



March 1, 2021

To: Commissioner Sophie Maxwell, President
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Through: Michael Carlin, Acting General Manager



From: Steven R. Ritchie, Assistant General Manager, Water
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Steven R. Ritchie

Subject: Alternative Water Supply Program Quarterly Update

Enclosed please find the Alternative Water Supply Program Quarterly Report, which provides an update on the status of new regional and local water supply and storage projects that are being planned within the SFPUC's service area. The Water Resources Division has been preparing detailed Quarterly Report updates since June 2020.

Collectively, the projects described in this report represent our early planning to meet future water supply challenges and vulnerabilities such as environmental flow needs and regulatory changes; earthquakes, disasters, and emergencies; changes in demand; and climate change. As we face future challenges – both known and unknown – we are leveraging regional partnerships and considering this suite of alternative water projects to help meet our anticipated needs through 2045. Our planning is focused on evaluating project feasibility based on technical, institutional and operational considerations, and thinking about project activities that can be sequenced to remain flexible and responsive as we continue to gain more clarity on our planning needs.

The structure of this report is similar to the December Quarterly Report. The Program background is included at the end of the report, to maintain completeness of the report as a standalone document. However, the format has been modified to more clearly identify new updates for the ease of the reader who follows quarterly updates on a regular basis.

Cc: Nicole Sandkulla, BAWSCA
 Tom Francis, BAWSCA

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Photo: San Antonio Reservoir, 2008

Alternative Water Supply Program Quarterly Report

March 2021

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Report Overview & Organization

The Quarterly Report for the Alternative Water Supply (AWS) Program provides an update to the SFPUC Commission, stakeholders and members of the public on the status of regional and local water supply and storage projects that are being planned to meet anticipated needs in the SFPUC's service area. The Quarterly Report provides updates every three months on program activities, but also contains discussion around relevant planning considerations, as well as background information so it can serve as a standalone document for the first-time reader.

Since the last quarterly report, there are some formatting updates to the report to help organize the material and improve readability. The Quarterly Report is divided into three sections: Section 1. Program Highlights and Updates; Section 2. Status of Projects; and Section 3. Program Fundamentals.

Section 1. Program Highlights and Updates. This section provides a discussion of program-level planning activities and considerations. Within this section, there is a discussion around different *Quarterly Highlights* each quarter. The highlights provide detail on one or two key themes and information on how they relate to the program, in order to provide context for future decision-making. Also included in this section is an update on *Ongoing Program Activities*.

For this report's *Quarterly Highlights*, there is **contextual information related to purified water** (commonly referred to as potable reuse) **for projects that are part of the AWS Program.** This update provides a description of the different types of purified water projects in California, the current regulatory status, and some relevant examples. Several projects in the AWS program, such as the Daly City Recycled Water Expansion Project, Crystal Springs Purified Water Project, ACWD-USD Purified Water Project, and San Francisco Purified Water include the evaluation of purified water alternatives, so this discussion helps support some of the planning considerations and timelines for these projects. A second thematic discussion related to **the role of storage in the SFPUC's alternative water supply planning** is also included in the *Quarterly Highlights*. This topic helps provide some context around the role storage projects play in meeting projected water supply needs under different conditions and allows us to discuss **specific considerations related to the Los Vaqueros Expansion Project, a project that has a number of key milestone decisions coming before the Commission this year.**

For this quarter's *Ongoing Program Activities* updates, the report summarizes activities related to **continued coordination with San Jose and Santa Clara.** This topic continues to be a standing item in our quarterly reports because it describes how planning for these customers relates to the broader dry year supply planning. For this quarter, there is also a **financial update** included. We began tracking expenditures for the AWS Program at the start of this fiscal year in July 2020, so an update is timely given that we are now almost three-quarters through the first year of this program.

Section 2. Status of Projects. This section provides a summary of activities associated with each of the projects being evaluated as part of the AWS planning efforts. **For this quarterly report, we have broken out the project status write ups to include 3-5 sections, based on their relevance:** *Project Background*, which provides a brief summary of the key elements and objectives of each project; *Current Planning Considerations*, which are included for context regarding the near-term activities for a project; and sections on *Activities This Quarter* and *Upcoming Activities* that are updated each quarter. **To provide a sense of the institutional complexity of the project, a schematic on *Project Partners & Interests* has been added at the outset of each project section where the SFPUC is working with external partners.**

Section 3. Program Fundamentals. This reference section provides background information on AWS planning activities. It includes information on the rationale, priorities, structure, challenges, opportunities, schedule and resources related to the program. **For the first time reader, this section provides a complete preface to the AWS Program and may be a useful starting point in reading this Quarterly Report.**

Section 1. Program Highlights and Updates

1.1 Program Purpose

The Alternative Water Supply (AWS) Program is evaluating new water supply projects that will meet future water supply needs in the San Francisco Public Utilities Commission (SFPUC) service area. This Program looks beyond the traditional surface water supplies of the Regional Water System (RWS) and local groundwater sources and considers “alternative” water supply options such as expanding surface water storage, groundwater banking, transfers, purified water (potable reuse), desalination and technological innovations and other tools that can increase supply or reduce demand.

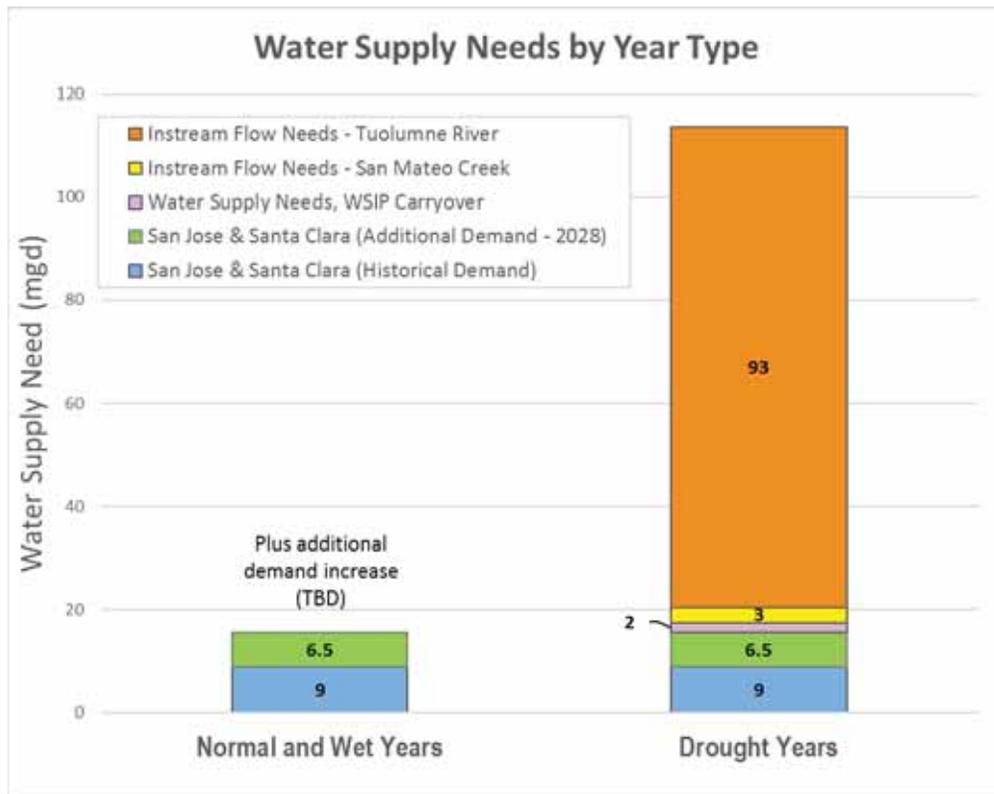
The central planning considerations of the program are to meet the following current water supply needs:

1. Up to 98 mgd in drought years (to meet current needs for existing customers and offsetting commitments to the environment); and
2. Between 9 and 15.5 mgd in all years (9 mgd is the minimum to make San Jose and Santa Clara permanent customers of the SFPUC).

Planning for and implementing alternative water supplies requires a comprehensive and detailed planning effort that considers a number of interrelated planning challenges, which are different than those faced for traditional water supply planning at the SFPUC. These planning challenges may include new governing regulations, multi-party partnerships, and approaches for integrating supplies into an existing water system, among other issues. And, as with any long-term water supply planning effort, the SFPUC must also contend with future uncertainties such as instream flow needs and other regulatory changes, demand projections and climate change. These planning challenges and uncertainties highlight the importance of being proactive and strategic in our planning efforts for the AWS Program. Strategic planning allows us to be flexible as the SFPUC continues to gain clarity over time around issues at both a programmatic level (i.e. drivers that will refine future water supply needs) and at a project level (i.e. regulatory developments, water rights issues, and other technical considerations). Proactive planning ensures that we have thoroughly examined the water supply options available ahead of the need so that the SFPUC can continue to provide a safe and reliable water supply for our 2.7 million customers.

The AWS Program’s anticipated water supply needs in both normal years and drought years are shown in **Figure 1** for the planning horizon. The water supply needs are described by each type of need that the AWS Program is considering.

Figure 1. Current Anticipated Water Supply Needs in the Planning Horizon



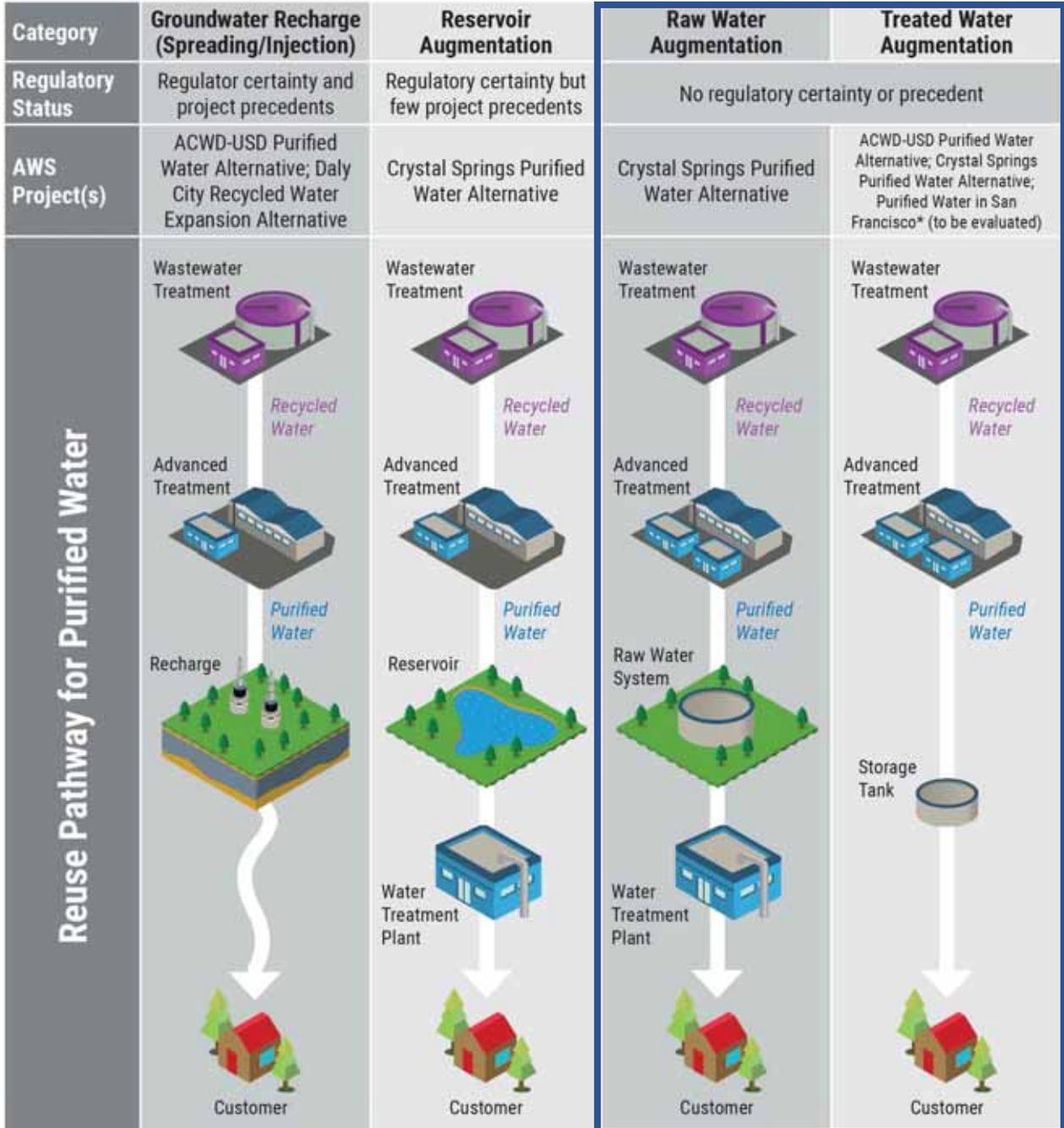
1.2 Quarterly Highlights

1.2.1 California Context for Purified Water in the AWS Program

Purified water refers to water that is produced by taking a non-potable recycled water source and putting it through a robust multi-stage treatment system that is regularly monitored including, at a minimum, microfiltration or ultrafiltration, reverse osmosis and advanced oxidation with ultraviolet light. This process produces a high-quality water supply that can be compared to state and federal drinking water standards. Following treatment, the water can take one of four pathways before delivery to customers. The spectrum of processes is shown in the figure below.

Figure 2. Purified Water in California and SFPUC Planning

Indirect Potable Reuse **Direct Potable Reuse**
CA Potable Reuse Regulation Evolution ➔



* The City and County of San Francisco does not have available environmental buffers or a water treatment plant. Any potable reuse within the City would have to be Treated Water Augmentation.

The first two processes, **groundwater recharge** and **reservoir augmentation**, are commonly represented collectively as **Indirect Potable Reuse (IPR)**, and final regulations for these processes have been in place in California as of 2014 and 2018, respectively. These processes are called *indirect* because there is an intermediary buffer where the purified water can be diluted and held before it is introduced to the domestic water supply system. The latter two processes include **raw water augmentation** and **treated water augmentation**. These processes are marked by either reduced time in a buffer or the absence of an environmental buffer altogether between treatment and water delivery. Collectively, these types of reuse are referred to as **Direct Potable Reuse (DPR)**. Regulations for both types of DPR are under development and anticipated in 2023; those plans are currently on track. While it is very common for the terms IPR and DPR to be used in the water industry, the State is moving away from these terms in favor of greater specificity around the processes being used and their associated regulations. They are defined in greater detail as follows:

- **Groundwater recharge** is the planned use of purified water for replenishment of a groundwater basin or an aquifer that has been designated as a source of water supply for a public water system. Recharge can be done either by spreading on the surface of the groundwater aquifer or by injection. The most prominent and largest example of IPR through groundwater recharge in California is the Groundwater Replenishment System, a joint project between Orange County Water District and the Orange County Sanitation District that has been operating since 2008. The project provides up to 100 million gallons per day (mgd) of purified water to recharge basins where it naturally percolates into the Orange County Groundwater Basin and supplements the County's drinking water supplies. Purified water is also injected into wells located along the coast to act as a barrier against seawater intrusion into the groundwater basin. A second expansion of an additional 30 mgd is expected in 2023. OCWD serves 19 cities and water agencies, with over 2.5 million residents in north and central Orange County.
- **Reservoir augmentation**, which is also referred to as surface water augmentation, is the introduction of purified water into a surface water reservoir that is used as a source of domestic drinking water supply. The purified water has to remain in the reservoir for six months to be considered sufficient under the definition of reservoir augmentation. There are no operating examples of reservoir augmentation in California, but the City of San Diego received conceptual approval for a 30 mgd project at the Miramar Reservoir. Other smaller projects are also being planned in California.
- **Raw water augmentation** is the planned placement of purified water into a system of pipelines or aqueducts that deliver raw water to a drinking water treatment plant that provides water to a public water system. Raw water augmentation can also refer to purified water added to a surface water body with insufficient residence time to be considered reservoir augmentation. The East County Advanced Water Purification

program plans to provide 11.5 mgd of purified water to Lake Jennings upstream of the R.M. Levy Water Treatment Plant in eastern San Diego County. This water supply will provide approximately 30 percent of the current drinking water demands in this region.

- **Treated water augmentation** is the planned placement of purified water into the water distribution system of a public water system's potable water pipelines or tanks for distribution to customers. There is no environmental buffer or water treatment facility in this type of reuse so additional front-end treatment will likely be required in the regulations when they are in place. In addition to San Francisco, Ventura Water and Valley Water are studying the potential for treated water augmentation DPR projects in the planning horizon.

Under the AWS Program, the SFPUC is considering potential alternatives that include all four potable reuse processes. The **Daly City Recycled Water Expansion** includes a baseline project of non-potable recycled water delivery to customers for irrigation purposes only. However, in the alternatives' analysis currently underway, we are evaluating the potential for groundwater recharge into the South Westside Groundwater Basin, which stretches from Daly City to Burlingame. In the **Crystal Springs Purified Water Project**, the SFPUC has been evaluating the option for reservoir augmentation using the Crystal Springs Reservoir as an environmental buffer before further treatment at Harry Tracy Water Treatment Plant. In the current Phase 3 feasibility analysis for this project, we are also considering DPR alternatives including raw water augmentation and/or treated water augmentation in and around a proposed advanced treatment facility. In the **ACWD-USD Purified Water Project**, the project partners are currently developing alternatives that will include groundwater recharge. As the alternatives are refined, they may also include the evaluation of treated water augmentation options.

In the coming months, the SFPUC will be initiating a study of purified water potential in San Francisco, building on what was learned through the **PureWaterSF** research project completed in 2020. Because there are no available environmental buffers or water treatment plants within the city, any purified water opportunity in San Francisco would necessarily be treated water augmentation.

1.2.2 Role of Storage Projects in the AWS Program

The current needs driving the planning for alternative supplies through 2045 are largely dry year needs. The AWS Program offers the opportunity to develop a diverse suite of water supply options that can be available in dry years including reuse and regional supplies such as desalination, and dry year transfers if they are available. In addition, as we anticipate greater climate variability and regulatory uncertainty, increasing the amount of water storage can help improve operational flexibility by storing water in wet years for use in dry years when we are vulnerable to supply shortages. By developing a mix of water supply and storage projects, the AWS Program can help improve SFPUC's adaptive capacity in the face of continued uncertainty.

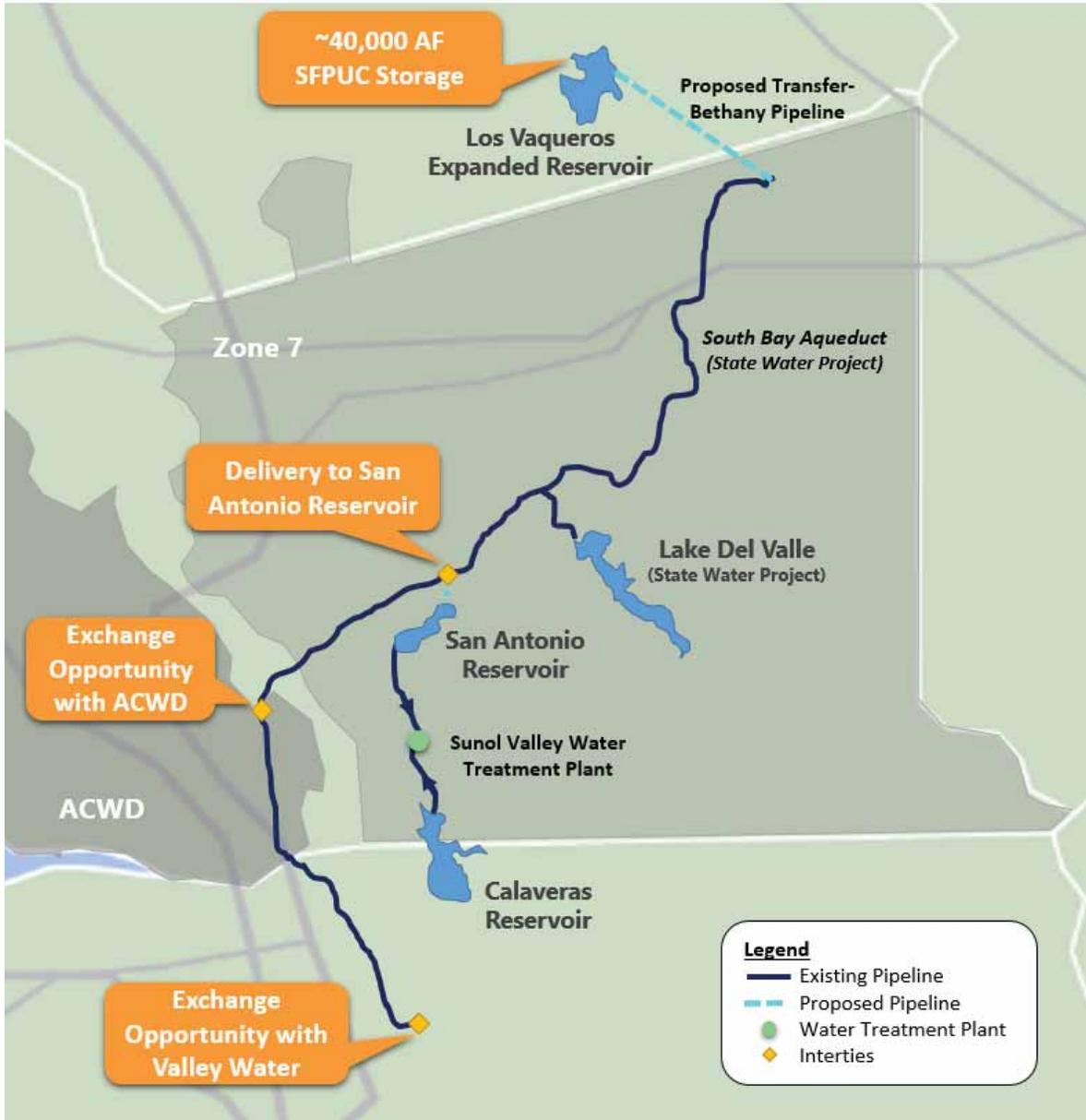
Water storage can be above- or below- ground. Below-ground storage or groundwater banking opportunities in the SFPUC service area are limited. As part of the Crystal Springs Purified Water Project, replenishment of up to 6 mgd in the San Mateo Plain Groundwater Basin was evaluated. However, space and well siting limitations eliminated further consideration of this alternative. Currently, we have expanded the scope of the Daly City Recycled Water Expansion project to include analysis of groundwater recharge in the South Westside Basin, but well siting and the concentration of pumpers in the area may present some physical and operational challenges to consider. We are also evaluating groundwater recharge at Quarry Lakes in Alameda County. However, the underlying aquifer in this area does not have space for long-term storage, for use during extended dry periods. Groundwater banking in the San Joaquin Valley is also included for evaluation as part of the Tuolumne River Voluntary Agreement. As negotiations continue, there will be an opportunity to evaluate the potential for additional storage there.

Within the AWS Program there are two surface water storage projects: the Calaveras Reservoir Expansion Project and the Los Vaqueros Reservoir Expansion (LVE) Projects. The LVE Project is a multi-partner regional project that is intended to increase dry year water supply reliability and provide environmental water supply to refuges within and south of the Delta. For the SFPUC, it can provide an auxiliary storage opportunity for dry year supplies. The possible mechanism for delivery of stored water from LVE is shown in **Figure 3** on the next page.

Unlike most of the other projects in the AWS Program, which are in early stages of planning and won't be ready for decisions to proceed to environmental review until July of 2023, the LVE Project is moving forward at an accelerated pace. Environmental review has been completed and the project was approved by CCWD's Board in May of 2020. A legal workgroup with representatives from each partner agency is reviewing the details for the formation of a Joint Powers Authority in the coming months. Long-term financial commitments to the LVE Project are anticipated at the end of 2021, in order to meet the current conditional award requirements for California Water Commission funding authorization of up to \$470 million.

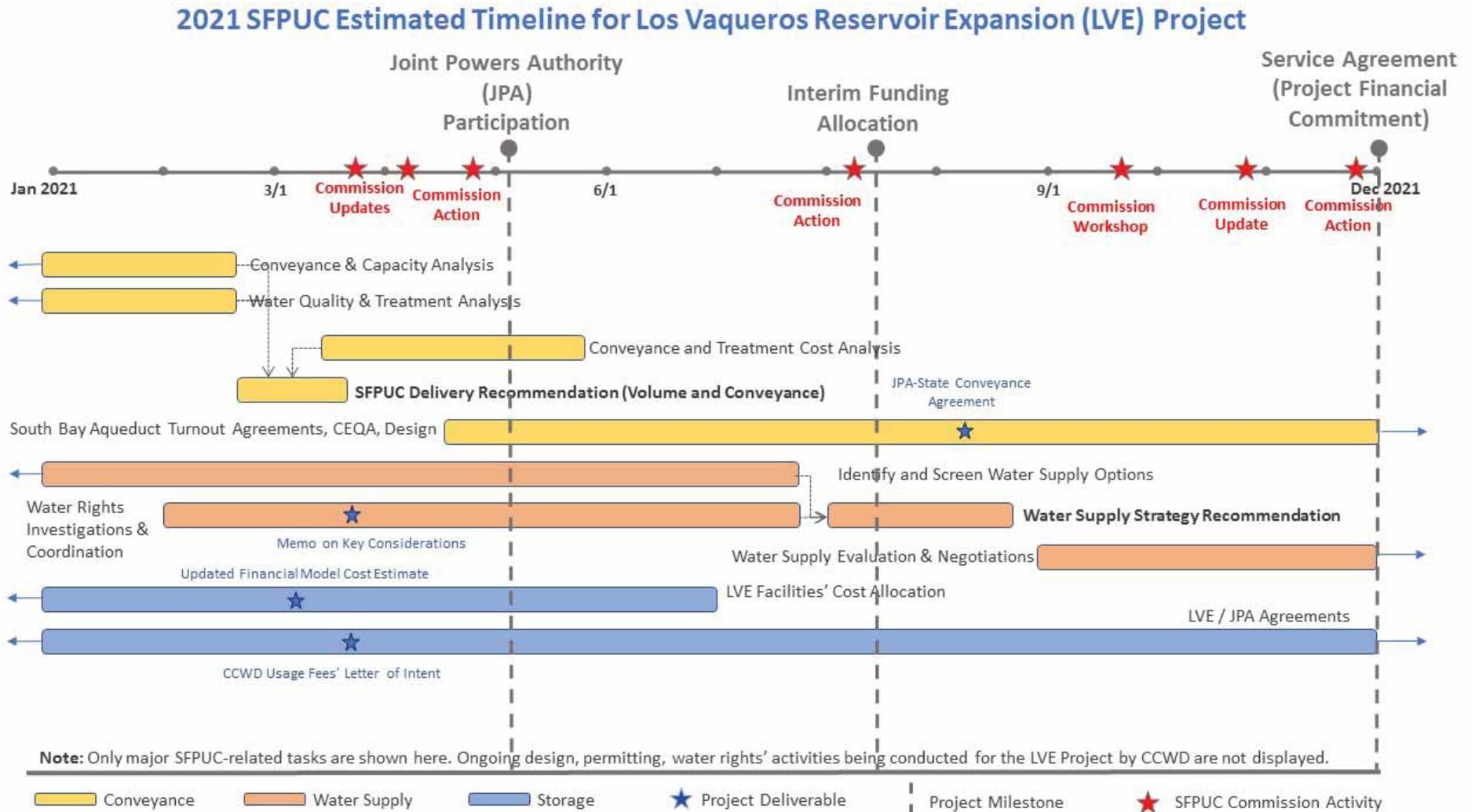
While the storage components and related facilities of the project have been studied and understood, the SFPUC has had two areas of concern with participation in the project: conveyance and water supply. Over the past year, SFPUC staff have been working to better understand constraints on these issues and significant progress has been made. As the analysis continues, staff are coordinating across planning, operations, water quality, and natural resources functions to lead to project recommendations.

Figure 3. SFPUC's Potential Delivery from the Los Vaqueros Expansion Project



The **2021 Estimated Timeline** on the next page shows the various tasks staff are engaged in this year, and the timeline on which discussions and decisions will be brought before the Commission to align with key project milestones. Staff plan to provide updates to the Commission (March-April and September-October) ahead of key decisions to 1) join the JPA and provide additional interim project funding and 2) enter into long-term financial commitments for the project.

Figure 4. 2021 SFPUC Estimated Timeline for LVE



1.3 Ongoing Program Activity Updates

1.3.1 Status on Ongoing Coordination with San Jose and Santa Clara

Planning Considerations for San Jose and Santa Clara's Permanent Status

Planning of alternative water supplies is proceeding with the intention to be able to make San Jose and Santa Clara permanent customers of the SFPUC. Based on the request from San Jose and Santa Clara, that means providing at least 9 mgd of additional water supply guarantees to the two cities collectively. However, consistent with the SFPUC's planning priorities, the SFPUC must first meet instream flow obligations and meet existing obligations to existing permanent customers before making interruptible customers permanent or considering meeting increased demands of existing and interruptible customers. Distinct from San Jose and Santa Clara's all-year needs, meeting our existing obligations requires securing dry year supplies.

As SFPUC staff evaluate the technical and institutional feasibility of each of the projects included in the AWS Program, the timing, availability and location of the water supply benefits associated with the projects are being considered. With these criteria, the SFPUC can review projects for their suitability as drought supply for existing permanent customers. If a project is better suited to meeting all-year needs rather than drought-year only needs, it can be considered as a potential source of supply for San Jose and Santa Clara. Depending on location and availability, a purified water project could be better suited to meeting San Jose and Santa Clara's needs rather than the drought needs of existing permanent customers alone.

Since August 2020, the Bay Area Water Supply & Conservation Agency (BAWSCA) has facilitated regular discussions with San Jose and Santa Clara to collectively consider project opportunities and interests.

Activities in this Quarter

Staff had two meetings with San Jose and Santa Clara organized by BAWSCA in this quarter. Both cities are working with Valley Water to support the development of a groundwater recharge project in Santa Clara County that can improve reliability in the Basin and provide additional water supply in the region. While this effort does not replace the cities' need for at least 9 mgd of water supply from the SFPUC or the desire of either Santa Clara or San Jose to become permanent customers of the SFPUC, it does help offset some of San Jose and Santa Clara's broader demands. During this quarter, San Jose and Santa Clara also expressed an interest in working together to evaluate new project concepts that may be considered to provide their water supply and meet broader regional reliability goals.

1.3.2 Financial Update

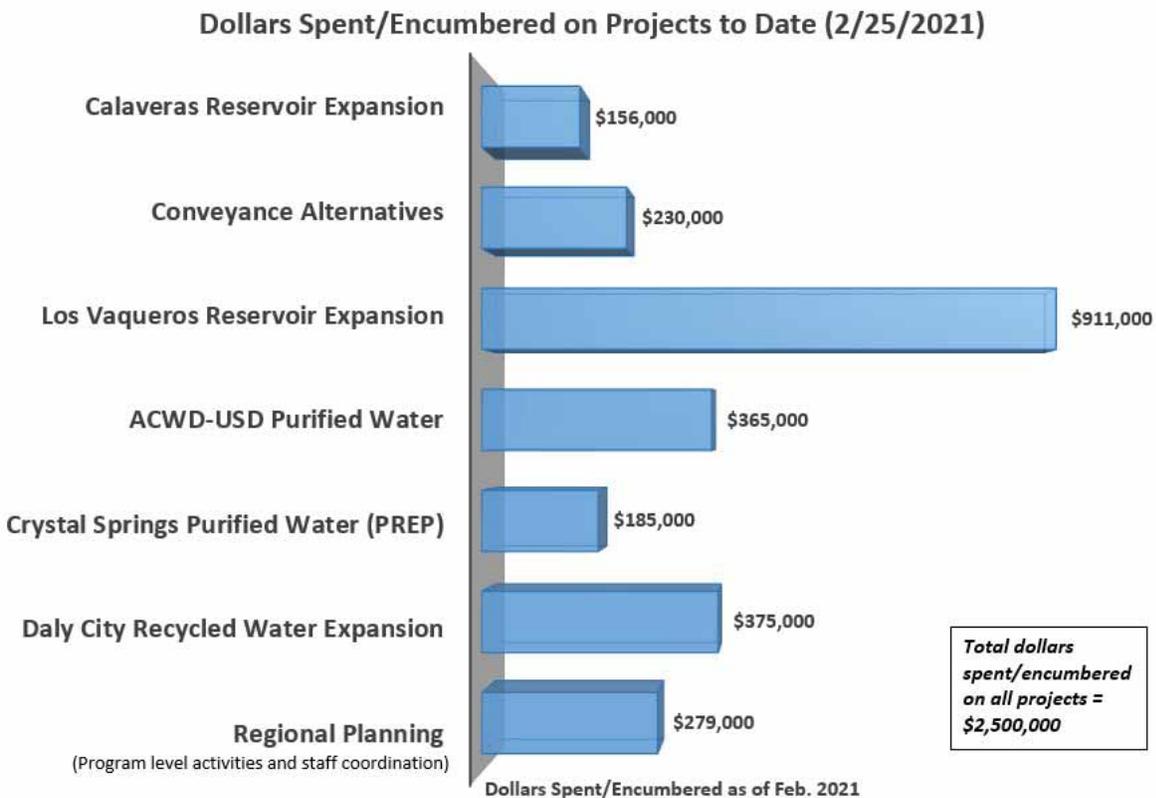
Funds became available to the AWS Program in July 2021, at the start of the current fiscal year. Since that time, AWS Program staff have consistently been tracking staff time, task orders, and contract expenditures with partner agencies on the planning tasks associated with the alternative water supply projects.

Except for the Los Vaqueros Reservoir Expansion, which includes large expenditures such as design and permitting, other AWS Program activities largely involve feasibility studies, alternatives analyses, staff time and coordination from the SFPUC, and city attorney support. Regional Planning refers to program-level activities, program administration, reporting out, and coordination across the SFPUC to advance project planning.

The current status of project expenditures, notwithstanding any reporting lag, is shown in the graphic below. As increases in expenditures remain small quarter over quarter, staff will provide updates at least once a year. If expenditures increase at a higher rate, updates will be provided more frequently as part of the Quarterly Report.

Figure 5. AWS Program Expenditures

(current as of 2/25/2021 reporting)



Section 2. Status of Projects

Staff are currently studying the feasibility of eight regional and four local projects that can contribute to meeting the needs and priorities identified for this planning effort. Three upcountry projects have also been identified and planning for those could begin in the coming months. Collectively, these projects represent new water supplies, local supply opportunities, a study of conveyance options, an innovations program, a potential local policy option, and a water transfer simulation that can help answer some planning questions. This section provides a status of each of these efforts, which are organized geographically.

For this quarterly report, we have updated the structure of each project status discussion to include the following: *Project Partners & Interests (graphic)*, *Project Background* and *Current Planning Considerations*, which are included for purposes and context, and sections on *Activities This Quarter* and *Upcoming Activities* that are updated each quarter. **The new schematic on project partnerships appears only for each of the regional projects in which there are multiple partners.**

2.1 Regional Projects

2.1.1 Daly City Recycled Water Expansion

Project Partners & Interests

SFPUC	Daly City (Sanitation District)	Cal Water
Increase drought supply reliability	Reduce ocean discharges	Develop local supplies

Project Background

This project can produce up to 3 mgd of tertiary recycled water during the irrigation season (~7 months). On an average annual basis, this is equivalent to 1.25 mgd or 1,400 acre-feet per year. The project is envisioned to provide recycled water to 13 cemeteries and other smaller irrigation customers, offsetting existing groundwater pumping from the South Westside Basin; this will free up groundwater, enhancing the reliability of the Basin. The project has been a regional partnership between the SFPUC, Daly City, and the California Water Service Company (Cal Water), in coordination with the Town of Colma and the irrigation customers who are located largely within Cal Water's service area. SFPUC customers will benefit from the increased reliability of the South Westside Basin for additional drinking water supply during droughts. In this way, this project supports the Groundwater Storage and Recovery (GSR) Project, which is under construction.

Current Planning Considerations

The current planning questions driving near-term project activities include:

- 1) Is there potential to increase production at Daly City?
- 2) Are there alternatives to the baseline recycled water project that might help mitigate project risks associated with the GSR project and increase dry year reliability in the South Westside Basin?
- 3) How will responsibilities and costs be allocated among the project partners?

Activities this Quarter

SFPUC staff have continued to meet monthly with Cal Water and Daly City to discuss project updates and key project tasks and goals related to the planning questions above. As a private water utility, Cal Water's participation in the project is subject to approval by the California Public Utilities Commission (CPUC). In preparation for a submittal to the CPUC this summer, Cal Water is undertaking a reliability study evaluating this project, among others, in the region. The study includes an evaluation of recycled water effects on headstones in cemeteries. Results of the study will not be available until later this year.

Throughout this quarter, SFPUC staff and the consultant team have continued to work on developing an understanding of the conceptual alternatives. SFPUC staff have completed groundwater modeling of the potential effects of each of the alternatives on the South Westside Basin. Staff have also been coordinating internally to ensure that the current planning for the GSR project is incorporated into the thought process and evaluation for the Daly City Recycled Water Expansion Project. Both the GSR developments and the modeling results will be important factors in how staff will narrow down the alternatives for detailed study.

The project partners have started to re-engage the largest potential customers of the project, the cemeteries in Colma. To date, staff have met with Cypress Lawn and Holy Cross cemeteries, and both expressed continued interest in being engaged with the project team at this stage. As the project planning progresses, two areas of concern for the cemeteries remain: 1) long-term cost of water and 2) operational and physical impacts of using recycled water at their sites. Meanwhile, the project team will also work with Holy Cross to further explore the feasibility and process of potentially siting the project's proposed 2.5 million-gallon storage tank on Holy Cross' property, which was evaluated during the environmental review process.

Upcoming Activities

In the coming quarter, SFPUC and its consultant team will refine the range of alternatives and select three alternatives for further analysis. SFPUC staff will continue to develop project costs and benefits to advance discussions of cost allocations. Outreach and communication with the cemeteries will also be a priority as they remain key partners in this project, along with the

Town of Colma where the cemeteries are located. The SFPUC and our partner utilities will need to work toward a comprehensive understanding of the challenges and processes for the cemeteries to consider recycled water as a viable alternative to groundwater for their long-term irrigation needs.

2.1.2 ACWD-USD Purified Water

Project Partners & Interests

SFPUC	Alameda County Water District (ACWD)	Union Sanitary District (USD)
Increase Dry Year Supply	Reduce dependence on SFPUC Regional Water System	Reduce Bay discharges

Project Background

This project could provide a new purified water supply utilizing USD's treated wastewater. Purified water produced by advanced water treatment at USD could be transmitted to the Quarry Lakes Groundwater Recharge Area to supplement recharge into the Niles Cone Groundwater Basin or put to other uses in ACWD's service area. With the additional water supply to ACWD, an in-lieu exchange with the SFPUC could result in more water left in the RWS. Additional water supply could also be directly transmitted to the SFPUC through a new intertie between ACWD and the SFPUC's Bay Division Pipelines.

Current Planning Considerations

The current planning questions driving near-term project activities include:

- 1) What is the maximum potential purified water that can be produced and put to beneficial use from this project?
- 2) What are a range of potentially feasible alternatives for treatment and delivery?
- 3) What are the considerations and tradeoffs of two alternatives that the partners wish to study, and what are the associated costs and infrastructure needs?

Activities this Quarter

During this quarter, the project team developed four conceptual alternatives with the goal of selecting two for detailed evaluation in the coming months. The alternatives build on the understanding of USD's current and planned wastewater treatment operations, an understanding of existing uses and challenges within Quarry Lakes and the underlying groundwater basin, ACWD's facilities and service area needs, and potential to connect to the SFPUC Regional Water System. The alternatives include purified water concepts that could either recharge the groundwater basin through Quarry Lakes or provide water supply to ACWD

or SFPUC directly. The partner agencies are continuing to work together to discuss and refine alternatives for further consideration.

Upcoming Activities

In the coming quarter, partner agencies will identify two alternatives that the consultant team will evaluate and prepare cost estimates for over the next several months.

2.1.3 Crystal Springs Purified Water (PREP)

Project Partners & Interests

SFPUC	Silicon Valley Clean Water
	City of San Mateo
Increase Dry Year Supply or Supply for San Jose / Santa Clara	Reduce Bay discharges
Cal Water	BAWSCA
	Redwood City
Develop local supplies	Increase dry year supply

Project Background

The Crystal Springs Purified Water (also referred to as the Potable Reuse Exploratory Plan or PREP) Project is a purified water project that could provide 6-12 mgd of water supply through reservoir water augmentation at Crystal Springs Reservoir, which is a facility of the RWS. Treated wastewater from Silicon Valley Clean Water (SVCW) and/or the City of San Mateo would go through an advanced water treatment plant to produce purified water that meets state and federal drinking water quality standards. The purified water would then be delivered via pipeline 10-20 miles (depending on the alignment) to Crystal Springs Reservoir, blended with regional surface water supplies and treated again at Harry Tracy Water Treatment Plant. Early studies analyzed the feasibility of treatment and distribution and provided feasible scenarios for institutional structure and costs.

Current Planning Considerations

To evaluate the merits of the project as a water supply to meet dry year needs, the SFPUC will need to answer the following near-term planning questions:

- 1) What is the preferred operational scenario for the project?
- 2) How will a new water supply in Crystal Springs Reservoir affect water quality and operational needs of the RWS?

- 3) What are the feasible alternatives to delivery through Crystal Springs Reservoir? How do the costs and benefits of the alternatives compare?

To answer these questions, the SFPUC and partner agencies including BAWSCA, Cal Water, Redwood City, SVCW and San Mateo developed a scope of work for Phase 3 of the feasibility study.

Activities This Quarter

In this quarter, the SFPUC, partner agencies and consultant team kicked off the Phase 3 feasibility study. The project team has selected the hydrologic years for modeling the impacts of different alternatives on Crystal Springs Reservoir and DPR alternatives.

Upcoming Activities

Next steps for SFPUC staff include developing the parameters to model the impact of reservoir augmentation at Crystal Springs on the operation of other parts of the Regional Water System and water quality considerations. Meanwhile, the consultant team will identify criteria for evaluating alternatives and begin defining DPR alternatives that will be considered in this phase of work.

2.1.4 Los Vaqueros Reservoir Expansion

Project Partners & Interests

CCWD	ACWD	SFPUC with BAWSCA
EBMUD	Zone 7 Water Agency	
	Valley Water	
Increase water supply reliability	Increase water supply reliability	Increase Dry Year Supply or Supply for San Jose / Santa Clara
San Luis & Delta Mendota Water Authority	Grassland Water District	DWR (State)
		USBR (Federal)
Increase water supply for irrigation	Protect wildlife refuges	Provide approvals and funding

Project Background

The LVE Project is a storage project that will enlarge the existing reservoir located in northeastern Contra Costa County from 160,000 acre-feet to 275,000 acre-feet. While the existing reservoir is owned and operated by CCWD, the expansion will have regional benefits and will be managed by a JPA that will be set up prior to construction. Meanwhile, CCWD is leading the planning, design and environmental review efforts. CCWD’s Board certified the EIS/EIR and approved the LVE Project on May 13, 2020.

The additional storage capacity from the LVE Project would provide a dry year water supply benefit to the SFPUC. However, securing a water supply and ensuring conveyance is available

can both be significant barriers to realizing the full water supply potential of storage for SFPUC customers. In particular, issues related to conveyance have been the focus for SFPUC staff in determining the extent of participation in the LVE project.

Specifically, to better understand the conveyance options and effects related to decision-making for the LVE Project, two subprojects were developed to support this project. These are listed here and described in the subsequent sections:

1. **Conveyance Alternatives** (evaluating conveyance from LVE to RWS facilities);
2. **The Bay Area Regional Reliability (BARR) Partnership Shared Water Access Program (SWAP)**, which is a simulation to evaluate the potential impacts of conveyance from LVE to San Antonio Reservoir within the RWS, as well as an exchange with ACWD.

In addition, water supply options are being considered for storage in LVE. One of these options is the **Brackish Water Desalination Project**, which could be a source of supply as an exchange with CCWD. This project is described separately under the AWS Program.

Current Planning Considerations

The current planning questions driving near-term project activities include:

- 1) Is conveyance through the South Bay Aqueduct a feasible alternative to deliver water either directly, or via exchange, to the SFPUC? If so, under what conditions?
- 2) Are there feasible alternatives to conveyance through the South Bay Aqueduct for the SFPUC?
- 3) What are the water supply options that are available to fill storage in Los Vaqueros Reservoir for the SFPUC? What are the opportunities and constraints associated with water supply?

Activities this Quarter

During this quarter, there have been several significant developments. The updates are grouped in the paragraphs that follow.

Planning and Permitting

The LVE Project partners have fully executed Amendment No. 2 to the Multi-Party Cost Share Agreement, which extends project planning and permitting through 2021. The cost of this extended planning phase is approximately \$6.1 million, shared equally among partners at \$869,000 per partner.

Formation of a Joint Powers Authority (JPA)

The project team has retained outside legal counsel to lead the formation of a JPA. A Legal Work Group representing all project partners continues to work on the JPA agreement. SFPUC representation on the Legal Work Group is through the City Attorney's Office, in close cooperation with SFPUC staff. During the quarter, the Legal Work Group continued to negotiate terms and provisions of the draft JPA such as voting, funding, staffing and withdrawal. JPA formation is expected to be finalized in the Spring-Summer of 2021.

Usage Fees

The LVE Project includes the use of underlying facilities owned by CCWD and EBMUD. Each of these agencies is proposing to assess facility use charges, or usage fees, to recoup proportionate costs of operating and maintaining those facilities. Both CCWD and EBMUD prepared memoranda (in September and October 2020, respectively) describing their methodology for calculating usage fees. While not finalized, CCWD has proposed memorializing the negotiations to date in a Letter of Intent. A pro forma financial model that was developed for the LVE Project in 2019 was updated with current assumptions on usage fees and was presented to the project partners in December and again in late February. SFPUC staff will be reviewing the pro forma model assumptions and details as they pertain to our share of costs.

Upcoming Activities

As shown in Figure 4, there are several key milestones projected in the coming months. In the next quarter, we expect the following activities to take place:

- Updated storage and usage cost allocations
- Letter of Intent on CCWD Usage Fees
- JPA formation
- Identification and preliminary characterization of water supply options
- SFPUC staff recommendation on conveyance and storage

2.1.4.A Conveyance Alternatives

Project Background

The SFPUC is considering two main pathways to move water from storage in a prospective LVE Project to the SFPUC's service area, either directly to RWS facilities or indirectly via an exchange with partner agencies. The first and preferred path is through the South Bay Aqueduct (SBA), and the second pathway is through EBMUD.

The SBA is a 49-mile aqueduct, which is part of the State Water Project, owned by DWR. There are three State Water Project contractors (SBA Contractors) who maintain contract capacity for use of the SBA. They are Zone 7 Water Agency, ACWD, and Valley Water. The SBA is in close

geographical proximity to SFPUC's San Antonio Reservoir and the Sunol Valley Water Treatment Plant. SFPUC staff, in coordination with BAWSCA, have been working with the SBA Contractors to develop a clear understanding of what the maximum potential use of the SBA could be that would be of benefit to the SFPUC and what constraints may exist to achieving those benefits.

Current Planning Considerations

As indicated under the LVE Project, identifying a viable conveyance pathway is critical for the SFPUC's participation. The primary focus of this task has been to understand the capacity within the SBA and evaluate an alternative through EBMUD.

Activities this Quarter

In August 2020, SBA Contractors shared a model to demonstrate available capacity in the SBA under various hydrologic conditions based on their projected demands in 2040. In this quarter, SFPUC and BAWSCA staff have been analyzing the model and have discussed planning assumptions with SBA Contractors. Preliminary analysis shows intermittent available capacity in dry years, when the SFPUC has indicated a need for water supply. The SFPUC is now refining the timing of potential deliveries and considering flow data from DWR to better understand capacity availability and potential risks. Meanwhile, through the Bay Area Regional Reliability Shared Water Access Program (BARR SWAP) effort described in the next section, the SFPUC is also evaluating potential water quality impacts of bringing new water supplies through the SBA into San Antonio Reservoir or the Sunol Valley Water Treatment Plant. Once there is confidence in treatability and available conveyance capacity through the SBA, SFPUC, through the JPA will enter into agreements with DWR regarding the terms and conditions for SBA use.

In addition to direct deliveries to SFPUC facilities, SFPUC staff are also pursuing exchanges with SBA Contractors. ACWD is a Wholesale Customer and the SFPUC shares common customers with Valley Water, including San Jose and Santa Clara. Discussions have been ongoing through this quarter with both agencies regarding potential exchanges. The potential for an exchange with ACWD is being evaluated through the BARR SWAP project described in the subsequent update.

As an alternative to use of the SBA, the SFPUC is also evaluating conveyance pathways through EBMUD. The SFPUC has retained a consultant team that is evaluating three potential alignments for conveyance, which will be completed in Spring 2021. EBMUD and the SFPUC share an emergency intertie through the City of Hayward, so this alternative considers the development of a new non-emergency intertie. Usage fee cost calculations for the LVE Project provide some estimates that are helpful in evaluating this alternative.

Upcoming Activities

In the coming quarter, evaluation of both conveyance alternatives is expected to be completed.

2.1.4.B Bay Area Regional Reliability Shared Water Access Program (BARR SWAP)

Project Background

As part of the BARR Partnership, a consortium of 8 Bay Area water utilities (including ACWD, BAWSCA, CCWD, EBMUD, Marin Municipal Water District (MMWD), SFPUC, Valley Water, and Zone 7 Water Agency) are exploring opportunities to move water across the region as efficiently as possible, particularly during times of drought and emergencies.

The BARR agencies are proposing two separate pilot projects in 2020-2021 through the Shared Water Access Program (SWAP) to test conveyance pathways and identify potential hurdles to better prepare for sharing water during a future drought or emergency. A strategy report identifying opportunities and considerations will accompany these pilot transfers and will be completed in 2021. This work is supported with grant funds from the U.S. Bureau of Reclamation and the participating water agencies.

The first proposed pilot (Pilot 1A) will be a desktop simulation that assumes the existence of some facilities that are currently not in place.

Current Planning Considerations

This simulation will test the conveyance of water from an expanded Los Vaqueros Reservoir through the SBA. The agencies participating in this simulation are the SFPUC, ACWD, and BAWSCA. This BARR SWAP project will help the SFPUC evaluate two aspects of LVE Project feasibility:

- 1) Potential water quality impacts and treatment needs associated with a new water supply through the SBA into San Antonio Reservoir and Sunol Valley Water Treatment Plant; and
- 2) Potential for exchange with ACWD, offsetting demand on the RWS.

Activities this Quarter

In this quarter, the project team collected water quality data from the SFPUC RWS facilities and the SBA. The data was collected and synthesized. Data on invasive species was also collected and analyzed. In this quarter, the project partners also began identifying and evaluating the potential financial implications of an exchange with ACWD from the SBA.

Upcoming Activities

In the next quarter, the project team will complete the water quality and treatability analysis, and will continue to make progress in evaluating the potential financial implications and necessary institutional agreements needed to enable exchanges with ACWD.

2.1.5 Bay Area Brackish Water Desalination

Project Background

The Bay Area Brackish Water Desalination (Regional Desalination) Project is a partnership between CCWD, EBMUD, SFPUC, Valley Water, and Zone 7 Water Agency. The project could provide a new drinking water supply to the region by treating brackish water from CCWD's existing Mallard Slough intake in Contra Costa County. While this project has independent utility as a water supply project, for the current planning effort the SFPUC is considering it as a source of supply for storage in LVE. While the allocations remain to be determined among partners, the SFPUC is considering a water supply benefit of between 5 and 15 mgd during dry year conditions when combined with storage at LVE.

Current Planning Considerations

In the current planning, SFPUC is considering brackish water desalination as a source for storage in LVE. For that scenario, the current planning questions include:

- 1) What are the conditions needed to make an exchange of water to fill SFPUC storage in LVE in wet years possible?
- 2) What are the losses associated with an exchange and related conveyance?
- 3) What are the alternatives to desalination for water supply storage in LVE?

Activities this Quarter

Staff have previously identified some water rights issues associated with exchanges needed to store water from this project in LVE. A decision was made to wait until a planned pilot exchange of Central Valley Project water between Valley Water and CCWD is completed. That pilot is ongoing, so no additional work has resumed for this project.

Upcoming Activities

Next steps will depend on the outcome of the planned Central Valley Project exchange.

2.1.6 Calaveras Reservoir Expansion

Project Background

This storage project envisions the expansion of Calaveras Reservoir to store excess RWS supplies or other source water in wet/normal years. No expansion of water rights from the local watershed is anticipated. With the Calaveras Dam Replacement project in place, Calaveras Dam impounds a capacity of 96,850 acre-feet, or 31 billion gallons of water. Through an expansion, up to an additional 289,000 acre-feet, or 94 billion gallons of additional storage could be realized. Calaveras Reservoir is owned and operated by the SFPUC for the benefit of RWS

customers. Unlike all other regional projects under review in this program, no external partners are anticipated at this time.

Current Planning Considerations

The current planning questions include:

- 1) What is feasible dam raise scenarios for the physical storage structure and what are some preliminary cost estimates?
- 2) What are the conveyance alternatives, including infrastructure and operational considerations, for an expanded Calaveras Reservoir?
- 3) How can different water supply alternatives be integrated to maximize efficient use of expanded storage at Calaveras?

Activities this Quarter

During this quarter, a consultant team helped staff evaluate four potential dam raise scenarios, which is now complete. The analysis indicates that an expansion of the dam at various elevations is technically feasible. A scope of work for the evaluation of conveyance alternatives has been prepared.

Upcoming Activities

The consultant team will begin work on identifying and evaluating conveyance alternatives.

2.2 Upcountry Projects

2.2.1 Groundwater Banking

Project Background

Groundwater banking in the Modesto Irrigation District (MID) and Turlock Irrigation District service areas could be used to provide some additional water supply to meet instream releases in dry years reducing water supply impacts to the SFPUC service area. For example, additional surface water could be provided to irrigators in wet years, which would offset the use of groundwater, thereby allowing the groundwater to remain in the basin rather than be consumptively used. The groundwater that remains in the basin can then be used in a subsequent dry year for irrigation, freeing up surface water that would have otherwise been delivered to irrigators to meet instream flow requirements.

Activities this Quarter

There is no change in status for this project over the reporting period.

Upcoming Activities

Feasibility study of this option is included in the proposed Tuolumne River Voluntary Agreement. Progress on this potential water supply option will depend on the negotiations of the Voluntary Agreement.

2.2.2 Inter-Basin Collaborations

Project Background

Inter-Basin Collaborations could provide net water supply benefits in dry years by sharing responsibility for in-stream flows in the San Joaquin River and Delta more broadly among several tributary reservoir systems. One mechanism by which this could be accomplished would be to establish a partnership between interests on the Tuolumne River and those on the Stanislaus River, which would allow responsibility for streamflow to be assigned variably based on the annual hydrology.

Activities this Quarter

No new development has occurred during this reporting period.

Upcoming Activities

As is the case with Groundwater Banking, feasibility of this option is included in the proposed Tuolumne River Voluntary Agreement.

2.2.3 Dry Year Transfers

Project Background

During the planning and implementation of the Phased WSIP, the SFPUC pursued a long-term agreement to transfer 2 mgd from MID in dry years only. The negotiations were terminated in 2012. Subsequently, the SFPUC has initiated discussions with Oakdale Irrigation District to secure a similar dry year transfer.

Activities this Quarter

No new water transfer developments occurred during this reporting period.

Upcoming Activities

While no transfer has been secured to date, the SFPUC continues to engage in discussions with partners to explore potential transfer opportunities on the Tuolumne River and throughout the San Joaquin Valley.

2.3 Local Projects

2.3.1 *San Francisco Purified Water*

Project Background

The San Francisco Purified Water Project is a concept that envisions providing a new, local drinking water supply in San Francisco. In 2020, the SFPUC successfully completed PureWaterSF, a small-scale research and demonstration DPR project at its headquarters. While much more research and investigation is needed before a project is conceptualized, there is a statewide push to increase reuse and reduce wastewater discharges. With the absence of large remaining non-potable applications and the lack of infrastructure in San Francisco to support other types of potable reuse, San Francisco would have to consider treated water augmentation in which purified water could be blended at one or more of San Francisco's drinking water reservoirs.

Activities this Quarter

In this quarter, staff have developed a scope of work to study the potential for purified water on a citywide basis.

Upcoming Activities

A Task Order to study purified water opportunities and develop a stepwise approach for planning will be initiated in the coming quarter.

2.3.2 *Satellite Recycled Water*

Project Background

The proposed Satellite Recycled Water Project would provide a tertiary recycled water supply to meet the demands of dual-plumbed¹ buildings in San Francisco that do not currently have a non-potable water supply source. This project would provide an appropriate water supply source for non-potable irrigation, as well as commercial and industrial uses not addressed by the Non-Potable Ordinance (NPO).

Activities this Quarter

In this quarter, the consultant team along with SFPUC staff completed an inventory of existing and future dual-plumbed buildings. The team also analyzed water consumption data from existing dual-plumbed buildings, developed non-potable water demands, and prioritized customer groupings. The consultant team summarized these findings in a technical

¹ Dual-plumbing is a plumbing system with two sets of pipes. One set of pipes is designed and used for the transmission of recycled water within buildings and structures, including lateral supply pipelines, and which is separate from any potable water distribution system that complies with all material and construction specifications contained in City codes and other applicable State and Federal laws. There are several dual-plumbed buildings in San Francisco that installed the plumbing to comply with the Recycled Water Ordinance.

memorandum. The consultant team and SFPUC staff worked together to begin coordinating with SFPUC Real Estate to identify potential locations for siting a satellite treatment facility on the east side of San Francisco.

Upcoming Activities

Evaluation of a satellite treatment facility will continue in the next quarter.

2.3.3 Innovations Program

Project Background

This program supports development of new technologies and initiatives to demonstrate the feasibility of atmospheric water generation technology, heat recovery in non-potable systems, expanded leak detection, and breweries treating process water for reuse. Included in the Innovations Program are demonstration of new technologies and grant funds to support partnership opportunities. Examples of projects within the Innovations Program include a grant program to treat process water in breweries and grants to support onsite reuse projects with heat recovery systems. The SFPUC is also pursuing a prospective project to expand leak detection and a project to test atmospheric water generation technology.

Activities this Quarter

In December 2020, SFPUC staff executed a grant agreement with a San Francisco brewery to implement a brewery process water reuse project. Within the reporting period, the SFPUC continued work on contracting to get Zero Mass Water on board for the atmospheric water generation project. SFPUC staff are reviewing a contract and are expecting to execute the contract in the next quarter.

Upcoming Activities

The SFPUC will continue developing projects to demonstrate the potential for water savings and supply with innovations in the coming quarter.

2.3.4 Potable Offset Potential

Project Background

The purpose of this project is to explore the potential to offset the incremental water demand associated with large new developments in San Francisco. Through coordination with other City departments such as the Planning Department and the Department of Building Inspection, the SFPUC will identify options and potable water thresholds that may result in policy recommendations. The first step in the planning process will be to survey proposed developments to determine the volume and characteristics of incremental demand that are not already being offset by the Non-Potable Ordinance or other existing requirements.

Activities this Quarter

A draft report is currently under review.

Upcoming Activities

A final report will be produced in the coming quarter.

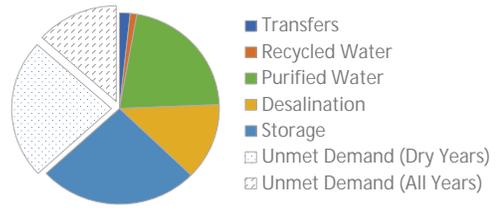
2.4 Project Summaries

In the following pages, single page summaries of each project are provided, along with current planning and development schedules and additional details of each project included in this program.

Summary of Alternative Water Supply Program

Project Description

As the SFPUC prepares to meet demands through the 2045 water supply planning horizon, there is a need to look beyond the traditional surface water supplies of the San Francisco Regional Water System (RWS) and local groundwater sources. The 15 projects under evaluation represent the non-traditional or "alternative" water supply options that we are considering such as expanding storage, groundwater banking, transfers, purified water (potable reuse), desalination, and technological innovations that can increase supply. The need to pursue these supply options stems from the significant water supply needs that the SFPUC faces within the planning horizon and because traditional supplies are increasingly limited. While these needs will continue to evolve over time, our adaptive planning strategy is focused on being able to meet needs when they arise while continuing to provide reliable and sustainable water supply to our retail and wholesale customers.



Potential New Alternative Water Supply Options

General Program Information

Average Annual Supply	Availability
Varies	Varies

SFPUC Budget Information

10-Yr CIP Budget Allocation	Current FY '21 Allocation
\$299.1M	\$18.3M

Total Project Costs

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD

Capital Cost/Acre-Foot

TBD

Programmatic Schedule



Current Status

Planning

Risks and Uncertainties

- Determining incremental water supply benefits
- Integrating new supplies with existing supplies

Benefits

- Potential to meet future water supply needs

18-Month Outlook

- Feasibility studies underway to identify and analyze project concepts

Daly City Recycled Water Expansion

Project Description

This is a recycled water project that will produce up to 3 mgd of tertiary recycled water during the irrigation season (~7 months). On an average annual basis, this is equivalent to 1.25 mgd or 1,400 acre-feet per year. The primary purpose of the project is to provide recycled water to 13 cemeteries and other smaller irrigation customers, offsetting existing groundwater pumping from the South Westside Groundwater Basin (Basin); this will free up groundwater, enhancing the reliability of the Basin. The project is a regional partnership between the SFPUC and Daly City and the irrigation customers are located largely within California Water Service's (Cal Water's) service area. SFPUC Regional Water System customers will benefit from the increased reliability of the South Westside Groundwater Basin for additional drinking water supply during droughts. In this way, this project supports the Regional Groundwater Storage and Recovery Project, which is under construction. This project includes construction of a new two-story treatment facility co-located at Daly City's recycled water treatment plant, approximately 11 miles of 14"-18"-diameter distribution pipelines, 1-2 pump stations and a 2.4 million gallon underground storage tank in Colma. Daly City completed a Mitigated Negative Declaration under CEQA in September of 2017 and 30% design for the project has been completed.



Holy Cross Cemetery Colma, CA

Project Partners

Daly City, Town of Colma, Cal Water and SFPUC

SFPUC Project Manager

YinLan Zhang

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
TBD	Drought and All Years	Recycled Water / Groundwater Offset	Regional	TBD

Total Project Cost

Est. Capital Cost:	\$85.0M	Est. Annual O&M:	\$2.0M
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Institutional Complexity

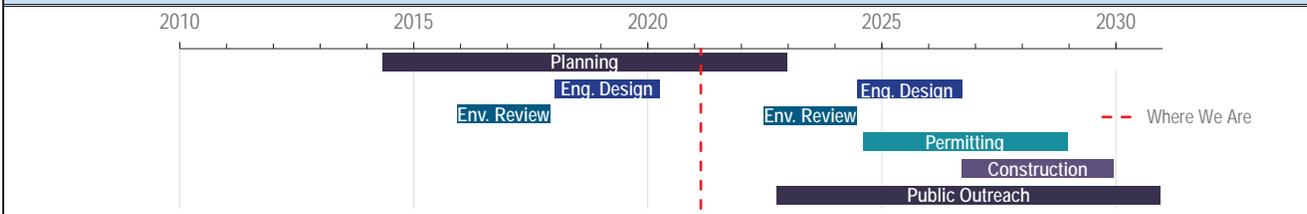
SFPUC Only  Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

SFPUC Budget Information

10-Yr CIP Budget Allocation:	\$85.0M	Current Allocation:	\$2.5M
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Estimated Project Schedule (Not a Baseline Schedule)



Current Status

Planning

18-Month Outlook

- Identify Project ownership and cost structure among Partners (SFPUC, Daly City, Cal Water)
- Evaluate project alternatives
- Develop Term Sheet for project
- Outreach and communication with cemeteries and Colma

Risks and Uncertainties

- Securing customers (cemeteries and others)
- Partner buy-in and involvement
- Finalizing and procuring storage tank location
- Realizing groundwater offset benefits through GSR
- Loss of 1-2 SFPUC retail customers, dependent on negotiations with partners

Benefits

- Reducing reliance of cemeteries on groundwater pumping for irrigation will increase the reliability of the Southwest Groundwater Basin for drinking water supply
- Recycled water supply may be available for additional customers (to be identified)
- Diversifying water supply portfolio
- Replace some potable water used for irrigation with recycled water (0.05 mgd)

Alameda County Water District - Union Sanitary District Purified Water

Project Description

This project will provide a new purified water supply utilizing Union Sanitary District (USD)'s treated wastewater and further treating it through a multi-barrier advanced treatment process to meet or exceed drinking water standards. While the potential volume of supply will be determined through a feasibility evaluation, prior studies indicate the potential for at least 4 mgd of new supply. Purified water produced at USD could be transmitted to the Quarry Lakes Groundwater Recharge Area to supplement recharge into the Niles Cone Groundwater Basin or for other uses in Alameda County Water District's (ACWD's) service area. With the additional water supply to ACWD, an in lieu exchange with the SFPUC would result in more water left in the SFPUC's Regional Water System. Additional water supply could also be directly transmitted to the SFPUC through a new intertie between ACWD and SFPUC. A range of scenarios considering treatment capacity, distribution potential and feasibility are being considered through an evaluation between the three partner agencies.



Quarry Lakes, Alameda County

Project Partners

Union Sanitary District (USD), Alameda County Water District (ACWD) and SFPUC

SFPUC Project Manager

YinLan Zhang

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
TBD	All Years	Purified Water	Regional	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
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Institutional Complexity

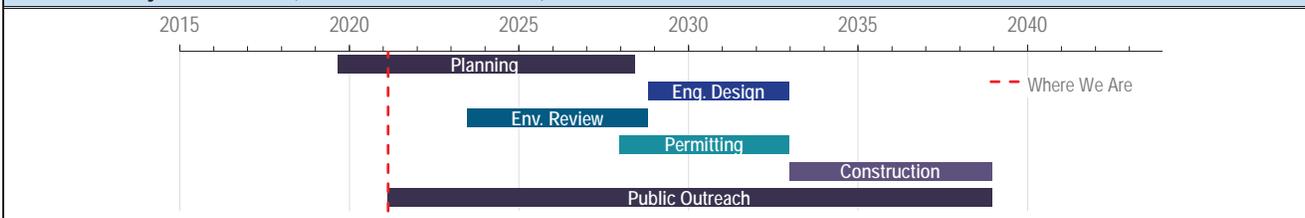
SFPUC Only Multi-Party Partnership

SFPUC Budget Information

10-Yr CIP Budget Allocation:	\$5.0M	Current Allocation:	\$2.5M
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Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

Estimated Project Schedule (Not a Baseline Schedule)



Current Status

Planning

18-Month Outlook

- Partner agencies selecting two alternatives to evaluate
- Prepare cost estimates for alternatives

Risks and Uncertainties

- Potential water quality change to Quarry Lakes

Benefits

- Leverages existing facilities to provide water supply

Crystal Springs Purified Water

Project Description

This is a purified water project that could provide 6-12 mgd of water supply through reservoir water augmentation at Crystal Springs Reservoir in San Mateo County, within the SFPUC's Regional Water System (RWS). Treated wastewater from Silicon Valley Clean Water and/or the City of San Mateo would go through a water purification process that uses multi-barrier treatment technology to meet state and federal drinking water quality standards. The purified water would then be transmitted 10-20 miles (depending on the alignment) to Crystal Springs Reservoir, blended with regional surface water supplies and treated again at Harry Tracy Treatment Plant. In addition to the SFPUC and the wastewater agencies, Cal Water, Redwood City and BAWSCA are also participating in the project. Initial feasibility analyses have been completed. Additional planning, including analysis of feasible operational scenarios, impacts to RWS operations, and the evaluation of Direct Potable Reuse (DPR) alternatives, are needed to further evaluate the feasibility and impacts of this project.



Crystal Springs Reservoir

Project Partners

Silicon Valley Clean Water, City of San Mateo, Cal Water, Redwood City, Bay Area Water Supply and Conservation Agency (BAWSCA) and SFPUC

SFPUC Project Manager

YinLan Zhang

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
TBD	All Years	Purified Water	Regional	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
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Institutional Complexity

SFPUC Only Multi-Party Partnership

SFPUC Budget Information

10-Yr CIP Budget Allocation:	\$4.5M	Current Allocation:	\$2.0M
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Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

Estimated Project Schedule (Not a Baseline Schedule)



Current Status

Planning

18-Month Outlook

- Continue analysis of impacts of new water supply into Crystal Springs Reservoir
- Identify and evaluate Direct Potable Reuse opportunities
- Initiate outreach and develop fact-sheet

Risks and Uncertainties

- Operational and water quality challenges in Crystal Springs Reservoir
- Construction challenges in parts of distribution area
- Water supply during non-drought years would impact operations and storage availability in the Regional Water System

Benefits

- Reduces Bay discharges
- Provides a new drought-resistant water supply

Los Vaqueros Reservoir Expansion

Project Description

The Los Vaqueros Reservoir Expansion (LVE) Project is a storage project that will enlarge the existing reservoir located in northeastern Contra Costa County from 160,000 acre-feet to 275,000 acre-feet. The main objectives of the expansion include increasing water supply reliability for municipal, industrial and agricultural customers as well as ecosystem benefits to south-of-Delta wildlife refuges and Delta fisheries. While the existing reservoir is owned and operated by Contra Costa Water District (CCWD), the expansion will have regional benefits and will be managed by a Joint Powers Authority that will be set up prior to construction. Meanwhile, Contra Costa Water District is leading the planning, design and environmental review efforts. The LVE Project includes construction of new pipelines, upgrades to existing facilities and reoperation of some facilities. Storage in LVE can provide a dry year water supply benefit to the SFPUC's Regional Water System (RWS). Currently, SFPUC staff are pursuing scenarios of 20,000 - 40,000 acre-feet of storage. In addition, water supply and conveyance to the RWS need to be determined before the SFPUC determines the extent of participation in the LVE project. Conveyance Alternatives, Brackish Water Desalination, and BARR simulation are planning efforts that are linked directly to this project.



Los Vaqueros Reservoir

Project Partners

Alameda County Water District (ACWD), CCWD, East Bay Municipal Utility District (EBMUD), SFPUC, Zone 7 Water Agency, and the San Luis Delta Mendota Water Authority

SFPUC Project Manager

Manisha Kothari

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
To be identified in a separate project	Drought and/or All Years	Storage	Regional	TBD

Total Project Cost

Est. Capital Cost:	\$980M	Est. Annual O&M:	TBD
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Institutional Complexity

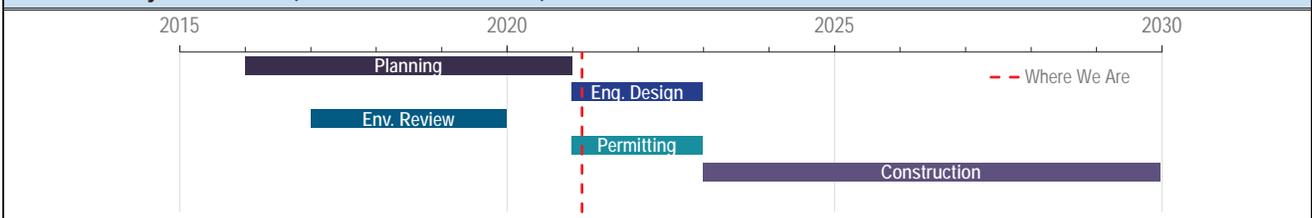
SFPUC Only Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

SFPUC Budget Information

10-Yr CIP Budget Allocation:	\$10.5M	Current Allocation:	\$2.5M
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Estimated Project Schedule (Not a Baseline Schedule)



Current Status	Risks and Uncertainties	Benefits
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<p>Planning; Environmental Review</p> <p>18-Month Outlook</p> <ul style="list-style-type: none"> Update storage and usage cost allocations Letter of Intent of CCWD Usage Fees JPA formation Staff recommendations on conveyance and storage 	<ul style="list-style-type: none"> Capacity and institutional constraints for conveyance to RWS Firm water supply source Depending on conveyance option, water quality and need for pretreatment 	<ul style="list-style-type: none"> Provides operational flexibility, particularly in drier years Allows the SFPUC to manage existing supply more efficiently
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Conveyance Alternatives

Project Description

This project is dependent on the SFPUC's participation in the Los Vaqueros Expansion Project in Contra Costa County. Through this evaluation, SFPUC staff will evaluate the potential mechanism(s) available to transfer or exchange water for the benefit of SFPUC Regional Water System (RWS) customers. The volume of water that can be transferred would be the same volume of water that is stored by SFPUC in Los Vaqueros Reservoir Expansion Project (to be determined).

The three conveyance alternatives that will be explored as part of this project using the South Bay Aqueduct (SBA) include 1) a transfer with ACWD; 2) a transfer with Valley Water; and 3) delivery to San Antonio Reservoir. Partners will include the SBA Contractors (ACWD, Zone 7 Water Agency, Valley Water), particularly any agency identified as a feasible transfer partner. Of the three options along the SBA, only one (delivery to San Antonio) provides a water supply directly into the RWS. Any conveyance option utilizing the SBA will likely include pipeline improvements and may also include pretreatment and/or pumping, depending on the option pursued. Reliability of the SBA is critical to the viability of these options.

In addition to the SBA, SFPUC is also considering other alternatives, including the potential for a new intertie with the East Bay Municipal Utility District (EBMUD).



South Bay Aqueduct

Project Partners

SFPUC and BAWSCA working with SBA Contractors: Alameda County Water District (ACWD), Zone 7 Water Agency, and Valley Water

SFPUC Project Manager

Matt Moses

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
Dependent on water supply	All Years	Transfer	Regional	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
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Institutional Complexity

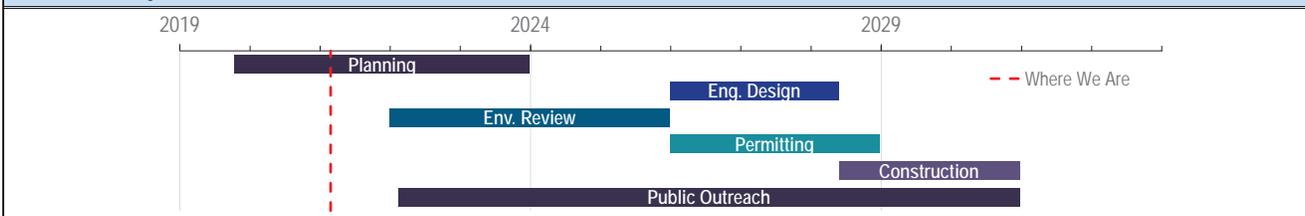
SFPUC Only Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

SFPUC Budget Information

10-Yr CIP Budget Allocation:	\$3.0M	Current Allocation:	\$2.0M
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Estimated Project Schedule (Not a Baseline Schedule)



Current Status

Planning

18-Month Outlook

- Refine conveyance availability, timing and conditions for SFPUC delivery
- Compare conceptual alternatives and costs between SBA conveyance and new intertie with EBMUD

Risks and Uncertainties

- Institutional arrangements / willingness of stakeholders
- Availability of supply
- Availability of SBA capacity

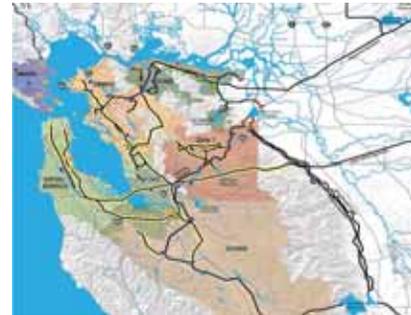
Benefits

- Leverages existing infrastructure

Bay Area Regional Reliability (BARR) Shared Water Access Program (SWAP)

Project Description

In 2016, eight of the Bay Area's largest water utilities formed a partnership to explore opportunities to transfer and exchange water across service areas to better serve customers, particularly in times of droughts and emergencies. The partnership is intended to leverage the existing infrastructure and interconnections that exist between the partnering agencies. The Bay Area Regional Reliability (BARR) Partnership includes the following agencies: 1) Alameda County Water District (ACWD), 2) Bay Area Water Supply & Conservation Agency (BAWSCA), 3) Contra Costa Water District (CCWD), 4) East Bay Municipal Utility District (EBMUD), 5) Marin Municipal Water District (MMWD), 6) the San Francisco Public Utilities Commission (SFPUC), 7) Valley Water (formerly Santa Clara Valley Water District and 8) Zone 7 Water Agency.



BARR Service Areas

The BARR Partnership has received two grants from the US Bureau of Reclamation to support for collaborative drought planning. A Drought Contingency Plan was completed in 2017. Currently, the BARR Partnership is planning to test water transfer scenarios through a Shared Water Access Program (SWAP) so that future transfers can be implemented more readily in times of drought or emergency. The SFPUC is participating in a water transfer simulation with ACWD and BAWSCA that would simulate the use of the South Bay Aqueduct (SBA) for an exchange with ACWD and a transfer into San Antonio Reservoir.

Project Partners

SFPUC and BAWSCA working with SBA Contractors: Alameda County Water District (ACWD), Zone 7 Water Agency, and Valley Water

SFPUC Project Manager

Manisha Kothari

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
Dependent on water supply	Drought Years	Conveyance/Transfer	Regional	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
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Institutional Complexity

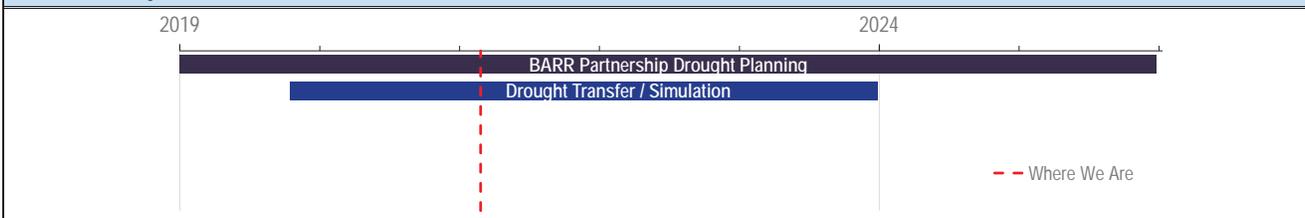
SFPUC Only Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

SFPUC Budget Information

CIP Budget Allocation:	\$0.3M
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Estimated Project Schedule (Not a Baseline Schedule)



Current Status

Conceptual

18-Month Outlook

- Conduct water transfer simulation through SBA, considering operational, water quality, financial and legal impacts
- Conduct water quality analysis
- Prepare draft executable agreement
- Incorporate stakeholder input in strategy report development

Risks and Uncertainties

- Institutional arrangements / willingness of stakeholders

Benefits

- Encourages regional water supply planning and collaboration
- Leverages existing infrastructure

Bay Area Brackish Water Desalination (Regional Desalination)

Project Description

The Bay Area Brackish Water Desalination (Regional Desalination) Project is a partnership between Contra Costa Water District (CCWD), SFPUC, Valley Water, and Zone 7 Water Agency. East Bay Municipal Utility District (EBMUD) and the Alameda County Water District (ACWD) may also participate. The project could provide 10-20 mgd of new drinking water supply to the region by treating brackish water from CCWD's existing Mallard Slough intake in Contra Costa County. The project relies primarily on available capacity in an extensive network of existing pipelines and interties that already connect the agencies, as well as existing wastewater outfalls and pump stations. The new infrastructure needed for this project includes a treatment facility and upgrades to existing facilities. Zone 7 Water Agency would likely need a new intertie with EBMUD. Depending on the conveyance system used, additional pretreatment and/or facility upgrades may be needed.



Bay Delta Wetland

Early planning studies conducted between 2003-2015 assumed that the project would provide a steady water supply of 9 mgd to the SFPUC in all years; however, the SFPUC is currently seeking drought year supply via storage in Los Vaqueros Reservoir from this project. The final volume share will be subject to negotiation with other partners. The SFPUC would not directly receive desalinated water, but would take delivery of water through a series of transfers and exchanges.

Project Partners

Contra Costa Water District (CCWD), East Bay Municipal Utility District (EBMUD), Valley Water, Zone 7 Water Agency and SFPUC

SFPUC Project Manager

Manisha Kothari

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
TBD	Dry Years (with storage) and/or All Years	Desalination / Transfers	Regional	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
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Institutional Complexity

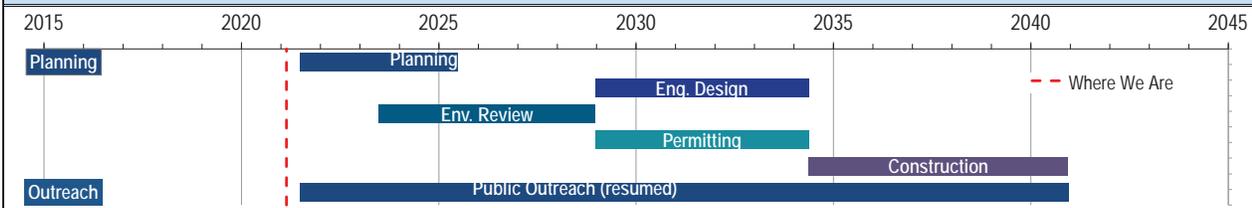
SFPUC Only Multi-Party Partnership

SFPUC Budget Information

10-Yr CIP Budget Allocation:	\$5.0M	Current Allocation:	\$1.5M
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Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

Estimated Project Schedule (Not a Baseline Schedule)



Current Status

Planning

18-Month Outlook

- Project paused until a planned pilot exchange is completed.
- Determine next steps based on outcome of planned Central Valley Project exchange.

Risks and Uncertainties

- Some impacts to sensitive fish may be unavoidable
- Water rights and permitting likely to be challenging
- Conveyance options are limited to transfer water to Regional Water System

Benefits

- Availability during dry years
- Lower GHG emissions than seawater desalination
- Leverages existing infrastructure
- Storage option in Los Vaqueros provide dry year benefits

Calaveras Reservoir Expansion

Project Description

This storage project envisions the expansion of Calaveras Reservoir to store excess Regional Water System (RWS) supplies or other source water in wet/normal years. No expansion of water rights from the local watershed is anticipated. With the Calaveras Dam Replacement project in place, Calaveras Dam holds a capacity of 96,850 acre-feet, or 31 billion gallons of water. Through an expansion, up to an additional 289,000 acre-feet, or 94 billion gallons of storage could be realized. Calaveras Reservoir is owned and operated by the SFPUC for the benefit of RWS customers. No external partners are anticipated at this time. The expansion of Calaveras Reservoir would provide storage for additional water that can be available in all water year types. The proposed project would include raising the dam, increasing the capacity of the outlet structures and the spillway, and the addition of any transmission and pumping needed to bring water to Calaveras Reservoir. Constraints including water availability and conveyance will need to be evaluated.



Calaveras Reservoir

Project Partners

SFPUC Only

SFPUC Project Manager

Susan Hou

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
N/A	Drought Years and/or All Years	Local Storage	Regional	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
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Institutional Complexity

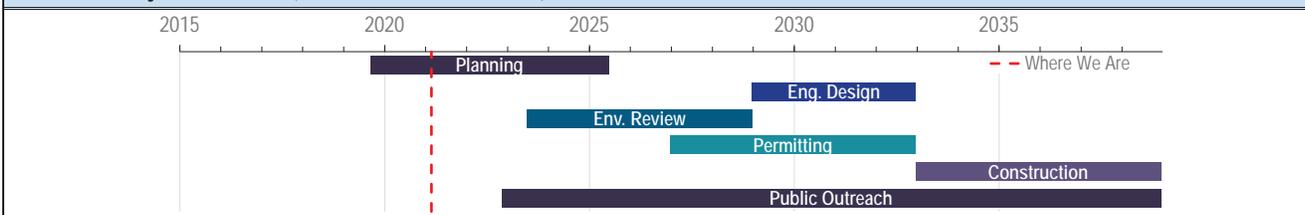
SFPUC Only	Multi-Party Partnership
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SFPUC Budget Information

10-Yr CIP Budget Allocation:	\$3.5M	Current Allocation:	\$2.5M
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Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

Estimated Project Schedule (Not a Baseline Schedule)



Current Status

Planning

18-Month Outlook

- Consultant team identifying and evaluating conveyance alternatives

Risks and Uncertainties

- Availability of additional water from the Tuolumne River to divert to storage

Benefits

- Provides operational flexibility, particularly in dry years
- Increases storage capacity in the SFPUC's largest reservoir
- Increases utilization of Tuolumne River and other wet/normal year supply

Groundwater Banking

Project Description

Groundwater banking in the Modesto Irrigation District and Turlock Irrigation District (the Districts) service areas could be used to provide some additional water supply to meet instream releases in dry years reducing water supply impacts to the SFPUC service area. For example, additional surface water could be provided to irrigators in wet years, which would off-set the use of groundwater, thereby allowing the groundwater to remain in the basin rather than be consumptively used. The groundwater that remains in the basin can then be used in a subsequent dry year for irrigation, subsequently freeing up surface water that would have otherwise been delivered to irrigators to meet instream flow requirements.



Irrigation in MID service area

Feasibility study of this option is included in the proposed Tuolumne River Voluntary Agreement.

Project Partners

MID and TID
Groundwater users within the MID/TID service areas that also receive surface water deliveries from the Districts

SFPUC Project Manager

Ellen Levin and Michael Carlin

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
Unknown	Drought Years	Groundwater / Storage	Regional	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
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Institutional Complexity

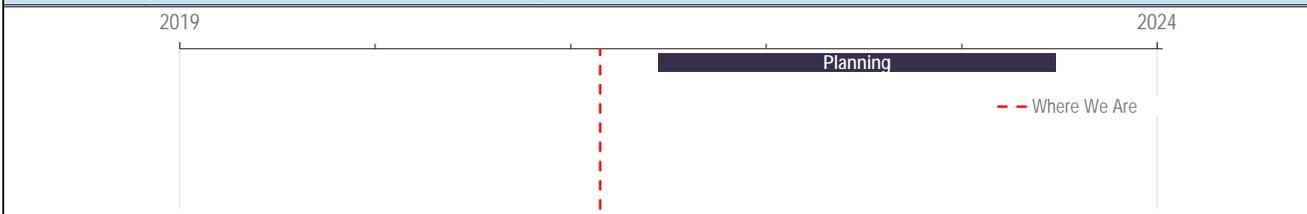
SFPUC Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

SFPUC Budget Information

CIP Budget Allocation:	\$0.0M	
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Estimated Project Schedule (Not a Baseline Schedule)



Current Status

Conceptual

18-Month Outlook

- Evaluate next step based on negotiations of Tuolumne River Voluntary Agreement

Risks and Uncertainties

- Institutional challenges relating to water rights and basin management

Benefits

- Additional storage, with availability in dry years

Inter Basin Collaborations

Project Description

Inter-Basin Collaborations could provide net water supply benefits in dry years by sharing responsibility for in-stream flows in the San Joaquin River and Delta more broadly among several tributary reservoir systems. One mechanism by which this could be accomplished would be to establish a partnership between interests on the Tuolumne River and those on the Stanislaus River, which would allow responsibility for streamflow to be assigned variably based on the annual hydrology. The Tuolumne system tends to spill more excess flow in wetter years than the Stanislaus, and this excess flow could be shaped and credited to meet Stanislaus system requirements, while New Melones Reservoir in the Stanislaus system is refilling. Then the stored water could be partially used to provide required streamflow to meet Stanislaus and Tuolumne requirements in future dry years.

Inter-Basin Collaborations could also include groundwater banking, utilizing the connections between the OID and MID surface water service areas.

Feasibility study of this option is included in the proposed Tuolumne River Voluntary Agreement. Any collaboration would need to protect the interests of all participants.



Reservoirs on the tributaries to the San Joaquin River

Project Partners

Tuolumne interests (SFPUC, MID, TID)
 Stanislaus interests (OID, SSJID, USBR)
 Groundwater users that also receive surface water for irrigation

SFPUC Project Manager

Ellen Levin and Michael Carlin

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
TBD	Varies	Storage or Exchanges	Regional	Unknown

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
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Institutional Complexity

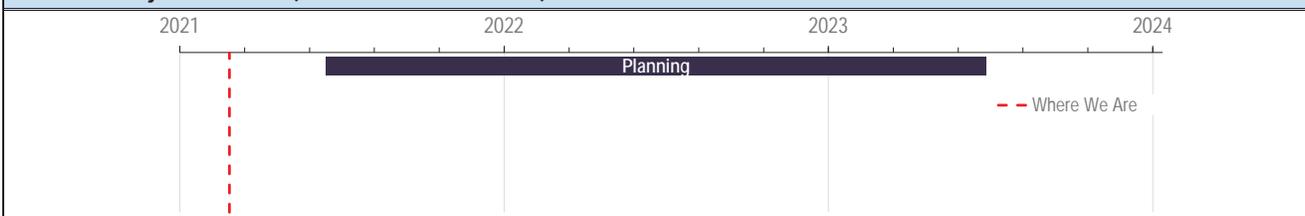
SFPUC Only Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

SFPUC Budget Information

CIP Budget Allocation:	N/A
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Estimated Project Schedule (Not a Baseline Schedule)



Current Status	Risks and Uncertainties	Benefits
Conceptual	<ul style="list-style-type: none"> • Collaboration will require agreements and operational changes among many public and private parties 	<ul style="list-style-type: none"> • Better management of basins can lead to greater regional water supply availability • Water supply and environmental benefits
18-Month Outlook <ul style="list-style-type: none"> • Meeting with other parties to be scheduled pursuant to Voluntary Agreement negotiations 		

Dry Year Transfers - Districts

Project Description

In 2008, the SFPUC Commission adopted the Water System Improvement Program (WSIP) Phased Variant to ensure that the SFPUC could continue to reliably meet the projected needs of its customers through 2030. One element of WSIP Phased Variant was a drought year water transfer. Coupled with the Regional Groundwater Storage and Recovery Project (GSR), this project was intended to ensure drought reliability in the planning horizon. The SFPUC pursued a long-term agreement to transfer 2 mgd from Modesto Irrigation District (MID) in drought years. However, the negotiations were terminated in 2012. Subsequently, SFPUC staff initiated discussions with the Oakdale Irrigation District (OID) to secure a similar drought year transfer. While no transfer has been secured to date, the SFPUC continues to pursue discussions with partners to explore potential transfer opportunities on the Tuolumne River and throughout the San Joaquin Valley.



Don Pedro Reservoir

Project Partners

SFPUC
Oakdale Irrigation District
Modesto Irrigation District

SFPUC Project Manager

Ellen Levin and Michael Carlin

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
TBD	Drought Years	Transfer	Regional	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
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Institutional Complexity

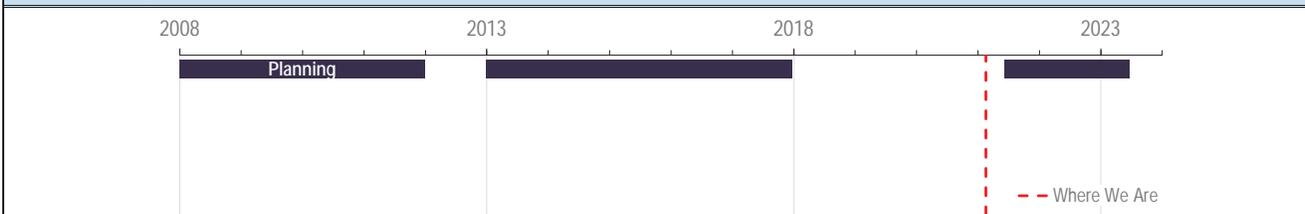
SFPUC Only Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

SFPUC Budget Information

CIP Budget Allocation:	TBD
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Estimated Project Schedule (Not a Baseline Schedule)



Current Status	Risks and Uncertainties	Benefits
Conceptual	<ul style="list-style-type: none"> Institutional arrangements / willingness of stakeholders Availability of supply 	<ul style="list-style-type: none"> Leverages existing supply and existing infrastructure
18-Month Outlook <ul style="list-style-type: none"> Resume discussions with Districts 		

San Francisco Purified Water

Project Description

The San Francisco Purified Water Project is a concept that envisions providing approximately 5 million gallons per day of new, local drinking water supply in San Francisco. The project would treat secondary effluent sourced from one of San Francisco's wastewater treatment plants through a multi-stage, multi-barrier advanced treatment process to produce water that meets state and federal drinking water standards. The treated water would then be blended at one or more of San Francisco's drinking water reservoirs. This treatment and distribution process is referred to as treated water augmentation, and State regulations are still under development (anticipated by 2023). The SFPUC would have no external partners in developing the project infrastructure, but close coordination with regulators, other utilities contemplating similar projects, and our communities will be very important throughout the planning and development of this project.



Southeast Treatment Plant

Before engaging in project planning, SFPUC conducted initial research and testing around water quality, process reliability, and operational needs for purified water opportunities. Initial outreach with staff and local communities was also carried out. This building-scale research project (PureWaterSF) was completed in 2020 with grant support from the U.S. Bureau of Reclamation and the Water Research Foundation. Data revealed that the treatment processes operated as anticipated. A feasibility study will be conducted to identify potential size, scale and other next steps. Additional, larger-scale research, testing, training and outreach is also anticipated.

Project Partners

SFPUC only

SFPUC Project Manager

Manisha Kothari

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
5 mgd	All Years	Purified Water	Local	TBD

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	TBD
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Institutional Complexity

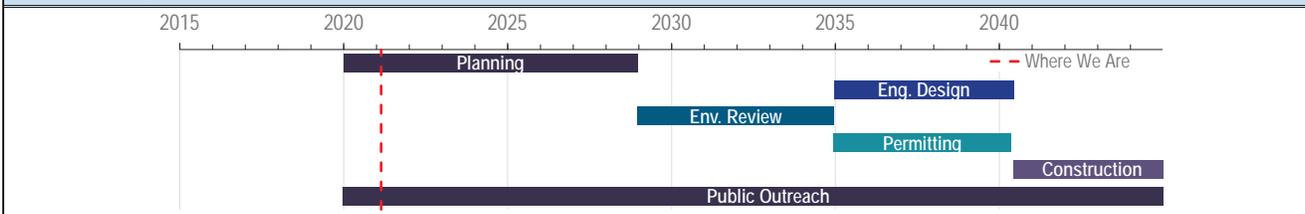
SFPUC Only Multi-Party Partnership

SFPUC Budget Information

10-Yr CIP Budget Allocation:	\$5.5M	Current Allocation:	\$0.5M
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Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

Estimated Project Schedule (Not a Baseline Schedule)



Current Status

Research / Conceptual

18-Month Outlook

- Study purified water opportunities
- Develop a stepwise approach for planning

Risks and Uncertainties

- Regulatory framework not in place until after 2023
- Need for additional testing, analysis and study
- Public perception

Benefits

- Reduces Bay discharges
- Takes advantage of treated recycled water availability

Innovations Program

Project Description

This program supports development of new technologies and initiatives to demonstrate the feasibility of atmospheric water generation, heat recovery systems in non-potable systems, expanded leak detection, and breweries treating process water for reuse. Included in the Innovations Program are demonstration of new technologies and grant funds to support partnership opportunities. Examples of projects within the Innovations Program include grant funding to support the reuse of process water in breweries, and onsite reuse projects with heat recovery systems. The SFPUC is also testing leak detection technologies and will pilot the use of atmospheric water generation technology locally.



Fog on Golden Gate Bridge

Project Partners

Various

SFPUC Project Manager

Paula Kehoe

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
Varies	Varies	Local	Local	N/A

Total Project Cost

Est. Capital Cost:	TBD	Est. Annual O&M:	N/A
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Institutional Complexity

SFPUC Only Multi-Party Partnership

SFPUC Budget Information

CIP Budget Allocation:	\$0.5M
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Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

Estimated Project Schedule (Not a Baseline Schedule)



Current Status

Planning; Pilot Testing

18-Month Outlook

- Continue developing projects to demonstrate potential for water savings and supply

Risks and Uncertainties

- Individual projects may be small, making them costly

Benefits

- Identifies new technology opportunities to increase efficiency and water availability

Potable Offset Potential

Project Description

The purpose of this project is to evaluate the potential to offset the incremental water demand associated with large new developments in San Francisco. Through coordination with other City departments such as Planning and the Department of Building Inspection, the SFPUC will identify options and potable water thresholds that may result in policy recommendations. The first step in the planning process will be to survey proposed developments to determine the volume and characteristics of incremental demand that are not already being offset by the Non-Potable Ordinance or other existing requirements. This is a local demand-side management measure that aims to limit the need for additional water supplies in San Francisco.



San Francisco Skyline Looking Past Bay Bridge

Project Partners

SFPUC and other City departments

SFPUC Project Manager

Taylor Chang

General Project Information

Average Annual Supply	Availability	Supply Type	Local or Regional?	Capital Cost/Acre-Foot
Unknown	All Years	Non-Potable Water / Potable Offset	Local	N/A

Total Project Cost

Est. Capital Cost:	Not yet known	Est. Annual O&M:	None
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Institutional Complexity

SFPUC Multi-Party Partnership

Institutional complexity is a relative measure that takes into account project service area, project facilities ownership, number of project partners, cost share, and whether SFPUC is construction and design lead.

SFPUC Budget Information

CIP Budget Allocation:	\$0.03M
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Estimated Project Schedule (Not a Baseline Schedule)



Current Status	Risks and Uncertainties	Benefits
Planning	<ul style="list-style-type: none"> Cost to developers and/or property owners of implementation 	<ul style="list-style-type: none"> Limits or eliminates demand from new developments
18-Month Outlook		
Finalize report		

Section 3. Program Fundamentals

3.1 Introduction

(updated March 2021)

This section includes background information on the Alternative Water Supply (AWS) Program and is intended to serve as a program reference. Sections include information on how the AWS Program was established, program goals, planning priorities, program schedules, and information on resources for program administration such as staffing, funding, and contracting. Much of the information included in this section will be the same from one quarterly report to the next. However, new information may occasionally be added to the section, and useful information presented in the upfront sections of previous quarterly reports may be moved into this section from time to time. When new information is added, or if significant updates are made to previously included background information, the sections will be marked as “updated”.

3.2 Purpose of the Program

As the SFPUC prepares to meet demands through the 2045 water supply planning horizon, there is a need to look beyond the traditional surface water supplies of the San Francisco Regional Water System (RWS) and local groundwater sources. The Alternative Water Supply program was established to evaluate non-traditional or “alternative” water supply options such as expanding storage, groundwater banking, transfers, purified water (potable reuse), desalination, and technological innovations that can increase supply.

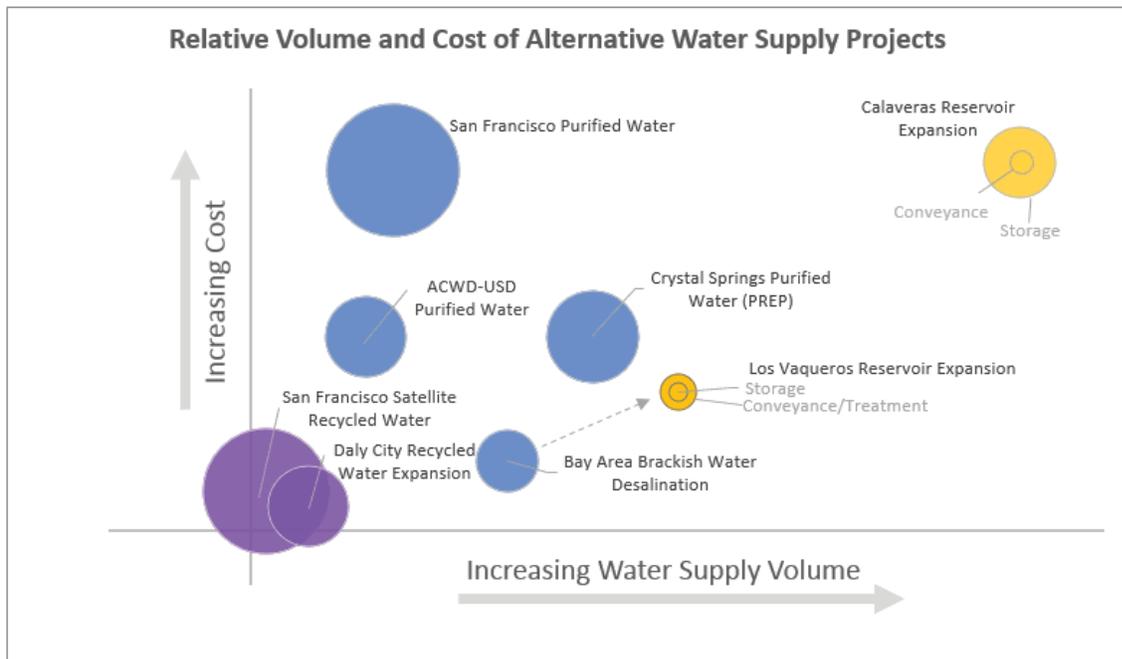
There are 15 projects listed as part of the SFPUC’s Alternative Water Supply program. While they all support the SFPUC’s goal of balancing future water needs, they are not all water supply projects. The projects that can provide direct water supply benefits and are currently being evaluated include four regional water supply projects, two regional storage expansion projects, and two local water supply projects in San Francisco.

In addition to regional and local water supply projects, the Alternative Water Supply program includes the evaluation of supporting and complementary infrastructure to meet future water supply needs. Included in this category are one evaluation of conveyance to deliver new supplies, one simulation of a transfer that can provide insight into the feasibility of a new water supply and exchange opportunities, and two projects to explore new ways of increasing supply or offsetting demand increases in San Francisco. Studies are underway to evaluate all these projects. Finally, there are also three additional water supply projects that would require partnerships with Irrigation Districts on the Tuolumne and/or Stanislaus Rivers (referred to here as upcountry projects). These projects may be analyzed in the coming months, in conjunction

with negotiation efforts with the State on the Bay Delta Water Quality Control Plan (Bay-Delta Plan). The upcountry projects are described in these quarterly reports, and more information will be provided on their development as it becomes available.

The SFPUC is still in the early stages of planning and significant uncertainties about cost, volume and timing of supply availability remain. However, all the projects under consideration will require significant capital investments and ongoing operations and maintenance support. Storage projects can provide significant water supply volume and can be operated to maximize dry year deliveries when the SFPUC's anticipated needs are greatest, but they require water supply. Desalination and potable reuse projects offer supplies in the range of 5-12 mgd each, but will likely have significant permitting, water rights and other regulatory considerations. They are also more difficult to operate intermittently for dry year supply. The lowest-cost projects being considered will likely be the non-potable supply projects, but non-potable demands are increasingly limited, particularly in San Francisco. The tradeoffs associated with projects and other technical, institutional, operational and financial considerations will continue to be studied and reported on through the planning phase of project development for the Alternative Water Supply projects.

The relative volume and cost of the alternative water supply projects are shown in the figure below. Purple dots represent non-potable supply projects, blue dots represent potable supply projects, and yellow dots represent storage projects.



Dot size is an indicator of relative \$/AF costs. The sizes are intended for illustrative purposes only, as project-specific costs are still being developed.

Purple dots represent non-potable supply projects. **Blue dots** are for potable supply projects. **Yellow dots** represent storage projects.

3.3 Planning Needs, Priorities and Service Objectives

The need to pursue these alternative water supply options stems from the significant water supply needs that the SFPUC faces within the planning horizon and because traditional supplies are increasingly limited. While these needs will continue to evolve over time, our adaptive planning strategy is focused on being able to explore and plan a diverse set of water supply options to meet needs when they arise while continuing to provide reliable and sustainable water supply to all our retail and wholesale customers.

Among the water supply needs before the SFPUC, the most significant is represented by the need to make up for new instream flow requirements on the Tuolumne River. In December of 2018, the State Water Resources Control Board (State Board) adopted amendments to the Bay-Delta Plan. For the SFPUC, the effect of this action is a requirement to leave 40% of unimpaired flows in the Tuolumne River to achieve fishery improvements in the Bay-Delta system. SFPUC staff determined that the water supply impact of this new flow requirement in the Tuolumne River would be approximately 93 million gallons per day (mgd) during dry years at our contract levels of demand.

The SFPUC is pursuing litigation against the State Board and is simultaneously seeking a compromise solution through a Voluntary Agreement with the State of California. We are hopeful that this will result in a smaller gap during dry year conditions than what is currently anticipated. In the meantime, water supply projects take years and even decades to plan and implement. Complexities of implementing alternative water supply projects can require even longer lead times for planning than traditional water supply projects. Thus, there is an urgency to plan new water supply opportunities that provide dry year reliability so that we can continue to meet our highest priority needs and our Level of Service (LOS) Goals and Objectives.

In our planning framework, water supply needs will be met in order of priority. These planning priorities, which were first articulated for the Commission in August 2016, have been slightly modified over time and are expressed as follows:

1. Offset instream flow needs and meet regulatory requirements (*obligatory*)
2. Meet existing obligations to existing permanent customers (*obligatory*)
3. Make interruptible customers permanent (*policy decision*)
4. Meet increased demands of existing and interruptible customers (*policy decision*)

In conjunction with these planning priorities, the SFPUC considers how well we can achieve our LOS Goals and Objectives related to water supply and sustainability when considering new water supply opportunities. The key LOS Goals and Objectives relevant to this effort can be summarized as:

- Meet dry-year delivery needs while limiting rationing to a maximum 20 percent system-wide reduction in water service during extended droughts
- Diversify water supply options during non-drought and drought periods
- Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers
- Meet, at a minimum, all current and anticipated legal requirements for protection of fish and wildlife habitat
- Maintain operational flexibility (although this LOS Goal was not intended explicitly for the addition of new supplies, it is applicable here)

Together, the planning priorities and LOS Goals and Objectives provide a lens through which we consider the water supply options and opportunities as we strive to meet all our foreseeable water supply needs. Developed in line with this framework, the current planning effort and the focus of the Alternative Water Supply program is on meeting the following needs:

Water Supply Need	Timing of Supply Shortfall	Volume (mgd)
Dry Year Transfers	Drought (near-term)	2
SUBTOTAL Water Supply Needs, WSIP Carryover		2
Instream Flow Obligations - San Mateo Creek	Drought (near-term)	3 ¹
Instream Flow Obligations - Tuolumne River ²	Drought (near-term)	93
SUBTOTAL Instream Flow Obligations		96
San Jose & Santa Clara (Historical Demand)	All Years	9
San Jose & Santa Clara (Additional Demand - 2028)	All Years	6.5
Anticipated Demand Increase	All Years	TBD
SUBOTAL Customer Demands		>15.5
Total Drought (Near-Term) Needs		98
Total All Year Needs		>15.5
TOTAL NEEDS		113.5

(footnote 2 updated March 2021)

¹ Flow release averaged over wet and dry years is 3.5 mgd; however, the average over dry years is 3 mgd

² SFPUC's estimated contribution to an environmental flow obligation associated with the Bay Delta Water Quality Control Plan in average annual terms, calculated over the design drought

3.4 Making San Jose and Santa Clara Permanent Customers

(updated March 2021)

Currently, the Cities of San Jose and Santa Clara are interruptible customers of the SFPUC. While the SFPUC has never interrupted water supply to San Jose and Santa Clara, the 2009 Water Supply Agreement (WSA) with the Wholesale Customers allows the SFPUC to issue a conditional notice of termination of supply if sufficient long-term water supplies from the RWS

are not available. As customer demands increase and uncertainties loom regarding future water supply availability, San Jose and Santa Clara would like to become permanent customers of the SFPUC. Permanent status would give San Jose and Santa Clara the ability to guarantee water supply availability to support planned growth in the northern portion of each of these cities.

For San Jose and Santa Clara to become permanent customers of the SFPUC, an additional 9 mgd of new, year-round supplies would be needed to meet historic demand levels and up to 15.5 mgd would be needed to meet planned demand through 2040.

Customer	Historic Demand	Projected Demand
San Jose	4.5 mgd	9 mgd
Santa Clara	4.5 mgd	6.5 mgd

Under the 2009 Water Supply Agreement with Wholesale Customers, as amended, the SFPUC is committed to making a decision about whether to make San Jose and Santa Clara permanent customers by December 31, 2028. In order to give San Jose and Santa Clara permanent status, the SFPUC would have to identify specific water supplies based on which to provide individual supply guarantees at the combined historic level of 9 mgd. Environmental review for the identified project(s) should be complete for the SFPUC to be able to select water supply alternatives to implement.

Through the evaluation of alternative water supplies, the SFPUC intends to identify supplies that can meet anticipated dry year needs and help the SFPUC Commission make a policy decision regarding permanent status for San Jose and Santa Clara by 2028.

3.5 New Alternative Water Supplies

(updated March 2021)

While the RWS will remain the backbone of the SFPUC’s wholesale and retail supply into the future, stresses on that system and new water supply needs require that we consider alternative water supplies and creative and sustainable new solutions within the planning horizon to remain resilient and fully meet our needs. In addition to the opportunities identified, SFPUC staff are also continuing to seek more options. The new supply categories that are being used for the AWS planning effort are described in the paragraphs below.

Storage (volume dependent on supply availability and conveyance). Both surface water and groundwater storage provide opportunities to hold water when we have it so that it can be available when we need it most (dry years). The amount of water storage we can use is dependent on the amount of additional supplies that could be secured as well as the capacity of the conveyance facilities that connect storage to our distribution system. The Calaveras

Reservoir Expansion Project and the Los Vaqueros Reservoir Expansion (LVE) Project would provide new storage opportunities. The Daly City Recycled Water Expansion Project would offset groundwater pumping in Colma, leaving more groundwater in the South Westside Basin, supporting the reliability of the ongoing Groundwater Storage and Recovery (GSR) Project during dry years. In addition, the SFPUC is exploring opportunities for inter-basin collaborations and regional groundwater banking in the Tuolumne River watershed. Expanding the capacity of Hetch Hetchy Reservoir was considered but is not being pursued in the planning horizon at this time.

Dry Year Transfers (~2 mgd). A transfer of water from another agency utilizing existing facilities during dry years would be an ideal way to efficiently utilize existing water supplies. However, during droughts is when there is a significant shortage in water supply, so securing dry year transfers has proven difficult in the past due to institutional complexities. We are continuing to pursue all feasible opportunities.

Purified Water (Potable Reuse) (~10-25 mgd). Potable reuse is the process by which treated effluent from a wastewater treatment plant undergoes advanced treatment, including filtration, reverse osmosis, disinfection and advanced oxidation, to produce purified water (the product) that that can be compared to drinking water standards. Depending on the nature of the project, this purified water can be used to augment surface water supplies, recharge a groundwater basin, or be blended in a drinking water reservoir for direct distribution. The latter form of potable reuse (treated water augmentation) is not yet regulated, but expected to be in 2023. Several utilities in California are considering purified water projects.

Unlike dry year transfers or storage projects that can enhance drought period reliability, potable reuse projects are generally designed to be operated in all years, including wet/normal years when use and storage capacity for that water may be limited or unavailable. As we pursue these projects, SFPUC staff continue to look for design and technology solutions for intermittent or scalable use.

Desalination (~5-15 mgd). The Brackish Water Desalination Project could provide 5-15 mgd of new supply for the SFPUC. The proposed project would be located in East Contra Costa County with partners including CCWD, Zone 7 Water Agency and Valley Water. East Bay Municipal Utility District (EBMUD) and ACWD may also participate in the project. Like potable reuse projects, a regional desalination project would likely need to be operated year-round to maintain the integrity of the treatment systems unless scalable design or technology solutions are identified. However, developed in conjunction with the LVE Project, this project could be used to provide greater dry year supply reliability.

3.5.1 Water Supply Programs not included in the AWS Program

(updated March 2021)

In 2008, the SFPUC Commission adopted the Phased Water Supply Improvement Program (WSIP), a variant of the proposed WSIP Program that included 10 mgd of conservation, recycled water and groundwater in San Francisco, and 10 mgd of conservation, recycled water and groundwater in the wholesale service area.

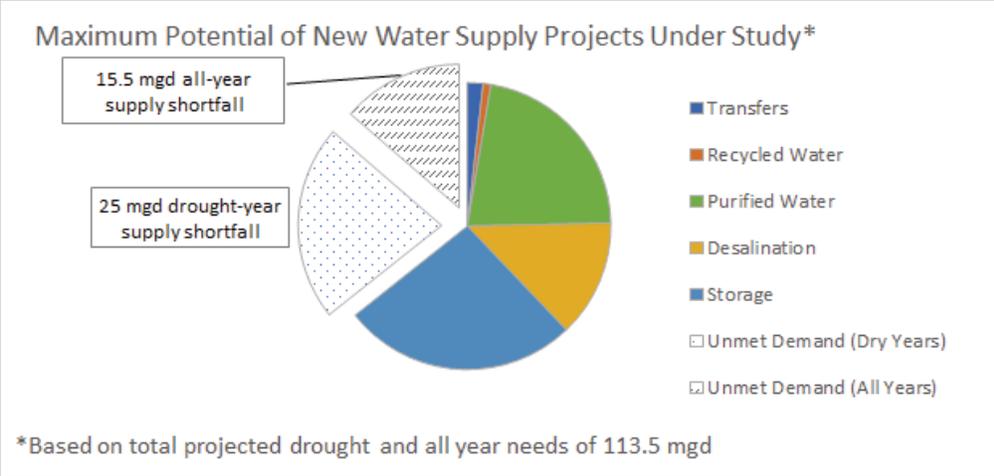
San Francisco is implementing its 10 mgd increment of local supply through the Local Water Supply Program. The program includes the San Francisco Groundwater Supply Project to augment San Francisco's retail water supply with local groundwater, and several recycled water projects, including the Westside Enhanced Water Recycling Project, to provide non-potable water for irrigation. The SFPUC has also implemented conservation programs to minimize both indoor and outdoor retail water demands, resulting in a per capita residential water consumption rate of 42 gallons per person per day, a rate that is half the statewide average.

Individual wholesale customers have implemented active conservation programs in their service areas to maintain low per capita use and are similarly investing in groundwater and water recycling programs to offset potable demands. The SFPUC does not track non-RWS supplies in the wholesale service area; however, we share best practices and coordinate on planning and messaging through BAWSCA and common planning efforts.

It's important to note that the projects identified to meet the 10 mgd local water supply commitments under WSIP were being planned well before the new dry year needs of up to 98 mgd were identified; therefore, they do not count toward meeting our current water supply needs that are the focus of the AWS Program.

3.6 Planning for Implementation

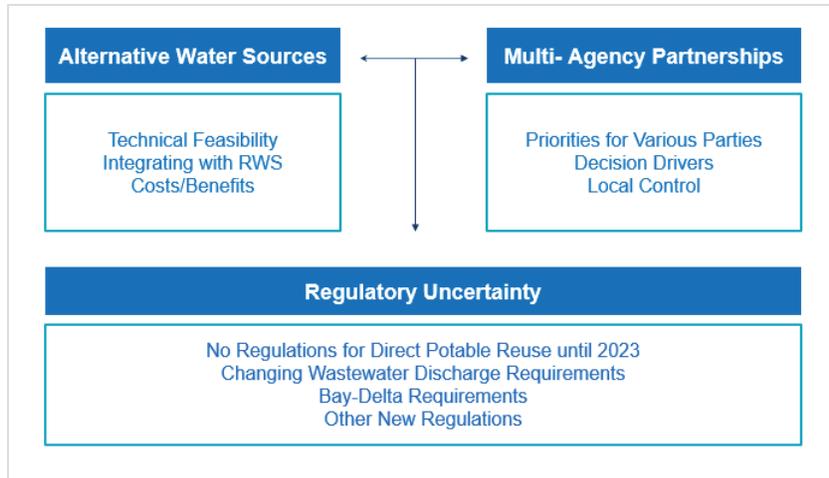
As shown in the figure below, if all the projects identified through the SFPUC's current AWS planning process to date could be implemented, there would still be a supply shortfall of approximately 25% to meet projected demands, and a 35% shortfall to meet dry year demands with San Jose and Santa Clara all-year water supply needs included. Furthermore, each of the supply options being considered has its own inherent challenges and uncertainties that may affect our ability to implement it.



Given the limited availability of water supply alternatives - unless the supply risks are significantly reduced or our needs change significantly - the SFPUC will continue to plan, develop and implement all project, partnership and policy opportunities that can help bridge the anticipated water supply gaps. In 2019 a survey was completed among water and wastewater agencies within the SFPUC service area to try to identify additional opportunities for purified water. Such opportunities remain limited, but staff continue to pursue all possibilities, and water supply options identified here may be augmented over time.

3.7 Trends and Risks

Of the regional water supply options being considered, there is only one (Calaveras Reservoir Expansion) that does not involve multi-party partnerships with institutional complexities. In all other cases, the SFPUC relies on our partner water and wastewater utilities to move forward due to jurisdictions over water sources or infrastructure. Therefore, other agencies' priorities, decision-making processes, funding, and other constraints are also factors in the feasibility, cost, and schedule of these regional projects.



Another risk facing some of the projects is regulatory uncertainty. While the State Board has adopted regulations for some forms of potable reuse, including groundwater injection and surface water augmentation, it has yet to pass regulations concerning direct potable reuse (DPR). Without clear regulatory guidance, projects with DPR components are at risk due to uncertainties concerning water quality criteria, treatment technologies, and overall feasibility.

3.8 Timeframe

(updated March 2021)

Planning remains in the early stages for the proposed Alternative Water Supply projects. Given the level of complexity and uncertainty around implementation, we expect that they will take between 10 and 30 years to implement. As we continue to plan, we will take into account the timing of water supply needs such as implementation of Bay-Delta Plan requirements during the next drought or the decision by 2028 to make San Jose and Santa Clara permanent customers.

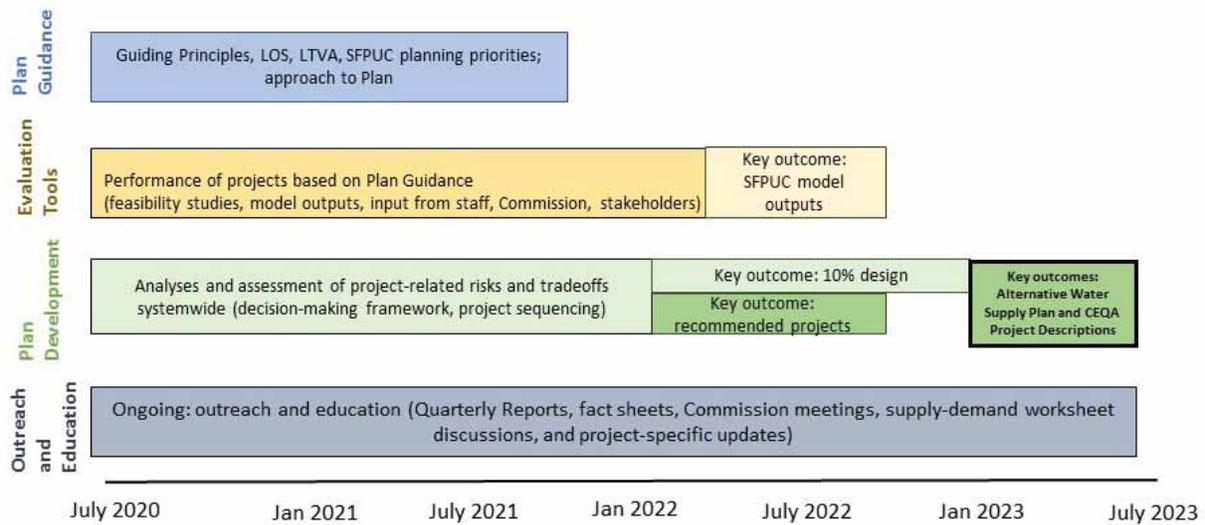
3.9 Moving Toward Environmental Review

(updated March 2021)

As with traditional infrastructure projects, there is a need to progress systematically from planning to environmental review, and then on to detailed design, permitting and construction of these alternative water supply projects. Given the complexity and inherent challenges described in the previous sections, these projects will require a long lead time to develop and implement. However, the SFPUC's dry year needs may be imminent and decisions to make San Jose and Santa Clara must be made by 2028.

SFPUC staff have developed an approach and timeline to substantially complete planning and initiate environmental review by July 2023 for a majority of the alternative water supply projects under consideration. This approach will allow sufficient time for environmental review so that decisions about the permanent status of San Jose and Santa Clara can be made by 2028.

Alternative Water Supply Plan Development Process

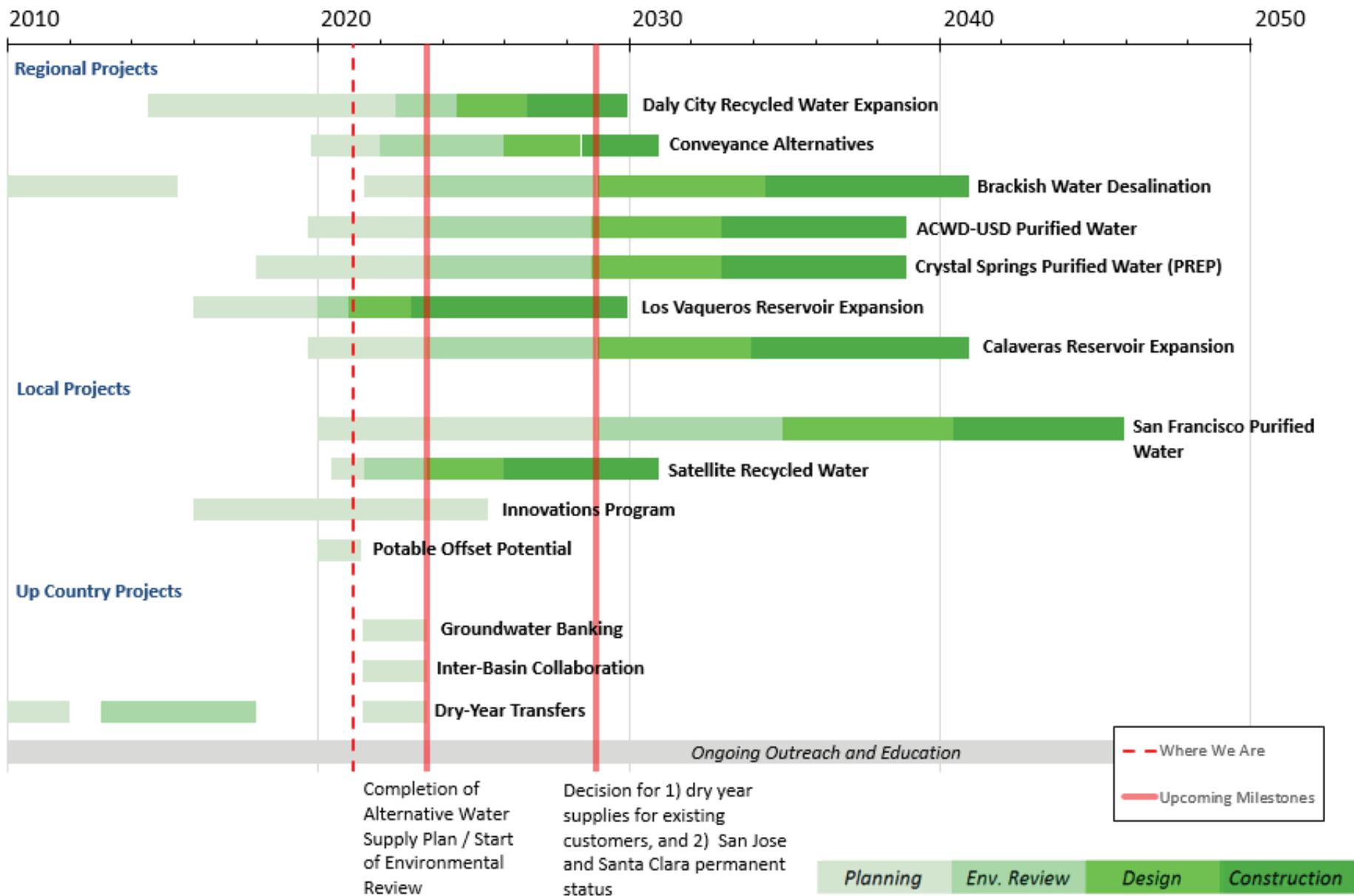


Although individual project evaluations and regular reporting and coordination are already underway, there is a need for a cohesive Alternative Water Supply Plan (Plan) that ties together the planning objectives, assumptions and approach to guide the planning and evaluation process ahead of significant project development decisions by the Commission. As shown in the figure above, the Plan guidance will be developed concurrently with ongoing project-level feasibility analyses and program reporting and outreach.

Typically, a minimum of 10 percent design is needed to obtain the level of project detail required to begin preparation of an environmental document. To achieve this, the SFPUC will need to work closely with its partners to complete the feasibility phase of the projects and make decisions about which projects to pursue no later than 2023. The Los Vaqueros Reservoir Expansion (LVE) Project is an exception to this schedule because of external project drivers. In this case, the SFPUC decided to continue to participate in planning and design in September of 2020 and will need to decide whether to participate in the broader project implementation by December 2021. SFPUC staff are working toward having necessary project planning information and Plan guidance in place in time for the Commission to make an informed decision.

A high-level schedule overview of each alternative water supply project is shown on the next page.

Proposed Programmatic Schedule



3.10 Staffing

(updated March 2021)

In order to advance the planning for several of these Alternative Water Supply projects expeditiously, the SFPUC has established a new group within the Water Resources Division. In February and March of 2020, two new project managers were hired. The timing of their onboarding and plans to hire a manager to supervise this group coincided with the onset of the COVID-19 Shelter in Place order in San Francisco. A manager for this group was hired in December 2020. Staff have put in extra effort to ensure that the SFPUC can make significant progress on all planning efforts underway during this time. No planning activities have been delayed as a result of the current crisis.

3.11 Water Supply Task Force

Success in planning water supply projects will ultimately depend on our ability to operate and integrate these new supplies into our existing water supply network. This goal is even more challenging when the new water supplies are from very different sources than our existing surface water and groundwater supplies.

To advance these Alternative Water Supply projects in a thoughtful way, the SFPUC has established a Water Supply Task Force within the SFPUC that brings together a cross-functional group including planning, policy, environmental management, operations, water quality, finance, legal, and communications resources. Through early and frequent communications on all of the proposed projects, this group helps to anticipate long-term risks and challenges and address them early in the planning process. The Water Supply Task Force convenes every two weeks, and has continued to do so remotely since March 2020.

3.12 Funding and Expenditures

(updated March 2021)

The Commission approved project budgets totaling over \$25 million in the current 2-year budget cycle for the continued planning of regional and local projects in February of 2020. Funding of \$17 million has been encumbered in the current fiscal year 2020-2021.

These funds are aimed at completing planning studies for the Daly City Recycled Water Expansion Project, Crystal Springs Purified Water Project, ACWD-USD Purified Water Project, LVE Project, and Conveyance Alternatives. We anticipate that we will move into the design phase of the Daly City Recycled Water Project (unless a non-recycled water alternative is preferred after an alternatives analysis) and if conveyance is not a barrier, we could enter into Service Agreements and participate in a JPA for the construction and implementation of the LVE

Project. The level of funding sought in this period assumes we will be in a position to continue to move forward on all of the current planning efforts.

3.13 Professional Services Contracts

The Water Resources Division is managing two as-needed joint venture contracts with a capacity of \$4 million each with 1) Carollo Engineers and Water Resources Engineering (WRE) and 2) Woodard and Curran and SRT Consultants. Some of the capacity in these contracts will be used for planning studies associated with the Alternative Water Supply program, as needed to meet planning objectives. These vehicles enable the SFPUC to move quickly to evaluate specific planning needs. If necessary, other as-needed contracting capacity through the Water Enterprise may also be available. We are currently working through a Water as-needed contract to conceptualize an alternative intertie with EBMUD, and completing work to report the results of PureWaterSF through another contract. We anticipate utilizing additional professional services support to advance planning efforts.

3.14 Adapting to an Uncertain Future

(updated March 2021)

The AWS Program is intended to identify, screen and plan for new alternative water opportunities that can help meet the SFPUC's foreseeable water supply needs over the planning horizon. Recognizing that these projects would introduce new sources of supply and require new partnerships, this program necessarily requires an integrated and holistic planning approach, both within the SFPUC and with external partners. Given the uncertain nature of planning needs, it also requires some built-in adaptability and flexibility. As this section described, the AWS Program has the infrastructure and resources needed to continue to plan in a changing environment.