



Memorandum

Date: December 16, 2020
To: Utilities Commission
Stan Gryczko, Public Works Utilities & Operations Director
From: John Alexander, Wastewater Division Manager
Adrienne Heinig, Management Analyst
Subject: Item 6A – Wastewater Cost of Service Study: Short Utility Introduction

Recommendation

Receive a short informational overview of the City's Wastewater Division of the Public Works Utilities & Operations Department in anticipation of the first presentation of the Wastewater Utility financial plan. Topics will include:

- Components of wastewater and the collection system
- An overview of system operations and maintenance
- The wastewater treatment plant
- Wastewater quality information
- Source control

Bartle Wells Associates will provide information on:

- Rate structures
- Capital Improvement Projects (an overview)
- An overview of additional costs as developed in preparation for the presentation of the financial plan next year

Background

In November 2019, as part of the Wastewater Cost of Service Study process, the Utilities Commission received a comprehensive presentation on the Wastewater Utility from City staff. The information accompanying that presentation is included below for reference:

[Wastewater Utility 101](#) (*link*)

[City of Davis Wastewater Utility Review](#) (*link*) – PowerPoint Presentation

With the established plan for Commission cost of service studies, the utility introduction is presented prior to the release of the Request for Proposals (RFP) for the study. In 2020, with the three cost of service studies underway, and the impacts of the global COVID-19 pandemic, the timeline between the initial utility presentation and the introduction of the financial plan for the Wastewater utility has encompassed a full year.

To prepare for the financial plan discussion, a brief re-introduction to the utility will be provided, along with a presentation from the City’s consultant on the cost of service study, Bartle Wells, on the rate structures and some components of the financial plan introduced this year (CIP projects and additional costs).

Wastewater Utility Brief Overview

Components of wastewater and the collection system

The City’s Wastewater Division operates and maintains the City’s wastewater system, supporting the residential, commercial, and industrial activities of the community. This includes the operation and maintenance of the collection system, treatment plant, and restoration wetlands, as well as the treatment of the wastewater generated in the Yolo County service areas of El Macero, North Davis Meadows, Davis Creek (formerly Royal Oaks) Mobile Home Park, and the Teichert Construction Complex.

As with most municipalities in California, the City of Davis wastewater collection and storm drain systems are separate. Wastewater flows to the wastewater treatment plant via the collection system and stormwater flows directly to local waterways, untreated.

The City’s wastewater collection system serves a population of about 70,717 people in Davis’ 10.5 square mile service area. The system serves 15,238 residential connections, and 560 commercial, industrial and institutional customers (as of 2019).

Components of the Collection System:

- 164 miles of gravity sewers (approximately 3,300 line segments) ranging in size from 6 to 42 inches in diameter – to transport the wastewater to the pump stations
- 3,237 manholes
- 6 pump stations
- 2.63 miles of force mains ranging in size from 4 to 14 inches – to transport the wastewater from the pump stations
- Roughly 123 miles of sewer laterals

An overview of system operations and maintenance

The Wastewater Division is housed in the Public Works Utilities & Operations Department and has one division manager. The division employees represent two areas of focus within Wastewater:

- Collections Team (6 team members)
 - The Collections team performs preventative and reactive maintenance on the city’s sanitary sewer system, performs maintenance responsibility checks for sewer laterals, and responds to sewage system overflows on public and private property.
- Wastewater Treatment Plant Team (13 team members)
 - Maintenance (5)

- Operations (5)
- Laboratory (3)

Two utility and Supervisory Control and Data Acquisition (SCADA) controls system technicians, an electrician, a water quality coordinator (focused on wastewater regulatory compliance) and an environmental program specialist (focused on source control) also assist the division. In addition, the city’s Wildlife Resource Specialist works with the team on the Wetlands habitat areas.

The Wastewater Treatment Plant

The City’s Wastewater Treatment Plant is located near the Yolo County Landfill and is owned and operated by the City of Davis. The facility is permitted to treat 7.5 mgd (million gallons per day) of wastewater. The existing treatment system design capacity is 6 mgd based on average dry weather flow. There are two permitted discharge points from the plant. Treated effluent is discharged to the Willow Slough Bypass and the Conaway Ranch Toe Drain. The Wastewater Treatment Plant team complies with the final discharge requirements of the NPDES permit which is accomplished by operational, maintenance, electrical, and instrumentation tasks.

The wastewater treatment process consists of the following stages:

Preliminary Treatment

- Screening – using a mechanical bar screen to sift out large material such as rags, wood, or rocks.
- Aerated grit removal – particles of sand and/or silt are removed from the wastewater in an aerated chamber where heavier particles sink to the bottom of the tank.

Primary Treatment

- Sedimentation – Wastewater velocity slows to a point where heavier material sinks to the bottom of a tank and is removed for additional treatment while the remaining wastewater flows to secondary treatment.

Secondary Treatment

- Activated sludge – Naturally occurring bacteria are cultivated in tanks. Wastewater from the primary treatment flows into the tanks and the bacteria consume the organic waste in the water. Oxygen is added to create the ideal environment for the bacteria to thrive. The mixed water then flows to clarifiers to allow the bacteria to sink to the bottom and be recycled back to the aerated tanks while the remaining water flows to tertiary treatment.

Tertiary Treatment

- Filtering – Water from the secondary process flows to filters that remove any remaining particulate material.

Disinfection

- Just before water leaves the treatment plant, it is injected with a chlorine solution to provide disinfection. After the chlorine has disinfected the water, sodium bisulfite is added to remove the chlorine from the water prior to being discharged.

Wastewater quality information

Wastewater quality is regulated through the City's NPDES permit, which includes monitoring and reporting requirements for the City under the authority of the Central Valley Regional Water Quality Control Board (CVRWQCB).

In addition to routine monitoring performed by the City's onsite environment laboratory, and reporting required by the City's NPDES permit, technical reports and special studies are also required. Monitoring of required parameters from various locations at the plant is to ensure that treatment processes under normal operating conditions meet wastewater quality objectives in order to comply with the effluent limits (i.e. treated water quality), for the protection of aquatic life and the environment at both discharge locations.

Source control

Pretreatment programs provide outreach, education, and enforcement of the City's ordinances and permit requirements, related to the residential, commercial and industrial sources of wastewater, and identifying issues or concerns at the site of discharge. The goals of the program, in accordance with the Federal Clean Water Act, include:

- To prevent interference with treatment plant operations
- To protect public health and safety
- To protect the structure and integrity of the wastewater collection system to ensure that personnel working in the system are safe
- To protect the environment by preventing toxic or hazardous substances from passing through the treatment plant to the receiving water
- To improve opportunities to recycle and reclaim municipal and industrial wastewaters and sludges

The City's pretreatment program was established in 1995, as required by the US Environmental Protection Agency (EPA). The term pretreatment refers to the reduction of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties, in wastewater prior to discharging or introducing such pollutants into a treatment plant.

Pretreatment also includes pollution prevention programs that focus on education and enforcement to prevent conditions that lead to sanitary sewer overflows. The program also includes a focus on food service establishments as well as industrial pretreatment. Of chief concern with food establishments is the fats, oil and grease that can cause issues with the system.

