

# Integrated Planning in Action

## 2019 Integrated Management Plan

Johnson County, Kansas

A paddleboarder enjoying the lake at Shawnee Mission Park.  
Photo courtesy of Donna Daugherty.

With a population of about 600,000 people, Johnson County is the most populous county in Kansas. Located just west of Kansas City, Missouri, Johnson County is home to several growing suburbs and two of the four largest cities in Kansas (Overland Park and Olathe). Johnson County Wastewater operates a sewer system that collects and transports wastewater to six wastewater treatment facilities<sup>1</sup> that discharge to tributaries of the Kansas and Blue Rivers. One of these tributaries, Little Bull Creek, flows into Hillsdale Lake, which is the centerpiece of a popular local state park.

### Challenges

During heavy storms, stormwater and groundwater enter Johnson County's sanitary sewer system through cracks and improper connections (i.e., infiltration and inflow). Under these conditions, the capacity of the sewer system and treatment facility may be exceeded, resulting in sanitary sewer overflows (SSOs). In some parts of the county, satellite facilities partially treat a portion of these SSOs before they are released. However, in other areas, SSOs discharge sewage directly into the Blue and Kansas Rivers.

In early 2019, Johnson County made plans to tackle complex challenges associated with Clean Water Act requirements. The county needed to protect water quality in local waterways by addressing eight total maximum daily loads (TMDLs) as implemented in six separate wastewater treatment facility permits. The county expected two additional TMDLs to be incorporated into the permits during the next permit term. It also anticipated new ammonia limits at two of the wastewater treatment facilities, which would require major capital improvements to comply with such limits.

In addition to meeting water quality requirements, the county wanted to explore increasing land application of biosolids and cogeneration of methane at wastewater treatment facilities. This would use resources more efficiently and reduce operating costs and adverse environmental impacts caused by chemicals in the biosolids.

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To address water quality challenges and pursue these other environmental priorities, the county created a multi-phased 25-year schedule to address immediate compliance requirements and then refine the plan as appropriate based on additional data.

Johnson County began the first phase by identifying ongoing projects and necessary infrastructure improvements based on previous planning efforts and wastewater system assessments. The county then reviewed existing

**JOHNSON COUNTY**  
KANSAS

**Wastewater**

EPA Region 7

600,000 population



<sup>1</sup> "Wastewater treatment facilities" (WWTFs) is a generic term for facilities that treat or manage wastewater, including publicly owned treatment works.

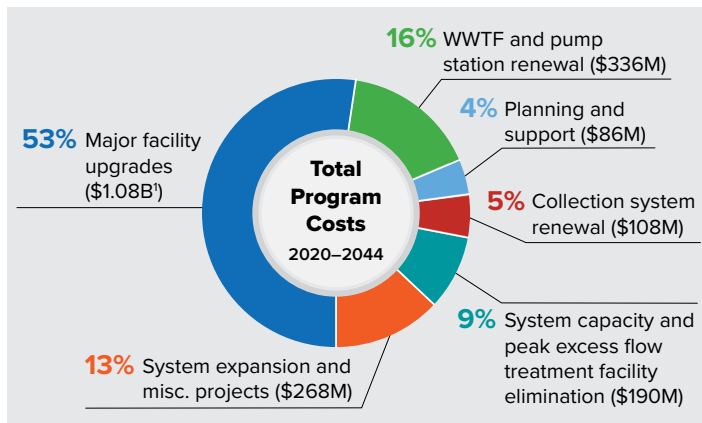
capital improvement projects and chose possible solutions to water quality challenges, such as wastewater treatment facility upgrades and collection system repair and replacement. The county prioritized these projects based on their ability to achieve three main objectives: environmental protection, customer service, and community enhancement. They also identified seven sub-objectives (see details in the box below).

Based on this analysis, the county developed its 25-year schedule of projects. The schedule included as many of the highest-priority projects as possible, while maintaining affordability for rate payers. The county addressed collection system challenges by including projects to increase storage and conveyance capacity, reduce public and private sources of infiltration and inflow, and rehabilitate the existing infrastructure. The county sequenced these projects so the ones that met the most objectives, such as expansion and treatment upgrades at three wastewater treatment facilities and the elimination of satellite facilities, would occur within the first 10 years. Projects that did not address multiple objectives, such as resource recovery and expansion of two other wastewater treatment facilities, fell later in the schedule. Johnson County estimated that the projects in this first phase of the integrated plan would have a total capital cost of \$2.07 billion over the 25-year planning period (2020–2044) (see graphic to right).

The second phase of planning will refine the 25-year schedule using more detailed planning studies and a more comprehensive assessment of community priorities. After the second phase ends in late 2022, Johnson County plans to monitor project performance and update the integrated plan at least every five years to achieve the greatest benefits.

The county used existing community engagement programs and input from the Board of County Commissioners to solicit feedback on the first phase of planning. The first-phase Integrated Management Plan indicates that the second phase will include broader engagement to support a more comprehensive assessment of community priorities.

### Projected Distribution of 25-Year Integrated Management Plan Costs by Category



<sup>1</sup> Cost includes \$173 million expenditure for Tomahawk Creek WWTF prior to 2020.

### Results

In 2019, Johnson County submitted the Integrated Management Plan to the Kansas Department of Health and Environment (KDHE), which implemented the plan through a consent order that same year. The consent order included implementation schedules for nitrogen and phosphorus removal at two of the wastewater treatment facilities, and eventual elimination of satellite facilities as the county increases collection and full treatment capacity. KDHE issued amended permits for these two wastewater treatment facilities in 2020. The permits acknowledged the receipt of the integrated plan and indicated that KDHE would use the plan when making future regulatory decisions. The county expects to complete the prioritized wastewater treatment facility expansion project by spring 2022.

#### Sub-Objectives for Prioritizing Projects in Johnson County

- Improve water quality
- Meet regulatory obligations
- Efficiently use and protect natural resources
- Minimize human health and property impacts
- Achieve financial benefits
- Be a good neighbor
- Foster responsible growth and important development