



San José-Santa Clara
Regional Wastewater Facility

CIP

CAPITAL IMPROVEMENT PROGRAM

Quarterly Status Report:
July – September 2022

MISSION

Rebuild and revitalize the
Regional Wastewater Facility
and deliver the CIP on time
and within budget.





CAPITAL IMPROVEMENT PROGRAM

HOW ARE WE DOING?

Key Performance Indicators (KPIs) Year-to-Date:

SAFETY

0 Incidents



EXPENDITURES

On Target



ENVIRONMENTAL

0 Permit Violations



The San José-Santa Clara Regional Wastewater Facility (RWF) is the largest advanced wastewater treatment facility in the western United States. The RWF has been treating the South Bay's wastewater and protecting public health and the environment without interruption since 1956. The discharge of clean wastewater into the South San Francisco Bay contributes to diverse and thriving fish and wildlife ecosystems.

Much of the RWF's infrastructure is functioning well beyond its intended use. As a result of a long and thoughtful Master Plan process, a \$2.1 billion, 30-year Capital Improvement Program (CIP) is modernizing and refurbishing the RWF so that its critical work can continue into the future. Homes and businesses in Silicon Valley need a modern, reliable, state-of-the-art treatment plant to ensure a high quality of life and thriving economy. The CIP is rebuilding RWF infrastructure and updating treatment processes with innovative, efficient new technologies. The first phase of the CIP is a 10-year plan that began in 2014, with a budget of \$1.4 billion.

This report summarizes the CIP's progress and highlights accomplishments from July to September 2022.

LEGEND



On Target



Alert



At Risk





Coordination is Key to Award-Winning Performance

By Kerrie Romanow, ESD Director

In August, the Environmental

Services Department was proud to receive the 2022 Organizational Excellence Award from the California Association of Sanitation Agencies (CASA). The award recognized the RWF CIP performance in several key areas, including leadership and management practices, governance, and budgeting and reporting. It also recognized the alignment between the CIP team and the Operations & Maintenance (O&M) staff — which allows for the uninterrupted daily operations of a facility that serves 1.4 million residents and more than 17,000 businesses while undergoes major construction. O&M teams are engaged throughout all phases of each CIP project:



Kerrie Romanow and Mariana Chavez-Vazquez at CASA Award Ceremony

***Scoping and feasibility:** O&M teams help clarify the challenges from the facility operator perspective. This includes supporting site visits by the project team to assess existing facilities. On one recent project, for example, buried pipelines – some over 100 inches in diameter – required inspection. These pipelines are in constant use, so for them to be inspected, O&M staff had to temporarily divert the flow early in the morning. O&M staff also participate in the evaluation of project alternatives.

*** Design:** CIP and O&M staff work together to define the design criteria, with O&M staff providing input on technical issues and contract specifications. For example, on the Blower Improvements Project, the blowers could not all be taken out of service at once, as they provide air essential for the secondary treatment process. O&M provided key input into the sequencing of this work.

*** Bid and award:** O&M staff facilitate pre-bid walkthroughs for prospective bidders and help answer bidder questions.

*** Construction:** On many projects, construction takes place in the dry season to take advantage of reduced flows to the RWF. Construction and testing, startup and commissioning (TSC) activities must be completed on schedule, to ensure sufficient treatment capacity during the wet season. O&M collaboration with CIP staff, design engineers, and contractors during TSC allows the CIP to meet this objective, consistently, across multiple projects. O&M staff participate in testing of new equipment and facilities and support the programming of new instrumentation and controls.

*** Post-construction:** O&M teams integrate into their daily activities the requirements for operating and maintaining new systems and equipment provided by each project.

The RWF continues to provide clean water to customers all over the South Bay, while helping the wildlife in the San Francisco Bay thrive. Meanwhile, its teams are carefully managing a 10-year, \$1.4 billion facility upgrade. Thanks to the collaboration of CIP and O&M staff, and their planning and coordination, the upgrades are taking place without any interruption to the facility’s essential operations. We are proud that CASA has recognized our excellent work.

First Phase of Advanced Facility Control and Meter Replacement Completed



CIP Project Team

A four-year project to upgrade control and monitoring equipment at the RWF has been completed — within budget, and with no interruption to the facility’s essential operations. The RWF relies on specialized equipment to control and monitor water treatment processes to maintain compliance with its National Pollutant Discharge Elimination System (NPDES) permit. Most of the original control equipment units were installed during the 1960s and 1970s and are in poor condition, requiring excessive maintenance. Some replacement parts are scarce or unavailable. This project replaced and upgraded equipment in the Secondary Battery B and Nitrification Battery B treatment areas.

The project started in July 2018 and reached substantial completion in July 2022. As is often the case with projects involving decades-old facilities, once demolition started, the infrastructure was found to be in worse condition than anticipated. The project team, O&M staff and the contractor had to work quickly and collaboratively to identify the extent of the deterioration and find solutions that would have the least impact on the project’s schedule, budget and RWF operations.

The result: Critical process monitoring and control equipment in the heart of the wastewater treatment process is now using current instrumentation technologies. These upgrades allow the RWF to treat wastewater reliably, efficiently and continuously. “I’m proud to have led the team in the resolution of significant challenges, and close out construction within the City Council-authorized budget,” said Project Manager **Kyle O’Dea**.



How the CIP Delivers Projects

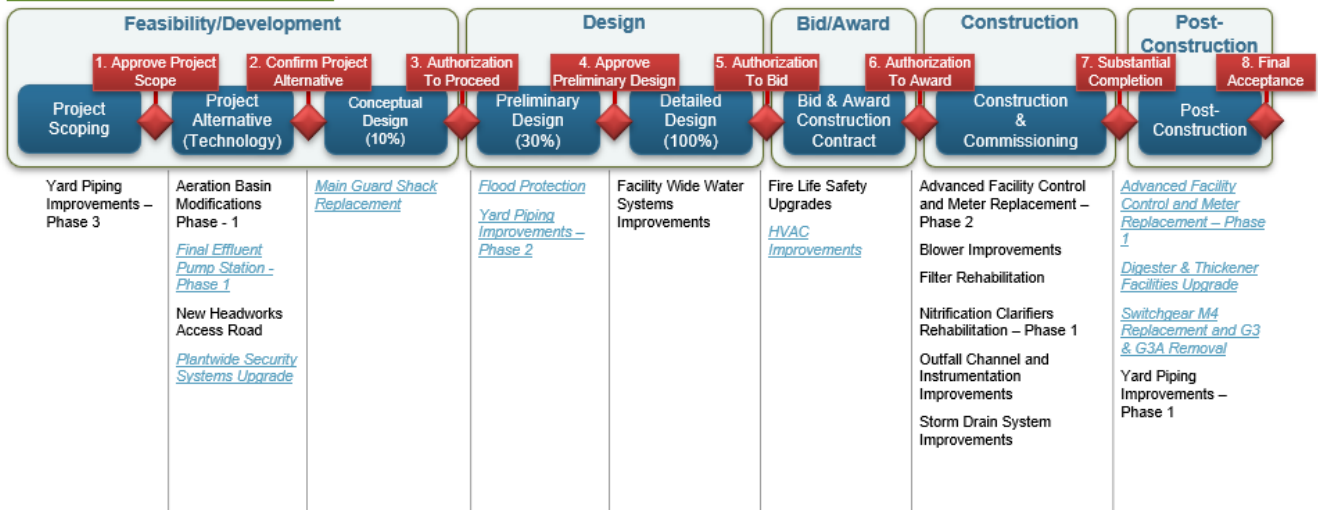
The CIP uses two project delivery methods:

- **Design-bid-build** is a commonly used delivery method in which an owner first procures a professional engineering firm to prepare detailed design plans and specifications for a project. The owner then gets bids for the project and procures a general contractor to construct the project based on the design completed by the engineer.
- **Progressive design-build** is a two-phase delivery method contracted with a single design-build firm in which the project's design, cost estimating, construction schedule and final guaranteed maximum price (GMP) are developed during the first phase. If the owner and design-builder agree on the schedule and the GMP during the first phase, the final design, construction and commissioning are completed during the second phase.

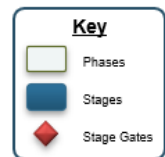
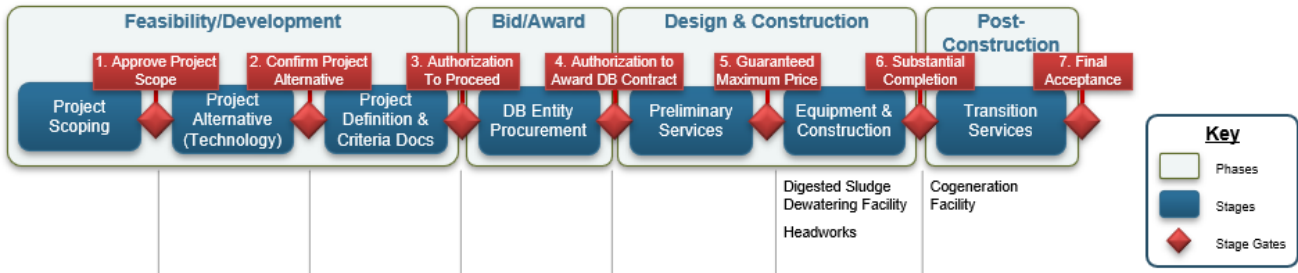
All CIP projects, regardless of project delivery method, follow a consistent process of consecutive delivery stages, each culminating in a stage gate, as presented in the project delivery models below. Stage gates are go/no-go points at which the project team must demonstrate that the project has met set evaluation criteria before advancing to the next delivery stage. The benefits of the stage gate process include consistency, quality, ensuring that the scope continues to address existing needs, budget/schedule control and Operations & Maintenance team engagement.

Active Projects by Delivery Model

Design-Bid-Build Active Projects



Progressive Design-Build Active Projects



*Projects shown underlined and in blue and italics have either been initiated or advanced this reporting period.



CIP PROJECTS

The CIP includes projects in both design and construction. CIP accomplishments for this quarter are outlined in two sections: Projects in Design and Projects in Construction. The CIP's projects in the construction and post-construction phases have cost and schedule baselines that are monitored using the City's Capital Project Management System. Project performance information can be found in the link below:

[Project Performance Information](#)

COVID-19 update: From July through September, CIP projects continued to progress despite COVID-19 pandemic impacts. Projects in construction continued with all contractors and construction management staff following the latest guidance from the Santa Clara County Health Officer and Public Health Director. The City continued to screen all City, consultant and contractor staff using an online form. During this period, CIP staff continued to work both in office and remotely. Environmental Services Department and Public Works staff continue to work with the City Attorney's office to address pandemic-related impacts to construction schedules and costs to ensure a consistent approach to resolving COVID-19-related claims across the City.

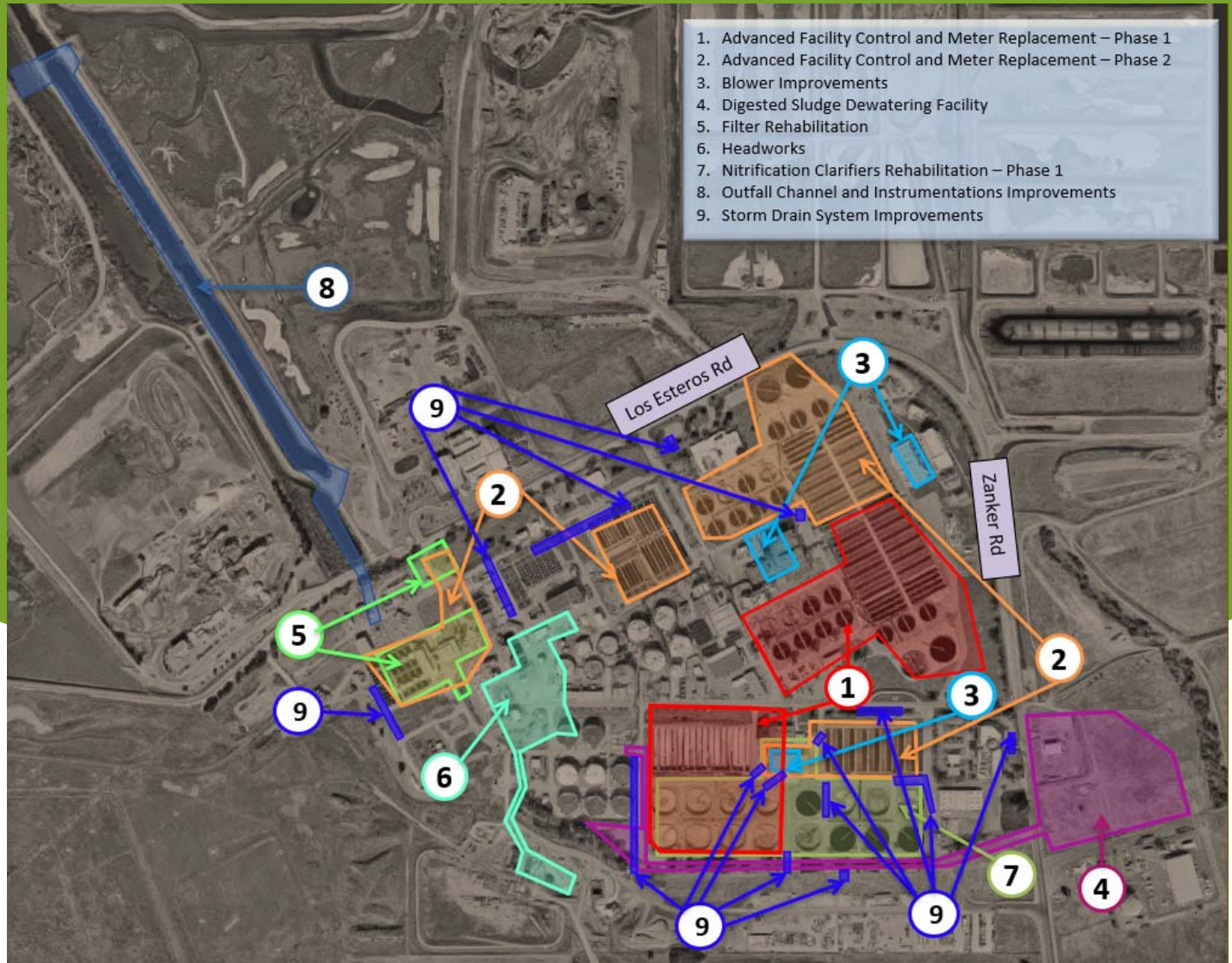
Projects in Design

- **Aeration Basin Modifications – Phase 1**
In July, the project team completed hazardous materials assessment in the east/west primaries and aeration basins. The team held a workshop to shortlist project alternatives for triple bottom line plus (TBL+) assessment.
- **Facility Wide Water Systems Improvements**
In July, consultant Kennedy/Jenks submitted the 60% design deliverables and started developing the 90% design.
- **Fire Life Safety Upgrades**
In August, Council awarded the construction contract to Blocka Construction, Inc. The project team started pre-construction activities in September.
- **Flood Protection**
In September, consultant HDR submitted the final conceptual design report.
- **Main Guard Shack Replacement**
In August, consultant Jacobs submitted the final conceptual design report.
- **New Headworks Access Road**
In August, consultant Brown and Caldwell completed site topographic surveys. In September, the project team held a workshop to review the draft Road Design Alternative Analysis Report and provide feedback to the consultant.
- **Yard Piping Improvements – Phase 2**
In August, consultant Black & Veatch submitted the draft 100% design documents, and a workshop was held in September to gather stakeholder feedback.
- **Yard Piping Improvements – Phase 3**
In July, consultant Black & Veatch submitted draft work plans for condition assessment of process pipes.



Projects in Construction

This aerial map of the RWF shows the CIP's active construction projects.



1

Advanced Facility Control and Meter Replacement - Phase 1: Reliably controlling processes



Contractors on a final walkthrough of Nitrification B side.

This is the first of a two-phase project. The project will replace aging and outdated RWF control equipment such as flow meters, valves, actuators and sensors. Original manufacturers no longer provide support for the existing equipment. New, reliable controls are vital to maintain effective process control and will ensure that the RWF continues to meet the requirements of the National

Pollutant Discharge Elimination System (NPDES) permit.
Project Budget: \$12.5 million
Achieved Beneficial Use: July 2022

Update:

- In July, the project achieved substantial completion.
- The project team and contractor Overaa continued to work on closeout activities.

2

Advanced Facility Control and Meter Replacement - Phase 2: Reliably controlling processes



Measurements being taken at Secondary Battery A.

The second part of a two-phase project, this project will replace aging and outdated RWF control equipment such as flow meters, valves, actuators and sensors. Original manufacturers no longer provide support for the existing equipment.

Project Budget: \$15.1 million
Expected Beneficial Use: March 2023

Update:

- In September, contractor Kiewit completed functional testing of new equipment installed in the Secondary Battery A area.
- Closeout activities continued in the Nitrification Battery A area.

3

Blower Improvements: Oxygenating wastewater with greater energy efficiency



New motor installed on Secondary Blower #2

RWF's aeration blower systems supply the oxygen needed for breaking down organic material in wastewater. The existing blower systems are more than 30 years old and need rehabilitation. This project will

replace blower engines, gearboxes and associated control equipment, extending the system's useful life and enhancing its energy efficiency.

Project Budget: \$50.9 million
Expected Beneficial Use: December 2022

Update:

- In July, contractor Monterey Mechanical completed pre-operational testing on Secondary Blower Building Blowers #2 and #3.
- Pre-operational testing for Tertiary Building Blower (TBB) #2 and operational testing for TBB #1 started in September.

4

Digested Sludge Dewatering Facility: Drying biosolids more efficiently and effectively



Dewatering Building Sewer and Process Drain pipe.

The RWF currently uses an open-air lagoon and drying bed process to stabilize biosolids before landfill disposal. The 2013 Plant Master Plan recommended transitioning

to an enclosed mechanical dewatering process. This project will build a new mechanical dewatering facility and associated support facilities.

Project Budget: \$173.8 million
Expected Beneficial Use: October 2025

Update:

- Design-builder Walsh continued to install process drain, office trailers, temporary utilities and temporary power as part of the early works package.
- In August, staff issued the notice to proceed to Walsh for the main construction work. Walsh commenced construction on the truck loadout area stair pad and dewatering building elevator pit.



5

Filter Rehabilitation: Protecting health and the environment, increasing reliability and capacity



Excavation for electrical duct banks near the Filtration Building.

The filtration process is one of the final steps in wastewater treatment. The RWF's tertiary filtration unit process consists of 16 granular media filters and ancillary equipment. Built in the 1970s and 1980s, these components are near the

end of their useful lives. The project will rehabilitate structural, mechanical, electrical and instrumentational elements of the system.

Project Budget: \$59.6 million

Expected Beneficial Use: July 2024

Update:

- In September, contractor Walsh completed work in filters A1, A2 and A3 and the A-side air scour piping. Walsh also continued to install media in the A3 filter and remove media from filters A5, A6 and A8 in preparation for construction.

6

Headworks: Offering better performance and reliability with new wastewater pre-treatment system



Aerial view of the new Raw Sewage Pump Station and Grit Facility.

Headworks pre-treatment of raw wastewater enhances and protects downstream treatment processes. This project will replace Headworks 1, the oldest RWF facility, with a new Headworks 3, and also modify Headworks

2. The new system will be more reliable and will be able to treat projected wet-weather wastewater flows.

Project Budget: \$171.7 million

Expected Beneficial Use: June 2023

Update:

- In August, design-builder CH2M completed earthwork and paving around the site, foul air duct in the grit basin, and meters and pipe supports in the west meter vault.
- In September, CH2M finished installing the Milpitas/66" reroute and commenced demolition of the 66-inch reinforced concrete pipe.

7

Nitrification Clarifiers Rehabilitation – Phase 1: Improving secondary treatment infrastructure and efficiency



Contractor assembling the clarifier mechanism at nitrification clarifier B6.

Central to the RWF's biological nutrient removal process, clarifiers separate sludge from effluent. The 16 existing clarifiers were constructed in the 1970s and 1980s and are near the end

of their useful lives. This project will make cost-effective improvements to enhance the clarifiers' efficiency and minimize unscheduled maintenance on them for the next 30 years.

Project Budget: \$51.1 million

Expected Beneficial Use: July 2023

Update:

- In July, contractor Overaa installed new clarifier mechanisms in Nitrification Clarifiers B6 & B7 and completed pre-operational testing.
- In September, Overaa installed a new motor control center for the A-side clarifiers and completed work in the return activated sludge gallery.

8

Outfall Channel and Instrumentation Improvements: Reliable water quality reporting at the edge of the Bay



The weir structure and Sulfur Dioxide building at the outfall channel.

The end product of the wastewater treatment process travels through the outfall channel to the Artesian Slough and South San Francisco Bay. This project will

replace older technology with a fiber optic system; install new instruments; construct a large vault structure to install new flow meter technology, making the meters accessible to staff; and improve the integrity of the weir structure.

Project Budget: \$9.9 million

Expected Beneficial Use: August 2023

Update:

- In July, contractor Anvil Builders completed excavation and pile casting for the flow meter vault.
- In September, Anvil completed the duct bank from the Sulfur Dioxide Building to the access gate, bridge lights and weir flashboards, flow meter vault, panel pad/canopy, and concrete and asphalt work in the Daylight Station.



9

Storm Drain System Improvements: Protecting critical infrastructure during 10-year through 100-year storm events



CCTV of Storm Drain

The RWF experiences localized flooding caused by runoff during heavy rainfall events. The existing storm drain system is deficient and needs to be improved to protect the operational area from floods. This project will improve the existing storm drain system by rehabilitating storm

water pump station, pipes, manholes, catch basins and other components. The upgrades made by this project will protect RWF's critical structures and equipment during 10-year through 100-year storm events.

Project Budget: \$13.8 million

Expected Beneficial Use: December 2023

Update:

- In July, contractor Ranger Pipelines continued to flush and clean storm drain pipes.
- In August and September, Ranger removed and replaced pipes on A St., the North Admin parking lot, B St., Main St., C St., D St., Center St. and the parking lot of the Environmental Services Building.































September 2022 aerial view of the Emergency Overflow Basin of Headworks Project.

What's Ahead?

In October - December 2022:

- Obtain Council approval of the contingency increase for Nitrification Clarifiers Rehabilitation – Phase 1 project.
- Issue construction notice to proceed for Fire Life Safety Upgrades project.
- Open construction bids for HVAC Improvements project.
- Advertise the construction contract for Yard Piping Improvements – Phase 2 project.
- Achieve Beneficial Use on Blower Improvements project and Advanced Facility Control and Meter Replacement – Phase 2 project.

Fiscal Year 2022-2023 Program Performance Summary

KPI	Target	Fiscal Year to Date			Fiscal Year End		
		Actual	Status	Trend	Forecast	Status	Trend
Stage Gates	90%	100%			100%		
		9/9 ¹			22/22		
Measurement: Percentage of initiated projects and studies that successfully pass each stage gate on their first attempt. Target: Green: >= 90%; Amber: 75% to 90%; Red: < 75%							
Schedule	90%	0%			50%		
		0/1 ²			2/4		
Measurement: Percentage of CIP projects delivered within 2 months of approved baseline Beneficial Use Milestone. ³ Target: Green: >= 90%; Amber: 75% to 90%; Red: < 75%							
Budget	90%	N/A			50%		
		0/0			3/6 ⁴		
Measurement: Percentage of CIP projects that are accepted by the City within the approved baseline budget. ³ Target: Green: >= 90%; Amber: 75% to 90%; Red: < 75%							
Expenditure	\$298M	\$271M			\$301M		
Measurement: CIP FY22-23 committed costs. Target: Committed costs meets or exceeds 70% of planned budget. 70% of \$426M = \$298M. Therefore Fiscal Year End Green: >=\$298M; Red: < \$298M							
Safety	0	0			0		
Measurement: OSHA reportable incidents associated with CIP Delivery for the fiscal year. Criteria: Green: zero injuries requiring hospitalization, zero fatality; Amber: 1 to 2 injuries requiring hospitalization, zero fatality; Red: >2 injuries requiring hospitalization, any fatality							
Environmental	0	0			0		
Measurement: Number of permit violations caused by CIP delivery for the fiscal year. Target: Green: zero incidents; Amber: 1 to 2; Red: > 2							
Vacancy Rate⁵	10%	13%			13%		
		11/85			11/85		
Measurement: Ratio of the number of vacant approved positions to approved positions. Target: Green: <= 10%; Amber: 10% to 20%; Red: > 20%							

Program KPI – Fiscal Year 2022-2023 information

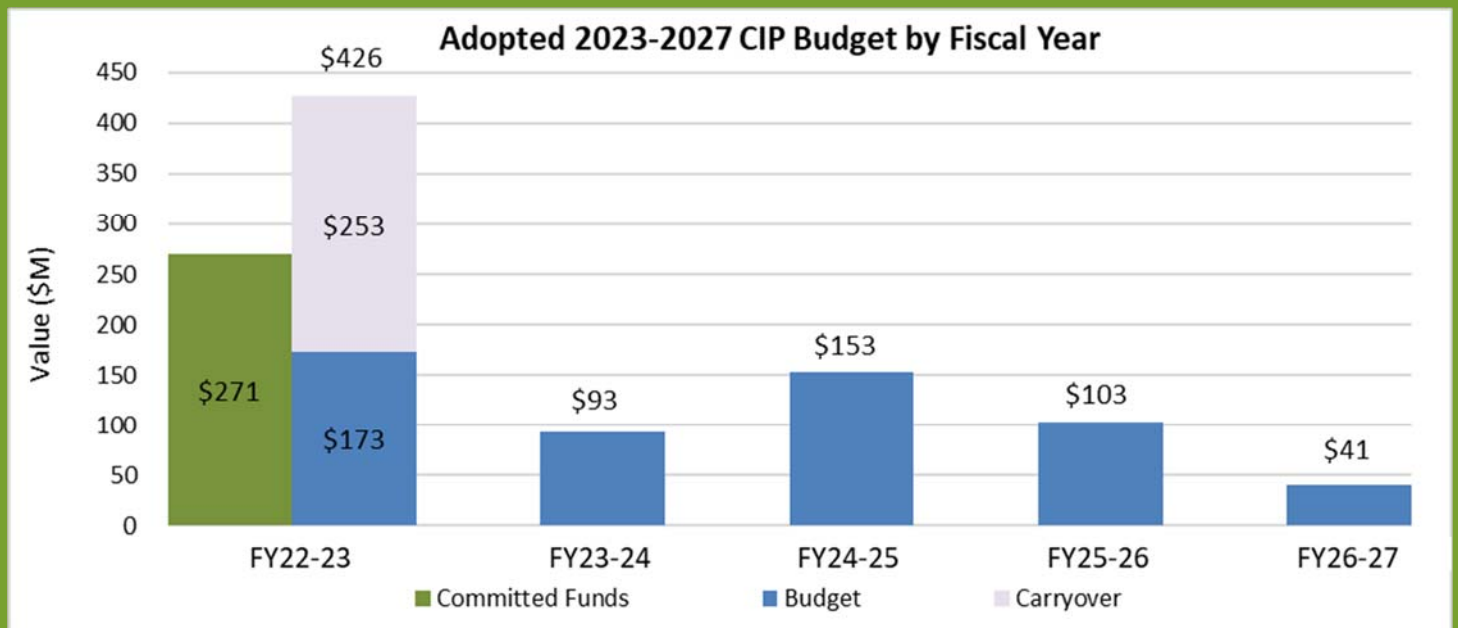




Program Budget Performance

This section summarizes the cumulative monthly budget performance for FY22-23 based on the Adopted 2023-2027 CIP Budget.

Adopted 2023-2027 CIP Expenditures and Encumbrances



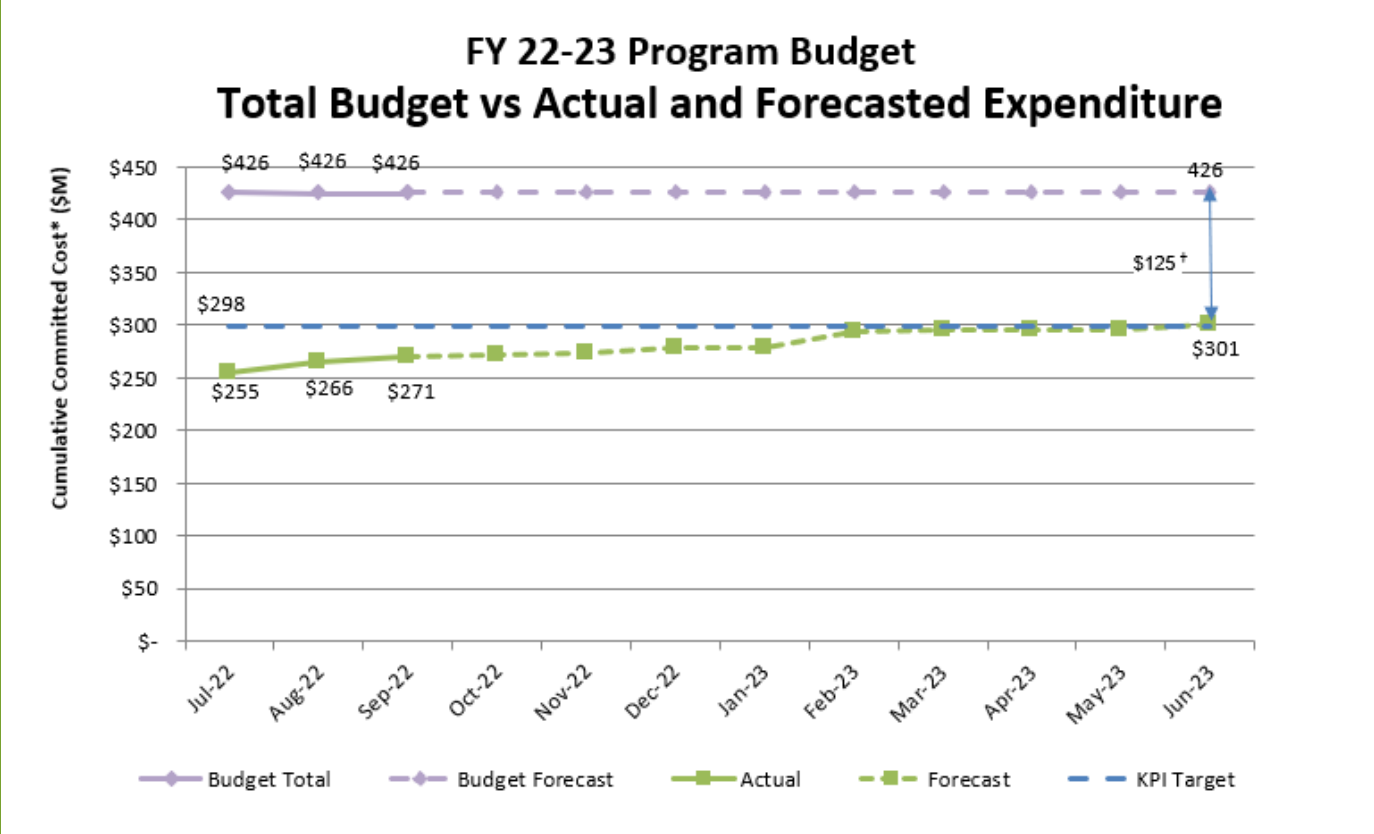
[Budget performance information](#)

Fiscal Year 2022-2023 Program Budget Performance

The FY22-23 CIP budget is composed of approximately \$173 million in new and re-budgeted funds, plus encumbered carryover of \$253 million, for a total of \$426 million.



FY22-23 Program Budget



[CIP program budget information](#)



How does the wastewater facility clean wastewater?



This award-winning [video](#) describes the process and equipment used to treat wastewater and protect public health and the environment.

Want to learn more?

[@sjenvironment](#)



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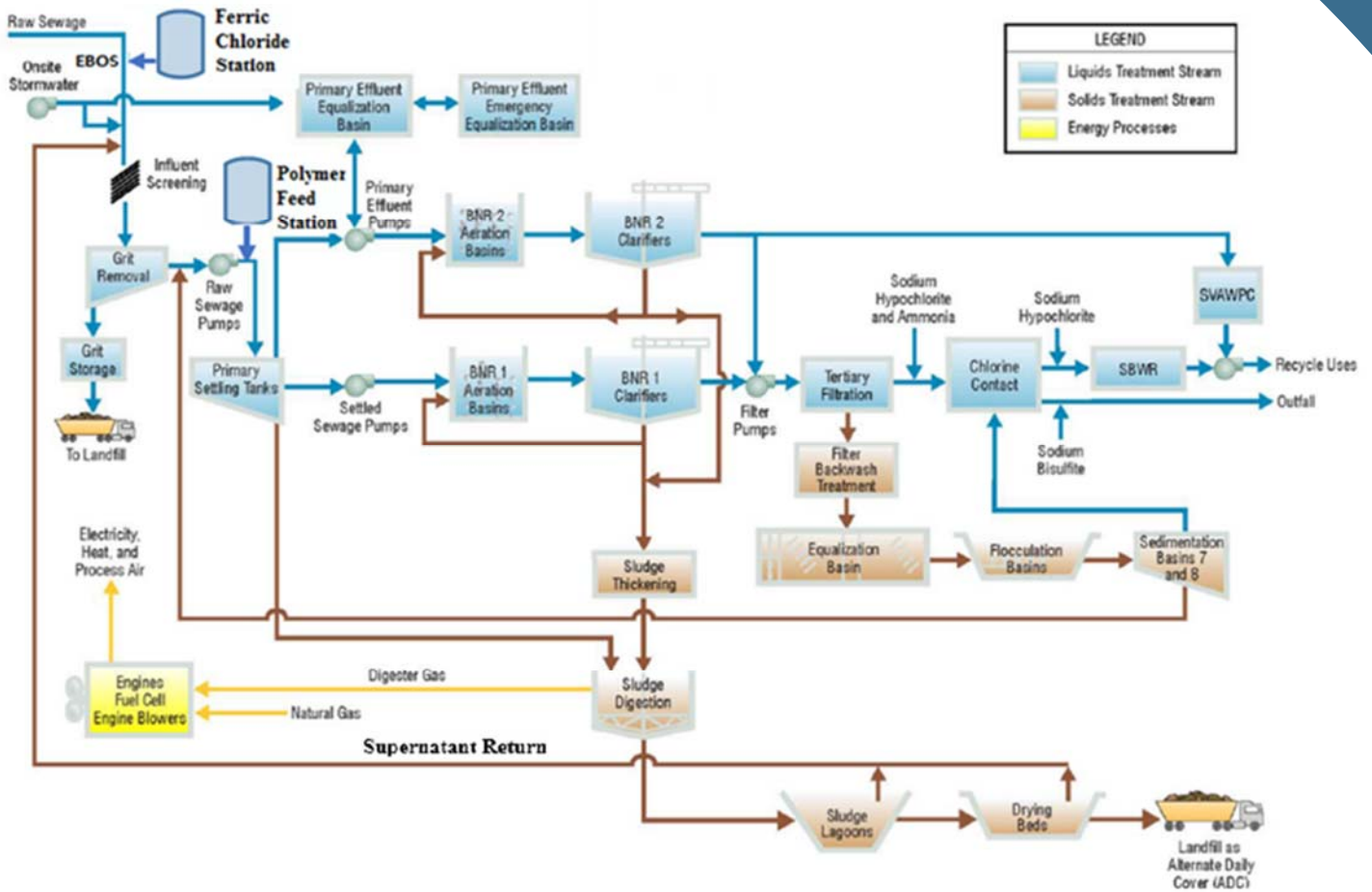


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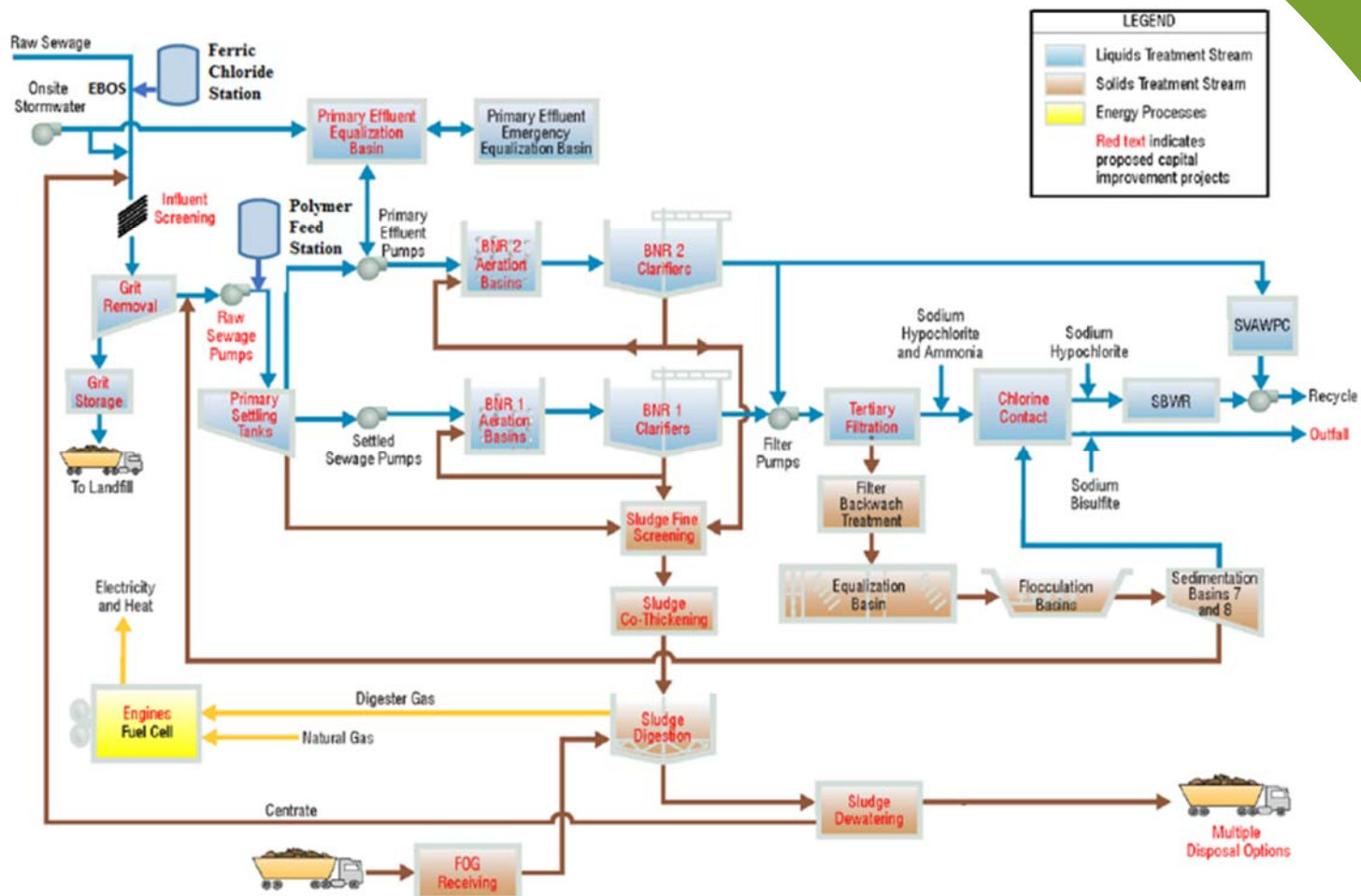
Regional Wastewater Facility Treatment

Current Treatment Process Flow Diagram



Regional Wastewater Facility Treatment

Proposed Treatment Process Flow Diagram



Glossary

Beneficial Use	When a CIP project is complete in accordance with contract documents and can be used or occupied by the City, it has achieved Beneficial Use.
Biogas	A renewable energy source produced by the breakdown of sewage waste in the absence of oxygen. Biogas is composed of methane, carbon dioxide and small amounts of hydrogen sulfide.
Biosolids	Treated sewage sludge.
Bufferlands	Open acreage used by wastewater treatment plants as a buffer between plant operations and nearby communities. Bufferlands minimize odor and operational impacts on plant neighbors and often serve as wildlife habitat.
Commissioning	The process of assuring that all systems and components of a facility, building or plant are designed, installed, tested, operated and maintained according to the owner's requirements.
DAFT	Dissolved air flotation thickener tanks. Dissolved air flotation, or DAF, is a treatment process that clarifies wastewater by removing suspended matter.
DCS	Distributed control system. A computerized system that allows treatment plant staff to remotely monitor and control treatment processes.
EIR	Environmental Impact Report. A public document required under the California Environmental Quality Act to describe potential environmental impacts associated with a project. An EIR also describes measures to mitigate the impacts.
Effluent	Treated wastewater that is discharged from a treatment plant.
Influent	Raw or untreated wastewater that flows into a treatment plant.
FOG	The Fats, Oils and Grease program administered by the City of San José's Environmental Services Department.
Headworks	Facilities that first receive influent at a wastewater treatment plant. The headworks screen and remove sticks, grit and other solid material from influent to protect downstream equipment in the treatment process.
NPDES permit	Under the federal Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program regulates point sources such as pipes and other conveyances that discharge pollutants into water. In California, NPDES permits for the discharge of treated wastewater are issued by the Regional Water Quality Control Boards.
Polymer	Primarily used to help manage the process of drying and consolidating sludge.
Preliminary treatment	The preparatory wastewater treatment stage, in which influent passes through headworks, which screen and remove sticks, rocks and debris; and grit chambers, which remove sand and gravel.
Primary treatment	The initial treatment for incoming wastewater, in which gravity settles solid material and rotating bars skim floating fats, oil and grease from influent.
Secondary treatment	The second stage of wastewater treatment, in which aeration tanks pump air into wastewater to promote the growth of naturally occurring bacteria that remove organic pollutants.
Stormwater	Water from rain that does not seep into the ground but instead flows into storm drains as runoff.
Tertiary treatment	The final stage in advanced wastewater treatment, in which wastewater flows through filter beds, then through chlorinated tanks to become 99 percent clean.
Wastewater	Water that enters the sanitary sewer system for treatment at a pollution control plant.
Wastewater Cake	Sludge that is compressed after dewatering.
WAS	Waste-activated sludge, or the excess quantity of bacteria and microbes removed from the secondary wastewater treatment process.

