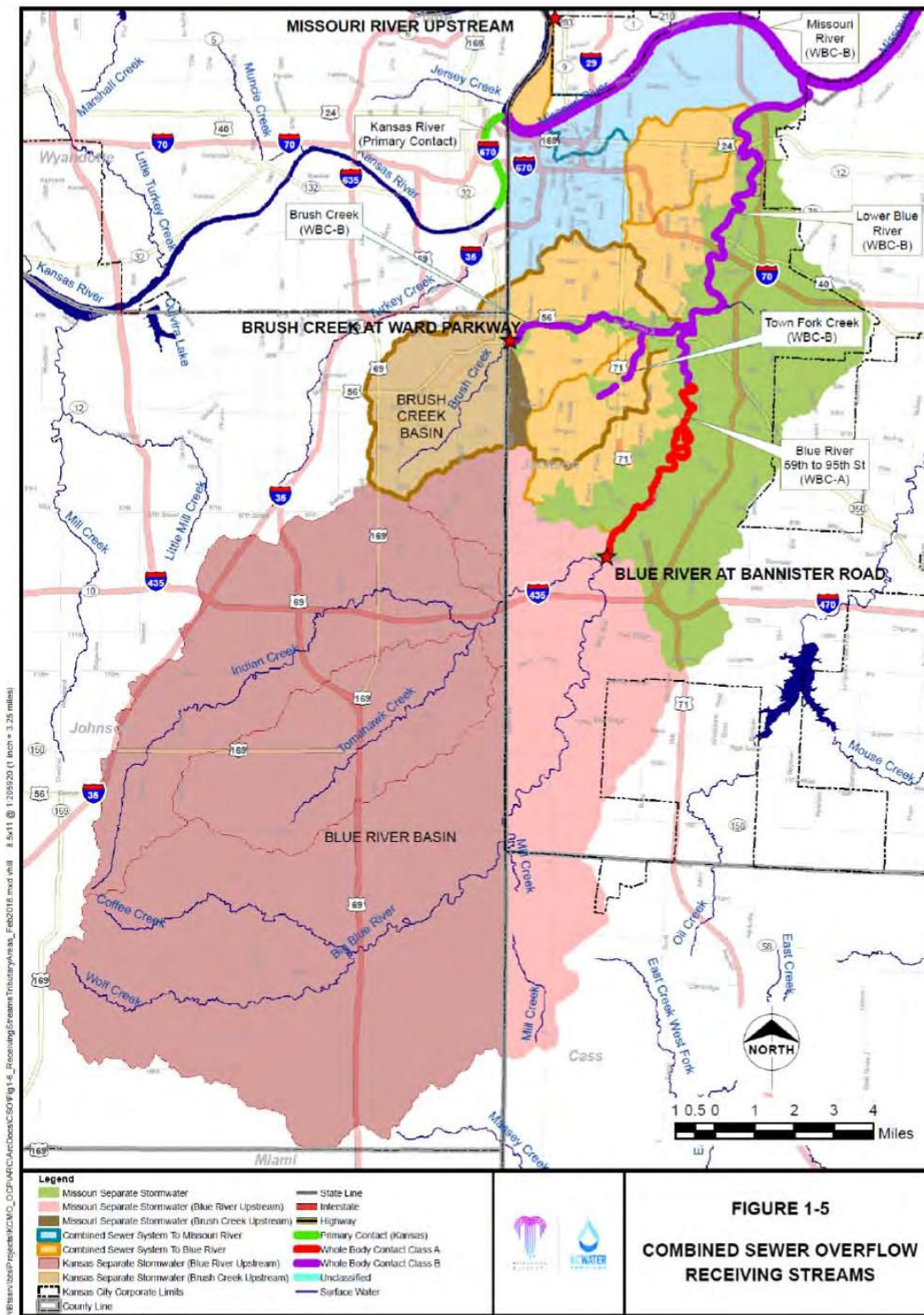




FIGURE 2: COMBINED SEWER OVERFLOW RECEIVING STREAMS



## XII. CAPACITY, MANAGEMENT, OPERATION AND MAINTENANCE PLAN PERFORMANCE CRITERIA – APPENDIX C

The following information is a summary of activities conducted during the reporting period to demonstrate compliance with the Capacity, Management, Operation and Maintenance (CMOM) program. This program aims at improving the ability of the utility to manage its separate sewer system and ultimately reduce the occurrence of sewer overflows and maintain compliance.

### A. COLLECTION SYSTEM MANAGEMENT

#### i. ORGANIZATIONAL STRUCTURE

Water Services' organizational structure delineates job responsibilities, outlines opportunities for advancement, ensures effective employee to supervisor ratios, and guarantees adequate staff is in place to accomplish the mission and vision of the department. This structure is used during the annual budget process to determine staffing needs and allocate operational expenses appropriately. Water Services maintains job descriptions and organizational charts, effectively communicates job responsibilities to staff, and acquires and maintains the level of skills and abilities necessary to support the business needs of the organization.

Hiring for all vacant positions is handled through Water Services' Human Resources Division. Positions are posted internally city-wide to provide advancement opportunities for existing staff members. Water Services fills vacancies once the appropriate level of talent is found. At the end of 2019, there were 31 vacant positions in the Wastewater Line Maintenance division.

The organizational structure is evaluated during the annual budget process and through frequent communication between Human Resources personnel and the operating divisions of Water Services. In addition, members of the management team evaluate staffing needs throughout the year to address operational challenges that may not have been taken into consideration while developing the budget. The performance of all Water Services employees is evaluated using a formal performance review process. The Director and the Human Resources Manager are responsible for ensuring that Water Services' organizational structure and staffing meet department needs.

#### ii. COMMUNICATIONS AND CUSTOMER SERVICE

During the reporting period, KC Water communications staff continued to meet the unique needs of the many audiences the department serves. These audiences encompass:

- Approximately 900 employees
- 170,000 retail customers
- 32 wholesale customers
- Local and national media outlets
- Neighborhood and civic groups
- Mayor, City Council, City Manager, City Departments
- State and Federal elected officials and governmental entities

During the reporting period, KC Water continued to improve internal business processes, enhanced employee training, and launched a customer bill-pay mobile app, which enables customers to perform many of the same self-service account functions that are available through the website from the convenience of a smartphone.

Communications staff members produce a newsletter, "What's on Tap," that is distributed in water bills, and regularly update KC Water's website ([www.kcwater.us](http://www.kcwater.us)). Currently, the website supplies basic information on the Overflow Control Program and informs customers of upcoming OCP projects. New webpages were added to promote OCP's "Keep Out the Rain" program.

### **iii. INQUIRIES, REQUESTS AND COMPLAINTS**

The City tracks all customer service requests, and the primary point of contact for members of the public with requests or complaints is the City's 3-1-1 Action Center. Calls to the Action Center are logged into a computer database that documents a description of the problem, location, caller identification and contact data. An electronic ticket is then generated for routing to the appropriate City department. Complaints related to sanitary sewer or stormwater issues are routed to the Wastewater Line Maintenance staff by both phone and email. A supervisor scans each complaint and assigns them to an investigator to determine the nature of the problem. In 2019, the Action Center opened 3,658 cases for sewer-related issues.

A work order is initiated if the Wastewater Line Maintenance Inspector finds that a problem is with a facility for which Water Services is responsible. Once the work is complete, the customer service ticket is closed out. In situations where Water Services repair activities require the involvement of other City departments, the appropriate departments are called in, and the associated costs are charged back to the Line Maintenance Division for work completed on their behalf.

Occasionally, a member of the public will call Water Services directly. If the call is related to an ongoing customer service ticket, the operator accesses the customer service database, looks up the matter and routes the call to the appropriate Wastewater Line Maintenance Supervisor.

### **iv. LEGAL AUTHORITY**

The legal authority of Water Services rests in the City Charter of Kansas City, Missouri, which sets forth each of the City departments and defines their responsibilities. Chapter 60 of the City Municipal Code defines the specific authority and responsibilities of Water Services regarding the sewer system.

Specifically, Chapter 60 of the Municipal Code provides the Department authority to do the following:

- Charge fees to all users of the sewer system, whether they reside within the City limits
- Set rates for different classifications of sewer system users
- Enter into agreements with communities outside the City limits for wastewater services
- Measure and/or calculate the volumes of wastewater received from customers outside of the City limits
- Solicit bids, select contractors and construct public sanitary and combined sewers
- Set standards for the use of private septic tanks or cesspools, including the cleaning of the tanks and the disposal of collected materials
- Maintain the approved pretreatment program pursuant to 40 C.F.R. Part 403 and the Current NPDES Permits
- Prohibit the discharge of flammable or other hazardous materials into the sewer system
- Regulate the release of oil and grease into the sewer system by setting acceptable discharge concentrations and setting surcharge rates for higher concentrations of discharged oil and grease
- Require the pretreatment of waste from industrial or commercial users to protect the POTW
- Require industrial or commercial users to report on their releases into the sewer system
- Inspect the facilities of industrial or commercial users to determine the types and quantities of materials being released into the sewer system
- Implement the City's approved pretreatment program against any industrial or commercial users who violate the terms of the ordinance or permits issued

In addition, Section 60-346 of the City's sewer user ordinance gives the City the authority to regulate the connection of private sewers to the public system by entering into contracts, assessing fees, requiring adherence to the City's Standard Specifications, and requiring bonds. The City has the authority to deny a building permit or sewer connection permit if it is determined the receiving sewers have inadequate capacity. The City has established Standard Specifications for the design and construction of new or upgraded sanitary and combined sewers. Coordination between the Departments of Public Works and Water Services is required to regulate the connection of private sewers to the public system in accordance with Section 60-346 mentioned previously.

An established Enforcement Program provides the City the support required to interpret, adapt, and enforce Water Services Rules and Regulations as needed, which helps control causes of SSOs. Causes may include I/I, corrosion, blockage due to industrial waste and FOG. The Enforcement Program also provides the City with the resources necessary to manage and implement the requirements set forth in the OCP, which will ultimately minimize overflows in the City's service area.

#### **v. ACQUISITION CONSIDERATIONS**

As part of the City's Acquisition Considerations Program, the design and construction of infrastructure acquired into the sewer system must comply with the City's technical specifications and construction standards. This program applies to prospective infrastructure from new construction and privately- owned systems being considered for a transfer of ownership to the City. The City has established a formal, written policy and guidelines for assuming ownership of pre-existing infrastructure and ensures the performance of proper record keeping and documentation. The program includes proactive measures to prevent the occurrence of I/I by inspecting new infrastructure to determine if it is properly designed, constructed, and installed, and by inspecting private sewers connecting to the public system to ensure they are watertight.

This program is primarily implemented and enforced through standard evaluation and inspection procedures. Located on the City's website, the City's standards (Design Criteria, Construction Specifications, and Standard Drawings) are a source of information for contractors and developers. City inspectors monitor new construction activities for compliance with City standards and specifications. Prior to accepting new infrastructure, City inspectors witness post-construction performance tests to assess the integrity of the infrastructure. The City's in-house inspectors are dedicated full time to monitoring construction activities of infrastructure to be dedicated to the City. This team of inspectors is within the City Planning and Development Department. Water Services works with City Planning and Development to ensure better coordination procedures.

The Permits staff (located in the City Planning and Development Department, Land Development Division) is responsible for issuing private development project permits for construction of public infrastructure, including storm and sanitary sewer improvements. The group, working under City ordinance, issues permits to those individuals and companies who have obtained the necessary insurance, bonds and construction plan approvals. The group also maintains public infrastructure records. The City provides unique file numbers to all public infrastructure construction plans, permits, and other pertinent records that are scanned and permanently stored.

The City Planning Development Services-Plans Management Division reviews and approves detailed plans required for permits. Upon submittal, the plans are reviewed for complete information and are then forwarded to the appropriate City departments for technical review and approval. The City issues permits once they receive all required approvals.

Such acquisitions are extremely rare and most likely will require custom procedures. Generally, the City follows the following procedure:

- City assigns a project manager to oversee potential acquisition activities
- Owner of the infrastructure obtains and delivers to the City historical information on the infrastructure, including proof of ownership, design guidelines, design calculations, as-built plans, specifications, rights-of-way, and any other information of interest
- Owner obtains/performs a condition assessment (to be witnessed by the City)
- Owner tests the performance (to be witnessed by the City)
- City may determine whether the infrastructure will meet the desired conveyance need
- City may require the owner to make improvements if needed, before assuming ownership



## vi. INFORMATION MANAGEMENT SYSTEM

The City maintains an Information Management System (IMS) that provides tools for tracking collection systems' performance, costs, and work orders and measures the effectiveness and efficiency of O&M activities.

In addition, the City continues to enhance its computer-based tools to manage and track collection system data. Standard operating procedures have been updated to ensure accurate documentation of pertinent collection system data and staff members' appropriate use of the IMS tools. The City continues to improve IMS training as mobile data units are deployed for data entry and research.

Collectively, IMS tools give staff members a well-defined, detailed understanding of how the collection system performs by monitoring, analyzing, and measuring their performance. The IMS tools help categorize and prioritize problems throughout the system so that staff members can make well-informed decisions regarding the allocation of resources and implement maintenance and rehabilitation activities that can minimize overflows.

Water Services continues to expand the IMS and share data among divisions in several locations around the City. For wastewater treatment and collection, the primary data system is Infor-Hansen work/service order, asset management and work crew assignment modules. Hansen combines the City's geographic information system (GIS) mapping with attribute tables, WinCan CCTV data management system, and other software applications to help manage the large quantity of data processed daily. The following is a list of the relevant systems maintained and used during the 2019 reporting period:

- **GIS – ESRI ArcGIS:** Discussed in more detail below
- **WinCan CCTV data management system:** Used to organize and store CCTV investigation information. WinCan stores digital video, still images and text data in a database format. The Division utilizes WinCan V8.24 with PACP coding.
- **Infor-Hansen System - CMMS:** Water Services is currently using Hansen 8.5.0 1812.
- **KWIK:** Used for Water, Wastewater, and Stormwater utility billing. Used to manage and bill approximately 175,000 customer accounts.
- **SCADA:** Used by the Water and Wastewater Treatment Divisions for data acquisition and signaling alarms.
- **Inventory Data Management – Interface Systems – Storeroom:** Used to manage supplies, track the quantity, cost, and physical location of spare equipment, parts, and material.
- **Mobile SR Tablet:** In-house developed web-based application to allow assignment of Hansen 8 service orders to be completed in the field in real-time with access to GIS, CIS, and Hansen 8 data via a secure connection. Tablets allow staff to close Hansen 8 service orders in the field and update Hansen within five (5) minutes, including the GIS that were allowable.
- **Work Tracking Application:** In-house developed web-based application that standardizes and automatically uploads information into the City's Hansen work management system. The goal of the system is to better inform relevant stakeholders in a timelier manner about the assets that are repaired or rehabilitated.

Water Services' Information Technology (IT) Division manages the PC network and applications specific to Water Services that includes the integration of various application programs to facilitate user and work needs at each location. The IMS interfaces are continually enhanced to improve efficiencies by automation based on work/problem code for work assignment and updates to the supporting system. Monitor tools have been added to review performance measures and provide real-time presorting to all the Water Services divisions.

On an annual basis, the systems are evaluated to assess upgrade or replacement needs. In addition, an assessment is conducted to evaluate if an existing module can replace an older standalone system or process. Water Services IT continues to work with each division to support the use of IMS in addition to providing training as requested with the core Water Services systems as new functionality becomes available or an enhancement is made. A combination of Water Services IT staff and vendor-provided maintenance teams provide oversight and support for Water Services IMS tools.

## **GIS Software**

During the reporting period, Water Services continued to use the ESRI ArcGIS suite of products, including ArcGIS for Desktop for spatial data. In Water Services, there are a moderate number of users of ArcGIS Desktop (split between water distribution, sewer collection, and stormwater collection) who create and maintain GIS data. A small number utilize ArcView to view the GIS and perform analysis. The remaining GIS users utilize ArcReader for viewing and plotting GIS data.

Field crews access GIS data via a secure connection from their mobile units based on user credentials. Monthly, the GIS group refreshes the accessible GIS data.

GIS data contains asset type, material, size, install date, pipe elevation, and address information. These data fields also exist in Hansen, which is integrated with GIS, and allows staff members to spatially analyze data through open database connectivity. Hansen 8 also has built-in integration into ESRI GIS, which allows work/service orders to be created via GIS.

## **vii. GIS MAPPING**

The purpose of Water Services' GIS Mapping Program is to ensure that an accurate and comprehensive inventory is maintained of the collection and transmission systems, to assemble and present the information in a manner conducive for use and to ensure that it is easily accessible by Water Services personnel who depend on the data. The City's online mapping system makes Water Services GIS data accessible to employees on the city-wide network.

Water Services' mapping software identifies several collection system components and attributes, including:

- Gravity sewer/force mains
- Property lines/parcels
- Pipe attributes
- Manholes and other access points
- Diversion structures/flow splitters and outfalls
- Ownership of infrastructure
- Sewer easements
- Stormwater inlets
- Septic tanks
- Impervious surfaces
- Aerial photography
- Wastewater facilities (including pump stations, flood pump stations and wastewater treatment plants)
- Green infrastructure
- Proposed new construction services
- Planimetric features (including contours, roads, surface water and land use)

Water Services continuously maintains comprehensive, accurate data in the GIS mapping system. Updates to the GIS are submitted by both internal crews and external consultants when routine field inspections or work in special project areas reveal changes or additions. These updates include new sewer extensions and sewer additions installed by contractors or identified by crews.

Digital maps generated from ArcGIS are available to field crews, both in the office and via ArcReader, or hard copies in the field.

Employees throughout Water Services utilize the system mapping tools and provide updates to inventory data. In addition to GIS edits by internal staff, the department obtains aerial photography from partnering GIS organizations. All relevant staff members receive training from IT personnel on ArcGIS and ArcReader. GIS administrators and users throughout Water Services evaluate the GIS Mapping Program on a continuous basis through monthly team meetings and frequent communication.

#### **viii. SANITARY SEWER OVERFLOW REPORTING AND NOTIFICATION**

The City maintains an SSO Reporting and Notification Program that ensures that discharges from the City's sewer system are documented, stored in a data management system, and properly reported to appropriate regulatory authorities. Water Services notifies the public, when appropriate, including persons with the potential to encounter the sewage. The program includes a listing of all building/private property backups discovered by or reported to the City that have occurred. Also included is the date of the building/private backup incident, location, source of notification (e.g., property owner, field crew), general cause(s) of the backup, and actions taken or suggested by the City to halt, mitigate, and prevent future incidents. The City follows its current NPDES Permits for verbal and written notification to the NPDES permitting authority to inform them that an SSO has occurred.

Adherence to, and compliance with, the SSO Reporting and Notification Program plays a vital role in minimizing SSOs, supporting the City's community values, and minimizing the City's compliance and legal risks. Properly tracking and reporting SSOs provides Water Services staff with a better understanding of release point trends and root causes throughout the collection systems and enables decision makers to prioritize resources to cost effectively minimize SSOs. Continuous tracking of overflow occurrences leads to proactive prevention of SSO events.

The primary point of contact for members of the public with complaints is Kansas City's 3-1-1 Action Center. The Action Center is the principal way in which SSO overflows are reported to Water Services. A work order is initiated if a problem with a Water Services facility is identified upon receipt and investigation of a 3-1-1 service call.

A total of 1,589 calls related to SSOs were routed to the Wastewater Line Maintenance Division during 2019. The breakdown of SSO call types includes:

- Water in basement dry weather – 1,177
- Water in basement wet weather – 412

In the event of a backup that resulted in the owner/tenant of the property calling 3-1-1 or calling Water Services Central Dispatch after hours, the City's Building and Private Property Response Plan comes into effect.

At the onset of the call, the consumer is asked a series of questions to determine the appropriate cleaning response. If the problem cannot be determined on the call, a Wastewater Line Maintenance Crew is dispatched to verify the condition of the City's sewer main and clean that section to ensure it is functioning properly.

If, because of the call, it is agreed upon that City involvement is necessary, a Hansen service request will be initiated. Either a Code 2 (Urgent) or a Code 3 (Emergency) prioritization will be given. In the case of a Code 2 event, a maintenance crew will respond as soon as it is available. In the case of a Code 3 event, a maintenance crew will be dispatched on an emergency basis and will respond as soon as possible.

Generally, if there is water coming into the house from an outside source, the event would be categorized as a Code 3. If water is slowly draining, then it would most likely be categorized as a Code 2. If water comes up in the basement after using the facilities in the residence, it would most likely be categorized as a Code 2 event. If it is determined that the backup occurred due to issues on private property, a "Property Owners Responsibility letter" is given to the property owner with instructions and next steps to resolve the issue.

Wastewater Line Maintenance Crews respond to dry weather backup complaints based on the Code 2 or Code 3 priority. Crews respond to all wet weather backup complaints as a Code 3 priority. Crews respond to inspect the city manholes for surcharge conditions. If a stoppage is found within the system, the crews will open it. If the sewer system is surcharging, a door hanger will be given to the property owner to inform them of the surcharge. The City will recommend that the owner contact a private plumbing company to install a backflow preventer at the property owner's expense.

Water Services strives to respond quickly to SSO complaints to control the release of wastewater and perform appropriate cleanup tasks; crews are dispatched 24 hours a day to investigate complaints. Water Services continually evaluates the SSO Reporting and Notification Program.

#### **ix. PERMIT AUTHORITY NOTIFICATION**

The Wastewater Line Maintenance Division notifies MDNR when a DWO occurs within 24 hours of discovery. Water Services completes and submits a follow-up written report to MDNR within five days of the completion on ending of the overflow. In all occurrences, the area around the overflow is cleaned and inspected for any debris or contaminants.

In the case of DWOs caused by vandalism to the manhole, the standard manhole covers are replaced with bolt-down covers to deter future vandalism.

There were 49 dry weather overflows reported to MDNR in 2019 compared to 63 in 2018.

## **B. COLLECTION SYSTEMS OPERATION**

### **i. BUDGETING**

The budgeting process provides adequate fiscal resources to the operating divisions to carry out their responsibilities. The Department's Division managers identify recommended staffing and funding levels, which are then adjusted based on City priorities.

Proper funding, budgeting, and planning are necessary for the Line Maintenance and Wastewater Treatment divisions to provide sufficient capital, labor, and equipment to complete CMOM activities as needed to ensure the minimization of overflows.

Division managers create budgets on an annual basis. The budget process covers project costs and revenue sources for five years. The managers submit their budget requests to Water Services Accounting staff members who review the requests, compile the budget and submit it to the Water Services Director for review and approval. The Director then presents it to the City Manager who, in turn, presents it to the Mayor and City Council for review and approval. Ultimately, the City Council approves the budget, which takes effect at the beginning of each fiscal year (May 1 through April 30).

### **ii. ENGINEERING**

The purpose of Engineering within Water Services is multi-faceted, as it encompasses several functional business units. The business units are the coordinating entities behind many collection system activities, including new construction, construction inspections, rehabilitation and replacement, and capacity assessment and assurance. The business units confirm that new facilities are constructed according to standard construction specifications, do not contribute to future I/I problems, and provide inspection and oversight of rehabilitative work to ensure proper execution.

The various engineering business units have unique areas of collection system responsibility, including:

- Planning is responsible for GIS mapping
- Energy Management is responsible for negotiating utility contracts for pump station and treatment plant operations
- Stormwater Management is responsible for the design of stormwater projects
- Systems Engineering is responsible for the planning, design, and construction of sewer collection systems and water distribution systems
- Facilities Plant Engineering is responsible for the design of all above-ground structures including pump stations and wastewater treatment plants for water and wastewater supply, treatment and pumping facilities
- The Overflow Control program team is responsible for development and implementation of the City's Overflow Control Program
- Waterways is responsible for stormwater management projects that are funded jointly by other government agencies such as the Corps of Engineers

The Overflow Control program team performs all engineering activities under the supervision and direction of registered professional engineers. Staff members in the Engineering Division receive continuing education and training through industry seminars and workshops, as well as classes required to maintain PE licensure.

In addition, the City commonly uses engineering consulting firms and outside contractors to perform planning, design and construction activities.

### **iii. WATER QUALITY MONITORING**

Water Services has developed an integrated monitoring program intended to meet all water quality related objectives in a cost-effective manner as part of the Overflow Control Plan post-construction monitoring requirements set forth in Appendix D.

The Water Quality Monitoring Plan is divided into five sections:

1. Objectives and Rationale
2. Water Quality Monitoring Plan
3. Field Methods and Procedures
4. Quality Control
5. Resource Assessment

Water Services conducts sampling and analysis efforts for the Water Quality Monitoring Program in accordance with Water Services' OCP Quality Assurance Project Plan, Water Services Laboratory's Quality Assurance Manual, and Health and Safety Plan.

More information on the Water Quality Monitoring Program can be found in the Consent Decree Appendix D: Post Construction Monitoring Program Performance Criteria in this report.

### **iv. PRETREATMENT PROGRAM**

The City continues to implement its approved pretreatment program through Water Services Regulatory Compliance Division pursuant to the Federal Register (40 C.F.R. Part 403) and current NPDES permits. Information on the pretreatment program may be found in NMC 3. Submittals to MDNR associated with the pretreatment program can be found in Attachment B.

## **v. PUMP STATION OPERATIONS**

Pump station operation is managed and staffed by the Wastewater Treatment Division to ensure reliable operations and continues as originally envisioned and developed.

The department ensures reliable operations by:

- Conducting routine scheduled inspections
- Troubleshooting and routine upgrades
- Performing preventative and corrective maintenance
- Retaining appropriate records of pump station performance
- Remotely monitoring pump station operations using remote dialers and a SCADA system

This program is executed in conjunction with the pump station maintenance program discussed later in this document. Operations staff are responsible for performing light and/or preventative maintenance work as needed, and routine inspections are performed which generate corrective work orders identifying work to be performed by maintenance staff.

Monitoring the reliability of pump stations through routine inspections, troubleshooting, and remote supervision decreases the chance of pump station failure that could potentially cause an overflow. Proper pump station operation also maximizes storage and ensures adequate capacity throughout the collection system, which may consequently prevent an overflow from occurring.

The Wastewater Treatment Division operators visit each wastewater pump station (WWPS), flood pump station, and headworks pump station at WWTP sites on a regular basis. The visits occur at varying frequencies ranging from daily to three times per week for larger stations, to one to several times per week for smaller stations. Visit frequency is based on several factors including staffing, facility size, complexity, criticality, reliability and past maintenance history. Maintenance staff also performs emergency maintenance and other tasks needed to maintain the overall wastewater treatment system.

In 2019 various design and construction was initiated, continued or completed at pump stations, force mains, and pipelines including Birmingham Pump Station, Weatherby Lake Pump Station, Line Creek Pump Station, 83rd Street Pump Station, and Buckeye Pump Station force main.

The pump stations include remote monitoring using telephone dialers and SCADA. In 2019, projects continued to implement a multi-year, system-wide SCADA system development and implementation including a new Operations Center at the Blue River WWTP. Pump station inspections are recorded in a logbook, and inspection forms and data are archived. At some of the larger stations, more extensive data is collected. Additional staff are assigned as needed to accomplish all activities.

Much of training for pump station operators occurs through on-the-job experience. Considerable training is provided through an in-house program in which staff are eligible to obtain continuing education credits required for certification.

## **vi. PUMP STATION MAINTENANCE**

The purpose of the Pump Station maintenance program is to perform the necessary preventative, corrective and predictive maintenance required to sustain the reliability of wastewater and flood pump stations and ensure all pump stations throughout the service area are operating efficiently. This program is executed in conjunction with operations and maintenance to complete work orders generated from routine inspections, trouble calls, and preventative maintenance schedules. In 2019, approximately 6,000 work orders were completed associated with maintenance of the City's 37 sewer pump stations and 16 flood pump station.

Maintaining the reliability of pump stations helps to decrease the chance of pump station failure, which could potentially cause an overflow. Performing predictive and preventative maintenance helps to correct problems before they become an emergency and increases pump station reliability.

Crews perform regular maintenance at each of the pump stations. All pump station maintenance is performed based on planned weekly maintenance schedules or when an emergency occurs. Typical tasks include verifying normal operation of pumps and equipment, checking operational status, servicing equipment for proper operation, and other corrective and preventative maintenance.

Maintenance supervisors produce a weekly maintenance schedule and select specific projects based on crew availability, parts availability and the urgency of a repair. Since 2010, staff members have updated plans during daily weekday meetings between the pump station mechanical, electrical and instrumentation mechanics and operators, supervisors and superintendents to facilitate coordination. As a result, 90 percent of all work performed consists of scheduled and planned maintenance.

The senior management team utilizes computerized maintenance management administration, procurement, project specifications reviews, project drawings, project design meetings and coordination. Additional daily meetings and communications with maintenance supervisors and chief plant operators are conducted to communicate and coordinate the activities that need to be performed.

The management and execution of work tasks are evaluated constantly through daily team meetings and regular tracking of work orders. Tracking work orders in computerized maintenance management system enables staff to identify performance patterns that may require further evaluation. All flood pump stations are inspected almost daily during routine events and more frequently during severe weather events. The U.S. Army Corps of Engineers conducts annual audits and identifies further actions needed for repair work.

#### **vii. PUMP STATION EMERGENCIES**

Emergency response procedures have been developed for pump station emergencies. The department monitors the basic operations status via the SCADA alarm reporting and telephone dial-out systems, with each used as appropriate to the pump station location and equipment type. The SCADA system is monitored 24 hours a day, seven days a week by a Chief Plant Operator (CPO) at the Blue River WWTP, who reports to a Section Superintendent, who in turn reports to Wastewater Treatment Division Manager. The alarms received by the CPO indicate the type of equipment problem and permit the CPO to tailor responses. The CPO has guidelines that specify whom to call and when to call them based on the time of day, weather conditions and nature of the issue. Water Services also receives notification of trouble in the collection system from the public. External constituencies can hear an audible alarm or see a flashing red light at pump stations and call Water Services' 24-hour response line to report trouble.

Water Services provides emergency response. The CPO has the authority to call in additional resources as needed, including either staff with specific expertise, a contractor or a contract hauler. This system ensures that quick response is available 24 hours a day and improves employee accountability.

Additional assistance for pump station trouble calls may be summoned by the CPO. Skilled and/or general labor is available, as well as equipment operators and their respective equipment. The responder will determine labor and equipment needs during the initial assessment of the issue. Water Services works with an existing contractor to respond to pump station emergencies.

Work orders associated with pump station emergencies are completed and documented in computerized maintenance management system. The success and effectiveness of Water Services' efforts are measured through a variety of performance indicators, such as response time, the effectiveness of remedies, and the number of well-trained personnel available to monitor and respond to pump station emergencies. The formal Emergency Response Plan is included as part of the City's 2010 Sewer Overflow Response Plan (SORP)



### **viii. FORCE MAINS**

The Force Main Maintenance Program and Air Release Valve (ARV) Program consists of five elements: GIS, condition assessment, corrosion investigation, preventative maintenance, and documentation of maintenance activities.

Water Services initially inspect force main sewers in isolated areas using infrared video/thermal imagery conducted as part of the annual aerial flyover contract. If an anomaly is found, field inspectors in the Wastewater Preventative Maintenance Division are sent out to determine if the anomaly was an active leak on the force main. This program is discussed further in the Remote Sewer Inspection Program later in this report. The Line Maintenance Division also assists in the repair of force main breaks on a point repair basis. The Wastewater Treatment Division is responsible for the ARVs on force main sewers. The ARVs are checked annually at a minimum.

### **ix. SMOKE TESTING**

The purpose of the Smoke Testing program is to identify specific public and private sources of stormwater I/I into the SSS and CSS that can be eliminated or reduced through rehabilitation or repair. Smoke testing, along with CCTV inspection, manhole inspections, and flow monitoring comprise the Sanitary Sewer Evaluation Survey (SSES) program elements. Smoke testing helps to identify significant sources of stormwater I/I, including private service laterals and illegal connections such as downspouts and area drains. Smoke testing can also be used to determine the location of sewer main defects likely contributing I/I to the system.

The City has developed a standard protocol for smoke testing. Water Services keeps a hard copy of this protocol along with electronic copies. Water Services uses external contractors to perform the smoke testing activities as dictated by specific projects; the smoke testing protocols accompanies all requests for proposals for these projects. Data is analyzed and used for system improvements as outlined in the Collection System Maintenance section below.

In 2019, smoke testing was performed on approximately 765,345 linear feet, or 145 miles, of sewer to detect I/I sources in the public and private sectors. Each positively identified source was photographed and located using a GPS device. A defect feature class was created and is included in the geodatabase.

### **x. FLOW AND RAINFALL MONITORING**

Flow and rainfall monitoring are being performed in conjunction with Appendix D of the Consent Decree. Additional flow and rainfall monitoring will be performed in individual sub-basins to aid in the design of proposed improvements and to monitor post-construction conditions after improvements are completed.

Water Services has developed a standard protocol for flow and rainfall monitoring and data analysis. Once the flow and rainfall data are received, it is stored on a server at Water Services and is reviewed by various Division managers and the Overflow Control Program team. The design professional conducts an analysis of the data for design of system improvements. Additional details and project-specific information on the flow monitoring program is described in more detail in Appendix D of this report.

### **xi. CCTV INSPECTION**

The purpose of the City's CCTV Inspection Program is to visually assess the condition inside of the collection system. The program relies on the use of National Association of Sewer Service Companies (NASSCO) standardized ratings to characterize conditions. Currently, CCTV inspections are conducted to investigate a known trouble area and as a follow-up to line cleaning. Water Services has developed a standard protocol for CCTV inspections.

In 2019, the City televised approximately 244 miles of sewer lines, exceeding the Consent Decree requirements. This mileage includes the mileage in the combined sewer system previously discussed in NMC 1. Water Services tracks CCTV inspection information in Hansen with information available from WinCan.

### **xii. REMOTE SEWER INSPECTION PROGRAM**

The Remote Sewer Inspection Program is implemented to inspect remote portions of the sanitary sewer system in an economical and efficient manner to identify anomalies warranting further inspection. This is

done through an aerial flyover that identifies and locates potential areas of ground seep into the watershed, specifically leaks from local underground sewer lines situated near or along the river, creeks and tributary streams in remote locations.

The entire 318 miles of the system's sewer lines, and force mains are evaluated using the flyover process. The specialized equipment requires a small aircraft equipped with a video camera and thermal infrared/integrated GPS tracking. These tools detect temperature anomalies along remotely located portions of the collection system. The temperature anomalies indicate flow may be either exfiltration or overflowing from the collection system, and that further investigation is necessary.

After the flyover is performed, the infrared footage is analyzed and adjusted to remove any known anomalies such as lights, animals or other obvious heat sources. For those heat sources that cannot be characterized, and that may be resulting from sewer system leaks, Water Services staff visually inspects those areas. If staff members discover a leak, a work order is issued for the repair.

A flyover was performed in March 2019 with 32 anomalies discovered and one anomaly was confirmed to be an overflow. Using the supplied GPS coordinates, the Wastewater Line Maintenance Division visually inspected the anomalies, finding one overflow located in a remote area. The remaining anomalies were the result of small ponds, dried up creeks with small pools of water, natural groundwater seepage, storm drainage pipes, and other non-sewage related items.

## C. COLLECTION SYSTEMS MAINTENANCE

### i. MANHOLE REPAIRS

The purpose of the Manhole Repair Program is to ensure the structural integrity of manholes in the system, reduce infiltration into manholes, control odor problems at manholes, increase accessibility to buried manholes, and prevent public harm due to structural failures.

Manhole repairs often reduce infiltration into manholes. This helps ensure capacity exists for the conveyance of sanitary sewer flows. The Manhole Repair Program also addresses the structural integrity of manholes. This reduces the likelihood a manhole would structurally fail, causing blockage in the system that may trigger either SSOs or CSOs. The Manhole Repair Program also helps to minimize overflows by increasing the accessibility of buried manholes. Greater accessibility for inspection and maintenance activities will minimize overflows with maintenance related causes.

Activities associated with this program include the repair or replacement of manhole components in the upper three feet of the structure by the Wastewater Line Maintenance Division manhole repair crew, or manhole replacement by a heavy repair crew. The division's manhole repair crew implements various types of repairs, including:

- Lid and ring replacement
- Lid grade adjustment
- Brick replacement

The repair crew does not repair manholes suffering severe structural failure; these manholes are typically removed and replaced by a heavy repair crew in the Line Maintenance Division. In 2019, the City's OCP Program Management team inspected 3,105 manholes (MHs). A total of 1,534 MHs were repaired, replaced, or raised as follows: 216 MHs by City-wide MH Raising Contractor, 1,217 MHs by OCP Project Contractors, and 101 MHs by City Wastewater repair crews.

### ii. MAINLINE SEWER REPAIRS

Actual physical repairs are made to the gravity sewer lines by the Line Maintenance Division. The repairs are performed to make upgrades and improvements to mainline sewers as needed to ensure adequate capacity, keep flow in pipes, reduce and eliminate I/I, and maintain the design conveyance of the pipes in the system.

Overflows are minimized by reducing the levels of I/I entering the system and by fixing deteriorating pipes that keep the flow in the collection system. A reduction in I/I levels leaves more system capacity available for

the conveyance of sanitary sewer flow, eliminating one significant cause of overflows. Maintaining the pipe also removes restrictions that could potentially cause blockages and overflows and further helps ensure capacity.

The type of repair method used is dependent upon several factors including:

- Pipe size
- Pipe type
- Pipe location
- Flow
- Surface conditions
- Severity of I/I

The City utilizes several repair technologies, including:

- Open cut
- Cured in place lining
- Horizontal directional drilling
- Boring and jacking
- Tunneling
- Pipe bursting
- Slip lining
- Grouting of joints
- Point repairs

Work orders are prioritized based on available assessment information and sound judgment. Work orders associated with mainline sewer repairs are tracked and stored in Hansen. Repair work performed by in-house construction crews is entered into Hansen by Collection Systems personnel, and repair work performed by outside contractors is entered into Hansen by Engineering personnel.

Water Services employs repair crews; however, a significant amount of mainline sewer repair work is completed by outside contractors. The department also relies on outside contractors for construction work that requires either special equipment or expertise to perform. In-house inspectors monitor work conducted by outside contractors. Specifications for construction work are included in formal contracts used to manage outside firms.

In 2019, approximately 440,702 linear feet of sewer main line repairs, including open cut replace/pipe bursting, point repairs, and CIPP. Additionally, 20,497 linear feet of service lateral pipe replacement and rehabilitation were performed as a part of OCP projects, Line Maintenance Division crews, and Water Services' annual sewer repair contracts.

### **iii. SEWER CLEANING**

The two purposes of the Sewer Cleaning Program are to perform preventative maintenance cleaning on the gravity sewer system and to clean trouble or emergency areas. Preventative maintenance cleaning is intended to ensure that system design capacity is available and prevent non-structural blockages caused by either root intrusion or buildup of grease or debris. A large percentage of annual sewer cleaning is on lines that are part of a routine preventative maintenance schedule. Water Services conducts emergency cleaning in response to emergency calls. The remaining cleaning activities are unscheduled trouble or emergency calls.

City crews also perform corrective cleaning in response to stoppages, trouble calls and city requests. If Water Services receives repeated trouble calls for a particular line segment, the line segment is placed on a frequent interval preventative cleaning cycle. CCTV inspection is completed in conjunction with all sewer cleanings. All sewer cleaning originates with a Hansen-generated work order. Completed work is also tracked in Hansen.

The City performs both hydraulic and mechanical cleaning. Mechanical cleaning is performed using either a rod machine or a bucket machine, while hydraulic cleaning is performed using jet trucks.

Water Services stores all data related to the Sewer Cleaning Program in Hansen. Cleaning records include date, time, and location information related to the cleaning, method of cleaning used, names of staff members who performed the cleaning, and any further actions that were initiated.

In 2019, the City cleaned approximately 615 miles of sewer lines, exceeding the Consent Decree requirement of at least 283 miles annually. This mileage includes the mileage in the CSS area previously discussed in NMC 1.

#### **iv. RESPONSE PLAN**

The City's Building and Private Property Backup Response Plan was developed to provide procedures for response and preventative maintenance. The purpose of the plan is to restore the public sewer line to a functioning condition and perform any cleanup that may be required while working within the applicable laws of the City.

If, while conducting preventative cleaning activities, a basement backup occurs that is found to be the responsibility of Water Services, the property owner will be directed to contact the City's Claims Department. The Claims Department will hire a private contractor to perform the clean-up work. If there is a claim or lawsuit, then the law department works with the property owner to install a backflow device (if they choose to have the device installed). This installation would be located on private property, and Water Services is typically not informed if the homeowner elected to have the device installed or not.

### **D. COLLECTION SYSTEM CAPACITY**

#### **i. CAPACITY ASSESSMENT AND ASSURANCE**

The City's current procedure for capacity assurance involves coordination with several City Departments and Divisions. The City Planning and Development Department (City Planning) Land Development Division reviews new development additions. The developer's engineering consultant is responsible for certifying that the proposed development will not overload the receiving sanitary sewer system. They must verify that the receiving trunk sewer was sized adequately according to APWA standards, and coordinate with Water Services when necessary to verify that the receiving pump station has sufficient capacity to handle the additional flows.

The City Planning Land Development Division has the authority to refuse authorizing the connection if there is a history of capacity issues or if the City has issued a moratorium on new connections in a specific area. City Planning is also responsible for reviewing plans and inspecting connections to the existing sewer system for a major infrastructure permit per Chapter 64 of the Code of Ordinance.

Water Services inspects the connections when new service line connections are requested and permitted. Water Services also inspects the installation of service lines on private property for 1-2 family residential structures, and building officials handle the inspections of the private service line installation on all other situations.

Public Works/Parks and Recreation inspects the right-of-way restoration associated with their excavation permits, and Public Works handles the traffic control inspections. Water Services supports the Land Development Division on larger proposed developments or unique drainage or sanitary sewer service areas when requested.

For single taps, City Planning Land Development Division grants or authorizes the connection. Water Services then issues the connection inspection permits for all connections and performs the inspection of the physical connection. Public Works (and/or Parks and Recreation Department for roads under its jurisdiction) issues excavation permits for excavation within the public right-of-way or easement. Public Works also issues any required traffic closure permits. Building officials issue a plumbing permit for the service line on private property.

## XIII. POST CONSTRUCTION MONITORING PROGRAM PERFORMANCE CRITERIA – APPENDIX D

### A. FLOW MONITORING PROGRAM

Short-term pre-construction flow monitoring was conducted by the City's OCP Program Management team for ten I/I reduction projects listed below beginning in April 2019 for approximately 90 days to seven months. Monitoring occurred to provide data for the identification and quantification of I/I sources and to measure the effectiveness of I/I rehabilitation work.

- Blue River South Area 4
- Middle Blue River Area 13
- Round Grove Basin
- Line Creek/Rock Creek Area 3
- Line Creek/Rock Creek Area 4
- Birmingham Area 2
- Birmingham Area 3
- Buckeye Creek Area
- Northern Basins Area 1
- Northern Basins Area 2

Post-construction flow monitoring was conducted to obtain data to measure the reduction in I/I obtained by six projects listed below. Flow data will be analyzed to determine I/I reduction effectiveness.

- Blue River South Area 3
- Blue River Central Area 1
- Blue River Central Area 2
- Blue River North Area
- Line Creek/Rock Creek Area 1
- Line Creek/Rock Creek Area 2

Multiple rain gauges were also installed in the project areas to supplement coverage provided by the City's existing ALERT gauging system.

In addition, flow and rainfall monitoring was performed for 90 to 210 days at four project locations in the Lower Blue River basin to provide pre-design data, at three project locations in the Middle Blue River basin to provide post-construction data, and at select locations within the Turkey Creek, Town Fork Creek, and Lower Blue River basins to provide data for hydraulic model calibration updates. Post-construction monitoring was also performed for two pilot private I/I target areas and analysis of the data is underway.

#### **I. LONG-TERM FLOW MONITORING**

During the reporting period, long-term flow monitoring was performed according to the revised CSS Metering Plan approved by USEPA in December 2016 and in accordance with the Middle Blue River Basin Post-Construction Flow Monitoring Plan submitted to USEPA December 21, 2018. Long-term flow monitoring commenced or continued in 2019 at eight locations within the combined sewer system as listed below.

- Outfall BR039 (continued)
- Outfall BR040 (continued)

- Outfall BR059 (continued)
- Outfall BR069 (continued)
- Outfall BR063 (continued)
- Outfall BR064 (continued)
- Outfall W003 (continued)
- Outfall BR056 (commenced)

## B. WATER QUALITY TESTING

The 2019 reporting period is the ninth year of monitoring conducted under the Integrated Water Quality Monitoring Program (IWQMP). Since April 2011, Water Services staff members have conducted sampling and field measurements at 20 smaller water locations. A Water Services contractor has conducted sampling and field measurements at three locations on each of the Kansas River and Missouri River. The Water Services laboratory conducted analysis of the samples. Sampling and analyses were conducted according to the methods prescribed in the Integrated Water Quality Monitoring Program<sup>1</sup> and the associated Quality Assurance Project Plan<sup>2</sup>.

The details of the monitoring program, including sampling locations, frequency of monitoring, and water quality parameters are presented in the IWQMP. The IWQMP specifies monitoring to be conducted every other week. Field measurements include temperature, pH, dissolved oxygen, and aesthetic observations. Samples are collected and delivered to the Water Services laboratory for analysis of E. coli, TSS, and conductivity. Monitoring was conducted during the 2019 recreation season, which extends from April 1 through October 31.

The implementation of the IWQMP in 2019 was successful in obtaining 109 percent of the planned samples for both the small stream sites and the large river sites. Also, the collection frequencies for field duplicate samples and field rinse blank (FRB) samples (13 percent and 13 percent of samples, respectively) met or exceeded the planned numbers (10 percent for duplicates; 5 percent for FRBs), and exceeded the requirements specified in the sampling and quality assurance plans.

A brief summary of the 2019 water quality monitoring results is presented for E. coli, dissolved oxygen, and TSS in *Table 8*.

Highest concentrations of bacteria are observed in Town Fork Creek (TF-01 and TF-02 - a new location added in 2018), the lower end of the Blue River (BR-08) and the middle reach of Brush Creek (BC-03, BC-04 and BC-06). These locations are generally consistent from past years. Bacteria concentrations in the Missouri River and the Kansas River were higher in 2019 than in previous years, except for 2016.

Average dissolved oxygen concentrations were slightly lower in 2019 than in 2018 but not noticeably different from previous years and are all meeting applicable water quality criteria.

The 2019 average TSS concentration at the Town Fork Creek location TF-01 was approximately tenfold higher than previous years, largely due to several high concentrations measured in April and May 2019. TSS concentrations were also higher in the other smaller tributary streams, but not noticeably different from previous years. TSS concentrations in the Missouri River and Kansas River were higher than previous years except 2016 (a high flow year for those systems).

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<sup>1</sup> LimnoTech, December 28, 2010

<sup>2</sup> LimnoTech, 2005, revised 2010

TABLE 8: SUMMARY OF 2019 OCP WATER QUALITY MONITORING

		E. Coli (Count/100 ml)		Dissolved Oxygen (mg/L)		TSS (mg/L)	
Site		No. of samples	Geometric mean	No. of samples	Average	No. of Samples	Average
Small Stream Sites	BC-01	18	574	16	7.3	18	9
	BC-02	18	578	16	5.9	18	10
	BC-03	18	1,605	16	8.8	18	27
	BC-04	19	1,334	17	7.4	19	14
	BC-05	19	439	17	8.4	19	18
	BC-06	18	1,438	16	6.3	18	15
	BC-07	18	915	16	7.1	18	16
	BR-01	19	177	16	8.8	19	48
	BR-02	18	268	16	8.0	18	81
	BR-03	18	595	16	8.0	18	69
	BR-04	17	351	15	8.3	17	48
	BR-05	17	221	15	8.1	17	32
	BR-06	18	367	16	8.0	18	32
	BR-07	19	446	16	7.6	19	31
	BR-08	19	3,277	16	6.2	19	27
	BR-09	18	305	16	9.0	18	36
	IC-01	19	394	16	8.9	19	25
	PV-01	19	133	16	10.2	19	15
	TF-01	16	3,268	15	7.5	16	469
	TF-02	17	6,682	16	5.8	17	18
	MC-01	17	225	15	8.4	17	20
Large River Sites	MR-01-R	17	336	15	8.0	17	279
	MR-01-C	16	352	15	8.1	16	311
	MR-01-L	16	327	15	8.0	16	295
	MR-02-R	30 <sup>a</sup>	615	16	8.5	30 <sup>a</sup>	341
	MR-02-C	15	551	15	8.4	15	349
	MR-02-L	15	575	15	8.4	15	340
	KR-01-R	16	352	15	9.0	16	493
	KR-01-C	16	399	15	9.1	16	468
	KR-01-L	16	619	15	9.0	16	785

Note: Three locations were monitored at each of the large river sites (MC, KR), one each in the right channel (R), the center channel (C), and left channel (L).

<sup>a</sup> A field duplicate was collected at this location each time it was sampled, resulting in a sample count approximately twice as high as the other locations in the Missouri River.

## XIV. SUPPLEMENTAL ENVIRONMENTAL PROJECT PLAN – APPENDIX E

To date there have been three (3) Supplemental Environmental Projects:

- a. SEP No. 1 (original SEP project) – Septic Tank Closure Program
- b. SEP No. 2 - Sustainable Stormwater BMPs associated with Water Services Swope Campus Parking Lot Improvements
- c. SEP No. 3 - Blue River Trailhead at Blue Parkway

The projects are complete, and the Supplemental Environmental Projects Completion Report was submitted to the EPA on January 25, 2019.

## XV. SCHEDULE FOR IMPLEMENTATION OF DISINFECTION TECHNOLOGY AT WASTEWATER TREATMENT PLANTS – APPENDIX F

Disinfection improvements have been completed. All six of the City's wastewater treatment plants are now equipped with effluent disinfection.



## ATTACHMENT A: DISCHARGE MONITORING REPORTS

The following is an example of a Discharge Monitoring Report as submitted by Water Services to MDNR. To conserve resources, electronic copies of all discharge and bypass reports submitted to MDNR in 2019 are enclosed.

PERMITTEE NAME/ADDRESS (include Facility Name, Location if Different)  
NAME: KC, Rocky Branch Sewage Treatment Plant  
ADDRESS: 4800 E 63<sup>rd</sup> St., Kansas City, MO 64130

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)  
DISCHARGE MONITORING REPORT (DMR)

Form Approved  
OMB No. 2040-0004

NO-0098305  
PERMIT NUMBER

003  
DISCHARGE NUMBER

MONITORING PERIOD  
YEAR MO DAY YEAR MO DAY  
FROM 2015 01 01 TO 2015 01 31

☐ Check here if No Discharge

NOTE: Read instructions before completing this form

PARAMETER	X	QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Flow *		1.2	0.87	MGD	-	-	-	-	-	Daily	24 Hr Total
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT	Daily Max	Monthly Avg						Once/Week	24 Hr Total
Biochemical Oxygen Demands		-	-	-	-	9	8	mg/L	0	Once/Week	24 Hr Composite
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT				20 Weekly Avg	10 Monthly Avg			Once/Week	24 Hr Composite
Total Suspended Solids		-	-	-	-	13	8	mg/L	0	Once/Week	24 Hr Composite
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT				25 Weekly Avg	15 Monthly Avg			Once/Week	24 Hr Composite
Ammonia as N (Oct 1 - Mar 31)		-	-	-	0.22	-	0.22	mg/L	0.1	Once	Grab
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT				7.5 Daily Max	2.5 Monthly Avg			Once/Month	Grab
Oil & Grease		-	-	-	ND	-	ND	mg/L	0	Once	Grab
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT				15 Daily Max	10 Monthly Avg			Once/Month	Grab
Dissolved Oxygen *		-	-	-	10	-	9	mg/L	-	5 Times	Grab
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT				Daily Max	Monthly Avg			Once/Month	Grab
pH		-	-	%	6.5	-	8.5		0	6 Times	Grab
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT				Daily Min 6.5	Daily Max 9.0			Once/Week	Grab

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER  
Randy Williams  
Utility Superintendent

TELEPHONE  
816 513-7205

DATE  
2015 02 27

TYPED OR PRINTED

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)  
\* Monitoring requirement only. \*2 Weekday, except for nine Federal holidays. ND - Non-Detect.

EPA Form 3200-1

PAGE 1 OF 2

PERMITTEE NAME/ADDRESS (include Facility Name, Location if Different)  
NAME: KC, Rocky Branch Sewage Treatment Plant  
ADDRESS: 4800 E 63<sup>rd</sup> St., Kansas City, MO 64130

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)  
DISCHARGE MONITORING REPORT (DMR)

Form Approved  
OMB No. 2040-0004

NO-0098305  
PERMIT NUMBER

003  
DISCHARGE NUMBER

MONITORING PERIOD  
YEAR MO DAY YEAR MO DAY  
FROM 2015 01 01 TO 2015 01 31

☐ Check here if No Discharge

NOTE: Read instructions before completing this form

PARAMETER	X	QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
BOD <sub>5</sub> Removal		-	98	%	-	-	-	mg/L	0	Once	24 Hr Composite
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT	> 85%							Once/Month	24 Hr Composite
TSS Removal		-	98	%	-	-	-	mg/L	0	Once	24 Hr Composite
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT	> 85%							Once/Month	24 Hr Composite
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT									
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT									
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT									
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT									
		SAMPLE MEASUREMENT									
		PERMIT REQUIREMENT									

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER  
Randy Williams  
Utility Superintendent

TELEPHONE  
816 513-7205

DATE  
2015 02 27

TYPED OR PRINTED

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)  
\* Monitoring requirement only.

## ATTACHMENT B: REPORTS SUBMITTED UNDER CURRENT NPDES PERMITS

To conserve resources, electronic copies of the following reports submitted to MDNR in 2019 are enclosed.

- Monthly Operating Reports
- Industrial Pretreatment Program Annual Report – 2018
- Municipal Separate Storm Sewer System Permit Annual Report – May 2018 – April 2019
- Sewer Extension Authority Report – 2018
- Birmingham Inflow/Infiltration Report - 2019

## ATTACHMENT C: LIST OF CRITICAL FACILITIES AND INSPECTION FREQUENCY

Table 10 below is the start of the critical facilities list and associated inspection frequencies. An electronic copy of the full list is enclosed.

DIVERSION STRUCTURE NUMBER	LOCATION	MAP NUMBER	MH NUMBER	RECEIVING STREAM	INSPECTION INTERVAL
2	100 MAIN ST DIVERSION	S028	302	MISSOURI RIVER	30
3	100 GILLIS AVE DIVERSION 600FT W	S028	954	MISSOURI RIVER	7
4	308 N LYDIA AVE - DIVERSION STRUCTURE	S027	483	MISSOURI RIVER	30
5	* 101 PROSPECT AVE PUMP STATION	S009	800	MISSOURI RIVER	30
7	7300 HAWTHORNE DIVERSION	S012	047	BLUE RIVER	30
8	320 BELMONT AVE	S024	209	BLUE RIVER	14
9	WILSON & CAMBRIDGE	S024	087	BLUE RIVER	30
10	801 E 9TH ST, IN PARKING LOT	S035	435	BLUE RIVER	14
11	7601 TRUMAN RD	S036	018	BLUE RIVER	14
12	1800 CRYSTAL AVE	S048	210	BLUE RIVER	14
13	3557 STADIUM DR	S059	009	BLUE RIVER	14
14	3333 STADIUM DR	S059	001	BLUE RIVER	14
16	5015 STATE LINE RD	S078	629	BRUSH CREEK	7
17	1308 W 50TH TER	S078	022	BRUSH CREEK	14
18	4941 WESTWOOD RD	S078	174	BRUSH CREEK	7
19	1204 W 50TH ST	S078	186	BRUSH CREEK	7
20	4979 WARD PKWY	S078	323	BRUSH CREEK	7
21	4938 HOLLY ST	S078	190	BRUSH CREEK	7
22	807 W 48TH ST	S078	354	BRUSH CREEK	14
23	4821 ROANOKE PKWY	S078	344	BRUSH CREEK	30
24	717 WARD PKWY	S078	340	BRUSH CREEK	7
25	4700 BROADWAY	S078	488	BRUSH CREEK	3
26	4849 WORNALL RD	S079	134	BRUSH CREEK	7
27	111 NICHOLS RD	S079	232	BRUSH CREEK	7
28	1 WARD PKWY	S079	159	BRUSH CREEK	7
29	4908 BROOKSIDE BLVD	S079	093	BRUSH CREEK	14

30	4925 OAK ST	S079	082	BRUSH CREEK	14
31	4722 MCGEE ST	S079	219	BRUSH CREEK	14
32	4750 TROOST AVE	S079	641	BRUSH CREEK	30
33	4825 TROOST AVE	S080	267	BRUSH CREEK	30
34	4909 TROOSTWOOD RD	S080	249	BRUSH CREEK	14
36	4822 PASEO	S080	242	BRUSH CREEK	14
38	1325 CLEAVER II BLVD	S080	838	BRUSH CREEK	7
39	1326 CLEAVER II BLVD	S080	418	BRUSH CREEK	14
40	1347 BRUSH CREEK BLVD	S080	414	BRUSH CREEK	14
41	1800 BRUSH CREEK BLVD	S080	388	BRUSH CREEK	14
42	4500 GARFIELD AVE	S080	490	BRUSH CREEK	30
43	2508 E 46TH ST	S080	357	BRUSH CREEK	14
45	4929 CHESTNUT AVE	S081	105	BRUSH CREEK	14
46	3321 E 51ST ST	S081	048	BRUSH CREEK	14
48	3214 E 53RD ST	S098	469	BRUSH CREEK	14
49	3333 E 55TH ST	S098	387	BRUSH CREEK	14
50	5520 COLLEGE AVE	S098	310	BRUSH CREEK	14
51	3024 E 57TH ST	S098	179	BRUSH CREEK	14
52	5727 SOUTH BENTON	S098	183	BRUSH CREEK	14
53	2802 E 58TH ST	S098	186	BRUSH CREEK	14
54	2902 E 58TH ST	S098	185	BRUSH CREEK	14
55	5816 WALROND AVE	S098	040	BRUSH CREEK	14
56	5901 PROSPECT AVE	S098	002	BRUSH CREEK	7
57	2800 E 60TH ST	S105	557	BRUSH CREEK	14
58	6025 PROSPECT AVE	S105	383	BRUSH CREEK	7
61	6125 PARK AVE	S104	306	BRUSH CREEK	14
62	1670 E 63RD ST	S104	861	BRUSH CREEK	7
63	1100 E MEYER BLVD	S104	069	BRUSH CREEK	30
64	6330 TROOST AVE	S104	066	BRUSH CREEK	14
67	7523 INDIANA, 500FT S IN CREEK	S129	800	BLUE RIVER	7
68	8300 OAK ST, 300FT S	S148	052	BLUE RIVER	7
69	1327 E 84TH TER	S147	885	BLUE RIVER	3
70	6224 PASEO	S104	108	BRUSH CREEK	7
71	1318 E 63RD ST	S104	089	BRUSH CREEK	7
72	5835 BELLEFONTAINE AVE	S098	035	BRUSH CREEK	3
73	5241 E 53RD TER	S097	059	BLUE RIVER	30
74	4232 E 58TH ST	S097	020	BLUE RIVER	3
75	4400 E 59TH ST	S097	005	BLUE RIVER	3
76	1503 E 49TH TER	S080	078	BRUSH CREEK	14
77	1510 E 50TH ST	S080	077	BRUSH CREEK	14
78	5007 PASEO	S080	075	BRUSH CREEK	14
79	5025 PASEO	S080	074	BRUSH CREEK	14
80	5045 PASEO	S080	069	BRUSH CREEK	3

81	1500 E 52ND ST	S099	529	BRUSH CREEK	14
82	5301 PASEO	S099	420	BRUSH CREEK	14
84	416 E MEYER BLVD	S103	227	BRUSH CREEK	14
86	440 E 63RD ST	S103	421	BRUSH CREEK	14
87	601 E 62ND ST	S103	424	BRUSH CREEK	14
90	745 E 63RD TER	S103	282	BRUSH CREEK	14
91	912 E 63RD ST	S103	277	BRUSH CREEK	14
92	6200 ROCKHILL RD	S103	450	BLUE RIVER	14
93	6144 ROCKHILL RD	S103	447	BRUSH CREEK	14
94	6300 YATES, LIGHT POLE 1028	S106	032	BLUE RIVER	7
109	6839 ASKEW AVE	S122	397	BLUE RIVER	3
111	3827 GREGORY BLVD	S122	900	BLUE RIVER	14
112	7103 TRACY AVE	S123	278	BRUSH CREEK	14
113	1209 E GREGORY BLVD	S123	335	BRUSH CREEK	3
114	7101 TRACY AVE	S123	296	BRUSH CREEK	14
115	69TH & LYDIA AVE	S123	331	BRUSH CREEK	3
116	69TH & FLORA AVE	S123	330	BRUSH CREEK	14
117	68TH & WOODLAND AVE	S123	352	BRUSH CREEK	14
118	1420 E 66TH TER	S104	018	BRUSH CREEK	14
119	1439 E 66TH TER	S104	015	BRUSH CREEK	14
120	8141 CAMPBELL ST	S127	454	BLUE RIVER	7
123	8501 FLORA ST	S147	149	BLUE RIVER	7
124	2425 E 77th ST	S128	803	BLUE RIVER	14
125	816 FREMONT AVE	S035	166	BLUE RIVER	14
127	6801 WINNER RD	S024	055	BLUE RIVER	14
128	6821 WINNER RD	S024	066	BLUE RIVER	14
129	5700 SMART AVE	S025	826	BLUE RIVER	30
130	HOLMES DIVERSION STRUCTURE	S028	265	MISSOURI RIVER	7
131	1420 KANSAS AVE	S033	042	BLUE RIVER	30
132	3100 BENTON PLZ	S033	828	BLUE RIVER	30
133	3820 E 16TH ST	S033	424	BLUE RIVER	30
134	3800 E 14TH ST	S033	605	BLUE RIVER	30
135	4200 E 12TH TER	S033	456	BLUE RIVER	30
136	4411 E 12TH ST	S034	055	BLUE RIVER	30
137	4900 E 12TH ST	S034	242	BLUE RIVER	3
139	5605 WINNER RD	S034	339	BLUE RIVER	14
140	5800 WINNER RD, IN REAR	S034	321	BLUE RIVER	7
142	4836 E 9TH ST	S034	257	BLUE RIVER	7
144	2909 NORTON AVE	S057	361	BLUE RIVER	14
145	2923 JACKSON AVE	S057	356	BLUE RIVER	14
146	2900 JACKSON AVE	S057	459	BLUE RIVER	14
147	4903 E 27TH TER	S058	467	BLUE RIVER	14
148	5300 E LINWOOD BLVD	S058	200	BLUE RIVER	14

149	3120 STADIUM DR	S058	198	BLUE RIVER	14
150	3000 STADIUM DR	S058	610	BLUE RIVER	7
151	5508 E 31ST ST	S058	171	BLUE RIVER	14
152	4040 VINEYARD DR	S073	037	BLUE RIVER	7
153	3909 ASKEW AVE	S074	267	BLUE RIVER	14
154	3941 MONROE AVE	S074	253	BLUE RIVER	14
155	3944 CLEVELAND AVE	S074	202	BLUE RIVER	14
156	3600 E 40TH ST	S074	187	BLUE RIVER	14
157	4018 MONROE AVE	S074	194	BLUE RIVER	14
158	4012 MERSINGTON AVE	S074	206	BLUE RIVER	14
159	4028 MYRTLE AVE	S074	212	BLUE RIVER	14
160	41ST & MYRTLE	S074	095	BLUE RIVER	14
161	4037 NORTON, IN WOODS	S074	089	BLUE RIVER	14
162	4109 JACKSON AVE	S073	029	BLUE RIVER	14
164	3525 E 43RD ST	S081	498	BRUSH CREEK	14
165	4401 MONROE AVE	S081	408	BRUSH CREEK	14
166	4447 MERSINGTON AVE	S081	421	BRUSH CREEK	14
167	4501 CLEVELAND AVE	S081	267	BRUSH CREEK	14
168	4518 CLEVELAND AVE	S081	265	BRUSH CREEK	14
169	4536 NORTON AVE	S081	248	BRUSH CREEK	14
170	4526 LISTER AVE	S082	154	BLUE RIVER	14
171	5618 INDEPENDENCE AVE	S025	827	BLUE RIVER	30
174	4110 SPRUCE AVE	S073	026	BLUE RIVER	14
175	4514 CLEVELAND AVE	S081	272	BRUSH CREEK	7
178	BENNINGTON & WILSON	S024	096	BLUE RIVER	30
179	4500 WAYNE AVE	S080	464	BRUSH CREEK	30
180	4500 HIGHLAND AVE	S080	480	BRUSH CREEK	30
187	5544 BELLEFONTAINE AVE	S098	321	BRUSH CREEK	14
190	7224 MAIN ST	S124	204	BRUSH CREEK	14
191	16 W 73RD ST	S124	193	BRUSH CREEK	14
192	101 W 72ND ST, FRONT	S124	189	BRUSH CREEK	14
193	7232 BALTIMORE AVE	S124	226	BRUSH CREEK	14
194	312 WINTROPE RD	S124	840	BRUSH CREEK	14
195	6441 TROOST AVE	S104	057	BRUSH CREEK	14
197	5101 WORNALL RD	S101	269	BRUSH CREEK	7
198	30 W 31ST TER (WST)	S055	290	OK CREEK	7
199	5144 OAK ST, LOT	S100	688	BRUSH CREEK	30
200	4901 TROOSTWOOD	S080	052	BRUSH CREEK	14
201	5300 PASEO	S099	414	BRUSH CREEK	14
203	6530 WINNER RD	S024	806	BLUE RIVER	14
205	8200 WINNER RD	S023	098	BLUE RIVER	7
206	1510 CRYSTAL AVE	S035	469	BLUE RIVER	14
207	7113 E 12TH ST	S035	544	BLUE RIVER	14

209	1700 CRYSTAL AVE	S048	117	BLUE RIVER	14
211	1801 WHITE AVE	S048	058	BLUE RIVER	7
214	I-70 & WHITE	S059	030	BLUE RIVER	14
218	6809 OAK ST	S124	404	BRUSH CREEK	14
219	2323 STATE LINE RD, TURKEY CREEK PUMP STATION (WST)	S053	682	KANSAS RIVER	30
220	258 W 3RD ST, BROADWAY DIVERSION (WST)	S029	058	MISSOURI RIVER	7
222	* SANTA FE PUMP STATION (WST)	S029	000	MISSOURI RIVER	30
301	4631 WYANDOTTE ST	S079	260	BRUSH CREEK	7
307	6104 E 7TH ST	S035	119	BLUE RIVER	14
308	7800 E 12TH ST	S036	112	BLUE RIVER	14
309	206 LYDIA AVE	S027	077	MISSOURI RIVER	14
310	HWY 210 & WALKER RD (SSO)	N014	040	MISSOURI RIVER	30
311	4501 GARFIELD AVE	S080	487	BRUSH CREEK	30
312	6142 MISSION DR, MISSION HILLS KS (SSO)	KS07	150	BRUSH CREEK	30
313	6140 MISSION DR, MISSION HILLS KS (SSO)	KS07	121	BRUSH CREEK	30
314	4200 BRUSH CREEK BLVD	S081	141	BRUSH CREEK	30
315	207 LOU HOLLAND DR	N002	016	MISSOURI RIVER	14
316	4 N RICHARDS RD	N002	221	MISSOURI RIVER	14
317	70 N RICHARDS RD	N002	162	MISSOURI RIVER	14
318	5600 ELMWOOD	S097	250	BLUE RIVER	30
320	2715 E SWOPE PKWY	S081	521	BRUSH CREEK	30
321	4400 E 12TH ST	S034	580	BLUE RIVER	30
322	1209 W 50TH ST	S078	180	BRUSH CREEK	7
323	6120 MISSION DR, MISSION HILLS KS (SSO)	KS27	172	BRUSH CREEK	30
324	1233 W 67TH ST (SSO)	S125	203	BRUSH CREEK	30
325	79TH AND BROOKSIDE RD	S127	TBA	BLUE RIVER	30
326	81ST TER AND BROOKSIDE RD	S127	TBA	BLUE RIVER	30
327	W 83RD ST AND BROOKSIDE RD	S148	TBA	BLUE RIVER	30
COUNT:	183				

Table 10: Critical Structures Inventory – Kansas City, MO



## ATTACHMENT D: CERTIFICATE OF ACHIEVEMENT OF FULL OPERATION FOR PROJECTS

To conserve resources, electronic copies of the Certificate of Achievement of Full Operation for the following OCP projects achieving this milestone in 2019 are included are enclosed:

- I/I Reduction: Blue River South Project 4 & 5 (Phase 1)
- Sewer Separation: Outfalls 066 & 067



KCMO.GOV/SMARTSEWER



KCMO.GOV/SMARTSEWER