

**City of Santa Barbara
Wastewater Fund Financial Plan
Project Descriptions**

Introduction

This paper is intended to describe Capital Improvement Program (CIP) projects which are outlined in the City's Wastewater Fund Financial Plan documentation (a MS Excel Spreadsheet developed by City staff). The purpose of the CIP project descriptions and related cost estimates is to provide City management with a basis for Wastewater Fund CIP project selection and prioritization so that appropriate budget funding can be scheduled in future fiscal years.

Current CIP Project Descriptions

The current CIP projects are delineated between the City's municipal wastewater collection system and its El Estero Wastewater Treatment Plant.

1. Wastewater Collection System Projects:

Each Fiscal Year the City will repair, rehabilitate, and/or replace approximately 2.6 miles of existing municipal sewer main in Santa Barbara. The City also is budgeting monies to update and improve its sewer lift stations. Between Fiscal Years 2012 through 2016, the City is accelerating its sewer main rehabilitation efforts by an additional \$900,000. This special project may be called the Channel Keeper project, the Accelerated Sewer Main Rehabilitation Project, or other similar title. Beginning in FY 2017, this Accelerated Sewer Main Rehab Program is no longer budgeted and the remaining project elements do vary in funding levels by Fiscal Year between FY 2017 and FY 2023.

Table 1. Wastewater Collection System Project Summaries.

Project Description	Fiscal Year(s)	Budget Amount
Annual Sewer Main Rehab/Repair/Replace	FY12-FY16	\$1,150,000 annual
Annual Lift Station Improvements	FY12-FY16	\$300,000 annual
Accelerated Sewer Main Rehab Program	FY12-FY16	\$900,000 annual
Future Wastewater Collection System Projects	FY17-FY23	\$7,100,000 total

2. El Estero Wastewater Treatment Plant Projects:

A. Preliminary Treatment Projects.

A major preliminary treatment project—the Headworks Screening Project—already has been planned and designed; the construction contract has been awarded and the

project now is in the construction phase. This project has been funded by both City Wastewater fund monies and by a State Revolving Fund (SRF) Loan provided by the State of California. The project replaces existing preliminary treatment equipment and related controls with a new automated bar screen system. Appurtenant equipment also will be installed as a part of this Headworks Screening Project contract.

A second major preliminary treatment project—the Influent Pump Station Rehabilitation project—also has been planned and designed; the construction contract is being bid in the FY12, 4th Quarter. It is anticipated that the contract will be awarded in the FY13, 1st Quarter and on-site construction begin in the FY13, 4th Quarter. This project's construction cost budget is shown in the FY12 Financial Plan spreadsheet.

In future Fiscal Years monies are being budgeted for a Grit Chamber Rehabilitation project. Also funding has been provided for a future Headworks Screening Rehabilitation project to update process equipment from the first decade of new equipment usage and a similar Influent Pump Station Improvement Project to provide necessary updates for influent pump equipment. Additional funding also has been budgeted in future Fiscal Years to renew/improve appurtenant Headworks facility equipment associated with the influent pumping, bar screening, emergency generator, grit chamber and related process areas.

Table 2. Preliminary Treatment Project Summaries.

Project Description	Fiscal Year(s)	Budget Amount
Headworks Screening Project Construction Project	FY10-FY13	N/A
Influent Pump Station Construction Project	FY12	\$2,030,000
Grit Chamber Rehabilitation Project	FY16-FY17	\$600,000
Future Screening, Influent Pump, and Grit Chamber Update Projects	FY22-FY23	\$600,000
Future Preliminary Treatment Improvement Projects	FY19-FY20	\$750,000

B. Primary Treatment Projects.

A Primary Treatment process CIP project has been completed within the past decade; some existing process equipment was not renewed as a part of that project. On-going Secondary Treatment Process project work now under preliminary design has identified additional process improvements for the existing primary clarifiers and associated equipment that will take place under the purview of that project. Primary Treatment CIP projects which are listed herein may be undertaken as a part of the near-term Secondary Treatment projects shown in Section 2C below.

Table 3. Primary Treatment Project Summaries.

Project Description	Fiscal Year(s)	Budget Amount
Primary Clarifier CEPT Process Upgrade	FY13-FY16	Part of Table 4.

Primary Clarifier Miscellaneous Improvements	FY15	\$300,000
Primary Sludge Pump Transfer System Upgrade	FY16	\$200,000

C. Secondary Treatment Projects.

A Secondary Treatment process CIP project has been completed within the past decade; some existing process equipment was not renewed as a part of that project. Furthermore on-going secondary effluent quality challenges have resulted in a renewed look at the entire secondary treatment process to ensure that proposed CIP projects now in planning and design phases will result in high quality secondary effluent being reliably produced.

Because of these process challenges, a consultant planning contract was awarded through a competitive process to the consultant Brown & Caldwell in CY 2010. The contract scope of work focused upon the secondary aeration basin processes alone. It did not include any proposed work for either the primary clarifiers or the secondary clarifiers. The planning study's recommended process upgrade alternative provided a preliminary capital construction cost estimate of \$9,760,000.

In early FY 12 Brown & Caldwell subsequently was awarded a preliminary design contract to proceed with the project work. This preliminary design contract cost was budgeted as \$400,000 in FY 12. Since this preliminary design work has begun, secondary clarifier deficiencies and primary clarifier enhancements (to provide for Chemically Enhanced Primary Treatment (CEPT)) have been identified to ensure that the overall secondary treatment process will perform satisfactorily. These proposed enhancements now are increasing the scope of the original project and will result in a significant increase to project construction and related soft costs.

It may be months before a consultant-based preliminary design-level project cost estimate can be provided. A city staff planning-level cost estimate (probable accuracy of +/-25%) for this comprehensive Secondary Treatment project work places the construction cost between \$14 million and \$16.5 million. Related soft costs associated with the project (planning, design, admin/legal, miscellaneous A/E fees, project inspection, contingencies) could approximate 32% of the construction costs. Thus at this time the total project cost could be between \$18.5 million and \$21.8 million. Approximately \$700,000 has been funded for consultant planning and preliminary design fees to-date.

With the abovementioned project issues outstanding at this early point in the project, the project's related budget estimate requires revision in the near future. The budget documentation summarized in Table 2C reflects the earlier project's scope of work and associated costs.

Table 4. Secondary Treatment Project Summaries.

Project Description	Fiscal Year(s)	Budget Amount
Aeration Basin Process Improvements Project includes (for 6 aeration basins): <ul style="list-style-type: none"> • Aeration Basin Upgrades • Aeration Air Supply System Upgrade • Secondary Clarifiers (7) Upgrade • Primary Clarifiers (5) CEPT Upgrade 	FY12-FY15	\$15,400,000
Future Secondary Treatment Process Improvements	FY21-FY23	\$1,300,000

D. Tertiary Treatment Projects.

In FY12 a Tertiary Treatment process CIP project has begun. The consultant CDM Smith has been contracted to perform an assessment of the existing tertiary filtration facility's performance and make recommendations for process improvements. In addition this assessment study will explore a demineralization process option to reduce the current recycled water product's total solids content.

This project's assessment study is scheduled to be completed in the FY13, 1st Quarter. Because this project is being funded by the City's Water Fund, the project's description and associated project cost are not listed here or in backup project spreadsheet documentation associated with the Wastewater Fund.

E. Anaerobic Digestion Projects.

Sludge processes involved with anaerobic digestion include some recent CIP project facilities that thicken both the primary and secondary sludge and subsequently transfer all sludge to the anaerobic digestion process. The current digestion process uses a holding tank from the original 1950's-era treatment facility to receive digested sludge from the anaerobic digesters and transfer the sludge to the Solids Handling Building for mechanical dewatering.

Prior to expending significant monies on upgrading the facility's anaerobic digestion process, a consultant facility-wide study is planned to optimize and prioritize future sludge process capital improvements. This consultant study effectively could undertake both digestion and final sludge handling process activities.

A city staff planning-level cost estimate (probable accuracy of +/-25%) for the existing anaerobic digestion tanks rehabilitation project work places these two existing digester's

rehabilitation construction cost at \$2.4 million. Related soft costs associated with the project (planning, design, admin/legal, miscellaneous A/E fees, project inspection, contingencies) could approximate 32% of the construction costs. Thus at this time the total project cost could approximate \$3.2 million.

The replacement of the legacy sludge holding tank provides a need for more detailed investigation. Some consideration could be given to construction of a third digester in lieu of a replacement sludge holding tank. A third digester would provide greater process redundancy when an existing digester needs to be taken out of service. It also provides an opportunity for creating higher quality bio solids beneficial use products at the El Estero Wastewater Treatment Plant itself.

A city staff planning-level cost estimate (probable accuracy of +/-25%) for a new digester's construction cost is \$3.3 million. Related soft costs associated with the project (planning, design, admin/legal, miscellaneous A/E fees, project inspection, contingencies) could approximate 32% of the construction costs. Thus at this time the total project cost could approximate \$4.3 million. Should the City decide to construct only a new sludge holding tank, the total project cost estimate could be reduced to approximately \$1.1 million if the new tank's size was about 1/4 the size of an existing digester.

The current Financial Plan provides for \$4.4 million between FY14 and FY18. This represents an adequate planning-level funding for the project which rehabilitates the two existing digesters and constructs a smaller volume replacement sludge holding tank. If the City decides to move forward with a new digester project to replace the existing sludge holding tank, an additional \$3.3 million would be required to fund that project option.

Table 5. Anaerobic Digestion Projects.

Project Description	Fiscal Year(s)	Budget Amount
Two Existing Digester Upgrade Project	FY14-FY17	\$3,200,000
New Digester Project:	FY14-FY18	
• New Digester Option		\$4,330,000
• New Sludge Holding Tank Option		\$1,100,000

F. Solids Handling Projects.

The existing solids handling facility accepts the digested liquid sludge from the digestion process and dewateres the sludge from liquid to a semi-solid state (sludge cake at about 15% solids content) using one of two belt filter presses. These two belt presses are functioning adequately in the near term. Sludge cake from the presses is conveyed by a small conveyer belt to a loading hopper in the building which drops the sludge cake into a small dump truck. City staff uses this truck to transport the sludge cake to a

holding bay next to the Solids Handling Building. Contract sludge haulers then load the sludge cake into large transport containers for off-site sludge beneficial use or disposal.

Solids Handling Project improvements will require consultant assessment prior to making new capital investment in the existing Solids Handling facility. This consultant work can be combined with the Anaerobic Digestion assessment study mentioned above. Solids Handling Process project planning considerations include: deciding whether future bio solids beneficial use projects warrant different and/or additional solids handling processes to be constructed; and whether future operational savings warrant replacement of existing belt filter presses with high-speed centrifuges to increase final sludge cake solids content. Existing final belt conveyor and sludge load out equipment should be replaced and optimized with processes that will save city staff labor costs associated with short-hauling sludge cake within the treatment plant.

The Financial Plan budget for Solids Handling projects does not begin until FY17 with construction projects contemplated to occur between FY19 and FY23. The total CIP cost for these projects initially was estimated at an order-of-magnitude level to be approximately \$5.8 million. While this initial cost estimate is too high for maintaining current level of service, it does provide an opportunity for the City to consider additional bio solids end use projects on-site at the facility during a time period when no other major capital projects are planned.

A city staff planning-level cost estimate (probable accuracy of +/-25%) for the solids handling facility's rehabilitation at the current level of service shows its construction cost is \$1.8 million. Related soft costs associated with the project (planning, design, admin/legal, miscellaneous A/E fees, project inspection, contingencies) could approximate 32% of the construction costs. Thus at this time the total project cost could approximate \$2.3 million. Should the City decide to improve the sludge dewatering process with centrifuges in lieu of belt filter presses, resulting capital costs will be increased. If the City elects to construct additional bio solids beneficial use projects, additional capital costs will be required. The budget figure of \$3.43 million has been used to provide an order-of-magnitude cost estimate for the FY17-FY23 time period.

Table 6. Solids Handling Projects.

Project Description	Fiscal Year(s)	Budget Amount
Solids Handling Facility Rehabilitation	FY17-FY20	\$2,320,000
Optional Bio Solids Processing Projects	FY17-FY23	\$3,430,000

G. Odor Control Systems Projects.

The Odor Control System units currently in use at the wastewater treatment plant are legacy process units dating back to the facility's construction. These units have been properly maintained and function as designed. It is planned to replace these odor control units and add additional odor control equipment as-needed throughout the

facility according to a multi-year schedule. An initial facility-wide assessment is planned for the FY17-FY18 time period. Following the recommendations of that assessment, it is estimated that approximately \$2 million will be spent on all odor control systems' improvements during the FY18-FY23 time period.

Table 7. Odor Control Systems Projects.

Project Description	Fiscal Year(s)	Budget Amount
Process Area-Specific Odor Control Unit Replacement or New Installation	FY17-FY23	\$2,200,000

H. Plant-wide Annual Allocation Projects.

The wastewater treatment plant has an important on-going need for small dollar-value CIP projects to be planned, project-managed, and constructed. Usually these projects' scope of work can be planned and managed by city staff; vendors are contracted with to complete project construction work within weeks or several months. Such projects involve short-term or sometimes emergency needs to keep important unit processes functioning at the treatment plant. Recent examples include: secondary aeration basins' baffle walls reinforcement project (FY11); process transfer pump replacements (FY10 and FY11); and digester isolation valve replacement (FY11).

Sometimes a small CIP project's initial engineering assessment and planning work can develop into a more substantial CIP project, with city staff requiring outside resources for consultant engineering and construction inspection services. A project of this nature then can be better assessed over time and included in future Fiscal Year CIP project work. The project could be transferred from the Annual Allocation project to a unique CIP project identified specifically in a future Fiscal Year. An example of this type of CIP project is the new facility-wide concrete assessment consultant study planned to begin in late FY12. Its scope of work is not large at this time, yet may grow if concrete structural assessment results warrant a work scope increase.

To effectively manage the many small-yet-important projects occurring on an on-going basis, this Annual Allocation Project budget is proposed to accommodate short-term capital construction projects. While the annual allocation may vary between Fiscal Years to accommodate other CIP budgetary needs, it is proposed that \$5.5 million in total be provided for these smaller projects between FY13 through FY23.

Table 8. Plant-Wide Annual Allocation Projects.

Project Description	Fiscal Year(s)	Budget Amount
Annual Allocation CIP Projects	FY13-FY23	\$5,500,000

Conclusion

This document is intended to supplement the City's Wastewater Fund Financial Plan and its related documentation. This document will be updated as-needed to meet the on-going needs of CIP-related planning activities within the City of Santa Barbara.