



**San José-Santa Clara**  
Regional Wastewater Facility

# Capital Improvement Program Monthly Status Report: April 2017

June 1, 2017

This report summarizes the progress and accomplishments of the Capital Improvement Program (CIP) for the San José-Santa Clara Regional Wastewater Facility (RWF) for April 2017.

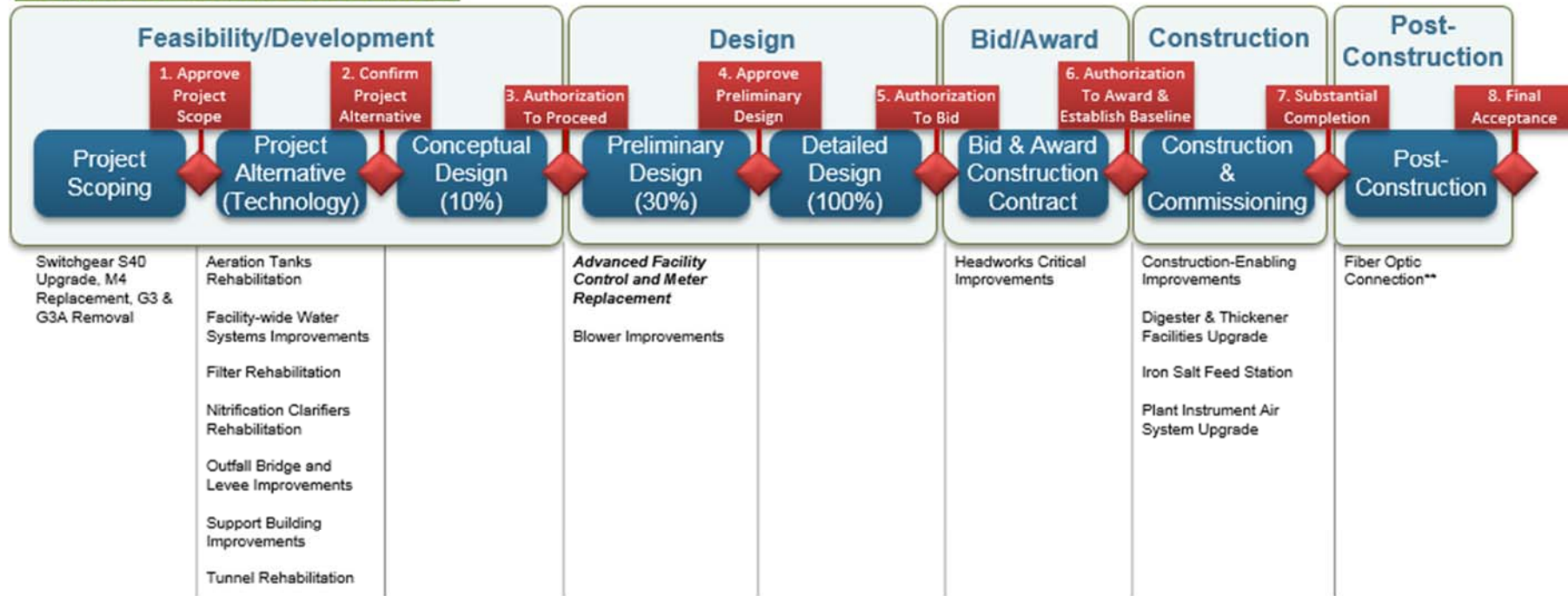
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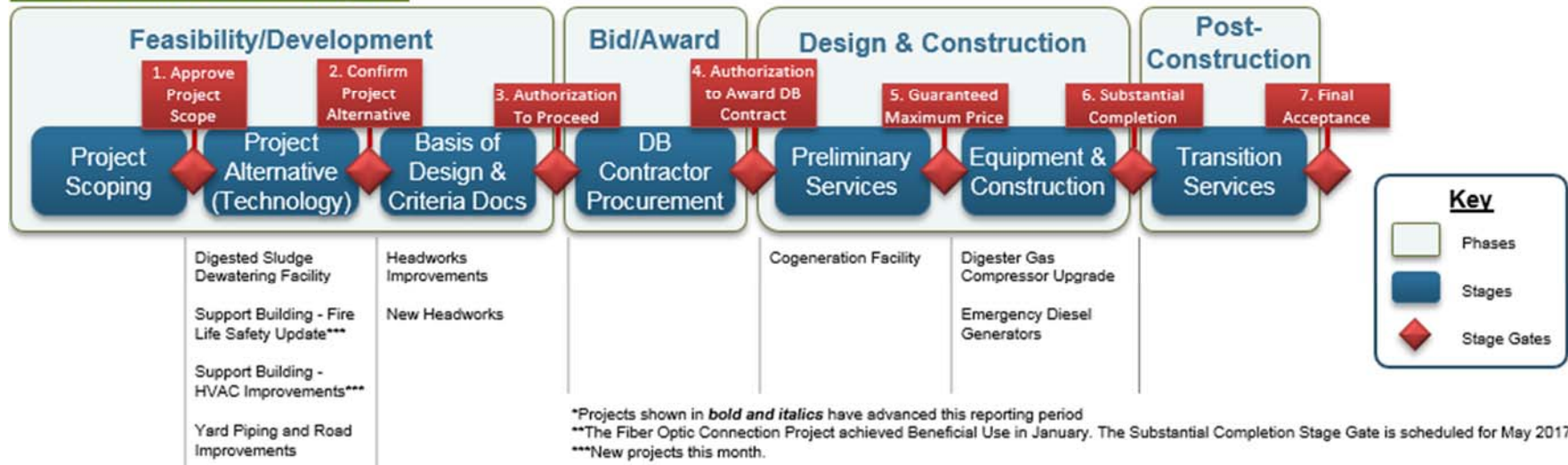


# Project Delivery Model

## Design-Bid-Build Active Projects



## Design-Build Active Projects



# Program Summary

## April 2017

The CIP progressed on multiple fronts in April: 1) The conceptual design review for the Advanced Facility Control and Meter Replacement Project was completed, and the project successfully advanced through the Project Delivery Model (PDM) Authorization to Proceed stage gate; and 2) A Request for Qualifications (RFQ) for Owner's Advisor services for the Yard Piping and Road Improvements Project was advertised. Staff also advertised an on-call repair and rehabilitation construction contract for use at the RWF. No bids were received; Staff are currently assessing the reasons for the lack of interest from contractors and how to address this in a future procurement.

In April, 18 active projects continued to make progress through the feasibility/development, design and bid/award stages. Alternatives analysis work continued for the Filter Rehabilitation, Nitrification Clarifier Rehabilitation, Facility-wide Water Systems Improvements, Digested Sludge Dewatering Facility, and the Aeration Tanks Rehabilitation projects. Design work continued on the Advanced Facility Control and Meter Replacement, Blowers Improvements, and Cogeneration Facility projects. The Headworks Improvements and New Headworks project team finalized the Basis of Design and procurement documents for prequalification of design-builders.

Our seven active CIP construction projects also made significant progress in April. Beneficial Use was achieved this month on the Digester Gas Compressor Upgrade Project, and testing and commissioning continued successfully on the Emergency Diesel Generators Project. Both projects are scheduled to complete this summer, along with the Construction-Enabling Improvements Project. Major construction also continued across multiple work areas for the Digester and Thickener Facilities Upgrade, Plant Instrument Air System Upgrade and Iron Salt Feed Station projects. Staff continued to coordinate process shutdowns, isolating sections of the RWF to allow construction to continue and utilities to be re-routed as necessary, for these projects. Staff continued to assess how best to address the heavily corroded pipelines identified in the Digester and Thickener Facilities Upgrade project area that are impacting construction progress. The project team began developing a temporary bypass pumping scheme to allow repairs to be carried out while construction continues.

## Look Ahead

In May, the Headworks Improvements and New Headworks projects will advertise an RFQ to pre-qualify design-builders, and the Cogeneration Facility Project will reach the 30 percent design milestone. Air permit applications and early works package submittals for the internal combustion engines and gas purification equipment will also be submitted for the Cogeneration Facility Project. The Fiber Optic Connection Project will seek to advance through the Substantial Completion stage gate. Testing and commissioning activities will continue on the Emergency Diesel Generators Project, which will reach Beneficial Use in June. Major construction activities will be completed on the Construction-Enabling Improvements and the Iron Salt Feed Station projects.

In May, staff will also present the CIP Semiannual Status Report, and a status report on the RWF CIP Ten-Year Funding Strategy to the Transportation and Environment Committee (T&E).

In May and June, Staff anticipates making the following recommendations to the Treatment Plant Advisory Committee (TPAC) and San José City Council (Council):

- Award a Master Consultant Agreement (MCA) for on-call industrial hygienist services;
- Award a construction contract for the Headworks Critical Improvements Project;
- Accept the CIP Semiannual Status Report, which highlights progress for the period of July through December 2016;
- Amend the existing MCA with Stantec (formerly MWH) for program management services for the CIP; and
- Purchase insurance policies as part of a recommended Owner-Controlled Insurance Program (OCIP) for the RWF CIP.

The 2018-2022 RWF CIP Proposed Budget is anticipated to be approved by Council on June 20, 2017.

In addition, CIP staff will continue to participate in monthly training for project managers. This training gives project managers tools and techniques based on Project Management Institute (PMI) fundamentals, tailored to the CIP. The training includes topics such as project scope, cost, and schedule management; design management; risk and quality management; and permitting. Project management training modules are being repeated to provide consistent training for new staff.



# Program Highlight – Cost Estimating

Good cost estimating is essential for informing funding needs at the program level, and to manage costs at the project level. High-level cost estimates were prepared for the various CIP project packages in late 2013 as part of the program validation/start-up work. These estimates are updated as each project is initiated and advances through the project delivery model to reflect scope development and any approved scope changes.

A project cost estimate consist of two key components: construction costs and project delivery costs.

**Construction cost estimates** (also referred to as hard costs) are typically prepared by the design consultant and/or design-builder. An Opinion of Probable Construction Cost (OPCC) is prepared in accordance with ACEC International (formerly Association for Advancement of Cost Estimating) Recommended Practice. Five classes of estimate (5 to 1) are used, each of which corresponds to an accuracy range based on the typical level of project definition expressed as a percentage (i.e. 10, 30, 60, 90, 100 percent). The OPCC at the 100% design completion stage represents the Engineer’s Estimate. As the project definition increases, the accuracy of the cost estimate improves. The OPCC also includes an escalation factor and contingencies in accordance with the Program Cost Estimating Manual. The design consultant is required to provide a Basis of Estimate report with the estimate which describes rationale, assumptions, pricing sources, and other inputs to the estimating process used by the estimator in development of the cost estimate.

The Program uses the services of an independent cost estimating firm to perform a review of each OPCC to confirm it is reasonable, that it reflects the project scope, and that it has been prepared using appropriate estimating techniques for the class of estimate.

**Project delivery cost estimates** (also referred to as soft costs) are prepared by the CIP project manager and represent the costs associated with City staff labor, consultant labor and expenses, permitting fees, and a specific allowance for construction contingency.

The CIP project manager combines the OPCC and project delivery costs to prepare the project estimate. Project estimates are used as a basis for developing the annual City CIP budget. The Program has developed a database to compare the Engineer’s Estimate with comparable projects from other agencies, both for construction and project delivery costs. This comparison is used to confirm that the estimate is reasonable before proceeding with contractor procurement.

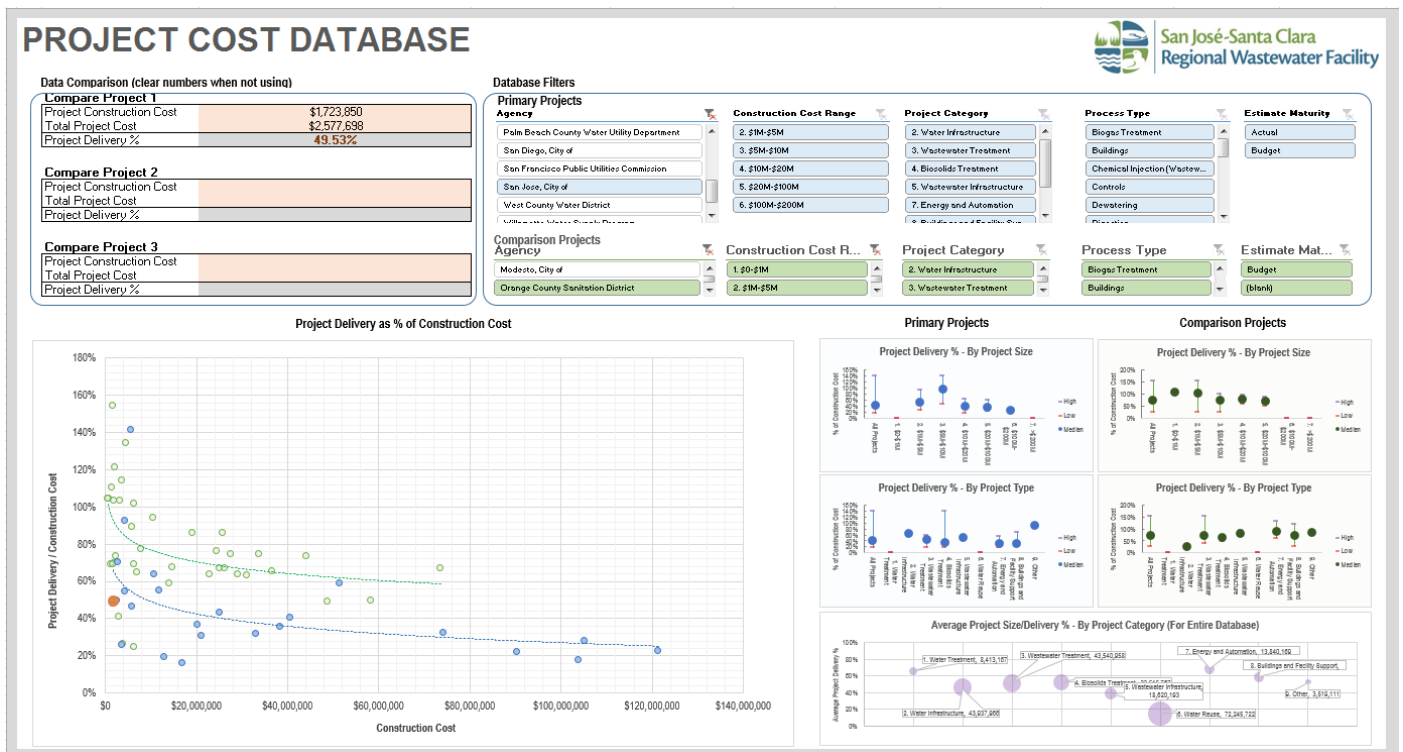


Figure 1: Project Cost Database



## Program Performance Summary

Eight 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.

### Program Key Performance Indicators – Fiscal Year 2016-2017

KPI	Target	Fiscal Year to Date			Fiscal Year End		
		Actual	Status	Trend	Forecast	Status	Trend
<b>Stage Gates</b>	80%	91% 10/11 <sup>1</sup>	●	↑	93% 14/15 <sup>2</sup>	●	↓
Measurement: Percentage of initiated projects and studies that successfully pass each stage gate on their first attempt.							
<b>Schedule</b>	90%	50% 1/2 <sup>3</sup>	◆	↓	33% 1/3	◆	→
Measurement: Percentage of CIP projects delivered within 2 months of approved baseline Beneficial Use Milestone. <sup>4</sup>							
<b>Budget</b>	90%	NA 0/0	●	→	100% 1/1	●	→
Measurement: Percentage of CIP projects that are accepted by the City within the approved baseline budget. <sup>4</sup>							
<b>Expenditure</b>	\$186M	\$194M	●	↑	\$228M <sup>5</sup>	●	↑
Measurement: CIP FY16-17 committed costs. Committed cost meets or exceeds 70% of planned Budget							
<b>Procurement</b>	80%	100% 5/5 <sup>6</sup>	●	↑	100% 7/7 <sup>7</sup>	●	→
Measurement: Number of consultant and contractor procurements advertised compared to planned for the fiscal year. Target: Green: >=80%; Amber: 70% to 79%; Red: < 70%							
<b>Safety</b>	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							
<b>Environmental</b>	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							
<b>Staffing<sup>8</sup></b>	80%	80% 16/20	●	→	100% 24/24	●	→
Measurement: Number of planned positions filled for the fiscal year. Target: Green: >=80%; Amber: 70% to 79%; Red: < 70%							

#### Notes

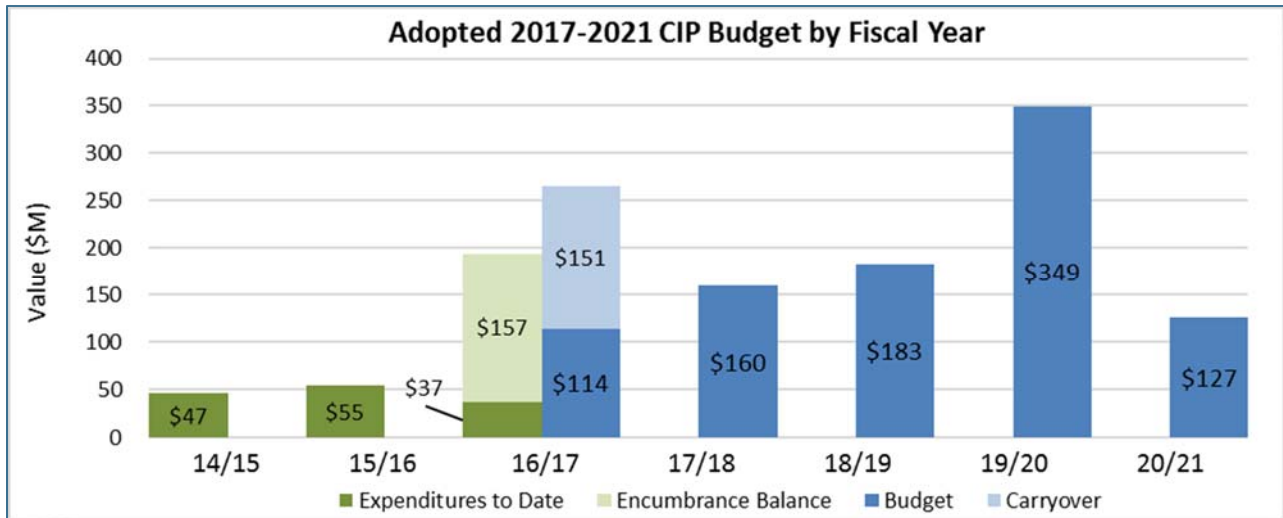
1. The Advanced Facility Control and Meter Replacement Project successfully passed Stage Gate 3: Authorization to Proceed advancing the project to the Preliminary Design Stage.
2. The fiscal year-end count has been updated to reflect a decrease in planned stage gates due to project schedule revisions.
3. The Digester Gas Compressor Upgrade Project achieved Beneficial Use this month, but is more than two months behind schedule.
4. The Baseline Beneficial Use Date and the Baseline Budget for a project are established at the time of construction contract award and execution.
5. The expenditure fiscal year-end estimate increased due to an encumbrance that was not in the previous estimated forecast.
6. The City advertised an RFQ for consultant services for the Yard Piping and Road Improvements Project and a Request for Bids for On-Call Construction Services.
7. The fiscal year-end procurement KPI was increased by one to include the RFQ to pre-qualify Design-Builders for the Headworks Project.
8. The staffing KPI represents CIP recruitments planned for the fiscal year and is measured quarterly. This KPI measurement does not account for staff turnover throughout the fiscal year.



## Program Cost Performance Summary

This section summarizes CIP cost performance for all construction projects and non-construction activities for fiscal year (FY) 16-17 and for the 2017-2021 CIP.

### Adopted 2017-2021 CIP Expenditure and Encumbrances



#### Notes

**Expenditure:** Actual cost expended, either by check to a vendor or through the City's financial system, for expenses such as payroll or 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.

**Encumbrance Balance:** The amount of the remaining encumbrance committed after payments.

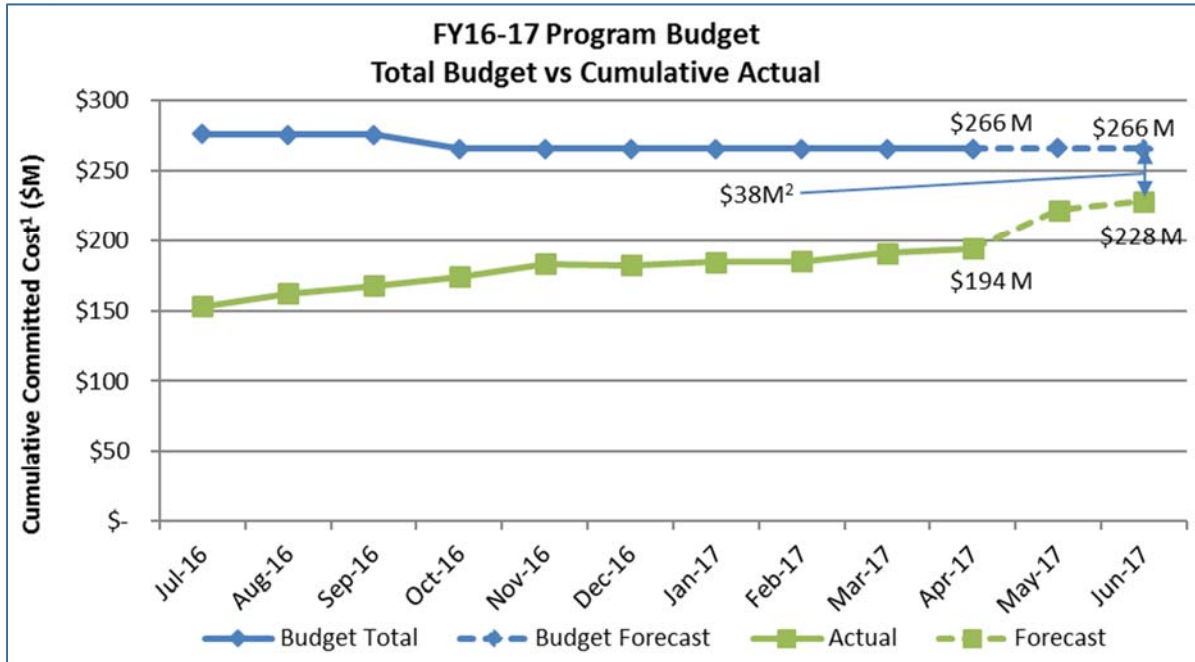
**Budget:** Adopted 2017-2021 CIP Budget, which is new funding plus rebudgeted funds in FY16-17.

**Carryover:** Encumbrance balances at the end of a fiscal year become carryover funding. Carryover is different from rebudgeted funds, in that it automatically utilizes funding that was previously committed, but not yet paid.



## Fiscal Year 2016-2017 Program Budget Performance

This budget comprises the FY16-17 budget of \$114 million, plus carryover of \$152 million. The budget excludes Reserves, Ending Fund Balance, South Bay Water Recycling, Public Art, and Urgent and Unscheduled Rehabilitation items.



### Notes

1. Committed costs are expenditures and encumbrance balances, including carryover (encumbrance balances from the previous fiscal year).
2. The forecasted variance between budget and expenditures can be primarily attributed to the following factors:
  - a. The Blower Improvements Project had originally planned to prepurchase blower equipment in FY16-17 due to long lead times. However, the equipment will now be furnished through the construction contract, shifting approximately \$12 million in estimated expenditures to FY17-18.
  - b. The Cogeneration Facility Project had originally planned to issue early work packages for site preparation and design work in FY16-17. Those packages, estimated at \$8.2 million, are now forecasted to be issued in FY17-18.
  - c. Several encumbrances for consultant services are either anticipated to be lower than budgeted or are anticipated to be awarded in FY17-18.
  - d. Estimated personal services are anticipated to be under budget. Several authorized positions are currently vacant, resulting in lower than budgeted personal services expenses.
  - e. The FY16-17 budget includes three recurring appropriations (Preliminary Engineering, Equipment Replacement, and Plant Infrastructure Improvements) totaling approximately \$3.66 million. These appropriations are included in the budget for implementing minor capital improvement projects that may be needed during the fiscal year. As of March 2017, there are no new major expenditures or encumbrances against these appropriations.



## Project Performance Summary

There are currently seven active projects in the construction or post-construction phases, with an additional 18 projects in feasibility/development, design, bid and award, or design and construction (design-build projects) phases (see PDM, page 2). All active projects are listed in the tables below. 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, using CPMS data as a source.

### Project Performance – Baselined Projects

Project Name	Phase	Estimated Beneficial Use Date <sup>1</sup>	Cost Performance <sup>2</sup>	Schedule Performance <sup>2</sup>
1. Fiber Optic Connection	Post-Construction	Jan 2017 <sup>3</sup>	●	●
2. Digester Gas Compressor Upgrade	Construction	Apr 2017 <sup>3</sup>	◆	◆
3. Emergency Diesel Generators	Construction	Jun 2017	●	◆
4. Construction-Enabling Improvements	Construction	Jul 2017	●	◆
5. Iron Salt Feed Station	Construction	Sep 2017	●	●
6. Plant Instrument Air System Upgrade	Construction	Apr 2018	●	●
7. Digester and Thickener Facilities Upgrade	Construction	Apr 2020	●	●

#### KEY:

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

#### 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 page 11.
3. Actual Beneficial Use date.





## Project Performance – Pre-Baselined Projects

Project Name	Phase	Estimated Beneficial Use Date <sup>1</sup>
1. Headworks Critical Improvements	Bid and Award	Feb 2018
2. Cogeneration Facility	Design & Construction	Apr 2019
3. Blower Improvements	Design	Mar 2020
4. Outfall Bridge and Levee Improvements	Feasibility/Development	Oct 2020
5. Adv. Facility Control & Meter Replacement	Design	Jan 2021
6. Headworks Improvements	Feasibility/Development	May 2021
7. Switchgear S40 Upgrade, M4 Replacement, G3 & G3A Removal	Feasibility/Development	Sep 2021
8. Digested Sludge Dewatering Facility	Feasibility/Development	Jul 2022
9. Filter Rehabilitation	Feasibility/Development	Aug 2022
10. Support Building - Fire Life Safety Update <sup>2</sup>	Feasibility/Development	Sep 2022
11. Support Building - HVAC Improvements <sup>2</sup>	Feasibility/Development	Sep 2022
12. Facility-wide Water Systems Improvements	Feasibility/Development	Feb 2023
13. New Headworks	Feasibility/Development	Oct 2022
14. Nitrification Clarifiers Rehabilitation	Feasibility/Development	Jan 2023
15. Support Building Improvements	Feasibility/Development	Apr 2025
16. Aeration Tanks Rehabilitation	Feasibility/Development	Jul 2025
17. Tunnel Rehabilitation	Feasibility/Development	Dec 2025
18. Yard Piping and Road Improvements	Feasibility/Development	Aug 2026

### 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. The Support Building Improvements Project was divided into three separate projects to allow the discrete project scope elements to be executed independently allowing more flexibility in the project delivery method and less ambiguity on project schedule and cost.



## Significant Accomplishments

### Biosolids Package

#### Digester Thickener and Facilities Upgrade

- Contractor Walsh Construction completed the digester floor upgrades and the demolition of the east wall of the dissolved air floatation tanks.

#### Digested Sludge Dewatering Facility

- Owner's advisor Brown and Caldwell completed the topographic, biological and cultural resources surveys. Next, the project team will complete the alternatives analysis to select the preferred technology for the facility.

### Facilities Package

#### Construction-Enabling Improvements

- Pacific Gas and Electric (PG&E) completed their work and energized the switchgear.

#### Facility-wide Water Systems Improvement

- The CIP project team completed the initial data collection exercise to enable detailed planning for the hydraulic modelling work to proceed. A Field Testing Verification Plan and Hydraulic Model Calibration Plan will be submitted by project consultant Kennedy/Jenks next month for approval.

#### Yard Piping and Road Improvements

- The City advertised an RFQ for consultants to provide owner advisor services. Award of the owner's advisor contract is anticipated in August.

### Liquids Package

#### Advanced Facility Control and Meter Replacement

- Design consultant Black and Veatch submitted the final Conceptual Design Report.
- Staff completed Stage Gate 3: Authorization to Proceed allowing Black and Veatch to begin the final design. Final design is anticipated for completion in January 2018.

#### Aeration Tanks Rehabilitation

- Design consultant Brown and Caldwell began work on the alternatives analysis for aeration tank process configurations and the aeration tanks condition assessment. The final alternative analysis report is forecasted for completion in March 2018.

#### Blower Improvements

- Consultant Hazen and Sawyer conducted a value engineering study to identify and evaluate cost savings concepts. Responses to the proposed recommendations will be prepared in May following workshops with the design consultant and O&M.

#### Iron Salt Feed Station

- Contractor Anderson Pacific completed coatings of the polymer and ferric chloride storage containment structures and passed the leak test of the ferric chloride containment area.

### Power and Energy Package

#### Digester Gas Compressor Upgrade

- Contractor Anderson Pacific completed the seven-day commissioning test of the new digester compressor and achieved Beneficial Use. The Notice of Completion and Acceptance anticipated for early September.



## Explanation of Project Performance Issues

### Digester Gas Compressor Upgrade

This project is over budget by approximately 3 percent due to higher than anticipated project delivery costs associated with increased construction inspection requirements and an extended project timeline.

The project Beneficial Use has been delayed primarily due to the following:

- The compressor skids needed to be reclassified from Class 1 Division 2 to Class 1 Division 1. This issue was resolved in May 2015.
- The Bay Area Air Quality Management District (BAAQMD) delayed approval of the digester gas flaring during the tie-in of the new gas piping. This issue was resolved in November 2016.
- Functional testing of the automation system has taken longer than anticipated.
- There are conflicting process shutdowns with other projects.

### Emergency Diesel Generator

The schedule shows a delay in the project completion of approximately one year from the Notice to Proceed completion date. The City granted that an additional 179 working days be added to the schedule through the change order process due to additional scope. The project continues to be late due to the following factors:

- Caterpillar, the supplier of the emergency diesel generator system, encountered delays in developing the controls and network switches that interface with existing RWF controls. Caterpillar and Peterson Control are in the process of completing all outstanding items. A problem was found with the new network switches during the factory acceptance test. The City and the design-build team completed an engineering study and found a solution to the problem. Additional switches have been installed for the existing network system. Caterpillar's completion of the Level 2 process load tuning testing for four new emergency diesel generators also took longer than anticipated.
- Additional time was required for PG&E to review the third-party report on the testing of the protective devices and schedule the witness test for the new emergency diesel generators. PG&E has now completed this work.
- A no-cost time extension change order was required to split the commissioning sequence into two phases and ensure RWF backup power during engine modification work. The contractor completed Phase 1 of the project, which includes modifications to the existing EG1 engine, an eight-hour load test for the four new generators, and the installation of the fueling system and the diesel exhaust fluid system. Phase 2 will include an upgrade to the existing EG2 and EG3 engines and M4 switchgear.

### Construction-Enabling Improvements

This project was originally scheduled to be substantially complete by mid-February 2017. Due to the extremely wet winter season, contractor Teichert Construction (Teichert) was unable to perform substantial site work for several weeks from October through April and has been granted 47 extra workdays for weather-related delays. Teichert has also been granted additional time for the removal and replacement of asphalt pavement in damaged areas of Zanker Road; installing traffic-rated pull boxes for the streetlight system; installing underground conduits for the fiber optic system; and other changes.

In addition, Teichert estimates delivery of the trailers required for the project in late May. Installation and furnishing of the trailers, plus final inspection, should take another three to four weeks to complete, putting the Beneficial Use date in early July 2017.



## Project Profile – Emergency Diesel Generators

In July 2014, Council awarded a \$15.3 million low-bid design-build contract for the Emergency Diesel Generators Project to Anderson Pacific Engineering Construction, Inc. (AP). The City issued Notice-to-Proceed to AP in September 2014 with a preliminary project scope including the installation of four diesel generators capable of producing three megawatts of power each and above ground fuel storage with capacity sufficient to sustain critical operations for two days in the event of a power outage, modification of existing systems as required, a storage building, and associated appurtenances, such as the emissions system, fueling system, control system, monitoring system, and connectivity to the RWF's Distributed Control System (DCS), electrical switchgear, synchronizing panel, and protective relays.

The new diesel generators will have the capacity to fully operate the primary and secondary processes at the Facility. The power generation system will automatically restart the critical and secondary loads, and re-synchronize to PG&E when available. The design-builder installed two 22,500-gallon fuel tanks on site, providing enough fuel storage for 48 hours of power outage.

During a power outage, the generators will automatically start, synchronize, and energize the RWF electrical distribution system in less than a minute. Big equipment, such as the 2,250 horsepower blowers and pumps in the nitrification process area, require a manual restart and are expected to be online within 30 minutes of a power outage.

The project was constructed in two phases: Phase 1 consists of the installation of four new emergency diesel generators and two fuel tanks, including full testing and commissioning as well as synchronizing to the PG&E grid system. Phase 1 also includes the modification of the existing cogeneration engine, EG1 and the M3 substation. Phase 2 consists of the modification of the two existing cogeneration engines, EG2 and EG3, and the M4 substation.

The project is currently under budget with more than half of the construction contingency remaining. Anderson Pacific has completed the Phase 1 work with full commissioning completed and approval received from PG&E last month. The project startup testing and commissioning for Phase 2 is currently underway with Beneficial Use expected in June 2017.



**Figure 2: Project Team in Front of the Four New Emergency Generators and Control Room**

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# Regional Wastewater Facility Treatment – Current Treatment Process Flow Diagram

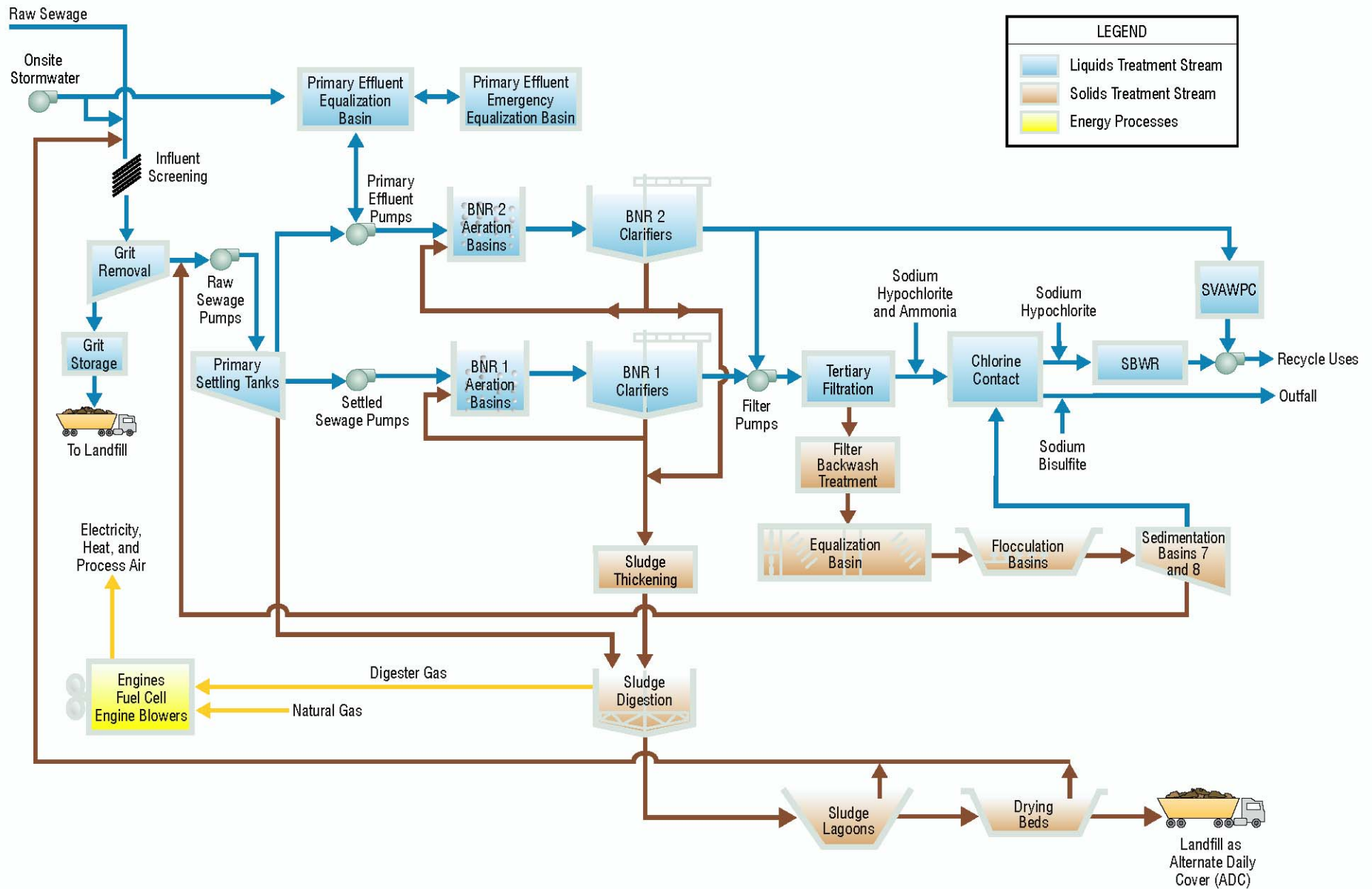


Figure 3 – Current Treatment Process Flow Diagram



# Regional Wastewater Facility Treatment – Proposed Treatment Process Flow Diagram

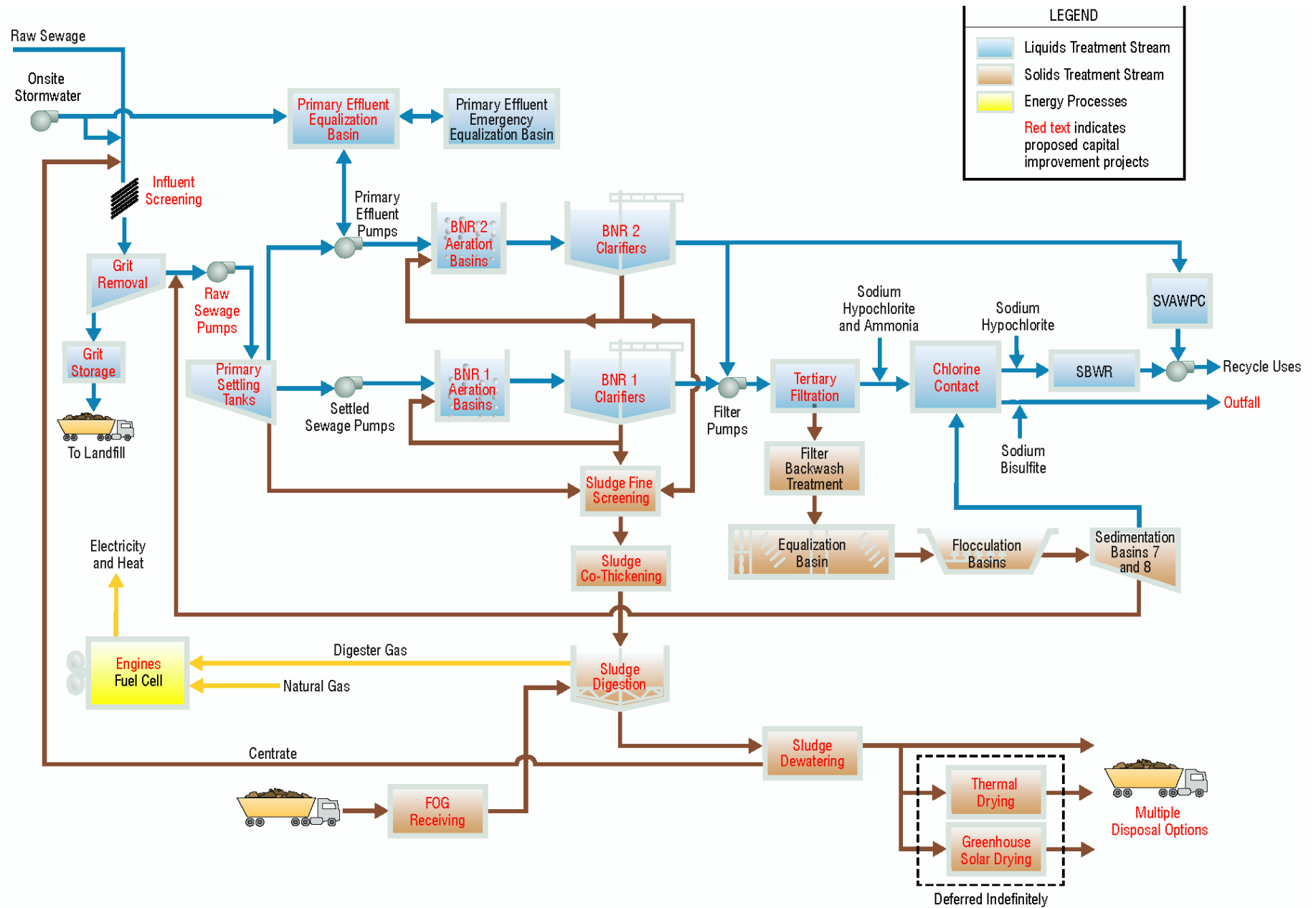


Figure 4 – Proposed Treatment Process Flow Diagram



## Active Construction Projects – Aerial Plan

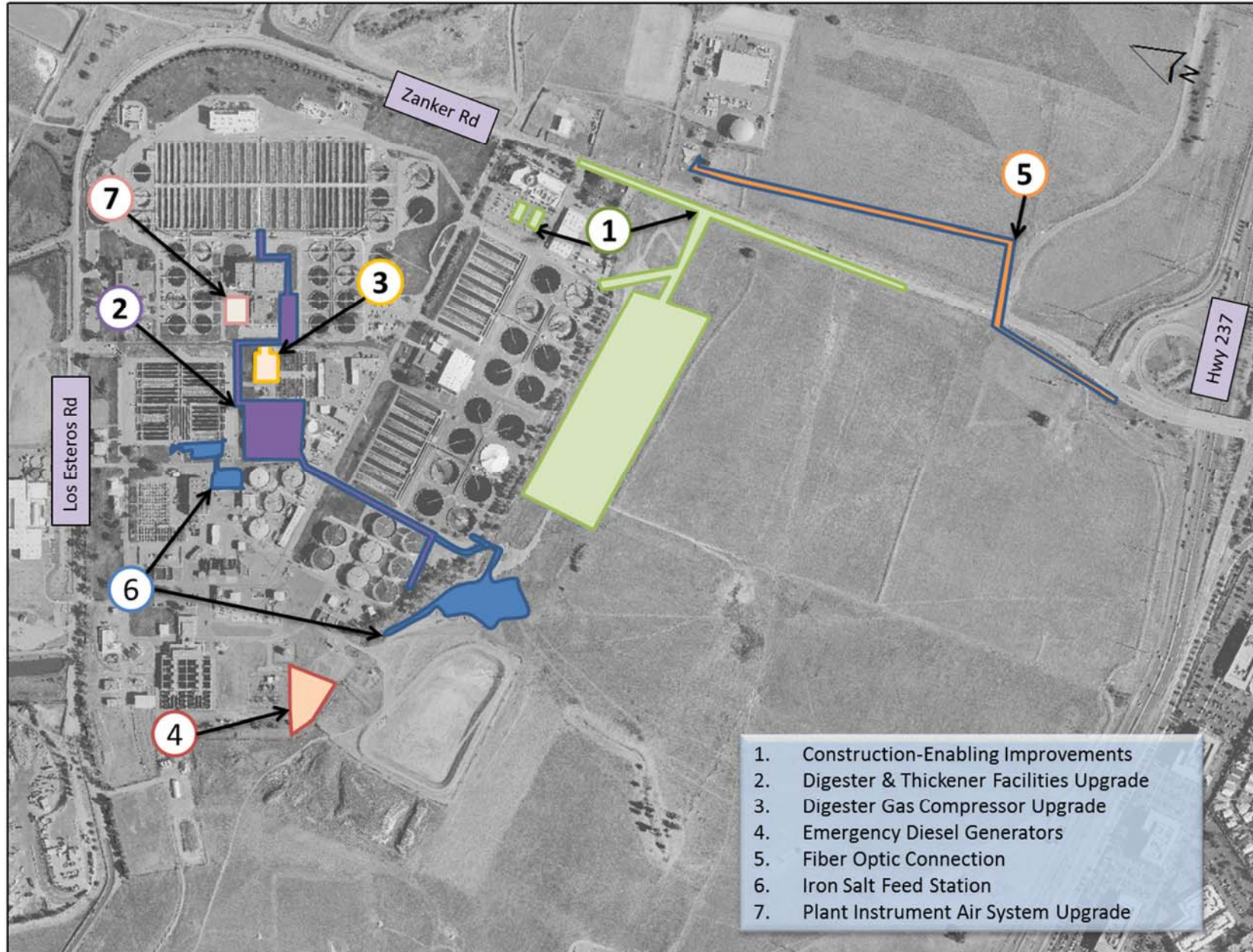


Figure 5 – Active Construction Projects

