BURNS McDONNELL

CASE STUDY

Metropolitan St. Louis Sewer District Launches Mission to Improve Water Quality

Through Project Clear, a Metropolitan St. Louis Sewer District (MSD) initiative, MSD has plans to alleviate wastewater concerns and improve water quality for the entire St. Louis region. The Gravois Trunk Sanitary Storage Facility project supports this initiative by incorporating a variety of water quality strategies through infrastructure solutions.

Challenge

Beginning in 2012, the Metropolitan St. Louis Sewer District (MSD) planned to invest billions of dollars in MSD Project Clear to plan, design and build wastewater system improvements.

New design recommendations were needed to eliminate the two constructed Sanitary Sewer Overflow (SSO) outfalls to Gravois Creek, improve access to the existing Gravois Creek Trunk Sewer and protect the existing trunk sewer from the natural geomorphological processes of Gravois Creek. As a result of aging wastewater collection systems, heavy rainfall events were causing sewer overflows and damage to nearby structures in the Gravois Creek Watershed. MSD originally had a plan for new trunk sewer construction but when it became apparent how difficult it was to obtain easements, MSD turned to Burns & McDonnell for a fast-paced design reevaluation.

Project Stats

Client
Metropolitan St. Louis Sewer District

Location
Greater St. Louis

$25
MILLION CONSTRUCTION SPEND

2
PARTIALLY BURIED, CIRCULAR STORAGE TANKS

3
VERTICAL TURBINE PUMPS

8
RAW SEWAGE SUBMERSIBLE PUMPS

Solution

Our team was brought in to design and provide support of construction for the wet-weather sanitary storage facility. Our team quickly determined a variety of infrastructure components would need to be implemented to create a successful storage solution. The storage facility has two partially buried circular storage tanks — each made of concrete and big enough to hold 4 million gallons, for a total volume of 8 million gallons. It also includes an influent pump station with eight raw sewage submersible pumps and a total capacity of 54 million gallons per day and a service water pump station to provide water for the facility's washdown system and yard hydrants.

Sustainability was a major theme throughout the design and construction of the facility. To achieve efficiency, the facility's tank domes were constructed to have internal drainage that pushes stormwater to the service water cistern. Rainwater is collected and stored in the service water cistern, which supplies the washdown system. Such reuse eliminates the need to purchase potable water for such on-site needs.

Additionally, the facility components include a robust diversion structure, a dewatering control vault, consolidation sewers, force mains, an odor control system, a control building, yard piping, duct banks, instrumentation and controls, and other related infrastructure. The infrastructure the design team recommended represents a unique approach to solving a collection systems issue, while improving local water quality and public health.

The project site had limited land between residential and light industrial properties. A line of trees separates a residential subdivision from the project site, with residential and light industrial properties across the street from the Gravois tanks. Such stakeholders had concerns about the potential for tanks-related size, odor and appearance issues. Our team created a community and stakeholder group consisting of elected officials, neighborhood leaders and surrounding business owners to address these concerns.

The group's input and involvement during design of this project proved crucial to success. The group met with the design team to select the fence type, tank color and finish, site lighting, finished landscaping, and public parking for the community to access a nearby walking trail. The design team maintained the lines of trees to provide a natural screening between the storage facility and the residential subdivision. The design used dual storage tanks to fit the limited footprint and provide operational flexibility for MSD staff, allowing for regular maintenance without impacting service.

Results

Through successful design and construction of this project, our team helped MSD meet its consent decree commitments. Construction of the Gravois Trunk Sanitary Storage Facility was completed in June 2021. The storage facility provides economic and sustainable benefits to the surrounding community, with the ability to eliminate sewage overflows to Gravois Creek, which had posed significant risks to water quality and public health. The constructed storage facility resolves a collection systems issue with an innovative infrastructure solution by providing a space for excess wet-weather sewage to be collected and stored.

This storage facility was designed to be virtually autonomous, requiring minimal staff oversight and can be modified or upgraded in the future if MSD requires additional operational capabilities in the Gravois Creek Watershed. The project is recognized nationwide for the advantages and benefits of storage facility design, including schedule control and community impact while improving water quality, the environment, and public health and safety.

About Burns & McDonnell

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