



San José-Santa Clara
Regional Wastewater Facility

Capital Improvement Program Monthly Status Report: February 2019

April 4, 2019

This report summarizes the progress and accomplishments of the Capital Improvement Program (CIP) for the San José-Santa Clara Regional Wastewater Facility (RWF) for February 2019.

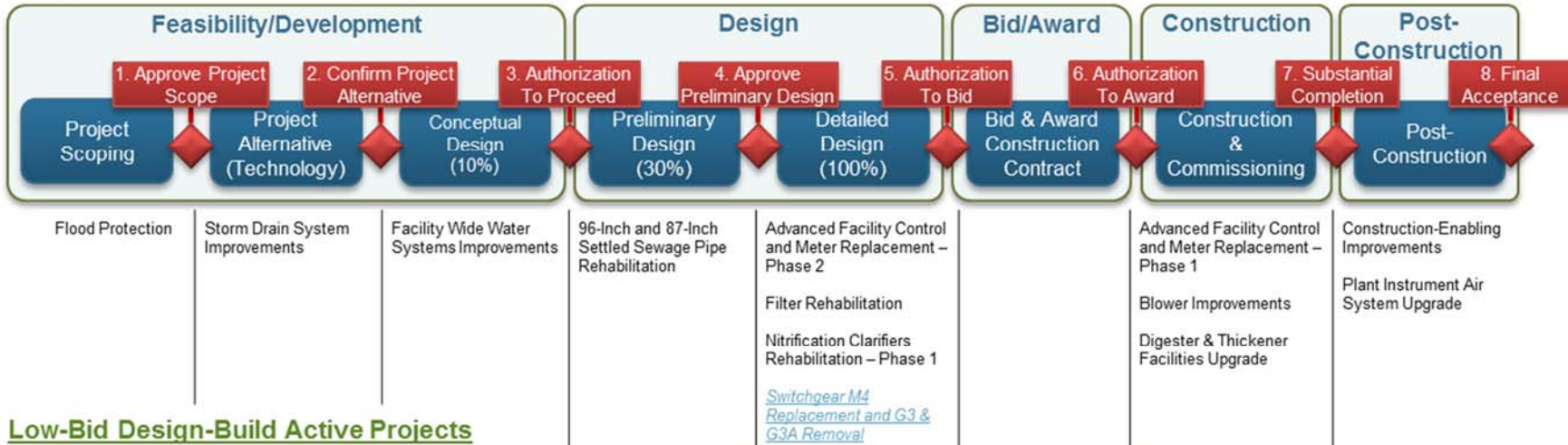
Report Contents

Project Delivery Model	2
Program Summary	3
Program Highlight – Vendor Open House	4
Program Performance Summary	6
Program Budget Performance Summary	7
Project Performance Summary	9
Project Significant Accomplishments	11
Explanation of Project Performance Issues	12
Project Profile – Fire Life Safety Improvements.....	14
Regional Wastewater Facility Treatment – Current Treatment Process Flow Diagram	16
Regional Wastewater Facility Treatment – Proposed Treatment Process Flow Diagram.....	17
Active Construction Projects – Aerial Plan.....	18

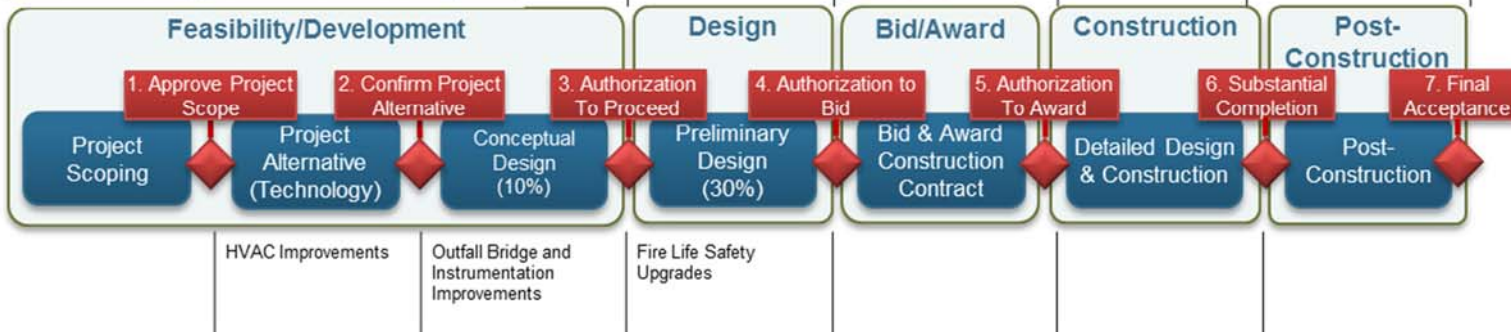


Project Delivery Models

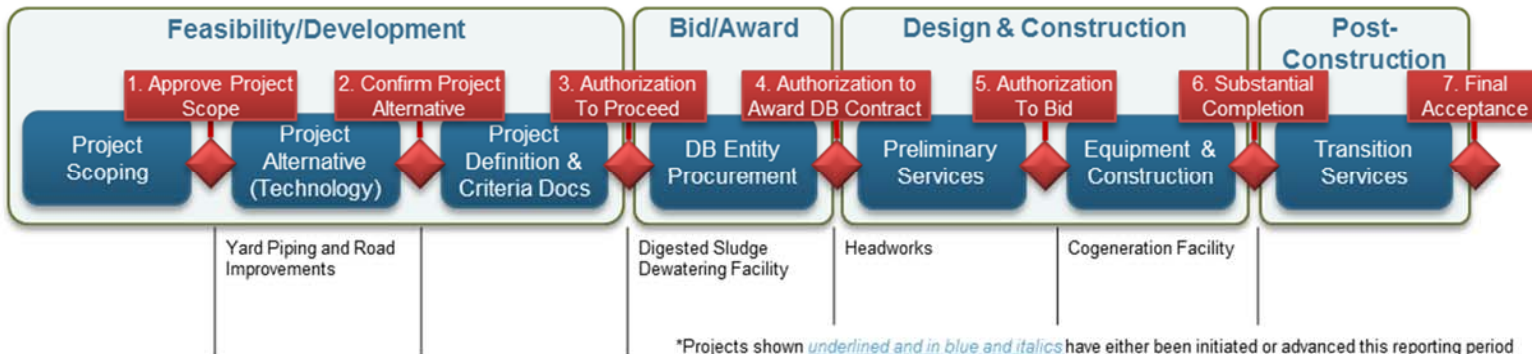
Design-Bid-Build Active Projects



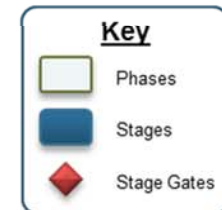
Low-Bid Design-Build Active Projects



Progressive Design-Build Active Projects



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



Program Summary

February 2019

In February, the Switchgear M4 Replacement and G3 & G3A Removal Project passed Stage Gate 4: Approve Preliminary Design. The project team began detailed design, the next stage of the Project Delivery Model (PDM), and expects to advertise the project for bid in summer 2019.

The contractor on the Digester and Thickener Facilities Upgrade Project continued concrete roof placement on Digesters 6, 7, and 8. The contractor also completed mechanical testing of the compressed digester gas piping on the elevated pipe rack and removed remaining piping from the temporary settled sewage re-route system.

The Cogeneration Facility Project continued to erect the concrete masonry unit (CMU) walls of the main generator building (Figure 1), with completion at roughly 60 percent of its total height of 40 feet. The Advanced Facility Control and Meter Replacement - Phase 1 Project contractor began receiving delivery of critical equipment that will be installed in the upcoming summer 2019 dry season. The Blower Improvements Project held a formal partnering session with the contractor, Monterey Mechanical, its subcontractors, and project stakeholders. A more detailed update on the four projects currently under construction is covered in the Program Highlight (page 3).



Figure 1: CMU wall construction at the new cogeneration building.

The Headworks Project team reviewed the draft Basis of Design Report (BODR) and returned comments to the design-builder. On the Digested Sludge Dewatering Facility Project, the project team started negotiations with the top-ranked firm selected in the recent request for proposals (RFP) procurement.

The design consultant for the Nitrification Clarifiers Rehabilitation – Phase 1 Project submitted the 90 percent design for City review. The project team also conducted a walkthrough with potential contractors as part of the pre-qualification process and expects to post a list of qualified contractors in April.

Look Ahead

The following key activities are forecast for March and April of 2019:

- The 96-Inch and 87-Inch Settled Sewage Pipe Rehabilitation Project will advertise the contractor pre-qualification package.
- The CIP will hold four stage gates as projects seek approval to advance to the next stage of the PDM. Anticipated stage gates include:
 - 96-Inch and 87-Inch Settled Sewage Pipe Rehabilitation Project - Stage Gate 4: Approve Preliminary Design
 - HVAC Improvements Project - Stage Gate 2: Confirm Project Alternatives
 - Outfall Bridge & Instrumentation Improvements Project - Stage Gate 3: Authorization to Proceed
 - Nitrifications Clarifiers Rehabilitation – Phase 1 Project – Stage Gate 5: Authorization to Bid
- The Blower Improvements Project contractor will perform a pre-assessment of all 10 blowers to establish baseline operating conditions.
- The Filter Rehabilitation Project design consultant will submit the 60 percent design and complete subsurface investigations.
- The Headworks Project design-builder will hold a workshop to review the influent pump station design configuration. Negotiations for a contract amendment for the design-builder to perform subsurface investigations of the proposed site for the new headworks facility will be completed.
- The City will issue Notices of Completion and Acceptance for the Construction-Enabling Improvements and Plant Instrument Air System Upgrade projects.

Program Highlight – Construction Activity Update

Since the last construction update in August 2018, when the four new engine generators arrived on site, the **Cogeneration Facility Project** has made significant progress. The RWF's existing engines are past their useful life, and the project will replace them with new engine generators. Housed in a new building, the generators will produce electricity and heat needed to operate the RWF.

On October 23, 2018, design-builder CH2M Hill Engineers (CH2M) poured a massive, two-foot-thick concrete slab for the main engine building. Thanks to excellent coordination, the pour took just nine hours, six hours shorter than originally anticipated. The concrete slowly hardened over several weeks until it was structurally sound and the new, 56-ton engine generators could be installed. Trucks with large beds transported the engines from the storage area to the construction site. A crane placed the engines onto the concrete slab in a single day in November (Figure 2).



Figure 2: A 330-ton crane was used to set each engine on its base.

The engines are so large that it would be very difficult to construct a building and then move them in. Therefore, the walls (consisting of CMU blocks) are being constructed around the engines. The engine building currently stands at approximately 25 feet at the highest point and will reach over 40 feet when complete. Barring weather delays, the project team anticipates that the engine building roof will be completed by summer 2019.

A new electrical ductbank is under construction to connect power and data transmission to the new electronic control systems for the engines and gas treatment equipment. Navigating this electrical ductbank around existing utilities, and in one case, through existing concrete, is one of the challenges faced by CH2M. After some precision cutting, the new electrical ductbank will run through a large, subterranean pipe gallery and connect to existing electrical vaults.

CH2M has installed various pipes that run from the aeration basins into the future digester gas treatment area. Welders, inspectors, and x-ray technicians spent a great deal of effort to verify that these pipes were properly connected, as they are vital to the cogeneration system. The pipes will ultimately transport biogas from the rehabilitated digesters and process water that facilitate distribution of heat to and from the digesters.

The **Digester and Thickener Facilities Upgrade Project** is now more than halfway complete. Since August 2018, the contractor, Walsh Construction, has made significant progress in several areas:

78-Inch Pipe Replacement

Replacement of the deteriorated 78-inch primary sludge pipe and wye structure was completed in late September 2018 and the system is in operation. The re-route installed to facilitate the replacement was decommissioned in October 2018.

Handling and Mitigation of PCBs

All PCB-containing caulking, except for a few seams in the walls of Digester 7, has been removed or encapsulated. The remaining work will be completed in June 2019 after the Digester 7 roof and foundation beam are installed. This mitigation was carried out in



Figure 3: Roof replacement of Digesters 5-8 in various stages.

strict compliance with a federal Environmental Protection Agency (EPA)-approved mitigation plan. A final report will be

submitted to the EPA with a plan for safely maintaining the encapsulated caulking and a deed restriction notifying future property users of the presence of encapsulated PCB-containing caulking.

Primary Sludge Screening Building

Primary sludge will be routed through the new sludge screening building to remove grit and other nonorganic materials. This screening will reduce solids volumes and will also improve the efficiency of later processes that thicken, digest, and dewater the sludge. Since August 2018, the floor slabs, walls, and roof have been completed. Mechanical and electrical equipment are now being installed on the ground floor; piping, pumping equipment, and screens will soon be installed on the upper floors.

Digester Rehabilitation and Conversion

Roof construction on the approximately 110-foot diameter digesters began in October 2018. To accelerate the process, the contractor deployed additional sets of scaffolding, allowing different trades to work concurrently. Each roof is about two feet thick and requires up to five separate concrete pours to construct. The roof of Digester 5 is complete, and the rebar is being installed in Digesters 6 and 8. Installation of mechanical, electrical, and communications equipment is in process.

Dissolved Air Flotation Tank Conversion

Six dissolved air flotation tanks (DAFT) have been enlarged and their efficiency improved. New mechanical mixing equipment has been installed in four of the six tanks. DAFT roofs are planned to allow the odorous air to be filtered before being released.



Figure 4: View of pipe rack and new footings, new flare foundation preparatory work.

Elevated Pipe Rack

The pipe rack (Figure 4) will remove digester gas piping from underground tunnels to meet current code requirements and improve RWF safety and environmental conditions. This nearly 0.75-mile long and 30-foot tall structure includes connections to each of the 12 digesters and will convey digester gas to the cogeneration building. Due to unforeseen underground conflicts, 43 of 144 column foundations had to be moved or redesigned. Currently, 90 percent of the column foundations are complete. The excavation to identify potential utility conflicts for the remaining foundations is nearly complete.





























New Gas Flare

If gas production exceeds engine generator requirements, the excess gas is combusted at a high temperature to minimize greenhouse gas emissions. The project rehabilitated the existing flare and is constructing a second flare for redundancy. The existing flare rehabilitation is complete, while foundations for the new flare are under construction (Figure 4).

Program Performance Summary

Seven key performance indicators (KPIs) have been established to measure overall CIP success. Each KPI represents a metric that will be monitored on a regular frequency. Through the life of the CIP, KPIs that best reflect the current program will be selected and measured. KPIs are reset each fiscal year.

Program Key Performance Indicators – Fiscal Year 2018-2019

KPI	Target	Fiscal Year to Date			Fiscal Year End		
		Actual	Status	Trend	Forecast	Status	Trend
Stage Gates	90%	92% 11/12 ¹			95% 18/19		
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% 1/3			33% 1/3		
Measurement: Percentage of CIP projects delivered within 2 months of approved baseline Beneficial Use Milestone. ² Target: Green: >= 90%; Amber: 75% to 89%; Red: < 75%							
Budget	90%	100% 2/2			75% 3/4		
Measurement: Percentage of CIP projects that are accepted by the City within the approved baseline budget. ² Target: Green: >= 90%; Amber: 75% to 89%; Red: < 75%							
Expenditure	\$253M	\$269M			\$295M ³		
Measurement: CIP FY18-19 committed costs. Target: Committed cost meets or exceeds 70% of planned Budget. 70% of \$361M = \$253M. Therefore Fiscal Year End Green: >=\$253M; Amber: \$199M to \$253M; Red: < \$199M							
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 Rate⁴	10%	18% 15/83 ⁵			6% 5/83		
Measurement: Ratio of the number of vacant approved positions to approved positions. Target: Green: <= 10%; Amber: 10% to 20%; Red: > 20%							

Notes

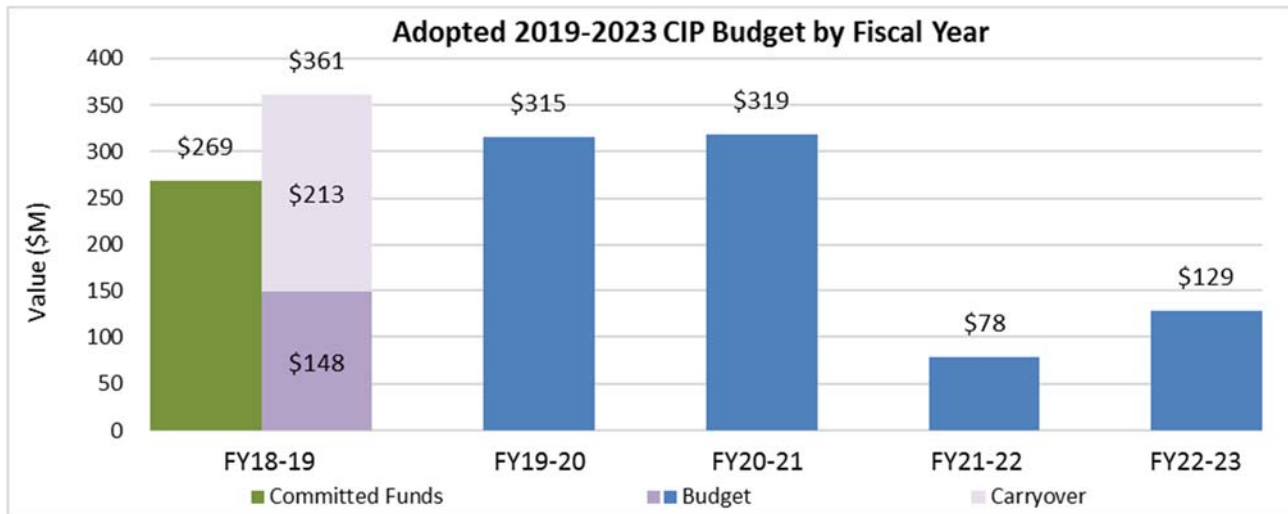
1. The Switchgear M4 Replacement and G3 & G3A Removal Project passed Stage Gate 4: Approve Preliminary Design.
2. The baseline Beneficial Use date and the baseline budget for each project are established at construction contract award and execution.
3. The forecasted fiscal year-end expenditure decreased because several design awards have moved to next fiscal year.
4. The Vacancy Rate KPI measures CIP-approved positions (ESD and Public Works) and program management consultant full-time staff.
5. The CIP vacancy count decreased by one.



Program Budget Performance Summary

This section summarizes the cumulative monthly budget performance for fiscal year (FY)18-19 based on the Adopted 2019-2023 CIP.

Adopted 2019-2023 CIP Expenditure and Encumbrances



Notes:

Committed Funds: Total of expenditures and encumbrances.

Expenditure: Actual cost expended, either by check to a vendor or through the City's financial system, for expenses such as payroll or for non-personal expenses that do not require a contract.

Encumbrance: Financial commitments such as purchase orders or contracts that are committed to a vendor, consultant, or contractor. An encumbrance reserves the funding within the appropriation and project.

The FY18-19 budget is \$185 million, which consists of \$131 million in new funds and \$54 million in rebudgets. For purposes of this monthly report, the adopted FY18-19 budget is adjusted from \$185 million to \$148 million due to the exclusion of certain appropriations that are not measured as part of the expenditure KPI. Excluded appropriations include City Hall Debt Service Fund; Clean Water Financing Authority Debt Service Payment Fund; Debt Service Repayment for Plant Capital Improvement Projects (San José only debt service); Equipment Replacement Reserve; Ending Fund Balance; Public Art; SBWR Extension; State Revolving Fund Loan Repayment; and Urgent and Unscheduled Treatment Plant Rehabilitation. Similar adjustments have been made to the budgets for FY19-20 through FY 22-23.

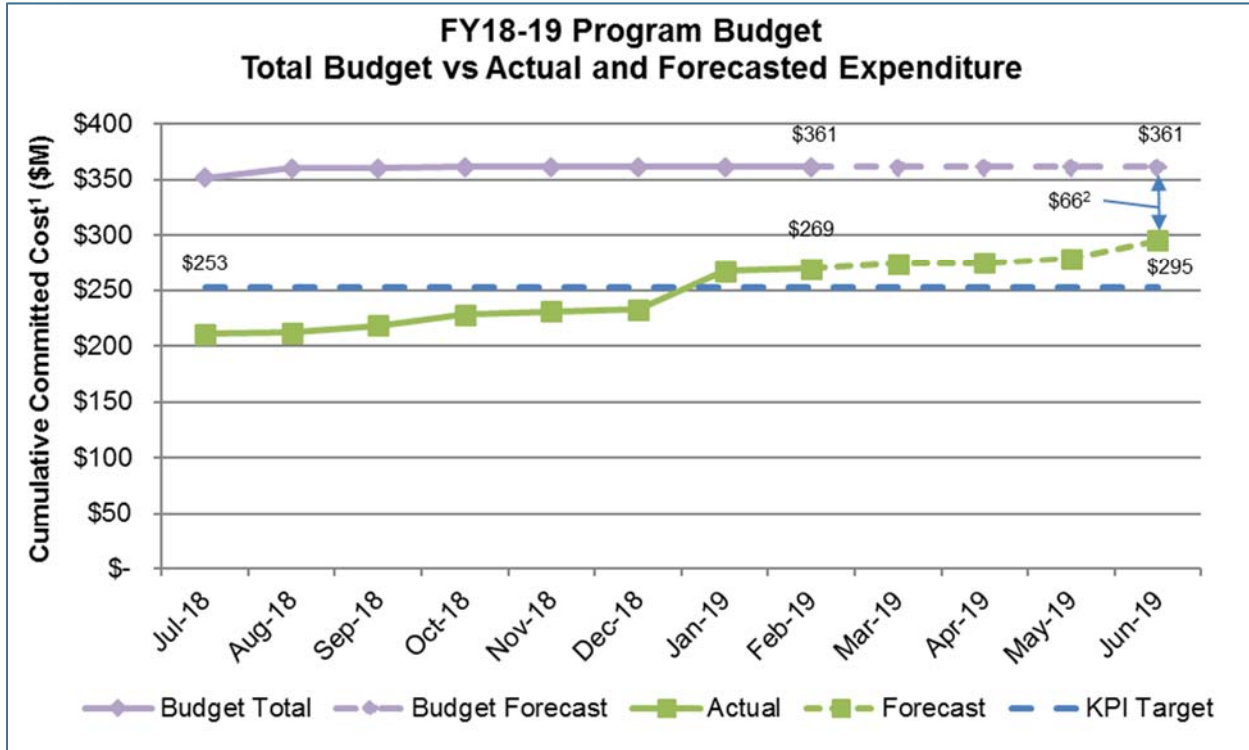
Carryover: Encumbrance balances at the end of the previous fiscal year are automatically carried forward to the current fiscal year as carryover funding to pay invoices for approved construction contracts and consultant agreements. FY18-19 carryover is \$213 million.

Budget of \$148.3 million and carryover of \$213.1 million totals \$361.4 million for FY18-19.



Fiscal Year 2018-2019 Program Budget Performance

The FY18-19 CIP budget is comprised of approximately \$148 million in new funds, plus encumbered carryover of \$213 million for a rounded total of \$361 million. This excludes City Hall Debt Service Fund; Clean Water Financing Authority Debt Service Payment Fund; Debt Service Repayment for Plant Capital Improvement Projects (San José only debt service); Equipment Replacement Reserve; Ending Fund Balance; Public Art; SBWR Extension; State Revolving Fund Loan Repayment; and Urgent and Unscheduled Treatment Plant Rehabilitation items. Overall, the forecasted fiscal year-end committed funds exceed the fiscal year-end target by \$42 million.



Notes:

1. Committed costs are expenditures and encumbrance balances, including carryover (encumbrance balances from the previous fiscal year).
2. The variance between forecasted budget and forecasted commitments can be primarily attributed to the following factors:
 - a. Several construction contracts are now anticipated to be awarded in FY19-20 instead of FY18-19 based on updated schedules:
 - i. Fire Life Safety Upgrades Project
 - ii. Switchgear M4 Replacement and G3 & G3A Removal Project
 - b. Several consultant service orders will not be awarded in FY18-19:
 - i. Aeration Tank Rehabilitation Project
 - ii. Support Facilities Project
 - iii. Tunnel Rehabilitation Project
 - c. The Blower Improvement Project construction bids came in under budget.
 - d. Several other minor encumbrances for consultant services are either lower than budgeted or are anticipated to be awarded in FY19-20.
 - e. Several authorized positions remain vacant, resulting in lower predicted personal services expenses than budgeted.
 - f. The FY16-17 payment budgeted for the annual Owners Controlled Insurance Program premium covered the period through FY17-18. Funds rebudgeted from FY17-18 will be programmed in FY19-20.



Project Performance Summary

There are currently six projects in the construction and post-construction phases and an additional 14 projects in feasibility/development, design, bid and award, or design and construction phases (see PDM, page 2). Projects in the construction phase have established cost and schedule baselines and are monitored using the City's Capital Project Management System (CPMS). Green/red icons are included in the table below to indicate whether these projects are on budget and schedule.

Project Performance – Baselined Projects

Project Name	Phase	Estimated Beneficial Use Date ¹	Cost Performance ²	Schedule Performance ²
1. Construction-Enabling Improvements	Post-Construction	Aug 2018 ³	◆	◆
2. Plant Instrument Air System Upgrade	Post-Construction	Nov 2018 ³	●	◆
3. Cogeneration Facility	Design & Construction	Sep 2020	●	●
4. Digester and Thickener Facilities Upgrade	Construction	Nov 2020	◆	◆
5. Advanced Facility Control & Meter Replacement - Phase 1	Construction	June 2021	●	●
6. Blower Improvements	Construction	Sep 2022	●	●

Key:

Cost:	● On Budget	◆ >1% Over Budget	Schedule:	● On Schedule	◆ >2 months delay
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Notes

1. Beneficial Use is defined as work that is sufficiently complete, in accordance with contract documents, that it can be used or occupied by the City. Beneficial Use dates are reviewed as part of project schedule reviews.
2. An explanation of cost and schedule variances on specific projects identified in this table is provided on pages 12 and 13.
3. Actual Beneficial Use date.



Project Performance – Pre-Baselined Projects

Project Name	Phase	Estimated Beneficial Use Date ¹
1. Digested Sludge Dewatering Facility	Bid/Award	Nov 2022
2. 96-Inch and 87-Inch Settled Sewage Pipe Rehabilitation	Design	Oct 2020
3. Switchgear M4 Replacement and G3 & G3A Removal	Design	Feb 2022
4. Fire Life Safety Upgrades	Design	Sep 2022
5. Advanced Facility Control & Meter Replacement - Phase 2	Design	Dec 2022
6. Headworks	Design and Construction	Dec 2022
7. Filter Rehabilitation	Design	Apr 2023
8. Nitrification Clarifiers Rehabilitation – Phase 1	Design	Oct 2023
9. Outfall Bridge and Instrumentation Improvements	Feasibility/Development	Jan 2022
10. Storm Drain System Improvements	Feasibility/Development	Jan 2023
11. HVAC Improvements	Feasibility/Development	Mar 2023
12. Flood Protection	Feasibility/Development	Apr 2023
13. Facility Wide Water Systems Improvements	Feasibility/Development	Aug 2024
14. Yard Piping and Road Improvements	Feasibility/Development	June 2027

Notes

- Beneficial Use is defined as work that is sufficiently complete, in accordance with contract documents, that it can be used or occupied by the City. Beneficial Use dates are reviewed as part of project schedule reviews.



Project Significant Accomplishments

Biosolids Package

Digester and Thickener Facilities Upgrade

- The City executed a contract change order for the additional work by the contractor, Walsh Construction, related to the structural seismic redesign of the digesters.
- Walsh removed the remaining dissolved air flotation liquid effluent and pressure flow piping from the temporary settled sewage reroute system and turned over the new sampling station to Operations and Maintenance.
- Walsh completed mechanical testing of the compressed digester gas piping on the elevated pipe rack.

Digested Sludge Dewatering Facility

- The project team met with the top-ranked design-builder Walsh Construction, to establish a negotiation schedule. The City anticipates awarding the design-build contract in August 2019.

Facilities Package

96-Inch and 87-Inch Settled Sewage Pipe Rehabilitation

- The project team completed the contractor pre-qualification documents and expects to advertise in March.

Outfall Bridge and Instrumentation Improvements

- Design consultant AECOM submitted the final draft conceptual design report for City review. In March, the project team will present the conceptual design at Stage Gate 3 – Authorization to Proceed for approval to begin preliminary design.

Liquids Package

Advanced Facility Control and Meter Replacement – Phase 1

- Contractor Overaa began receiving critical equipment, including 17 flow meters, and anticipates beginning installation in May 2019.

Blowers Improvements

- The City held a formal partnering session with contractor Monterey Mechanical.
- Monterey Mechanical began mobilization on site. In March, the contractor is scheduled to complete pre-assessment of the 10 blowers being rehabilitated to establish baseline operating conditions.

Filter Rehabilitation

- Design consultant Kennedy/Jenks completed the existing electrical infrastructure verification this month and plans to submit the 60 percent design next month.

Headworks

- The City returned comments to design-builder CH2M on the draft BODR. The final BODR and 30 percent design package are anticipated in May 2019.

Nitrification Clarifiers Rehabilitation – Phase 1

- Design consultant HDR submitted and held a workshop to review the 90 percent design. The 100 percent design is anticipated in April 2019.
- The project team conducted a walkthrough with potential contractors as part of the pre-qualification process and expects to post a list of pre-qualified contractors in April 2019.

Power and Energy Package

Cogeneration Facility

- CH2M completed the hot water loop and biogas piping from the project site to the basin area where the piping will connect with the Digester Thickener and Facilities Upgrade Project pipe rack. CH2M also completed construction of the south half of the electrical ductbank that will connect the cogeneration facility to the RWF power grid.
- CH2M continued to construct the CMU walls for both the engine and operations buildings. The project team anticipates completing the engine building roof by summer 2019.



Explanation of Project Performance Issues

Construction-Enabling Improvements Project

This project was originally scheduled to be substantially complete by mid-February 2017. Due to the extremely wet 2016-17 winter season, contractor Teichert Construction was unable to perform site work on several occasions between October 2016 and April 2017. Teichert was granted extra work days for weather-related delays and for extra work associated with several contract change orders. A new contract completion date of June 8, 2017 was established. However, Teichert's subcontractor, ModSpace, was slow to respond and regularly submitted late and incomplete documentation, which resulted in the portable trailers arriving in January 2018, approximately nine months later than the contract completion date.

Teichert experienced additional delays completing installation of the portable trailers and submitting complete and acceptable documentation for access ramps and canopies. In early August 2018, the contractor completed installation of the electrical, communications, and wastewater utilities. Also in August, the City of San José Building Division issued the Certificate of Occupancy permit for the trailers, and the construction management group issued the Notice of Substantial Completion, which indicated that the project had reached Beneficial Use. The project team provided Teichert with a list of remaining contract work to be completed. The project team has reached agreement with Teichert for liquidated damages and to complete outstanding tasks for project closeout. The project team anticipates accepting the project in April 2019.

Plant Instrument Air System Upgrade Project

Project construction was delayed by seven months due to four issues: 1) The project team discovered that the planned construction site access route crossed a large settled sludge pipeline, requiring an alternative access route to be developed and constructed; 2) the contractor was temporarily unable to install a section of the conduit from the sludge control building to the new compressor building due to other work being performed in the area by a different contractor; 3) development of the 28-day commissioning test procedure took longer than anticipated; and 4) during the eight-hour functioning test the project team discovered oxidized (rusted) carbon steel shavings in an existing condensate tank unrelated to the project construction. The material was removed, and the test was successfully completed. The project achieved Beneficial Use in November 2018. The project team anticipates project acceptance in April 2019.

Digester and Thickener Facilities Upgrade Project

This project encountered numerous unforeseen conditions at the beginning of construction in 2016, described below. In 2017, design modifications were required to address seismic risks, and discovery of hazardous materials required extensive cleanup. Delays for these conditions have amounted to 273 working days. The original construction completion and Beneficial Use date in September 2019 has been delayed to November 2020.

The City has negotiated contract change orders for the following unforeseen conditions discovered in 2016:

- Major corrosion of a below-ground, 78-inch settled sewage pipeline and junction structure delayed the construction of dissolved air flotation tank piping connections, two new pressurization flow boxes, and utility relocation work. The contractor postponed all repairs until a temporary pumping and pipeline system could be designed and safely installed to enable replacement of the pipeline in the 2018 dry season. In May of 2018, the contractor started full-time operation of this temporary pumping and pipeline system and began replacing the 78-inch settled sewage pipeline, which was completed in late September 2018.
- A 36-inch biochemical oxygen demand pipe was found to be obstructing the new sludge screening building foundation. The contractor removed this pipe and relocated several gas drain vaults and associated piping before the foundation construction began.
- Multiple conflicts between contract work and existing utilities required numerous relocations including water, natural gas, digester gas, landfill gas, storm drains, and sanitary sewer pipelines. The contractor completed necessary relocations and rerouting, especially near the new digester gas pipe rack footings. Many of these modifications also required design changes.
- Bay Area Air Quality Management District venting restrictions also delayed digester work. The contractor completed the temporary digester gas connections and the system became operational in February 2018.

The City has negotiated contract change orders for the following issues discovered in 2017 and 2018:

- Digester structural redesign: The design consultant revised the structural drawings to address seismic concerns by enlarging the foundation ring beam at the base of each of the four digesters. The contractor provided a cost proposal associated with this revision and the City issued a final, global change order to cover work activities;
- Distributed control system architectural changes: The design guidelines for the distributed control system were developed after the project plans were completed. Several changes were required for fiber optic cable, electrical wiring, patch panels, converters, communications instrumentation, and emergency power supply. Drawings, color-coding labeling, and process diagrams had to be revised to reflect these changes;



- Fire Department requirements: Fire permit requirements changed after the design was completed. The Fire Marshal required additional alarms and electrical connections. A new electrical fire suppression system was installed to meet current environmental requirements. At one structure, additional time was needed to confirm the fire suppression system was not required;
- Structural issues with the west electrical building, DAFT tank walls, DAFT ceiling slab, and digester feed pump canopy;
- Drainage of one DAFT underground gallery, polymer pad, Main Street drainage; and
- Warranty extensions required that resulted from the construction delays.

The hazardous material mitigation issue is currently being evaluated and is expected to result in additional costs. Testing of soils and concrete for PCBs was completed, and the federal EPA issued a final conditional approval. In compliance with the EPA-approved, risk-based management plan, removal and disposal of all contaminated materials in three of four affected digesters and all tunnel joints has been completed. All contaminated soils have been removed and disposed of and most of the impacted concrete has been encased. The last portion of the work will be finalized once the digester foundation base layers and roof work are complete. The project team anticipates submittal of final work reports to the EPA in June 2019.

In November 2017, Council approved a construction contingency increase of \$15 million. The City issued change orders against the increased contingency for delays associated with the conditions discovered in 2016.

In June 2018, Council approved a second construction contingency increase of \$25 million for additional costs associated with the seismic redesign, hazardous material remediation, and extended construction duration.

To minimize further delays, the contractor is executing several tasks concurrently that had been planned originally in series.



Project Profile – Headworks

When raw wastewater enters the RWF, it first goes to the headworks facility for preliminary treatment. The headworks facility removes inorganic material such as sticks, stones, grit, and sand from the influent wastewater stream to reduce wear on the downstream process equipment and enhance process performance.

Of the RWF's two separate headworks facilities, the original Headworks 1 includes screens; grit removal through aerated grit chambers; detritors, screenings, and grit handling facilities; and pumping facilities. Headworks 1 has been in operation for more than 50 years and has a rated capacity of 271 million gallons per day (MGD). Headworks 2, commissioned in 2008 with a rated capacity of 160 MGD, includes screens; vortex grit removal units; screenings and grit handling facilities; and a pump station. It was built to supplement Headworks 1 in response to a 1998 storm that resulted in an estimated peak wet-weather flow of 330 MGD.

With the aging Headworks 1 facility requiring regular repairs and rehabilitation, the City's Plant Master Plan recommended decommissioning Headworks 1 and expanding Headworks 2 to handle future anticipated peak flows of up to 400 MGD. Subsequent City evaluations identified the need for a new Headworks 3 facility (Figure 5), instead of an expanded Headworks 2, to replace Headworks 1, and outlined modifications required for Headworks 2 to improve operational reliability and performance. The project scope includes:

- Repairs and modifications to several existing raw sewage influent structures;
- Improvements to the emergency basin overflow structure;
- A new concrete liner for the emergency overflow basin;
- Modifications to the existing headworks-related piping to direct raw sewage and in-plant recycle flows to Headworks 3 and provide additional capacity;
- Installation of infrastructure needed to reroute flows from Headworks 1 to Headworks 3 in preparation for the decommissioning of Headworks 1, which will be completed as a separate project;
- Two new recycle flow pump stations;
- Improvements to Headworks 2 electrical facilities to align with RWF protocols; and
- A new Headworks 3, including new influent piping; a new pump station; screenings (Figure 6) and grit removal systems; and an odor control facility.

In June 2018, Council approved a design-build contract with CH2M for the project. That same month, the City issued a notice to proceed to CH2M to begin preliminary services. As part of these services, the design-builder held a lengthy series of workshops to evaluate the location of the new Headworks 3, process alternatives, engineering design criteria, hydraulics, regulatory requirements, acceptance criteria, construction planning, and costs. Workshop outcomes were summarized in the draft BODR, which was submitted to the City in January 2019.

As currently configured, Headworks 3 will be located in the southwest corner of the RWF site, adjacent to the existing emergency overflow basin (Figure 7). This location was selected to facilitate construction sequencing, reduce the overall construction cost of the project, and improve facility performance by eliminating site constraints that were dictating equipment selection.

The basis of design is predicated on the following criteria:

- Headworks 2 and Headworks 3 will be able to treat the projected year 2040 extreme peak hour wet weather flow of 400 MGD when both facilities are in service.
- Headworks 3 will be the lead headworks facility, normally operating in dry flow conditions and capable of treating the projected year 2040 peak hour dry weather flow of 209 MGD with one train out of service.

Project current estimated total cost is roughly \$166 million. Key milestones include completion of subsurface investigations to reduce unknown conditions and risks by July 2019; 30 percent design submittal in May 2019; recommendation of guaranteed maximum price (GMP) not-to-exceed amount to Council and TPAC in September 2019; approval of the GMP by December 2019; construction start in February 2020; and Beneficial Use by December 2022.

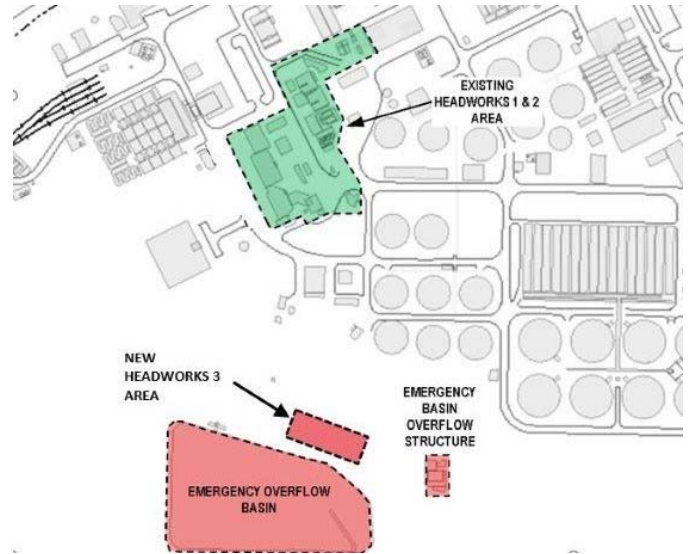


Figure 5: Project Site Map



Figure 6: New multi-rake bar screens at Headworks 2, installed under the recently completed Headworks Critical Improvements Project. Similar screens are planned to be installed at Headworks 3.



Figure 7: Proposed Headworks 3 layout near the emergency overflow basin.

Regional Wastewater Facility Treatment – Current Treatment Process Flow Diagram

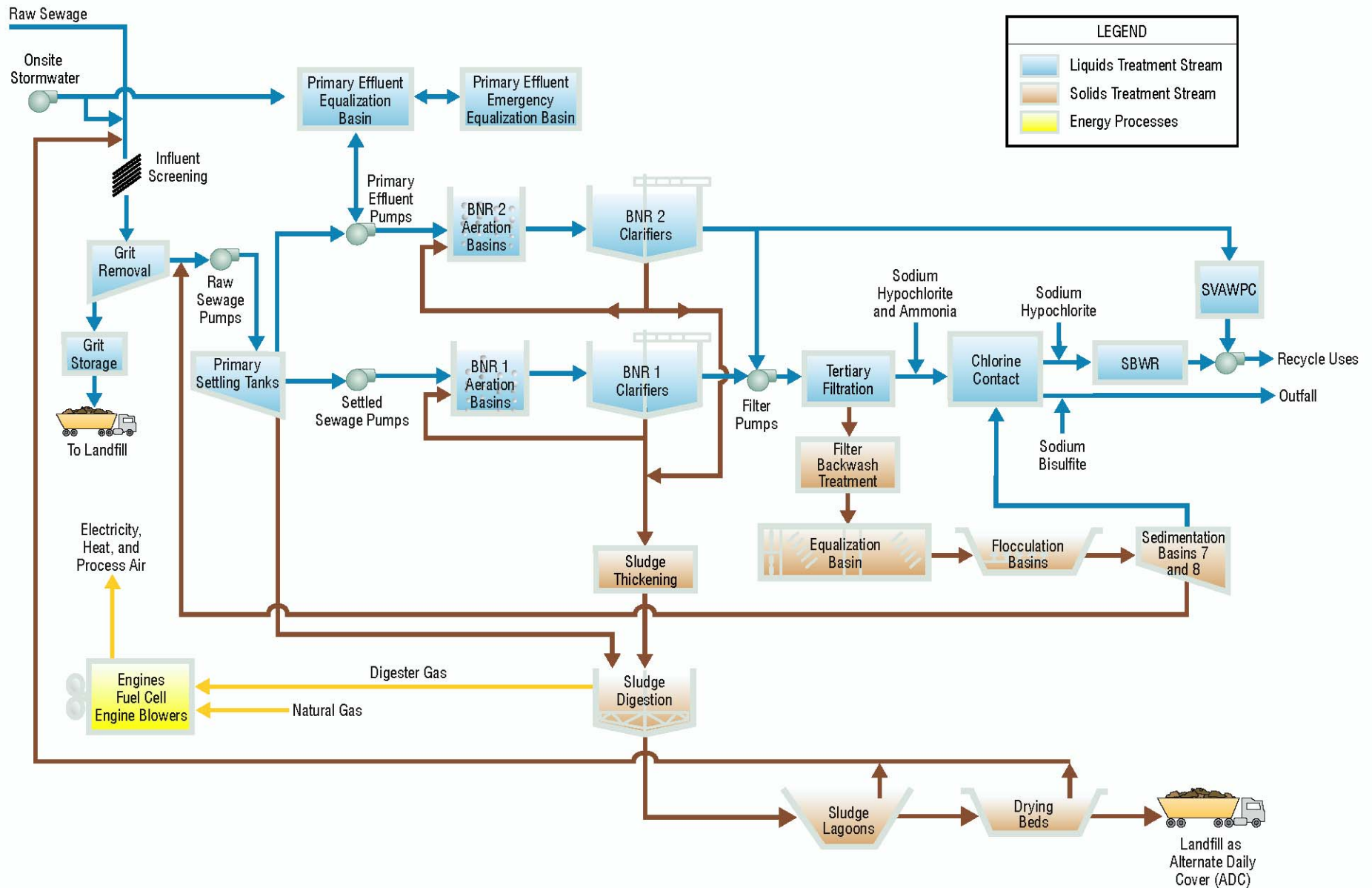


Figure 8 – Current Treatment Process Flow Diagram



Regional Wastewater Facility Treatment – Proposed Treatment Process Flow Diagram

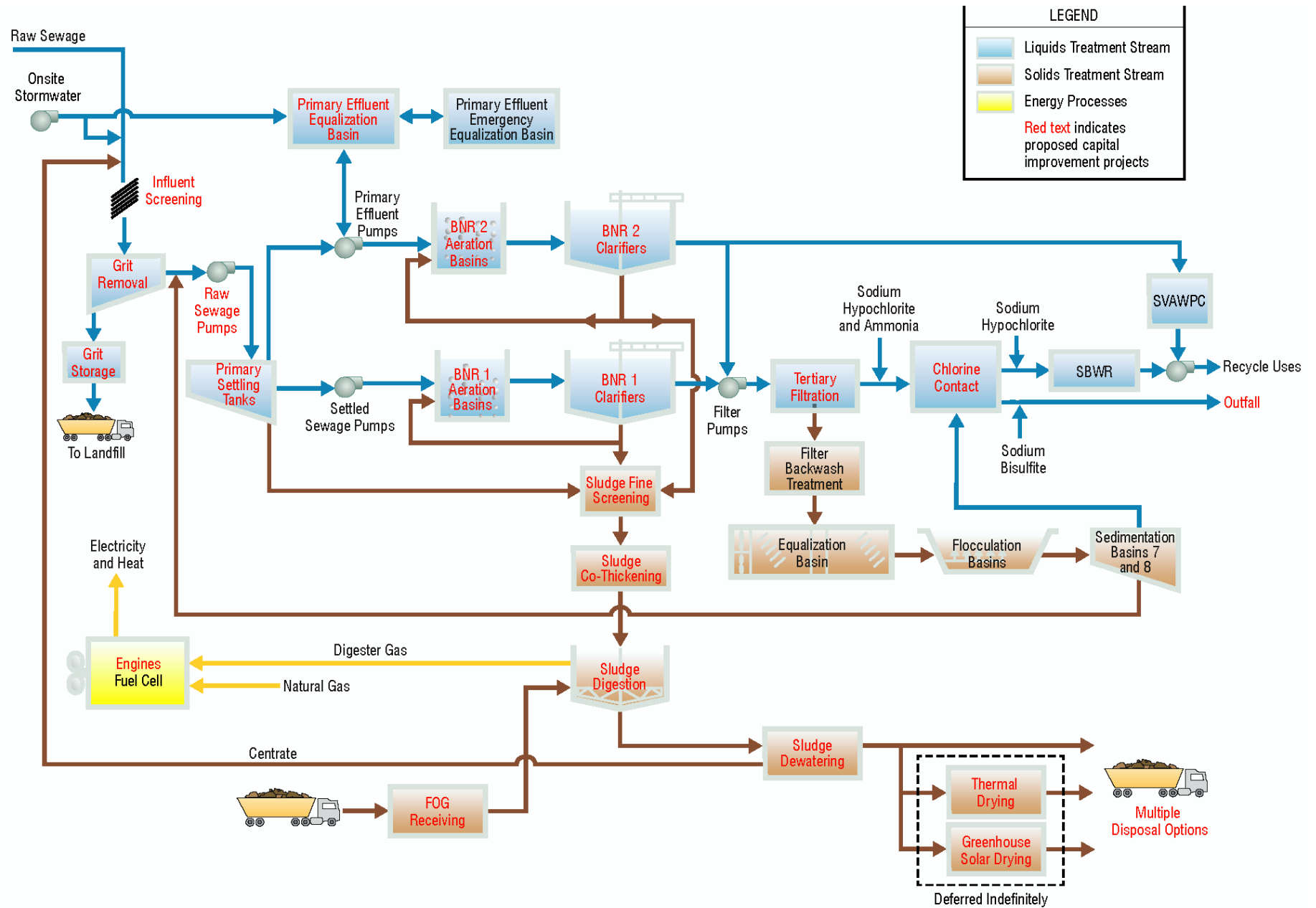


Figure 9 – Proposed Treatment Process Flow Diagram



Active Construction Projects – Aerial Plan

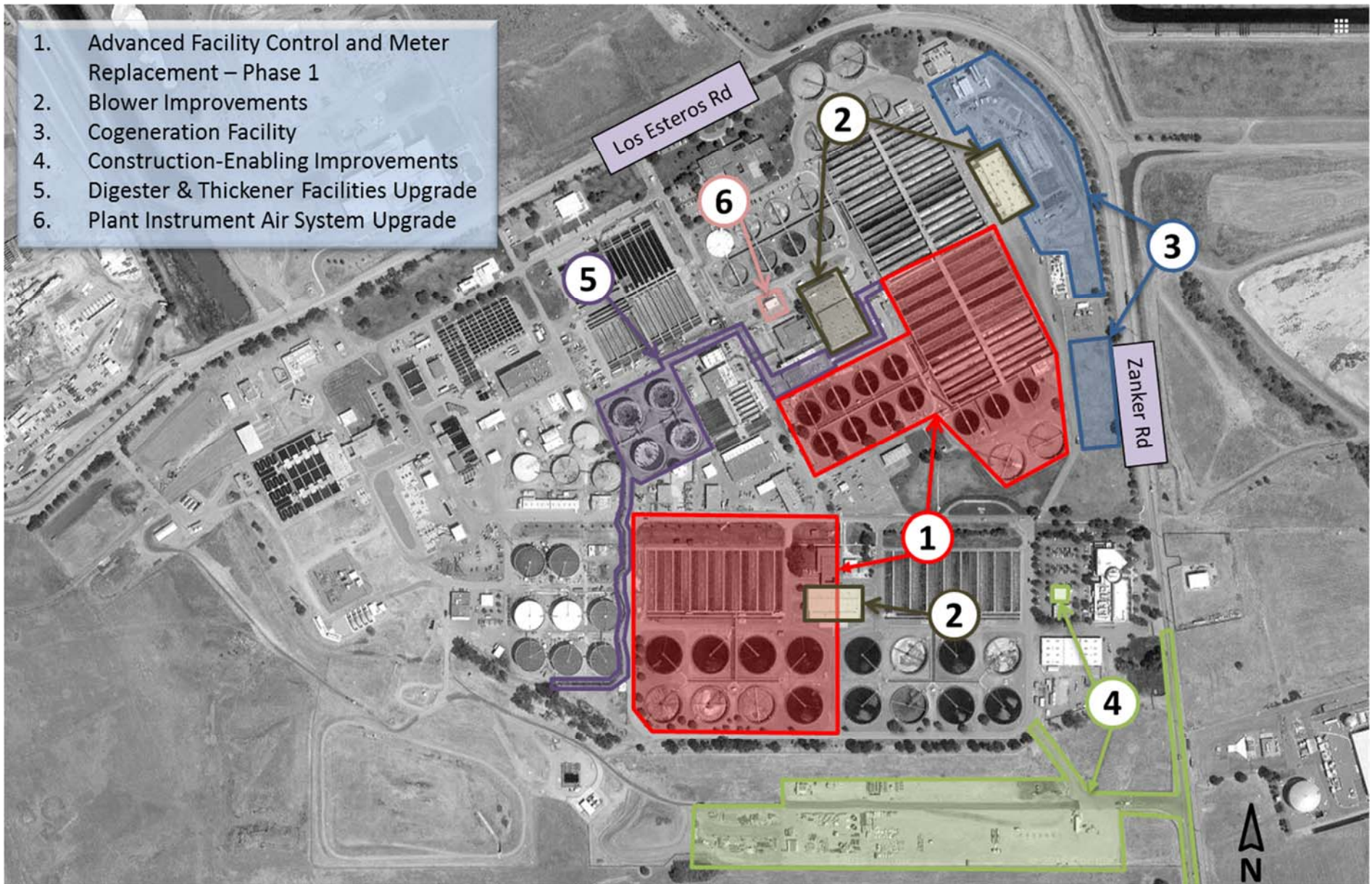


Figure 10: Active Construction Projects