



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

# Capital Improvement Program

## Monthly Status Report: September 2016

November 3, 2016

This report summarizes the progress and accomplishments of the Capital Improvement Program (CIP) for the San José-Santa Clara Regional Wastewater Facility (RWF) for September 2016.

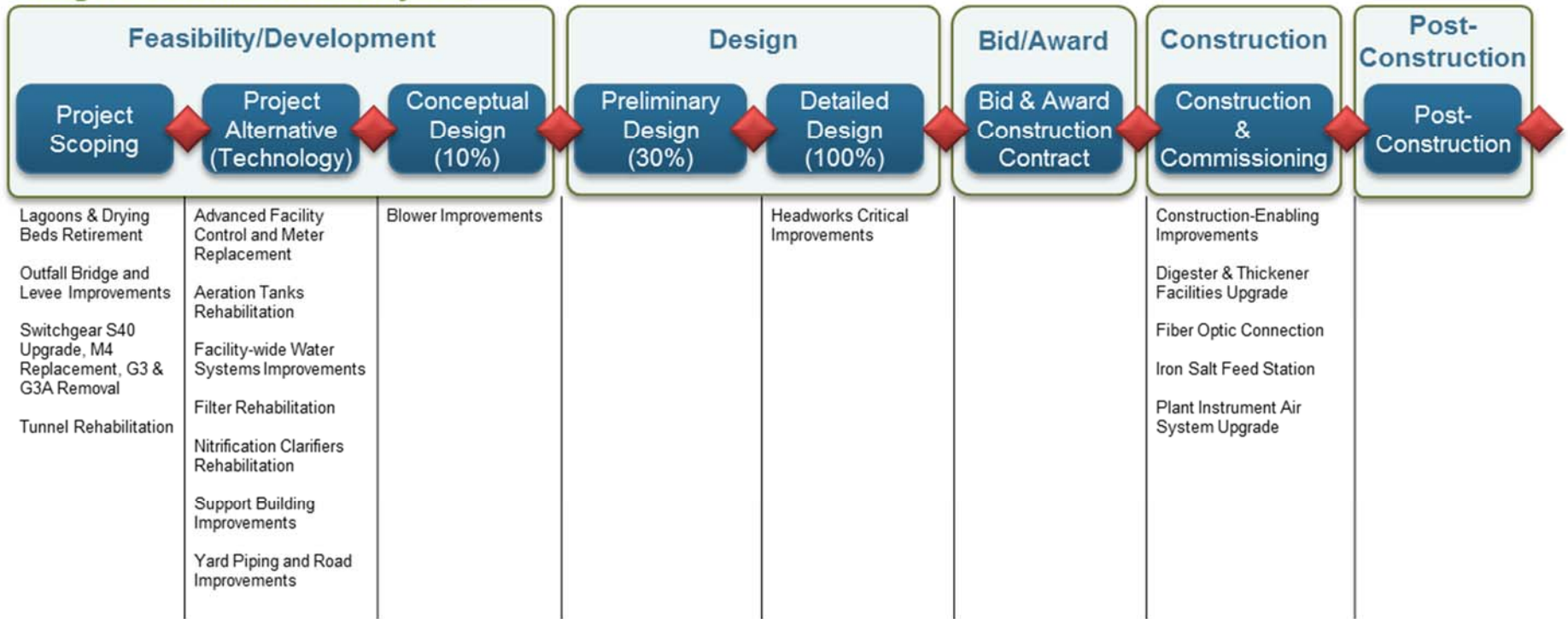
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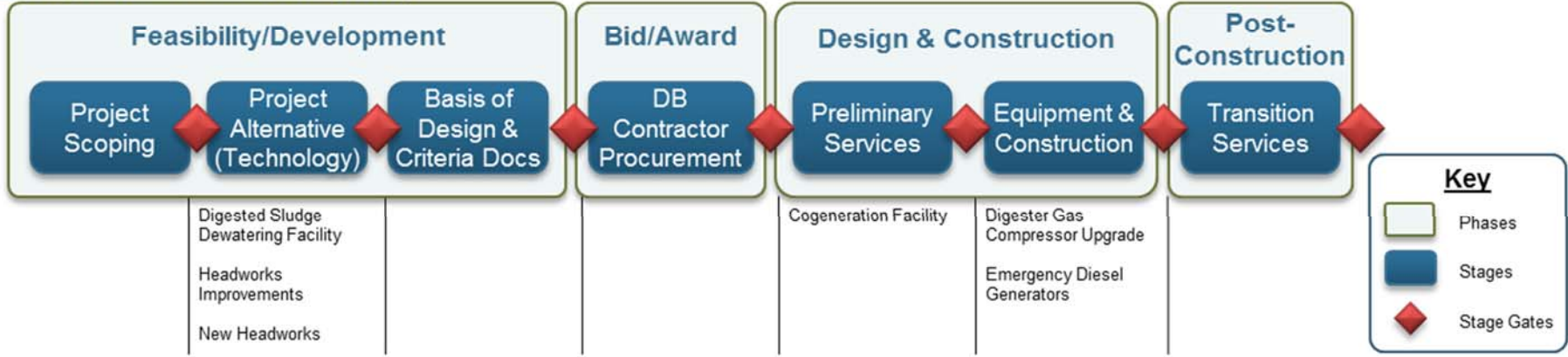


# Project Delivery Model

## Design-Bid-Build Active Projects



## Design-Build Active Projects



**Key**

- Phases (represented by a light blue box)
- Stages (represented by a dark blue box)
- Stage Gates (represented by a red diamond)

\*Projects shown in **bold and italics** have advanced this reporting period





## Program Summary

### September 2016

In September, the CIP progressed on multiple fronts with key procurement, planning, design, and construction activities continuing across all phases of the program.

CIP staff presented the following recommendations to the Treatment Plant Advisory Committee (TPAC) and San José City Council (Council):

- Award an agreement to provide broker, administrative, and claims services to implement an Owner Controlled Insurance Program (OCIP) at the RWF;
- Award a master consultant agreement (MCA) for the Facility-wide Water Systems Improvement Project;
- Award a MCA to provide audit services at the RWF;
- Process a change order for the Emergency Diesel Generator Project to eliminate particulate filters from the project scope, pursuant to Bay Area Air Quality Management District (BAAQMD) evaluations. This change will result in a credit to the City of approximately \$718,000.

All recommendations were approved by Council with the exception of the OCIP Broker Services agreement. This will be re-advertised and presented to TPAC and Council in January 2017.

The Headworks Critical Improvements Project reached the 100 percent design milestone this month. The project is scheduled to advertise for bid in November 2016. The Cogeneration Facility design-build project also made significant progress, with the draft Basis of Design Report submitted this month. A value engineering session based upon the initial design was also held to identify potential value improvements to the project. Conceptual design and alternatives analysis efforts continued on the Headworks, Blower Improvements, Filter Rehabilitation, and Nitrification Clarifiers Rehabilitation projects, with technical workshops held for each project this month. The draft conceptual design report was completed for the Blower Improvements Project, and condition assessment work progressed on the Filter Rehabilitation and Nitrification Clarifiers Rehabilitation projects.

Construction work continued on the Emergency Diesel Generators, Digester Gas Compressor Upgrades, Iron Salt Feed Station, Fiber Optic Connection, Construction-Enabling Improvements, and Digester and Thickener Facilities Upgrade projects. Staff engaged in significant planning and coordination efforts this month to prepare for a number of major process shutdowns required to isolate sections of the RWF in advance of construction activities for the Digester and Thickener Facilities Upgrade Project.

### Look Ahead

In October, CIP project teams and the selected design consultants will move forward with design, condition assessment, and alternatives analysis work for the Headworks, Cogeneration Facility, Filter Rehabilitation, Blower Improvements and Nitrification Clarifiers Rehabilitation projects. Staff anticipate that the Headworks Critical Improvements Project and the Blowers Improvement Project will both advance through stage gates next month. Applications and discussions with the State Water Resources Control Board relating to Clean Water State Revolving Fund funding for the Digester and Thickener Facilities Upgrade and Cogeneration Facility projects will also continue.

Staff will advance efforts related to consultant procurements and service orders for the Aeration Improvements, Facility-wide Water Systems Improvements, Advanced Facility Control and Meter Replacement, Switchgear S40 Upgrade, M4 Replacement, G3 & G3A Removal, Digested Sludge Dewatering Facility, and Support Building Improvements projects. Service order negotiations for the Advanced Facility Control and Meter Replacement Project will be completed in October, with project work scheduled to commence in November.

Procurements for a number of services will also continue to advance, including one for a CIP industrial hygienist and another for owner's advisor services for the Yard Piping and Road Improvements Project. These procurements are scheduled to be advertised in October and November, respectively.

Staff will make the following recommendations to TPAC and Council in October:

- Award an MCA for Owner's Advisor services for the Digested Sludge Dewatering Project, and
- Accept the CIP Semiannual Status Report, highlighting progress for the period of January through June 2016.

Construction activities will continue on the Emergency Diesel Generators, Digester Gas Compressor Upgrade, Iron Salt Feed Station, Fiber Optic Connection, Digester and Thickener Facilities Upgrade, and Construction-Enabling Improvement projects. Pre-construction activities will commence on the Plant Instrument Air System Upgrade Project.

In addition, all CIP project managers and project engineers will continue formal staff training to acquire tools and techniques to effectively manage projects, based on Project Management Institute fundamentals tailored to the CIP.



## Program Highlight – Process Shutdown Procedure

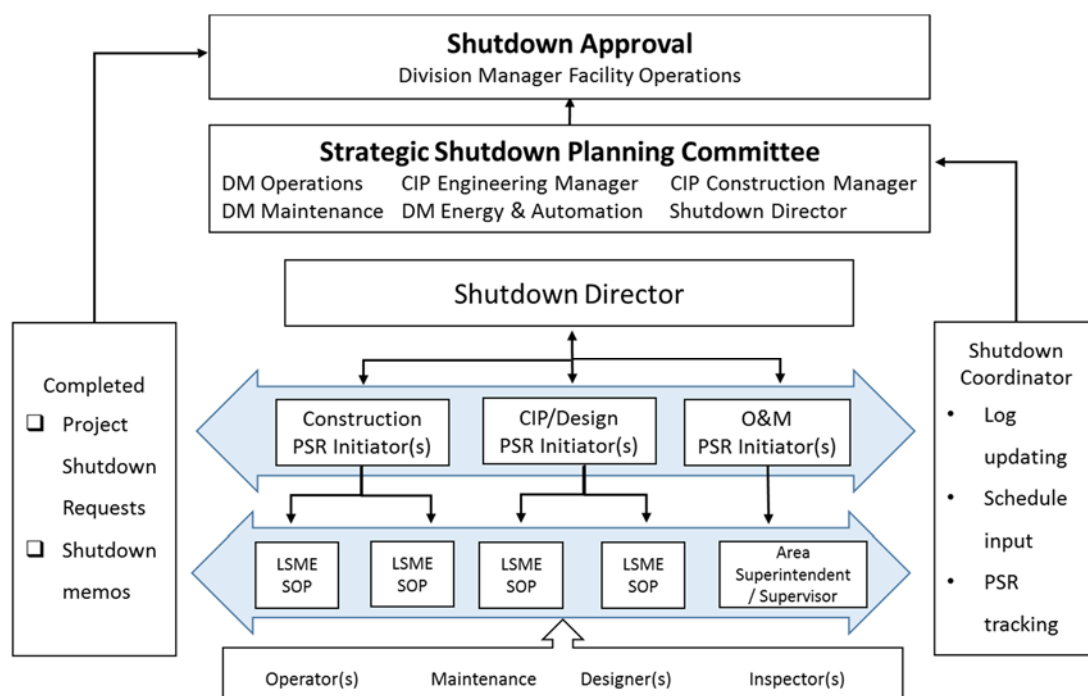
As design and construction activities increase at the RWF, so will process shutdowns. The CIP anticipates hundreds of shutdowns during the course of the program. Process shutdowns are required for several reasons, including:

- Condition assessments of structures, equipment, or piping;
- Construction of new facilities or modification/improvement to existing facilities;
- Commissioning and integration of new facilities and systems;
- Planned or unplanned maintenance on existing facilities;
- Bringing treatment process units in or out of service on a seasonal basis; and
- Compliance with requests of utility districts or companies.

Procedures have been established to facilitate the planning, scheduling, and approval of necessary process shutdowns. The goals of these procedures are to:

- Ensure that shutdowns do not violate discharge or other permits;
- Provide a safe working environment for all RWF staff and contractors;
- Coordinate other work to minimize the number and length of shutdowns and their effects on treatment processes and systems;
- Allow orderly construction and commissioning of new projects;
- Allow orderly integration of Operations and Maintenance (O&M) work into construction activities; and
- Ensure that process shutdowns are conducted efficiently and effectively.

The roles and relationships of key participants in process shutdowns are illustrated in Figure 1 and described below.



**Figure 1: Unit Process Shutdown Flow Chart**

The construction contractor, design consultant, or O&M staff can initiate process shutdowns. The process shutdown initiator and the O&M lead subject matter expert (LSME) both play important roles and work as a team in the planning, scheduling, and implementation of successful unit process shutdowns. The initiator is responsible for providing details of the shutdown to other involved parties so that they can perform their required roles.

Together, the documents required for a process shutdown are called the “process shutdown package.” This package consists of the following:

- Process Shutdown Request (PSR) Form – The initiator completes the PSR form and supporting material to describe exactly what is to be shut down, where the boundaries of the shutdown are located, duration, work to be performed during the shutdown, and other detailed information so that O&M staff know which operating facilities and equipment will be impacted.



- Shutdown Memorandum – The LSME for the project initiating the shutdown prepares this document, with attached standard operating procedures (SOPs), to describe the shutdown purpose, areas affected, preparation, shutdown procedures, restoration procedures, and contingency actions.
- SOPs – The LSME describes these procedures in sufficient detail to inform O&M staff exactly which equipment, facilities, and control systems will need to be turned on or off; the sequence of shutdown activities; duration; tasks required to restore normal treatment operation; indicators of any unsafe or undesirable condition; and restoration plans.

After the PSR, Shutdown Memorandum, and SOPs are prepared and combined into the process shutdown package, the construction management liaison or shutdown director will review and present the package to the Division Manager of Facility Operations for review and approval. This division manager is the only person authorized to approve RWF process shutdowns.



## 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 will be selected and measured that best reflect the current program.

### 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%	100%			100%		
		1/1			23/23		
Measurement: Percentage of initiated projects and studies that successfully pass each stage gate on their first attempt. Target: Green: >=80%; Amber: 70% to 80%; Red: < 70%							
<b>Schedule</b>	90%	NA			50%		
		0/0			2/4		
Measurement: Percentage of CIP projects delivered within 2 months of approved baseline Beneficial Use Milestone. Target: Green: >=90%; Amber: 75% to 89%; Red: < 75%							
<b>Budget</b>	90%	NA			75%		
		0/0			3/4		
Measurement: Percentage of CIP projects that are accepted by the City within the approved baseline budget. Target: Green: >=90%; Amber: 75% to 89%; Red: < 75%							
<b>Expenditure</b>	\$193M	\$167M			\$249M <sup>1</sup>		
Measurement: CIP FY16-17 committed costs. Committed cost meets or exceeds 70% of planned Budget Target: 70% of \$276M = \$193M. Therefore Green: >=\$193M; Amber: \$152M to \$193M; Red: < \$152M							
<b>Procurement</b>	80%	NA			100%		
		0/0			5/5		
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>2</sup></b>	80%	100%			100%		
		5/5 <sup>3</sup>			24/24		
Measurement: Number of planned positions filled for the fiscal year. Target: Green: >=80%; Amber: 70% to 79%; Red: < 70%							

#### Notes

1. Fiscal year end projections have been revised.
2. The City staffing level KPI for planned recruitments for positions that are vacant at the start of the fiscal year is measured quarterly; all other KPIs are measured monthly. KPI measurement does not account for staff turnover throughout the fiscal year.
3. Five positions were filled this quarter, including two sanitary engineers, an engineer, an engineering technician, and a staff specialist.

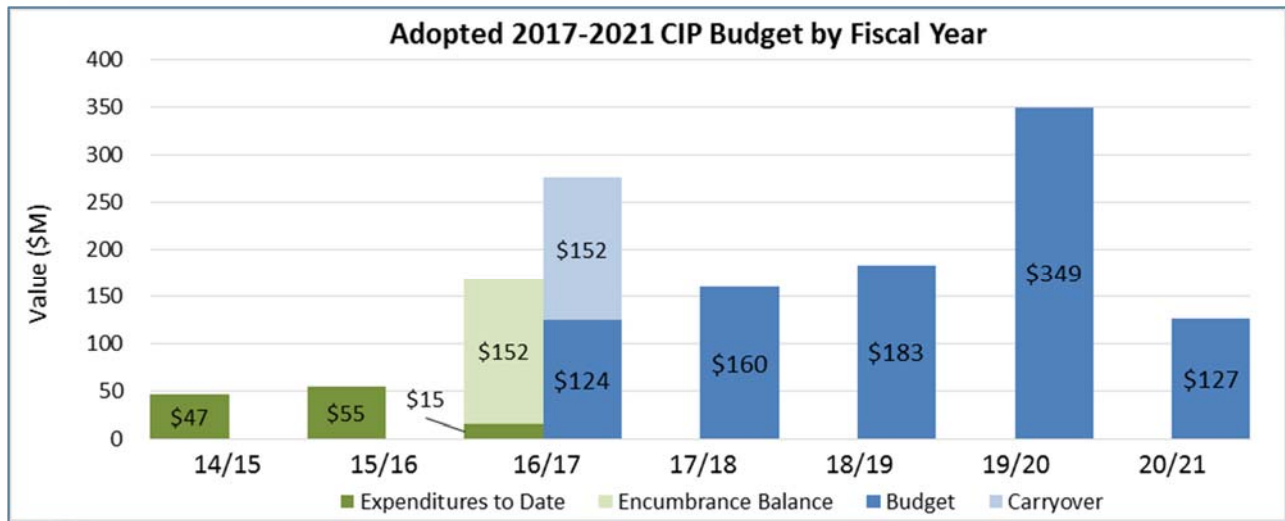


## Program Cost Performance Summary

This section summarizes CIP cost performance for all construction projects and non-construction activities for FY16-17 and for the 2017-2021 CIP.

### Adopted 2017-2021 CIP Expenditure and Encumbrances

FY14-15 and FY15-16 expenditures have been adjusted to reflect the CIP portion of the Treatment Plant Capital Fund (Fund 512), excluding South Bay Water and Urgent and Unscheduled Cost (\$2.6 million and \$1.5 million, respectively).



#### 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. The encumbrance reserves the funding within the appropriation and project.

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

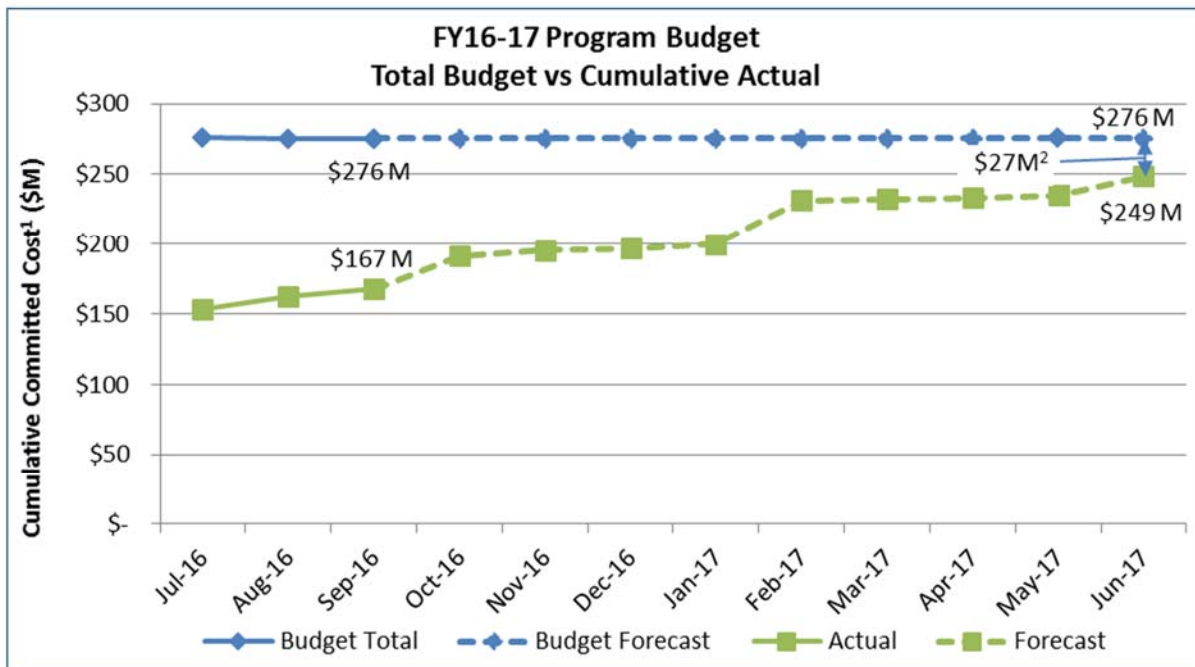
**Budget:** Adopted 2017-2021 CIP Budget, which is new funding plus rebudgeted funds.

**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 \$124 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 expenditure can be primarily attributed to the following factors:
  - a. Expenses anticipated for the pre-purchase of blowers for the Blower Improvements Project are no longer required this fiscal year. Originally, the project had identified a potential need to pre-purchase blowers to meet schedule constraints. As design progressed, this pre-purchase was deemed unnecessary. The equipment will now be purchased in FY17-18 as part of the main construction award.
  - b. Several encumbrances for consultant services are either anticipated to be lower than budgeted or are no longer anticipated this fiscal year.
  - c. Estimated personal services are anticipated to be under budget. Several authorized positions are currently vacant, resulting in lower than budgeted personal services expenses.
  - d. Recurring appropriations such as Equipment Replacement and Plant Infrastructure Improvements are included in the budget, but not anticipated at this time to be expended.




















## Project Performance Summary

There are currently seven active projects in the construction or post-construction phases, with an additional 17 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. Digester Gas Compressor Upgrade	Construction	Jan 2017		
2. Emergency Diesel Generators	Construction	Mar 2017		
3. Fiber Optic Connection	Construction	Feb 2017		
4. Construction-Enabling Improvements	Construction	Mar 2017		
5. Iron Salt Feed Station	Construction	Sep 2017		
6. Plant Instrument Air System Upgrade	Construction	Jan 2018 <sup>3</sup>		
7. Digester and Thickener Facilities Upgrade	Construction	Apr 2020		

#### KEY:

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

#### 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.
- An explanation of cost and schedule variances on specific projects identified in this table is provided on page 13.
- Project construction Beneficial Use date will be baselined once the contractor submits their construction schedule.



## Project Performance – Pre-Baselined Projects

Project Name	Phase	Estimated Beneficial Use Date <sup>1</sup>
1. Headworks Critical Improvements	Design	Oct 2017
2. Cogeneration Facility	Design & Construction	May 2019
3. Blower Improvements	Feasibility/Development	Mar 2020
4. Adv. Facility Control & Meter Replacement	Feasibility/Development	Jan 2021
5. Switchgear S40 Upgrade, M4 Replacement, G3 & G3A Removal	Feasibility/Development	Apr 2021
6. Headworks Improvements	Feasibility/Development	Apr 2021
7. Digested Sludge Dewatering Facility	Feasibility/Development	Dec 2021
8. Filter Rehabilitation	Feasibility/Development	May 2022
9. Outfall Bridge and Levee Improvements	Feasibility/Development	Jun 2022
10. Facility-wide Water Systems Improvements	Feasibility/Development	Jul 2022
11. New Headworks	Feasibility/Development	Oct 2022
12. Nitrification Clarifiers Rehabilitation	Feasibility/Development	Nov 2022
13. Yard Piping and Road Improvements	Feasibility/Development	Mar 2023
14. Aeration Tanks Rehabilitation	Feasibility/Development	Mar 2024
15. Tunnel Rehabilitation	Feasibility/Development	Nov 2025
16. Support Building Improvements	Feasibility/Development	Jan 2027
17. Lagoons & Drying Beds Retirement	Feasibility/Development	Apr 2027

### 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.



# Significant Accomplishments

## Biosolids Package

### Digester and Thickener Facilities Upgrade

- Construction is ongoing. The contractor, Walsh Construction is coordinating process shutdowns and has begun initial demolition work.

## Facilities Package

### Cogeneration Facility

- Design-builder CH2M Hill submitted the draft Basis of Design Report and associated cost model.
- Owner's advisor Black & Veatch held value engineering workshops. The project team will discuss the resulting recommendations in early October.

### Construction-Enabling Improvements

- Contractor Teichert Construction is nearing completion of the earthwork, including grading, base rock placement, and geotextile installation. The project team expects electrical submittals in early October.

### Facility-wide Water Systems Improvements

- Council awarded an MCA to the top-ranked consulting firm, Kennedy/Jenks Consultants, Inc.

### Fiber Optic Connection

- Contractor Aegis ITS, Inc. began conduit verification and pull box placement activities.

### Support Building Improvements

- The project team began negotiations with the top-ranked consulting firm to agree on scope and anticipated fees for a Master Consulting Agreement.

### Yard Piping and Road Improvements

- The project team completed all requirements associated with stage gate conditions, and received approval from CIP leadership to proceed to the project alternatives stage.

## Liquids Package

### Advanced Facility Control and Meter Replacement

- The project team completed negotiating the scope of work and fees with design consultant Black & Veatch and anticipates issuing the Notice to Proceed in October.

### Blower Improvements

- Staff received, reviewed, and provided comments on the draft Conceptual Design Report.
- The project team completed negotiating the first service order's scope of work and fees with design consultant Brown & Caldwell.

### Filter Rehabilitation

- The project team completed review of the Tertiary Process Narrative and coordinated onsite structural and electrical condition assessments.
- Design consultant Kennedy/Jenks completed the onsite structural condition assessment.

### Headworks Critical Improvements

- Design consultant CDM Smith achieved the 100 percent design milestone. The project is scheduled to advertise for bid in November.

### Iron Salt Feed Station

- Contractor Anderson Pacific completed site excavations for both the iron salts and polymer stations, relocated key underground utilities, and began constructing formwork for concrete footings, slabs, and walls.

### New Headworks

- Design consultant CDM Smith completed the collection of onsite data and submitted the draft hydraulic model, draft Headworks Equipment Technology memorandum, and the draft alternative analysis memorandum for review.



- The project team held an alternatives analysis workshop with O&M staff to select the preferred headworks alternative.

#### Nitrification Clarifiers Rehabilitation

- The project team completed a visual condition assessment of the nitrification clarifiers and mixed liquor channels, and met with design consultant HDR and O&M staff to prepare for the underground utilities condition assessment.

#### **Power and Energy Package**

##### Emergency Diesel Generators

- Contractor Anderson Pacific pulled and terminated the electrical cables.
- Subcontractors Peterson and CAT ISO began their level-one system checkout.

##### Digester Gas Compressor Upgrade

- Contractor Anderson Pacific installed the electrical conduits and pulled cables to the electrical instrumentation devices in the outdoor cooling area.





## Explanation of Project Performance Issues

### Emergency Diesel Generator

The project completion schedule has been delayed approximately nine months due to the following three 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 ordered and installed for the existing network system. Caterpillar will conduct level 1 and level 2 startup process testing to test and verify that all issues have been corrected. Level 1 startup testing began in mid-September and should be completed by the end of October.
- Additional time is required for Pacific Gas & Electric (PG&E) to schedule the witness test of the emergency diesel generator equipment installation and commissioning to connect to the RWF grid. The City completed the third-party testing of the switchgear, power, and controls and submitted the report to PG&E for review and approval. The proposed onsite inspection and witness testing dates for the emergency diesel generator equipment commissioning have been submitted to PG&E for approval.
- A no-cost time extension change order has been processed and fully executed to split the commissioning sequence into two periods and ensure RWF backup power during engine modification work. The City's phase 1 existing engine modification has been completed and will be tested during the commissioning process.

### Digester Gas Compressor Upgrade

This project is over budget by 1.8 percent. The two issues below have increased project delivery costs, pushing the total project cost slightly over budget:

- Construction inspection requirements were more involved than anticipated, and
- Necessary changes in the contract have extended the project. The project management labor budget has not been increased to reflect the project time extension.

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

- The compressor skids needed to be reclassified from Class 1 Division 2 to Class 1 Division 1, and
- The Bay Area Air Quality Management District (BAAQMD) has not approved digester gas flaring during the tie-in of the new gas piping with existing piping.

Staff have resolved the reclassification issue and are working with the BAAQMD to update the RWF air permit to allow flaring during equipment upgrades.



## Project Profile – Nitrification Clarifiers Rehabilitation

The RWF's 16 nitrification clarifiers were constructed in the 1970s. These clarifiers, together with the aeration basins, are at the core of the RWF treatment process. The clarifiers' performance directly impacts the performance of downstream filters, and ultimately the quality of the final effluent that enters the Bay. Many of the clarifiers' mechanical, structural, and electrical components are nearing the end of their useful lives. The objective of this project is to implement cost-effective improvements that will enhance the efficiency and minimize unscheduled maintenance activities of the nitrification clarifiers for the next 30 years.

In October 2011, the consultant firm AECOM completed a condition assessment that inventoried and evaluated the condition of the clarifier elements, then provided an opinion on the need to repair or replace those elements. The project team is utilizing the condition assessment results and input from O&M staff to develop the project scope of work. Currently, the project team anticipates that all of the mechanical components will require complete replacement. These components include the clarifier mechanism, piping, valves, and flow elements, as well as two motor control centers dedicated to the clarifiers. Other minor scope items include concrete repair and miscellaneous site work.

In September 2015, staff advertised a Request for Qualifications (RFQ) seeking preliminary engineering, detailed design, engineering support during construction, and post-construction support for the project. Staff evaluated three firms and negotiated an MCA with the top-ranked consultant, HDR Engineering, Inc. (HDR). Council approved the MCA in May 2016 and the City issued a Notice to Proceed for the first service order in August 2016.

Under the first service order, HDR will perform additional condition assessment work to assess certain structures and pipelines not previously inspected. In August 2016, HDR completed a condition assessment of the mixed liquor channels and focused on the structural components of the clarifiers. HDR will complete the condition assessment of the return-activated sludge piping and valves in October 2016. Next, HDR will develop alternatives for implementing necessary improvements to the clarifiers; consider the selection of products and materials, construction sequencing strategies, and lifecycle costs; and perform an alternatives analysis workshop and business case analysis to recommend preferred project alternatives before proceeding with the project's conceptual design.

The project's planning-level construction estimate is \$33.5 million. The project team will refine this estimate as the project advances through feasibility/development, conceptual design, preliminary design, and detailed design stages. The project will be delivered using the conventional design-bid-build project delivery method. Design is estimated to be completed by summer 2018 with Beneficial Use anticipated in fall 2022.



**Figure 2 – Inoperable and corroded groundwater relief valve**



**Figure 3 - Clarifier interior and mechanism during structural condition assessment**

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# Regional Wastewater Facility Treatment – Current Treatment Process Flow Diagram

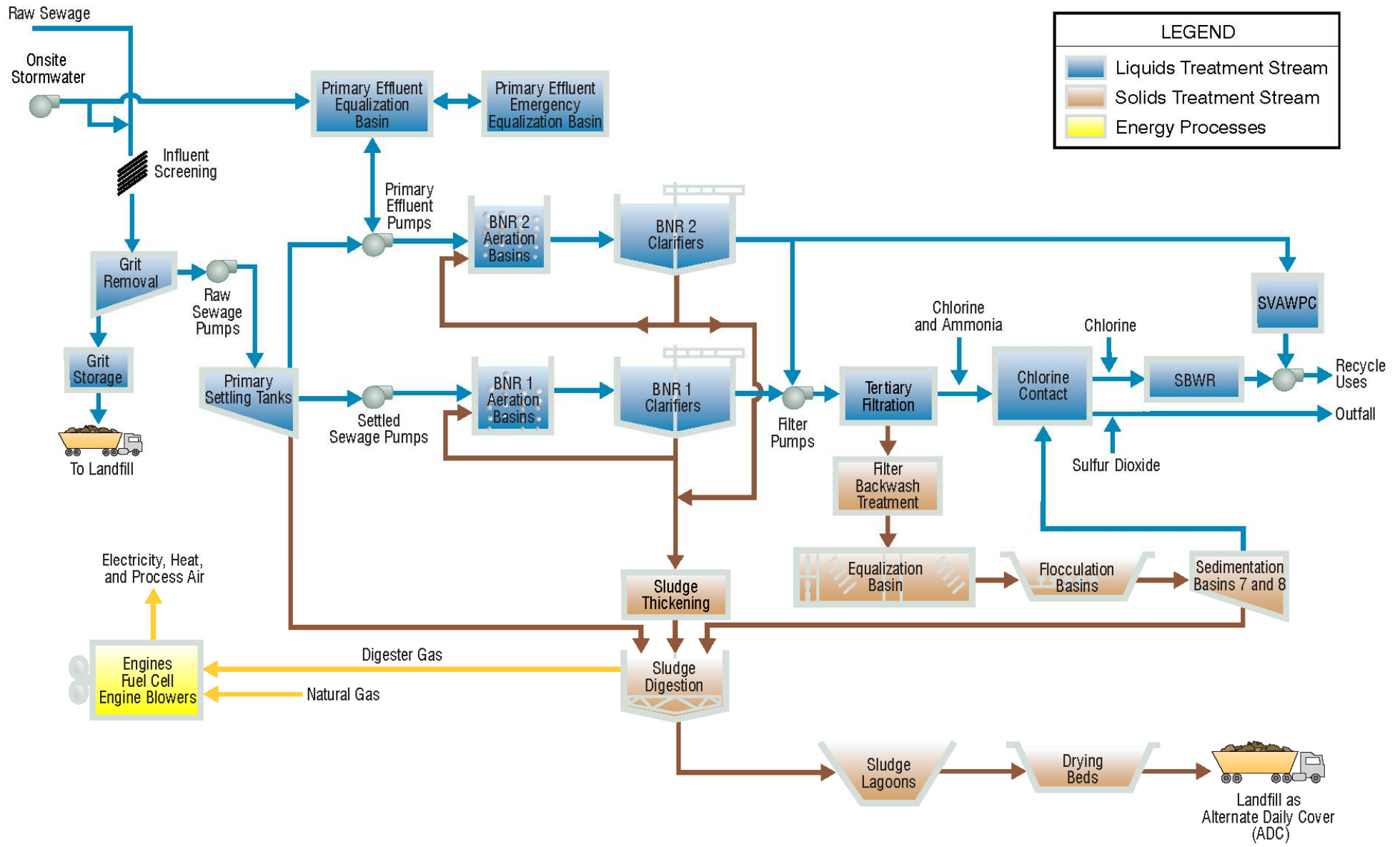


Figure 4 – Current Treatment Process Flow Diagram





# Regional Wastewater Facility Treatment – Proposed Treatment Process Flow Diagram

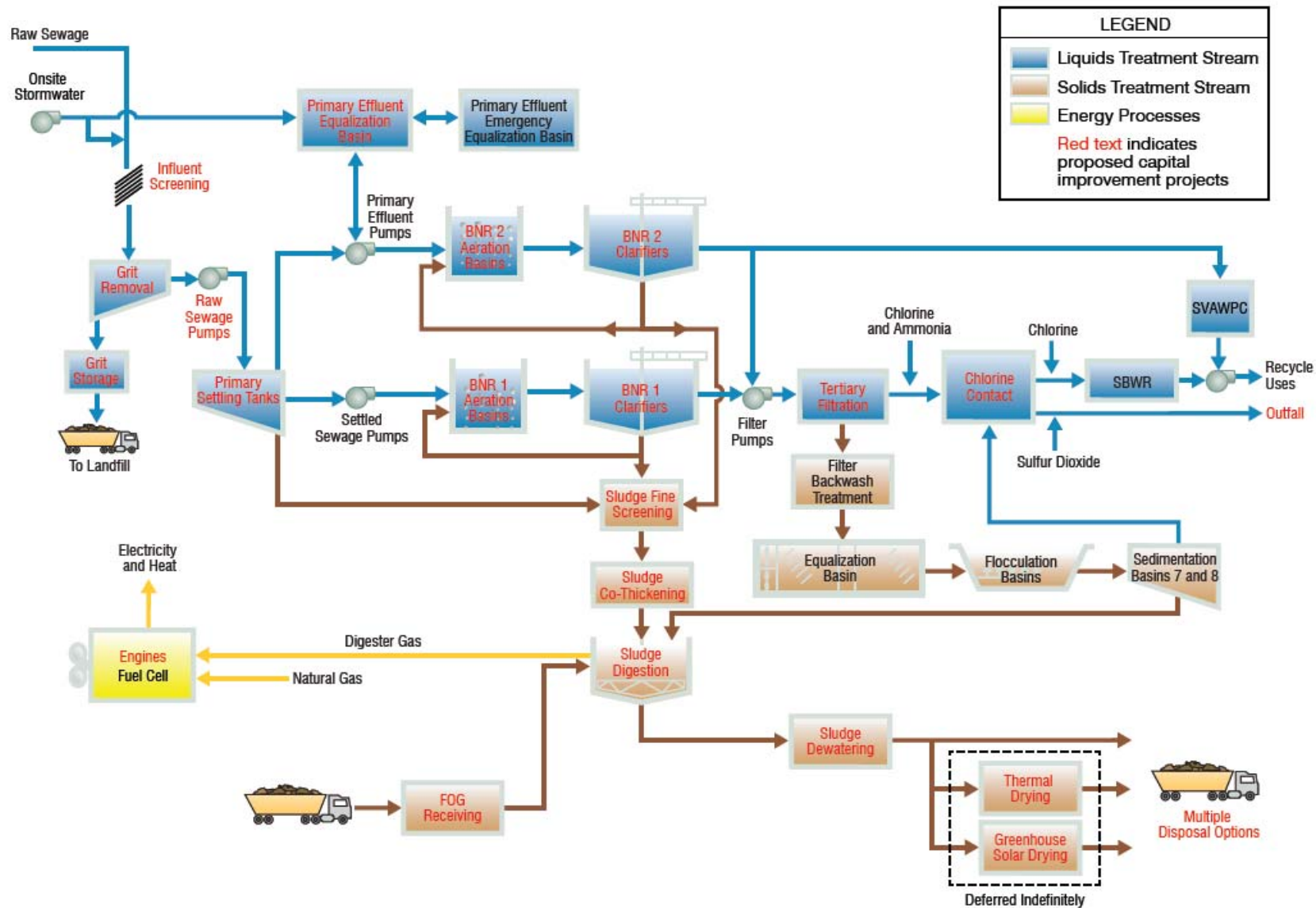


Figure 5 – Proposed Treatment Process Flow Diagram



## Active Construction Projects – Aerial Plan

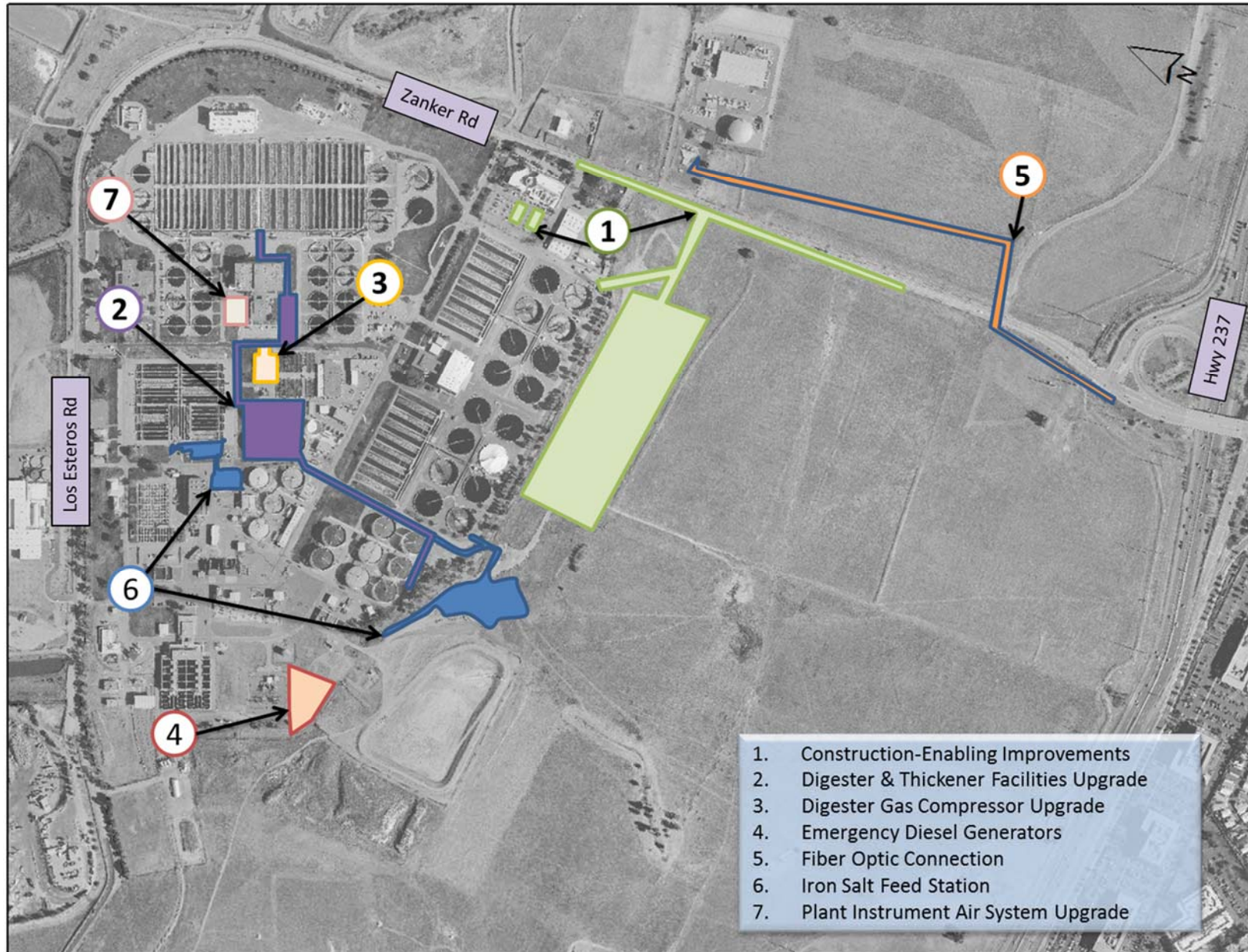


Figure 6 – Active Construction Projects

