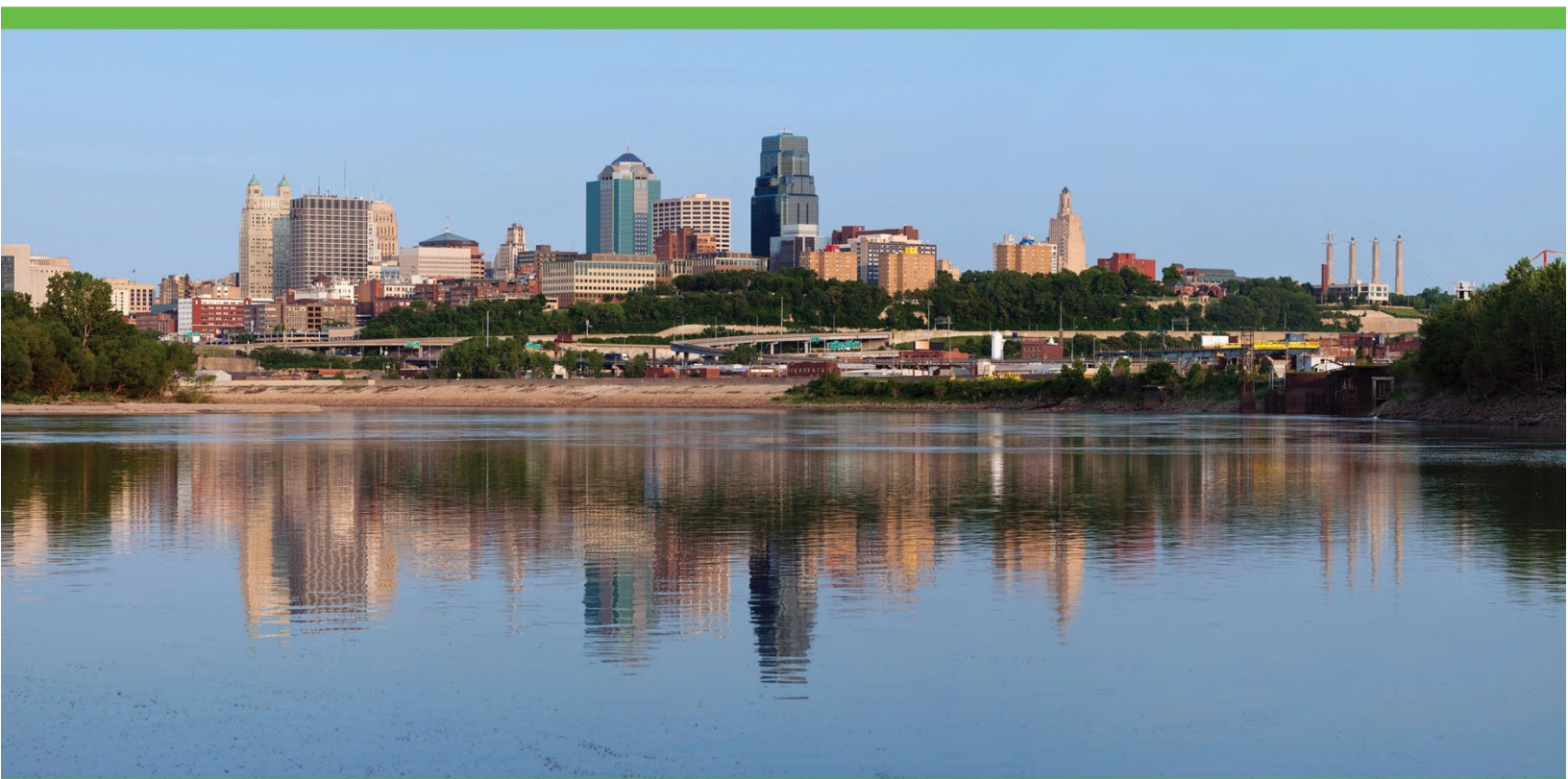


ANNUAL REPORT

KANSAS CITY'S OVERFLOW CONTROL PROGRAM

REPORTING PERIOD: JANUARY 1, 2021 TO DECEMBER 31, 2021





smartsewer

INNOVATION & INFRASTRUCTURE TO LAST A LIFETIME

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March 1, 2022

To All,

Please find enclosed the eleventh annual report related to Kansas City's Overflow Control Program (OCP). This report covers the annual reporting period from January 1, 2021, through December 31, 2021. Pursuant to the Consent Decree, this report has a required submittal date of no later than March 31, 2022. Included with this report are electronic files containing inspection records of critical structures performed in accordance with the City's CMOM and NMC programs, and certificates of APO for OCP projects completed in 2021 referenced in Attachments D and E, respectively.

Additionally, as required by the Consent Decree, enclosed are electronic files of Discharge Monitoring Reports and other reports submitted by the City under its current NPDES permits.

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,

Wes Minder
Director of KC Water

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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 Non-Material Consent Decree Modification was agreed upon by the parties and filed with the court on February 12, 2020. The Third Amended Consent Decree was entered into the United States District Court for the Western District of Missouri Western Division on March 3, 2021. This Annual Report is submitted in accordance with Section IX.A of the amended Consent Decree and reflects the status of program implementation that occurred between January 1, 2021, and December 31, 2021.

II. KANSAS CITY'S SEWER OVERFLOW CONTROL PROGRAM

Individual elements of the City's Overflow Control Plan approved by the Missouri Department of Natural Resources by letter dated April 14, 2010, 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, and management, operation, 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 Kansas City Water Services Department (KC Water) at each treatment facility.

The City and its regulatory partners have agreed to meet the objectives of the Consent Decree over a 30-year period from 2010 through 2040 as indicated in the Third Amended Consent Decree (hereafter referred to as Consent Decree). The Overflow Control Plan (OCP) defined in the Consent Decree involves a list of improvements that are structured to capture and treat at least 85 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 south of the Missouri River and a two year, 24-hour rainfall event north of the Missouri River. Kansas City's Smart Sewer Program implements the OCP to achieve compliance with the City's federal Consent Decree.

The Consent Decree components include:

- Control measures targeted at reducing the occurrence of Combined Sewer Overflows (CSO)
- Separate Sewer Overflow (SSO) Control Measures
- Rehabilitation of sewers based on asset management principles to reduce the business risk exposure of the City's utility
- 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

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 2736 miles of pipe. The combined sewer system consists of 1010 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 1726 miles of Kansas City's sewer system is comprised of separate sewers. A separate sanitary sewer system is only intended to collect and convey wastewater. However, rainwater can enter the sanitary system through inflow and infiltration (I/I). Sources of I/I may include but are not limited to, 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 into local streams and rivers. Kansas City has one constructed sanitary sewer overflow (SSO) in the Line Creek Basin, the Hillside interceptor, which will be included in the plans to reduce overflows to meet the two year level of service as part of the Overflow Control Plan. 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.

IV. 2021 PROGRAMMATIC HIGHLIGHTS

With the second program decade now underway and increased public investments on the horizon, the City's Smart Sewer Program remains firmly committed to fulfilling best-practice outcomes while addressing the City's Consent Decree mandates on behalf of the City of Kansas City's residents and businesses. The Third Amended Consent Decree, finalized on March 3, 2021, provided an opportunity to focus the Smart Sewer Program's purpose and to establish a strategic framework, titled Vision 2035, for driving the program through the next decade and beyond. Implementing Vision 2035 requires investing in practices and processes that support achieving the Consent Decree's overarching purpose of improving public health and environmental protections.

A. THIRD AMENDED CONSENT DECREE AND VISION 2035

The Vision 2035 strategic framework outlines connected strategic actions that the Smart Sewer Program will execute in order to achieve the Third Amended Consent Decree requirements. With Vision 2035 strategic framework execution, Kansas City's Smart Sewer Program will realize 77% wet weather flow capture and be well on its way to achieving performance target of 85% capture by 2040 through:

- Enhancing adaptive management practices with cost-effective integration of 480 green acres;
- Embracing technological innovations and trends;
- Adjusting rate-payers' investments for best return to realize futuristic sewer system management using advanced intelligent data-driven decision support platforms; and
- Realizing increased levels of protection of public health and the environment.

In summary, Vision 2035 strategic framework enables the City the following:



B. ADAPTIVE MANAGEMENT PROVIDES FLEXIBILITY AND MAXIMIZES PROJECT VALUE

One key aspect of the Third Amended Consent Decree is enhanced adaptive management allowing the City an opportunity to request revised or alternative control measures in lieu of the control measures defined in the Consent Decree to optimize achievement of defined performance criteria. Proposed alternatives and revisions that meet established criteria approved by the EPA will be handled as “non-material” Consent Decree modifications. Prior to the Third Amended Consent Decree, Kansas City was required to execute the specific projects listed in the Consent Decree, even if the specific project type or control measure was more expensive than potential alternatives.

The enhanced adaptive management approach will allow KC Water to apply best-practices and technical advancements for evaluating project options and optimize the control measures to meet certain performance milestones for the various projects listed in the Consent Decree. This approach allows integration of green infrastructure for stormwater management in effectively reducing wet weather overflows in the combined sewer system, in lieu of and in addition to structural controls. This approach helps make cost-effective and efficient decisions using improved technologies and innovative practices such as Gauge-Adjusted Radar Rainfall applications; smart sewer flow sensor networks; enhanced hydraulic modeling tools; advanced data analytics; continued evolution of intelligent and data-driven sewer system operations, maintenance, and optimized capital improvements.

C. GREEN INFRASTRUCTURE PROJECT PLAN (GIPP) SHOWS KC’S PATH FORWARD ON IMPLEMENTING GREEN INFRASTRUCTURE

As a requirement of the Third Amended Consent Decree, the Green Infrastructure Project Plan (GIPP) for Green Infrastructure Project No. 1 with 80 green acres was submitted on November 30, 2021 to the EPA. This plan included project-specific performance levels expected to be achieved with the implementation of green infrastructure facilities at multiple locations; a detailed description of the activities and work to be performed as part of the project location; and a description of the post-construction monitoring and modeling to be performed.

The project selection process for integrating green infrastructure considered multiple factors, including effectiveness in reducing wet weather flows into the CSS, performance and cost, and synergies when partnering with other public works by multiple City departments for implementation. When taken together, the seven project locations presented in the plan comprise Green Infrastructure Project 1 which is required to be fully operational by December 31, 2026. Green infrastructure projects proposed in the plan go above and beyond what is required in the Consent Decree by exceeding 80 green acres and instead targeting approximately 130 green acres, or an acre of impervious area that drains to a green infrastructure site. For each identified green infrastructure project, KC Water evaluated application of Envision™ sustainable principles. Any green acreage implementation exceeding the required 80 green acres will be carried forward and applied to the 160 green acres required by the Consent Decree under Green Infrastructure Project 2 by 2030.

D. ANNUAL SEWER REHABILITATION

Another significant benefit of the Third Amended Consent Decree was to acknowledge the City's ongoing commitment to maintaining and rehabilitating existing sewer assets. The City executes an Annual Sewer Rehabilitation (ASR) Program based on the application of asset management principles utilizing a risk-based approach. This helps reduce KC Water's business risk exposure by prioritizing the inspection and rehabilitation of sewers and manholes with a higher likelihood and consequence of failure. KC Water uses an asset management model to assess risk and a decision support tool to prioritize the repair of sewer structural defects which improves the performance and reliability of its sewer system. Rehabilitation of these assets reduces the amount of rainwater entering the sanitary sewer system and contributing to overflows, while also eliminating hydraulic restrictions caused by sewer structural defects. Ultimately, the investment in the rehabilitation of existing assets allows the City to maximize the life of its assets in a cost-effective way while also mitigating its highest overall risk.

The ASR Program is divided into four subprograms, based on asset classes, allowing execution to vary based on the uniqueness of each asset class:

- Small Diameter Gravity Sewers
- Large Diameter Gravity Sewers
- Force Mains
- Waterway Crossings

i. SMALL DIAMETER GRAVITY SEWERS

Small Diameter Gravity Sewers are sanitary and combined sewers less than 48 inches in diameter that do not operate under pressure during normal flow conditions. The City has a long-standing practice of cleaning, inspecting and rehabilitating their small diameter gravity sewers. In 2021 the City refocused that effort by revising their business risk exposure model, which is used to prioritize the inspection and repair of those assets. The City enhanced the decision support tool by adding a rehabilitation recommendations component, which is customized logic to provide preliminary rehabilitation recommendations based on sewer inspection records. Together the business risk exposure scoring and preliminary rehabilitation recommendations allows the City to better allocate their resources to inspect and rehabilitate their highest risk small diameter sewer assets.

ii. LARGE DIAMETER GRAVITY SEWERS

Large Diameter Gravity Sewers are sanitary and combined sewers greater than or equal to 48 inches in diameter that do not operate under pressure during normal flow conditions. Historically, the City has not focused preventative maintenance and rehabilitation efforts on these assets, as they make up less than 10% of their sewer system by length. However, in recent years the City has observed failures of some large diameter sewer assets and took a vested interest in gathering more condition assessment data. In addition, the City is undergoing an effort to update mapping of these assets, with a plan to perform system characterization and inspection of all large diameter gravity sewers by end of 2024. In 2021 the City launched a large diameter pilot inspection program, which utilized various inspection technologies including traditional closed-circuit television (CCTV), SONAR, LiDAR/LASER, and manned-entry sewer walks to inspect their large diameter assets. KC Water advertised and selected firms to perform large diameter pipeline inspections and contracted with a design professional to review the inspection data and provide rehabilitation recommendations.

iii. FORCE MAINS

Force Mains are sanitary and combined pressurized sewers. Due to their pressurized condition, force mains are difficult and expensive to inspect. However, in 2021 the City developed an assessment plan for their force main assets with a goal to complete assessments by the end of 2025. The plan was set in motion with the performance of pump station drawdown testing, air relief valve locates, and mapping updates. This information will be utilized by the program to characterize and prioritize force main assets for assessment. The City advertised for a design professional to perform assessments on selected force main assets and provide repair or replacement recommendations.

iv. WATERWAY CROSSINGS

In 2021, the City committed to developing a plan to integrate existing inspection and repair work on sewer mains within waterways into the ASR Program for 2022. Through this integration, it is anticipated that sewers within waterways will be inspected and rehabilitated utilizing a risk-based approach.

E. KEEP OUT THE RAIN (KOTR) SOFT RESTART

The City's Keep Out the Rain Program (KOTR) designed to reduce private inflow to sanitary sewers faced a new set of challenges due to the global COVID-19 pandemic and the economic shutdown endured by the City and our communities. This is a voluntary program offered by the City to private property owners to evaluate their properties for potential illicit rainwater sources connected to the sanitary sewer system and to perform cost-effective disconnections to comply with City code resulting in reduced levels of wet weather flows.

As a result of the pandemic, the KOTR Program was suspended in March 2020 and remained on hold through November 2021 at which time a "soft" restart of the program was initiated to help address these challenges and allow time for the public to get re-acquainted with the program. The KOTR Program is implementing both a near-term and long-term approach as part of this soft restart. The near-term approach will extend into the spring of 2022 and address the backlog of building plumbing evaluations and disconnection of illicit sources previously identified along with the assessment of all remaining private property parcels within project areas throughout the City's sanitary sewer systems. The program's long-term approach will adapt enhanced data driven approaches for achieving and maintaining the level of service requirements for the City's sanitary sewer systems identified in the Third Amended Consent Decree.

F. CONTINUED INTEGRATION OF TECHNOLOGY ADVANCEMENTS

KC Water's innovative, data-driven, and adaptive approach to meeting the requirements of the Consent Decree is centered on making continuous improvements in integrating technology advancements including the following:

i. GAUGE ADJUSTED RADAR RAINFALL (GARR)

GARR is used for increasing rainfall spatial and temporal accuracy to support program planning and implementation activities. These activities include updating the system-wide hydraulic model to support enhanced adaptive management to optimize overflow control measures; post-construction monitoring to assess program performance toward achieving consent decree interim performance milestones; minimum control measures; and Capacity, Management, and Operation and Maintenance activities.

ii. HYDRAULIC MODEL ENHANCEMENTS

An enhanced integrated hydraulic model is central to the Vision 2035. The City initiated development and implementation of a Hydraulic Model Update Plan within the context of continuous digital transformation of the wastewater utility as a strategic action. The City has made advancements in both hydraulic modeling and flow data collection during the reporting period.

The hydraulic models for the Town Fork Creek and Brush Creek basins were updated in this reporting period. The updated Town Fork Creek model was used for evaluation of green infrastructure and structural control solutions for combined sewer overflows in the vicinity of the Daniel Morgan Boone Park to support design of Green Infrastructure Project No. 2 which is required to be constructed by the end of 2030.

iii. SMART SEWER SENSOR NETWORK

The City's Smart Sewer Sensor Network was improved with adjustments to the sensor locations to support various use cases, including operations, maintenance, hydraulics modeling, and other Consent Decree data needs. Continuous improvements of the Smart Sewer Network are planned for the next reporting period.

The above example technology adaptations will support the continuous digital transformation of wastewater system management for sustained capital project optimization, operational efficiency, and in-time maintenance activities.

G. COVID-19 IMPACTS PERSIST

The COVID pandemic and the resulting disruptions to the economy, workforce, and supply chains are unprecedented in our history. The pandemic undoubtedly affected day-to-day operations of the City's Consent Decree activities. The City's ability to complete projects in a timely fashion has been undermined by supply chain disruptions, workforce/labor shortages, and significant inflation that is increasing project duration and driving up the cost of projects. In particular, supply chain disruptions have had an impact on the program's ongoing activities that are dependent on equipment, materials, and other supplies through delivery suspensions or delays. The City is seeing fewer bidders on projects as they become more selective as construction activity increases with the improving economy.

Even before the pandemic, KC Water faced challenges in recruiting, training, and retaining employees to oversee projects; however, these challenges are being severely exacerbated by the pandemic. KC Water is struggling to fill vacancies caused by retiring workers, including an early retirement incentive program implemented by the City throughout 2021. Recruiting younger workers is an uphill battle with many looking to maintain the remote/flexible working arrangements they have had since the onset of the lockdown. Workforce retention is also being impacted by vaccination mandates and requirements.

The contractors and vendors on which our program relies are being similarly impacted. For contractors, there is not enough qualified labor to keep pace with demand resulting in fewer contractors bidding Consent Decree projects. Demand for Contractors is expected to increase with the influx of funds from the federal infrastructure bill. Consequently, the City expects it will not be able to accomplish as much Consent Decree action such as sewer system improvements/repair/replacement and operation and maintenance until these workforce shortages and inflationary pressures are reduced.

In response to the financial impact of the pandemic on utility resources, construction start dates for several inflow and infiltration reduction projects were deferred; investments in the Annual Sewer

Rehabilitation Program were reduced; the Keep Out the Rain Program was suspended; and the budgetary prices for future Consent Decree projects were increased. In addition, the City dealt with the unfortunate consequences of one of its most regularly used construction contractors working on four Consent Decree projects abruptly going out of business due to COVID-19 related impacts. Working through the Contractor's surety, KC Water determined the appropriate course of action on each project to have the work completed by other construction contractors. Project warranty issues and concerns expressed by the public for each affected project also had to be addressed. The change in construction contractor availability delayed the completion of these projects and subsequent follow-up work during the 3-year correction period.

For all these reasons, utilities across the country, including KC Water, expect to struggle in the coming years to deliver projects on time. As an extension to the letter sent from Kansas City on March 25, 2020, KC Water will further address related impacts in a letter forthcoming in early 2022.

V. 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, 2021, through December 31, 2021. 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 milestones have been met in accordance with the Consent Decree and its subsequent modifications, including the Third Amended Consent Decree. 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.A. Requirements for NMC and CMOM were met for the reporting period.

A. APPENDIX A – PERFORMANCE MEASURES

Northeast Industrial District Basin

- In-Line Storage: Gooseneck Arch Sewer Gate & Pump Station
 - Consent Decree Required Achievement of Full Operation Date: December 31, 2021
 - Actual Achievement of Full Operation Date: September 2020

Lower Blue River Basin

- Neighborhood Sewer Rehabilitation: Lower Blue River North
 - Consent Decree Required Achievement of Full Operation Date: December 31, 2021
 - Actual Achievement of Full Operation Date: December 2020
- Neighborhood Sewer Rehabilitation: Lower Blue River South
 - Consent Decree Required Achievement of Full Operation Date: December 31, 2021
 - Actual Achievement of Full Operation Date: January 2021

Little Blue River Watershed

- I/I Reduction: Area 1
 - Consent Decree Required Achievement of Full Operation Date: December 31, 2023
 - Actual Achievement of Full Operation Date: November 2021
- I/I Reduction: Area 2
 - Consent Decree Required Achievement of Full Operation Date: December 31, 2023
 - Actual Achievement of Full Operation Date: July 2021

Middle Blue River Basin

- Diversion Structure 068 Storage Basin
 - Consent Decree Required Achievement of Full Operation Date: December 31, 2021
 - Actual Achievement of Full Operation Date: July 2021

Turkey Creek/Central Industrial District Basin

- Neighborhood Sewer Rehabilitation
 - Consent Decree Required Achievement of Full Operation Date: December 31, 2021
 - Area 1 Actual Achievement of Full Operation Date: February 2021
 - Area 2 Actual Achievement of Full Operation Date: April 2021

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 and as supplemented by post-construction flow monitoring plans submitted by City. Post-Construction Flow Monitoring Plans were submitted for the Middle Blue River Basin and NEID Basin on December 21, 2018, and December 23, 2020, respectively. Additionally, the City submitted post-construction flow monitoring plans for the following major facilities: Turkey Creek Pump Station, In-Line Gates at Santa Fe Pump Station, Gooseneck Arch Sewer Gate and Pump Station, OK Creek Sewer In-Line Storage, Westside WWTP, and Diversion Structure 068 Storage Basin.

The City implemented its Long-Term Flow Monitoring Program for the combined sewer 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 2021. Outfalls listed as "commenced" had post-construction related flow meters installed in the 2021 calendar year.

- Outfall BR059 (continued)
- Outfall BR069 (continued)
- Outfall BR063 (continued)
- Outfall BR064 (continued)
- Outfall W003 (continued)
- Outfall BR056 (continued)
- Outfall BR067 (Continued)
- Outfall BR072 (Commenced)
- Outfall BR073 (Commenced)
- Outfall BR074 (Commenced)
- Outfall BR075 (Commenced)
- Outfall BR077 (Commenced)

VI. PROGRAM CONTROLS AND DATA MANAGEMENT

Managing the large amount of data generated by the Overflow Control Plan is a primary focus of the City. During the reporting period, a Program Management Portal (PMP) or “dashboard” was created to more effectively communicate the overall status of the program, including financial, schedule, potential risk, and change management. Monthly hardcopy reports were eliminated and replaced with a dynamic and live interface that gives program leadership timely, critical information at their fingertips to assist in the decision-making for the Consent Decree project delivery through the City’s Smart Sewer Program. Major improvements were also made in the reporting from KC Water’s financial system, Peoplesoft. Once-a-month manual financial updates have been replaced with daily automated updates, as well as the ability to track contractual history with change orders and amendments. Enhancements were made in the reporting of schedule data from Primavera P6. The manual, monthly schedule reports have been replaced with a live direct link to the program dashboard. Program risk and change management are also being reported on the program dashboard so that critical items can be identified, highlighted, and addressed in a timely manner.

During the reporting period, the City continued to utilize Primavera P6 scheduling tools for schedule management. This software enabled project managers 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 potential risks.

The accumulation of data related to sewer system network characterizations, manhole inspections, sewer cleaning, and CCTV work throughout the City continued during the reporting period. KC Water 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 Consent Decree projects.

Updating the quality of the City’s GIS data related to Consent Decree projects also continued during the reporting period. As CCTV information or other Consent Decree project data 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.

The City’s Smart Sewer Program uses two web-based document control systems as it transitions from the use of Aconex to e-Builder software platforms. These platform tools are utilized to track all facets of project delivery associated with construction, including shop drawing and data 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 Consent Decree projects.

The Smart Sewer Program maintained a data system integration plan, that provides an inventory of systems used and how those system interface to meet the needs of program stakeholders. The data system integration plan provides a baseline for the systems that are used today and helps to identify opportunities for data integration in the future.

In an effort to ensure a high quality of data being stored in the systems of record, the City implemented data health checks with KC Water project managers. The purpose of these meetings is to confirm that all data related deliverables submitted during a project are complete, in the correct format, and stored in the proper location. This additional quality check on incoming data ensures accurate records and promotes informed, data-driven decision making. Key areas of focus include timely updates of field work, completion and compliance checks on inspection deliverables, accurate project record drawings, and detailed project location information.

VII. PUBLIC OUTREACH

In 2021, Public meetings and program staff meetings went virtual and hybrid, social distancing practices and public health guidelines were emphasized as KC Water and program team members worked to prevent exposure to and spread of COVID-19. The Smart Sewer Program continues to incorporate public outreach best practices learned during this on-going COVID-19 era to maintain and improve service to the City's ratepayers. Below is a summary of public outreach activities for the City's Smart Sewer Program completed during the reporting period. Additional information regarding these activities is in the discussion of NMC 7, which begins on page 33 in this report.

- Conducted 7 public meetings attended by 39 citizens about overflow control plan related projects, City-wide. Of the 7 public meetings, 5 were virtual meetings and 2 of the public meetings were "hybrid," which meant they were held in-person with a virtual option to promote accessibility and convenience. Additionally, public meeting recordings posted to YouTube received 160 total views.
- Published program and project-related information on KC Water's program-specific website at www.kcsmartsewer.us; through the City of Kansas City, Missouri newsletter and social media channels; and in neighborhood association newsletters.
- 5 stories related to various aspects of the City's Overflow Control Plan (television, radio and print) generating more than 1.1 million impressions.
- On-going public engagement about Consent Decree projects and initiatives with residents via Nextdoor, Twitter, Instagram, and Facebook media channels.

VIII. IMPLEMENTATION OF OVERFLOW CONTROL MEASURES

A. POST-CONSTRUCTION MONITORING PROGRAM

Post-construction monitoring activities completed in 2021, as defined in Appendix D of the Consent Decree, are summarized in this report beginning on page 65.

B. GREEN INFRASTRUCTURE

Over the last year, the City's Green Infrastructure Program has included efforts towards planning, analysis and design for future green infrastructure sites, operations and maintenance of existing sites, pre- and post-construction monitoring of performance, corrective actions when performance issues are identified, and proactive measures to avoid future challenges with green infrastructure design and construction.

i. GREEN INFRASTRUCTURE PROJECT 1 UPDATE

Current green infrastructure implementation efforts align with the projects presented in the GIPP. Green Infrastructure Project 1 represents a combination of projects planned for implementation by KC Water by December 31, 2026, other city department capital projects within the combined sewer system, and other project partners willing to implement green infrastructure on their improvement sites. Integration of green infrastructure targets both projects that provide benefit of reducing stormwater volume through retention and/or detention to result in CSO volume reduction, and those that provide stormwater treatment benefit for the first flush prior to release to a receiving stream. The GIPP proposed the green infrastructure projects listed in Table 1 to exceed the 80 green acres required in the Consent Decree for Green Infrastructure Project 1.

Table 1: Green Infrastructure Project 1

Project	Green Acres (acres)	Status	Proposed Construction
Mill Creek Park	39	In Design (<30%)	2022- 2023
Paseo Gateway/KCU	18	In Design	2023-2024
75 th and Wornall	8	In Design (90%)	2023-2024
Streetcar Extension	10	In Design (90%)	2022-2024
Blenheim Park (TFC Baseline Improvements)	3	In Design (Bid Recommendation)	2022
40 th and Monroe	41	In Design (90%)	2022-2024
Outfall 054	12	In Design (90%)	2022-2023
Total	131	Green Acres	

Several of these projects involve implementation partners, phased design components, and different levels of stakeholder involvement. These projects represent the next phase of green infrastructure implementation for the City based on lessons learned from previous green infrastructure projects.

1. Mill Creek Park. This is a KC Water led project, collaborating with KC Parks and Recreation Department to build green infrastructure in the northern areas of Mill Creek Park in the Brush Creek basin. Stormwater runoff collected from approximately 39 green acres of drainage area within the combined sewer system will be managed by the project to reduce the CSO impacts. Stormwater collection system design that will route stormwater runoff to the green infrastructure facility is currently in construction. A design professional was selected this year and design of the green infrastructure facility within Mill Creek Park is underway.
2. The Paseo Gateway/ Kansas City University (KCU). This project is located at the intersection of The Paseo and Independence Avenue. This is a KC Parks and Recreation Department led project that will separate stormwater from approximately 18 green acres of drainage area and be managed using green infrastructure. Construction of the stormwater collection system for the green infrastructure facility is underway, with design of the facility anticipated for completion Spring of 2022.
3. 75th and Wornall. This is a Public Works Department led project that is incorporating green infrastructure into intersection and parking lot improvements to manage stormwater runoff from approximately 8 green acres of drainage area. The types of green infrastructure proposed include tree planters, pervious pavers, and underground storage. This project is located in the Town Fork Creek basin and is anticipated to complete design in 2022.
4. Streetcar Extension. In January 2021 federal funding was secured to extend the KC Streetcar 3.6 miles south on Main Street, connecting the downtown started line to Midtown, Westport, the Art Museum District, the Plaza, and UMKC. The project is a partnership between the City of Kansas City, Missouri, the Kansas City Area Transportation Authority and the Kansas City Streetcar Authority. Green infrastructure has been incorporated into available space within the

right of way along the Main Street route to capture and remove stormwater from the combined sewer system with bioretention, permeable pavers, and underground storage practices. The green infrastructure design is nearing completion, and construction is expected to begin in early 2022.

5. Blenheim Park (Town Fork Creek (TFC) Baseline Improvements). This KC Water project evaluated improvements to combined sewer diversion structures to reduce CSOs within the Town Fork Creek Basin. Bioretention green infrastructure improvements were integrated into Blenheim Park within the project area to capture and manage stormwater prior to reaching the combined sewer system. Construction bids were received in December 2021, with construction being anticipated in 2022.
6. 40th and Monroe. This is a stormwater collection system project led by KC Water that has incorporated green infrastructure. Vegetated pretreatment, underground storage, permeable pavers, and bioretention green infrastructure is proposed to provide stormwater treatment and water quality benefit for the separated stormwater. Design is anticipated to be complete Spring 2022.
7. Outfall 054. This KC Water stormwater collection system project utilizes green infrastructure in available open space to improve the neighborhood and provide higher stormwater quality benefit. Types of green infrastructure are proposed to include bioretention, permeable pavers, underground storage, and extended dry detention. Design is anticipated to be complete Spring 2022.

ii. GREEN INFRASTRUCTURE PROJECT 2

Per the Consent Decree, Green Infrastructure Project 2 requires that 160 green acres be constructed by December 31, 2030. The 63rd and Daniel Morgan Boone Park project is proposed to meet and potentially exceed this requirement with the potential to collect stormwater from up to 436 green acres. The City completed a conceptual engineering report presenting several green infrastructure improvements evaluated for the project. This project will require a collaborative effort between KC Water, KC Parks, Public Works, private developer(s), and the community surrounding the project area. KC Water has received proposals for an RFQ/P solicitation issued in November 2021 to complete preliminary design including public engagement, Envision sustainability screening per the KC Water Sustainability Playbook, design alternatives analysis, and 30% design plans. Design professional selection and project kickoff is anticipated in 2022.

iii. COMPLETED GREEN INFRASTRUCTURE STORAGE VOLUMES

The following table summarizes the green infrastructure projects completed to date and the associated storage volume that is provided with each.

Table 2: Completed Green Infrastructure Project Storage Volumes

CSS Basin	Project Name	Design Storage Volume (gallons)
CID	West Bottom Flats P3	125,337
	CID	1,000,000
Lower Blue River	East High School	261,155
	Avenues of Life	84,347
	VA Hospital	420,911
Middle Blue River	Pilot Project	360,000
	Target Green East	1,004,557
	Target Green West	1,052,500
	Diversion 099 (Wabash)	59,451
	Outfall 066/067	189,736
NEID	Gardner Ave	1,626,227
	Chestnut Opti Retrofit	69,190
	NEID	848,578

iv. FUTURE GREEN INFRASTRUCTURE PLANS

In addition to the projects currently moving through the design and construction process, planning efforts are ongoing for green infrastructure implementation into the future. As part of the adaptive management approach, the City continues to identify future green infrastructure opportunities for reducing wet weather overflows in the combined sewer system. A challenge the City has faced with this process over the years is aligning city-wide green infrastructure opportunities with overflow reduction goals to maximize cost-effectiveness of solutions for both the community and the SSP. A strategic approach has been developed and implemented that identifies priority subwatersheds using the system model to target green infrastructure opportunity sites with the highest potential for overflow reduction. This process has been completed for the Brush Creek and Town Fork Creek watersheds and will continue in the remaining CSS watersheds moving forward.

Collaborative coordination for green infrastructure is being provided by the Stormwater Coordinating Committee comprised of the department directors from Water, Parks, Planning, Neighborhoods, Public Works, Aviation, and Office of Environmental Quality. This Committee is addressing five priority collaborative actions (CA) related to green infrastructure implementation. These include:

- CA-1. Updated stormwater standards within the combined sewer system (CSS) to address separate stormwater collection systems to green infrastructure.
- CA-2. Passing a green infrastructure ordinance for managing smaller, more frequent events on private property as part of development/redevelopment process.
- CA-3. Green infrastructure maintenance responsibility definition and funding.
- CA-4. Evaluation of green infrastructure projects and coordination throughout project stages.
- CA-5. Inspections of green infrastructure on private property.

The GISC met quarterly in 2021 and plans to continue regular meetings in 2022 to continue progress on the list collaborative actions listed above.

v. *GREEN INFRASTRUCTURE OPERATIONS & MAINTENANCE*

KC Water currently operates and maintains approximately 30 acres of green infrastructure footprint across the City. Currently the City utilizes one or a combination of different methods for maintenance of green infrastructure: contractor maintenance, the Green Solutions crew, the Green Stewards Program, or the on-call maintenance contract also known as the EV Contract. Work orders and maintenance records are tracked through an Infor Hansen asset management system for the Green Solutions crew, monthly hard copy reports from external contractors, or through the Survey123 application for the Green Stewards Program. The City is developing a live dashboard that tracks and displays maintenance activities completed by the Green Solutions crew. Contractor maintenance is required to maintain the green infrastructure facilities to meet service level of performance standards outlined in their standard Green Stormwater Infrastructure Establishment Period specification. This activity is tracked on a project-by-project basis in construction documentation forms. The following table summarizes the maintenance and inspection efforts completed in 2021 by the Green Solution Crew.

Table 3: Green Solutions Maintenance Work Order Summary

GI Maintenance Activity	Cost
Cleaning Concrete and Drainage Structures	\$87,543
Inspection of Green Solution Infrastructure Asset	\$23,413
Mowing, Pruning and Trimming	\$22,795
Spraying, Weeding and invasive Plant Removal	\$21,510
Trash and Debris Removal	\$12,152
Erosion Control	\$8,279
Watering	\$4,255
Monitoring and Inspection	\$2,199
Plant and Tree Installation	\$1,110
Total:	\$183,256

In addition to regular maintenance activities, the City is currently developing an Operations & Maintenance Program Development Plan. The purpose of this plan is to evaluate the current green infrastructure operations and maintenance approach and develop recommendations to guide further development of a Green Infrastructure Operation and Maintenance (O&M) Program. The primary objective is to consider options that would streamline operations, improve efficiency, improve tracking capabilities, and define an organization that could grow with the Green Infrastructure Program. A draft of this plan was developed in 2021 and is currently under review and is anticipated to be completed in 2022.

vi. GREEN INFRASTRUCTURE MONITORING

The City developed a 5-Year Performance Monitoring Plan. The plan defines five phases of green infrastructure monitoring including: planning phase, pre-design/design phase, construction phase, post-construction phase (5-years), and Long-Term operation and maintenance phase. Each phase defines the primary objective of monitoring to be completed during that time period, a responsible party for completing the monitoring activities, and the specific monitoring and testing requirements. Additionally, the phased recommendations were applied to existing green infrastructure sites to project planned testing needs through 2025.

This plan was followed to complete the Spring and Fall 2021 green infrastructure monitoring efforts for vegetated and non-vegetated green infrastructure. Monitoring completed this year is documented in the following draft reports anticipated for completion in 2022:

- 2021 Green Infrastructure Performance Monitoring: Permeable Pavement Infiltration Testing (Draft January 7, 2022)
- Spring 2021 Vegetated Green Infrastructure Performance Monitoring (Draft August 13, 2021)
- Fall 2021 Green Infrastructure Performance Monitoring: Vegetated Infiltration Testing (Draft January 28, 2022)

Additionally, pre-construction flow monitoring was completed for the Mill Creek Park green infrastructure project defined in the GIPP. Pre-construction monitoring results are anticipated to be used in the detailed design of the project in addition to long term assessment for the performance of major green infrastructure improvements in accordance with the Consent Decree.

vii. GREEN INFRASTRUCTURE CHALLENGES AND CORRECTIVE ACTIONS

Since its inception the Green Infrastructure Program has gained significant knowledge through years of design and implementation of green infrastructure projects. This institutional knowledge is helpful as the program expands and new challenges arise. Over the years, one continuous challenge is related to stakeholder expectations for green infrastructure performance to address flooding issues that are beyond the capacity the system is designed to control. One step the City has taken to addressing this challenge is to define stormwater collection system level of service for green infrastructure, to set a standard expectation moving forward. Additionally, in 2021 the City identified areas for improvement within the completed green infrastructure projects at Arleta Park and Rachel Morado. Erosion issues have occurred at specific locations within these sites due to higher stormwater flows entering the green infrastructure facilities than were intended. Major repairs were completed to address the erosion and prevent this issue in the future. The City is working on updates to the Kansas City, Missouri Green Stormwater Infrastructure Design Manual that will address issues like this during design and construction to avoid future corrective needs. Putting in place design standards like these that incorporate lessons learned from green infrastructure implementation in the past will set the City up for more success in the future.

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, and 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 KC Water 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.

IX. COMBINED SEWER OVERFLOW CONTROL MEASURES – APPENDIX A

The combined sewer system (CSS) makes up approximately 1010 miles of the City's sewer system running from the Missouri/Kansas state line on the west to the Blue River on the east, and from the Missouri River on the north to 85th Street on the south. The area served by the CSS is subdivided into six principal basins: Brush Creek, Lower Blue River, Middle Blue River, Northeast Industrial District, Town Fork Creek, and Turkey Creek/Central Industrial District.

Collection system field investigation activities for CSS projects were completed during the reporting period through the City's Smart Sewer Program Management contract and two city-wide sewer cleaning and closed-circuit television (CCTV) inspection contracts. The work consists of sewer system network characterization and manhole inspections, and sewer cleaning and CCTV inspection of sewers in the Lower Blue River, Middle Blue River, and Brush Creek basins.

The City's 30-year Overflow Control Plan is being implemented in three stages, each with a primary control strategy. The early years of the program included repairing/rehabilitating existing sewer systems to restore conveyance capacity and developing and evaluating green infrastructure pilot projects and I/I reduction efforts with a focus on source control of stormwater impacts. The middle years of the program focus on maximizing the capacity within the existing system with strategic use of in-line storage, sewer separation and construction of relief sewers, and analyzing the results of source volume reductions in combined and separate systems through expanded implementation of green infrastructure solutions and infiltration and inflow reduction projects, respectively. The later years of the program will address necessary improvements to the City's wastewater treatment plants and any additional or revised control measures which the City determines are necessary to achieve the Final Capture of Wet Weather flows by December 31, 2040. These additional or revised control measures will be identified by City in a Further Measures Plan submitted to EPA by December 31, 2032.

The status of the projects in the combined sewer system basins is summarized in Tables 4A and 4B. During the reporting period, the combined sewer system had twenty (20) active projects. Three (3) projects are recorded in Table 4A as Non-Consent Decree projects. Seventeen (17) projects are recorded in Table 4B as projects that were included in Appendix A of the Consent Decree.

Table 4A: Non-Consent Decree Projects in Combined Sewer System Basin
(through December 31, 2021)

Project Name	Description	Percent Complete through 12/31/2021 Planned Completion Date		
Combined Sewer System		Pre-Design	Design	Construction AFO
Bush Creek Basin				
Brookside I/I Reduction	This project is being implemented to reduce water in basement occurrences in a separate sewer system area located within the Brush Creek Basin.	<u>100%</u>	<u>5%</u> February 2024	September 2025
Northeast Industrial District Basin				
Green Infrastructure: The Paseo Gateway/ Kansas City University (Proposed by City in Green Infrastructure Project #1 GIPP)	This project is located at the intersection of The Paseo and Independence Avenue. This is a KC Parks and Recreation Department led project that will separate stormwater from approximately 18 green acres of drainage area and be managed using green infrastructure.	<u>100%</u>	<u>30%</u> September 2022	November 2024
Town Fork Creek Basin				
Green Infrastructure: 75 th and Wornall Road (Proposed by City in Green Infrastructure Project #1 GIPP)	This is a Public Works Department led project that is incorporating green infrastructure into intersection and parking lot improvements to manage stormwater runoff from approximately 8 green acres of drainage area. The types of green infrastructure proposed include tree planters, pervious pavers, and underground storage.	<u>100%</u>	<u>90%</u> June 2022	June 2024

Table 4B: Consent Decree Projects in Combined Sewer System Basin
(through December 31, 2021)

Project Name	Description	Percent Complete through 12/31/2021 Planned Completion Date			CD AFO Date
Combined Sewer System		Pre-Design	Design	Construction AFO	
Brush Creek Basin					
Green Infrastructure Project 1-1: Mill Creek Park	This project is being implemented in conjunction with the City's Streetcar Phase 2 Project and will reduce combined sewer overflow volume at Outfall 017 into Brush Creek. The project will separate sewers in the vicinity of 43rd Street and Main Street and direct separated stormwater flow to a green infrastructure facility in Mill Creek Park prior to being conveyed back in the CSS. (Proposed by City in Green Infrastructure Project #1 GIPP)	<u>100%</u>	<u>35%</u> <u>October 2022</u>	March 2024	12/31/2026*
Lower Blue River Basin					
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	<u>100%</u>	<u>100%</u>	North - <u>100%</u> December 2020 South - <u>100%</u> March 2021	North 12/31/2021 South 12/31/2021

Project Name	Description	Percent Complete through 12/31/2021 Planned Completion Date			CD AFO Date
Combined Sewer System		Pre-Design	Design	Construction AFO	
	manholes and sewer pipes 12-inches and smaller in diameter				
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>100%</u> April 2021	September 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>70%</u> August 2021	December 2023	12/31/2023
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>100%</u> July 2021	To Be Determined. Pending City submission of formal request for either a time extension or to implement an alternative control measure upon EPA approval.	12/31/2022
Relief Sewer: 45th 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>100%</u>	<u>100%</u> July 2021	October 2022	12/31/2023
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>85%</u> April 2021	October 2024	12/31/2024
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>100%</u> August 2020	<u>100%</u> March 2022	August 2023	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>100%</u> July 2020	<u>100%</u> July 2022	August 2023	12/31/2023
Middle Blue River Basin					
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>100%</u> June 2021	12/31/2021
I/I Reduction: Middle Blue River 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	<u>100%</u>	<u>100%</u> August 2021	July 2024	12/31/2026

Project Name	Description	Percent Complete through 12/31/2021 Planned Completion Date			CD AFO Date
Combined Sewer System		Pre-Design	Design	Construction AFO	
	project will also increase the level of service achieved by downstream interceptor sewers.				
<i>Northeast Industrial District Basin</i>					
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>100%</u> January 2021	12/31/2021
<i>Turkey Creek/Central Industrial District Basin</i>					
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>	Area 1 – <u>100%</u> January 2021 Area 2 – <u>100%</u> April 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>100%</u> July 2020	<u>40%</u> August 2022	12/31/2022
<i>Town Fork Creek Basin</i>					
Baseline Improvements Town Fork Creek	This project is being implemented to eliminate combined sewer overflows at 5 small outfalls in the Town Fork Creek Basin. A combination of sewer separation and green infrastructure will be constructed to eliminate overflows for the typical year at 7 diversion structures at various locations throughout the basin.	<u>100%</u>	<u>75%</u> January 2022	December 2022	12/31/2022
Green Infrastructure Project 2-1: 63 rd and Paseo/Daniel Morgan Boone Park	Sewer separation of between 160 to up to 858 acres of combined sewer area with potential downstream green infrastructure within the Town Fork Creek corridor and Daniel Morgan Boone Park.	<u>0%</u> July 2022	February 2024	November 2027	12/31/2030
<i>Westside WWTP</i>					
Westside Facility Plan (Formerly 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>90%</u> April 2022	12/31/2022

* GIPP Project

X. SEPARATE SEWER OVERFLOW CONTROL MEASURES – APPENDIX A

Kansas City's Separate Sanitary Sewer Systems (SSS) comprises nine basins covering 1726 miles of the City's sewer system. The four SSS basins north of the Missouri River are the Northern and Northwestern watersheds and the Line Creek/Rock Creek, Buckeye Creek, and Birmingham/Shoal Creek basins. The five SSS system basins south of the Missouri River are the Blue River Central, Blue River North, Blue River South, Little Blue River, and Round Grove basins.

Much of the early projects and program strategy in the separate sanitary sewer basins involve reducing the amount of I/I entering the SSS to reduce overflows from the sanitary sewer 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 wet weather storage and treatment will be utilized to address system needs as outlined in the City's Overflow Control Plan.

Collection system field investigation activities for the I/I reduction projects were completed during this reporting period through the City's Smart Sewer Program Management contract and two city-wide Sewer Cleaning and Closed-Circuit Television (CCTV) Inspection contracts. The work consists of sewer system network characterization and manhole inspections, and sewer cleaning and CCTV inspection of sanitary sewers in the Line Creek/Rock Creek, Blue River South, Birmingham, Northern, Northwestern, Round Grove, and Buckeye Creek basins.

The status of the projects in the SSS basins is summarized in Table 5. During the reporting period, the separate sewer system had fourteen (14) active projects. All projects were included in Appendix A of the Consent Decree.

In addition to the project list in Appendix A of the Consent Decree, the City is also evaluating and rehabilitating sewer defects at stream crossings and immediately adjacent to streams in an effort to identify excessive I/I sources attributed to sewer defects. The work is occurring under a multi-year, multi-phase design/build contract. The City evaluated and repaired forty (40) sites from 2017 - 2021 and is in the process of repairing an additional twelve (12) sites in 2022.

Table 5: Consent Decree Projects in Separate Sewer System Basin
(through December 31, 2021)

Project Name	Description	Percent Complete through 12/31/2021 Planned Completion Date			CD AFO Date
Separate Sanitary Sewer System		Pre-Design	Design	Construction AFO	
Blue River South Watersheds					
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.	Phase 1 - <u>100%</u> Phase 2 - <u>100%</u>	Phase 1 – <u>100%</u> Phase 2 – <u>100%</u>	Phase 1 – <u>100%</u> Phase 2 – <u>80%</u> February 2022	12/31/2023
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.	Phase 1 - <u>100%</u> Phase 2 - <u>100%</u>	Phase 1 – <u>100%</u> Phase 2 – <u>100%</u>	Phase 1 – <u>100%</u> Phase 2 – <u>90%</u> February 2022	12/31/2023

Project Name	Description	Percent Complete through 12/31/2021 Planned Completion Date			CD AFO Date
Separate Sanitary Sewer System		Pre-Design	Design	Construction AFO	
<i>Line Creek/Rock Creek Watersheds</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>100%</u>	<u>0%</u> August 2024	12/31/2029
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>100%</u>	<u>0%</u> August 2024	12/31/2029
I/I Reduction: North of the River	The project is tracked as part of the Line Creek/Rock Creek basin since the original OCP included Buckeye creek area within the LC/RC basin. This 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. The location of Phase 2 for this project will be confirmed based on I/I reduction optimization.	<u>100%</u>	Phase 1 – Buckeye – <u>100%</u> October 2021 North of River Phase 2 – <u>0%</u> July 2025	Phase 1 -Buckeye August 2026 North of River Phase 2 August 2027	Phase 1 – Buckeye 12/31/2027 North of River Phase 2 12/31/2029
<i>Round Grove Watershed</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>90%</u> February 2022	12/31/2022
Supplemental I/I Reduction: Round Grove Basin	This project is being implemented to reduce or eliminate the need for relief sewers upstream of the Round Grove Pump Station	<u>100%</u>	<u>100%</u> December 2021	September 2023	12/31/2023
<i>Little Blue River Watershed</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>100%</u> November 2021	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>100%</u> June 2021	12/31/2021
<i>Birmingham/Shoal Creek Watersheds</i>					
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>100%</u>	December 2024	12/31/2029

Project Name	Description	Percent Complete through 12/31/2021 Planned Completion Date			CD AFO Date
Separate Sanitary Sewer System		Pre-Design	Design	Construction AFO	
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>	<u>100%</u> December 2021	December 2024	12/31/2029
<i>Northern and Northwestern Watersheds</i>					
I/I Reduction Northwestern Watersheds 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>100%</u> July 2020	<u>100%</u> December 2021	November 2024	12/31/27
I/I Reduction Northern Watersheds 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>100%</u>	East – <u>100%</u> October 2021 West – <u>100%</u> September 2021	May 2023	12/31/23
<i>Citywide</i>					
Citywide Sewer within Waterways	In an effort to identify excessive I/I sources attributed to sewer defects, the City is evaluating and rehabilitating sewer defects at stream crossings and immediately adjacent to streams. The work is occurring under a multi-year, multi-phase design/build contract.	<u>N/A</u>	Original Contract – <u>100%</u> Renewal 1 – <u>100%</u> Renewal 2 – <u>0%</u> May 2022	Original Contract – <u>100%</u> Renewal 1 – <u>80%</u> April 2022 Renewal 2 – May 2023	12/31/2024

A. KOTR PRIVATE INFLOW REDUCTION PROGRAM

Keep Out the Rain is a voluntary program offered by the City to private property owners to evaluate their properties for potential illicit sanitary sewer system connections and to perform cost-effective disconnections to comply with City code and help eliminate sanitary sewer overflows in accordance with the Consent Decree. In 2021, the City continued to manage the KOTR Program on a limited basis since the program was temporarily suspended on March 17, 2020 due to the COVID-19 pandemic. A “soft” restart commenced on November 3, 2021 and is divided into four phases. The soft restart helps address the challenges from the pandemic and allows time for the public to get re-acquainted with the program. The first three phases will extend into the spring of 2022 and will address the building plumbing evaluations and disconnection of illicit sources previously identified along with the assessment of all remaining private property parcels within defined project areas. Phase 4 will be implemented on a long-term approach and will focus on achieving and maintaining the level of service (LOS) requirements for the City’s sanitary sewer systems that are identified in the third modification of the Federal Consent Decree.

The focus of the program is to disconnect illicit private inflow sources identified as cost-effective to remove the excessive private inflow from the sanitary sewer system. Approximately 70,000 properties are targeted for private inflow evaluation in the City’s SSS. Since the start of the City’s Private Inflow Reduction Program in 2016, through December of 2021, the City has performed a total of approximately 47,750 property evaluations.

During COVID-19 pandemic in this reporting period, the program team did not host any public outreach efforts or complete door-to-door outreach efforts. The hotline was managed to record the information from interested property owners and to address issues with completed disconnection repairs that fall within the warranty period.

Since commencement of the private inflow reduction program in 2016, approximately 60% of contacted property owners have granted interior and exterior building evaluations, while 34% of properties have had only an exterior building evaluation completed. Approximately 10% of all properties evaluated have been found to contain cost-effective private inflow sources and approximately 91% of property owners have voluntarily entered into agreements with the City to have disconnection work completed.

XI. SCHEDULED ACTIVITY FOR THE NEXT REPORTING PERIOD

The activities listed below are expected to occur during the next reporting period between January 1, 2022, and December 31, 2022. This list, however, should not be interpreted as an explanation of all activities that will occur in 2022. Certain Consent Decree 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 Consent Decree related projects are scheduled to be developed and advertised for selection of Design Professional services:
 - Relief Sewer: Dykes Branch Interceptor
 - ASR: Force Main Condition Assessment
 - Santa Fe Sanitary Sewer Rehabilitation
- Requests for bids will be advertised for selection of Construction Contractors for the following Consent Decree Projects:
 - Sewer Separation: 40th and Monroe
 - Sewer Separation: Outfall 054
 - Dry Weather Sewer Line: Outfall 055
 - Supplemental I/I Reduction Project: Round Grove Basin
 - Green Infrastructure Project 1-1: Mill Creek Park
 - Relief Sewer: Hardesty Ave and 31st Street
 - Santa Fe Sanitary Sewer Rehabilitation
 - I/I Reduction: Line Creek/Rock Creek Area 3 and Area 4
 - I/I Reduction: Birmingham Area 2
- KC Water will issue a Notice to Proceed to Design Professionals or Construction Contractors for the following Consent Decree project contracts:
 - Green Stewards Program (PST)
 - Green Infrastructure Project 2-1: 63rd and Paseo/Daniel Morgan Boone Park
 - Baseline Improvements: Town Fork Creek
 - Sewer Separation: 40th and Monroe
 - Sewer Separation: Outfall 054
 - Dry Weather Sewer Line: Outfall 055
 - Relief Sewer: Vineyard and Lawn Street
 - I/I Reduction: Northern Watersheds Area 2
 - Citywide Sewer Stabilization within Waterways
 - I/I Reduction: Line Creek/Rock Creek Area 3 and Area 4

- Work will continue on active Consent Decree projects shown in Tables 4A, 4B, and 5 that were not completed in 2021.
- Flow monitoring will continue in accordance with the CSS Metering Plan approved by USEPA in December 2016.
- Water Quality Monitoring will resume during the recreation season, pending conclusion of the COVID-19 pandemic and the City's recovery from its significant impacts.

XII. 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 6 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 6: NMC Accomplishments Summary (2021)

NMC	Description	Accomplishment
1	Proper Operation and Regular Maintenance Program	<ul style="list-style-type: none"> • Conducted routine maintenance procedures • Conducted routine inspection schedules • Carried out emergency response protocol and reported 47 dry weather overflows City-wide, 16 in the CSS • Inspected flow regulating structures • Conducted 52 miles of CCTV inspections in the CSS • Cleaned 136 miles of CSS interceptor and collection lines • Received and responded to 1485 3-1-1 Action Center calls about the City's wastewater collection system
2	Maximization of Storage in the Collection System	<ul style="list-style-type: none"> • No Modifications to Diversion Structures were made during the reporting period • Conducted 6,914 inspections of the CSS diversion structures • Construction was initiated, continued, or completed at Gooseneck Pump Station, Round Grove Pump Station, and the new Diversion Structure 068 (Trolley Trail Basin)
3	Review and Modification of Pretreatment Requirements	<ul style="list-style-type: none"> • Inspected 242 non-domestic FOG sources at Food Service Establishments • Assessed non-domestic CSO discharge impacts • Issued zero citations for standards violations and self-reporting violations
4	Maximization of Flow to the POTW for Treatment (Westside and/or Blue River)	<ul style="list-style-type: none"> • Continued implementation of an In-Line Storage and Conveyance Operational Analysis using real-time control to optimize existing system storage and capacity • Continued improvements at Westside WWTP to increase treatment capacity to 60 MGD
5	Elimination of CSOs during Dry Weather	<ul style="list-style-type: none"> • Conducted 300 sewer main point repairs in the CSS • Reported 16 dry weather overflows in the CSS • Reported 5 dry weather overflows from CSOs • Performed routine preventative cleaning of system
6	Control of Solids and Floatable Material in CSOs	<ul style="list-style-type: none"> • Repaired or replaced 241 catch basins City-wide • Inspected and cleaned 16,536 catch basins City-wide • Conducted street sweeping of 10,135 lane miles in the CSS

7	Pollution Prevention Programs to Reduce Contaminants in CSOs	<ul style="list-style-type: none"> • Carried out Oil and Grease Management Program • Conducted Solid Waste and Recycling activities • Conducted Household Hazardous Waste Program • Conducted Leaf and Brush Collection and Recycling Programs • Conducted Public Education and Outreach Programs • Made 16 presentations to more than 452 citizens and stakeholders • Conducted 5 public meetings City-wide with approximately 30 residents
8	Public Notification	<ul style="list-style-type: none"> • Provided CSO notification • Distributed 7 media advisories for sewer overflows • Conducted warning sign inspections
9	Monitoring to Characterize CSO Impacts and the Efficacy of CSO Controls	<ul style="list-style-type: none"> • Identified and mapped CSO structures and outfalls • Mapped the location of green infrastructure facilities constructed by SSP and WSD

A. NMC1 – PROPER OPERATION AND REGULAR MAINTENANCE PROGRAM

i. ORGANIZATION

Kansas City operates and maintains its wastewater systems through its KC Water Department. The Wastewater Inspections and Investigations, Utility Repair, and Wastewater Treatment Divisions are primarily responsible for the operation and maintenance (O&M) of the City's wastewater and stormwater collection systems.

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) and all other wastewater treatment and pump stations.

ii. RESOURCES

KC Water maintains personnel and capital resources for O&M activities throughout the wastewater system. Through the end of the reporting period, KC Water employed approximately 300 staff members in maintaining the stormwater and wastewater collection systems. KC Water also engages the services of contractors specializing in construction inspection and repair to supplement the inhouse workforce. In fiscal year 2021 (May 1, 2020, through April 30, 2021), the operating expenses for sewer operations were as follows:

- Wastewater Treatment and Pumping: \$38,011,768
- Sewer Maintenance: \$26,256,707
- Administration and General: \$36,223,300

iii. LIST OF CRITICAL FACILITIES

KC Water 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 D contains a list of critical facilities. Inspection intervals vary from 3 to 30 days, depending on the history of required cleaning. If inspections reveal the interval is not adequate, it is adjusted accordingly.

Attachment D on page 71 lists the identification number, location, map number, and receiving stream of the CSOs and inspection intervals.

iv. *CSO SEWER MAINTENANCE MANUAL*

KC Water Divisions adhere to requirements outlined in the CSO Operations and Maintenance Manual. 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*

KC Water uses a computerized maintenance management system (CMMS) to log maintenance activities. The system logs activities with work orders initiated from various sources, including 3-1-1 Action Center calls, Internal observations, scheduled maintenance and repairs, 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
- GIS Locations
- Labor level of Effort
- Total Costs
- Permitting

All activity is tracked and reviewed weekly and monthly by differing levels of management to ensure appropriate response and resources. Table 7 shows a summary of the maintenance activities performed in the combined sewer system during the reporting period.

Table 7: CSS Maintenance Activities (2021)

Activity in CSS	Quantity
Sewer-Main Stoppages Opened	16 work orders
Sewer-Main Point Repairs	300 work orders
Sewer-Manhole Repair/Resurfacing	114 work orders
Sewer-Water in the Basement	903 work orders
Sewer-Main CIPP/Total Replacement	18 miles
Sewer CCTV	52 miles
Sewer Cleaning	136 miles

vi. CLOSED CIRCUIT TELEVISION INSPECTION

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

In 2021, approximately 52 miles of CSS were televised. Documentation for sewer mileage CCTV inspected is stored in the CMMS and verified using inspection software.

vii. SEWER CLEANING

KC Water conducts sewer cleaning activities both inhouse and with outside contractors. KC Water maintains a fleet of sewer cleaning equipment including, jet trucks, vacuum and flushing trucks, rodding machines, easement machines, bucket machines, and street sweepers.

Local contractors are utilized for specialized cleaning services on large diameter sewers through contractual agreements. In 2021, approximately 136 miles of CSS were cleaned.

viii. OVERFLOW AND BYPASS RESPONSE

The Inspections and Investigations 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 electronically to MDNR in accordance with the City's plan and permits. In 2021, a total of 47 dry weather overflows were reported citywide, 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, 1,485 3-1-1 calls related to wastewater collection system problems were received and responded to.

Emergency contact numbers are also posted on 87 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. NMC2 – 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 3 to 30 days as shown on page 71 in Attachment D. During the reporting period, 6,914 inspections of the CSS diversion structures were performed.

ii. *DIVERSION STRUCTURE MODIFICATION*

No modifications to diversion structures were made during this reporting period.

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. KC Water staff members continually oversee and maintain green infrastructure improvements that are their responsibility. Dedicated Green Solutions maintenance staff provide routine green infrastructure maintenance services, including trimming, mulching, and weeding. Contracted Services as well as the Green Stewards workforce development program are also used to maintain a portion of the green infrastructure projects. KC Water's technical staff provide inspection and assist with coordinating maintenance activities.

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.

1. KC Water Capital Projects

In addition to the Consent Decree green infrastructure projects, KC Water has three (3) other green infrastructure projects currently in pre-design or design. These projects, listed in Table 8 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.

Table 8: KC Water Green Infrastructure Projects
Under Design and Construction (2021)

Property/Project Name	Phase	Description/Type
55 th /56 th and Brookside	Pre-Design	Local Flooding Solution, Temporary Storage Solution
Harrison Street	Pre-Design	Infiltration Swales, Bioretention
North Flagor Road	Design	Infiltration Facility

2. Other City-Wide Green Infrastructure Efforts

Outside of KC Water, implementation of green infrastructure projects occurs in three primary ways: through City capital project enhancements, required private installations, and voluntary private installations.

iv. *UPGRADE/ADJUST PUMP OPERATIONS AT SANITARY PUMP 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 generally in operation for usual and customary flow and according to the Wet Weather Operating Plan during wet weather events defined in NMC 4.

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 the 15th Street Pump Station and Sewer Separation project listed in the CSO Control Measures table located in Appendix A of the Consent Decree, following sewer separation, dry weather flows currently handled by the 15th street Pump Station will be diverted to the 12th Street Pump Station. The 15th Street Pump Station will be taken offline for future demolition and Diversion Structures 206 and 136 will be eliminated.

In 2021, various design and major construction was initiated, continued, or completed at pump stations, force mains, and pipelines including the Gooseneck Pump Station, Round Grove Pump Station, and the new Diversion Structure 068 (Trolley Trail Basin).

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 Repair and Inspections and Investigations 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.

C. NMC3 – 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:

- Industrial Pretreatment Program
- Surcharge Program for High-Strength Wastewaters
- Oil and Grease Management Program

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: no pretreatment requirements were modified in 2021

i. INDUSTRIAL PRETREATMENT PROGRAM

The Regulatory Compliance Division's administration of the Industrial 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 2021 Industrial

Pretreatment Program Annual Report is due to the MDNR by March 31 of 2022. 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 83 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.

KC Water’s 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 2021, there were 242 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 2021, no changes to the pretreatment program were made.

D. NMC4 – MAXIMIZATION OF FLOW TO THE PUBLICLY OWNED TREATMENT WORKS (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. Plant stress tests were also performed on both plants. 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 105 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 short durations.

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. 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, KC Water 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.

E. NMC5 – 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 D, on page 71 of this report, lists the inspection intervals completed for each diversion structure and flow splitter in the CSS.

ii. *DRY WEATHER OVERFLOW CORRECTIVE ACTION*

KC Water 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. KC Water 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 previous reporting mechanisms.

Wastewater Inspection and Investigation 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*

KC Water Divisions notify MDNR within 24 hours of discovery of a DWO. Follow-up written reports are completed within five days. 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 2021, 16 dry weather overflows in the CSS were reported to MDNR, five (5) of which were from combined sewer outfalls. No dry weather overflows occurred at pump stations during this reporting period.

F. NMC6 – CONTROL OF SOLIDS AND FLOATABLE MATERIAL IN CSOs

KC Water and other City departments employ various measures that minimize extraneous solids and floatables from entering the CSS.

i. STREET SWEEPING

KC Water sweeps streets on a routine schedule to reduce trash, silt, and other debris. During 2021, KC Water swept a total of 11,673 lane miles, including 10,135 lane miles in the combined sewer system area and 1,538 lane miles in the separate sewer system areas. The schedule for street sweeping runs from January 1 through December 31 each year. In that time, street sweeping is conducted twice annually on all streets with curbs within the CSS area and once annually within the SSS area.

ii. 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 2021, 16,536 catch basins were inspected and cleaned City-wide and 241 were repaired or replaced City-wide.

iii. CONSTRUCTION SITE EROSION CONTROL

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 2021, the Regulatory Compliance Division conducted monthly inspections for 20 active City construction sites that disturbed 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. NMC7 – 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:

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 PROGR

The Household Hazardous Waste (HHW) program is hosted by KC Water and consists of two subprograms: an HHW drop-off facility and HHW mobile collection events. In 2021, 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. The Swap Shop was discontinued in the Spring of 2020 due to COVID-19 pandemic concerns, but activities resumed in 2021. During the reporting period, 5490 pounds of material was recycled which provided an estimated \$3,302 in savings.

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.

In 2021, the program collected a total of 1,682,970 pounds (841 Tons) of HHW materials.

iii. LEAF AND BRUSH COLELCTION AND RECYCLING

The Leaf and Brush Recycling Program is a collaborative effort between KC Water and the City's Public Works Department. KC Water is responsible for the collection of curbside leaf and brush, and the Public Works Department runs the drop-off facilities. KC Water 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, 2,750 tons of leaf and brush material was collected and recycled.

iv. PUBLIC EDUCATION AND OUTREACH PROGRAMS

KC Water 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 Plan, are provided below.

1. Presentations, Conferences, and Tours

During the reporting period, 16 presentations and 12 tours were made to more than 452 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:

- Adult Water Lesson- Stirred to Action: February 14, 2021
- Engineering Advisory- Liberty High School: February 22, 2021
- Water Quality Small Grant Program- Community Members: March 12, 2021
- Water Quality Lesson Green Guard- Heartland Conservation Alliance: March 13, 2021
- Adult Presentation- Waldo Brookside Association: April 14, 2021
- Infrastructure Tour- East High School: April 17, 2021
- Green Infrastructure Tour- Green Guard: May 1, 2021
- Floating Wetlands Presentation Floating Wetland Project- SAGE: May 11, 2021
- Adult Presentation- Centurions: May 21, 2021
- Green Infrastructure Tour- Foxtown East Green Guard: June 12, 2021
- Wastewater Pump Station Tour- Green Works KC: June 16, 2021
- Green Infrastructure Tour- Operation Breakthrough: June 28, 2021
- Green Infrastructure Tour- Operation Breakthrough: June 29, 2021
- Journey of Stormwater BMP with PBL- NKC Summer Teacher Academy: July 16, 2021
- Programming 6-8- NKC Summer Teacher Academy: July 22, 2021
- Green Infrastructure Sites- Guadalupe Center High School: September 9, 2021
- Careers/KC to the Sea- Liberty High School Chemistry: September 28, 2021
- Client Connected Group Project- Guadalupe Center High School: September 28, 2021
- Take Action Project- Girl Scouts of NE Kansas and NW Missouri: October 16, 2021
- Drinking Water Plant- Rockhurst University: October 20, 2021
- Client Connected Group Project- Guadalupe Center High School: October 26, 2021
- Client Connected Group Project- Guadalupe Center High School: November 2, 2021
- Water Quality Education- Job Corps: November 4, 2021
- Green Infrastructure Tour- Girl Scouts: November 7, 2021
- Water Treatment Plant Tour- Northeast Middle School: November 19, 2021
- Green Infrastructure Tour- St. Teresa's Academy: December 2, 2021
- Wastewater Plant Tour- Water Equity: December 9, 2021
- Green Infrastructure Tour- Guadalupe Center High School: December 16, 2021

2. Public Meetings

Table 9 displays information about the public meetings held in 2021 in support of Consent Decree projects. A total of 5 public meetings were held for Consent Decree projects with approximately 30 residents in attendance. Due to local COVID-19 social distancing policies, in-person public meetings were paused in March of 2020. The public meetings listed below were held throughout the community, not just in the combined sewer system area.

Table 9: Consent Decree Project Public Meeting Information (2021)

Date	Project	Meeting Purpose	No. of Attendees
April 20, 2021	Baseline Improvements: Town Fork Creek Project	Project Update	1
April 27, 2021	Outfall 054 Sewer Separation Project	Project Update	2
May 4, 2021	31st and Broadway Sewer Separation Project	Project Update	2
September 27, 2021	15th St Pump Station and Sewer Separation Project	Project Update	2
October 26, 2021	45 th Street Relief Sewer Project	Project Update	23
November 9, 2021	Outfall 054 Sewer Separation Project	Project Update	1
November 23, 2021	Green Infrastructure Project 1:1 Mill Creek Park	Project Update	8
		TOTAL	39

3. Other Outreach

During the reporting period, the City of Kansas City, Missouri continued to add Consent Decree project information online. The City's website (www.kcmo.gov/smartsewer) provides general information about the Overflow Control Plan, current projects, and fact sheets. In addition to the City's website, KC Water launched a Consent Decree (Smart Sewer Program) specific website in 2020 (www.kcsmartsewer.us), which includes general information about the program and project fact sheets. The fact sheets provide citizens information about each active Consent Decree 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. Due to the ongoing Covid-19 pandemic, outreach events for the year were limited. The team coordinated an update for the KC Green Teams to the City Manager and Directors, prepared Council Proclamations for Energy Efficiency Day and Earth Day and created a web form for the Neighborhood Recognition Program was developed which made the application process quicker and easier for applicants.

2. Green Infrastructure Team

The Green Infrastructure Team focused on three initiatives during 2021 consisting of Peer Learning, Maintenance Proposal, and Asset Management. To promote Peer Learning, the team used the start of each meeting to review one of EPA's Green Infrastructure Barrier Buster Fact Sheets. The Fact Sheets help to guide group discussion and the resources on each are explored together. A draft Maintenance Proposal for the coordination of interdepartmental green infrastructure was in development by the team in 2021. Its primary focus would be establishing

a consistent Memorandum of Understanding (MOU) template for use on all green infrastructure projects which would clearly define, for each project, maintenance, and replacement responsibilities for city departments. Asset Management work in 2021 involved the team's maintenance of a list of city-built green infrastructure projects.

3. Regulation and Policy

The Regulation and Policy Team's work in 2021 was focused in six areas. Initiatives under consideration included Tree Preservation and Expansion; Fleet Vehicle Management and Optimization; EVSE (charging station) policy and municipal code language recommendations – on-street and off-street parking; Mandatory recycling for City facilities; Telework Policy; and Energy efficiency and renewable energy. Tree canopy preservation and expansion was a primary focus area. To that end, the Tree Preservation Administrative Regulation (AR) was adopted. This AR sets out the departmental rules for removing and replacing trees during city operations to ensure Kansas City's tree canopy is protected. Additionally, work continued on a draft Tree Preservation Ordinance that will outline the mitigation requirements for the removal of mature healthy trees.

4. Resource Management

During 2021, the Resource Management Team (RMT) focused on three initiatives. Green and Sustainable Procurement, Waste Diversion, and Internal City Recycling Program. Green and Sustainable Procurement initiative was the primary focus and the team continued implementation of a grant from the Mid-America Regional Council (MARC) Solid Waste Management District to improve procurement processes within the City. Kansas City has a Green Procurement Ordinance and associated Administrative Regulation and this grant will assist in evaluating its impacts and optimizing its implementation. Through the grant, the RMT hired a consultant to audit current practices, create training materials for city staff, identify Key Performance Indicators to measure success, and work with the Procurement Department and vendors to ensure that sustainable products are widely promoted. The goal of this grant is to reduce the amount of hard to recycle items procured and to promote the selection of more sustainably sourced products.

vi. *STORMWATER: FROM KC TO THE SEA*

Since 2010, KC Water has worked to educate local 4th through 6th grade students via a curriculum titled Stormwater: From KC to the Sea. The water education 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 2021, 1,112 students from 27 schools and youth programs throughout the Kansas City metro area participated in the program.

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

In 2016, KC Water launched the WE KC Program to expand the school age education program beyond Stormwater: From KC to the Sea. Through WE KC, KC Water 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 2021, KC Water assisted 69 schools and youth groups with water quality related events and educational programs, reaching 4,303 people.

viii. REGIONAL WATER QUALITY EDUCATION PROGRAM (RWQEP)

KC Water 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 18 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.

1. Name the Droplet Campaign

The "Name the Droplet" contest was re-launched in 2021 to select a name for the Water Quality Education Committee's new mascot. The water droplet features prominently in the committee's water quality education animated video series and other promotional materials. Name submissions were collected in June and July through a competitive process open to all residents of the Kansas City region. Submissions were then reviewed by a panel of committee members and a finalist was selected.

2. Plog-a-Thon

In October 2021, MARC conducted the first ever metro-wide virtual Plog-a-thon to reduce the impact of trash and litter on regional water quality. Plogging, a Swedish term for picking up litter while running, was first introduced to the metro in 2019. In 2021, the event was adapted to a virtual format to ensure proper social distancing and to reach a broader audience.

During Plogtober 2021, individuals and groups were encouraged to clean up area parks and neighborhoods to keep litter out of our local water ways. On Sunday, October 17th, MARC organized six county-wide Plogs on regional trails to get residents outdoors after a long quarantine and engage them in a socially responsible activity that beautifies the streamside trails in your community. 118 people participated in Plogtober, collecting at least one bag-full of trash each.

3. Trainings

Stormwater & Resilience Webinar Series: With the delay and eventual cancellation of the 2021 KC Urban Stormwater Conference, MARC hosted four webinars to provide information on emerging trends in stormwater management and resilience around the country. Webinar speakers represented 13 organizations, including stormwater utilities, public works, planning, and parks departments, engineering firms, regulatory entities, and nonprofit organizations. On average, 50 virtual registrants attended each session.

- "Why Riparian Restoration and How?", July 20.
- "Climate Change/Adaptation & Resilience", July 27.
- "Stormwater Funding Gaps + Policy", September 21.
- "Transportation & Conservation Planning", October 26.

Green Infrastructure Training with CDM Smith: On October 5th, MARC hosted CDM Smith for a half-day workshop on Green Infrastructure design and maintenance. This workshop covered strategies to maximize the success of green infrastructure projects and lessons learned locally and around the country, providing specific recommendations for municipalities, owners, designers, contractors, and maintenance personnel.

4. Grants

Each year, the committee offers funding opportunities to local nonprofit and educational organizations for education and outreach events related to reducing stormwater runoff and improving water quality in area creeks and streams. Proposals undergo a competitive selection process and are evaluated by a grant selection subcommittee. The Water Quality Education Committee awarded grants to the following organizations:

StoneLion Puppet Theater (\$5,000) - From August 19th to October 30th, StoneLion Puppet Theater held four free water festivals focused on educating Kansas City residents about their impact on the local water system. The festivals offered insight into the adverse effects of stormwater runoff and water pollution on regional water quality and promoted policies and household scale management practices to reduce stormwater runoff and water pollution.

Little Blue River Watershed Coalition (\$3,000) - Big Muddy Cleanup is a Missouri River Cleanup in Kansas City. In 2021, Little Blue River Watershed Coalition held two cleanups. On August 26th, Little Blue River Watershed Coalition partnered with Missouri River Relief on a Missouri River Cleanup from downtown KC east to the I-435 bridge. There were 100 volunteers from Kansas City and 50 from Columbia, MO. On October 2, 35 volunteers cleaned up the south bank of the Missouri River from the confluence with the Kansas River to the I-35 Bond Bridge.

Blue Hills Neighborhood Association (\$5,000) - The Blue Hills Neighborhood Association (BHNA) is working to create a rain garden in the Gateway Pocket Park, a green space where the community's neighborhood marker is located. The rain garden will serve as an example and educational tool for the residents within the Blue Hills neighborhood—encouraging them to create rain gardens in their yards to help capture and control storm water runoff.

Boys Grow (\$3,335) - Boys Grow's Flow Down project was a two-part educational program provided to 40 youth at Boys Grow during the Summer of 2021. The program focused on mitigating stormwater runoff and water pollution at work and at home and led to the successful installation of a diversity of water delivery and irrigation methods.

5. Education and Outreach Campaign

Table 10 displays information on activities carried out for the Education and Outreach Campaign during this reporting period.

Table 10: Educations and Outreach Campaign Activities (2021)

Campaign Item	Activity
Native Plants and Rain Gardens	<ul style="list-style-type: none"> Distribute “Build Your Own Rain Garden” how-to brochure Distribute “Know your Roots” brochure Distribute outdoor rated “Do Not Mow/Native Planting” signage for BMPs
Pet Waste	<ul style="list-style-type: none"> Distribute “Pick Up After Your Pet” brochure Outdoor-rated, “Pick Up After Your Pet” signage to local municipalities. Distribute Portable, refillable pet waste bag dispensers with “Pick Up After Your Pet” message as promotional giveaway items.
Lawn Care	<ul style="list-style-type: none"> Distribute “Build Your Own Rain Barrel” brochure Distribute “Redirect or Disconnect Your Downspout” brochure Distribute “Know Your Soil” brochure Distribute “Making and Using Compost” brochure Distribute “Use Lawn Chemicals Wisely” brochure
Brochure Translations	<ul style="list-style-type: none"> Distribute existing supply of Spanish-language brochures Distribute double-sided doorhangers (in English and Spanish) as a companion outreach tool for neighbors near stormdrain marker installations
General Stormwater Education	<ul style="list-style-type: none"> Distribute stormdrain inlet markers for local municipalities Distribute “Keep Sediment Out of Our Water”, “Know Your Watershed”, “Protect Our Streams” and “Stormdrain Stewardship” brochures Make the committee’s Water Quality Education Program banner available for community events and functions Distribute automotive trash bags with the “Stop Littering” imprinted message Distribute Water Quality Education Postcards
Water Quality Education Playing Cards	<ul style="list-style-type: none"> The Committee used artwork developed by the Kansas City Art Institute to develop educational playing cards, with staff developing a modified “Go Fish” game that cards could be used to play. Game cards outlined actions individuals could take to improve stream water quality, including using less fertilizer, landscaping with native plants, and picking up pet waste.

ix. PARTNERSHIPS IN PUBLIC OUTREACH TABLING EVENTS

KC Water partnered with various schools and municipalities to 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. KC Water tables used a combination of stormwater “Plinko”, the stormwater frame, aquatic macroinvertebrates, watershed models, and stormwater education to get students and families interested in the science and math of water quality. The following tabling events reached a total of 373 people during the reporting period.

- Stormwater Sunday with Stonelion Puppet Theatre Table: April 8, 2021
- Stormwater Sunday with Stonelion Puppet Theatre Table: May 2, 2021
- Juneteenth at 18th and Vine: June 19, 2021
- Lakeside Nature Center Table: July 17, 2021
- North Kansas City School District Table: July 20, 2021
- Missouri Bicentennial 3904 Chouteau Trafficway Table: July, 24, 2021
- Guadalupe Center High School Table: August 23, 2021
- Blue Springs 1st United Methodist Church/ Girl Scouts: November 6, 2021
- Plaza Middle School Table: November 30, 2021

x. *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 2021, Water Quality Small grant program continued with three of the four recipients completing programming into 2021. The next grant cycle of 2021 awarded 7 grant recipients grants for water education. Some grants began programs at the end of 2021.

The following organizations continued programming into 2021 through the Water Quality Small Grant Program:

1. Friends of Kaw Point Park

Friends of Kaw Point Park was one of the recipients that continued their grant into 2021. “From Runoff to Rivers” 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.

- 5 From Runoff to Rivers Curriculum classes in at Pembroke Hill School at 5121 State Line Rd. 95 students participated in the 5 classes on April 23, 26, 27, 28, 29 and 30. We did the field testing on April 27 & 28 directly south of the school in Brush Creek on the Missouri side of the state line.
- FRR Curriculum classes with 6 students from the Emmanuel Child Center participated in the class on July 19 at the Trailside Center at 9901 Holmes Rd, Kansas City, MO 64131. We did the field testing on Indian Creek behind the Trailside Center
- 3 Trash Tally programs. Girl Scout Troop 2211 at North Congress Park on May 10. We worked with 13 Girl Scouts, 3 Girl Scout leaders and one volunteer and picked up 31 pounds of trash. The second Trash Tally was with 2 second grade classes on the grounds of James Elementary at 5810 Scarritt Ave, Kansas City, MO 64123. We worked with 24 children, two teachers, and two aides and picked up 31 pounds of trash. The third Trash Tally was with Emanuel Youth Child Center on July 19 after we completed FRR class. We collected trash along the walking/bike path behind the Trailside Center and picked up 26 pounds of trash.
- On October 18, 19, 21, & 22 we taught From Runoff to Rivers 115 5th grade students at Northview elementary school at 3900 NE 92nd St., KC, MO 64156. On October 25, 26, 27 & 28 we taught From Runoff to Rivers to 96 middle school students (6th, 7th, & 8th) at Northland Christian School – 10500 N. Arrowhead Trafficway, KC, Mo 64155. We did the field testing with water from the bio-retention ponds at each school.
- FOKPP did 5 Trash Tally programs with Pembroke School with 80 students from Brandon Gillette’s 7th grade science classes in Brush Creek across from the school at 5121 State Line Road on October 5 & 6. We picked up over 1,700 items and over 1000 pounds of trash that KCMO picked up from the south side of Ward Parkway.

2. Stonelion Puppet Theatre

Stonelion Puppet Theatre (SPT) is dedicated to expanding environmental education through the art of puppetry. This year, SPT was awarded a Water Quality Small Grant to provide Puppets Talking Trash, a multi-level, multimedia project to engage and teach about the need to stop pollution on our streets from reaching our water system. Along with the puppet shows, SPT will also host a series of Stormwater Sundays. These shows will educate and inspire homeowners

about how they can reduce stormwater runoff and pollution. Also, provide education on the importance of protecting infrastructure, local waterways, and associate natural resources. These events will have social distancing in place, have a limited number of attendees, and will be live streamed to a larger audience. StoneLion Puppet Theatre completed their grant in 2021:

- Education and Outreach: Fifteen performances from our Environmental Education/Clean Water roster into public or private schools serving Kansas City MO residents with 1463 children reached in the school assemblies. Thirty puppet making workshops 724 students created puppets in these workshops. Twelve of the workshops were in person and eighteen were conducted over ZOOM
- Stormwater Sundays: Eight events with socially distanced seating watching environmental education performances, participate in safe art activities and listen to speakers about the importance of clean water. We started each event with a talk about the teaching garden and what each aspect is demonstrating such as the gutters leading into the rain garden, the no pesticide aspect and using MO Organic compost in the vegetable garden. The events reached 432 in-person and was live streamed on Facebook.
- Puppet Trash Talking series: The series was posted on YouTube, Facebook, Instagram and Tik Tok. It is also found on our website and area schools were given the links to share with their students.

3. Bridging the Gap

Bridging The Gap Water Quality Small Grant supports a Business Outreach and Stream Clean-Up Project that included: 4 stream clean-up volunteer events, identify and educate 2 retail property management companies, train 4 neighborhoods and community partners to provide business outreach/education in close proximity to 'high priority' streams, post 20 educational messages through our social media channels regarding pollution prevention and engage communities and offer the Community Tool Lending Shed as a resource to neighborhood association and community groups.

- March 20 and April 3, 2021-Brush Creek @ Elmwood and 71 Highway: Collected 109 bags of litter and a variety of other items that totaled 1153 lbs.
- April 17, 2021-Town Fork Creek @ Dunn Park: Collected 40 bags of litter and a variety of other items that totaled 615 lbs.
- Indian Creek: Collected 34 bags of litter that totaled 514 lbs.
- Bonus: Town Fork Creek @ Metro Plaza Shopping Center (Appendix B – map litter hot spots) Collected 492.5 pounds of bagged litter in 41 bags.
- Expand and continue to work with two retail districts that are significantly impacted by litter near the "high priority" streams: doing outreach and education to the owners of the property: In March 2021 after several attempts, we spoke with the property manager of Metro Plaza Shopping Center through Perner's KC Commercial Real Estate Brokerage. Following several emails and phone discussions regarding the litter problem we provided the team with a presentation and historical information from past clean-ups. After the discussions, the property owner agreed to work with us and as a first step allowed us to assist with addressing the stormwater and litter abatement surrounding the shopping center. In May 2021 we hosted a litter clean-up event with students from Rockhurst.
- Social Media Engagement: In collaboration with KC Water, BTG created 20 post to raise awareness and educate KCMO residents of the importance of litter abatement and the impact it has on water. These posts continued until April 2021 reaching an average of over 2,500 residents with each post.

- The Community Tool Lending Shed: This is housed out of the Deramus Community Recycling Center on the KCMO Environmental Campus. Using the KCMO Neighborhood Groups Database, we completed various outreach activities using email, text messages and social media post to 91 neighborhood associations and 15 community groups. Results included 32 individuals registering to use the Community Tool Lending Shed representing 28 neighborhood associations and 2 community groups. A total of 350 bags of trash were collected.

The following organizations were 2021 Grant Recipients:

1. Bridging the Gap

Bridging the Gap received their grant at the end of 2021 had the following priorities for their grant to implement in 2022:

- Identify three property management companies and identify business districts near “high priority” streams business districts that are significantly impacted by litter – conduct outreach and education to the property owners, neighborhoods, and community partners. Complete stream and business litter audit, map neighborhoods and community partners near the “high priority” business districts and streams to increase awareness of litter prevention near the waterways and provide additional opportunities.
- Host three stream clean-up workdays in watershed areas identified by KC Water as “high priority”
- Create a “keep the waterways clean” social media campaign to address stormwater solutions to the larger community near and surrounding “high priority” streams.
- Continue to manage the Tool Lending Shed, which is a community resource for neighborhood leaders to borrow cleanup tools at no charge

2. Heartland Conservation Alliance

Heartland Conservation Alliance received their grant at the end of 2021 had the following priorities for their grant to implement in 2022:

- The grant will fund the Green Guard Stewardship Training. The goal of the program is to increase community understanding and awareness of issues facing the Blue River and offer hands-on training to empower people to take action by serving as volunteer stewards. For this project, the training will focus on water quality education and engage new stewards to help strengthen the Heartland Conservation Alliance Missouri Stream Team #5145.

3. Hickman Mills School District

Hickman Mills School District received their grant at the end of 2021 had the following priorities for their grant to implement in 2022:

- Host a water fair will have several exhibits where attendees will have hands on experience cleaning debris from water, filtering water to produce clean water, learning the affects that contaminated water has on animals, observing how far debris travels in water, the purpose of collecting rainwater, learning what happens to water when it leaves your home and career opportunities. The goal is to continue education of the families we serve by providing resources and information on ways to improve sustainability in the community.

4. Little Blue River Watershed Coalition – Project Blue River Rescue

- On September 11, 2021 Little Blue River Watershed Coalition held the Little Blue River Cleanup at 2 sites. Little Blue River Watershed Coalition partnered with Missouri Stream Teams, KC Parks, Jackson County Parks, Missouri chapters of Artemis Outdoor Sportswomen and WildHERness. There were 30 people at Little Blue Valley Park. They collected 90 tires. 40 tires came out of the water in a one block stretch of the river. The Blue River Community College site saw 30 volunteers over 2 days. They removed 130 tires from Spring Branch Creek a tributary of the Little Blue. Bridgestone Tires 4Ward program disposed of the 220 tires collected.
- On October 2, 2021, 35 volunteers cleaned up the south bank of the Missouri River from the confluence with the Kansas River to the I-35 Bond Bridge with Little Blue River Watershed Coalition.

5. Missouri River Relief

Missouri River Relief hosted their cleanup day in KC to kick off the Big Muddy Cleanup:

- August 21, 2021. Volunteers arrived early in the morning to register themselves and their families for the event and receive a reusable water bottle, gloves and a t-shirt. Following registration, volunteers receive an educational orientation talk, a thorough safety talk, gloves, a life jacket and a boat ride on one of five MRR boats or agency partner boats to their cleanup site equipped with trash bags and tools. Once the volunteers arrive to their cleanup site, they worked in teams to remove literal tons of trash from the banks for proper disposal. After several hours of stewardship, the volunteers were brought back to the boat ramp for a hot volunteer lunch provided by RC's Dining & Lounge and served by KC Rotary South. In the afternoon, our staff and crew head back out to the trash sites to collect the waste tires, white goods and trash to bring it back to the boat ramp for proper disposal with the help of Evergy. This project covered a 9.3-mile stretch of the Missouri River where 166 volunteers removed 6 tons of trash including 1 ton of scrap metal, 2.3 tons of tires and 2.7 tons of landfill trash.

6. Pembroke Hill School District

Pembroke Hill School District received their grant for students in 7th grade middle school to sign up for summer programs in 2022:

- This project will be conducted in two parts: 1) formal classwork using the program Runoff to Rivers facilitated by Friends of Kaw Point Park; 2) Water Week Summer Camp where students will take a more in-depth look at water runoff, water infrastructure, and water resources in and around Kansas City.

7. StoneLion Puppet Theatre

StoneLion Puppet Theatre proposes a two-part program designed to improve public knowledge of the effect human activities have on water quality and create behavior change within the community to protect water resources and associated infrastructure. This program will teach ways to reduce the impact of stormwater runoff on water quality giving age-appropriate examples to children and adults. Special emphasis will be given to highlighting the need to stop roadside pollution (trash) and dumping.

- Objective #1 — Education and outreach for school-age children and families in Kansas City, MO. SPT proposes to build a new puppet show for virtual and in-person performances focusing on why we need to stop trash and dumping along our roadways, riparian areas, and in storm drains. In 2021, two workshops and a Puppet Performance were given to area students in November and December reaching 242 students.
- Objective #2- Art in the Garden. Sub Pod in-garden compost system that will be placed within a vegetable/herb garden created with Eco Bricks to serve as a demonstration of how to reuse plastic in a safe and effective way while composting our kitchen waste. Eco Bricks will be created in community events and volunteer days.

H. NMC8 – PUBLIC NOTIFICATION

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

KC Water utilizes the following methods to inform the public of the potential for CSOs:

i. WARNING 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 Smart Sewer information line that is staffed by KC Water employees. 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.

ii. MEDIA ADVISORIES

When a sewer overflow occurs during the recreation season, KC Water Communications distributes a media advisory to local media outlets. In 2021, 7 advisories were distributed.

iii. KCMO NEWS WEBSITES

In addition to providing notification directly to media outlets, the media advisories are also posted on the KC Water website at www.kcwater.us/news/.

I. NMC9 – 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. No diversion structures or outfalls were added or removed during this reporting period.

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 OCCURRENCES ESTIMATES

The current performance of the CSS is estimated using updated baseline computer models initially developed as part of the Overflow Control Plan. KC Water recalibrates the models using sewer flow meter and rainfall data collected annually. 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 PLAN

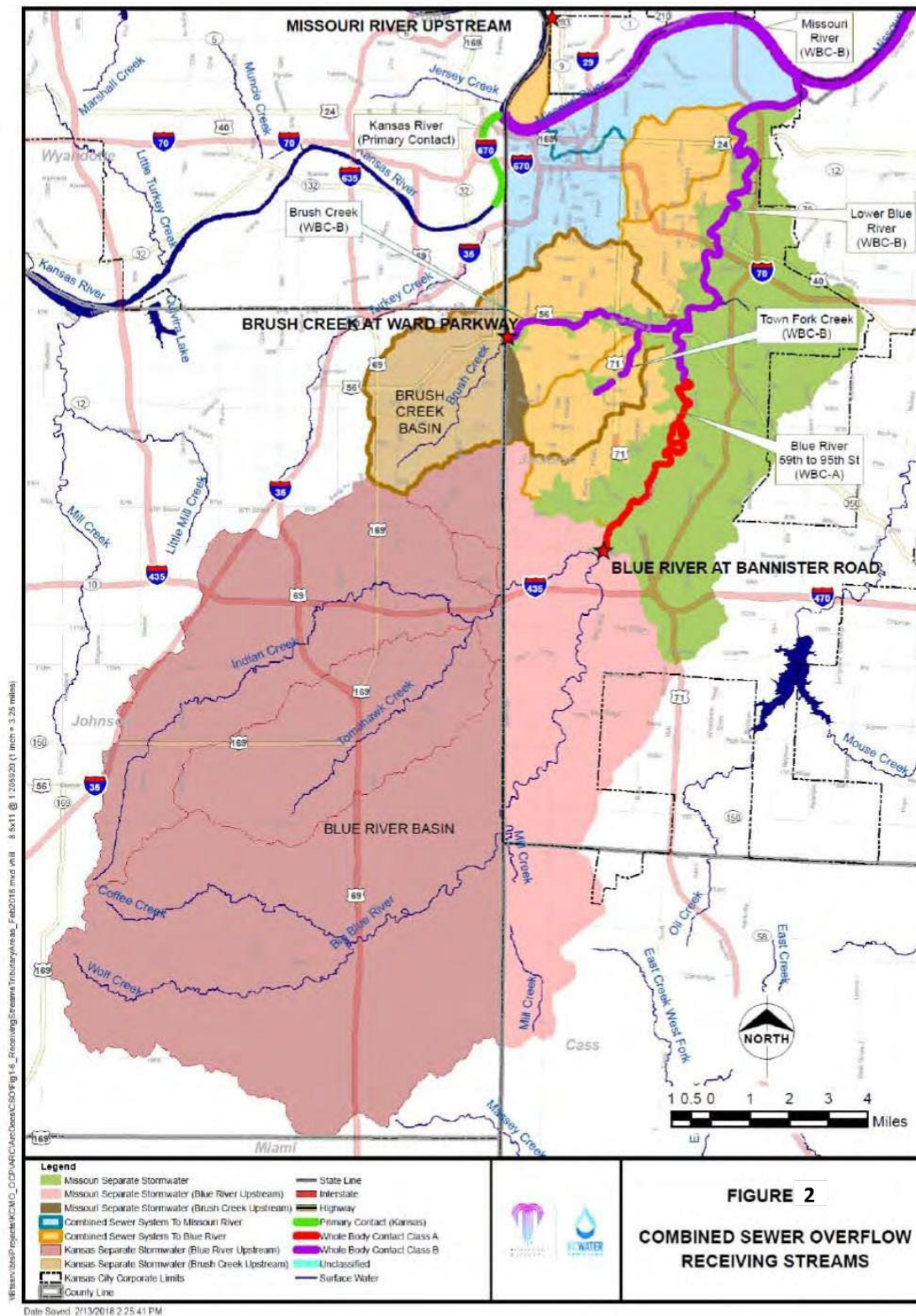
The City is implementing a Water Quality Monitoring Program (WQMP) that was developed in December of 2010 to address the requirements of Section II, Water Quality Monitoring Plan of the Post-Construction Monitoring Program Performance Criteria, included as Appendix D of the Consent Decree.

Legend

- Outfall (MONR ID, KCMO ID)
- Diversion Structure
- Flow Splitter
- Rivers and Lakes
- Surface Water
- Interstate
- Highway
- Major Streets

DIVERSION STRUCTURE FLOW SPLITTER AND OUTFALL LOCATIONS

Figure 2: Combined Sewer Overflow Receiving Streams



XIII. 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

KC Water's 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. KC Water 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 KC Water's Human Resources Division. Positions are posted internally city-wide to provide advancement opportunities for existing staff members. KC Water fills vacancies once the appropriate level of talent is found. At the end of 2021, there were 66 vacant positions in the divisions which have dedicated sections for stormwater and wastewater collection.

The organizational structure is evaluated during the annual budget process and through frequent communication between Human Resources personnel and the operating divisions of KC Water. 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 KC Water employees is evaluated using a formal performance review process. The Director and the Human Resources Manager are responsible for ensuring that KC Water's 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 780 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 updated and/or made improvements to various software including WaterGIS.

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). Currently, the website and the City’s Smart Sewer Program website supplies information on the Overflow Control Plan and informs customers of upcoming Smart Sewer projects.

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 2021, the Action Center opened 1485 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 KC Water is responsible. Once the work is complete, the customer service ticket is closed out. In situations where KC Water 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 KC Water 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 KC Water 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 KC Water 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 KC Water 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 KC Water 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

The design and construction of infrastructure acquired as part of 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. KC Water works with City Planning and Development to ensure better coordination procedures.

The Permits Division (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.

KC Water continues to expand the IMS and share data among divisions in several locations around the City. The following is a list of the relevant systems maintained and used during the 2021 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 VX with PACP 7 coding.
- **Infor-Hansen System - CMMS:** KC Water is currently using Hansen 11.
- **KWIK (Banner):** 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.
- **Various hardware devices and software applications:** Includes In-house developed web-based application to allow assignment of Hansen 11 service orders to be completed in the field, with, where available, in real-time with access to GIS, CIS, and Hansen data.
- **Innovyze InfoAsset Planner:** utilized in Business Risk Exposure, Annual Sewer Rehabilitation, and other system improvement programs.

KC Water's Information Technology (IT) Division manages the hardware and applications specific to Water Services. This includes the integration of various application programs to facilitate user and work needs at various locations. Interfaces and updates to the supporting systems of record are regularly completed to improve efficiencies in business delivery. Monitor tools have been added to review performance measures and provide real-time presorting to all the Water Services divisions.

On a regular 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. KC Water IT continues to work with each division to support the use of IMS in addition to providing training as requested with the core KC Water systems as new functionality becomes available or an enhancement is made. A combination of KC Water IT staff and vendor-provided maintenance teams provide oversight and support for KC Water IMS tools.

vii. GIS SOFTWARE

During the reporting period, KC Water continued to use the ESRI ArcGIS suite of products. Updates to the department's web portal were achieved, as was progress towards KC Water updating to the new ESRI Utility Network, which is scheduled to be complete in 2023.

Field crews access GIS data via a secure connection from their mobile units based on user credentials.

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

viii. GIS MAPPING

The purpose of KC Water's GIS Mapping Program is to aid in business decisions by ensuring that accurate and comprehensive asset information is available to those who might need it. KC Water's 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)

KC Water maintains its geospatial data in a GIS mapping system. Updates to the GIS are submitted by both internal crews and external customers under a variety of circumstances. Updates

include new sewer extensions, sewer additions installed by contractors, capital project as-builts or asset corrections identified by crews.

Digital maps generated from ArcGIS are available to office and field staff via the department's web portal.

KC Water Customers 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.

ix. 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. KC Water 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 KC Water 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 KC Water. A work order is initiated if a problem with a KC Water facility is identified upon receipt and investigation of a 3-1-1 service call.

A total of 1438 calls related to SSOs were routed to the Wastewater Line Maintenance Division during 2021. The breakdown of SSO call types City-wide includes:

- Water in basement dry weather – 1,154
- Water in basement wet weather – 284

In the event of a backup that resulted in the owner/tenant of the property calling 3-1-1 or calling KC Water 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.

KC Water 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. KC Water continually evaluates the SSO Reporting and Notification Program.

x. PERMIT AUTHORITY NOTIFICATION

The Wastewater Treatment and Inspections and Investigations Divisions notifies MDNR when a DWO occurs within 24 hours of discovery. KC Water completes and submits a follow-up written report to MDNR within five days. 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 47 dry weather overflows reported to MDNR in 2021 compared to 46 in 2020.

B. COLLECTION SYSTEM 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 KC Water Accounting staff members who review the requests, compile the budget and submit it to the KC Water 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 KC Water 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. Stormwater and wastewater engineering is managed collaboratively by several units including Asset Management, Stormwater, and Smart Sewer Divisions in conjunction with overall direction from the engineering executive management.

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

- Asset Management Division is responsible for GIS mapping and IT software and systems used to manage the City's Overflow Control Plan
- Smart Sewer and Facilities Engineering Divisions are responsible for the planning, design, and construction of stormwater and wastewater collection and pumping.
- Facilities Engineering Division is responsible for the design of all above-ground structures including pump stations and wastewater treatment plants.
- Smart Sewer Division is responsible for development and implementation of the City's Overflow Control Plan
- Stormwater Division is responsible for stormwater management projects that are funded internally and jointly by other government agencies such as the Corps of Engineers

All engineering activities are performed under the supervision and direction of registered professional engineers. Staff members receive continuing education and training through industry seminars and workshops, as well as classes required to maintain PE licensure.

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

iii. WATER QUALITY MONITORING

KC Water 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

KC Water conducts sampling and analysis efforts for the Water Quality Monitoring Program in accordance with KC Water's Smart Sewer Quality Assurance Project Plan, KC Water 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 KC Water 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 2021, various design and construction was initiated, continued or completed at pump stations, force mains, and pipelines including Birmingham Pump Station, Buckeye Force Main and Pump Station, Round Grove Pump Station, Satna Fe Pump Station, and Mace Road Pump Station.

The pump stations include remote monitoring using telephone dialers and SCADA. In 2021, 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 and recorded electronically. At some of the larger stations, more extensive data is collected. Additional staff are assigned as needed to accomplish all activities.

Training for wastewater operators occurs through on-the-job experience and through an inhouse 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 2021, approximately 14,561 work orders were completed associated with maintenance of the City's 43 sewer pump stations and 15 flood pump stations.

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. Staff members update 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. KC Water 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 KC Water's 24-hour response line to report trouble.

KC Water 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. KC Water 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 KC Water's 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.

KC Water 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. KC Water keeps a hard copy of this protocol along with electronic copies. KC Water 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.

There was no smoke testing performed during the reporting period.

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.

KC Water has implemented a Smart Sewer Sensor Network consisting of over 250 permanent flow and depth sensors throughout the sanitary and combined sewer networks. The data collected from the sensor network will be displayed on data dashboards in real-time and configured for five KC Water use cases: Consent Decree compliance, hydraulic model maintenance and project delivery, Green Infrastructure performance evaluation, Operations and Maintenance support, and Wastewater Treatment Division support.

KC Water 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 KC Water and is reviewed by various Division managers. 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. KC Water has developed a standard protocol for CCTV inspections.

In 2021, the City televised approximately 185 miles of sewer lines, this mileage includes the mileage in the combined sewer system previously discussed in NMC 1. KC Water 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.

Targeted sections of the 2800 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, KC Water 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 2021 with 19 anomalies discovered and zero anomalies associated with an overflow. Using the supplied GPS coordinates, the Wastewater Inspections and Investigations Division visually inspects the anomalies on the ground and with the drone. The anomalies found were small pools of water, storm drainage pipes, and other non-sewage related items.

C. COLLECTION SYSTEM MAINTENANCE

i. MANHOLE REPAIRS

The purpose of the Manhole Repair Program is to ensure the structural integrity of manholes (MHs) 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 2021, the City inspected 610 MHs. A total of 1,390 MHs were repaired, replaced, or raised City-wide as follows: 73 MHs by City-wide MH Raising Contractor, 1307 MHs by Smart Sewer Project Contractors, and 10 MHs by City Wastewater repair crews.

ii. MAINLINE SEWER REPAIRS

Actual physical repairs are made to the gravity sewer lines by the Utility Repair Division and outside contractors. 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 the CMMS. Repair work performed by in-house construction crews is entered into the CMMS by Collection Systems personnel, and repair work performed by outside contractors is entered into the CMMS by Engineering personnel.

KC Water 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 2021, approximately 26 miles of sewer main line repairs, including open cut replace/pipe bursting, point repairs, and CIPP was performed City-wide. Additionally, 1.8 miles of service lateral pipe replacement and rehabilitation were performed City-wide.

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. KC Water 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 KC Water receives repeated trouble calls for a particular line segment, the line segment is placed on a frequent interval preventative cleaning cycle. All sewer cleaning originates with a CMMS-generated work order.

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 vacuum trucks. KC Water stores all data related to the sewer cleaning program in the CMMS. 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 2021, the City cleaned approximately 355 miles of sewer lines, 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 KC Water, 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 KC Water 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 KC Water 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.

KC Water inspects the connections when new service line connections are requested and permitted. KC Water 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. KC Water 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. KC Water 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.

XIV. POST CONSTRUCTION MONITORING PROGRAM PERFORMANCE CRITERIA – APPENDIX D

A. FLOW MONITORING PROGRAM

Short-term pre-construction flow monitoring was conducted by the City for six project locations listed below beginning in April 2021 for approximately 120 days. Monitoring occurred to provide post-construction data.

- Middle Blue River CSO 056
- Middle Blue River CSO 066/067
- Middle Blue River DS 068
- Little Blue River CSO 054
- Gooseneck DS 128
- Gooseneck DS 203

In addition, flow and rainfall monitoring was performed for 120 days at one project location in the Brush Creek basin to measure the reduction in I/I from rehabilitation work.

- Brush Creek Mission Hills I/I

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

For Long-Term Flow Monitoring, refer to Sections IV, REPORTING PERIOD ACTIVITY, Part B. APPENDIX D: POST-CONSTRUCTION MONITORING PROGRAM.

B. WATER QUALITY TESTING

The 2021 reporting period encompasses the tenth and eleventh years of monitoring conducted since 2011 under the Integrated Water Quality Monitoring Program (IWQMP). In 2021, Water Services staff members conducted sampling and field measurements at 20 small stream sites. Monitoring was not conducted during the 2020 at the small stream sites due to labor constraints resulting from COVID-19 complications. A Water Services contractor conducted sampling and field measurements at three locations in the large rivers Kansas River and Missouri River in 2021. 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 and the associated Quality Assurance Project Plan.

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 during the recreations season from April 1 through October 31. Monitoring may also be conducted outside the recreation season. 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.

The implementation of the IWQMP in 2021 was successful in obtaining 100 percent of the planned samples. Also, the collection frequencies for field duplicate samples and field rinse blank (FRB) samples (16 percent for each) 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 2021 water quality monitoring results is presented for E. coli, dissolved oxygen, and TSS in Table 11.

Highest concentrations of E. coli bacteria are observed in Town Fork Creek (TF-01 and TF-02) and the lower end of the Blue River (BR-08). These locations are generally consistent from past years. Bacteria concentrations in Brush Creek appear generally lower than previous years. Missouri River and Kansas River bacteria concentrations were generally lower in 2021 than recent years. 2021 was a lower flow year in the Missouri River at 83% of the long-term average annual flow.

Average dissolved oxygen concentrations were much lower in 2021 than previous years in the small streams, yet much higher than previous years in the large river sites.

The 2021 TSS concentrations in the smaller tributary streams were not noticeably different from previous years. TSS concentrations in the Missouri River and Kansas River were lower than previous years which is expected for a lower flow year.

Water quality conditions can vary significantly year-to-year depending on precipitation conditions. The average annual precipitation in Kansas City from 2000-2021 is 39.21 inches. Precipitation in 2021 was above average at 41.24 inches.

¹ LimnoTech, December 28, 2010

² LimnoTech, 2005, Revised 2010

³ National Weather Service: <https://w2.weather.gov/climate/xmacis.php?wfo=eax> (selections: NOW tab; 1. Location = Kansas City Intl, MO; 2. Product = Monthly summarized data; 3. Options = Year range: 2000-2021, Variable: Precipitation, Summary: Sum; 4. View = Go)

Table 11: Summary of 2021 OCP Water Quality Monitoring

		<i>E. Coli</i> (MPN/100 ml)				Dissolved Oxygen (mg/L)		TSS (mg/L)	
Site		No. of samples	Geometric mean	No. of Samples recreational season	Geometric mean recreational season	No. of samples	Average	No. of Samples	Average
Small Stream Sites	BC-01	15	455	15	455	15	6.1	15	5.5
	BC-02	15	312	15	312	15	4.5	15	6.1
	BC-03	15	656	15	656	15	9.1	15	5.5
	BC-04	15	170	15	170	15	6.0	15	7.0
	BC-05	16	392	16	392	16	5.3	16	14.1
	BC-06	15	661	15	661	15	7.1	15	9.9
	BC-07	14	228	14	228	14	7.3	14	14.8
	BR-01	15	293	15	293	16	7.2	15	22.9
	BR-02	15	256	15	256	16	7.1	15	31.6
	BR-03	15	757	15	757	16	7.2	15	31.3
	BR-04	15	314	15	314	16	7.7	15	34.1
	BR-05	14	325	14	325	15	7.2	14	25.7
	BR-06	15	473	15	473	16	7.3	15	34.5
	BR-07	16	603	16	603	18	7.4	16	39.2
	BR-08	15	1,049	15	1,049	17	6.9	15	45.7
	BR-09	15	826	15	826	17	8.1	15	22.5
	HG-01	15	567	15	567	16	7.3	15	155
	IC-01	15	373	15	373	17	7.7	15	28.1
	PV-01	15	226	15	226	17	8.1	15	18.3
	TF-01	15	6,770	15	6,770	15	7.3	15	35.1
	TF-02	14	42,902	14	42,902	14	3.8	14	20.6
	MC-01	15	377	15	377	17	7.3	15	9.1
Large River Sites	MR-01-C	15	70	15	70	15	11.4	15	138
	MR-02-C	17	103	17	103	17	11.0	17	191
	KR-01-C	15	124	15	124	15	11.6	15	252

Note: 2021 is the first year that the Large River Sites were monitored at the center channel (C) only.

END

Attachment A: Discharge Monitoring Reports

The following is an example of a Discharge Monitoring Report as submitted by KC Water to MDNR. To conserve resources, electronic copies of all discharge and bypass reports submitted to MDNR in 2021 will be transmitted separately.

PERMITTEE NAME/ADDRESS NAME: Birmingham Sewerage Treatment Facility ADDRESS: 4800 E 63 rd St., Kansas City, MO 64130 FACILITY: 1801 NE 28 th Street LOCATION: Kansas City, MO 64141				NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) DISCHARGE MONITORING REPORT (DMR)				Report Approved: OMB No. 20-004-004			
		MO-049531 PERMIT NUMBER		001 DISCHARGE NUMBER							
MONITORING PERIOD											
FROM		YEAR	MO	DAY	TO		YEAR	MO	DAY		
		2020	12	01			2020	12	31		
<input type="checkbox"/> Check here if No Discharge NOTE: Read instructions before completing this form											
PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Flow ^{1,3}	SAMPLE MEASUREMENT	13.20	9.35	MGD	-	-	-	-	-	Daily	Flow meter
	PERMIT REQUIREMENT	Daily Max	Monthly Avg.		-	-	-	-	-	Once/Weekday	24-Hr estimate
Biochemical Oxygen Demands	SAMPLE MEASUREMENT	-	-	-	-	13	10	mg/L	0	Once/Weekday	Composite
	PERMIT REQUIREMENT	-	-	-	-	45 Weekly Avg	30 Monthly Avg	-	Once/Weekday ²	Composite	
Total Suspended Solids	SAMPLE MEASUREMENT	-	-	-	-	11	10	mg/L	0	Once/Weekday	Composite
	PERMIT REQUIREMENT	-	-	-	-	45 Weekly Avg	30 Monthly Avg	-	Once/Weekday ²	Composite	
pH	SAMPLE MEASUREMENT	-	-	-	6.8	-	7.0	SU	0	Once/Weekday	Composite
	PERMIT REQUIREMENT	-	-	-	Daily Min 6.5	-	Daily Max 9.0	-	Once/Weekday ²	Composite	
Ammonia as N *	SAMPLE MEASUREMENT	-	-	-	26.1	-	25.1	mg/L	-	Once/week	Composite
	PERMIT REQUIREMENT	-	-	-	Daily Max	-	Monthly Avg	-	Once/week	Composite	
Oil & Grease	SAMPLE MEASUREMENT	-	-	-	<3.1 ND	-	<3.1 ND	mg/L	0	Once/month	Grab
	PERMIT REQUIREMENT	-	-	-	15 Daily Max	-	10 Monthly Avg	-	Once/month	Composite	
BOD ₅ Removal	SAMPLE MEASUREMENT	-	97	%	-	-	-	-	0	Once/month	Composite
	PERMIT REQUIREMENT	-	> 85%	-	-	-	-	-	Once/month	Grab (Inf)	
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER: TELEPHONE: _____ DATE: _____											
Hance Newsom Senior Superintendent, North Operations											
TYPED OR PRINTED											
COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here). * Monitoring requirement only. ² Weekday, except for 8 Federal Holidays ³ Additional samples were analyzed for this parameter, and that data is included in calculations. ND=Non-Detect											

[illegible]

Attachment D: List of Critical Facilities and Inspection Frequency

The following is a preview of the critical facilities list and associated inspection frequencies. To conserve resources, an electronic copy of the full list of critical facilities and their associated inspection frequencies will be transmitted separately.

Diversion Structure Number	Location	Map Number	MH Number	Receiving Stream	Inspection Interval
2	100 MAIN STREET DIVERSION	S028	302	MISSOURI RIVER	30
3	100 GILLIS AVE DIVERSION 600FT W	S028	954	MISSOURI RIVER	7
4	100 LYDIA AVE DIVERSION	S027	860	MISSOURI RIVER	30
5	* 101 PROSPECT AVE PUMP STATION	S009	800	MISSOURI RIVER	30

Attachment E: Certificate of Achievement of Full Operation for Consent Decree Projects

To conserve resources, electronic copies of the following Certificates of Achievement of Full Operation for Consent Decree projects achieving this milestone in 2021 will be transmitted separately:

- Neighborhood Sewer Rehabilitation: Lower Blue River South – January 2021
- I/I Reduction: Little Blue River Area 1 – November 2021
- I/I Reduction: Little Blue River Area 2 – July 2021
- Diversion Structure 068 Storage Basin – July 2021
- Neighborhood Sewer Rehabilitation: TC/CID Area 1 – February 2021
- Neighborhood Sewer Rehabilitation: TC/CID Area 2– April 2021



[KCMO.GOV/SMARTSEWER](https://kcmo.gov/smartsewer)