San José-Santa Clara
Regional Wastewater Facility

CIP

CAPITAL IMPROVEMENT PROGRAM

Quarterly Status Report:
October – December 2021

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 (KPI) Year-to-Date:

SAFETY
0 Incidents

EXPENDITURES
On Target

ENVIRONMENTAL
0 Permit Violations

LEGEND

●	On Target
▲	Alert
◆	At Risk

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 October to December 2021.

CIP-Consultant Roles Transition

By: Kerrie Romanow, ESD Director

The CIP is a complex, $1.4 billion program to modernize and refurbish the RWF over 10 years. The program consists of more than 30 projects, most of which are being designed and constructed while the RWF continues to operate 24 hours a day, 365 days a year. Teams of dedicated, experienced staff and contractors work hard every day to bring this much-needed effort to fruition.

To ensure that projects move forward as operations continue unimpeded, the CIP needs high-level program management expertise. In October 2013, as the Plant Master Plan was being approved and the program was being launched, the City of San José (City) and Stantec Consulting Services, Inc. (formerly MWH Americas) entered into a five-year, $39 million master agreement for professional program management services. In October 2017, this agreement was amended to become a 10-year, $78 million agreement, so that Stantec could provide professional staff, as well as processes and systems, to help the City manage and deliver projects through June 2023, aligning with the 10-year CIP. Stantec's services and technical expertise have been, and continue to be, critical in implementing the program.

A core City principle when bringing Stantec in was prioritizing the transfer of knowledge and skills from consultant staff to City staff. This knowledge transfer has occurred since the CIP began, and over the years has consisted of formal training, "on the job" training, and City shadowing of key roles. The overall goal is to ensure the transition of key roles to the City before the end of Stantec's services. The transitioning process starts with assigning City staff to shadow a consultant expert to build up competencies and experience before fully taking over the role. Over the years, there has been a systematic and progressive transitioning of key roles from Stantec to the City, including positions such as package managers, project managers and program controls staff. This process continues, although challenges in filling some senior-level positions in a tight labor market continue.

Transitioning Process – Program Controls

The Program Controls Team consists of multidisciplinary professionals who specialize in project and program scheduling, cost estimating, stage gates and database management. Program Controls Team roles have been progressively transitioned to City staff over the years. One of the first role transitions was the Stage Gate Manager. The Stage Gate Manager oversees the program governance process, working with project teams, to ensure projects are delivered in alignment with the mission, vision and goals of the program, while managing scope, cost, schedule and risks and ensuring robust stakeholder engagement throughout project delivery.

Several other program control roles have transitioned from consultant to City staff, including Reporting Lead, CIP Portal Administrator, Document Manager and Program Controls Manager. Future roles to be transitioned in the coming months include Risk and Interface Manager and Construction Coordinator. As transitioning proceeds, CIP staff continue to gain valuable and necessary skills. The City's transition strategy is paving the way toward long-term resource sustainability for the CIP, with the recognition that certain key programmatic roles will likely continue to require consultant expertise, given their specialized nature.

Future Resource Planning

City staff regularly review program and project resource needs, based on the latest forecast of upcoming projects. The most recent CIP planning review is underway. Upon completion, it will identify any potential City resource gaps, together with recommendations for how such gaps will be addressed through recruitment, additional consultant staff or project sequencing.

RWF Spotlight – Yard Piping Improvements Project Maintains Critical Wastewater Flows

At the RWF, approximately 67,000 linear feet (LF) of process pipes carry gas, liquids, sludge, air, steam and other process streams across various treatment areas. These pipes vary in age, material, size and condition. Sixteen of these pipe systems, totaling 21,000 LF, were identified as being at high risk of failure in a 2015 study, with two of the highest priority pipes showing severe crown corrosion. As a result of these findings, the City expedited RWF pipeline rehabilitation in separate projects. First, a 78-inch settled sewage (SES) pipe was rebuilt in 2018, under the Digester and Thickener Facilities Upgrade Project project, followed by the 96-inch SES, and 87-inch x 136-inch SES pipes in 2020. The remaining high-priority pipes are being addressed by the Yard Piping Improvements Project, through multiple phases.

In 2021, the first phase of the project completed rehabilitation of 490 LF of 78-inch primary effluent (PE) pipe and 146 LF of 96-inch PE pipe using the cured-in-place-pipe (CIPP) lining method. The CIPP rehabilitation method was chosen because it does not require excavation and therefore causes less disruption to surface activities. Also, because the CIPP lining can be installed over a shorter construction duration, rehabilitation work can typically be completed during a dry season (i.e. between May and October) when flows to the RWF are low, and processes can be safely shut down without impact to treatment capacity. During construction of the Phase 1 project, flows through the pipes were temporarily rerouted, which allowed the RWF to continue to treat wastewater uninterrupted. Coordinated efforts by CIP and Operations and Maintenance (O&M) staff and the contractor ensured that the construction was complete. The pipes were returned to service by the start of the wet season in October 2021. This important work will extend the pipes' service life for 50 years. "I'm proud to manage projects that inspect, repair and maintain such important infrastructure," said **Tie Feng**, project manager.

96-inch primary effluent pipe with crown corrosion before (left) and after (right) CIPP rehabilitation.

The Phase 2 project has identified nine additional high-priority pipes for rehabilitation in the 2023 and 2024 dry seasons. This includes the 120-inch raw sewage pipe and 48-inch Santa Clara Force Main, which convey raw sewage to the RWF from the City of San José and City of Santa Clara, respectively. Phase 2 is currently in design development and the construction contract is anticipated to be advertised in fall 2022.

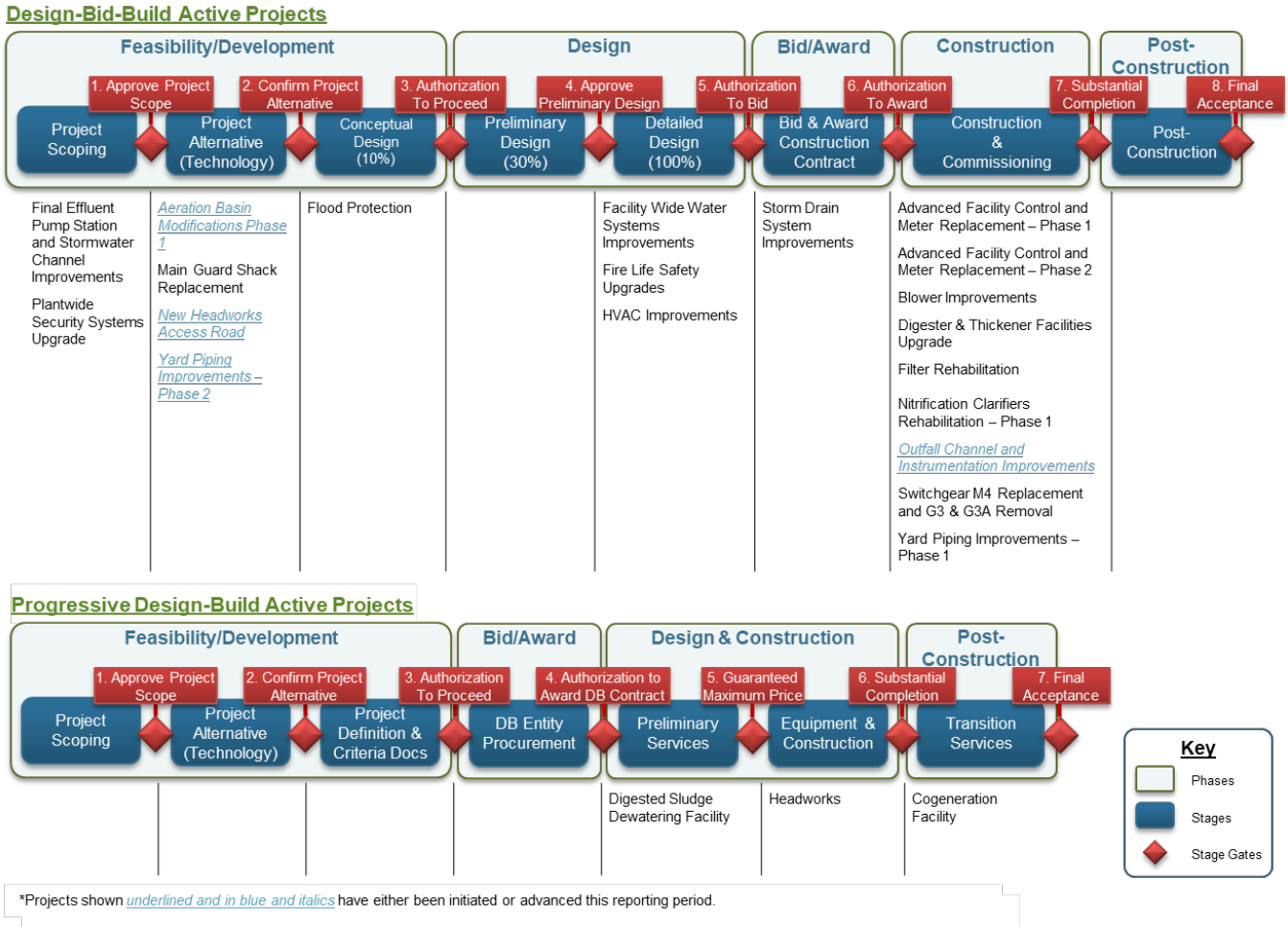
How the CIP Delivers Projects

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 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 O&M team engagement.

Project Delivery Models



*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 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

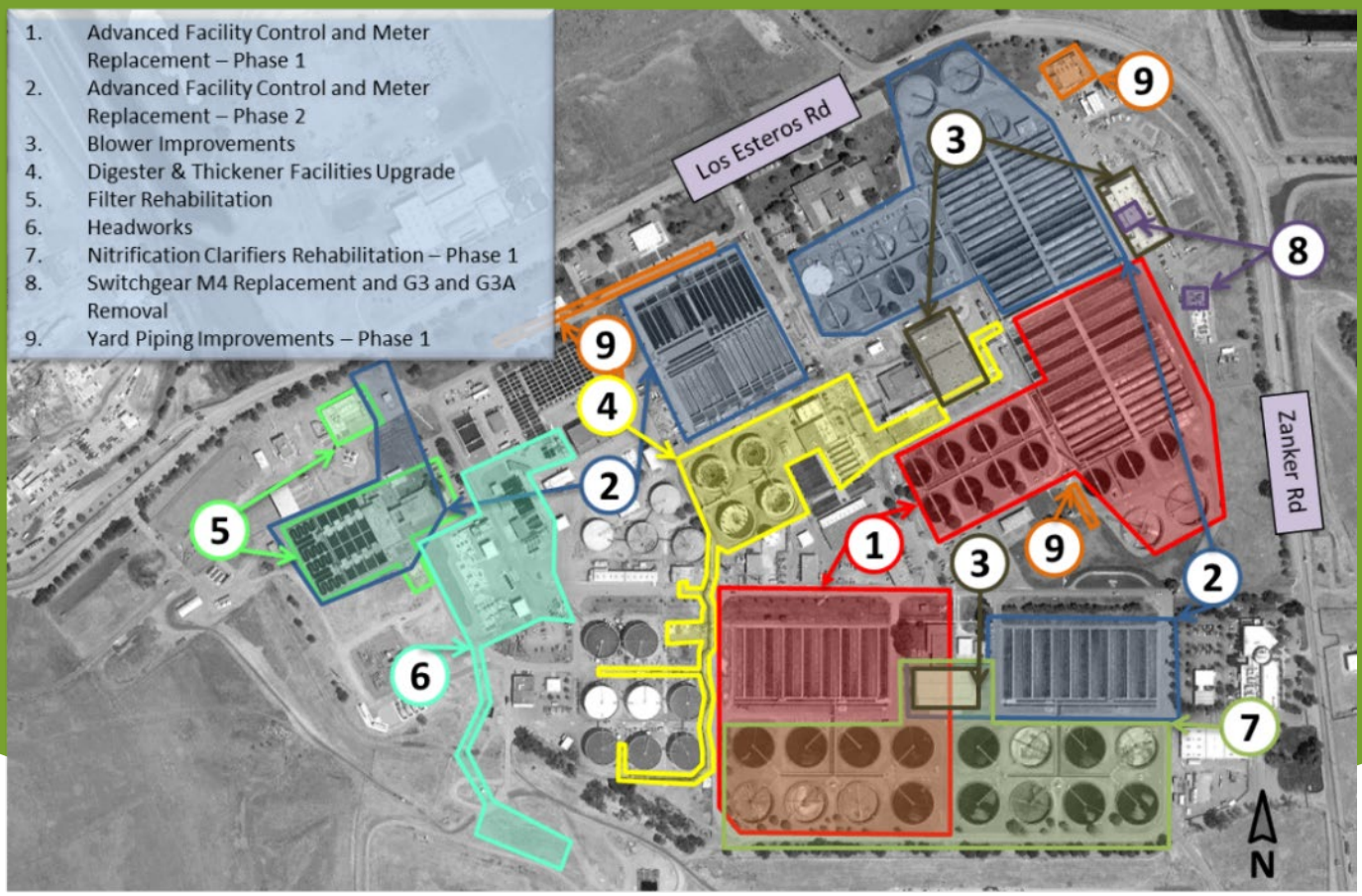
COVID-19 update: From October through December, CIP projects continued to progress despite COVID-19 pandemic impacts. Projects in construction continued with all contractors and construction management (CM) staff following the latest guidance from the Santa Clara County Public Health Officer. The City continued to screen all City, consultant, and contractor staff using an online form. All other CIP staff continued to work remotely. Environmental Services 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

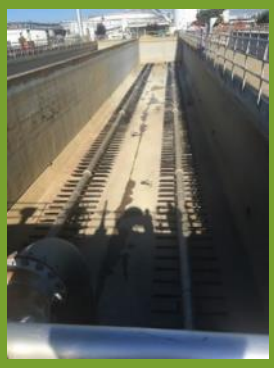
- Digested Sludge Dewatering Facility Project
  Design-builder Walsh completed site clearing and grubbing in October and began recycled water pipe relocation activities in November.

  In December, the project team completed negotiating a fixed price with the design-builder and anticipate bringing the definitive contract amendment to TPAC and Council in March.
- Facility Wide Water Systems Improvements Project
  In October, consultant Kennedy/Jenks began work on the 60 percent design, which is expected to be completed in May 2022.
- Main Guard Shack Replacement Project
  In December, consultant Jacobs began work on alternatives analysis and conceptual design.
- New Headworks Access Road
  In December, staff approved the renaming of the Construction-Enabling Improvements Phase 2 Project to the New Headworks Access Road to reflect the finalized scope. This project will construct a permanent road from the RWF's construction entrance to the new Headworks 3 transfer point for septic hauling and chemical trucks. The scope includes proper drainage and spill protection for the road.
- Outfall Channel and Instrumentation Improvements Project
  In October, Council approved award of the construction contract to Anvil Builders Inc. The City will issue the Notice to Proceed (NTP) in January.
- Storm Drain System Improvements Project
  The City rejected all bids in November and re-advertised the construction contract in December. The City received one bid and staff will recommend award of the construction contract to TPAC and Council in March 2022.
- Yard Piping Improvements – Phase 2
  In December, the project team completed project scoping and received approval to proceed with project alternatives and conceptual design.

Projects in Construction



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



New O&M -installed diffusers at the Nitrification B area.

This is the first of a two-phased 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: $12.4 million
Expected Beneficial Use: April 2022

Update:

- In preparation for functional testing by contractor Overaa, O&M completed diffuser installation and filled the tanks on the Nitrification B side in November. Functional testing began in December and is anticipated to be completed in January.

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

New transmitter installed at the Nitrification Tank Gallery A.

The second part of a two-phased 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: $15.0 million
Expected Beneficial Use: March 2023

Update:

- Contractor Kiewit began the 28-day operational testing of new equipment on the Nitrification A side in November, and successfully completed testing in December.

3 Blower Improvements Project: Oxygenating wastewater with greater energy efficiency

Tertiary Building blower after a motor replacement.

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: $51.5 million
Expected Beneficial Use: November 2022

Update:

- Contractor Monterey Mechanical completed Primary Air Building (PAB) Blower #3 operational testing in October. Tertiary Blower Building (TBB) #4 operational testing began in November and successfully completed testing in December. TBB #5 began functional testing in December and is anticipated to be completed in January.
- Monterey Mechanical began demolition of the Secondary Blower Building B side blower engines in November.

4 Digester and Thickener Facilities Upgrade Project: Producing energy, improving treatment

Completed paving at the Digester and Thickener Facilities.

The RWF's 16 digesters use anaerobic digestion to break down sludge. This project will upgrade four of the digesters to improve gas production, reduce sludge volume and reduce the number of digesters required. A new sludge screening building will allow primary sludge to be thickened with secondary sludge before it reaches these upgraded digesters. Six thickening tanks will be renovated to improve efficiency, allowing the RWF to retire 10 older tanks.

Project Budget: $200.1 million
Expected Beneficial Use: April 2022

Update:

- Contractor Walsh began operational testing of the sludge screens on waste-activated sludge using polymer in October.
- Walsh completed operational testing on water of the four renovated digesters, six gas compressors, eight heat exchangers and 30 pumps in December.

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

Aerial view of the current filtration area.

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: $58.3 million
Expected Beneficial Use: July 2024

Update:

- In November, contractor Walsh completed potholing to identify potential underground utilities conflicts.

6 Headworks Project: Pretreating wastewater with better performance and reliability

Three climbing bar screens installed at the Headworks Project.

Headworks pretreatment of raw wastewater enhances and protects downstream treatment processes. This project will replace Headworks 1, the oldest facility in the RWF, with a new Headworks 3, and also modify Headworks 2. The new pretreatment system will be more reliable and will be able to treat projected wet-weather wastewater flows.

Project Budget: $172.6 million
Expected Beneficial Use: June 2023

Update:

- In November, design-builder CH2M installed three climbing bar screens at the influent screening structure and successfully completed factory acceptance testing for all five raw sewage pumps.
- CH2M began installing the final sections of the 96-inch pipeline in October and anticipates completion in January. CH2M completed reinstatement of the Emergency Overflow Basin berm in October. In November, the formwork pouring of the last sections of concrete lining began.

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

Contractor installing a screen in a clarifier

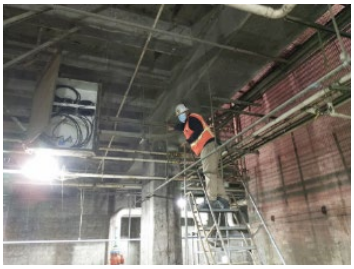
Central to the RWF's biological nutrient removal (BNR) process, clarifiers separate sludge from effluent. The 16 existing clarifiers were constructed in the 1970s and 1980s and are near the end of their useful lives. This project will make cost-effective improvements to enhance the clarifiers' efficiency and minimize unscheduled maintenance on them for the next 30 years.

Project Budget: $62.7 million
Expected Beneficial Use: August 2023

Update:

- Contractor Overaa completed pre-operational testing of new equipment in the Nitrification Battery B clarifiers in October and commenced functional testing in December. Process startup is anticipated in February.

8 Switchgear M4 Replacement and G3 & G3A Removal Project: Upgrading systems, enhancing safety



Contractors removing wire and conduits for the black start engine.

For the last 10 years, the RWF has been implementing a series of electrical reliability projects to strengthen the RWF electrical distribution system. This project will replace the aging M4 switchgear with a new switchgear with 3,000-amp breakers. The M4 switchgear replacement will have protective relays to lower arc flash levels, enhancing employee safety. Removal of the existing G3 and G3A switchgears is also in the project scope.

Project Budget: $9.6 million
Expected Beneficial Use: July 2022

Update:

- In October, the Switchgear M4 operational testing was successfully completed and the demolition of the G3 & G3A Switchgear began.
- Demolition of the existing Switchgear M5 cabling and conduits was completed November and removal of the wiring and conduits to the G3A was completed in December.

9 Yard Piping Improvements – Phase 1: Repairing and replacing important pipelines at the RWF

Contractor installing a new electric actuator in the PEPS Building.

The RWF has 67,000 linear feet of process pipes that carry gas, liquids, sludge, air, steam and other process streams to and from the various treatment areas. These networks of pipeline are critical to RWF operations. Seventy percent of the pipes are more than 25 years old, and 10 percent are more than 50 years of age. This is the first of a multi-phased project to repair or replace pipe systems that have been identified as high priority or at high risk of failure.

Project Budget: $5.4 million
Expected Beneficial Use: January 2021

Update:

- In December, contractor Michels Pipeline Construction successfully installed an electric valve actuator and strap-on flowmeter in the Primary Effluent Pump Station (PEPS) building. Functional testing is anticipated to be completed in January.

November 2021 aerial view of the Headworks Project.

What's Ahead?

In January - March 2022:

- Issue NTP to the contractor for the Outfall Channel and Instrumentation Improvements Project;
- Obtain Council approval for a second Owner Controlled Insurance Program to provide coverage for the CIP's upcoming construction projects;
- Obtain Council approval for the Definitive Contract Amendment for the Digested Sludge Dewatering Facility Project;
- Obtain Council approval to award the construction contract for the Storm Drain System Improvements Project; and
- Advertise the construction contract for the Fire Life Safety Upgrades Project.

Program Performance Summary

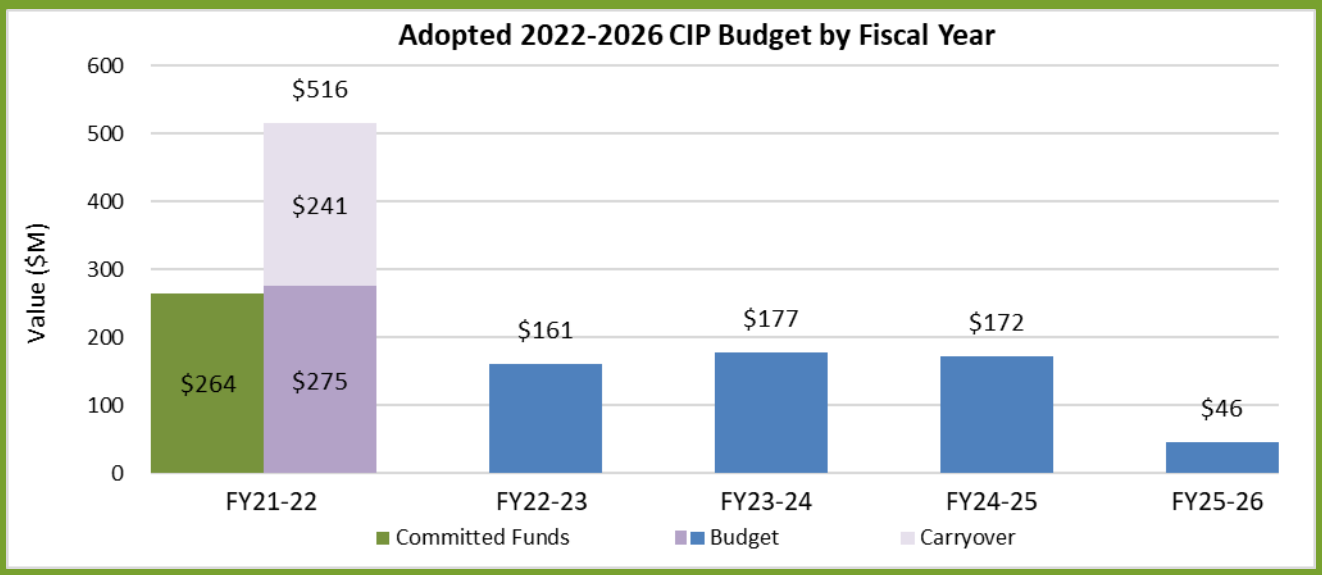
KPI	Target	Fiscal Year to Date			Fiscal Year End		
		Actual	Status	Trend	Forecast	Status	Trend
Stage Gates	90%	100% 9/9 [2]			100% 21/21 [3]		
Measurement: Percentage of initiated projects and studies that successfully pass each stage gate on their first attempt. Target: Green: >= 90%; Amber: 75% to 90%; Red: < 75%							
Schedule	90%	0% 0/0			0% 0/3[4]		
Measurement: Percentage of CIP projects delivered within 2 months of approved baseline Beneficial Use Milestone.[1] Target: Green: >= 90%; Amber: 75% to 90%; Red: < 75%							
Budget	90%	N/A 0/0			50% 1/2[5]		
Measurement: Percentage of CIP projects that are accepted by the City within the approved baseline budget.[1] Target: Green: >= 90%; Amber: 75% to 90%; Red: < 75%							
Expenditure	$361M	$264M			$433M [6]		
Measurement: CIP FY21-22 committed costs. Target: Committed costs meets or exceeds 70% of planned budget. 70% of $516M = $361M. Therefore Fiscal Year End Green: >=$361M; Red: < $361M							
Safety	0	0			0		
Measurement: Number of OSHA reportable incidents associated with CIP delivery for the fiscal year. Criteria: Green: zero incidents; Amber: 1 to 2; Red: > 2							
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 Rate[7]	10%	14% 12/84			10% 8/84		
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 2021-2022 information

Program Budget Performance

This section summarizes the cumulative monthly budget performance for FY21-22 based on the Adopted 2022-2026 CIP Budget.

Adopted 2022-2026 CIP Expenditures and Encumbrances

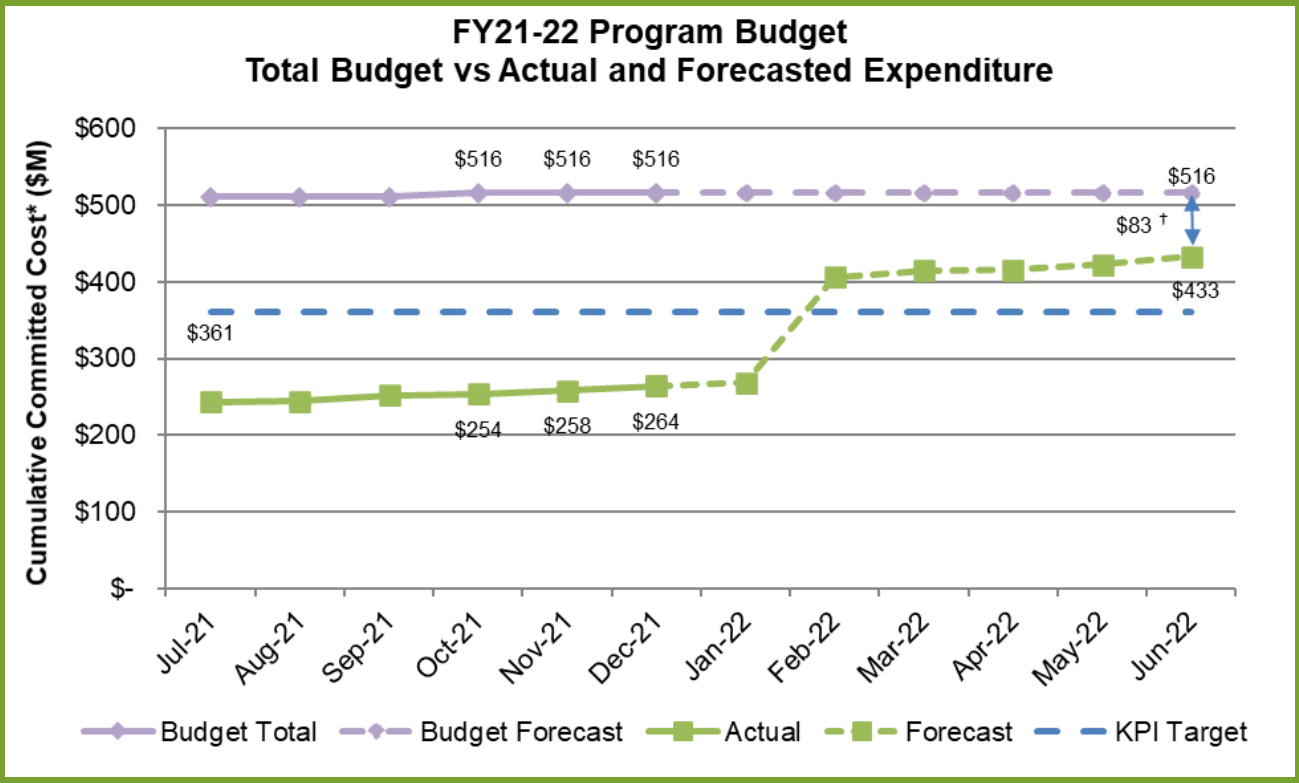


Budget performance information

Fiscal Year 2021-2022 Program Budget Performance

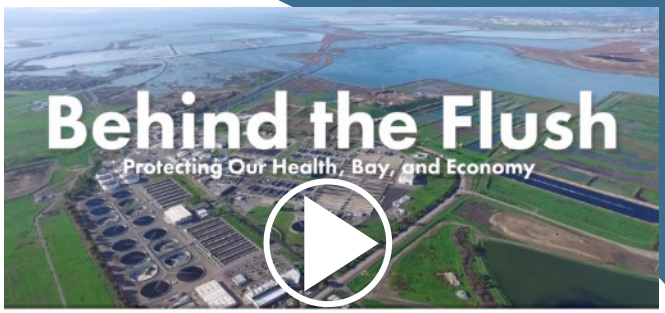
The FY21-22 CIP budget is comprised of approximately $275 million in new and re-budgeted funds, plus encumbered carryover of $241 million, for a total of $516 million.

FY21-22 Program Budget

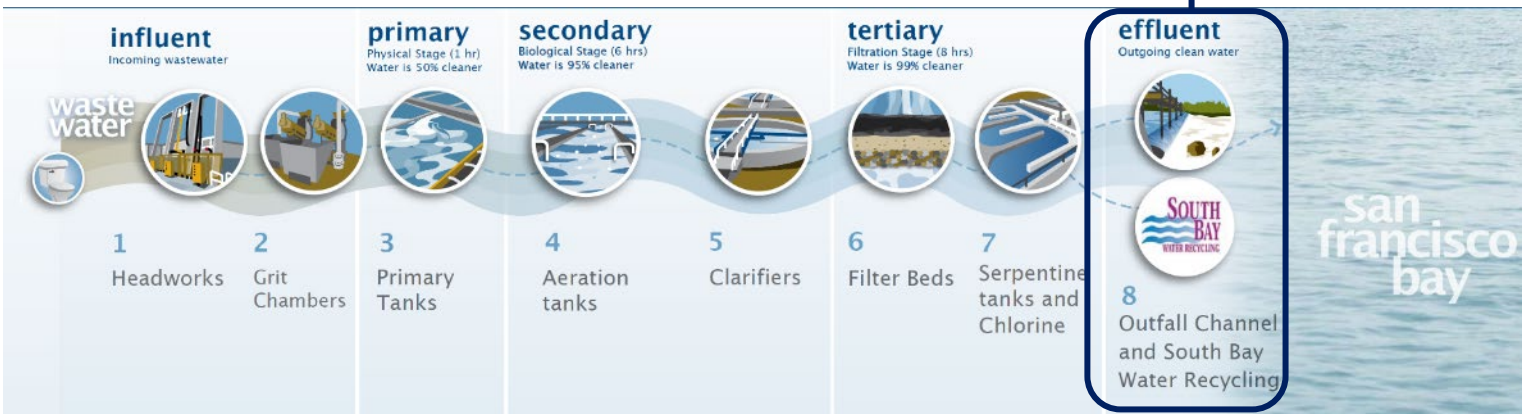


CIP program budget information

How does the wastewater facility clean wastewater?



Eighth Step: Final Effluent



Want to learn more?

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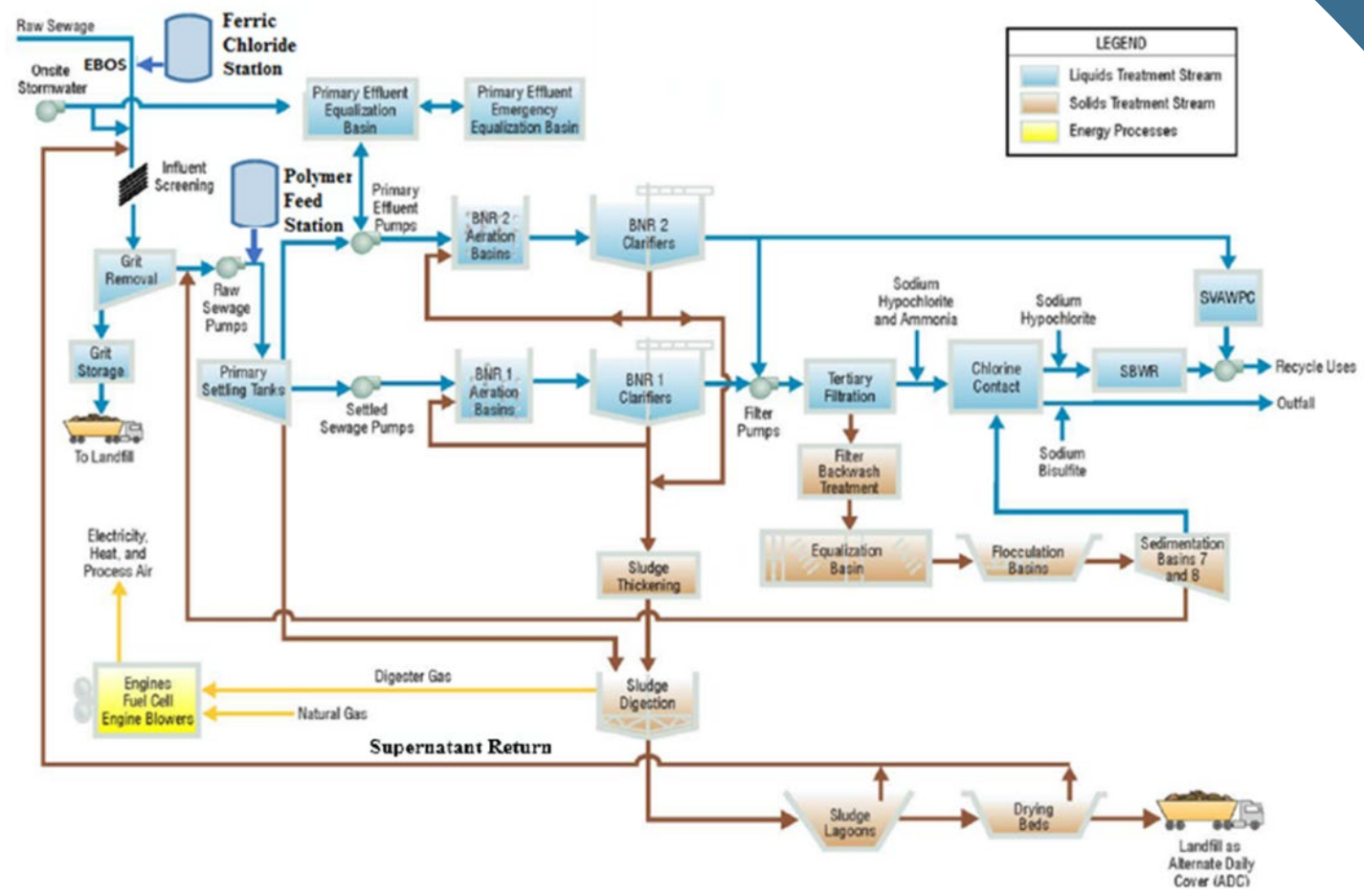
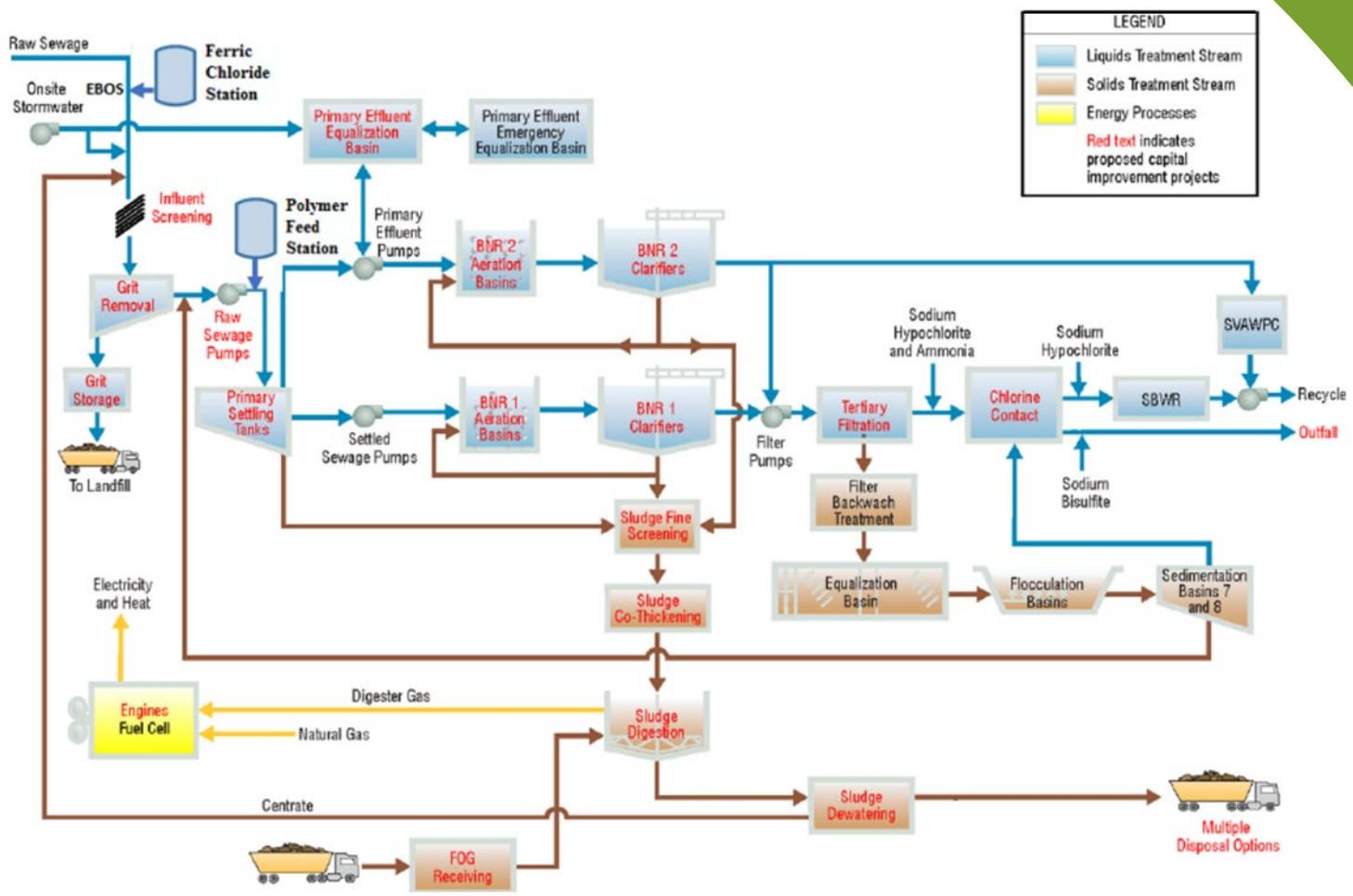
Regional Wastewater Facility Treatment

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 comprised 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	A distributed control system (DCS) is a computerized system that allows treatment plant staff to remotely monitor and control treatment processes.
EIR	An Environmental Impact Report (EIR) is 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.