

San Jose/Santa Clara Water Pollution Control Plant Capital Improvement Program



Semiannual Status Report
July - December 2012

SAN JOSE/SANTA CLARA
WATER POLLUTION
CONTROL PLANT



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Eastward view of the secondary treatment tanks that use bacteria to clean wastewater.

San Jose/Santa Clara Water Pollution Control Plant Capital Improvement Program Semiannual Status Report July - December 2012

I. Introduction

Report Objective and Contents

This report provides an overview and specific information on the implementation of capital improvement projects at the San Jose/Santa Clara Water Pollution Control Plant (Plant) as guided by the Draft Plant Master Plan (Draft PMP) and included in the 2013-2017 Adopted Capital Improvement Program (CIP). South Bay Water Recycling projects, which are not considered Plant projects, are not included. The projects discussed in the report are tracked in the Capital Program Management System (CPMS) database and fall under one of three classifications:

- **Construction Projects:** Capital improvement projects are designed by City staff or by consultants, and then are bid to a contractor for construction. Such projects may also be built by City staff, or by other entities through an agreement.
- **Non-Construction Projects:** Non-construction projects are efforts that may lead to the construction of capital improvements such as feasibility studies, pilot studies, and master planning efforts.
- **Public Art Projects:** The CIP also funds projects that involve public art installations; these may be associated with a specific capital improvement or be part of a larger public art strategy with funding support from the CIP.

This report also describes the policy context that guides decision-making; outlines accomplishments and specific issues; provides detailed summaries of project schedules and budgets; and highlights key projects in the CIP.

Plant Background

The Plant is a regional advanced wastewater treatment plant that serves eight South Bay cities and four sanitation districts:

- City of San José
- City of Santa Clara
- City of Milpitas
- Cupertino Sanitary District (Cupertino)
- West Valley Sanitation District (Campbell, Los Gatos, Monte Sereno and Saratoga)
- County Sanitation Districts 2-3 (unincorporated)
- Burbank Sanitary District (unincorporated)

Jointly owned by the cities of San José and Santa Clara, the Plant is managed and operated by the City of San José's Environmental Services Department (ESD).

The Plant is the largest tertiary facility in the western United States. Operating on a 24-hour schedule, 365 days per year, the Plant treats an average of 110 million gallons per day (mgd) of wastewater, has an average dry weather flow design capacity of 167 mgd, and peak hourly flow capacity of 271 mgd. The Plant's operational area occupies 180 acres of a 2,600-acre site at the southern edge of the San Francisco Bay.



Constructed in 1956 as a primary treatment facility for agricultural wastewater and a growing population, the Plant subsequently expanded in response to continued population and economic growth and to meet state regulations. Facilities for secondary treatment were constructed in 1964, followed by another expansion to tertiary treatment in 1979 to meet Clean Water Act regulations. Additional expansions included the South Bay Water Recycling facility in 1998, and an advanced recycled water treatment facility, currently under construction in partnership with the Santa Clara Valley Water District (SCVWD).

Digester tanks produce biogas from the sludge collected in the treatment process.

Importance to the Region and Environment

As the South Bay has grown, so has the critical importance of the Plant to the region. The Plant ensures that the wastewater it receives is cleaned to meet strict standards to protect public health and the environment. The facility serves more than 1.4 million residents and 7,000 businesses in an area greater than 300 square miles. South Bay communities depend on it to reliably protect their quality of life as well as safeguard wildlife habitat and Bay water quality. Businesses such as food service, automotive, metal finishing, photo processing, and manufacturing rely on the Plant to ensure that their wastewater is further treated to meet regulations. In protecting residents, businesses, and the environment, the Plant supports the local economy.

The Plant recycles about 10 mgd of its highly treated wastewater annually for use in landscape irrigation, industrial processes, cooling towers and toilet flushing in certain commercial areas of San José, Santa Clara, and Milpitas. The recycled water program saves an average of 2.2 billion gallons of drinking water each year. Advanced treatment for recycled water is currently under joint development by the Plant and the SCVWD; such treatment allows for expanded uses of recycled water.

Important to air quality and energy reliance issues, the Plant self-generates up to

Plant Energy Accomplishments

- **2010:** The Plant was honored with a Green California Leadership Award for its energy innovations.
- **2009:** The federal Environmental Protection Agency included the Plant in a nationwide list of the top 10 on-site alternative energy producers and users.

75 percent of its energy needs. Like other similar facilities, the Plant is a very large energy user with the largest demand coming from the secondary treatment aeration process followed by process pumping and heating. The Plant's daily energy demand can range from 8 to 11 megawatts (MW). By using on-site power generation equipment and a blend of digester gas, landfill gas, and natural gas, the Plant can produce as much as 8 MW of power daily. The Plant has been recognized for its energy accomplishments, and is working towards accomplishing the City's Green Vision goal of 100 percent energy self-sufficiency by 2022.

Infrastructure Condition Assessment and Draft PMP

Most of the Plant's infrastructure is now more than 50 years old and has exceeded its useful life, with repairs needed to every process area and facility. Still, the Plant must continue to provide continuous service and meet the strict requirements of more than 18 federal, 13 state, and four regional regulations for treated wastewater discharge, use of recycled water, disposal of biosolids, air emissions, safety

requirements, and land use controls. The Plant's key role as protector of public and environmental health underscores the critical need for infrastructure rehabilitation and replacement.

In 2007, the Plant completed an Infrastructure Condition Assessment report that identified nearly \$1 billion in needed projects to refurbish the Plant's aging electrical, mechanical, and structural assets. The report recommended \$250 million in immediate critical repairs to the Plant's electrical and solids digestion systems and \$750 million in other significant but lower priority capital replacements. The report also identified a funding gap of approximately \$40 million annually, based on a recommended capital reinvestment level of \$250 million per five-year CIP cycle to address decades of deferred maintenance.

Rebuilding and improving the Plant is among the largest public works efforts in the South Bay's history.

As the assessment study focused only on existing condition deficiencies, staff recommended the development of a master plan that would address how the different treatment processes interrelate, the impacts of future regulations, changes to flow and loads, risks from rising sea level, and opportunities for implementing new technology or process optimization.

In late 2007, the City Council approved a consultant agreement for development of a Plant Master Plan. This entailed a three-year planning process with extensive technical oversight and community and stakeholder input. A Steering Committee (comprised of staff from the cities of San José, Santa Clara, and the tributary agencies) guided the master planning process. The project team provided regular updates to the Treatment Plant Advisory Committee (TPAC) and San José's Transportation and Environment Council Committee (T&E). This work resulted in the Draft PMP Preferred Alternative, approved by the San José City Council in April 2011.

CURRENT PLANT OPERATIONAL AREA



Existing Plant and residual solids management areas

Master Planning Update

Master Plan activities completed for this reporting period include completion of the Draft Environmental Impact Report (DEIR). San José's Planning Department acted as the Lead Agency for the CEQA analysis, supported by consultant services from ESA and Jones and Stokes, Inc. The DEIR was circulated for public comment in January 2013. Staff will compile comments received from members of the public and other agencies during the statutory 45-day public review, along with written responses as part of the First Amendment to the EIR.

Staff estimate that the amended EIR will be available for public review in May 2013. The Planning Commission's public hearing to certify the EIR is targeted for June 2013. Subsequent to the EIR certification, the Planning Commission and Council will consider formal adoption of the Plant Master Plan. As co-owner, the Santa Clara City Council will also consider approval of the Plant Master Plan, prior to the San José City Council's final action.

II. Program Overview

The Draft PMP envisions approximately \$2 billion of investments over the next 30 years to rebuild and modernize the Plant. The Draft PMP recommends more than 100 capital improvement projects, with the most critical rehabilitation work to take place over the first 15 years.

Recommended Projects

The recommended improvements totals over a 30-year planning period are summarized in **Table 1 — Summary of Recommended Capital Improvements**. A number of these have been incorporated into the 2013-2017 Adopted CIP budget. A detailed list of projects within each process area is included on page 36. The Five-Year Adopted CIP provides \$339.2 million in funding of which \$144.3 million is allocated in 2012-2013. Highlights of significant capital projects begin on page 19.

Project Criteria. Capital projects recommended by the Draft PMP were evaluated and prioritized based on six criteria:

1. **Infrastructure condition:** Risk of failure requires repairs or rehabilitation
2. **Regulatory requirements:** Future regulations require new or modified infrastructure
3. **Economic benefit:** Opportunities exist to save operations and maintenance costs by modifying or replacing infrastructure
4. **Improved performance benefit:** Modifying or replacing existing infrastructure improves reliability or treatment performance
5. **Increased flows or increased loading:** Increased flows trigger the need for additional infrastructure
6. **Policy decision:** Policy direction triggers improvements

Process Area	Adopted FY 2013-2017	PMP Cost Estimate*
1. Preliminary Treatment Projects	\$13.4 M	\$151.2 M
2. Primary Treatment Projects	\$33.2 M	\$150.4 M
3. Secondary Treatment Projects	\$35.9 M	\$240.0 M
4. Tertiary Treatment Projects	\$2.8 M	\$201.0 M
5. Biosolids Digestion	\$64.6 M	\$156.3 M
6. Biosolids Residual Sludge Management	\$1.6 M	\$362.3 M
7. Power Generation	\$4.6 M	\$166.2 M
8. Electrical Systems	\$3.0 M	\$32.6 M
9. Advanced Process Control and Automation Systems	\$6.5 M	\$9.8 M
10. Site Facility Improvements	\$32.3 M	\$599.5 M

*Cost estimates follow the American Associate of Cost Engineering International (AACE International) Recommended Practice No. 18R-97 estimate classes 5 and 4. Typical accuracy range for Class 5 estimates are -20 percent to -50 percent on the low side, and +30 percent to +100 percent on the high side. Class 4 estimates are -15 percent to -30 percent on the low side, and +20 percent to +50 percent on the high side. Cost estimates include engineering, construction, and contingencies; escalated to the midpoint construction at 2 percent per annum.

Program Management Strategy

ESD staff developed a program management strategy to facilitate implementation of the ambitious program recommended in the Draft PMP. The 2013-2017 Adopted CIP incorporates this strategy, which utilizes outside consultants and technical experts to:

- Develop alternative implementation strategies;
- Address construction sequencing for uninterrupted Plant operations; and
- Provide additional expertise in light of current staff vacancies at the Plant.

Elements of the program management strategy include:

- Partnering with the City's Public Works Department to optimize capital project delivery;
- Hiring expert consultants to advise and assist with program management, technical direction and coordination, and design and design/build procurements; and
- Implementing a phased approach that organizes projects recommended by the Draft PMP into three separate "packages" to minimize disruptions to Plant operations, lower the risk of permit violations, meet the Plant's good neighbor goals, and manage rate impacts.

A program management team comprised of City staff and consultants will be located at the Plant to most effectively manage the program, share knowledge, and coordinate with Plant staff. This integrated team will provide program support, including design and construction management, cost estimating, scheduling, document control, change management, budgeting, and reporting.

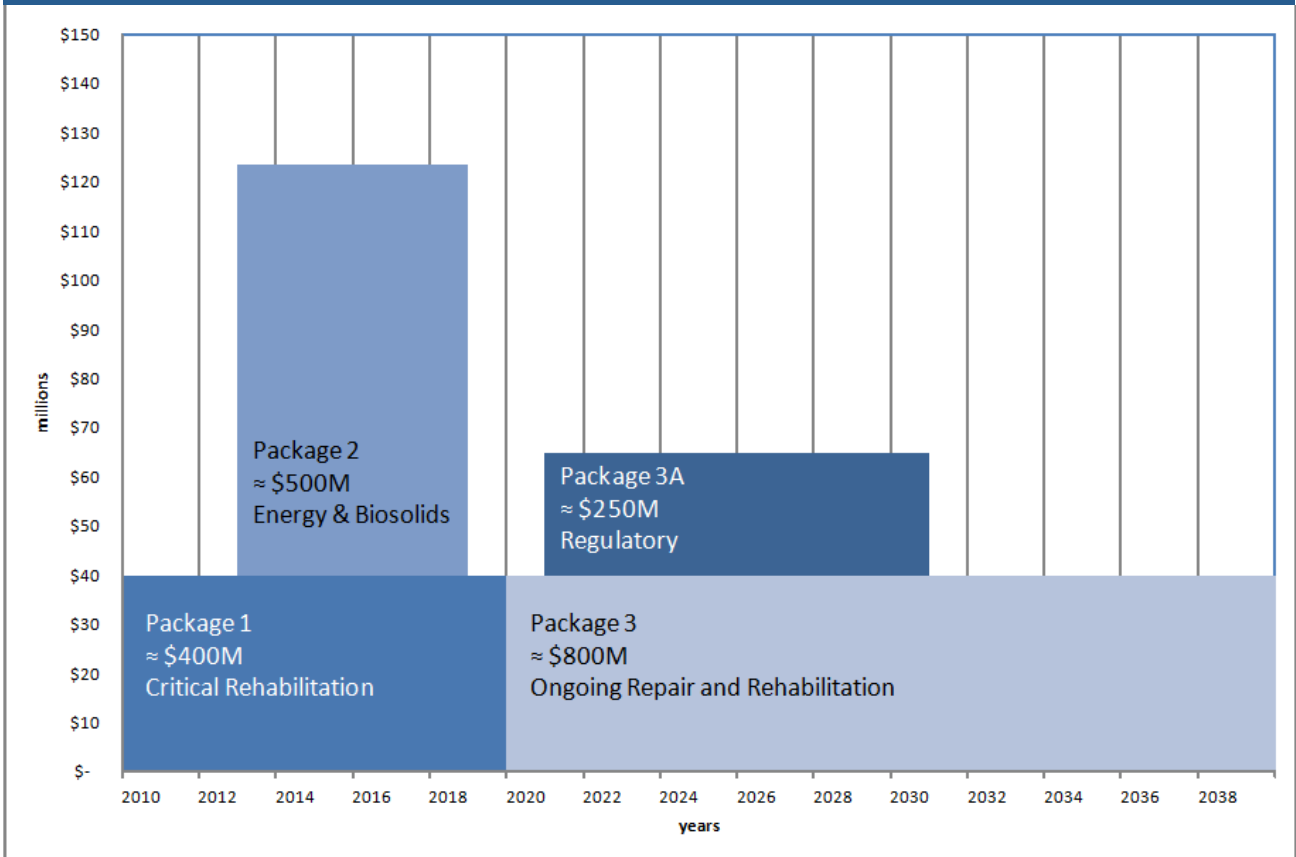
The CIP program strategy to rebuild and modernize the Plant includes partnering with the Public Works Department; hiring consultants for additional expertise in several key areas; and managing capital projects in three packages.

Project Packages

In February 2012, the City Council approved the packaged delivery approach. This concept is illustrated in **Figure 1** on the next page.

- **Package 1** – This package includes critical rehabilitation projects in various process areas such as the rebuilding of the headworks; rehabilitating and seismically upgrading the primary and secondary tanks; rehabilitating the digesters, covers, and mixing systems; upgrading the gas handling and heating systems; and upgrading the electrical distribution systems. Altogether, these projects are estimated to average \$40 million per year over the next 10 years.
- **Package 2** – This package includes projects that meet the priorities set forth by the Draft PMP and address significant challenges faced by the Plant, such as deteriorating power generation equipment, deteriorating filter systems, and odor impacts to the neighboring communities. Package 2 projects include transitioning from open-air biosolids drying to mechanical dewatering and drying; installing new gas turbines or advanced internal combustion engines to replace aging engine generators; and replacing existing gravity filters with newer filtration technology. Package 2 involves implementation of significant new technologies at an estimated cost of about \$500 million over six years.
- **Package 3 and 3A** – This package includes projects that are expected to exceed the 10-to-15 year implementation horizon, such as estimated end-of-life replacement of existing infrastructure and new projects that may be required based on future regulations or changes in wastewater flows and volume loads. The total cost of these projects over the 20-year period is estimated at \$1.05 billion, with a highly variable annual cost that is dependent on future regulatory and flow triggers.

Figure 1 — Proposed Project Packages 1, 2 and 3



Package 1
Critical Rehabilitation

- Headworks Rehabilitation
- Primary Rehabilitation
- Secondary Rehabilitation
- Digester Rehabilitation
- Electrical Systems
- Controls and Automation
- Site Facility Improvements

Package 2
New Technology

- Legacy Lagoon Cleanup
- Solids Dewatering and Drying
- Energy Generation
- Filter Reconstruction

Package 3
Regulatory, Flow, and Unspecified
Repair and Rehabilitation

- Ongoing Repair and Rehabilitation
- Regulatory-Driven Improvements
- Flow-Driven Improvements

III. Program Accomplishments and Challenges

Several capital program milestones were achieved during the first two quarters of fiscal year 2012-13, including completion of two projects:

Fuel Cell Foundation Platform and Utility Interconnection Project

Start date: Q4 2010 **Completion date:** Q2 2012

Budget: \$2,226,750 **Actual:** \$2,248,333 **Contract amount:** \$1,741,533

This project installed the foundation platform and provided necessary utility connections for a 1.4 megawatt fuel cell system to convert digester gas into electricity. Fuel cells are more efficient than typical cogeneration systems and are a clean, renewable, and reliable source of power. The project:

- Brings the Plant one step closer to becoming energy self-sufficient, a long-time facility goal; and
- Brings the City one step closer to fulfilling its Green Vision goal of 100 percent electrical power from clean, renewable sources.



Don Edwards National Wildlife Refuge

Street Rehabilitation Project, Phase One

Start date: Q2 2011 **Completion date:** Q2 2012

Budget: \$290,800 **Actual:** \$221,328 **Contract amount:** \$110,938

This project replaced curbs, gutters, sidewalks, driveways, and pavement on Fifth and Center streets at the Plant. The five miles of the Plant's paved roads are in damaged condition, with pavement failure, potholing, damaged curbs and gutters, and areas of poor drainage. At least five more rehabilitation phases will be needed to rehabilitate these streets to support ongoing Plant operations.

Other Accomplishments

- Four service orders totaling \$1.3 million were awarded to initiate consultant work on several projects, including Digester Gas Storage Replacement, Digester Gas Compressor Upgrade, Energy Generation Improvements, and New Filter Complex.
- Staff held an Open House at the Plant on November 14, 2012 to discuss upcoming procurement opportunities for consultants, contractors, vendors, and suppliers. The intent was to generate interest and involvement from the wastewater community as well as outline opportunities for small and local business participation. About 100 people attended.
- Staff made significant progress on obtaining an Executive Program Advisor and Program Technical Coordinator to assist with program organization and implementation. A term-limited consultant contract was approved with Reid Consulting Services on November 1, 2012 for technical coordination services. A Request for Qualifications (RFQ) for an Executive Program Advisor services was advertised on September 28, 2012 with interviews conducted on December 17, 2012. Contract negotiations are currently underway and with award expected in March 2013.

Challenges

Although this inaugural report focuses on recent accomplishments, key technology and financing challenges related to the implementation of the CIP will be highlighted in future reports.

IV. CIP Project Performance

Performance Measures

A key goal of this Semiannual Status Report is to provide regular updates on project performance based on schedule and budget commitments. Project schedules and budgets described in this report follow the same definitions and conventions used to describe projects in the Citywide CIP Annual Status Report.

Schedules

Baseline schedules are established as a commitment for delivery and a measurement of on-time project delivery performance. Project schedules are set once project scope and requirements have been established, and fall into one of the following categories:

- **On schedule:** Projects are considered to be on schedule if completed within two months of the committed completion date. Projects are also in this category if no previous schedule commitment existed prior to this report.
- **Extended schedule:** Projects have extended schedules if they are running more than two months behind the committed delivery date.
- **Schedule reset:** Project schedules are reset when committed schedules are no longer feasible as a result of significant changes in scope, bid protests, or Council-directed reprioritization. This reset process occurs as part of the City Council's consideration of the Citywide Annual CIP Status Report.
- **Schedule pending:** Projects that do not have schedules at the time of this report are noted as pending. The schedules for these projects are uncertain due to incomplete scoping, community concerns, or funding issues.
- **Schedule on hold:** Project schedules that have been deferred and placed on hold.

Phases

Projects are described as progressing through the following phases:

- **Planning.** Work can include condition assessments, pilot tests, feasibility studies, scope development, preliminary engineering, and environmental clearance.
- **Design.** Work can include preparation and review of plans and specifications, selection and management of consultants, and project coordination.
- **Bid and Award.** Work can include bid advertisement, pre-bid meetings, preparation of addenda, evaluation of bids, and recommendation for award.
- **Construction.** Work can include execution of contract and issuance of the Notice to Proceed, construction management, and construction inspection.
- **Post-construction/Startup.** Work can include final inspection, project closeout, warranty tracking and documentation, operations and maintenance training, startup, and commissioning.

Budgets

Baseline budgets are established as a commitment for delivery and a measurement of on-budget project delivery performance. Project budgets are generally established once the project scope is complete and a schedule has been determined. Projects are considered on budget if total project costs are within 1 percent of the established baseline budget. The baseline budget may differ from the project budget listed in the Adopted CIP budget in that baseline budgets may include funding which has not yet been identified and appropriated by the City Council. Any resets of baseline budgets will occur during Council consideration of the Citywide Annual CIP Status Report.

Performance Snapshot

The 2013-2017 Adopted CIP five-year budget provides \$339.2 in funding, \$144.3 million of which is allocated in 2012-2013.

Several projects discussed in this report are in the Conceptual Planning phase, which precedes the Planning phase. These are projects in the early stages of development; they do not yet have detailed scopes, schedules, or budgets. In order for a baseline schedule and budget to be established, a project in the Conceptual Planning phase will require further clarification and refinement of project goals, environmental clearance, and engineering analysis such as feasibility studies and technology evaluations. Projects in the Conceptual Planning phase are included in **Table 3** starting on page 17.

A summary chart of current active projects with budgets and schedules is provided on the next page in **Figure 2**. In future reports, on-time and on-budget performance information will also be included.

Project Phase	Number of Projects
Conceptual Planning	13
Planning	3
Design	8
Bid and Award	3
Construction	3
Post-Construction/Startup	6
Total	36



Clarifier tank

Figure 2 – 2013-2017 Project Schedule and Budget Chart

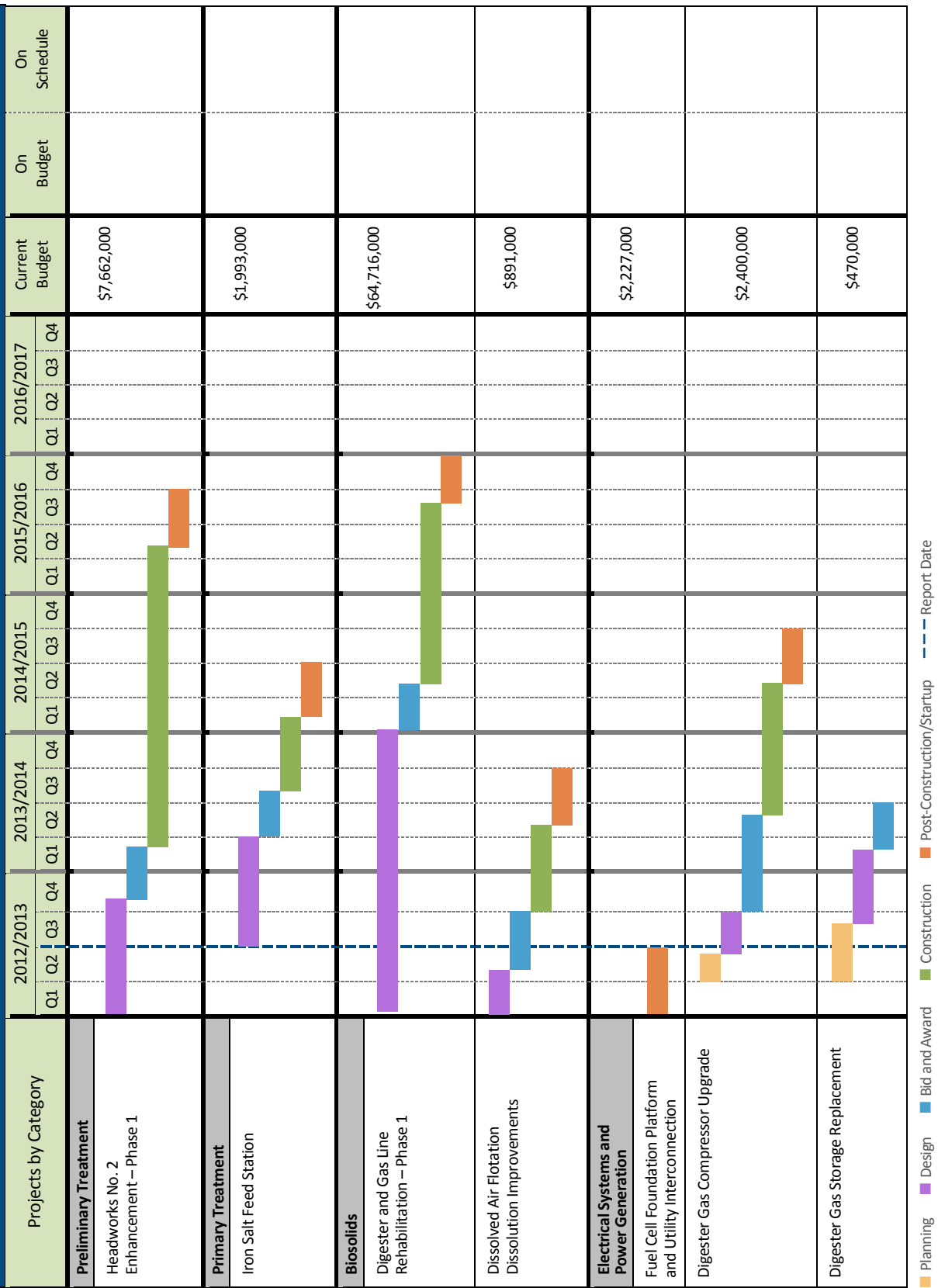


Figure 2 continued

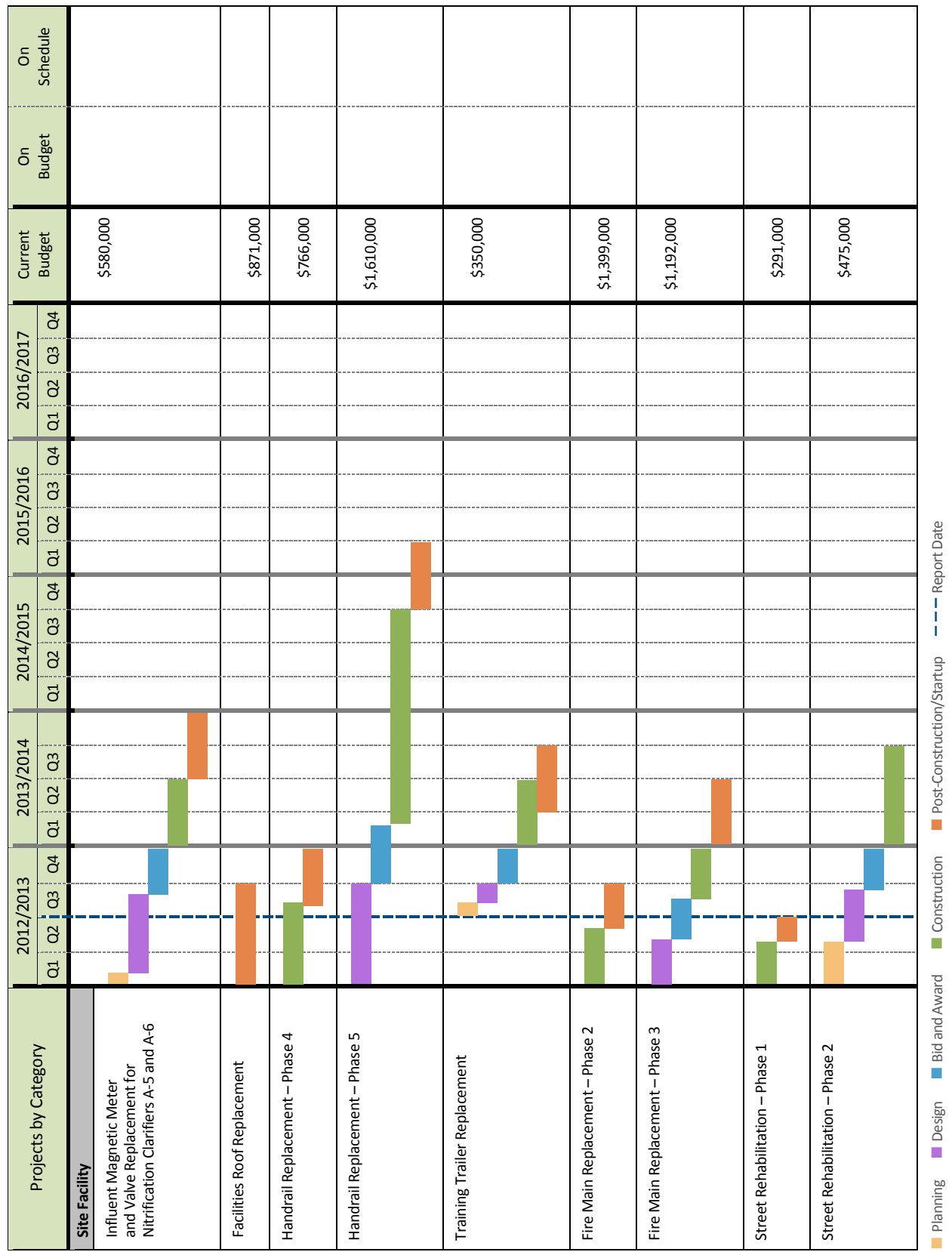


Table 3 – 2013-2017 Project Schedule and Budget – Conceptual Planning

Project by Category	Adopted Project Budget
Preliminary Treatment	
Headworks No. 1 Repair and Rehabilitation	\$5,975,000
Headworks No. 2 Expansion	\$79,400,000
Primary Treatment	
East Primary Rehabilitation	\$82,025,000
Secondary Treatment	
Biological Nutrients Removal 1 and 2 Connection	\$14,486,000
Fine Bubble Membrane Diffuser Conversion	\$36,400,000
Secondary and Nitrification Clarifier Rehabilitation	\$26,427,000
Tertiary Treatment	
Alternative Disinfection (Decommissioning only)	\$1,000,000
Filter Improvements	\$3,506,000
New Filter Complex	\$1,000,000
Biosolids	
Biosolids Transition	\$1,000,000
Electrical Systems and Power Generation	
Energy Generation Improvements	\$1,300,000
Switchgears S40, G3 & G3A, and M4 Controls Upgrade	\$1,300,000
Site Facility	
Plantwide Facilities	\$650,000

Conceptual Planning

Projects listed under Conceptual Planning are in the early stage of development and do not yet have detailed scopes, schedules, or budgets. In order for a baseline schedule and budget to be established, a project in the Conceptual Planning phase will require further clarification and refinement of project goals, environmental clearance, and engineering analysis such as feasibility studies and technology evaluations.

V. Capital Project Highlights

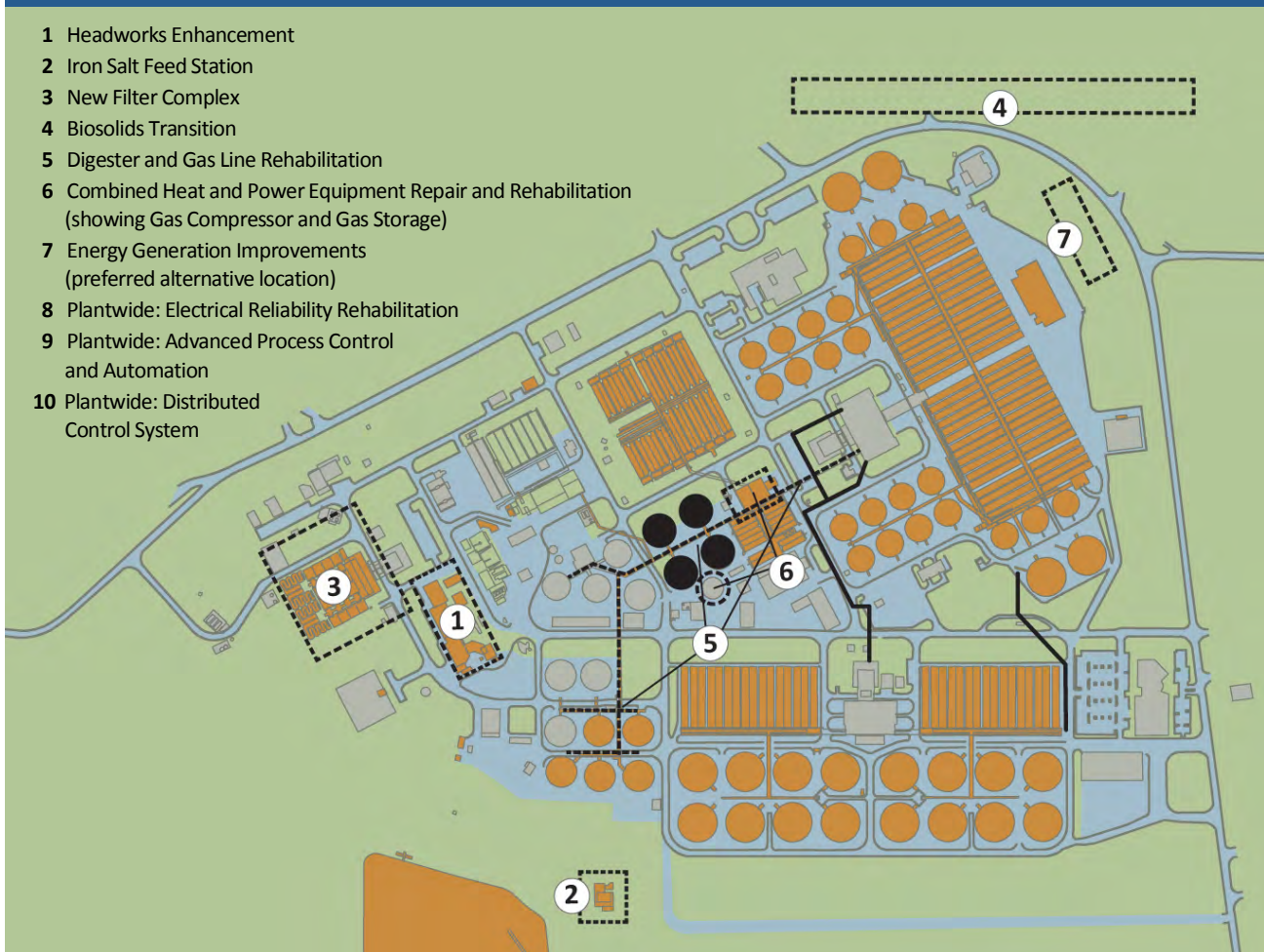
Selected projects from the Adopted 2013-2017 CIP are described in detail on the following pages to provide a closer look at key Plant improvements. Figure 4 below shows the location of the projects at the Plant site.

These projects showcase work that is critical to ongoing Plant operations, including improvements to most treatment process areas. Some, like the Energy Generation Improvements Project, also pave the way for continued innovation and efficiency in how the Plant produces and uses energy.

In addition to information on project description, benefits, status, schedule, and budget, each page shows a budget estimate level. Capital project budget estimate levels are defined as:


- **Program level:** Created for long-term planning and initial feasibility studies; level of certainty plus or minus 35 percent.
- **Preliminary level:** Based on planned sizes of buildings and functional areas, not formal engineering work; level of certainty plus or minus 20 percent.
- **Budget level:** Based on current scope and schematic design work derived from previous similar projects; level of certainty plus or minus 10 percent.
- **Engineer's level:** Based on final construction plans and specifications; level of certainty plus or minus 5 percent.

Figure 4 – Locations of Highlighted Projects



1. Headworks Enhancement

PRELIMINARY TREATMENT



Headworks facilities screen and remove material such as rags, sticks, floating solids, grit, and grease from incoming wastewater.

Budget Estimate Level: Budget
Current Project Budget: \$7,662,000

Description

This project will make enhancements to Headworks No. 2 (HW2) to allow it to ultimately become the duty headworks. Phase 1 work will include modifications to the raw sewage distribution structure, construction of a new connection pipeline, and re-routing of recycle and other process water flows that currently connect to Headworks No. 1 (HW1).

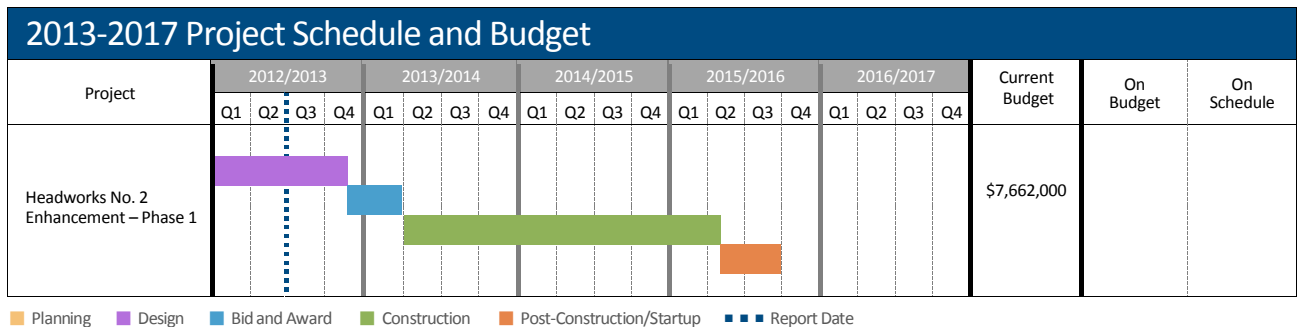
Benefits and Desired Outcomes

Improving the functionality and reliability of HW2 will result in easier maintenance, greater operational flexibility, improved plant hydraulics, and reduced solids settling.

Current Status

The design is 90 percent complete and expected to bid and award in Spring 2013.

Notes: Budget is for Phase 1 work only. A second phase is still under evaluation and may be incorporated into future CIPs.



2. Iron Salt Feed Station

PRIMARY TREATMENT



Iron salts help control the formation of hydrogen sulfide gas.

Budget Estimate Level: Budget

Current Project Budget: \$1,993,000

Description

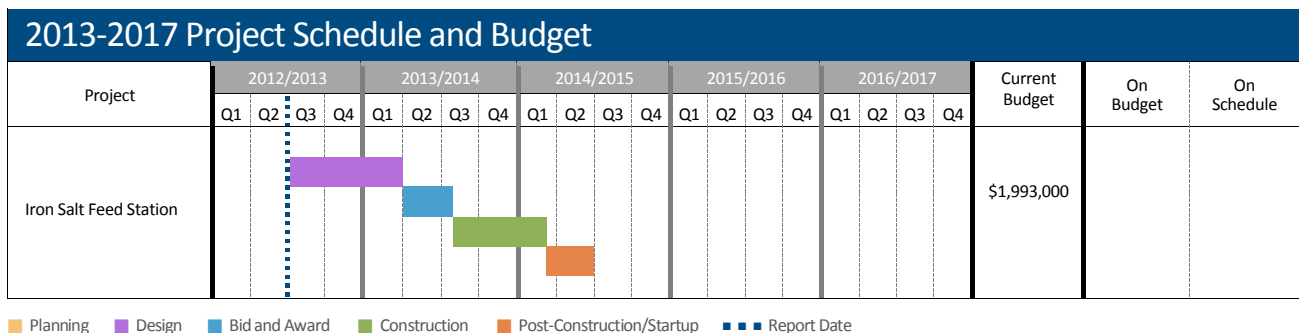
This project will design and construct a feed station to add iron salts to incoming wastewater, to help control the formation of hydrogen sulfide gas, reduce corrosion and odor, and enhance the settling of sludge. Hydrogen sulfide gas is sometimes present at high levels in the Plant's digesters, and is a potential air quality problem. Work will include construction of a chemical feed station and a concrete containment structure, as well as installation of pumps, piping, and instrumentation to dose and deliver the iron salts solution.

Benefits and Desired Outcomes

Adding iron salts to incoming wastewater will improve Plant operations by enhancing the settling of sludge in the primary clarifiers, and reducing corrosion and odor. Reducing odor benefits neighboring communities.

Current Status

Scope development is underway with design expected to start in Spring 2013.



3. New Filter Complex

TERTIARY TREATMENT



Suspended solids are removed by passing water through a filter medium such as sand.

Budget Estimate Level: Program

Current Project Budget: \$1,000,000

Description

The Plant's 1970s-era gravity filters need to be refurbished or replaced, and many new filter technologies are now available. This project will study, evaluate, and potentially pilot test one or more new replacement filter technologies in advance of a full-scale transition to a new filter complex. Reserves have been set aside in the 2013-2017 Adopted CIP for further development of a new filter complex project concept. Depending on the outcome of the study and potential pilot testing, additional funding for full-scale project implementation may be incorporated in future capital improvement programs as part of the Package 2 projects.

Benefits and Desired Outcomes

Evaluation and pilot testing of modern filter technologies will ensure that the most appropriate and cost effective solution is selected. A significant investment could be required to refurbish and retain the existing filters. A new filter complex could be constructed with new filter technologies at a potentially lower cost, possibly in combination with limited refurbishment of the existing filters.

Current Status

Scope development and service order award for a technology evaluation and feasibility study were completed in December 2012. The study is expected to kick off in early 2013 and complete by summer 2013.

Notes: Budget includes feasibility study and technology evaluation, which will inform the overall estimated project budget. Formerly "New Filter Technology."

4. Biosolids Transition

BIOSOLIDS



Richard Dawson

Mechanical drying of biosolids requires a smaller operational footprint and reduces odor when covered.

Budget Estimate Level: Program

Current Project Budget: \$1,000,000

Description

Compared with the Plant's current method of storing and air-drying treated sludge (or biosolids) in open lagoons, covered mechanical dewatering and drying coupled with new odor treatment technologies would require a much smaller operational footprint and improve odor impacts to the surrounding communities. This project will study, evaluate, and potentially pilot test one or more mechanical dewatering technologies in advance of full-scale transition to a new biosolids processing operation. Reserves have been set aside in the 2013-2017 Adopted CIP for further development of a new biosolids processing complex concept. Depending on the outcome of the technology study, additional funding for full-scale project implementation may be incorporated in future capital improvement programs as part of the Package 2 projects.

Benefits and Desired Outcomes

Because moving to a new biosolids processing method would involve significant capital investments and major changes to Plant operations, careful evaluation of available technologies, costs, and operational impacts is needed before any project implementation.

Current Status

An Owner's Engineer is being hired to assist with scope definition and project delivery approach. An Owner's Engineer is an engineer or engineering firm who acts as an advocate for the owner of a project during design, development, and construction to confirm that the work is done well and within legal standards. This project is in the conceptual planning phase thus a detailed schedule and budget is not yet available.

Notes: Budget for preliminary engineering only. Owner's Engineer to assist City with developing total estimated project budget. Formerly "Biosolids Transition Technology."

5. Digester and Gas Line Rehabilitation

BIOSOLIDS



Richard Dawson

Digester tanks work continuously to break down organic matter in sludge and produce methane gas.

Budget Estimate Level: Preliminary

Current Project Budget: \$64,716,000

Description

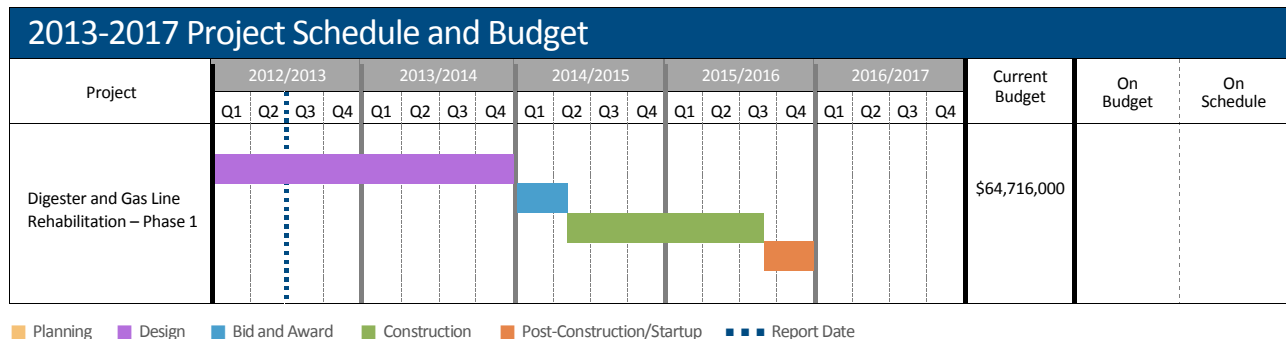
Several of the Plant's digester tanks are out of service due to age and poor condition; all are nearing the end of their useful lives. This project will rehabilitate four digesters, including installing new covers and mixing systems, and upgrading heating and gas handling systems. The project also includes making modifications to six Dissolved Air Flotation (DAF) tanks for sludge co-thickening and new odor control, and replacing the gas pipeline system.

Benefits and Desired Outcomes

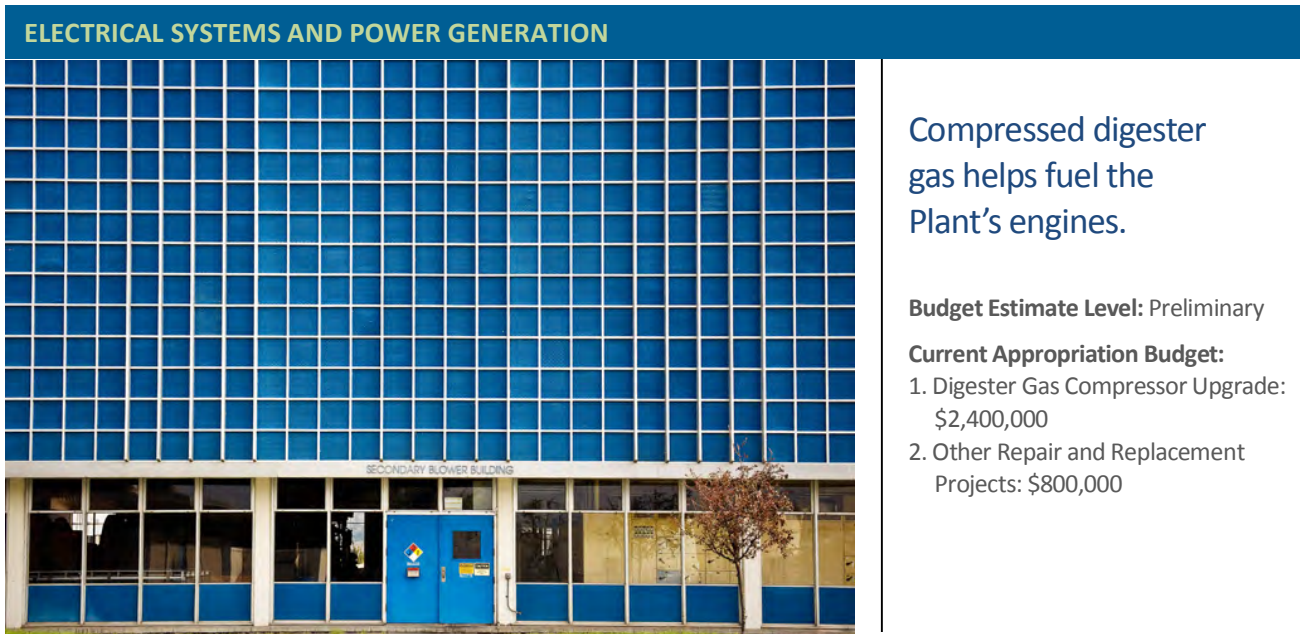
Rehabilitation of the digesters is critical to ongoing, reliable Plant operations.

Current Status

A Request for Qualifications (RFQ) for engineering services is currently under development with award of contract targeted for Summer 2013.



6. Combined Heat and Power Equipment Repair and Rehabilitation



Compressed digester gas helps fuel the Plant's engines.

Budget Estimate Level: Preliminary

Current Appropriation Budget:

1. Digester Gas Compressor Upgrade: \$2,400,000
2. Other Repair and Replacement Projects: \$800,000

Richard Dawson

Description

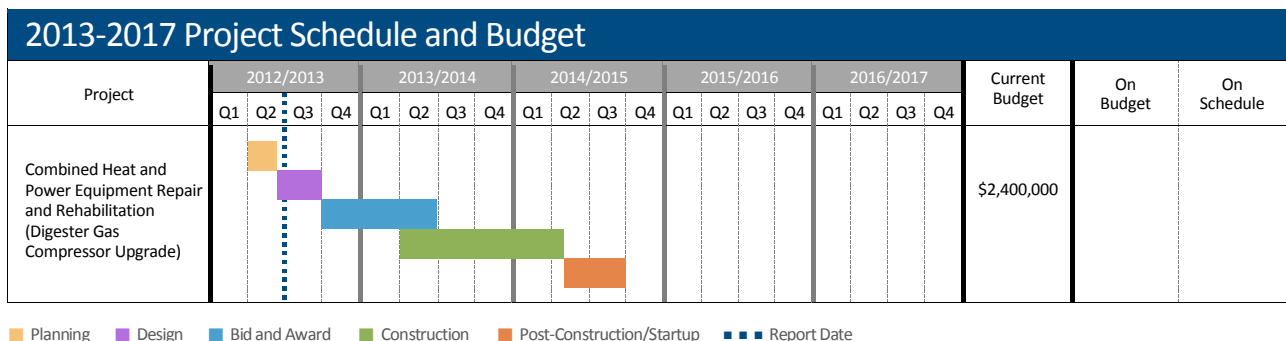
Major projects in this appropriation include the Digester Gas Compressor Upgrade and the Digester Gas Storage Replacement. The Digester Gas Compressor Upgrade project will construct a new building to house two new gas compressors that replace older ones. The Digester Gas Storage Replacement project will replace a failing digester gas holder.

Benefits and Desired Outcomes

Compressed digester gas is blended with natural and landfill gases to meet heat requirements for the Plant's engines. The Digester Gas Compressor Upgrade will increase the reliability of the supplied compressed digester gas. The Digester Gas Storage Replacement will allow the digester gas management system to reliably and efficiently use digester gas and control the combined heat and power system for the Plant.

Current Status

Design is underway for the Digester Gas Compressor Upgrade project, and alternatives for a new gas holder is currently being evaluated with detailed design expected to start in Spring 2013.



7. Energy Generation Improvements

ELECTRICAL SYSTEMS AND POWER GENERATION



Richard Dawson

Cogeneration efficiently captures heat lost during electricity production and converts it into thermal energy, resulting in cost savings and reduced greenhouse gas emissions.

Budget Estimate Level: Program

Current Project Budget: \$1,300,000

Description

Improvements will include a new cogeneration building that will house three new gas turbines or advanced internal combustion engines, a new gas treatment system, new standby diesel generators, and several other miscellaneous energy modifications and improvements.

Benefits and Desired Outcomes

These projects will reduce the risk of system failure, provide reliable energy generation facilities, and accommodate added power loads from other projects.

Current Status

An Owner's Engineer is being hired to assist with scope definition and project delivery approach. An Owner's Engineer is an engineer or engineering firm who acts as an advocate for the owner of a project during design, development, and construction to confirm that the work is done well and within legal standards. This project is in the conceptual planning phase thus a detailed schedule and budget is not yet available.

Notes: Budget for preliminary engineering only. Owner's Engineer to assist City with developing total estimated project budget. Formerly "Combined Heat and Power Technology Evaluation."

8. Electrical Reliability Upgrades

ELECTRICAL SYSTEMS AND POWER GENERATION



Upgrading the Plant's power distribution network will result in improved safety and reliability.

Budget Estimate Level: Budget

Current Appropriation Budget:

1. 115kV Circuit Breaker Replacement: \$665,000
2. Administration Building Standby Generator: \$297,000
3. M1/M2/M3 Switchgear Replacement: \$100,000
4. Other upgrades: \$1,985,000

Description

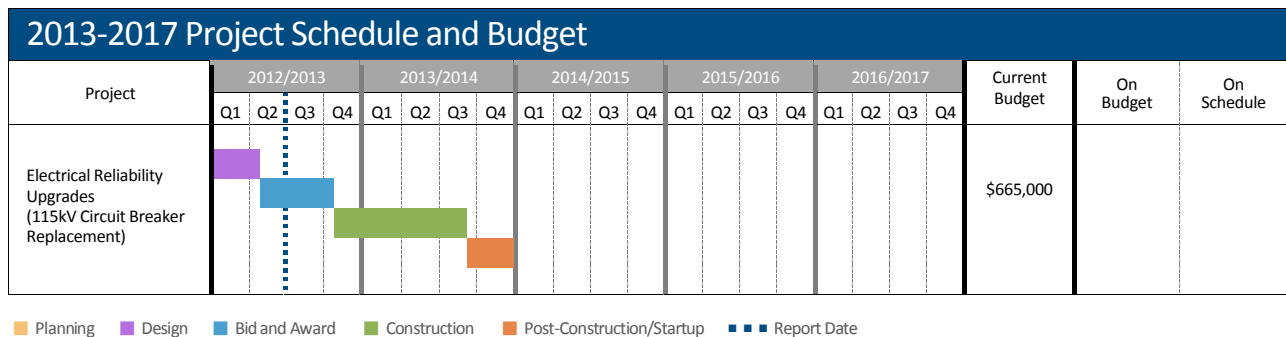
These projects replace substations and switches, modify power distribution buses and cabling, and provide backup systems to enhance the overall safety and reliability of Plant electrical systems. Under current design is the 115kV Circuit Breaker Replacement project, which will replace two aging and faulty circuit breakers and two adjacent devices.

Benefits and Desired Outcomes

The current power distribution network has grown in a patchwork manner over the years and many electrical system components have reached the end of their service life. This project addresses immediate safety and long-term reliability needs.

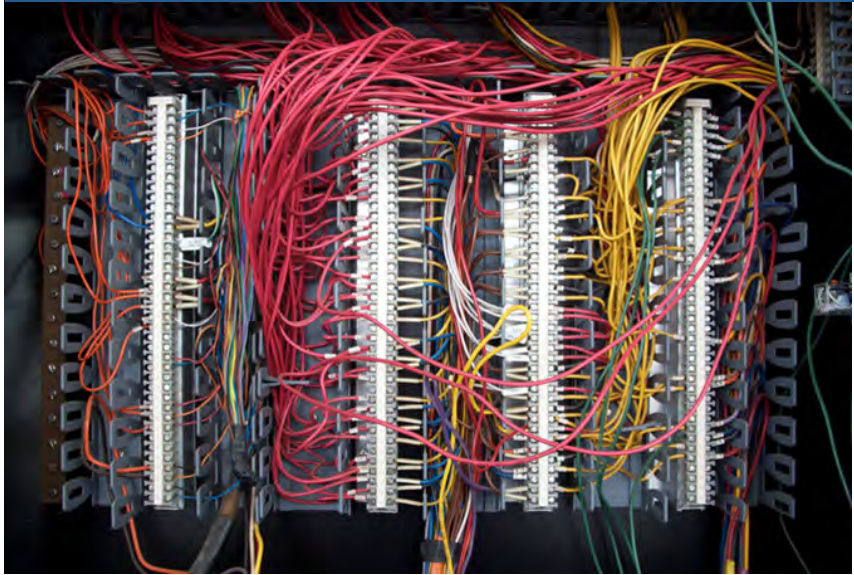
Current Status

The 115KV Circuit Breaker Replacement project is currently in design and expected to award in Spring 2013.



9. Advanced Process Control and Automation

ADVANCED PROCESS CONTROL AND AUTOMATION



Richard Dawson

Automatic data collection results in more accurate information for making operating decisions.

Budget Estimate Level: Preliminary

Current Appropriation Budget:

- 1. Ammonia and TSS Meter Replacement: \$602,000
- 2. East Secondary Magnetic Meters: \$1,200,000
- 3. Other Improvement Projects: \$837,000

Description

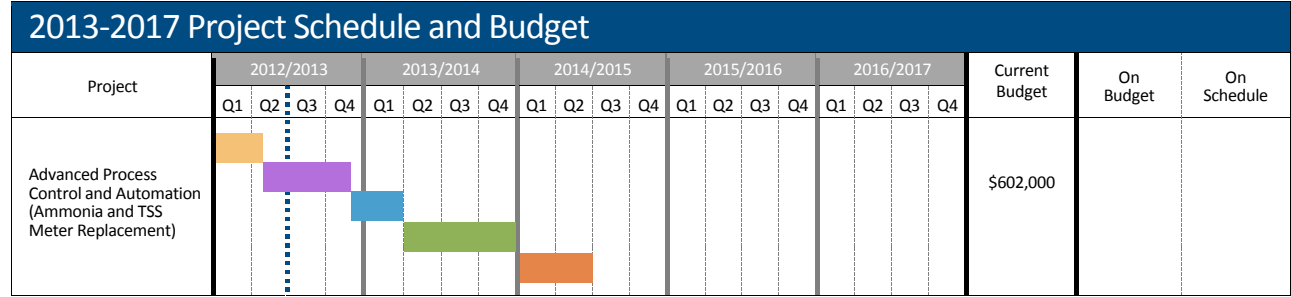
These projects install or replace various meters and monitoring equipment throughout the Plant to allow automatic collection of Plant process control data, such as solids content of wastewater.

Benefits and Desired Outcomes

New meters and sensors will provide more accurate readings, allowing Plant operators to run more efficient operations and detect problems quickly. The new equipment will also increase operational reliability.

Current Status

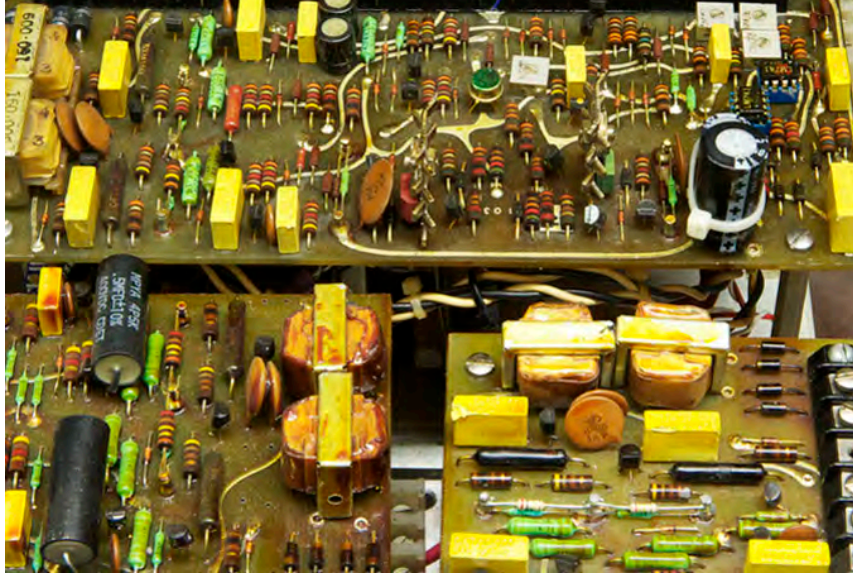
Scope development for the Ammonia and TSS Meter Installation project is currently underway.



■ Planning
 ■ Design
 ■ Bid and Award
 ■ Construction
 ■ Post-Construction/Startup
 ■ ■ Report Date

10. Distributed Control System Upgrades

ADVANCED PROCESS CONTROL AND AUTOMATION



Richard Dawson

The Plant’s Distributed Control System (DCS) allows operators to remotely monitor and control treatment process operations.

Budget Estimate Level: Budget
Current Project Budget: \$4,064,000

Description

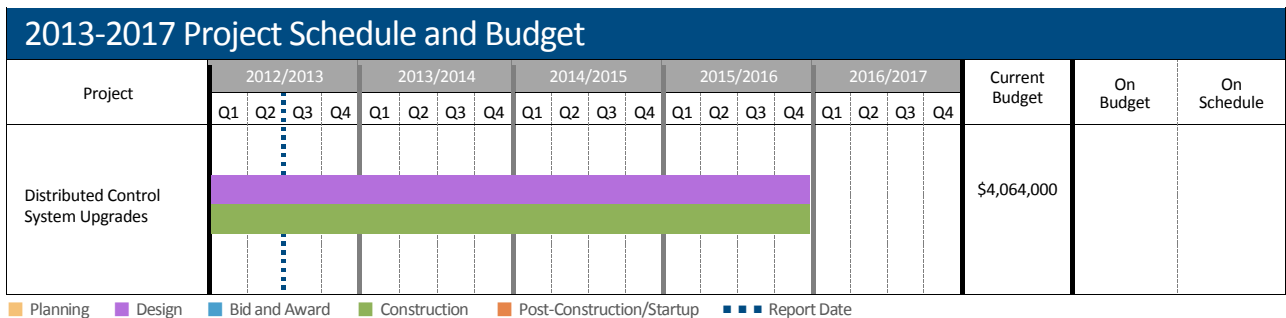
Critical to continuous Plant operations, the Distributed Control System (DCS) is a large and complex automated network of workstations, servers, and field controllers developed specifically for the Plant. This project will completely upgrade the system’s hardware and software to allow for new process areas to be added to the system.

Benefits and Desired Outcomes

The upgraded DCS will improve system reliability and ease of maintenance, increase automation of the Plant’s machinery, and improve monitoring to facilitate process efficiencies.

Current Status

An Request for Qualifications (RFQ) for system upgrade services is currently underway with contract award targeted for Spring 2013.



VI. Financial Summaries

The following Financial Summaries Chart reflects project costs as adopted in the 2012-2013 CIP Budget. The chart also includes reserves, transfers, and non-construction elements that are not discussed in this status report.

2013-2017 Adopted Capital Improvement Program – Use of Funds (Combined)

	Estimated 2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	5-Year Total
Construction Projects							
Public Art							
Public Art	193,000	546,000	12,000	123,000	3,000		684,000
Total	193,000	546,000	12,000	123,000	3,000		684,000
Preliminary Wastewater Treatment							
1. Headworks No. 1 Repair and Rehabilitation		600,000	5,050,000	325,000			5,975,000
2. Headworks No. 2 Enhancement	500,000	6,715,000	225,000				6,940,000
3. Headworks No. 2 Expansion		500,000					500,000
Total	500,000	7,815,000	5,275,000	325,000			13,415,000
Primary Wastewater Treatment							
4. East Primary Rehabilitation, Seismic Retrofit, and Odor Control	13,000	1,715,000	2,000,000	5,000,000	9,760,000	12,820,000	31,295,000
5. Iron Salt Feed Station	422,000	1,918,000					1,918,000
Total	435,000	3,633,000	2,000,000	5,000,000	9,760,000	12,820,000	33,213,000
Secondary Wastewater Treatment							
6. Biological Nutrients Removal 1 and Biological Nutrients Removal 2 Connection		876,000	1,000,000	12,328,000	282,000		14,486,000
7. Fine Bubble Membrane Diffuser Conversion		1,000,000		2,166,000	1,770,000	2,478,000	7,414,000
8. Secondary and Nitrification Clarifier Rehabilitation	594,000	3,175,000	516,000	2,800,000	6,939,000	578,000	14,008,000
Total	594,000	5,051,000	1,516,000	17,294,000	8,991,000	3,056,000	35,908,000

	Estimated 2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	5-Year Total
Construction Projects							
Tertiary Wastewater Treatment							
9. Alternative Disinfection	1,000	1,000,000					1,000,000
10. Filter Improvements		822,000					822,000
11. New Filter Technology		1,000,000					1,000,000
Total	1,000	2,822,000					2,822,000
Biosolids							
12. Biosolids Transition Technology		1,000,000					1,000,000
13. Digester Rehabilitation	660,000	12,480,000	47,000,000	3,000,000	1,100,000		63,580,000
14. Dissolved Air Flotation Rehabilitation and Odor Control	158,000	1,000,000					1,000,000
15. Inactive Lagoons Bio-Solids Removal	267,000	585,000					585,000
Total	1,085,000	15,065,000	47,000,000	3,000,000	1,100,000		66,165,000
Electrical Systems and Power Generation							
Fuel Cell	1,145,000	20,000					20,000
16. Combined Heat and Power Equipment Repair and Rehabilitation		3,200,000					3,200,000
17. Combined Heat and Power Technology Evaluation		1,300,000					1,300,000
18. Plant Electrical Reliability	8,910,000	1,047,000	2,000,000				3,047,000
Total	10,055,000	5,567,000	2,000,000				7,567,000
Advanced Process Control & Automation							
19. Advanced Process Control and Automation	498,000	1,847,000	640,000				2,487,000
20. Treatment Plant Distributed Control System	65,000	2,500,000	500,000	500,000	500,000		4,000,000
Total	563,000	4,347,000	1,140,000	500,000	500,000		6,487,000

	Estimated 2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	5-Year Total
Construction Projects							
Site Facility Maintenance and Improvements							
Outfall Channel and Levee Improvements	250,000						
WPCP Reliability Improvements	21,000						
21. Equipment Replacement	3,959,000	1,663,000	1,663,000	1,663,000	1,663,000	1,663,000	8,315,000
22. Plant Infrastructure Improvements	8,898,000	4,665,000	1,000,000	1,000,000	1,000,000	1,000,000	8,665,000
23. Plantwide Facilities		645,000					645,000
24. Treatment Plant Engine Rebuild	1,000,000	1,000,000	1,000,000				2,000,000
25. Treatment Plant Fire Main Replacement	1,155,000	1,245,000					1,245,000
26. Treatment Plant Street Resurfacing	360,000	715,000	500,000	500,000	500,000	500,000	2,715,000
27. Unanticipated/Critical Repairs	250,000	250,000	250,000	250,000	250,000	250,000	1,250,000
28. Urgent and Unscheduled Treatment Plant Rehabilitation	250,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	7,500,000
Total	16,143,000	11,683,000	5,913,000	4,913,000	4,913,000	4,913,000	32,335,000
South Bay Water Recycling							
Recovery Act - South Bay Water Recycling Phase 1C	1,075,000	72,000					72,000
SBWR Customer Connection Program	1,000,000						
SBWR Reservoir Facility	2,939,000	120,000					120,000
29. SBWR Backup Water	838,000	2,162,000					2,162,000
30. SBWR Extension	9,788,000	4,093,000					4,093,000
31. SBWR System Reliability and Infrastructure Replacement		2,000,000	1,500,000	1,500,000	1,500,000		6,500,000
Total	15,640,000	8,447,000	1,500,000	1,500,000	1,500,000	1,500,000	12,947,000
TOTAL CONSTRUCTION PROJECTS	45,209,000	64,976,000	66,356,000	32,655,000	26,767,000	20,789,000	211,543,000

	Estimated 2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	5-Year Total
Non-Construction Projects							
General Non-Construction							
Capital Program and Public Works Department Support Service Costs	300,000	574,000	580,000	586,000	592,000	598,000	2,930,000
Transfer to Clean Water Financing Authority Debt Service Payment Fund	6,956,000	6,947,000	6,953,000	6,915,000	6,943,000	6,787,000	34,545,000
32. Payment for Clean Water Financing Authority Trustee	5,000	5,000	5,000	5,000	5,000	5,000	25,000
33. Plant Master Plan	2,086,000	900,000					900,000
34. Preliminary Engineering		1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	5,000,000
35. Program Management		2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	10,000,000
36. SBWR Master Plan		2,304,000					2,304,000
37. State Revolving Fund Loan Repayment	4,464,000	4,464,000	4,464,000	4,464,000	4,464,000	4,464,000	22,320,000
Total	13,811,000	18,194,000	15,002,000	14,970,000	15,004,000	14,854,000	78,024,000
Contributions, Loans and Transfers to General Fund							
Transfer to the General Fund: Human Resources/Payroll System Upgrade	10,000						
Total	10,000						
Contributions, Loans and Transfers to Special Funds							
Transfer to the City Hall Debt Service Fund	47,000	77,000	82,000	85,000	89,000	93,000	426,000
Transfer to the Federated Retirement Fund for 2010-2011 Additional Payment	58,000						
Total	105,000	77,000	82,000	85,000	89,000	93,000	426,000

	Estimated 2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	5-Year Total
Non-Construction Projects							
Reserves							
Reserve for Advanced Process Control and Automation		3,000,000					3,000,000
Reserve for Biosolids Transition		5,000,000					5,000,000
Reserve for Digester Rehabilitation		5,000,000					5,000,000
Reserve for East Primary Rehabilitation, Seismic Retrofit, and Odor Control		1,000,000					1,000,000
Reserve for Electrical Systems and Power Generation		10,000,000					10,000,000
Reserve for Equipment Replacement		5,000,000					5,000,000
Reserve for Headworks		6,000,000					6,000,000
Reserve for New Filter Complex		6,000,000					6,000,000
Total		41,000,000					41,000,000
TOTAL NON-CONSTRUCTION	13,926,000	59,271,000	15,084,000	15,055,000	15,093,000	14,947,000	119,450,000
Ending Fund Balance	104,635,097	20,091,097	6,417,097	5,316,097	6,785,097	8,187,097	8,187,097*
TOTAL USE OF FUNDS	163,770,097	144,338,097	87,857,097	53,026,097	48,645,097	43,923,097	339,180,097*

* The 2012-2013 through 2015-2016 Ending Balances are excluded from the FIVE-YEAR TOTAL USE OF FUNDS to avoid multiple counting of the same funds.

VII. Looking Ahead



Aerial view of Plant site looking eastward.

Staff expect significant activity over the next six months, once the advisory, technical, and program management teams become established. The organizational structure and management approach will be refined to facilitate informed decision-making, followed by integrated project implementation. With the anticipated certification of the EIR in June 2013, work can begin on various elements of the Draft PMP. Activities planned for January through June 2013 include:

- Issuing of a Request for Qualifications (RFQ) and negotiating a contract for engineering services for the Digester Rehabilitation and Gas Line Replacement Project.
- Developing procurement documents for an Owner's Engineer for the Biosolids Transition Project.
- Developing a RFQ and selecting a Program Management firm to provide implementation support for the program.
- Developing a RFQ for subject matter experts to provide technical direction.
- Initiating a third-party operational review of the headworks complex and feasibility study for future expansion.
- Final decision-making and project definition for the cogeneration facility.
- Analyzing various filter technologies, which may lead to a complete replacement of the Plant's gravity filter system.
- Completing construction on several projects and awarding five new construction contracts.

Glossary

Biogas	A renewable energy source produced by the breakdown of organic matter, such as sewage or green waste, in the absence of oxygen. Biogas is comprised of methane, carbon dioxide, and small amounts of hydrogen sulfide and other components.
Biosolids	Treated sewage sludge.
Bufferlands	Open acreage used by wastewater treatment plants as a buffer between plant operations and nearby communities. Bufferlands minimize odor and operational impacts on plant neighbors, and often serve as wildlife habitat.
Cogeneration	The process of recovering and reusing industrial waste heat to produce electricity.
DCS	A Distributed Control System, or DCS, is a computerized system that allows treatment plant staff to remotely monitor and control treatment processes.
Effluent	Treated wastewater that is discharged from a treatment plant.
EIR	An Environmental Impact Report (EIR) is a public document required under the California Environmental Quality Act to describe potential environmental impacts associated with a project. An EIR also describes measures to mitigate the impacts.
Headworks	Facilities that first receive incoming wastewater at a treatment plant. The headworks screen and remove sticks, grit, and other solid material from influent to protect downstream equipment in the treatment process.
Influent	Untreated wastewater that flows into a treatment plant.
mgd	Million gallons per day.
Preliminary treatment	The preparatory wastewater treatment stage, in which influent passes through headworks, which screen and remove sticks, rocks and debris; and grit chambers, which remove sand and gravel.
Primary treatment	The initial treatment for incoming wastewater, in which gravity settles solid material and rotating bars skim floating fats, oil, and grease from influent.
Secondary treatment	The second stage of wastewater treatment, in which aeration tanks pump air into wastewater to promote the growth of naturally-occurring bacteria that remove organic pollutants.
Tertiary treatment	The final stage in advanced wastewater treatment, in which wastewater flows through filter beds, then through chlorinated tanks to become 99 percent clean.
Wastewater	Water that enters the sanitary sewer system for processing at a treatment plant.

Appendix

Preliminary Treatment Projects – Adopted FY 2013-2017 CIP budget: \$13.4 million		
PMP ID #	Project	PMP Cost Estimate* (in millions)
1	Headworks Enhancements Phase 1 and Phase 2	\$6.7 ±
2	Miscellaneous Headworks 1 Repairs	\$5.9 ±
3	Headworks 2 Modifications	\$62.6 ±
4	Headworks Odor Control	\$22.7 ±
5	Expand and Line Raw Equalization Basin to 10 MG	\$9.0 ±
6	Demo Headworks 1	\$11.5 ±
7	Refurbish/Demo P&E Building	\$11.3 ±
8	Consolidate Influent Piping	\$21.5 ±
Program Subtotal		\$151.2 ±
Primary Treatment Projects – Adopted FY 2013-2017 CIP budget: \$33.2 million		
9-10	East Primaries Steel Conversion, Coating Rehabilitation, Concrete Repair, and Seismic Modification for Odor Control	\$50.1 ±
11	Primary Treatment Odor Control	\$49.9 ±
12	Tunnel Rehabilitation: West Primaries	\$1.8 ±
13	Tunnel Rehabilitation: East Primaries	\$2.4 ±
14	Iron Salt Facilities	\$2.5 ±
15	Demo West Primaries	\$22.1 ±
16	Additional 12 MG PE Equalization Basin	\$21.6 ±
Program Subtotal		\$150.4 ±
Secondary Treatment Projects – Adopted FY 2013-2017 CIP budget: \$35.9 million		
17	Secondary Air Plenum Filtration	\$1.7±
18	Connect BNR1 and BNR2 Clarifiers	\$14.6 ±
19	Connect Aeration Headers	\$4.7 ±
20	Aeration Tank Rehabilitation (BNR 1 and BNR 2)	\$62.1 ±
21	Rehabilitation of Remaining Secondary Clarifiers (BNR 2)	\$13.2 ±
22	CFD Modeling and Rehabilitation of 1 Secondary Clarifier	\$1.2 ±
23	Rehabilitation of Remaining Secondary Clarifiers (BNR 1)	\$28.9 ±
24	Conversion to Fine Bubble Diffusers	\$35.4 ±

Secondary Treatment Projects – Adopted FY 2013-2017 CIP budget: \$35.9 million		
PMP ID #	Project	PMP Cost Estimate* (in millions)
25	Foam and Scum Control	\$1.4 ±
26	Nocardia Control	\$7.7 ±
27	Field Verification of Foam and Scum Control Options	\$1.1 ±
29	Conversion to NAS (TN < 8mg/L regulation) – Alternative 2	\$68.0 ±
28, 30	Other Alternatives	—
Program Subtotal		\$240.0 ±
Tertiary Treatment Projects – Adopted FY 2013-2017 CIP budget: \$2.8 million		
31	Underdrain and Media (Remaining Bank A7 filters)	\$3.2±
32	Miscellaneous Filtration Repairs	\$12.2 ±
33	Field Verification of Alternative Filter Technology	\$3.2 ±
34	Underdrain and Media (1 filter) + Field Verification	\$0.4 ±
35	New Filters: 128 mgd Tetra Denite plus 52 mgd New Tertiary (NAS mode only) – Alternative 1	\$132.6 ±
39	New Ultraviolet Disinfection Facilities – Alternative 3	\$49.4 ±
36-38, 40-41	Other Alternatives	—
Program Subtotal		\$201.0 ±
Biosolids Digestion – Adopted FY 2013-2017 CIP budget: \$64.6 million		
44	WAS and Primary Sludge Fine Screening	11.8 ±
45	Digester Gas Manifold and Tunnel Improvements	\$14.7 ±
46	Tunnel Rehabilitation: Digesters and DAFT	6.8 ±
47-49	Digester Cover and Mixing Upgrades (4 digesters)	30.1 ±
50	Digester Cover and Mixing Upgrades (3 digesters)	26.0 ±
51	Digester Cover and Mixing Upgrades (3 digesters)	27.9 ±
52	DAFT Final Upgrades (6 DAFTs)	4.6 ±
53	Digester Heating Upgrades	0.7 ±
54	Struvite Control Chemical Feed	0.2 ±
55	Digestion Pre-Treatment Field Verification	11.4 ±
56	FOG Receiving Station and 1/2-Mile Access Road	9.2 ±
57	Fourteen-inch Digested Sludge Line Replacement (parallel pipe)	12.9 ±
Program Subtotal		\$156.3 ±

Biosolids Residual Sludge Management – Adopted FY 2013-2017 CIP budget: \$1.6 million		
PMP ID #	Project	PMP Cost Estimate* (in millions)
42	Inactive Lagoons Rehabilitation Phase 1	13.9 ±
43	Inactive Lagoons Rehabilitation Phase 2	13.9 ±
58	Sludge Dewatering Field Verification	2.3 ±
59	2/3 Full Mechanical Dewatering (Centrifuges) Plus Feed Storage Tank	84.7 ±
60	Cake Storage	15.1 ±
61	1/3 Full Mechanical Dewatering (Centrifuges)	41.9 ±
62	Lagoons/Drying Bed Retirement	3.0 ±
63	2/3 Covered Lagoons (180 days storage)	32.0 ±
64	Emergency Biosolids Storage	7.6 ±
65	1/3 Covered Lagoons (180 days storage)	19.8 ±
66	Sludge Drying Field Verification	1.8 ±
67	2/3 Thermal Drying for 20 Percent of Solids Stream	68.5 ±
68	1/3 Thermal Drying for 20 Percent of Solids Stream	27.7 ±
69	Biosolids Greenhouse Demonstration Project (w/ BFPs)	9.0 ±
70	2/3 Greenhouse: Full Scale (w/o dewatering)	13.3 ±
71	1/3 Greenhouse: Full Scale (w/o dewatering)	7.8 ±
Program Subtotal		362.3±
Power Generation – Adopted FY 2013-2017 CIP budget: \$4.6 million		
72	Energy Strategic Plan	0.4 ±
73	Fuel Cell	1.4 ±
74	Plant Electrical Reliability (PER) – 4.6 MW Gas Turbine Phase 1 (w/o gas storage)	36.0 ±
75	Gas Turbine Phase 2 (9.2 MW) (2 turbines)	39.0 ±
76	Gas Turbine Phase 3 (4.6 MW)	23.7 ±
77	Digester Gas Storage, Compressors, and Piping	15.3 ±
78	Solar Power Facility Phase 1 (1 MW) – PPA	0.8 ±
79	Solar Power Facility Phase 1 (1 MW) – Direct Purchase	7.3 ±
80	Solar Power Facility Phase 2 (5 MW)	42.3 ±
Program Subtotal		\$166.2 ±

Electrical Systems – Adopted FY 2013-2017 CIP budget: \$3.0 million		
PMP ID #	Project	PMP Cost Estimate* (in millions)
81	PER – 115 kV Breaker Replacement	2.9 ±
82	PER – M1, M2, M3 Switchgear Replacement	0.5 ±
83	PER – MCC H1, H2, J1, J2	0.2 ±
84	PER – MCC Phase II Replacements	0.3 ±
85	PER – S11 Switchgear Replacement	9.9 ±
86	PER – S40 and G3 Switchgear Update	14.2 ±
87	PER – Standby Generator (Admin Building)	0.6 ±
88	Double-ended Substation with Switchgear for Solids Handling Processes	4.0 ±
Program Subtotal		\$32.6 ±
Advanced Process Control Systems Projects – Adopted FY 2013-2017 CIP budget: \$6.5 million		
89-91	Advanced Process Control and Automation	9.6 ±
92	EG2 and EG3 Engine Control Panel Upgrade	0.2 ±
93	Side Stream Nitrogen Removal	—
Program Subtotal		\$9.8 ±
Site Facility Improvements – Adopted FY 2013-2017 CIP budget: \$32.3 million		
94-96	Miscellaneous Heating and Cooling Upgrades	3.0 ±
97	Handrail Replacement	5.0 ±
98	Site Facility Improvements – Phase 1 (through 2025)	9.1 ±
99	Site Facility Improvements – Phase 2 (2026 through 2040)	12.2 ±
100	Yard Piping	16.5 ±
101	Unanticipated/Critical Repairs	25.4 ±
102	Unspecified Remaining Repair and Rehabilitation (2025 through 2040)	416.0 ±
103-104	Tunnel Rehabilitation: BNR 1 and BNR 2	10.3 ±
105	3W Pump Station Improvements	1.1 ±
106-109	Warehousing Facility Additions and Support Building Improvements	100.9 ±
110-112	Public Art Reserve – 2010 to 2040	TBD
Program Subtotal		\$599.5 ±

* Cost estimates follow the American Associate of Cost Engineering International (AACE International) Recommended Practice No. 18R-97 estimate classes 5 and 4. Typical accuracy range for Class 5 estimates are -20 percent to -50 percent on the low side, and +30 percent to +100 percent on the high side. Class 4 estimates are -15 percent to -30 percent on the low side, and +20 percent to +50 percent on the high side. Cost estimates include engineering, construction, and contingencies; escalated to the midpoint construction at 2 percent per annum.