



City of Palo Alto

Finance Committee Staff Report

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Meeting Date: 4/20/2021

Summary Title: Regional Water Quality Control Plant Wastewater Treatment Fund Capital Program Update

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From: City Manager

Lead Department: Public Works

Recommendation

Staff recommends that the Finance Committee review the near-term capital improvement program for the Regional Water Quality Control Plant (RWQCP) Wastewater Treatment Fund.

Background

The RWQCP, originally constructed in 1934, has undergone several expansions and upgrades. The RWQCP is now an advanced (tertiary treatment) facility that provides treatment and disposal of wastewater for Palo Alto, Mountain View, Los Altos, Los Altos Hills, East Palo Alto Sanitary District, and Stanford University. The RWQCP has a capital improvement program (CIP) to re-invest in or replace aging infrastructure. The Wastewater Treatment Fund infrastructure is owned by Palo Alto and supported by its partner agencies. The Plant's core infrastructure was built in 1972 with tanks, pumps, large pipes, industrial buildings, acquisition of additional land, and complex mechanical and electrical systems. The 1972 Plant had major capital additions in 1980 and 1988. From 1999 to the present, staff has managed an ongoing \$1.9 to \$3.4 million annual CIP reinvestment in aging infrastructure funded on a recurring basis through the partner agreements; the recurring capital budget is increased by an annual inflation index first approved by partner agencies in 1998. Key projects are listed below with major debt financed/grant funded projects in 1972, 1980, 1984, 1988, 1999, 2009, 2010, and 2019. Debt service for larger projects financed through loans or bonds is provided through amendments to the partner agreements. Typical useful life of Plant infrastructure is 30 years for mechanical and electrical gear with most of the Plant at or beyond its useful life. The capital program is a critical commitment to replace and improve aging systems for reliable wastewater treatment.

Project	Funding	Expense (million \$)
1972 Regional Water Quality Control Plant	Federal Grants/Bonds	\$11.2
1980 Advanced Wastewater Treatment Facility	Federal Grants/Operating	\$10.3
1984 Dewatering and Cogeneration Project	Utility Revenue Bond	\$1.1
1988 Capacity Expansion Project	Utility Revenue Bond	\$9.7
1984 – 1998 miscellaneous projects (note 1, 2)	Recurring Capital Budget	\$7.8
1999 – 2021 miscellaneous projects (note 1, 3)	Recurring Capital Budget	\$50.5
1999 Sludge Incinerator Rehabilitation	Utility Revenue Bond	\$7.5
2009 Recycled Water Pipeline	California SRF Loan (note 4)	\$19.4
2010 Ultraviolet Disinfection Facility	California SRF Loan	\$8.6
2019 Sludge Dewatering/Truck Loadout Facility	California SRF Loan	\$29.2
	Subtotal	\$155
<p>Note 1: Per audited financial statements</p> <p>Note 2: CIP could not exceed 2% of total capital investment of Plant 10/10/68 to 6/30/99</p> <p>Note 3: Recurring CIP allowance of \$1.9 million established in base year FY99; annual consumer price index (CPI) increase of recurring amount increased to \$3.3 million in FY21</p> <p>Note 4: State Water Resources Control Board State Revolving Fund (SRF) Program</p>		

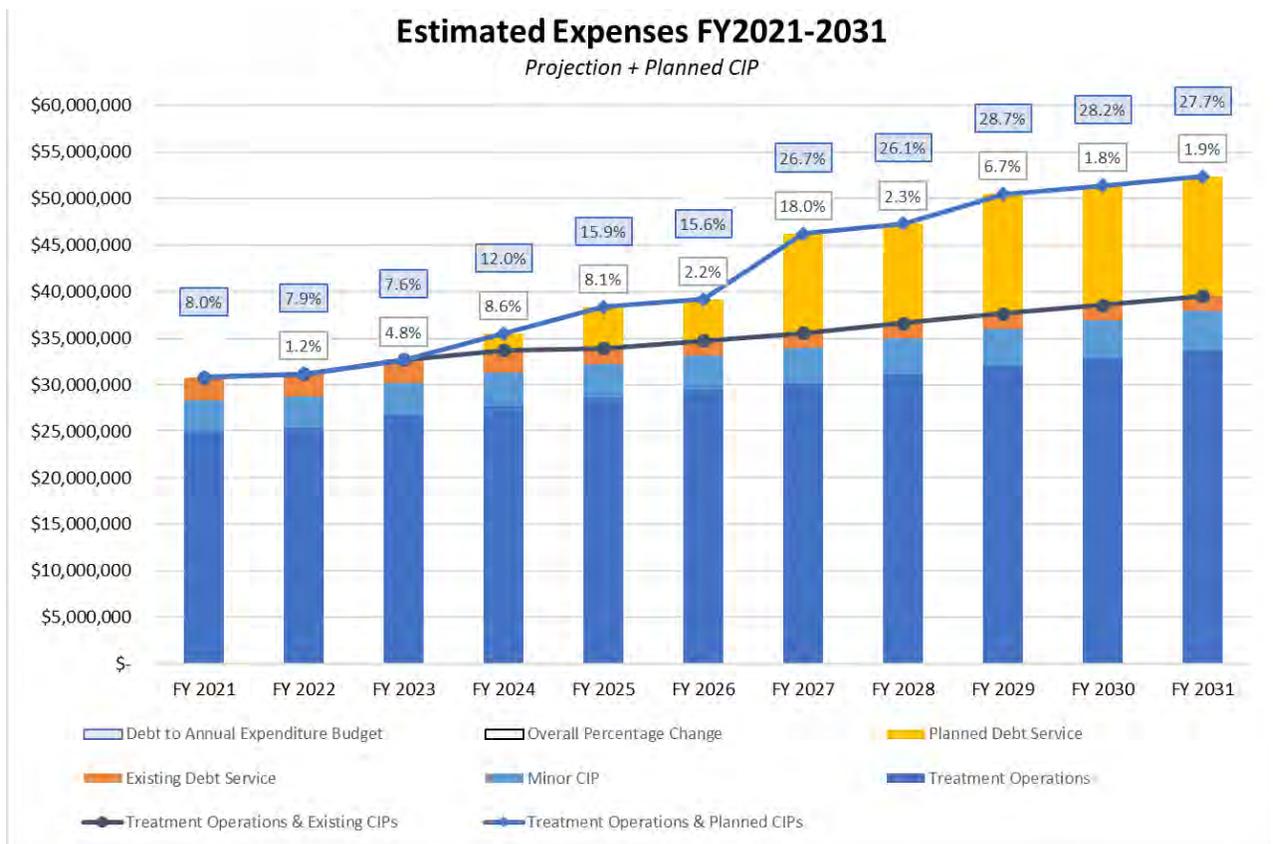
Discussion

The RWQCP’s [Long Range Facilities Plan](#) (LRFP) identifies additional projects that are needed to rebuild and revitalize the facility, with recommended projects expected to cost between \$315 to \$392 million (2015 dollars). The LRFP was accepted by the City Council on July 2, 2012 ([SR #2914](#)). Implementation of the LRFP is managed by a CIP team of staff engineers, support staff, and a program manager (Woodard & Curran) (see [SR #11612](#)). Near-term project work commenced and is listed below with latest project costs and status. Work to reline 2,364 linear feet of the more deteriorated section of the 72-inch joint intercepting sewer is not listed but in early stages of development. Longer-term work from the LRFP that is not listed below includes:

- (a) complete relining of the remaining 6,636 linear feet of the less deteriorated sections of the 72-inch joint intercepting sewer,
- (b) a dual media filter facility overhaul,
- (c) recycled water filters, storage, and booster station overhaul, and
- (d) potential ozonation or other advanced facilities for advanced treatment of toxic pollutants.

Project	Status	Expected Funding	Expense (million \$)
Primary Sedimentation Tanks Rehabilitation and Equipment Room Electrical Upgrade (WQ-14003)	Awarding Construction	SRF Loan	\$19.4
Outfall Line Construction (WQ-19000)	100% Design / Re-evaluation for Future Levee Height	SRF Loan	\$11.1
Secondary Treatment Upgrades (WQ-19001)	60% Design Complete	SRF Loan / USEPA Loan	\$146.0
Advanced Water Purification System (WQ-19003)	Design Started	Valley Water/Mountain View/Palo Alto	\$20.0
New Laboratory and Environmental Services Building (WQ-14002)	Advanced Planning	Revenue Bond	\$57.0
Headworks Facility Replacement (WQ-16002)	Budgeted	SRF Loan	\$48.0
Projects in Progress (WQ-19002)	Varies	Operating Capital Budget	\$8.3
		Subtotal	\$310.0

The RWQCP capital program requires both the recurring CIP funding as well as debt-financed instruments for larger projects. The 10-year financial forecast is shown below. Significant new annual debt service (for the above listed projects) will commence at various times over the next ten years as new capital improvements are realized (see Timeline section below for details of debt timing).



The City Council, on June 22, 2020, adopted the City’s Capital Budget ([CMR #11330](#)), which included the Wastewater Treatment Fund’s multi-year capital expenditure plan. Included in this plan were capital improvement projects consistent with the RWQCP’s LRFP. The projects include:

- 1) WQ-14003 Primary Sedimentation Tank Rehabilitation and Equipment Room Electrical Upgrades;
- 2) WQ-19000 Outfall Line Construction;
- 3) WQ-14002 New Laboratory and Environmental Services Building;
- 4) WQ-19001 Secondary Treatment Upgrades;
- 5) WQ-19003 Advanced Water Purification System;
- 6) WQ-19002 Plant Repair, Retrofit, and Equipment Replacement; and
- 7) WQ-16002 Headworks Facility Replacement.

Recent project status is included below.

WQ-14003 Primary Sedimentation Tank Rehabilitation & Equipment Room Electrical Upgrades

The Project rehabilitates the four concrete primary sedimentation tanks and their ancillary systems and extends their useful life at least another 30 years. The scope of work includes the following for all four tanks: repair cracked and spalling concrete on the tank's floors, walls, and covers; apply a new protective coating to the tank walls, ceilings, and covers; upgrade primary sedimentation tank area lighting with LED light fixtures; replace hatch and drainage covers on the top deck; install a flight and chain monitoring system for the primary sludge raking mechanisms; replace effluent flow diversion gates; and replace aging motor control centers, (i.e., electrical power distribution equipment) relocating them to a pre-engineered building adjacent to the sludge pump room.

The design consultant is Kennedy / Jenks Consultants. In May 2021, staff will bring to Council a recommendation for approval of the project's construction contract and approval of a resolution for the SRF loan to cover the design and construction costs of the project. Additionally, Council will be asked to approve amendments to three partner agreements covering loan repayment with Mountain View, Los Altos, Stanford, and the East Palo Alto Sanitary District. Construction is expected to be completed in December 2023.

WQ-19000 Outfall Line Construction

The RWQCP has one 54-inch diameter outfall line to convey treated effluent from the RWQCP to the Bay, traversing the Palo Alto Airport property. The existing outfall pipe was installed in 1964. The LRF identified the need for a new outfall due to insufficient capacity in the existing outfall due to sea level rise impacts, high king tides, wet-weather events, and generally insufficient flow capacity in the existing pipe. Design, permitting, and California Environmental Quality Act (CEQA) work is complete for a new 63-inch pipeline to supplement the capacity of the rehabilitated 54-inch pipeline. However, the project is currently delayed.

The US Army Corp of Engineers has developed draft feasibility studies for a levee project surrounding the Bay and the low-lying areas of Palo Alto. These draft studies highlight impacts on the future alignment and height of the levee around the Palo Alto Airport. Future levee height changes (e.g., potentially two feet or higher) impact the departure and landing angles used to determine aeronautical safety. A potential runway shift to ensure safe takeoff and landings might be triggered by a future levee height increase; the change impacts the depth and top soil height of the new outfall pipeline, requiring it potentially to be deeper than it is currently designed.

A re-evaluation of the new outfall depth will be made by the City's consultant (Kennedy / Jenks Consultants) after gathering technical information. After the re-evaluation of outfall pipeline depth, it may be necessary to return to Council for a design fee amendment with the consultant Kennedy / Jenks Consultants. The re-evaluation and potential redesign of the outfall pipe is

likely to add 12 to 18 months to the project schedule. An SRF loan is currently approved by the State for this project, however due to the delay, this financing may need to be increased (e.g., for construction cost escalation, a deeper pipeline, etc.). The project remains on the funding list and will remain eligible for financing if progress continues on the potential redesign, however a new state credit review may be required.

WQ-14002 New Laboratory and Environmental Services Building

The scope per the LRFP for this project was to take staff and equipment from existing RWQCP buildings and move them into a new Operations Center for technical, lab, pretreatment, and operations staff. An architect was hired in early 2019 to complete a full design for an Operations Center. However, in 2019, an early construction cost estimate for total project cost was \$57 million, which was much higher than anticipated in the LRFP. The ancillary design fee increase request from the architect and the substantially increased overall total project cost led staff to release the architect from the contract at a point where the work completed was still useful for later planning and design efforts. The restart, while unfortunate, has enabled staff to strategize some advanced planning opportunities before restarting a full design approach for future staff buildings. This re-evaluation will be an advanced planning analysis and include remodeling current operations and/or administration buildings, procurement possibilities for a supplemental real estate, office lease options, as well as a full design by an architect for new building including (a) a lab-only building, (b) a technical services building for lab, pretreatment, and technical staff, or (c) an operations center for lab, pretreatment, technical, and operational staff. Staff is evaluating these options in the context of work condition changes in light of the current pandemic as well as the most economical and long term fiscally prudent investments.

WQ-19001 Secondary Treatment Upgrades

Upgrading the secondary treatment process (biological process) to a process that removes harmful nitrogen will be accomplished by creating anoxic and aerated zones in existing aeration basins. The project will improve final water quality, ensure the Plant continues to meet effluent discharge permit limits, and allow for ultimate decommissioning of the aging biotrickling filters and other aging equipment. The project includes new air blowers; air diffusers in aerobic zones; anoxic zone pulsed air equipment; membrane aerated biofilm reactor cassettes; slide and sluice gates and valves to isolate and throttle flows; instruments such as flowmeters and oxygen probes; power distribution equipment including standby diesel generator and power transfer equipment; and return activated sludge piping and pumping.

On September 10, 2018, Council approved a professional services contract ([SR #9485](#)) for design services with Brown and Caldwell for the Secondary Treatment Upgrades Project (WQ-19001). The project adds treatment technology to remove nitrogen to address new regulatory requirements as well as to replace 41- to 49-year old aging infrastructure that is beyond its useful life. The contract was amended December 7, 2020 to add additional services ([SR #11155](#)).

City staff plan to work with State SRF and USEPA Water Infrastructure Finance and Innovation

Act (WIFIA) program financial staff to secure project financing. Design completion is anticipated in October 2021. If WIFIA co-financing is pursued, staff will seek Council approval of WIFIA loan issuance costs later this year (approximately \$310,000). WIFIA loan closing is typically five to six months after the loan application is submitted; the WIFIA application and application fee is due by December 15, 2021. Solicitation for a construction contract will commence in mid- to late calendar year 2022, after securing project financing. In early 2023, staff will return to Council for approval of the final loan(s), the approval of a construction contract, and approval of amendments to RWQCP partner agreements. Construction completion is expected in 2026. If SRF financing eligibility is delayed one year to 2023, construction completion is delayed to 2027.

WQ-19003 Advanced Water Purification System

The project improves the quality of the RWQCP's recycled water used for irrigation and other purposes. The project is an advanced treatment system, initially sized for 1.125 million gallons per day, and potentially expandable to 2.25 million gallons per day of recycled water. In March 2021, Council approved the project's design services contract with Black & Veatch ([SR #11782](#)). Construction is expected to be completed in 2025.

The Preliminary/Conceptual Design Report estimated the project to cost \$20 million in 2017 dollars. Project funding is a partnership agreement between Valley Water, Mountain View, and Palo Alto, with Valley Water providing the largest share (\$16 million) of the funding, and the Mountain View and Palo Alto portions split 75% Mountain View, 25% Palo Alto. Palo Alto's share, estimated to be \$1 million, would be funded by water and wastewater utilities ([SR #10627](#)). The City has also applied for State SRF loan financing to cover the project's design and construction costs above and beyond the \$16 million Valley Water contribution.

WQ-19002 Plant Repair, Retrofit, and Equipment Replacement

Using ongoing, recurring funding from partner agencies, minor capital improvement projects are financed and constructed. They are reimbursed based on the annual operating share of the budget (about 35% for Palo Alto). Current projects include a recoating for the sludge blending tank (\$310,895) and replacement of two secondary clarifier mechanisms (\$2,231,900). These smaller projects are designed by consultants or in-house staff. One key project is the Medium Voltage Electrical Distribution Loop Rehabilitation project (aka, 12kV Loop Rehab) to replace buried underground cable, switches, and a primary metering cabinet. The 65% design has been completed by Salas O'Brien; the 65% cost estimate for construction is \$6,901,500. The project will require specialized construction inspection of high voltage equipment.

WQ-16002 New Headworks Facility

The new Headworks Facility will replace the existing influent junction box, and two raw sewage pump stations built in 1956 and 1972, respectively. The Headworks will consist of new preliminary treatment equipment (large opening bar screens, fine screens, grit removal, and odor control) followed by a raw sewage lift pump station, discharging into a new pressurized "force main" between the lift station and the primary sedimentation tanks. All new equipment

will be provided with new electrical power distribution, backup power, and state of the art controls.

The project is on the list of major CIP projects outlined in the LRFP. The project is in the planning stage. Staff anticipates putting out an RFP for the design services contract in 2022. Staff will also apply for a state SRF loan to cover the design and construction costs of the project.

RWQCP On-Call Construction Management and Inspection Services

To support the construction management and inspection service needs of the RWQCP capital program, staff expects to bring to Council in May 2021 a set of contracts with multiple construction management firms. These firms will be pre-selected to provide cost proposals for the RWQCP capital program, which saves time on soliciting future proposals for each CIP project. The price of the recommended firm will be brought to Council for approval, typically in conjunction with approval of the construction contract, as an amendment to the construction management firm's compensation schedule. Construction management costs have been budgeted with each capital project.

Capital Program Delivery Risks

Programmatic risks impacting delivery of capital projects include technical, schedule and sequence, financial, staffing, and logistical issues.

Technical risks include, for example, difficulties assessing and rehabilitating infrastructure that is in operation 24/7. Furthermore, project priorities sometimes change when systems are evaluated to be at greater risk of failure.

Schedule and sequence risks include the SRF loan program delaying the ability to start construction if the low-interest loan program scores a project lower than is required to get financing for a particular year; the project is then rolled over to the following year for SRF loan consideration. The SRF's minimum qualifying score changes every year depending on the number of applications and associated amounts of loan applied. Key project interdependencies impacting schedule include the following:

- The Primary Sedimentation Tank Rehabilitation and Equipment Room Electrical Upgrades Project (WQ-14003) must complete work prior to the 12kV Electrical Upgrades Project (WQ-19002) and the Secondary Treatment Upgrades Project (WQ-19001). Also, the 12kV Electrical Upgrades Project (WQ-19002) must precede the Secondary Treatment Upgrades project (WQ-19001).
- A replacement raw sewage pump station odor control system (WQ-19003 Phase 1) must be installed before the full Advanced Water Purification System (WQ-19003 Phase 2) construction groundbreaking can commence. Implementing the two phases of the Advanced Water Purification System creates potentially complicating project scheduling and financing issues.

If one of the projects above is delayed, it can put a large amount of later capital work at schedule and cost risk.

Some projects require a greater level of coordination with internal and external stakeholders. For example, the Outfall Pipeline is a project with significant outside coordination. Stakeholder coordination and expectations may contribute to capital program delivery risk (e.g., communication issues, inadequate staffing, insignificant outreach, changing technical standards, interference with a new project, changing regulatory requirements, etc.). Key capital delivery stakeholders include (a) regulators (e.g., Federal Aviation Administration, Bay Area Air Quality Management District, Regional Water Quality Control Board, US Army Corps of Engineers, etc.), (b) internal City departments (e.g., budget staff, attorney's office staff, purchasing division staff, planning staff, etc.), (c) partner agencies, and (d) RWQCP neighbors (e.g., Palo Alto Airport, landfill, Baylands Nature Preserve stewards and advocates, etc.).

Financial risks and considerations to plan for include changing loan interest rates, cash flow needs and limitations to pay contractors prior to reimbursement from lenders, and the need to forecast expenses to help Palo Alto and partner agencies establish rate planning efforts. Staff is working to develop debt service and cashflow options for the very significant future Secondary Treatment Upgrade project (WQ-19001), which is scheduled to begin in 2024. Partner agreements extend either indefinitely and, at minimum, are extended and terminate no earlier than the repayment of all debt. Any partner agency that may desire to exit the agreement would need to identify a replacement site and construct their own wastewater treatment plant within their jurisdiction, and this is extremely cost prohibitive due to the cost efficiencies of a joint endeavor. Other risks to consider and mitigate for are delays to construction start that can impact established project budgets; planning for differences in costs between estimates, project budget, and bid results; changes in scope and the construction environment can introduce timing issues into the scale and scope of work that is already defined; and securing financing together while coordinating a loan application with a partner agreement.

Logistical issues include coordinating multiple onsite contractors. Staging and laydown areas at the RWQCP are limited. Temporary bypass pumping operations and detailed construction sequencing at a 24/7 operation are significant challenges for designers and onsite staff that must plan a rebuild of an aging plant while continuing to safely treat and maintain existing wastewater treatment infrastructure during construction (e.g., during the 39-month long Secondary Treatment Upgrades project).

Cumulatively, the risks stated above represent a significant undertaking requiring the management and support of a variety of City staff functions beyond the project team to ensure that human and financial resources are directed effectively with appropriate controls and contingencies addressed. This is an ongoing effort involving primarily Public Works, Administrative Services, Human Resources, the City Attorney's Office and City Manager's Office.

Comparison to Neighboring Agencies

The \$310 million (2021 dollars) RWQCP capital program highlighted herein is similar to neighboring wastewater treatment capital programs. These programs are also using USEPA WIFIA, State SRF programs, and revenue bonds for financing. Some neighboring agencies are shown below with the size of their capital programs.

Project	CIP Program (million, \$)	Residential Population Served
San Jose (10-year CIP for Regional Wastewater Treatment Facility)	\$1,400	1,400,000
Sunnyvale Clean Water Program	\$450	152,770
Silicon Valley Clean Water RESCU Program (Redwood City)	\$495	220,000
San Mateo Clean Water Program	\$991	140,000
Palo Alto Regional Water Quality Control Plant CIP	\$310	236,000

Timeline

From a financing perspective, the low interest state SRF and USEPA WIFIA loan payments start one year after construction completion. Assuming SRF and WIFIA financing, the annual total projected expense for the Wastewater Treatment Fund, which includes new debt service, is shown below.

Fiscal Year	Total WWT Fund Cost	Percent Change	Key Project Debt Added
2022	\$31,576,000	1.2%	
2023	\$33,081,000	4.8%	
2024	\$35,895,000	8.6%	Outfall WQ-19002 Lab & Environmental Services Building WQ-14002
2025	\$38,764,000	8.1%	Primary Sedimentation Tank Rehab WQ-14003
2026	\$39,608,000	2.2%	
2027	\$46,668,000	18.0%	Secondary Treatment Upgrades WQ-19001
2028	\$47,716,000	2.3%	
2029	\$50,897,000	6.7%	Headworks WQ-16002
2030	\$51,432,000	1.8%	
2031	\$52,397,000	1.9%	
2032	\$52,838,000	0.8%	

¹ Advanced Water Purification System project not included due to Valley Water funding

Resource Impact

The Public Works Department is currently seeking funding for the projects planned in the Wastewater Treatment Fund Capital Improvement Program through three primary sources:

1. State SRF loans
2. USEPA WIFIA loans (co-financing option)
3. Commercial market utility revenue bonds

The interest rate is currently 1.1% for SRF loans, approximately 2.0% for WIFIA loans, and typically between 3.0-4.5% for revenue bonds depending on credit rating. SRF loans are typically pursued for the RWQCP because they have the lowest long-term costs. However, eligibility is competitive and not all projects are being funded (i.e., the program is overcommitted). Changing federal priorities and new proposed infrastructure legislation may change the funding levels of state SRF programs, which are periodically reinvested with new federal money, but it is likely the SRF program will remain competitive.

The USEPA WIFIA loan is a co-financing option for larger projects where the WIFIA component is \$20 million minimum and no more than 49% of total project costs. Utility revenue bonds are another possibility but are being pursued only if a needed project is not fundable from SRF. A utility bond funded project could also be co-financed with WIFIA funds.

Annual debt service payments associated with each project depend upon prevailing interest rates at the time of the loan approval and/or bond issuance, as well as the length of the repayment term. The annual debt service payments will be paid by all the Partners to the Palo Alto RWQCP and will be specified in amendments to their Agreements with Palo Alto, which are brought to Council for approval as needed. Palo Alto is responsible for its fixed capacity payment of 38.16% of debt financed instruments. These costs and the Palo Alto share are a direct impact on the City's Wastewater Collection Fund forecasted rates. These rates projected for FY 2022 and the financial plan including forecasted future rate increases can be found in the most recent report to the Finance Committee on April 6, 2021 ([SR# 11886](#)).

Anticipated project costs, funding sources, and debt repayment terms are detailed in the tables above. The impact on Wastewater Treatment Fund expenses of the debt service associated with the anticipated loans and bonds for each project is visualized in the 10-year forecast in the graph above. The forecast projects overall expenses for the entire fund based on projected operating and minor capital expenses, existing debt service, current capital project cost estimates, and planned debt service assumptions detailed in the tables above. The graph also shows the impact on the *Debt Service Ratio* of obtaining and accepting these loans and bonds in the future based on current/conservative debt repayment assumptions (i.e., interest rates, loan terms). The current Palo Alto policy is to keep the Debt Service Ratio below 15% and, per initial staff analysis, the loans and bonds will cause the 15% amount to be exceeded reaching over 28% in current projections. When funding sources are approved and cause the fund to exceed

the Debt Service Ratio, staff will return to Council with recommendations on handling the potential increase in the debt service and related issues.

As these preliminary project cost estimates are still in the process of being reviewed, refined, and developed, the current estimates for some of the Wastewater Treatment Fund’s Capital projects are not expected to be included in the Fiscal Year 2022 Proposed Capital Budget. As design continues and construction estimates are updated, total cost estimates will be adjusted and brought to Council for approval through the annual budget development process in subsequent years.

Environmental Review

Individual capital improvement projects are reviewed under CEQA prior to any project approval. All capital projects are designed to comply with the City’s [Sea Level Rise Policy](#). Projects, and current CEQA status, include the following:

Project	CEQA Status
Primary Sedimentation Tanks Rehabilitation and Equipment Room Electrical Upgrade Project	Categorically Exempt
Outfall Line Construction	Mitigated Negative Declaration
Secondary Treatment Upgrades	Categorically Exempt
Advanced Water Purification System	Environmental Impact Report
New Laboratory and Environmental Services Building	TBD
Headworks Facility Replacement	TBD
WQ-19002 Minor CIP Projects in Progress	Varies, Typically Categorically Exempt