2025 URBAN WATER MANAGEMENT PLAN

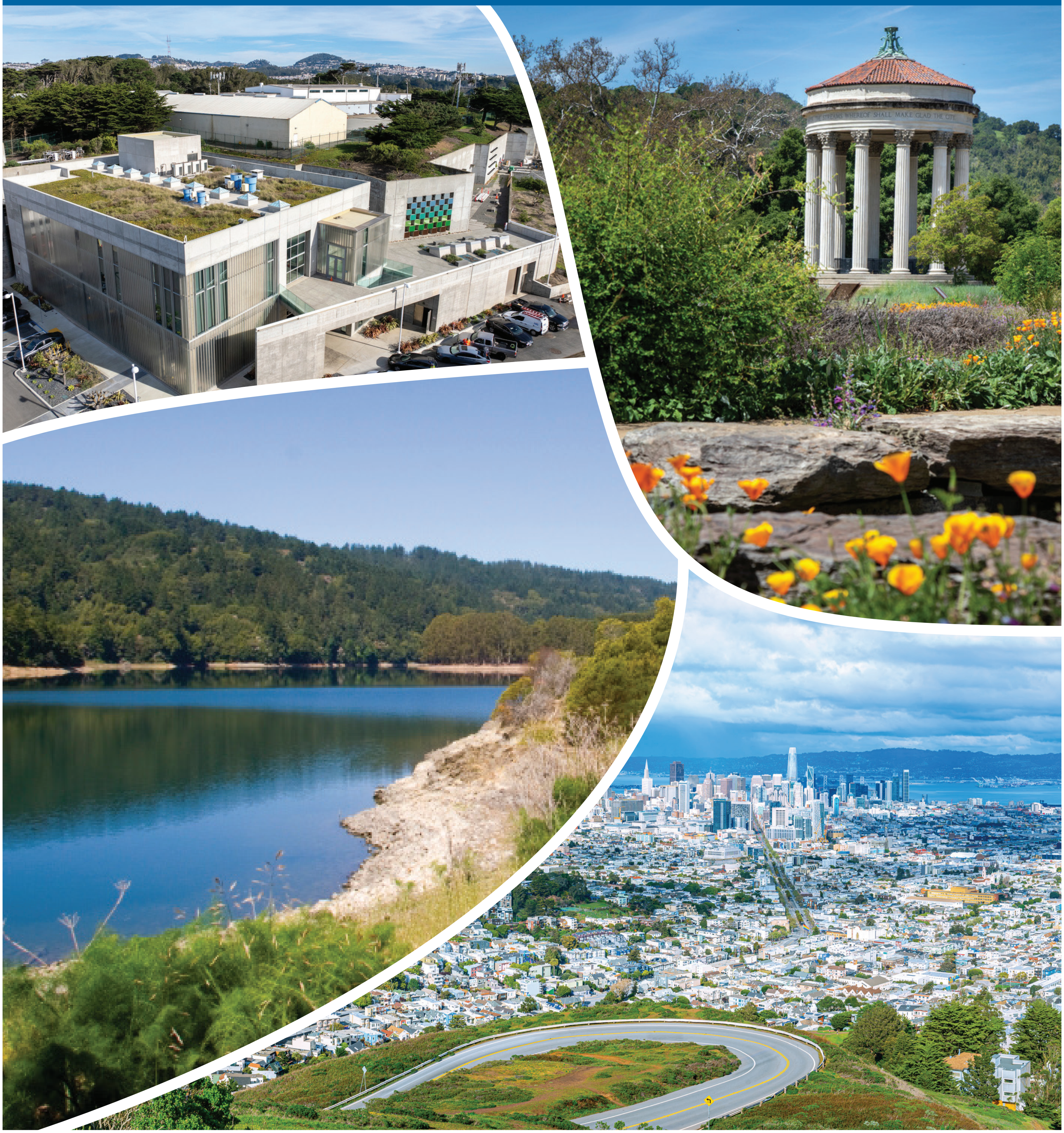
FOR THE CITY AND COUNTY OF SAN FRANCISCO

PUBLIC REVIEW DRAFT

March 2026

Prepared by: The San Francisco Public Utilities Commission

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission



ON THE COVER

Clockwise from top left: Westside Enhanced Water Recycling Project at Oceanside Wastewater Treatment Plant with a living roof, the Sunol Water Temple in Alameda County, an aerial view of San Francisco, and Lower Crystal Springs Reservoir in San Mateo County.

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

Act	California Urban Water Management Planning Act
AF	acre-feet (volume of water, equivalent to 325,851 gallons)
AWS	Alternative Water Supply Program
AWWA	American Water Works Association
BACWA	Bay Area Clean Water Agencies
BARR	Bay Area Regional Reliability
BAWSCA	Bay Area Water Supply and Conservation Agency
BDPL	Bay Division Pipeline
BG	billion gallons
BMP	Best Management Practice
CCF	hundred cubic feet (volume of water, equivalent to 748 gallons)
CEQA	California Environmental Quality Act
CIP	Capital Improvement Program
City	City and County of San Francisco
CSA	County Service Area
CSD	Community Services District
CWC	California Water Code
DMMs	demand management measures
DRA	drought risk assessment
DSOD	Division of Safety of Dams
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utility District
EIR	Environmental Impact Report
EOP	Emergency Operations Plan
FERC	Federal Energy Regulatory Commission
FY	fiscal year
GPCD	gallons per capita per day
GSP	Groundwater Sustainability Plan
HHLSM	Hetch Hetchy and Local Simulation Model
HHWP	Hetch Hetchy Water and Power
HRL	Agreements to Support Healthy Rivers and Landscapes
HTWTP	Harry Tracy Water Treatment Plant
ISG	Individual Supply Guarantee
LOS	Level of Service
LTVA	Long Term Vulnerability Assessment
MG	million gallons

mgd	million gallons per day (flow or usage rate of water)
MWC	Mutual Water Company
NBSU	North Bayside System Unit
PFAS	Per- and polyfluoroalkyl substances
RCP	Representative Concentration Pathway
RGSR	Regional Groundwater Storage and Recovery
RWS	San Francisco Regional Water System
SB	Senate Bill
SB X7-7	Senate Bill Seven of the Senate's Seventh Extraordinary Session of 2009 (a.k.a., Water Conservation Act of 2009)
SF	San Francisco
SFDPH-EH	San Francisco Department of Public Health-Environmental Health
SFGW	San Francisco Groundwater Supply Project
SFO	San Francisco International Airport
SFPUC	San Francisco Public Utilities Commission
SGMA	Sustainable Groundwater Management Act
State	State of California
SVCF	Sunol Valley Chloramination Facility
SVWTP	Sunol Valley Water Treatment Plant
SWRCB	State Water Resources Control Board
SWRCB DDW	SWRCB Division of Drinking Water, formerly the California Department of Public Health Drinking Water Program
TIWRRF	Treasure Island Water Resource Recovery Facility
USEPA	U.S. Environmental Protection Agency
UWMP	Urban Water Management Plan
Valley Water	Santa Clara Valley Water District
WPCP	water pollution control plant
WSA	Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County
WSAP	Water Shortage Allocation Plan
WSCP	Water Shortage Contingency Plan
WSIP	Water System Improvement Program

This page intentionally left blank.

SECTION 1: INTRODUCTION AND OVERVIEW

The San Francisco Public Utilities Commission (SFPUC) proudly presents the 2025 Urban Water Management Plan (UWMP) for the City and County of San Francisco (City). This plan provides a comprehensive overview for ensuring a reliable, sustainable water supply for the next 25 years, balancing the needs of residents, businesses, and the environment in an era of growth and uncertainty.

The City owns and operates the San Francisco Regional Water System (RWS), a vital public asset that delivers high-quality drinking water to more than 2.7 million residents and thousands of businesses across the San Francisco Bay Area. About 85% of this water originates from the Tuolumne River watershed and is stored in Hetch Hetchy Reservoir within Yosemite National Park. The remaining supply comes from protected local watersheds in the East Bay and on the Peninsula.

With the RWS, the SFPUC delivers water to 28 wholesale customers, including 24 cities, water districts, an investor owned utility, and a university in Alameda, Santa Clara, and San Mateo Counties, Groveland Community Services District (Groveland CSD) in Tuolumne County, and Cordilleras Mutual Water Company (MWC) in Redwood City. The Bay Area Water Supply and Conservation Agency (BAWSCA) represents the interests of 26 of the wholesale customers (not including Cordilleras MWC and Groveland CSD), generally referred to collectively as the "Wholesale Customers," and coordinates water conservation programming on their behalf. The SFPUC also serves retail customers in San Francisco (generally referred to as in-City retail customers) and several dozens of customers outside of San Francisco that are located along the RWS transmission system (generally referred to as suburban retail customers). Some retail customers also receive local groundwater and recycled water supplies, further diversifying the system.

The 2025 UWMP updates the 2020 UWMP and incorporates updated water demand projections, supply reliability, and strategies to meet future challenges. Retail water demand is estimated at 62.5 million gallons per day (MGD) in 2025 and is projected to rise by 17.4%, or to 73.4 MGD, by 2050. Meanwhile, housing unit projections are expected to grow from about 418,000 units to 559,000 units, a 33.8% increase over the same period. Retail demand projections incorporate the latest housing and employment growth projections, socioeconomic trends, and conservation assumptions. These projections also account for conservation measures and align with the SFPUC's 2025 Retail Water Conservation Plan.

Meeting projected demands will require a combination of traditional and alternative supplies. While the RWS remains the primary component of the system, local water supplies are becoming increasingly important. Groundwater production within the City will ramp up to about 4.3 MGD by 2040, and recycled water projects—including the Westside Enhanced Water Recycling Project and Treasure Island Water Resource Recovery Facility Project—will provide an additional 2.4 MGD. Onsite water reuse, mandated for large new developments, is expected to offset another 1.6 MGD by 2040. Water conservation programs will continue to drive efficiency and are expected to contribute to 0.7 MGD in active conservation savings. These programs support San Francisco as a leader in water efficiency within California, with a residential per-capita use averaging 43 gallons per day.

Since the adoption of the 2020 UWMP, the region has experienced significant challenges. The COVID-19 pandemic reshaped water-use patterns as remote work became widespread. California also endured another drought where in 2021, the state declared a water shortage emergency requiring water suppliers to implement Level 2 shortage actions under their Water Shortage Contingency Plans (WSCPs). This updated UWMP includes the WSCP and also details the SFPUC's emergency preparedness strategies for catastrophic supply interruptions.

This UWMP evaluates water supply reliability under multiple scenarios. Under normal conditions, the RWS can meet projected demands through 2050. However, regulatory changes pose significant risks. In December 2018, the State Water Resources Control Board (SWRCB) adopted amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan Amendment). The Bay-Delta Plan Amendment established new flow objectives for three Lower San Joaquin River tributaries, including the Tuolumne River. SWRCB adopted the Bay-Delta Plan Amendment with the goal of increasing salmonid populations in these three tributaries and the Bay-Delta. The Bay-Delta Plan Amendment requires each tributary to bypass 30—50% of the flow of each river from February through June of every year. The Bay-Delta Plan Amendment refers to this as the "unimpaired flow percentage." If fully implemented, the Bay-Delta Plan Amendment could reduce RWS supplies by up to 43% during prolonged droughts. After allocating available RWS supplies between retail and Wholesale Customers according to the Water Shortage Allocation Plan and comparing total supplies to projected demands, the retail portion of supplies show a shortage of up to 29% and up to 49% for Wholesale Customers. Without the implementation of the Bay-Delta Plan Amendment, there will be no shortages even in five consecutive dry years at 2050 demand levels.

In response to the Bay-Delta Plan Amendment, the SFPUC and the Modesto and Turlock Irrigation Districts proposed the Tuolumne River Voluntary Agreement—now referred to as the Tuolumne River Healthy Rivers and Landscapes Agreement—which combines flow and non-flow measures to improve native salmon populations in the lower Tuolumne River. The Tuolumne River is part of the proposed multi-agency Healthy Rivers and Landscapes Program proposed by Sacramento and San Joaquin River water agencies which balances environmental and water-supply needs. This Healthy Rivers and Landscapes Program, including the Tuolumne River's proposed contributions, is being evaluated by the SWRCB. Given the uncertainty surrounding implementation of the Bay-Delta Plan Amendment, the UWMP evaluates water supply reliability under two supply scenarios: with implementation of the Bay-Delta Plan Amendment and continuation of current conditions (which represents delays in implementation of the Bay-Delta Plan Amendment).

To prepare for these uncertainties, the SFPUC established the Alternative Water Supply (AWS) Program in 2019 to identify new dry-year water supply projects. This program explores projects such as purified water opportunities, regional storage expansions, and brackish water desalination. In 2024, the SFPUC published the AWS Plan to guide its decision-making, provide recommendations on project implementation, and to identify areas requiring further analysis to meet future water supply challenges and vulnerabilities, such as climate change, regulatory shifts, seismic risks, and population growth. The SFPUC anticipates updating the AWS Plan in FY 2026-27.

In preparing this UWMP, the SFPUC conducted a sensitivity analysis to identify key drivers of demand variability. The results informed two additional demand scenarios that reflect a range of potential retail water demands based on different population and employment growth assumptions. Together, these analyses, projections, and planning efforts position the SFPUC to navigate an increasingly complex water supply landscape. The 2025 UWMP provides an assessment of future challenges and outlines the strategies needed to maintain reliable service for retail and wholesale customers.

SECTION 2: PLAN PREPARATION AND IMPLEMENTATION

This section summarizes the SFPUC's actions to assure agency coordination and public participation throughout the development of this 2025 UWMP.

2.1 BASIS FOR PREPARING A PLAN

The SFPUC prepared this 2025 UWMP in accordance with the requirements of the California Urban Water Management Planning Act (Act), California Water Code (CWC) Division 6, Part 2.6, Sections 10610 through 10657. The purpose of the Act is to assure that water suppliers plan for long-term reliability, conservation, and efficient use of California's water supplies to meet existing and future demands. The Act requires that planning projections extend at least 20 years beyond the year of the UWMP, i.e., through 2045 for the 2025 UWMP cycle. The planning horizon for the SFPUC's 2025 UWMP is 25 years, i.e., through 2050.

The Act requires urban water suppliers to prepare an UWMP update every five years. The 2025 UWMPs are due to the California Department of Water Resources (DWR) by July 1, 2026. As defined by CWC Section 10617, an urban water supplier is a supplier (either publicly or privately owned) that provides water for municipal purposes to more than 3,000 customers (either directly or indirectly) or that supplies more than 3,000 acre-feet of water annually. The SFPUC meets these criteria as both a retail and wholesale supplier of water.

The SFPUC prepared this individual UWMP specifically for the City and is not participating in the preparation of a regional UWMP.

2.2 FISCAL OR CALENDAR YEAR AND UNITS OF MEASURE

The data provided throughout this 2025 UWMP and the accompanying standardized tables are reported on a fiscal year (FY) basis. The SFPUC operates on a fiscal year that starts on July 1 and ends on June 30. The "current" fiscal year reported in this 2025 UWMP corresponds to FY 2024-2025, which represents the period from July 1, 2024 through June 30, 2025. Similarly, the projected year of 2030 denotes FY 2029-2030; 2035 denotes FY 2034-2035; and so on. The SFPUC has employed its best efforts to convert data that were originally collected on a calendar year basis to a fiscal year basis. However, in a few cases, fiscal year quantities are approximated based on calendar year quantities and are noted as such.

The SFPUC's water supply planning, contracts, and related documents primarily use units of million gallons per day (MGD) when quantifying volumes of water. The standardized tables prescribed by DWR allow volumetric water data to be reported in units of acre-feet (AF), million gallons (MG), or hundred cubic feet (CCF) per year. This 2025 UWMP's standardized tables include data in units of MG rounded to the nearest MG (see Appendix A). The corresponding data in the body of this 2025 UWMP are reported in units of MGD unless otherwise noted. Although reported in different units of measure, the quantities in both sets of data are equal. DWR staff confirmed the use of this approach for this 2025 UWMP. This approach differs from the SFPUC's previous UWMPs, which reported data in the standardized tables in AF. The SFPUC's change to MG in the 2025 standardized tables is based on DWR's recommendation to make the units in the body of the UWMP and the standardized tables as consistent as possible.

2.3 COORDINATION AND OUTREACH

2.3.1 Agency Coordination

2.3.1.1 Coordination with City Agencies

The SFPUC coordinated internally and with other City agencies to develop elements of this 2025 UWMP and the documents referenced herein. The SFPUC utilized San Francisco housing and employment growth projections provided by the San Francisco Planning Department to develop water demand projections. The SFPUC also notified other City agencies of its intent to prepare the 2025 UWMP. The notice included instructions for viewing the draft 2025 UWMP, as well as the date, time, and location of the public hearing on the UWMP. The SFPUC reviewed and addressed, as appropriate, comments received from other City agencies on the proposed 2025 UWMP. Documentation relating to these efforts and communications is provided in Appendix B.

2.3.1.2 Regional Interagency Coordination

The SFPUC coordinated the development of this 2025 UWMP with its wholesale customers and BAWSCA. The SFPUC has individual water sales contracts with 27 wholesale customers, 26 of which are members of BAWSCA. Cordilleras Mutual Water Company (Cordilleras MWC) is a wholesale customer that contracts directly with the SFPUC, but is not a member of BAWSCA. Groveland Community Services District (Groveland CSD) is considered a suburban retail customer by the SFPUC, but for the purposes of this 2025 UWMP, it is recognized as a wholesale customer, as further described in Section 2.4. Throughout this document, references to Wholesale Customers mean the 26 wholesale customers that are members of BAWSCA. For more information about the SFPUC's wholesale customers, see Section 3.3.

The SFPUC provided water supply reliability information to BAWSCA for distribution to all its members. The SFPUC projected RWS supplies in five-year increments from 2025 through 2050 for normal, single dry, and multiple dry years. These projections are provided in Appendix C. The SFPUC also worked with its Wholesale Customers, either individually or through BAWSCA, to obtain population and water supply purchase projections in five-year increments through the year 2050. Wholesale Customers that are urban water suppliers are concurrently preparing their own 2025 UWMPs; therefore, the data that they provided to the SFPUC for the SFPUC's use in the development of this 2025 UWMP are subject to change.

The SFPUC notified all wholesale customers to which the SFPUC provides water of its intent to prepare the 2025 UWMP. The notice included instructions for viewing the Draft 2025 UWMP, as well as the date, time, and location of the public hearing on the Draft 2025 UWMP. The SFPUC reviewed and addressed, as appropriate, comments received from these agencies on the Draft 2025 UWMP. Documentation relating to these efforts and communications is provided in Appendix B.

2.3.2 Public Participation

The SFPUC encourages public participation in its urban water management planning efforts. Public outreach activities for the 2025 UWMP are listed below. Further documentation is included in Appendix B. Notification of the 2025 UWMP was electronically mailed on February 12, 2026, with an additional mailing to be sent by March 14, to all cities within which the SFPUC provides water, as well as to other interested parties. The notification letter served as both (1) a notice to cities and counties about the 2025 UWMP, and (2) a notice of the time and place of the corresponding public hearing, as required by the CWC. A list of notified organizations and individuals is provided in Appendix B.

The Draft 2025 UWMP will be made available for public review between March 16 to April 20, 2026 at **www.sfpuc.gov/uwmp**. The SFPUC will meet with the Citizens' Advisory Committee on March 17, 2026 to present the Draft 2025 UWMP. The Citizens' Advisory Committee meetings were publicly noticed on the SFPUC website at **www.sfpuc.gov**.

A public hearing on the Draft 2025 UWMP will be held on April 14, 2026 during an SFPUC Commission meeting. A notice of the hearing will be advertised in the local newspaper by March 29, 2026 and April 5, 2026 in accordance with California Government Code Section 6066. Copies of newspaper advertisements of the public hearing will be provided in Appendix B. Public comments on the Draft 2025 UWMP will be taken during the public hearing, as well as throughout the public comment period. A meeting to adopt the Draft 2025 UWMP will be held at the SFPUC Commission meeting no later than June 2026. For further information regarding the 2025 UWMP submittal, availability, and implementation, see Section 11.3.

2.4 ACCOUNTING FOR GROVELAND CSD

Groveland CSD serves about 3,500 residential and commercial water customers in Groveland, Big Oak Flat, and Pine Mountain Lake, a semi-rural area of southern Tuolumne County. Before 2015, the UWMP listed Groveland CSD as a retail customer because Groveland CSD had not prepared its own UWMP. Starting with the 2015 UWMP, the SFPUC reported Groveland CSD as a wholesale customer since they now prepare their own UWMP. The SFPUC still treats Groveland CSD as a suburban retail customer for contractual obligations and supply planning purposes. However, beginning with the 2015 UWMP, DWR directed the SFPUC to report Groveland CSD as a wholesale customer.

To meet both SFPUC's planning needs and DWR's reporting requirements, this UWMP classifies Groveland CSD differently (either as a suburban retail customer or a wholesale customer) depending on the context:

- **DWR reporting (Sections 3, 9, and Appendix A):** Groveland CSD is treated as a wholesale customer for describing the SFPUC's wholesale service area, population, demands, and supplies, WSCP, and to avoid double counting in regional or statewide aggregation of UWMP data.

- **Contractual obligations, RWS supply allocations, and retail conservation programs (Sections 4, 6, 7, 8, and 10):** Groveland CSD is treated as a retail customer.

- **SB X7-7 baselines and targets (Section 5 and SB X7-7 Compliance Form in Appendix A):** Groveland CSD is treated as a wholesale customer and therefore excluded from per capita baselines and targets.

Groveland CSD provided actual and projected population and demand data for the preparation of the 2025 UWMP. Because Groveland CSD is preparing its own 2025 UWMP, the data it supplied may change. Any discrepancies between tables in the body of this 2025 UWMP and Appendix A resulting from these differing classifications of Groveland CSD will be noted. DWR staff have reviewed and agreed with this approach.

This page intentionally left blank.

SECTION 3: SYSTEM DESCRIPTION

This section describes the SFPUC's water system (including the RWS and in-City distribution system) and the SFPUC's retail and wholesale service areas, including their climate and demographic features.

3.1 SFPUC WATER SYSTEM OVERVIEW

Over 2.7 million people and thousands of businesses in the San Francisco Bay Area rely on water supplied by the SFPUC, a department of the City and County of San Francisco, to meet their daily water needs. The City-owned and operated RWS, which serves both retail and wholesale customers, supplies high-quality drinking water from the Tuolumne River watershed and from the local Alameda and Peninsula watersheds. The RWS draws an average of 85% of its supply from the Tuolumne River watershed, collected in Hetch Hetchy Reservoir in Yosemite National Park. This water feeds into an aqueduct system delivering water 167 miles by gravity to Bay Area reservoirs and customers. The remaining 15% of the RWS supply is drawn from local surface waters in the Alameda and Peninsula watersheds. The percentage split between these water sources varies from year to year depending on the water year hydrology and operational circumstances.

The SFPUC provides retail water service to customers both inside and outside of San Francisco (collectively referred to as the retail customers). The majority of the retail customers are located inside of San Francisco and are referred to as the "in-City" retail customers. The small number of retail customers outside of San Francisco are located along the RWS transmission system and are referred to as "suburban" retail customers. The in-City distribution system serves a residential population of nearly 850,000 in addition to San Francisco-based businesses. The suburban retail customers include a residential population of approximately 2,000, as well as businesses and institutions, in San Mateo, Santa Clara, Alameda, Tuolumne, and San Joaquin Counties. In-City retail customers are primarily served with RWS supply, but some customers also receive groundwater and recycled water from the SFPUC or other providers. Similarly, the suburban retail customers are primarily served with RWS supply, with one customer also receiving groundwater. The RWS, in-City distribution system, and other localized systems owned and operated by the SFPUC are described in the following sections.

3.1.1 Historical Development of the RWS

The RWS evolved through the development of two separate water systems: the Spring Valley Water Company system and the Hetch Hetchy Water and Power Project (HHWP Project). The Spring Valley Water Company was established in 1858 as it developed a spring and several creeks in San Francisco into a local water system. It expanded over the next few decades with the construction of the Pilarcitos, San Andreas, and Upper and Lower Crystal Springs Dams on the Peninsula. Further expansions included the development of the Pleasanton Well Field, the Sunol Filter Gallery, and Calaveras Dam in southern Alameda County.

Very early in San Francisco's development, it was recognized that the local water resources would be inadequate to support a burgeoning metropolis; thus, plans for importing water from the Sierra Nevada were born. In the late 1800s, the City's decision to develop its own water supply system culminated in the planning, financing, and construction of the HHWP Project. Because many of the HHWP Project facilities were to be located on public land within Yosemite National Park and Stanislaus National Forest, Congressional approval of the use of federal land was required. That approval was granted by the Raker Act of 1913 (38 Stat. 242). For more information about the Raker Act and the City's water rights under state law, see Section 3.1.4.

The construction of the HHWP began in earnest in 1914. After almost 20 years of construction (including the building of Hetch Hetchy Reservoir and the 1930 acquisition of the Spring Valley Water Company by the City), Tuolumne River water began flowing into Upper Crystal Springs Reservoir in October 1934. Through the coordinated operation of the two systems, the SFPUC has been able to provide the residents of the City and its neighboring communities with a supply of high-quality potable water from protected watershed sources.

Since the 1930s, the major additions to the RWS have included the raising of O'Shaughnessy Dam, the construction of Cherry Valley Dam (Cherry Lake); the construction of Canyon Power Tunnel and Kirkwood Powerhouse; the construction of additional pipelines across the San Joaquin Valley and the Rock River Lime Plant; and the local construction of San Antonio Reservoir in Alameda County and Bay Division Pipelines (BDPL) Nos. 2, 3, 4, and 5. Other local projects have included Crystal Springs Pipeline No. 3, Sunol Valley and San Andreas (now Harry Tracy) Water Treatment Plants, the Crystal Springs Bypass Tunnel and Balancing Reservoir, and the Tesla Treatment Facility.

3.1.2 Water Distribution

This section further describes how water is distributed by the RWS and the in-City distribution system.

3.1.2.1 Regional Water System

The RWS, shown in Figure 3-1, consists of more than 280 miles of pipelines, 60 miles of tunnels, 11 reservoirs, five pump stations, two water filtration plants, and two treatment facilities for pH adjustment and/or disinfection. It includes the HHWP Project and the Bay Area water system facilities. The HHWP Project is generally composed of the reservoirs, hydroelectric generation and transmission facilities, and water transmission facilities from Hetch Hetchy Reservoir west to the Alameda East Portal of the Coast Range Tunnel in the Sunol Valley. Water system components of the HHWP Project are also referred to as the Hetch Hetchy System. The Bay Area water system is comprised of two parts - the Alameda System and the Peninsula System - generally consisting of the facilities west of the Alameda East Portal of the Coast Range Tunnel, including the 63,000-acre Alameda and Peninsula watersheds, storage reservoirs, two water filtration plants, and the distribution system that delivers water to both retail and wholesale customers. The Hetch Hetchy, Alameda, and Peninsula Systems are described in more detail below.

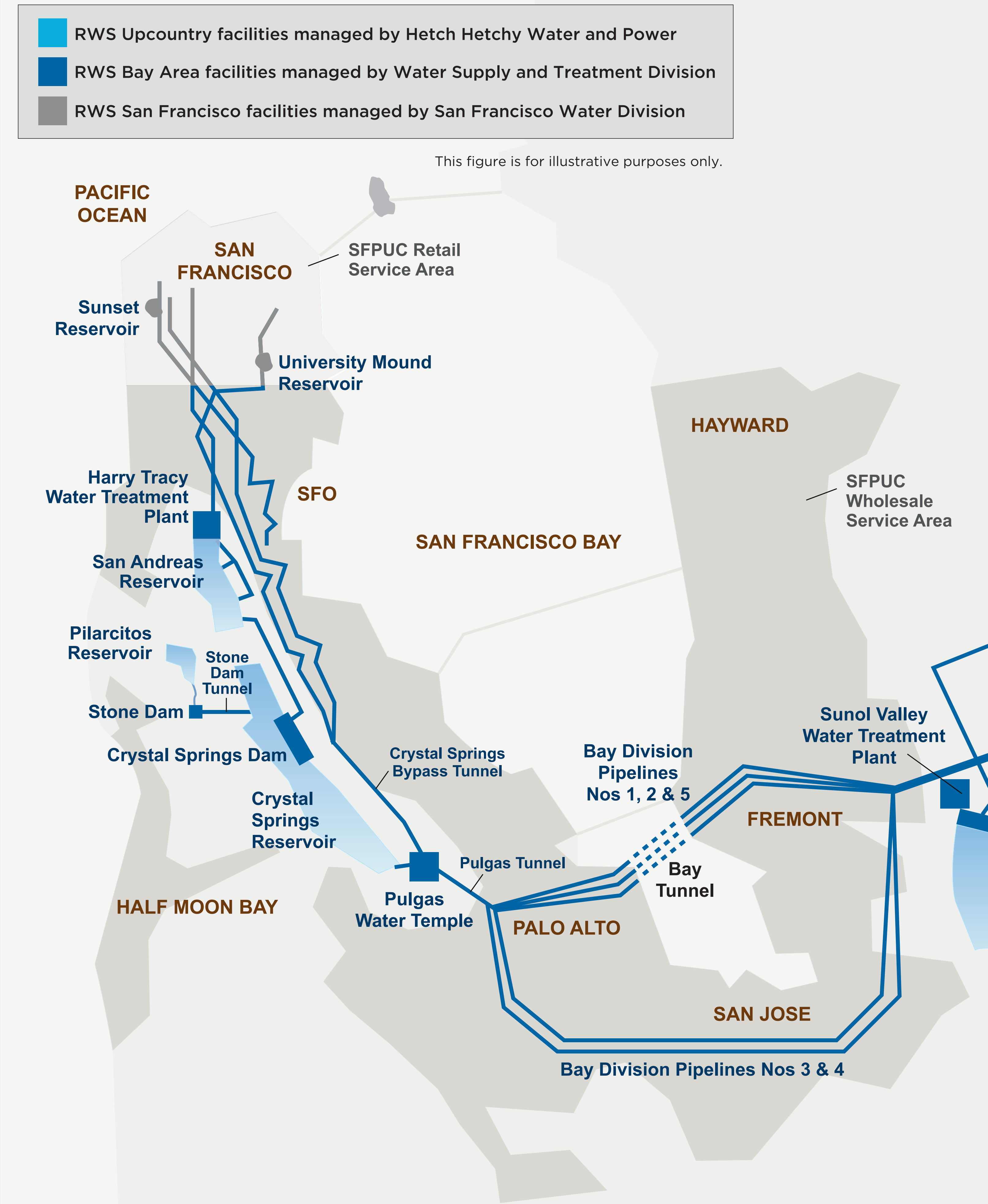
- **Hetch Hetchy System:** In the Hetch Hetchy System, water is diverted from the Tuolumne River watershed into Hetch Hetchy Reservoir. The water is then transported in a series of tunnels and aqueducts from the Sierra Nevada to the San Joaquin Pipelines that cross the San Joaquin Valley to the Coast Range Tunnel, which connects to the Alameda System at the Alameda East Portal. Hetch Hetchy System water is disinfected at the Tesla Treatment Facility.

- **Alameda System:** The Alameda System includes two reservoirs, San Antonio Reservoir and Calaveras Reservoir, which collect water from San Antonio Creek, Upper Alameda Creek, and Arroyo Hondo watersheds in Alameda County. San Antonio Reservoir also receives water from the Hetch Hetchy System.

Conveyance facilities in the Alameda System, including the Irvington Tunnels and the BDPLs, connect the Hetch Hetchy System and Alameda System to the Peninsula System. The BDPLs traverse the South Bay and cross to the Bay Tunnel to meet the Peninsula System, delivering water to customers along the pipeline routes. The Sunol Valley Water Treatment Plant (SVWTP) filters and disinfects water supplied from San Antonio Reservoir and Calaveras Reservoir. The Sunol Valley Chloramination Facility (SVCF) treats Hetch Hetchy supplies with aqueous ammonia to form chloramines and with sodium hydroxide to adjust pH. Water is then blended in the Alameda Siphons for delivery to Bay Area customers via the Irvington Tunnels.

- **Peninsula System:** The Peninsula System includes conveyance facilities connecting the BDPLs to the distribution system in San Francisco and to other customers on the Peninsula. Two reservoirs, Crystal Springs Reservoir and San Andreas Reservoir, collect runoff from the San Mateo Creek watershed. Crystal Springs Reservoir also receives water from the Hetch Hetchy System. A third reservoir, Pilarcitos Reservoir, collects runoff from the Pilarcitos Creek watershed and directly serves one of SFPUC's Wholesale Customers, Coastside County Water District (which serves the City of Half Moon Bay), in addition to delivering water to Crystal Springs and San Andreas Reservoirs. The Harry Tracy Water Treatment Plant (HTWTP) filters and disinfects water supplied from Crystal Springs Reservoir and San Andreas Reservoir before it is delivered to customers on the Peninsula and in San Francisco.

Figure 3-1. The Regional Water System and Main Facilities




Cherry Reservoir and Dam
Lake Eleanor and Dam
Cherry Power Tunnel
Holm Powerhouse
Canyon Power Tunnel
Hetch Hetchy Reservoir
TUOLUMNE RIVER
Mountain Tunnel
O'Shaughnessy Dam
Kirkwood Powerhouse
San Antonio Reservoir and Dam
Foothill Tunnel
Priest Reservoir
San Joaquin Pipelines
Moccasin Powerhouse, Reservoir, and Dam
Coast Range Tunnel
YOSEMITE NATIONAL PARK
Tesla Treatment Facility
Alameda East Portal
Don Pedro Reservoir
MODESTO
Calaveras Dam & Reservoir

3.1.2.2 In-City Distribution System

San Francisco's in-City distribution system (Public Water System No. CA3810011) was originally developed during the 100-year period between 1860 and 1960, reflecting the patterns and rates of growth in the City. Several major pipelines convey RWS supply from the Peninsula System to the City. Two pipelines feed water to the eastside of the in-City distribution system and terminate at University Mound Reservoir. Two additional pipelines feed water to the west side of the in-City distribution system and terminate at Sunset Reservoir and at Merced Manor Reservoir. As shown in Figure 3-2, the in-City distribution system also includes ten reservoirs (two are split into two basins) and eight water tanks that store water supplied by the RWS. Seventeen pump stations[1] and approximately 1,250 miles of pipelines move water throughout the City and deliver water to homes and businesses.

3.1.3 Water Treatment

The Hetch Hetchy Reservoir is the largest unfiltered water supply on the West Coast and one of only a few large unfiltered municipal water supplies in the nation. The water originates from well-protected wilderness areas in Yosemite National Park and flows down the Tuolumne River to Hetch Hetchy Reservoir. This water meets or exceeds all federal and State of California (State) drinking water standards. Water from Hetch Hetchy Reservoir, which is protected in pipes and tunnels as it is conveyed to the Bay Area, requires pH adjustment to control pipeline corrosion and disinfection. Based on the SFPUC's disinfection treatment practice, extensive bacteriological quality monitoring, and high operational standards, the United States Environmental Protection Agency (USEPA) and the State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW) determined that the Hetch Hetchy water source meets federal and state drinking water quality requirements without the need for filtration.

The Tesla Treatment Facility is an ultraviolet treatment facility with a capacity of 315 MGD that provides primary disinfection using chlorine and fluoridation in compliance with *Cryptosporidium* requirements for all unfiltered sources. The facility was a key component of the SFPUC's Water System Improvement Program (WSIP) and enhances the high water quality from the RWS.

The SFPUC treats all water derived from sources other than Hetch Hetchy Reservoir at one of two water filtration facilities: SVWTP or HTWTP. SVWTP primarily treats water from the Alameda System reservoirs and upcountry non-Hetch Hetchy sources (if used), and has a design capacity of 160 MGD. Treatment processes include powder activated carbon for taste and odor control, coagulation, flocculation, sedimentation, filtration, disinfection, fluoridation, corrosion control, and chloramination. The nearby Sunol Valley Chloramination Facility can also provide fluoridation, chloramination, and corrosion control treatment for the Hetch Hetchy System (as defined in Section 3.1.2.1) and blending with water treated from SVWTP. HTWTP treats water from the Peninsula System reservoirs and has a design capacity of 140 MGD. Treatment processes at HTWTP include ozonation, coagulation, flocculation, filtration, disinfection, fluoridation, corrosion control, and chloramination. The SFPUC completed major upgrades to SVWTP in 2013 and HTWTP in 2015. Major work started in 2025 to add ozonation at SVWTP for additional taste and odor treatment.

[1] This number of pump stations does not include three pump stations on Treasure Island, which are not operated by the SFPUC.

Figure 3-2. In-City Distribution System

3.1.4 Water Storage

Most of the water delivered by the SFPUC is supplied by runoff from the upper Tuolumne River watershed on the western slope of the central Sierra Nevada. Three major reservoirs collect runoff: Hetch Hetchy, Cherry (also known as Lake Lloyd), and Lake Eleanor. The storage capacity of these three reservoirs is included in Table 3-1. A "water bank" in Don Pedro Reservoir is also integrated into RWS operations.[2] Don Pedro Reservoir, which is jointly owned and operated by Modesto Irrigation District and Turlock Irrigation District (the Districts), is located on the Tuolumne River downstream of the Hetch Hetchy System.

San Francisco generates hydroelectric power through the HHWP Project as a by-product of water delivery and water supply management. Water released from Hetch Hetchy Reservoir is used for hydroelectric generation and provides instream flows when released downstream. Normally, only Hetch Hetchy Reservoir water supplies are exported to the Bay Area, while releases from Lake Eleanor and Cherry Lake are used to provide instream flows, satisfy the Districts' Raker Act allocations, and produce hydroelectric power. The HHWP Project includes four hydroelectric powerhouses along the Tuolumne River—Holm, Kirkwood, Moccasin, and Moccasin Low Head - that have a collective generating capacity of nearly 400 megawatts.

In the Bay Area, the SFPUC utilizes the local Peninsula and Alameda watersheds. Crystal Springs, San Andreas, and Pilarcitos Reservoirs, located in San Mateo County, capture local runoff in the Peninsula watershed, and Calaveras and San Antonio Reservoirs, located in Alameda County, capture local runoff in the Alameda watershed. In addition to capturing local runoff, San Andreas, San Antonio, and Crystal Springs Reservoirs provide storage for water conveyed to the Bay Area from the Hetch Hetchy System. These five local reservoirs are an important water supply source in the event there is an interruption of Hetch Hetchy System deliveries. The storage capacity of each of these Bay Area reservoirs is included in Table 3-1.

Prior to 2019, Calaveras Reservoir had been operating at one-third of its capacity due to restrictions imposed by the DWR Division of Safety of Dams (DSOD). The Calaveras Dam Replacement Project, which took place from 2011 to 2019, involved the construction of a new dam downstream of the then-existing dam. The DSOD restrictions on filling Calaveras Reservoir to full capacity have since been removed, and Calaveras Reservoir reached full capacity during the 2022-23 winter season when it was refilled completely in January 2023 following the dam replacement project.

In-City reservoirs and tanks collectively have the capacity to hold approximately 417 MG of water. The SFPUC estimates this capacity to be a five-day supply at the current average water consumption rate for the City. In addition, there is an emergency supply of non-potable water from Lake Merced immediately available within the City. Lake Merced currently holds approximately 1.9 billion gallons of water.

Table 3-2 summarizes the storage capacity of in-City reservoirs and storage tanks, not including Lake Merced as it is a freshwater lake used for recreation, not water supply storage.

---

[2] The Turlock Irrigation District and Modesto Irrigation District (Districts) have senior water rights to the City for Tuolumne River water and are provided the first increment of flow in the Upper Tuolumne River watershed according to the apportionment set forth in the Raker Act of 1913 (38 Stat. 242). The water bank at Don Pedro Reservoir provides a credit and debit system, which allows the City to divert water upstream while meeting its obligations to the Districts. Through this mechanism, the SFPUC may pre-deliver the Districts' entitlements and credit the water bank so that at other times the SFPUC may retain water upstream while the Districts debit the water bank.

Table 3-1. Regional Water System Storage Capacity

[Standardized Table: Not Applicable]

RWS Reservoir	Storage Capacity in Acre-Feet (AF)[a]	Storage Capacity in Billions of Gallons (BG)
Up-Country[a]		
Hetch Hetchy	360,360	117.4
Cherry[c]	273,345	89.1
Lake Eleanor	27,100	8.8
Water Bank[d]	570,000	185.7
Subtotal Upcountry	**1,230,805**	**401.1[e]**
Local		
Calaveras (Alameda)	96,670	31.5
San Antonio (Alameda)	53,266	17.4
Crystal Springs (Peninsula)[f]	68,953	22.5
San Andreas (Peninsula)[g]	18,675	6.1
Pilarcitos (Peninsula)[h]	3,125	1.0
Subtotal Local	**240,689**	**78.4[i]**
Total RWS Storage[j]	**1,471,494**	**479.5**

a Storage values are rounded to whole numbers for larger reservoirs.

b Three other regulating reservoirs are also part of the RWS: Early Intake, Priest, and Moccasin Reservoirs.

c Storage capacity shown includes flashboards, which are structures placed in a spillway to increase the capacity of a reservoir.

d The SFPUC may draw against a credit of up to 740,000 AF in storage in a water bank account in Don Pedro Reservoir; 170,000 AF of this water bank storage is only available under certain circumstances and for a limited time. For this reason, the SFPUC considers 570,000 AF in contributing to total storage for planning purposes.

e Rows above do not sum to total due to rounding.

f Crystal Springs Reservoir has a maximum storage capacity of 22.5 BG (at 294.6 feet). Based on permit conditions, the reservoir is currently operated at 286.6 feet (8 feet below capacity).

g San Andreas Reservoir has a maximum storage capacity of 6.1 BG (at 451.8 feet). Since August 2020, in response to safety concerns about the seismic stability of the dam and a directive from the Division of Safety of Dams, the SFPUC has held the maximum water level at approximately 447.8 feet (4 feet below capacity).

h Pilarcitos Reservoir has a maximum storage capacity of 1.0 BG (at 696.5 feet). Since April 2025, in response to safety concerns about the seismic stability of the dam and a directive from the Division of Safety of Dams, the SFPUC has held the maximum water level at approximately 681.5 feet (15 feet below capacity).

i Rows above do not sum to total due to rounding.

j For planning purposes, the total RWS storage is 1,471,494 AF. This includes 63,700 AF in dead storage (i.e., the volume in a reservoir below the lowest controllable level).

Table 3-2. In-City Potable Water System Storage Capacity

[Standardized Table: Not Applicable]

In-City Reservoir	Storage Capacity in Acre-Feet (AF)	Storage Capacity in Millions of Gallons (MG)
Sunset South	267.9	87.3
Sunset North	266.4	86.8
University Mound South	250.1	81.5
University Mound North	182.3	59.4
Sutro	96.4	31.4
Summit	43.0	14.0
College Hill	41.4	13.5
Stanford Heights	39.6	12.9
Merced Manor	29.2	9.5
Lombard	19.0	6.2
Potrero	4.0	1.3
Hunters Point	3.1	1.0
Storage Tanks	38.7	12.6
Total In-City Storage	**1,281.0[a]**	**417.4**

a Rows above do not sum to total due to rounding.

3.1.5 Other Retail Water Systems

3.1.5.1 Groundwater and Recycled Water Systems

While the RWS system is the primary supply source serving in-City retail customers, some customers also receive groundwater or recycled water. The San Francisco Water Division operates and maintains groundwater wells supplying in-City potable water reservoirs and serving irrigation and other non-potable uses (e.g., lake filling, water exhibits) at Golden Gate Park, the San Francisco Zoo, and landscaped medians along the Great Highway. More information about this groundwater supply is provided in Section 6.2.1.1.

The City's golf courses at Harding Park (which includes Fleming Golf Course) and a portion of Sharp Park use recycled water for irrigation. The North San Mateo County Sanitation District provides recycled water to Harding Park, an in-City retail customer, and Sharp Park, a suburban retail customer in Pacifica. The SFPUC neither owns nor operates either of these recycled water systems, except for a portion of the Harding Park recycled water transmission line that is within City limits, and an onsite 700,000-gallon underground storage tank and above-ground pump station at Harding Park. More information about these recycled water supplies is provided in Section 6.2.1.2.

3.1.5.2 Suburban Retail Water Systems

As discussed above, the SFPUC serves several dozens of retail customers outside the City, who are collectively referred to as suburban retail customers. These customers are generally located directly adjacent to the RWS transmission pipelines and do not form one contiguous service area. There are also two small water systems in unincorporated Alameda County that the SFPUC operates, as permitted by the SWRCB DDW: the Castlewood Well System and the Town of Sunol domestic water system. More information about the suburban retail service area is provided in Section 3.2.

- **Castlewood Well System:** The SFPUC owns and operates the Pleasanton Well Field Water System[3] (Public Water System No. CA0110018, herein referred to as the Castlewood Well System), which in FY 2024-25 supplied approximately 0.22 MGD of treated (potable) groundwater to the Castlewood County Service Area (CSA), a community comprised of the Castlewood Country Club and approximately 190 homes located in unincorporated Alameda County. The Castlewood community water system itself is owned and operated by the CSA and the California Water Service Company, respectively. The SFPUC serves the Castlewood CSA through one metered connection with groundwater pumped from the Castlewood Well System. This system consists of two wells, a 3,000-gallon control tank, and a 1.0-million gallon treated water reservoir. The supply is disinfected via sodium hypochlorite injection into the transmission main between the control tank and reservoir. Water quality is monitored weekly by the SFPUC.

- **Town of Sunol Domestic Water System:** The SFPUC owns and operates the domestic water system for the Town of Sunol (Public Water System No. CA0110012), which typically serves less than 0.1 MGD to approximately 120 metered and unmetered connections in unincorporated Alameda County. These connections are primarily residential customers that receive potable water from the RWS. After RWS supply is fully treated, fluoridated, and chloraminated, the supply enters the Town of Sunol transmission pipeline downstream of Sunol Valley Mixing Manifold. The supply is then piped to a pump station at the SFPUC's Sunol Yard and pumped to two 130,000-gallon storage tanks. Water quality is overseen by the SFPUC.

3.2 RETAIL SERVICE AREA

The SFPUC's retail customers include the residents, businesses, and industries located within City limits, referred to as the in-City retail service area. Retail service is also provided to a patchwork of customers located outside the City, such as the Town of Sunol, San Francisco International Airport, Lawrence Livermore National Laboratory, and Castlewood CSA. These areas are not contiguous and are collectively referred to as the suburban retail service area. Both the in-City and suburban retail service areas are shown in Figure 3-3.

3.2.1 Climate

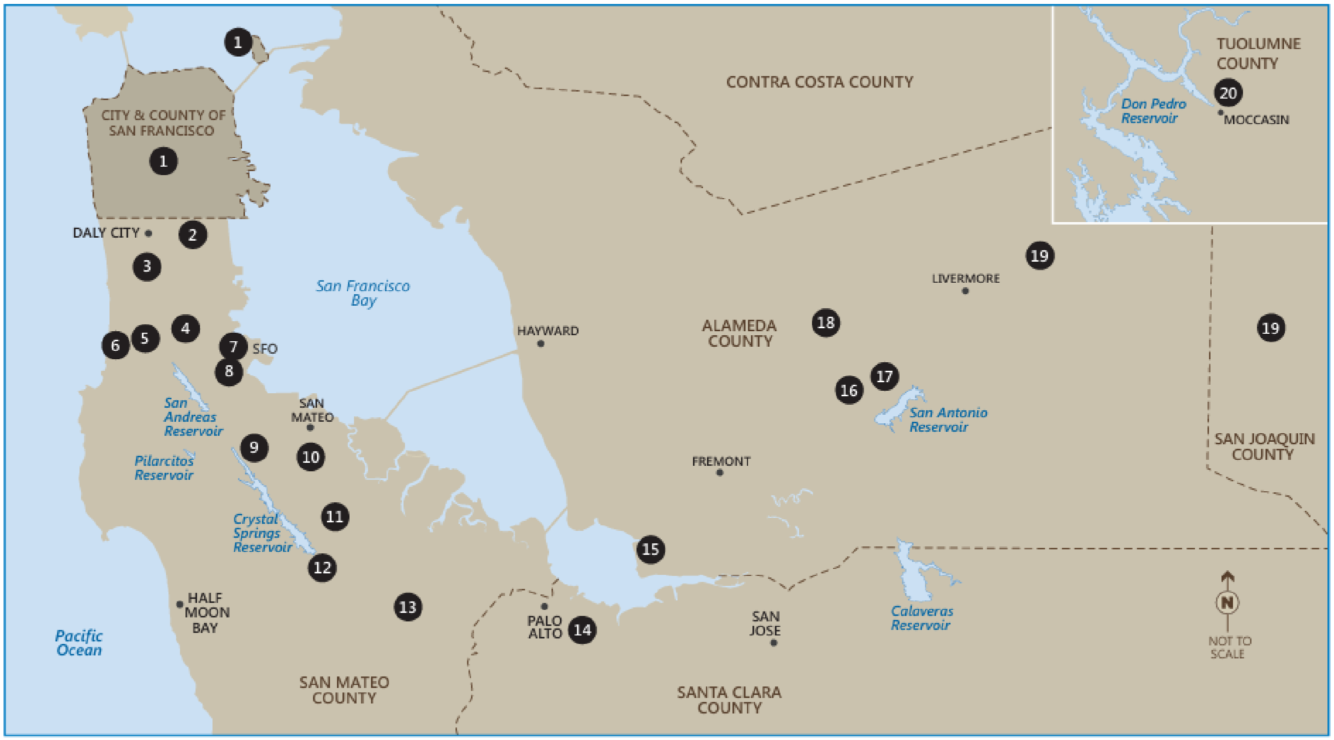
The San Francisco Bay Area has a Mediterranean climate where summers are cool and winters are mild with infrequent rainfall. Temperatures average 57.8 degrees Fahrenheit annually, ranging from the upper 40s in the winter to the upper 60s in the late summer. Strong onshore flow of wind in the summer keeps the air cool, generating fog through September. The warmest temperatures generally occur in September and October. Rainfall averages about 22 inches per year and is generally confined to the "wet" season from late October to early May.[4] Except for occasional light drizzles from thick marine stratus clouds, summers are nearly dry. For a discussion of climate change and potential impacts, see Section 6.1.3.

---

[3] The Castlewood wells are the last remnant of Spring Valley's Pleasanton well system, which were last used to export water to San Francisco for 15 months in 1948-49.

[4] Average maximum and minimum temperatures and total annual rainfall data obtained from the National Weather Service, 2000-2025 data from the downtown San Francisco station. Accessed from: weather.gov.

Figure 3-3. Retail Service Customers



IN-CITY RETAIL SERVICE AREA

1 City and County of San Francisco

SUBURBAN RETAIL SERVICE AREA

2 Residential and Non-residential Customers in Daly City
3 Cemeteries in Colma
4 Golden Gate National Cemetery
5 San Francisco County Jail #3
6 Sharp Park Golf Course
7 San Francisco International Airport
8 SFPUC Millbrae Headquarters
9 Crystal Springs Golf Course
10 Peninsula Golf and Country Club
11 Residential Customers in Redwood City
12 Filoli Center
13 Menlo Country Club
14 NASA Ames Research Center
15 Cargill Salt
16 Residential and Non-residential Customers in Sunol
17 GE Hitachi Nuclear
18 Castlewood Country Club
19 Lawrence Livermore National Laboratory (Mocho Shaft at Site 200 and Thomas Shaft at Site 300)
20 Residential and non-residential customers in Moccasin

The suburban customers shown above represent the majority of water use in the suburban retail service area, but are not comprehensive. Groveland Community Services District (CSD) is alternately characterized as a retail and wholesale customer. For the purposes of the UWMP, Groveland CSD is considered a wholesale customer.

3.2.2 Population and Demographics

As shown in Table 3-3 the total population in the retail service area is currently estimated to be 843,881 and is projected to increase to over 1.2 million by 2050. Retail population projections are provided here; however, projected retail water demands are based on projected housing and employment growth provided by the San Francisco Planning Department rather than projected population growth. See Section 4.1 for further discussion of retail demand projections.

Table 3-3. Retail Service Area Actual and Projected Population

[Standardized Table 3-1 Retail: Population - Current and Projected]

Retail Service Area	2025 (Actual)	2030	2035	2040	2045	2050
In-City Retail[a]	842,027	1,008,333	1,063,920	1,119,800	1,174,800	1,229,800
Suburban Retail[b]	1,854	1,854	1,854	1,854	1,854	1,854
Total Retail	843,881	1,010,187	1,065,774	1,121,654	1,176,654	1,231,654

a Actual 2025 County of San Francisco population obtained from the California Department of Finance Report E-5, released May 2025. County of San Francisco population projections obtained from the San Francisco Planning Department consistent with the 2025 memo for housing unit projections with an assumption of 2.2 people per housing unit.

b Actual and projected population based on the number of retail residential service connections in Redwood City, Daly City, Fremont, Millbrae, and Sunol; the number of homes in Castlewood CSA; inmate population of the San Francisco County Jail #3 in San Bruno (previously Jail #5); and 2018-2023 U.S. Census data. The estimated population in the suburban retail service area was developed by multiplying the area's respective housing unit occupancy data from the U.S. Census by recorded in sales data. Population for Groveland CSD is not included in the suburban retail service area population but instead reported within the wholesale service area population in Table 3-4. Actual and projected population estimates previously reported in the 2020 UWMP included residential, commercial, industrial, irrigation and institutional connections. The actual and projected population estimates presented in this table only account for the residential connections within the suburban retail service area.

The retail service area, particularly the in-City portion, is highly urbanized, dense, and experiencing infill development. Open space and landscaped areas are limited, as are lot sizes. The City is almost fully built-out with a few, large areas under construction, such as Candlestick Point/Hunters Point Shipyard, Treasure Island/Yerba Buena Island, Mission Bay, and Pier 70. Most of these areas are located along the eastern shoreline of the City and are comprised of mixed-use, multi-family residential, and commercial high-rise buildings.

Housing unit estimates for San Francisco are based on San Francisco's Housing Element 2022 Update objective, which plans to add an average of 5,000 housing units per year, with adjustments for certain large developments. It is projected that the number of single family detached houses will not increase, and it is anticipated that nearly all of the new housing built in San Francisco will be multi-family buildings. Currently, the ratio of multi-family households to single family households in the City is approximately 3:1 (i.e., one-fourth of total housing is single family). As new housing is built, the SF Planning Department has assumed all new units will be multi-family. The multi-family to single-family housing ratio will increase to over 5:1 (i.e., one-sixth of total housing will be single family) by 2050.

Additional information about demographic data sources and assumptions supporting the retail demand projections can be found in Appendix C.

3.3 WHOLESALE SERVICE AREA

Under the terms of a 25-year contract known as the Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County (WSA), the SFPUC sells water to 26 wholesale customers (collectively referred to as the Wholesale Customers). The SFPUC has associated individual water sales contracts with each Wholesale Customer, as well. The SFPUC also sells water to two other wholesale customers, Cordilleras MWC and Groveland CSD. These customers are further described below:

- **Wholesale Customers and BAWSCA:** Enabled by Assembly Bill (AB) 2058, BAWSCA was established on May 27, 2003 to represent the interests of 24 cities, water districts, an investor owned utility, and a university in Alameda, Santa Clara, and San Mateo Counties that purchase water on a wholesale basis from the RWS. Since 1970, the SFPUC has supplied approximately 65% of the total Wholesale Customers' demand. Twenty-one of the Wholesale Customers rely on the RWS for more than 60% of their drinking water supply.

- **Cordilleras MWC:** Cordilleras MWC serves a community of 18 single family homes in Emerald Hills, located in unincorporated San Mateo County. It is not considered an urban water supplier as defined by CWC Section 10617. It is not a member of BAWSCA and not subject to the terms of the WSA. However, Cordilleras MWC has a water supply contract with the SFPUC for 3,007 CCF annually (about 0.006 MGD).

- **Groveland CSD:** As described in Section 2.4, Groveland CSD primarily serves residential and commercial customers in Groveland, Big Oak Flat, and Pine Mountain Lake, located in a semi-rural area of southern Tuolumne County. Although Groveland CSD is considered a retail customer of the SFPUC and is accounted as such in the SFPUC's contractual obligations and supply planning, the SFPUC has been directed by DWR to report Groveland CSD as a wholesale customer since its 2015 UWMP update and maintains this distinction in this 2025 UWMP. Therefore, Groveland CSD is included in the wholesale service area for the remainder of this section. It is not a member of BAWSCA and not subject to the terms of the WSA.

The wholesale service area encompassing the Wholesale Customers, Cordilleras MWC, and Groveland CSD is shown in Figure 3-4.

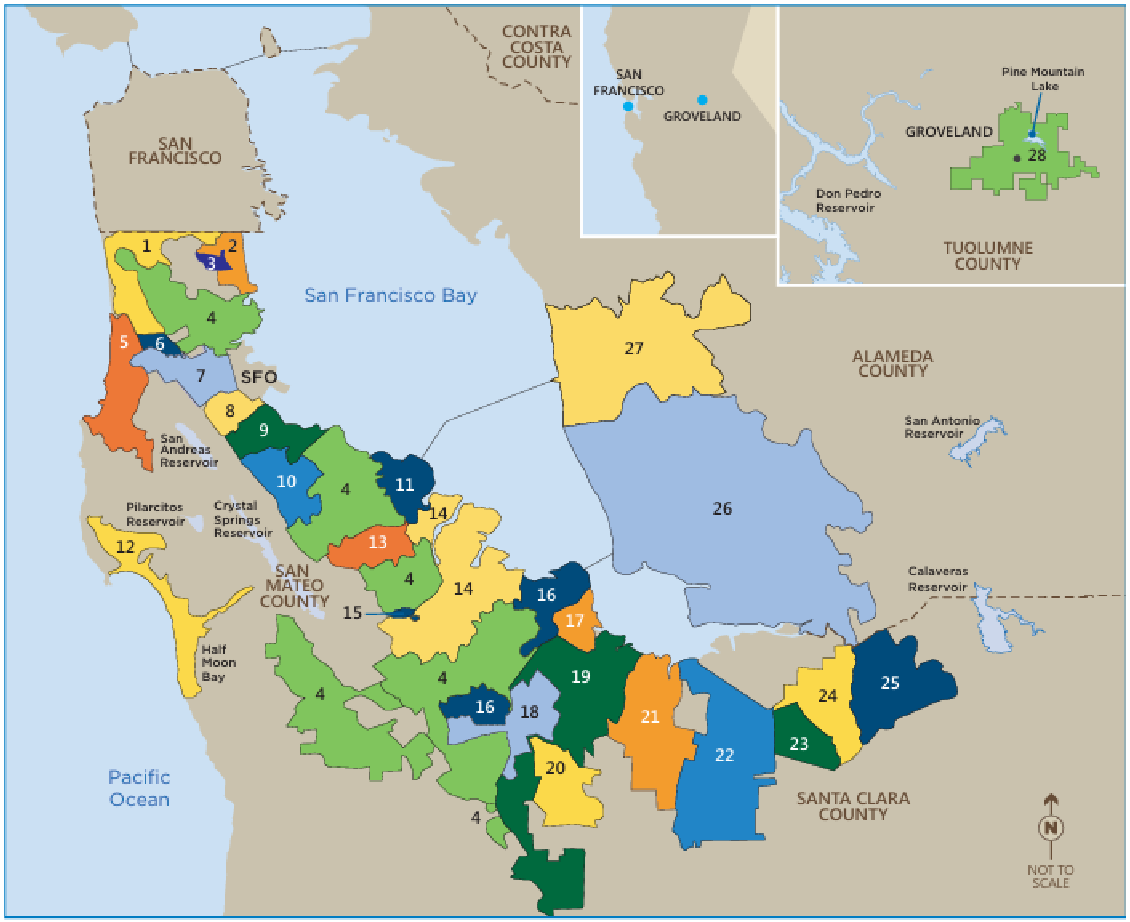
3.3.1 Climate

As described in Section 3.2.1 for the retail service area, the San Francisco Bay Area has a Mediterranean climate. Varied topography throughout the Bay Area creates numerous microclimates dependent upon elevation, proximity to the Bay or coast, orientation with respect to the ocean, and wind patterns. These microclimates also result in different rainfall amounts and evapotranspiration rates. However, in general, the wholesale customers experience a climate like the SFPUC's customers in the in-City retail service area, except for those wholesale customers who are located in the southern and inland regions of the Bay Area that tend to experience warmer temperatures in the summer months with less incidence of fog.

Further inland in the Sierra Nevada foothills, Groveland CSD experiences hot, dry summers and mild winters. Most of Groveland CSD's service area is located at elevations of 2,800 to 3,300 feet, so it is not subjected to the long, severe winters and heavy snowfall that are experienced at higher elevations above 5,000 feet.

For a discussion of climate change and potential impacts, see Section 6.1.3.

Figure 3-4. Wholesale Service Area



MUNICIPALITIES

2 City of Brisbane
9 City of Burlingame
1 City of Daly City
17 City of East Palo Alto
27 City of Hayward
16 City of Menlo Park
8 City of Millbrae
25 City of Milpitas
21 City of Mountain View
19 City of Palo Alto
14 City of Redwood City
7 City of San Bruno
24 City of San Jose[a]
23 City of Santa Clara[a]
22 City of Sunnyvale
10 Town of Hillsborough

WATER PURVEYING DISTRICTS

26 Alameda County Water District
12 Coastside County Water District
11 Estero Municipal Improvement District
3 Guadalupe Valley Municipal Improvement District
13 Mid-Peninsula Water District
5 North Coast County Water District
20 Purissima Hills Water District
6 Westborough Water District
28 Groveland Community Services District[b]

OTHER ENTITIES

4 California Water Service Company[c]
18 Stanford University
15 Cordilleras Mutual Water Company[d]

a. The SFPUC provides water on an interruptible basis to fixed service areas in the northern portions of the cities of San Jose and Santa Clara.

b. The SFPUC reports Groveland Community Services District as a wholesale customer in its 2025 UWMP because it is an urban water supplier and prepares its own UWMP and WSCP. Outside of the UWMP and WSCP, the SFPUC considers Groveland Community Services District a Retail Customer in the context of allocating RWS supplies between Retail and Wholesale Customers.

c. California Water Service Company (Cal Water), an investor-owned utility, provides water service to four separate districts in the SFPUC's wholesale service area, which are consolidated into three operating districts: Bear Gulch (serving Portola Valley, Woodside, Atherton, and portions of Menlo Park, Redwood City, and San Mateo County), Mid-Peninsula (serving San Mateo and San Carlos), and South San Francisco.

d. Cordilleras Mutual Water Company is not a member of BAWSCA.

3.3.2 Population and Demographics

Population projections for the wholesale service area are from three sources: BAWSCA, Cordilleras MWC, and Groveland CSD. BAWSCA's figures come from its *Regional Water Demand and Conservation Projections Study* (December 2025). Cordilleras MWC provides its own population estimates. Groveland CSD's projections rely on its 2023 *Integrated Water and Wastewater Master Plan*, which assumes a 3.44% average annual growth rate. As shown in Table 3-4, the total population in the wholesale service area is currently estimated to be about 1.9 million and is projected to increase to over 2.6 million by 2050. This corresponds to an average growth rate of about 1.2% per year.

Compared to the retail service area, the majority of which is the City and County of San Francisco, the wholesale service area is less dense and populated, but still fairly urbanized and built out. Single family homes are more prevalent and lot sizes are larger.

Table 3-4. Wholesale Service Area Actual and Projected Population

[Standardized Table 3-1 Wholesale: Population - Current and Projected]

Wholesale Service Area	2025 (Actual)	2030	2035	2040	2045	2050
BAWSCA Member Agencies	1,896,180	2,048,994	2,171,693	2,303,905	2,433,408	2,595,684
Cordilleras MWC	64	64	64	64	64	64
Groveland CSD	4,144	4,907	5,810	6,880	8,146	9,646
Total Wholesale	1,900,388	2,053,965	2,177,567	2,310,849	2,441,618	2,605,394

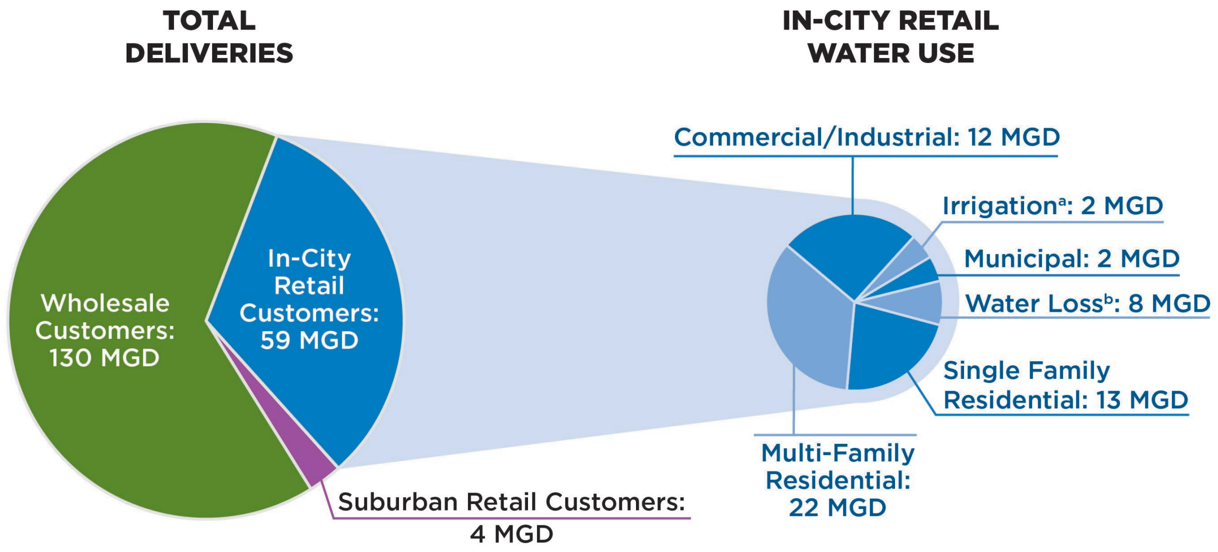
This page intentionally left blank.

SECTION 4: WATER DEMANDS

This section describes and quantifies the current and projected water uses within the SFPUC's retail and wholesale service areas. Retail demand projections are based on recent demographic information and a detailed analysis of water use characteristics. Wholesale demand projections for RWS supplies were developed by the Wholesale Customers. Note that the terms "use," "demand," and "consumption" are used interchangeably in this 2025 UWMP. Additionally, water loss is included in total retail demands unless otherwise noted.

As described previously, approximately two-thirds of the SFPUC's annual water deliveries are provided to wholesale customers, and the remaining one-third is delivered to the retail customers. In 2025, the SFPUC delivered approximately 191 MGD of RWS supplies to its entire water service area, with an additional 1.9 MGD in groundwater and 0.1 MGD in recycled water provided to retail customers. Figure 4-1 shows the total volumes of water delivered to wholesale customers, in-City retail customers, and suburban retail customers. Approximate water use by sector in the in-City retail service area is also shown in Figure 4-1.

Figure 4-1. Total Deliveries and In-City Retail Water Use in 2025



a This data is from dedicated irrigation accounts only and does not include irrigation use from water accounts that jointly serve both indoor and outdoor demands. Irrigation use includes use of local groundwater and recycled water.

b Water loss includes apparent losses (e.g., inaccuracies associated with customer billing, illegal use) and real losses (e.g., distribution system losses, main breaks). Unbilled, authorized consumption for operational uses (e.g., pipe flushing, street cleaning), has been included in the municipal category.

Groveland CSD is accounted for differently in this section of the 2025 UWMP and the corresponding standardized tables in Appendix B. This section includes Groveland CSD in the estimation of retail demands because, in the context of RWS supply allocations between the SFPUC and its Wholesale Customers, Groveland CSD is a retail customer. In contrast, the standardized tables in Appendix B include Groveland CSD in the estimation of wholesale demands, as directed by DWR and explained in Section 2.4.

4.1 RETAIL DEMANDS

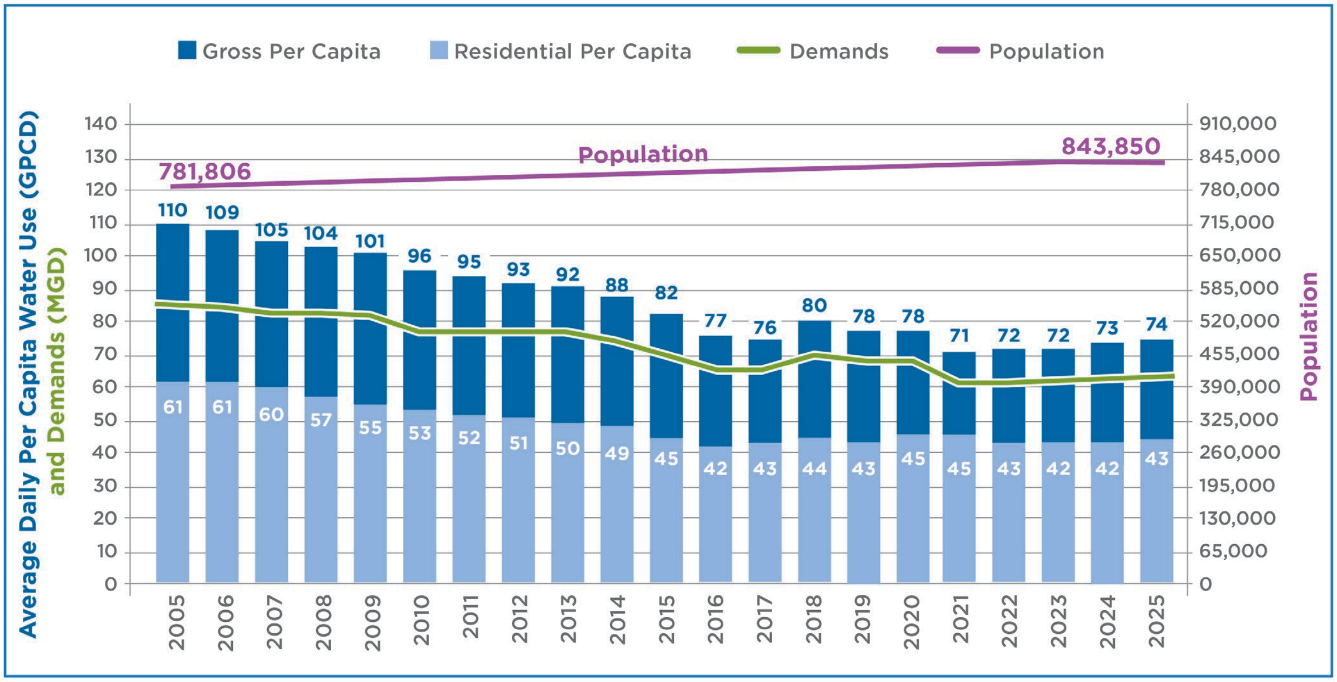
4.1.1 Current Retail Demands

Water use within San Francisco (i.e., the in-City retail service area) continues to be among the lowest in the State and below historical consumption. Both total consumption and per capita water use (i.e., gallons of water consumed per person per day [GPCD]) have been on a general decline since the mid-1970s. Many factors have contributed to this reduction in water use, including significant changes to the mix of industrial and commercial businesses and their associated water demand, and the general characteristics of water use by San Franciscans. In particular, the severe droughts of 1976-77 and 1987-92, changes in plumbing codes, and conservation programs (either voluntarily embraced by residents and businesses or mandated by the City) have affected water demands. During the drought in 2012-16, per capita water use further declined. Following the start of the COVID-19 pandemic and shelter-in-place order issues in March 2020, retail water demands decreased by approximately 10% due to a steep decline in commercial and industrial water use.

As illustrated in Figure 4-2, daily per capita water use and deliveries for all retail customers (i.e., in-City and suburban) have declined over the past decade and have remained consistently low over the past five years. Figure 4-2 presents per capita water use on both a gross basis (i.e., water use by all sectors) and a residential basis (i.e., water use by the residential sector only). Daily gross per capita water use comes from dividing total water demand by the total population while daily residential per capita water use comes from dividing residential demand by the residential population. The residential population was estimated using total population minus group quarter population—people living in non-household settings such as correctional facilities, nursing homes, and shelters. According to current estimates from the California Department of Finance, about 3.6% of San Francisco's population lives in group quarters. In 2025, in-City retail customers gross water use was 69.5 GPCD, with a residential per capita water use of 42.9 GPCD. Including suburban retail customers, the total gross and residential per capita water use for all retail customers is 74.1 and 42.9 GPCD. This gross per capita water use calculation divides 62.5 MGD (total water demand) by 843,881 people (as shown in Table 3-3), and the residential per capita water use divides 34.9 MGD by 812,841 people, which represents the in-City and suburban retail residential population. In-City residential population reflects the total population minus 3.6% for the group quarter population in San Francisco. These per capita rates are among the lowest in the State.

As an urban water supplier, the SFPUC is required to report water use data to the SWRCB in response to various emergency and permanent conservation regulations. Between 2014 and 2023, the SFPUC reported total water production and residential per capita water use monthly to the SWRCB through its former Drinking Water Drought and Conservation Reporting platform. Since 2023, the SWRCB has required urban suppliers to report similar and expanded water use data monthly and quarterly for each regulated water system. Additionally, the SWRCB's "Making Conservation a California Way of Life" regulation went into effect on January 1, 2025. Pursuant to the regulation, urban retail water suppliers are required to submit a reporting form to the SWRCB annually. The SFPUC submitted its first such report in December 2024, covering FY 2023-24 water use. SFPUC water use was below its calculated objective for that reporting period, and the SFPUC anticipates its use will continue to remain under its objective in future years.

Figure 4-2. Trends in Average Daily Per Capita Water Use, Retail Demands, and Population between 2005 and 2025



In 2025, total retail demand (including both in-City and suburban retail customers) was 62.5 MGD, which is much lower than the SFPUC retail demand anticipated in the 2015 UWMP. Of this demand, in-City retail customers used approximately 58.4 MGD (94% of total retail demand), of which 1.5 MGD was met with groundwater, 0.1 MGD was met with recycled water, and the remainder was met with RWS supplies. Suburban retail customers used approximately 4 MGD (6% of total retail demand), of which 0.2 MGD was met with groundwater and the remainder was met with RWS supplies. Total retail water loss, including both real and apparent losses, was estimated to be 7.2 MGD.

The SFPUC generally tracks and projects retail customer demands by each of the major sectors outlined below. Current retail demands for each of these sectors are shown alongside projected demands in Table 4-1.

- **Single Family Residential:** Single family demands represent approximately one-fifth of total retail demand. Due to the Bay Area's moderate climate and high-density housing, especially in the City, residential water use is primarily indoors.

- **Multi-Family Residential:** Multi-family households include apartments, condominiums, and townhouses. This sector represents approximately two-thirds of total retail demand. Average outdoor water use is limited since outdoor space for many multi-family households are generally limited to patios and shared spaces, if any.

- **Non-residential:** This sector includes all other water uses not designated as residential. It includes commercial, industrial, institutional, municipal, and irrigation (through a dedicated meter) water accounts. Non-residential water use represents almost one-third of total retail demand.

- **Water Loss:** Water loss is defined as the difference between the quantity of water supplied to customers and the quantity of water consumed by customers. It is comprised of both apparent losses (customer meter inaccuracies, unauthorized consumption, and systematic data handling errors) and real losses (water main breaks, system leakage, and storage tank overflow). For more information on water loss, see Section 4.1.4 and Appendix G.

4.1.2 Projected Retail Demands

4.1.2.1 Methodology Used to Project Retail Demands

Beginning in 2015, the SFPUC transitioned away from an end use-based model to an econometric model for demand projections. Econometric models incorporate socioeconomic factors to project demands and are able to capture a more complete demand picture. This demand projection methodology is becoming more prevalent among urban water utilities and managers. The demand projections shown in Table 4-1 below are comprised of the following components:

- **In-City Single Family, Multi-Family, and Commercial/Industrial Demands**: Econometric models are used to project the demands for these three sectors. Detailed information about these models is provided in Appendix C.
    - Active conservation savings are savings achieved through SFPUC conservation program activities, such as fixture incentives and leak alerts. The models explicitly incorporate active conservation savings. The SFPUC estimates these savings using an end-use-based water savings accounting model customized for the SFPUC from the Alliance for Water Efficiency's Water Conservation Tracking Tool. Additional information about this customized model, referred to as the SFPUC Water Conservation Tracking Model, is provided in Appendix D.
    - Passive conservation savings are savings achieved through natural fixture replacement and changes to the plumbing code over time. In an effort to avoid double-counting of passive conservation savings, the SFPUC did not subtract from the modeled demands the passive savings estimated by the SFPUC Water Conservation Tracking Model. For an excerpt of the passive savings from the Retail Conservation Plan, see Table 4-2. While it is not the SFPUC's intention or purpose in setting water rates, the SFPUC also assumes that some passive savings (e.g., per-capita water use reductions) may occur in response to changes in water rates. For example, when the volumetric component of water rates increases, people may respond by replacing inefficient fixtures to save costs or by reducing their total water consumption. Single family, multi-family, and commercial and industrial sectors all show a correlation between increasing water rates and decreasing water use. Although the SFPUC may not account for all passive savings, subtracting passive savings that the SFPUC estimated separately would likely result in a double counting of conservation savings. For an estimate of both passive and active conservation savings, refer to the SFPUC's Retail Water Conservation Plan. The Retail Water Conservation Plan provides an

overview of the retail water conservation program, the factors that shaped the program, estimated water savings, and the program's effect on the overall retail water demand projection. This plan is a key element of the SFPUC's water supply management and planning and is updated every five years to coincide with each UWMP update. The plan may be accessed online at **www.sfpuc.gov/learning/conserve-water**.

  - The models incorporate savings from the Onsite Water Reuse Program, which was established by the Non-potable Water Ordinance (per Article 12C of the San Francisco Health Code) and requires developments over a certain square footage to install onsite water systems. These savings were estimated by SFPUC staff. Additional information about this estimate can be found in Section 4.1.3.

- **Other In-City Non-Residential Retail Demands (i.e., Irrigation and Municipal) and Suburban Retail Demands**: These demands are estimated based on historical consumption and supplement the demands projected by the econometric models described above. These demands are assumed to be constant through 2050 because no significant growth is anticipated among these sectors.

- **Groveland CSD**: Groveland CSD provided to the SFPUC its projected demands through FY 2049-50. Demands for Groveland are projected to increase from 0.4 MGD in FY 2024-25 to 0.9 MGD in FY 2049-50, based on the anticipated level of development for this service area. As shown in the Groveland Community Services District Integrated Water and Wastewater Master Plan (2023), population is estimated to double over the next twenty years.

- **Water Loss**: Water loss is projected separately and is described in Section 4.1.4.

A key aspect of the retail demand projections starting in the 2020 UWMP is that the SFPUC calibrated the econometric models using 10 years of historical San Francisco account-level water usage data. The SFPUC combined this data with property characteristics, demographic characteristics, and historical climate data to create an econometric model that evaluates the impact of several factors on household-level demands. The SFPUC then projected demands based on the growth assumptions discussed below, along with expected future changes in rates and climate.

The models rely on household and employment projections provided by the San Francisco Planning Department.

- **Housing Growth Projections:** The SF Planning Department updated citywide housing projections through 2050 based on the certified Housing Element 2022 Update Environmental Impact Report (Housing Element EIR) and approved Housing Element. The Housing Element EIR includes projections for 2035 and 2050. To produce the five-year incremental projections required by the California Water Code for the UWMP, the Planning Department assumed a constant, straight-line rate of housing production for 2020-2035 and 2035-2050, using 2020 existing conditions as the base year. According to the SF Planning Department's 2024 Housing Inventory (published in April 2025), the city's actual housing stock at the end of 2024 was approximately 418,000 units, which is lower than the 433,000 units shown for 2025 in the projections. The demand model uses the actual 2024 housing unit inventory estimate of 417,824 units as the number of housing units in 2025.

- **Employment Growth Projections:** The SF Planning Department's current job projections through the year 2050 derive from their Land Use Allocation published in 2021, which were consistent with the projections in Plan Bay Area 2050, adopted by the Metropolitan Transportation Commission and the Association of Bay Area Governments in 2021. The commercial and industrial sector model accounts for employment distributed across a variety of sectors, such as office/professional, manufacturing, health, and education.

The demand projections for the three sectors modeled with an econometric model (single family, multi-family, and commercial/industrial) were grown from a normalized base year, i.e., the FY 2024-25 demands were normalized to represent an average year. The impacts of the COVID-19 pandemic were removed, and the demands were adjusted to reflect average temperature conditions. Normalizing the base year for demand projections removes the impact of idiosyncrasies that make any given year different from the average year, rather than assuming that these idiosyncrasies will continue in all future years.

Separately, Groveland CSD prepared its own demand projections for use in its 2025 UWMP. Groveland CSD provided these projections to the SFPUC to report as part of the SFPUC's wholesale demands in the standardized tables of this UWMP update (see Appendix B). However, in the body of this UWMP, Groveland CSD's demands are included in the SFPUC's retail demands, as discussed above. The demand projections Groveland CSD reported to the SFPUC are subject to change as part of Groveland CSD's UWMP process.

4.1.2.2 Retail Demand Projections by Sector

Actual water demands for 2025 come from customer billing records. Residential demand projections—both single family and multi-family—are based on an econometric model developed for the SFPUC. Commercial and industrial projections use the same model, while municipal and irrigation demands are held constant at FY 2024-25 levels. Water losses include both apparent and real losses. The 2025 in-City retail water loss estimate comes from the validated FY 2024-25 water loss audit. Other reported uses include unbilled and unmetered water. Because the suburban retail service area has no multi-family accounts, all suburban residential demand is classified as single-family. Suburban retail losses are negligible. Groveland CSD is treated as a retail customer in this table and in later retail supply and demand comparisons. Its demand projections were provided by Groveland CSD and are based on its population projections. In Appendix A, however, Groveland CSD appears under wholesale rather than retail. Table 4-1 presents the SFPUC's updated retail demand projections by sector for 2030 through 2050. These projections show total retail demand reaching 73.4 MGD in 2050.

Table 4-1. Actual and Projected Retail Demands (MGD)

[Standardized Table 4-1 Retail: Demands for Potable and Raw Water - Actual]
[Standardized Table 4-2 Retail: Demands for Potable and Raw Water - Projected]
[Standardized Table 4-3 Retail: Total Water Demands]
[Standardized Table 6-4 Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area]

Retail Sector or Use Type	Actual 2025 Demands	Projected 2030 Demands	Projected 2035 Demands	Projected 2040 Demands	Projected 2045 Demands	Projected 2050 Demands
In-City Retail						
Single Family Residential	12.6	13.3	13.0	13.0	13.0	13.0
Multi-Family Residential	22.2	26.2	27.1	28.7	30.4	32.2
Commercial and Industrial	12.4	12.0	10.7	11.1	11.5	12.2
Municipal	2.2	2.2	2.2	2.2	2.2	2.2
Irrigation	1.5	1.5	1.5	1.5	1.5	1.5
Water Loss and Other	7.6	7.8	7.8	7.8	7.8	7.8
Subtotal In-City Retail Demand	58.5	62.9	62.3	64.3	66.3	68.9
Suburban Retail						
Single Family Residential	0.1	0.1	0.1	0.1	0.1	0.1
Non-Residential	3.6	3.6	3.6	3.6	3.6	3.6
Groveland CSD	0.3	0.4	0.5	0.6	0.7	0.9
Water Loss	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal Suburban Retail Demand	4.0	4.1	4.2	4.3	4.4	4.5
Total Retail Demand	**62.5**	**67.0**	**66.5**	**68.6**	**70.7**	**73.4**

Total retail demand is projected to increase by about 17%, from 62.5 MGD in 2025 to 73.4 MGD in 2050, which includes water savings from active conservation programs and the Onsite Water Reuse Program. While there is an overall increase in retail demands due to projected population and employment growth, there is an anticipated decrease in gross and residential per capita water usage across the retail service area, influenced by rate changes, temperature, and precipitation, as further detailed in Appendix C. See Figure 4-3 for a comparison of gross and residential per capita water usage from 2025 to 2050.

Both the projected demands and conservation savings reported in this 2025 UWMP are conservative, as new building codes, standards, and programs that increase water use efficiency and reduce water use will likely be implemented. A closer analysis of the estimated conservation savings is provided in the SFPUC's Retail Water Conservation Plan referenced above. Sector-specific observations are summarized below:

- **Single Family Residential:** Single family residential water use is projected to increase by 3% between 2025 and 2050. Similar to the demand projections in the 2020 UWMP, the demand projections in this 2025 UWMP assume no new single-family homes will be constructed in the retail service area over the planning horizon. In-City single family residential demands are modeled as a function of socioeconomic factors that include water price, precipitation, and temperature. Single family per household usage is expected to decline as a result of conservation savings and responses to rate increases.

- **Multi-Family Residential:** Multi-family residential water use is projected to increase by 45% between 2025 and 2050. In-City multi-family residential demands are modeled as a function of the water and sewer rates, temperature, and precipitation. Compared to single family residential demands, multi-family residential demands may be more sensitive to rate changes, but less sensitive to increases in temperature or decreases in precipitation. Multi-family households have relatively little outdoor water use.
- **Commercial and Industrial:** Commercial and industrial water use is projected to decrease by 13% between 2025 and 2035 before rebounding up to the 2025 levels by 2050. While the in-City commercial and industrial demands are directly related to the growth in employment, commercial and industrial demands are also influenced by utility rates, precipitation, and temperature.
- **Municipal, Irrigation, and Suburban Retail:** Municipal, irrigation, and suburban retail (except for Groveland CSD) water use is projected to hold flat across the planning horizon based on historical trends. These demands are anticipated to stay constant at their FY 2024-25 levels. The water demand from these sectors is not as influenced by housing or employment growth compared to that of the residential and commercial sectors, and demands have historically varied within 1 MGD year to year including during a water shortage emergency.
- **Water Loss and Other:** Water loss and other unmetered water use is projected to be a constant 7.8 MGD between 2025 and 2050 for planning purposes, based on the latest three-year historical average between FY 2022-23 and FY 2024-25 for water loss (i.e., 7.1 MGD) and other unmetered water use (0.7 MGD). More information on water loss projections is provided in the next section.

Figure 4-3. Projected Retail Demands, Population, and Per Capita Water Use.

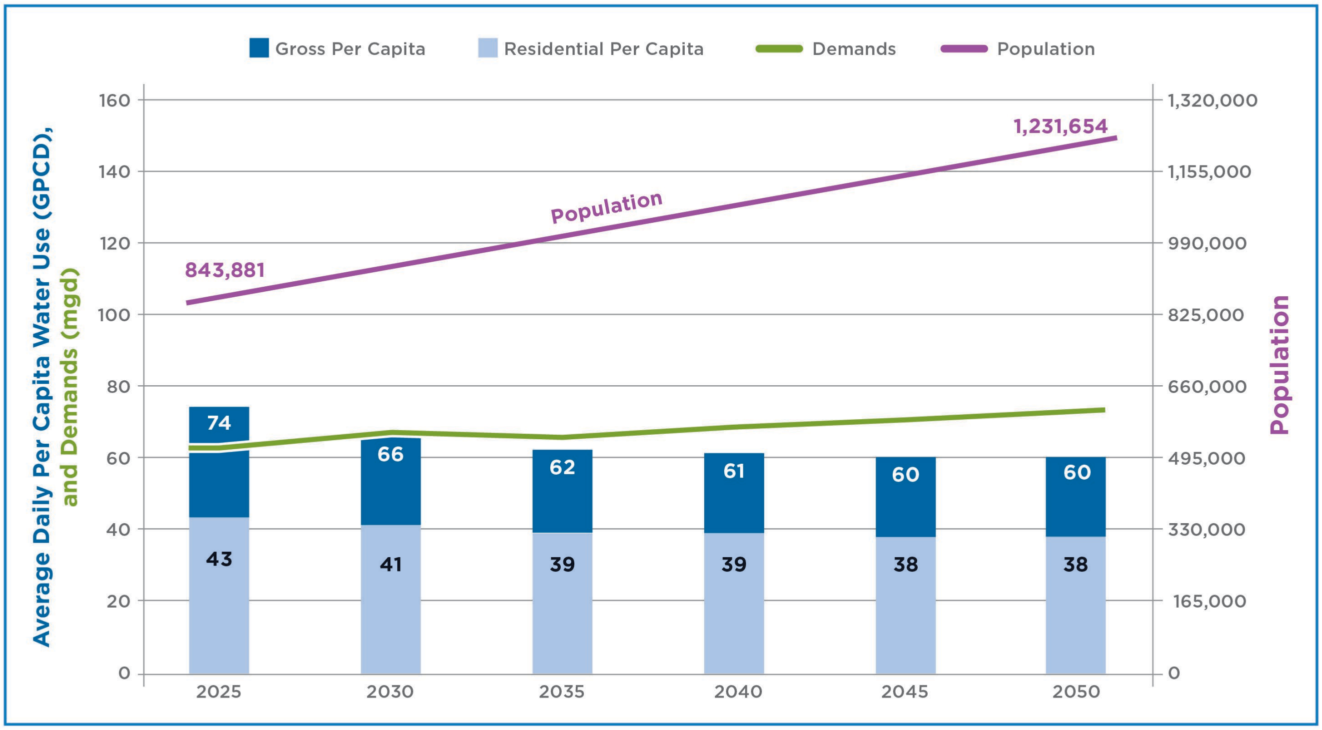


Table 4-2. Projected Passive Savings (Relative to 2025) (MGD)

Retail Sector	2025	2030	2035	2040	2045	2050
Single Family Residential	0.0	-0.4	-0.7	-1.0	-1.2	-1.3
Multi-Family Residential	0.0	-0.7	-1.2	-1.5	-1.8	-2.0
Non-Residential	0.0	-0.3	-0.4	-0.6	-0.7	-0.9
Total Passive Savings	**0.0**	**-1.4**	**-2.4**	**-3.1**	**-3.7**	**-4.1**

4.1.2.3 Additional Retail Demand Scenarios

The SFPUC recognizes that past UWMP demand projections have historically been conservatively higher than actual water use. During development of the SFPUC's 2024 AWS Plan, several public comments suggested that the SFPUC create additional retail demand scenarios and conduct a sensitivity analysis similar to the one in BAWSCA's *Regional Water Demand and Conservation Projections Update* (2022) for the Wholesale Customers. This recommendation was incorporated into the AWS Plan, and the SFPUC committed to developing one to two additional retail demand scenarios, including a sensitivity analysis.

A sensitivity analysis tests how changes in key assumptions affect projected outcomes. For water demand projections, it helps identify which variables have the greatest influence on future demand and shows how projections shift under different conditions. This approach improves transparency and strengthens long-term planning by highlighting uncertainty and the range of potential futures.

The SFPUC interviewed peer water agencies that also use econometric demand models, coordinated with BAWSCA on its demand study update, and reviewed BAWSCA's 2022 sensitivity analysis. The SFPUC evaluated several variables, including housing growth, employment growth, water conservation savings, SFPUC rate projections, and vacancy rates. Of these variables, housing and employment growth influenced future demand projections the most.

Using this information, the SFPUC developed two hypothetical retail demand scenarios in addition to the retail demand scenario presented in this section (i.e., the UWMP Scenario) in accordance with the Urban Water Management Planning Act. These additional scenarios differ from the UWMP Scenario because they rely on alternative housing and employment growth projections. The first additional scenario is the Historical Growth Scenario, which uses linear regressions of historical population and job estimates to project future growth. The second additional scenario is the Department of Finance and Moody's Scenario, which uses population projections from the California Department of Finance and employment projections from Moody's Corporation. These additional scenarios may inform future water supply planning for the SFPUC beyond the UWMP. Appendix C provides more detail on the sensitivity analysis and the additional retail demand scenarios.

4.1.3 Onsite Water Reuse Water Savings

This 2025 UWMP accounts for the water supply savings from buildings in San Francisco that install and operate onsite water reuse systems as a type of conservation savings. The water supplies produced by these systems are not municipally-supplied by the SFPUC, and they serve to reduce demands on the SFPUC's system.

In September 2012, the City adopted the Onsite Water Reuse for Commercial, Multi-family, and Mixed Use Development Ordinance (Ordinance 195-12). Commonly known as the Non-potable Water Ordinance, this ordinance added Article 12C to the San Francisco Health Code, allowing for the collection, treatment, and use of alternate water sources for non-potable applications. The ordinance also established the SFPUC's Non-potable Water Program, since renamed the Onsite Water Reuse Program.

Since 2012, the Non-potable Water Ordinance has been amended to allow for district-scale projects, where two or more parcels can share alternate water sources. In 2015, Article 12C became a mandatory requirement for new development projects that contain 250,000 square feet or more of gross floor area to install and operate an onsite water reuse system. In October 2021, Article 12C was amended to further increase potable water savings from new developments and increase opportunities for cost-effective systems. The 2021 amendments lowered the mandatory square footage threshold to 100,000 gross square feet and modified the requirements for different project types. Commercial buildings must reuse blackwater and condensate for toilet flushing and drain trap priming. Mixed-use and multi-family residential buildings must reuse graywater and condensate for toilet flushing, irrigation, clothes washing, and drain trap priming. While they are not required to install an onsite water system under Article 12C, developments between 40,000 and 100,000 square feet of gross floor area must submit water budget applications to the SFPUC.

Onsite water systems are operated, maintained, and monitored by the property owner. Under the Onsite Water Reuse Program, the San Francisco Department of Public Health-Environmental Health (SFDPH-EH) has established ongoing monitoring requirements and water quality standards that are protective of public health. Different treatment levels are required depending on the alternate water source and end use. The frequency of monitoring and reporting also vary depending on the alternate water source, and they are identified in the San Francisco Department of Public Health's *Director's Rules and Regulations Regarding the Operation of Alternate Water Source Systems* and the operating permit for the onsite water system issued by the SFDPH-EH Branch.

In addition to projects that install mandatory onsite water reuse systems in accordance with the Non-Potable Ordinance, there are several projects that have voluntarily implemented onsite reuse. Some of these have received grants from the SFPUC via the Onsite Water Reuse Grant Program. The SFPUC also offers grant funding to breweries to collect, treat, and reuse process water (e.g., water used in the brewing process for applications such as rinsing bottles and cleaning equipment) generated onsite. The brewery grant program includes water quality, treatment, and monitoring standards for brewery process water reuse systems.

The SFPUC received two water budget applications to install onsite water systems in FY 2024-25, bringing the total number of water budget applications received and reviewed by the SFPUC since the beginning of the Onsite Water Reuse Program to 121. SFPUC staff also maintain a database of future projects that have not yet submitted water budget applications, but will have to comply with the Non-Potable Water Ordinance based on their proposed gross square footage. Using existing water budget applications and the assumptions in the SFPUC's Water Use Calculator, staff have estimated the future potable offsets that will be achieved by all known onsite water reuse projects, as shown in Table 4-3. This estimate of future savings is conservative because it does not include savings from future unknown projects that are assumed in the demand projections; as these projects do not yet exist, no information about them is available to estimate the offsets from their potential onsite water reuse systems.

The SFPUC estimates that the Onsite Water Reuse Program (both mandatory and voluntary projects) will generate a total potable water offset of approximately 1.55 MGD by 2045, which will be sustained through 2050.

Table 4-3. Actual and Projected Onsite Water Reuse Program Potable Offsets (MGD)

	Actual 2025 Savings	Projected 2030 Savings	Projected 2035 Savings	Projected 2040 Savings	Projected 2045 Savings	Projected 2050 Savings
Onsite Water Reuse Savings	0.15	0.63	1.43	1.55	1.55	1.55

4.1.4 Retail Distribution System Water Losses

Water loss is defined as the difference between the quantity of water supplied to customers and the quantity of water consumed by customers or other authorized uses. It is comprised of (1) apparent losses, which include inaccuracies associated with customer metering, estimated systematic data handling errors, and theft or illegal use; and (2) real losses, which include all water physically lost due to distribution system leaks, breaks, or overflows. Water loss in the retail service area ranges from 5 to 8 MGD annually.

The SFPUC conducts water loss audits of its retail water distribution system in accordance with the methods in AWWA's Manual of Water Supply Practices - M36, "Water Audits and Loss Control Programs" and Free Water Audit Software, pursuant to section 10608.34 of the California Water Code. State law requires water loss audits to be validated and submitted annually to DWR. The results of the water loss audits from the past five years are reported in Table 4-4; these include both apparent and real losses, as calculated in the AWWA worksheet. Water loss in FY 2024-25 was determined to be 7.16 MGD, of which 5.97 MGD was attributed to real losses and 1.19 MGD was attributed to apparent losses.

Table 4-4. Retail Annual Water Losses over the Past Five Years

[Standardized Table 4-4 Retail: 12 Month Water Loss Audit Reporting]

Reporting Period Start Date (mm/yyyy)	Volume of Water loss (MG/yr)	Volume of Water loss (MGD)
07/2021	1,959.99	5.37
07/2022	1,875.51	5.14
07/2023	2,382.43	6.53
07/2024	2,765.66	7.58
07/2025	2,614.56	7.16

As part of the "Making Conservation a California Way of Life" regulations, SWRCB established individual system water loss standards that water suppliers should reach by 2028. The SFPUC's real water loss standard is set at 27.1 gallons per service connection per day. Compliance with this real water loss standard will be reviewed starting in 2028 based on an average of the real water losses that the SFPUC reports in the three most recent annual water audits. Based on the current three-year average, the SFPUC's losses are 32.7 gallons per service connection per day, currently above its 2028 real water loss standard. The SFPUC is participating in ongoing operations with the goal of reaching its real water loss standard.

For planning purposes, the SFPUC projects total water loss in its in-City retail service area will be 7.8 MGD through 2050. This estimate is based on a three-year historical average, which comprises of real and apparent losses (7.1 MGD) and authorized, unbilled water usage (0.7 MGD). This estimate reflects, among other things, anticipated leaks and water main breaks due to aging infrastructure. The SFPUC's total projection for in-City water loss is a conservative estimate and reported as such in this 2025 UWMP.

Nearly all of the SFPUC's suburban retail customers are located immediately off of RWS transmission pipelines. Therefore, real losses in the suburban retail service area are assumed to be negligible and reported as such in this 2025 UWMP. As described in Section 3.1.5.2., the SFPUC operates the Castlewood Well System and the Town of Sunol domestic water system. However, the extent of distribution in the Castlewood Well System is limited from the well field to the control tank and reservoir; the system is not connected to the RWS. Because there is no master meter to the Town of Sunol, water loss in the Town of Sunol system cannot be directly measured. The primary source of water loss in the Town of Sunol is system maintenance flushing, which would occur regularly at a rate of 10,000 gallons per week for 50 weeks per year, or roughly 0.001 MGD. These losses in the suburban retail service area are considered to be negligible.

The SFPUC manages real losses through its Automated Water Meter Program and Linear Assets Management Program. Deployment of the Automated Water Meter Program began in 2010 as the SFPUC sought to upgrade all in-City retail water meters with wireless advanced metering technology. By 2025, the SFPUC had converted 99.5% of the meters to Advanced Metering Infrastructure. The Linear Assets Management Program replaces and renews distribution system pipelines and customer service connections for approximately 1,280 miles of drinking water mains in the City. More information about management of retail system losses is provided in Section 10.2.5.

4.1.5 Water Demands of Lower Income Households

The California Water Code requires water suppliers to include within their UWMPs projected water demands for lower income households (i.e., those with less than 80% of the area median income). This section documents the SFPUC's best effort to do so. The SFPUC does not use this estimate for any planning purposes. The demands of lower income households are included in the demand projections presented in Table 4-1.

The SFPUC estimated projected water use by lower income households by multiplying the planned future housing units for lower income residents by the estimated water use per household. This analysis, detailed below, is only performed for the in-City retail service area as lower income demands in the SFPUC's retail service area are primarily located in the City.

As described above, the demand projections presented here are based on housing growth projections from the Housing Element 2022 Update. The Housing Element 2022 Update estimates that of the 82,000 units that the City must plan for over the 2021-2031 period according to state law, 32,881 of those units are for low-income households.

Based on the water demand model, the average multi-family household is projected to use 72.1 gallons per unit per day in 2030. At this rate, the demand in 2030 for 32,881 lower income housing units is estimated to be 2.4 MGD.

This estimate of lower income water demand is reflected in the retail demand projections presented in Table 4-1. Although lower income housing growth and demands have not been analyzed separately, they have always been included in the SFPUC's retail demand projections and, subsequently, its related planning efforts.

The SFPUC complies with California Senate Bill 1087 (codified in California Government Code Section 65589.7) and does not deny or condition water service to housing developments intended for persons and families of lower income when sufficient water supply is available. Water service policies are applied consistently and without discrimination across all types of development.

4.2 WHOLESALE DEMANDS

As noted above and discussed in further detail below, the SFPUC sells water to 26 Wholesale Customers (collectively referred to as the Wholesale Customers) under the terms of a contract known as the Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County (WSA) and associated individual water sales contracts with each Wholesale Customer. Collectively, the Wholesale Customers receive over two-thirds of the RWS's annual deliveries, with the remaining approximately one-third provided to SFPUC's retail customers. Of the 26 Wholesale Customers, 10 rely on the SFPUC for 100% of their total supply. The remaining 16 Wholesale Customers rely on the SFPUC for a significant portion of their supply, but also use other local and imported supplies to meet their water customers' needs, including, but not limited to local groundwater and surface water, recycled water, and in some cases, purchases from the Santa Clara Valley Water District and the State Water Project.

In addition to the 26 Wholesale Customers, the SFPUC also provides water on a wholesale basis to Cordilleras MWC in San Mateo County and Groveland CSD in Tuolumne County. Cordilleras MWC relies entirely on the SFPUC for its supply, and Groveland CSD relies on the SFPUC for much of its supply. The demands of these two additional wholesale customers are small compared to the collective demands of the other Wholesale Customers.

4.2.1 Wholesale Water Contractual Obligations

The following section describes the water supply contracts that the SFPUC has with the Wholesale Customers.

4.2.1.1 Water Supply Agreement and Individual Water Sales Contracts

The WSA became effective on July 1, 2009, as its predecessor agreement, the 1984 Settlement Agreement and Master Water Sales Contract between the SFPUC and the Wholesale Customers (1984 Agreement), expired. The WSA, as amended and restated in 2025, describes the current contractual relationship between the SFPUC and the Wholesale Customers.

The WSA carries forward many components of the 1984 Agreement, including the SFPUC's "Supply Assurance" of 184 MGD to the Wholesale Customers. The SFPUC has agreed to deliver water to the Wholesale Customers up to the amount of the Supply Assurance, and this agreement is perpetual and survives the expiration of the WSA. The Supply Assurance is, however, subject to reduction due to water shortage, drought, scheduled RWS maintenance activities, and emergencies.

The Supply Assurance is shared among 24 of the 26 Wholesale Customers (all Wholesale Customers which have "permanent" status, except the cities of San Jose and Santa Clara, which are "temporary, interruptible" customers as discussed in Section 4.2.1.2 below). Twenty-three of these 24 Wholesale Customers have an "Individual Supply Guarantee" (ISG), which represents their dedicated individual share of the 184 MGD Supply Assurance. The ISGs are also perpetual and survive the expiration of the WSA. The City of Hayward is the 24th Wholesale Customer that shares in the Supply Assurance, but it does not have an ISG due to the terms of its 1962 individual water supply contract with the SFPUC did not contain a fixed allocation of water. The City of Hayward's unspecified water supply allocation is included in the Supply Assurance as the difference between 184 MGD and 161.9 MGD (the sum of the other 23 permanent Wholesale Customers' ISGs), or 22.1 MGD. If the City of Hayward's water purchases from the RWS exceeds 22.1 MGD over a period of three consecutive fiscal years (an event that has not occurred to date and is not projected to occur before 2050), the 23 Wholesale Customers with ISGs would be required to reduce their individual ISGs to accommodate the demands of Hayward.

Each Wholesale Customer also has an individual water sales contract with the SFPUC that describes the service area of the customer, identifies the location and size of service connections between the RWS and the customer's distribution systems, and in some instances contains additional specific provisions unique to the customer. The individual water sales contracts may be amended from time to time by the SFPUC and the applicable Wholesale Customer pursuant to the terms of the WSA.

4.2.1.2 Interruptible Customers

As noted above, the cities of San Jose and Santa Clara are not included in the Supply Assurance, and they do not have an ISG, because the SFPUC has provided water to them on a temporary and interruptible basis under the 1984 Agreement and the WSA. While the SFPUC has never interrupted water supply to the cities of San Jose and Santa Clara, the WSA allows the SFPUC to issue a conditional notice of termination of supply if sufficient long-term water supplies from the RWS are not available. Additional discussion about the future status of these customers can be found in Section 7.3.3.

4.2.2 Wholesale Demands

Wholesale demands reached a historic low during the 2012-2016 drought and have rebounded slightly since then. A shorter drought occurred in 2020-2023, during which demands also decreased slightly to 111.3 MGD. As shown in Table 4-5, RWS supplies purchased by the SFPUC's wholesale customers in 2025 was 130.1 MGD.

In 2025, BAWSCA facilitated an update of the water demand and conservation projections for its member agencies (26 of the SFPUC's 28 wholesale customers) using a hybrid demand modeling framework that integrates: (1) an econometric (or statistical) model developed for each member agency and (2) the Alliance for Water Efficiency Water Conservation Tracking Tool to estimate historic and future conservation. Population, housing units, and job projections used to develop the demand projections were approved by each member agency and were based on locally approved planning documents, Association of Bay Area Governments and Metropolitan Transportation Commission's Plan Bay Area 2050 growth rates, and California Department of Finance data. BAWSCA documented the demand and conservation projection methodology and results in its 2025 *Regional Water Demand and Conservation Study* (BAWSCA 2025 Demand Study). The results support BAWSCA's Long-Term Reliable Water Supply Strategy, also referred to as Strategy 2050.

In preparation for the 2025 UWMPs, BAWSCA collected RWS purchase projections from its member agencies. Collective Wholesale Customer demands for RWS supplies through 2050 are projected to be significantly less than anticipated at the time the SFPUC adopted the phased implementation of WSIP in 2008. BAWSCA's member agencies that are urban water suppliers preparing an individual 2025 UWMP are in some cases using the projections developed for the BAWSCA 2025 Demand Study, and in other cases using their own set of projections. Table 4-5 presents each Wholesale Customer's projected purchase requests for RWS supplies through 2050, as provided to the SFPUC by BAWSCA.

Regarding the SFPUC's two additional wholesale customers, the demand projections for Cordilleras MWC shown in Table 4-5 are based on the SFPUC's knowledge of the small, residential-only service area for that customer where no growth is anticipated. As noted earlier, the demand projections for Groveland CSD are presented as part of retail demands in Table 4-1 in the body of this 2025 UWMP, but as part of wholesale demands in the corresponding standardized tables in Appendix B.

Table 4-5. Wholesale Customer ISG, 2025 Purchases, and 2030-2050 Purchase Requests (MGD)

[Standardized Table 4-1 Wholesale: Demands for Potable and Raw Water - Actual]

[Standardized Table 4-2 Wholesale: Demands for Potable and Raw Water - Projected]
[Standardized Table 4-3 Wholesale: Total Water Demands]

Wholesale Customer	ISG[a]	Actual 2025 Purchases[b]	2030	2035	2040	2045	2050
Alameda County Water District	13.76	10.08	11.25	11.56	12.00	12.45	13.76
City of Brisbane / Guadalupe Valley Municipal Improvement District[c]	0.98	0.68	0.94	0.95	0.97	0.97	0.97
City of Burlingame	5.23	3.23	3.92	3.99	4.15	4.30	4.44
California Water Service Company	35.68	29.46[d]	27.04	26.89	26.93	26.80	26.89
Coastside County Water District	2.18	1.01	1.17	1.16	1.16	1.16	1.16
City of Daly City	4.29	3.55[d]	4.29	4.29	4.29	4.29	4.29
City of East Palo Alto	3.46	1.72	1.19	1.19	1.19	1.18	1.19
Estero Municipal Improvement District	5.90	3.78	3.90	3.92	3.93	3.91	3.90
City of Hayward	22.10	13.66	14.74	15.66	16.82	18.14	19.71
Town of Hillsborough	4.09	2.32	2.09	2.08	2.09	2.11	2.12
City of Menlo Park	4.46	2.72	2.58	2.64	2.71	2.76	2.83
Mid-Peninsula Water District	3.89	2.34	2.82	2.97	3.18	3.39	3.43
City of Millbrae	3.15	1.81	1.91	1.99	2.09	2.18	2.29
City of Milpitas	9.23	4.68	5.30	5.35	5.41	5.46	5.52
City of Mountain View	12.46	7.69	7.87	8.12	8.59	9.04	9.55
North Coast County Water District	3.84	2.58	2.23	2.29	2.37	2.36	2.36
City of Palo Alto	16.58	9.31	8.30	8.20	8.15	8.15	8.18
Purissima Hills Water District	1.63	1.51	1.36	1.35	1.36	1.36	1.37
City of Redwood City	10.93	7.43	6.84	6.54	6.73	6.91	7.09
City of San Bruno	3.25	1.01[d]	1.85	2.27	2.68	2.68	2.68
Stanford University	3.03	1.59	1.77	1.96	2.02	2.07	2.13
City of Sunnyvale	12.58	10.28	10.72	11.15	11.92	12.58	12.58
Westborough County Water District	1.32	0.70	0.82	0.80	0.84	0.88	0.91
Cordilleras Mutual Water Company[e]	—	0.01	0.01	0.01	0.01	0.01	0.01
Subtotal Permanent Customer Purchase Requests	**184.0**	**123.17**	**124.91**	**127.33**	**131.59**	**135.14**	**139.36**
City of San Jose	0.00	3.99	4.50	4.50	4.50	4.50	4.50
City of Santa Clara	0.00	2.91	4.50	4.50	4.50	4.50	4.50
Total Wholesale Purchase Requests	**—**	**130.07**	**133.93**	**136.33**	**140.58**	**144.12**	**148.36**

a Individual Supply Guarantee (ISG) refers to each Wholesale Customer's share of the Supply Assurance as defined in the Water Supply Agreement (WSA). The Supply Assurance is the 184 MGD maximum annual average metered supply of water dedicated by San Francisco to public use in the Wholesale Customer service area (not including the cities of San Jose and Santa Clara). The City of Hayward's ISG is calculated as 184 MGD less the total of permanent customer ISGs (161.92 MGD).

b Actual demands are equivalent to purchases as reported in customer billing data.

c The City of Brisbane and Guadalupe Valley Municipal Improvement District are two Wholesale Customers that are jointly operated.

d California Water Service Company, Daly City, and San Bruno participate in the Regional Groundwater Storage and Recovery Project, and its 2025 demands include an in-lieu groundwater credit of 1.2 MGD, 1.6 MGD, and 1.7 MGD, respectively for using surface water in place of groundwater pumping.

e Cordilleras MWC is not a member of BAWSCA or a party to the WSA and therefore does not have an ISG.

Notes: RWS purchase requests are reported in each agency's 2025 UWMP, if one is being prepared, and all estimates are subject to change. Projections were provided to the SFPUC by BAWSCA in March 2026. For the most current purchase request projections, refer to each agency's 2025 UWMP. Groveland CSD is not accounted for as a wholesale customer for the purpose of this table and subsequent wholesale supply and demand comparisons. Refer to Table 4-1 for Groveland CSD's current and projected demands. However, in the corresponding DWR standardized tables, Groveland CSD is reported as wholesale rather than retail. Numbers may not add up due to rounding.

4.3 CLIMATE CHANGE IMPACTS TO DEMANDS

The SFPUC's assumptions for temperature and precipitation in this 2025 UWMP are that by 2050, there will be an increase in average temperature of 0.7^{o}C relative to 2025 and an increase in average annual precipitation of 0.13 inches per month. The retail demand model shows that retail projected demands are not significantly impacted by future changes in temperature and precipitation, likely due to the fact that irrigation demands in the SFPUC's retail service area are relatively low given the dense urban environment. For the same reason, the potential for an increase in irrigation demand due to increased temperature or decreased precipitation is low.

This page intentionally left blank.

SECTION 5: RETAIL BASELINES AND TARGETS

The Water Conservation Act of 2009 (SB X7-7) required the State to set a goal of reducing statewide urban water use by 20% by 2020. To support this goal, each retail urban water supplier had to determine its baseline water use, expressed in gallons per capita per day (GPCD), and establish its target water use for 2015 and 2020.

In its 2010 UWMP, the SFPUC established the baseline per capita water use for its retail service area and set its 2015 interim and 2020 water use targets. The 2015 UWMP updated these values by revising the in-City retail population to reflect the 2010 U.S. Census (instead of the 2000 U.S. Census) and by including the population and water use of the suburban retail service area. In its 2020 UWMP, the SFPUC submitted its SB X7-7 Compliance Form demonstrating that it met its 2020 target. Consistent with California Water Code Section 10608.40, this section of the 2025 UWMP reports the SFPUC's progress toward the 2020 target and summarizes the 2020 analysis.

Additionally, Groveland CSD is not included in this section, as explained in Section 2.4.

5.1 GROSS PER CAPITA WATER USE BASELINES & TARGETS SUMMARY

The SFPUC calculated its retail service area's five-year baseline, 10-year baseline, 2015 interim target, and 2020 compliance target in accordance with the Water Conservation Act of 2009 and DWR's *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use (For the Consistent Implementation of the Water Conservation Act of 2009)*. Using Methodology 3, the SFPUC determined its urban water use targets and adjusted them to meet the minimum water use reduction requirement of 95% of the five-year baseline. Table 5-1 summarizes the baselines and targets calculated in the 2015 UWMP.

Table 5-1. Gross Per Capita Water Use Baselines and Targets Summary (GPCD)

Baseline Period	Start Year	End Year	Average Baseline	Interim 2015 Target	Confirmed 2020 Target
10–Year Baseline	2001	2010	107	102	96
Five-Year Baseline	2006	2010	101	—	—

5.2 COMPLIANCE WITH 2020 DAILY PER CAPITA WATER USE TARGET

The 2020 gross water use reported in this 2025 UWMP includes all water the SFPUC delivered from the RWS and groundwater sources to in-City and suburban retail customers. Gross water use in this context means water used by all sectors and water loss. The SFPUC did not deduct indirect recycled water, agricultural water use, or process water. All water sources are metered, and SFPUC staff calibrates meters on an annual basis.

The 2020 retail service area population includes both the in-City population and suburban retail populations. For the in-City retail service area, the SFPUC used population data from the California Department of Finance for the County of San Francisco. Because the suburban retail service area does not align with municipal boundaries, the SFPUC could not use the California Department of Finance data. Instead, the SFPUC estimated the population of its retail connections in Redwood City, Daly City, Fremont, Millbrae, Sunol, and Castlewood CSA by multiplying the number of customer accounts with the average household size in those respective areas using U.S. Census data.

The SFPUC consulted with DWR on this approach, and both agencies agreed it was appropriate since all suburban residential accounts are assumed to serve single-family homes, making the number of connections equivalent to number of households.

The SFPUC calculated the base daily per capita water use by dividing the annual gross water use by population and averaging the result per day.

As shown in Table 5-2, 2020 daily water use within the retail service area was 76 GPCD, well below the SFPUC's 2020 confirmed target of 96 GPCD.

Table 5-2. SB X7-7 2020 Target Compliance Summary
[Standardized Table 5-1 Retail: SB X7-7 2020 Target Progress]

2020 Confirmed Target (GPCD)	2020 Gross Water Use (MGD)	2020 Service Area Population	2020 Daily Per Capita Water Use (GPCD)	Did the Supplier Achieve Targeted Reduction in 2020?
96	68.5	899,732	76	Yes

5.3 ASSISTANCE TO WHOLESALE CUSTOMERS

As a wholesale supplier, the SFPUC is required to provide an assessment of present and proposed SFPUC measures, programs, and policies that will help the retail water suppliers in the SFPUC's wholesale service area (i.e., its Wholesale Customers) achieve their own water-use reduction targets in compliance with SB X7-7. The SFPUC's assessment is discussed in Section 10.3.

SECTION 6: SYSTEM SUPPLIES

This section describes the water supplies the SFPUC uses to serve its retail and wholesale customers, and examines water rights, water quality, and the impacts of climate change on those supplies. It also outlines existing and future local water supplies in the retail service area that can augment and increase the long-term reliability of SFPUC supplies. As explained in Section 2.4, Groveland CSD is treated as a retail customer in this section, but as a wholesale customer in the corresponding standardized tables in Appendix B.

6.1 RWS SUPPLIES FOR RETAIL AND WHOLESALE CUSTOMERS

The SFPUC serves its retail and wholesale customers through the integrated operation of its local Bay Area water production facilities (referred to as the Peninsula System and the Alameda System) and the Hetch Hetchy System. The SFPUC operates the Peninsula and Alameda System facilities to conserve local runoff for delivery and to maintain sufficient stored water to meet RWS demands during emergencies that affect Hetch Hetchy supplies. When local runoff is insufficient, the SFPUC meets remaining demands with water diverted from the Tuolumne River through the Hetch Hetchy System. On average, the Hetch Hetchy System provides about 85% of the water the SFPUC delivers, and during dry years it can supply over 90% of the total water delivered.

The SFPUC's available water supply is constrained by hydrology, physical facilities, and institutional parameters governing the Tuolumne River allocations. Because of these constraints, the SFPUC relies on reservoir storage to maximize supply reliability. Reservoir storage also provides essential carry-over capacity: during dry years, only a small portion of the Tuolumne River supply is available to the SFPUC, and local watersheds produce very little water. Reservoir storage is therefore critical for carrying water from wet years into dry years.

As discussed in Section 7.1, the WSIP Phased Variant adopted by the Commission in 2008 limits average annual RWS deliveries from the SFPUC's watersheds to 265 MGD, with 184 MGD allocated to Wholesale Customers and 81 MGD allocated to retail customers under the Water Supply Agreement. Although the SFPUC may deliver up to 265 MGD on average each year, the supply values shown in the tables of this section and in Section 8 reflect the supplies the SFPUC projects retail and wholesale customers will use over the UWMP planning horizon. The SFPUC's Level of Service Goals and Objectives for the Water Enterprise, most recently updated in 2023, include an objective to meet an average annual demand of 265 MGD for retail and Wholesale Customers during non-drought years, consistent with the Water Supply Agreement. Appendix E provides an analysis of the SFPUC's ability to meet this objective in normal, single dry, and multiple dry years.

6.1.1 Water Rights

The City holds both pre-1914 and post-1914 appropriative water rights to store and deliver water from the Tuolumne River and local watersheds. Appropriative water rights allow the holder to divert water from a specific source regardless of whether the place of use is contiguous to that source. These rights are primarily based on seniority, and all use must be reasonable, beneficial, and not wasteful. In 1914, California established a formal water rights permitting system through the 1913 Water Commission Act, which permitting system is administered by the SWRCB. The SWRCB does not have permitting jurisdiction over pre-1914 appropriative water rights.

Under the Raker Act of 1913 (38 Stat. 242), Congress granted San Francisco rights-of-way to construct and operate Hetch Hetchy facilities, most of which are located on federally owned land in Yosemite National Park, Stanislaus National Forest, as well as on federal lands managed by the Bureau of Land Management. Among other features, the Raker Act establishes conditions for releases downstream to the Turlock Irrigation District and Modesto Irrigation District (collectively, the Districts), as well as other requirements to establish access for recreational opportunities and to protect watershed conditions in the Hetchy Valley region of Yosemite National Park.

The Districts hold senior water rights to the Tuolumne River water and receive the first increment of flow in the Upper Tuolumne River watershed, and are allocated the initial increment of Upper Tuolumne River flows in the Raker Act of 1913.

Separately, San Francisco has entered into a Fourth Agreement with the Districts that provides San Francisco with a water bank at Don Pedro Reservoir. The water bank provides a credit and debit system that allows the City to divert water upstream while meeting its obligations to the Districts. Through this mechanism, the SFPUC may pre-deliver the Districts' entitlements and credit the water bank, while at other times enabling the SFPUC to retain water upstream that the Raker Act allocates to the Districts to debit the water bank.

Under Section 9(c) of the Raker Act and the subsequent Fourth Agreement, the Districts are allocated the first portion of the natural flow of the Tuolumne River (up to 4,066 cubic feet per second during the spring snowmelt period between April 15 and June 13, and up to 2,416 cubic feet per second between June 13 and April 15). San Francisco is only allocated flows above these thresholds. District and City staff compute these flows daily. When the natural flow falls below the threshold values, the Raker Act does not allocate San Francisco any flow for that day. During multi-year droughts, when flows remain low, SFPUC diversions from the Tuolumne River may be limited to previously stored carryover water in system reservoirs, as well as any flows SFPUC may capture that are allocated to the Districts and that SFPUC may debit from its water bank account in Don Pedro Reservoir.

6.1.2 Water Quality of RWS Supplies

Surface water supplies available to the RWS include the Tuolumne River and local Bay Area reservoirs. Most of the water supply originates in the upper Tuolumne River watershed high in the Sierra Nevada, where the watershed is protected from development and pollution. Water from Hetch Hetchy Reservoir is conveyed to the Bay Area through a system of pipes and tunnels and requires only primary disinfection, ultraviolet light disinfection at the Tesla Treatment Facility, and pH adjustment for corrosion control.

The USEPA and SWRCB Division of Drinking Water have approved the use of this drinking water source without filtration. In contrast, water from the SFPUC's local watersheds requires filtration to meet drinking water quality standards. The SFPUC blends filtered and treated local water with water from Hetch Hetchy Reservoir, and most customers receive this blended supply. The SFPUC continuously monitors and tests both raw and treated water to ensure that water delivered to customers meets or exceeds federal and state drinking water and public health requirements. The SFPUC expects to continue relying on these high-quality water sources and does not anticipate future degradation of water quality.

Each spring, the SFPUC publishes an annual water quality report (Consumer Confidence Report), available at **www.sfpuc.gov/waterqualityreport**.

6.1.3 Climate Change Impacts to RWS Supplies

Climate change has become an important factor in water resources planning in California and is frequently considered in urban water management planning, although the extent and precise effects of climate change remain uncertain. Increasing concentrations of greenhouse gases have caused and will likely continue to cause a rise in temperatures around the world, which will result in a wide range of changes in climate patterns. Moreover, observational data show that a warming trend occurred during the latter part of the 20th century, the first quarter of the 21st century, and will likely continue through the end of the 21st century. Numerous studies have been conducted to determine the potential impacts of climate change to water resources. These climate change impacts are likely to affect both the Tuolumne River watershed and local watersheds in the Bay Area and include the following:

- Reductions in the average Sierra Nevada annual snowpack due to a rise in the snowline elevation and a shallower snowpack at lower elevations, and a shift in snowmelt runoff to earlier in the year;
- Changes in the timing, annual average, intensity, and variability of precipitation, and an increased amount of precipitation falling as rain instead of as snow;
- Long-term changes in watershed vegetation and increased incidence of wildfires that could affect water quality and quantity;
- Sea level rise and an increase in saltwater intrusion;
- Increase in water temperatures with accompanying potential adverse effects on some fisheries and water quality;
- Increases in evaporation and concomitant increase in irrigation need; and
- Changes in urban and agricultural water demand.

6.1.3.1 SFPUC Climate Change Study

The SFPUC views assessment of the effects of climate change as an ongoing need that requires regular updating to reflect improvements in climate science, atmospheric/ocean modeling, observations, and human response to the threat of greenhouse gas emissions. Climate change research by the SFPUC began in 2009 and continues to be refined.

The SFPUC partnered with The Water Research Foundation to develop the Long Term Vulnerability Assessment (LTVA) of the RWS. The study was conducted by the University of Massachusetts Amherst Hydrosystems Research Group with input from National Center for Atmospheric Research, other climate scientists, and Deltares. The goal of the LTVA is to help quantitatively and qualitatively assess to what extent climate change will be a threat to the RWS in comparison to, or in combination with, other external drivers of change over the next 50 years (2020-2070). The LTVA assessed the potential effects of climate change on RWS water supply using a wide range of plausible increases in temperature and changes in precipitation to address the wide uncertainty in climate projections over the planning horizon. There are many uncertain factors, such as climate change, changing regulations, water quality, growth and economic cycles, that may create vulnerabilities for the RWS's ability to meet Levels of Service. The uncertainties associated with the degree to which these factors will occur and how much risk they present to the water system are difficult to predict but were considered in this study. To address this planning challenge, the LTVA used a vulnerability-based planning approach to explore a range of future conditions to identify vulnerabilities, and to assess the risks associated with these vulnerabilities, that could lead to developing an adaptation plan that is flexible and robust to a wide range of future outcomes. The LTVA was completed in 2021 and the University of Massachusetts Amherst and The Water Research Foundation amended it in 2024.

The key findings of the LTVA are:

- Climate change exacerbates impacts from other external drivers of change and is not the single most important driver of vulnerability for the RWS.
- The RWS at a baseline demand of 227 MGD is resilient to changes in climate and other external drivers.
- The RWS water supply performance declines with reductions in mean precipitation but is mostly insensitive to increases in temperature.
- The RWS is more vulnerable to changes in demand and instream flow requirements than changes in mean annual temperature and precipitation.
- The RWS is vulnerable to changes to mean climate when demand or regulatory instream flow requirements increase.

Further results and conclusions from the LTVA and its amendment are provided below:

- According to climate projections and expert elicitations, there is a central tendency of warming of +2°C and +4°C by 2040 and 2070 (Representative Concentration Pathway [RCP] 8.5), respectively, with no clear direction of change in mean annual precipitation over the planning horizon.
- In the upcountry region, by 2040, most projections and elicitations of warming estimate between +1°C and +4°C, and precipitation changes range between -5% and +5%, compared to historical baseline; and by 2070, estimates of warming range between +3°C and +6°C, and precipitation changes range between -15% and +15% (RCP8.5).
- Changes in hydrology due to climate change affect the RWS's ability to meet water supply targets. At 227 MGD baseline demand, the RWS can sustain up to +4°C and -5% precipitation change before failing to meet targets for delivery reliability, frequency of 20% rationing, storage reliability, and duration of rationing.
- Precipitation change is an important driver for RWS performance. A decrease by 10% or more will cause RWS water supply targets to be missed. The climate projections and expert elicitations show that such a change in precipitation is possible by 2040, although unlikely. The likelihood of this change increases toward 2070.
- The RWS shows minor sensitivity to temperature change for the metrics evaluated in this study. Most metrics stay above target under warming conditions. However, warming conditions often magnify the loss in system performance if precipitation or demand change.
- Demand change appears to be a major driver of future RWS performance. An increase in demand by 15% (265 MGD) will lead to failure to meet rationing frequency targets under current climate conditions. At 265 MGD demand, the rationing frequency targets would be met if there is an increase in precipitation of 10%. If demand increases by 30%, the rationing target cannot be met even when precipitation increases by 40%, which is believed plausible but unlikely over the planning horizon.

- The RWS is particularly vulnerable to the state-amended new instream flow requirements below Don Pedro Dam, which represents a huge reduction in water available. Under all demand and climate scenarios the system reliability, defined as frequency of years without rationing, remains below 5%.
- The RWS is also vulnerable to the draft Tuolumne voluntary agreement new instream flow requirements below Don Pedro Dam, which represents a large reduction in water available, although significantly less than for the state-amended new instream flow releases. The implementation of the draft Tuolumne voluntary agreement under current climate and demand conditions would reduce the system reliability to 75%, which corresponds to the effects of a reduction in average rainfall by 20% under the current Federal Energy Regulatory Commission agreement.

6.1.4 Summary of Existing and Future RWS Supplies

As noted in Section 6.1 and discussed further in Section 7.1, the WSIP Phased Variant adopted by the Commission in 2008 limits average annual RWS deliveries from the SFPUC's watersheds to 265 MGD, with 184 MGD allocated to Wholesale Customers and 81 MGD allocated to retail customers under the Water Supply Agreement. This 2025 UWMP defines normal year RWS supplies as the supplies that the SFPUC will use to meet the full RWS demands in a normal year. Current and projected normal year RWS supplies for both retail and wholesale customers are shown in Table 6-1.

Table 6-1. Projected Regional Water System Supply Availability in Normal Years (MGD)

[Standardized Table 6-9 Retail: Water Supplies – Projected]

[Standardized Table 6-9 Wholesale: Water Supplies – Projected]

RWS Supply[a]	2030	2035	2040	2045	2050
Retail Customers[b, c]	62.7	61.2	61.9	64.0	66.7
Wholesale Customers[d, e, f]	133.9	136.3	140.6	144.1	148.4
Total RWS Supplies	196.6	197.5	202.5	208.1	215.1

a In the context of this document, normal year RWS supply is defined as the supply that will be used to meet the full demands on the RWS in a normal year.

b Groundwater and recycled water are assumed to be used before RWS supplies to meet retail demand. However, if these alternative supplies are not available, up to 81 MGD of RWS supply could be used in normal years.

c The SFPUC reports Groveland CSD as a wholesale customer in its 2025 UWMP, but the SFPUC otherwise considers Groveland CSD a retail customer and includes its demands (approximately 0.3 MGD) within the retail supply allocation of 81 MGD.

d Projected RWS supplies to be used by Wholesale Customers are based on the purchase request projections provided to the SFPUC by BAWSCA in March 2026. These purchase requests are subject to change in each individual agency's UWMP.

e Projected Wholesale Customer deliveries are limited to 184 MGD.

f Cordilleras MWC is a Wholesale Customer of the SFPUC, but is not a party to the WSA or a BAWSCA member agency, and it is not included in the Wholesale Customer supply allocation of 184 MGD. The demands of Cordilleras MWC are minor (projected to be less than 0.01 MGD).

6.2 LOCAL SUPPLIES FOR RETAIL CUSTOMERS

The RWS provides about 97% of total retail water supplies. The remaining 3% comes from locally produced groundwater and recycled water. Onsite water reuse also produces local non-potable water that is deducted from demands and is described in this section.

6.2.1 Existing Local Supplies

Existing supplies of groundwater, recycled water, and non-potable water are described below. Future supplies are described in Section 6.2.2.

6.2.1.1 Local Groundwater and the San Francisco Groundwater Supply Project

San Francisco overlies all or part of seven un-adjudicated groundwater basins: Westside, Lobos, Marina, Downtown, Islais Valley, South San Francisco, and Visitacion Valley basins. Four of these basins (Lobos, Marina, Downtown, and South San Francisco) lie entirely within City limits, while the remaining three basins extend into San Mateo County. The portion of the Westside Basin aquifer located within the City is referred to as the northern Westside Groundwater Basin. Except for the Westside and Lobos basins, most basins have limited municipal supply due to low yield, contamination, or subsidence concerns.

Historically, the City relied on local groundwater, springs, and spring-fed surface water. After imports of water from Hetch Hetchy Reservoir began in October 1934, water supply shifted almost entirely to surface water. Local groundwater use has continued in both the City and the suburban retail service area. By 2040, the SFPUC plans to increase groundwater production in San Francisco to an average of 4.0 MGD for municipal use and discontinue about 1.5 MGD of groundwater pumping for park irrigation.

Westside Groundwater Basin. The Westside Groundwater Basin spans roughly 40 square miles across San Francisco and San Mateo counties and supports both irrigation and municipal uses. The Westside Groundwater Basin contains three aquifer zones: the Shallow Aquifer, Primary Production Aquifer, and Deep Aquifer, which have not been adjudicated or identified as overdrafted. The basin is divided administratively into northern and southern portions at the county line, though no geologic feature restricts groundwater flow between them.

Within San Mateo County, the southern Westside Groundwater Basin encompasses 25 square miles and extends southeast across the San Francisco Peninsula south of San Bruno Mountain from the ocean near Daly City to San Francisco Bay in Burlingame. It is described in the South Westside Basin Groundwater Management Plan.[5] Municipal water demand within the southern Westside Basin is served by the City of San Bruno, California Water Service Company, City of Daly City, and the SFPUC as a wholesaler to those three entities.

The northern Westside Basin has a land surface area of 15 square miles encompassing much of the western third of the City, including Lake Merced and most of Golden Gate Park. The northern Westside Basin is largely residential, with residential and commercial land uses accounting for about 75% of its area, including the Sunset and Parkside districts; and at least 25% park and open space, most notably Golden Gate Park, Lake Merced, golf clubs, and hilltop parks along the basin's eastern boundary. The northern Westside Basin land surface extends from sea level along Ocean Beach to nearly 1,000 feet above sea level along a bedrock ridge three to four miles inland. The northern Westside Basin is bounded on the north by a mostly buried bedrock ridge extending from Point Lobos

[5] City of San Bruno, California Water Service Company, Daly City, and Hetch Hetchy Regional Water System. July 2012. *South Westside Basin Groundwater Management Plan*.

southeast to Strawberry Hill in Golden Gate Park and from the park northeast to Lone Mountain. The eastern basin boundary encompasses the panhandle of Golden Gate Park, and extends south-southwest through Twin Peaks and Mount Davidson, crossing south into San Mateo County a little more than a mile east of Lake Merced. The San Andreas and Serra fault bound the basin on the west and southwest. The SFPUC has the capacity to pump up to 4 MGD of groundwater from the northern Westside Basin for municipal use.

The SFPUC leads the basin-wide Westside Basin Groundwater Monitoring Program, providing information summarizing groundwater pumping, groundwater levels, and groundwater quality, along with Lake Merced water elevations. This program publishes an annual monitoring report, which may be accessed at **www.sfpuc.gov/programs/water-supply/groundwater**. Monitoring in the northern Westside Basin is accomplished by wells constructed in either single, nested, or clustered configurations at approximately 21 locations. Groundwater levels in all wells are measured quarterly by hand and supplemented by continuous monitoring using pressure transducers at select locations. Based on regular groundwater monitoring conducted in the northern Westside Basin since 2004, static groundwater levels along the Pacific Coast and north of Lake Merced have generally remained above sea level in the Shallow and Primary Production Aquifers. The SFPUC continues to monitor water levels and conducts semiannual groundwater quality sampling at sentinel monitoring wells within the basin providing data, which assists ongoing evaluation of potential for sea water intrusion.

The SFPUC samples groundwater semiannually at 13 monitoring wells, including well locations in Golden Gate Park, coastal wells in the vicinity of the Great Highway, lake-aquifer monitoring wells in the vicinity of Lake Merced, and one well at the West Sunset Playground. The monitored parameters include total alkalinity, calcium, magnesium, sodium, potassium, bicarbonate, hardness, chloride, nitrate, sulfate, total dissolved solids, pH, and specific conductance.

Groundwater has been pumped in Golden Gate Park since 1872 and at the San Francisco Zoo since the 1930s. Based on flow meter data, these wells produce about 1.5 MGD annually for irrigation at Golden Gate Park, irrigation of landscaped medians along the Lower Great Highway, and other non-potable uses by the San Francisco Recreation and Parks Department.

The San Francisco Groundwater Supply Project (SFGW) constructed or rehabilitated six groundwater supply wells and their associated pump stations, and more than five miles of pipelines to distribute groundwater to in-City reservoirs for blending with the municipal drinking water supply. Construction began in 2014 and was completed in 2020. These wells pump groundwater from 120 to 460 feet below ground within the San Francisco portion of the Westside Basin (i.e., northern Westside Basin). Before entering the in-City distribution system, the pumped groundwater is disinfected and then blended in relatively small quantities in Sunset and Sutro Reservoirs with water supplied by the RWS. During calendar year 2021, the SFGW wells supplied an average of 0.5 MGD to those reservoirs. However, since 2021, potable groundwater production has been less than 0.1 MGD due to ongoing repairs at the Lake Merced well and the Sunset Supply transmission pipeline, as well as the need for additional treatment at three of the project wells, and the delay in receiving recycled water (used to offset groundwater) for Golden Gate Park irrigation. Once the SFPUC completes the Westside Enhanced Water Recycling Project (see Section 6.2.2.1 below) and the project's wells in Golden Gate Park are no longer needed for irrigation, the project will add an average of up to 1 MGD to the local water system for one or more years. Over the following several years, with continued monitoring and testing, production will step up to an average of 4 MGD. Given approximately 1.3 MGD of existing groundwater use for park irrigation, this project represents approximately 2.7 MGD of net new supply. Two of the six wells are also capable of serving as emergency drinking water supplies following an earthquake or other natural disaster, and they include filling stations for emergency water tankers.

Following the 2014 Sustainable Groundwater Management Act (SGMA), the SFPUC established itself as the Groundwater Sustainability Agency for San Francisco and completed a draft Groundwater Sustainability Plan (GSP) for the northern Westside Basin in 2016. This plan has guided the implementation of the SFGW to ensure sustainable groundwater management in the northern portion of the Basin. The plan summarizes the Basin hydrogeology and defines measurable objectives and actions for protecting groundwater yield and quality, such as avoiding saltwater intrusion, land subsidence, and impacts to interconnected surface water resources. Although DWR designated the Westside Basin and San Francisco's other groundwater basins as very low priority, meaning a GSP is not required, the SFPUC continues to manage the northern portion of the Westside Basin consistent with SGMA. Currently, the SFPUC is updating the 2016 plan and will finalize it as a Groundwater Management Plan under Assembly Bill 3030 (the Groundwater Management Act). Adherence to this plan will ensure a long-term, high quality, local water supply for current and future uses.

Livermore Valley Basin, Central Groundwater Sub Basin. In the suburban retail service area, the SFPUC delivers about 0.3 MGD of groundwater to the Castlewood CSA from the Castlewood Well System operated by the SFPUC (this system is described in Section 3.1.5.2.). This groundwater draws from the Central Groundwater Sub Basin in the Livermore Valley Basin. This basin is not identified as overdrafted, nor as projected to be overdrafted in the future. These wells are metered and have been in operation for several decades. The system serving Castlewood is not connected to the RWS.

Groundwater volumes pumped between 2021 and 2025 from the two sources described above are shown in Table 6-2.

Table 6-2. Groundwater Pumped (MGD)

[Standardized Table 6-1 Retail: Groundwater Volume Pumped]

Groundwater Source	2021	2022	2023	2024	2025
Westside Groundwater Basin[a]	1.8	1.4	1.4	1.5	1.7
Livermore Valley Basin[b]	0.3	0.4	0.3	0.2	0.2

a Data from 2020-2024 are obtained from the 2024 Annual Groundwater Monitoring Report, Westside Basin (SFPUC, April 2025), Pumping volumes are reported on a calendar year basis, but are used to approximate fiscal year data for this table.

b This basin is the source of water for the Castlewood Well System. Pumping volumes are assumed to be equivalent to billed consumption for Castlewood CSA; obtained from customer billing data.

6.2.1.2 Other Surface Water

The Sunol Filter Gallery (Gallery) is located adjacent to Alameda Creek in Sunol, south of the SFPUC's Sunol Pump Station. Its supplies come from subsurface flows directly connected to creek flow and are therefore classified as surface water and subject to surface water permitting. The Gallery previously provided about 0.3 MGD for irrigation at the Sunol Valley Golf Club until the course closed in January 2016, after which the SFPUC substantially reduced production. Since then, diversions from Alameda Creek have been limited to maintenance and emergency fire flow needs for the golf course property. The SFPUC is evaluating options to restore the Gallery to fully operational.

6.2.1.3 Local Recycled Water

From 1932 to 1981, the McQueen Treatment Plant supplied recycled water to Golden Gate Park for irrigation and flow augmentation of its streams and lakes. Regulatory changes eventually rendered the plant non-compliant, leading to its closure in 1981 and discontinuation of recycled water in Golden Gate Park. A limited amount of recycled water is still used in the retail service area as described below.

Harding Park. The Harding Park Recycled Water Project, a partnership between the SFPUC and the North San Mateo County Sanitation District, was completed in October 2012 and provides tertiary-treated recycled water for irrigating the Harding Park and Fleming Golf Courses in San Francisco. The project replaces potable RWS water for golf course irrigation and has an average capacity of 0.23 MGD. In 2025, the recycled water treatment plant was offline for most of the year due to infrastructure upgrades, resulting in only about 5 MG (0.01 MGD) of recycled water delivered to Harding Park.

Sharp Park. The Pacifica Recycled Water Project supplies recycled water to several irrigation customers in Pacifica, including a portion of the Sharp Park Golf Course, a suburban retail customer of the SFPUC. Developed in partnership between the SFPUC and North Coast County Water District, the project began delivering recycled water in 2014. In 2025, Sharp Park received about 0.11 MGD of recycled water.

Southeast Water Pollution Control Plant. The SFPUC previously provided disinfected secondary-treated recycled water from the Southeast Water Pollution Control Plant through a truck-fill station for construction and municipal uses. The facility has been offline since 2015. Construction is underway to restore service by fall 2026.

In its 2020 UWMP, the SFPUC projected 2.1 MGD of recycled water use in 2025, based on anticipated production from the Westside Enhanced Water Recycling Project and the Treasure Island Water Resource Recovery Facility (see Sections 6.2.2.1 and 6.2.2.2 below). Actual 2025 use was approximately 0.12 MGD due to project delays. Table 6-3 compares projected and actual recycled water uses.

Table 6-3. Projected and Actual Recycled Water Use for 2025 (MGD)

[Standardized Table 6-5 Retail: 2020 UWMP Recycled Water Use Projection Compared to 2025 Actual]

Use Type	2020 Projection for 2025	2025 Actual Use
Golf Course Irrigation[a]	0.3	0.12
Landscape Irrigation[b]	1.8	0.0

a Golf course irrigation includes Harding Park, Fleming and Sharp Park golf courses.

b The 2020 projection for the 2025 landscape irrigation recycled water use planned for the implementation of the Westside Enhanced Recycled Water Project and the Treasure Island Water Resource Recovery Project. Sections 6.2.2.1 and 6.2.2.2 below provide updated implementation timelines for the respective recycled water projects.

6.2.1.4 Wastewater Assessment

The SFPUC's Wastewater Enterprise operates and maintains the City's sewer systems, which collect wastewater for treatment. On the mainland, San Francisco has three combined wastewater treatment facilities that treat both wastewater and stormwater: the Southeast Water Pollution Control Plant (WPCP), the Oceanside WPCP, and the North Point Wet Weather Facility (which operates only during wet weather). On Treasure Island, the Treasure Island

Wastewater Treatment Plant serves a separate sanitary sewer system and treats only wastewater. Collectively, the collection and conveyance systems consist of over 1,000 miles of sewer pipes, transport and storage structures, and pump stations located throughout the City. The Southeast and Oceanside WPCPs provide secondary treatment year-round, while the North Point Wet Weather Facility provides primary treatment during wet weather. Treated wastewater effluent is discharged to the San Francisco Bay and Pacific Ocean. The Treasure Island Wastewater Treatment Plant provides secondary treatment for domestic and commercial wastewater from Treasure Island and Yerba Buena Island, with effluent discharged to central San Francisco Bay.

The Mel Leong Treatment Plant at San Francisco International Airport (SFO) is owned and operated by SFO, an SFPUC suburban retail customer, and treats domestic and industrial wastewater generated at the airport. Effluent is discharged to the North Bayside System Unit (NBSU) force main, which conveys treated wastewater to dechlorination facilities before discharge to the lower San Francisco Bay. The NBSU is a joint powers authority that includes the cities of Burlingame, Millbrae, San Bruno, South San Francisco, and San Francisco. In 2024, SFO began constructing an Advanced Water Treatment Plant that will provide an average of 1.0 MGD of recycled water for airport uses, such as for toilet flushing, irrigation, cooling, industrial water processes, vehicle washing, and dust control. Planned improvements include per- and polyfluoroalkyl substances (PFAS) treatment demonstration plant, upgrading the sequencing batch reactors to an aerobic granular sludge system for additional nutrient removal, and a new pipeline to the NBSU outfall. This project is anticipated to be completed by the end of 2027 and will offset their demands. Table 6-4 summarizes current wastewater volumes collected, treated, and discharged within the retail service area.

Except for SFO, estimating wastewater volumes associated with SFPUC's suburban retail customers is difficult because they are located throughout the Bay Area and are served by multiple wastewater utilities. As shown in Table 4-1, suburban retail water use in 2025 was 4.1 MGD, or about 7% of total retail customer demand. The SFPUC's suburban retail service area generates less wastewater than the in-City retail service area.

Table 6-4. Wastewater Operations within Retail Service Area for 2025

[Standardized Table 6-2 Retail: Wastewater Collected Within Service Area in 2025]
[Standardized Table 6-3 Retail: Wastewater Treatment and Outcomes Within UWMP Service Area in 2025]

Wastewater Treatment Plant and Place ID Number	Wastewater Collection Agency	Collected (MGD)	Treated (Level)	Discharged (MGD)	Recycled (MGD)	Delivered to Another Entity for Additional Treatment (MGD)
Southeast WPCP, N-Point & Bayside, Place ID 256499[a,b]	City and County of San Francisco (SFPUC)	56.7	56.7 (secondary, disinfected)	52.1[c]	0	0
Oceanside WPCP, Place ID 256498[b]	City and County of San Francisco (SFPUC)	13.9	13.9 (secondary, undisinfected)	15.0[d]	0	0
Treasure Island Wastewater Treatment Plant, Place ID 266328	City and County of San Francisco (SFPUC, operator for Treasure Island Development Authority)	0.5	0.5 (secondary, disinfected)	0.5	0	0
Mel Leong Treatment Plant, Place ID 256507[e,f,]	City and County of San Francisco (SFO)	1.00	1.00 (secondary, disinfected)	1.00	0	0

a The Southeast WPCP and North Point Wet Weather Facility are grouped together as one facility because they are hydraulically connected (both plants receive influent from the same collection system) and their discharges are covered by the same permit.

b At the Southeast and Oceanside WPCPs, metered effluent flows include both primary-only and secondary treated effluent (the bulk of which is secondary treated) and flows include treated combined wastewater and stormwater because the collection systems are predominantly combined systems.

c The volume discharged is less than the volume collected because a small volume of the discharged wastewater is treated to secondary, disinfected-23 level and used for other purposes.

d The volume discharged is greater than the volume collected because the discharged volume includes additional plant recycle streams.

e The Mel Leong Treatment Plant is the only wastewater facility that treats and discharges wastewater generated by a suburban retail customer within the suburban retail service area. Wastewater utilities serving other suburban retail customers do not treat or dispose of wastewater within the suburban retail service area.

f Volumes of wastewater treated at and discharged from the Mel Leong Treatment Plant correspond to calendar year 2025.

6.2.2 Future Local Supplies

The SFPUC expects the existing local supplies described above to remain available in the future. However, to reliably and sustainably meet long-term retail water needs, the SFPUC is expanding and diversifying its local water supply portfolio by increasing groundwater and recycled water production. These projects reduce reliance on any single source of water and help protect against supply disruptions. The projects related to these efforts are described below, with projected volumes provided in Table 6-5. Additional water supply projects under development in the SFPUC's Alternative Water Supply Program are described in Section 7.4.

6.2.2.1 Westside Enhanced Water Recycling Project and Associated Zoo Recycled Water Project

The Westside Enhanced Water Recycling Project includes the construction of a tertiary recycled water plant and associated pipelines to replace RWS and groundwater supplies currently used to irrigate Golden Gate Park, Lincoln Park and Golf Course, the San Francisco Zoo, Lower Great Highway, the Presidio Golf Course, and other landscaped areas in the Presidio. The plant is under construction at the Oceanside WPCP and will provide 1.7 MGD to meet identified irrigation demands in Golden Gate Park, Lincoln Park Golf Course, San Francisco Zoo, Lower Great Highway, and Sunset Boulevard. The project is designed to deliver up to 2 MGD on an average annual basis, with a peak capacity of 4 MGD. Recycled water deliveries are scheduled to begin in late 2027.

Approximately eight miles of recycled water pipelines have been completed. Irrigation system retrofits at Golden Gate Park, the Panhandle, and Lincoln Park Golf Course are finished.

The San Francisco Zoo Recycled Water Project will construct a new recycled water pipeline along Sloat Boulevard, west of Skyline Boulevard, to deliver recycled water from the Westside Enhanced Water Recycling Project to the San Francisco Zoo. The recycled water will be used for non-potable uses such as irrigation, animal exhibit washdown, and animal pool filling. The project will also replace groundwater used for irrigation at the Lower Great Highway. The project includes modifications and new components at the existing reservoir and pump station facility at Sloat Boulevard and 43rd Avenue. The San Francisco Zoo Recycled Water Project will offset approximately 200,000 gallons per day, or 100% of the current groundwater use, which supports diversification of the SFPUC's water supply portfolio and benefits the Westside Groundwater Basin. Construction is expected to be completed by summer 2026.

Recycled water deliveries to Golden Gate Park and Lincoln Park (annual average of 1.3 MGD) are expected to begin in 2027. Deliveries to the San Francisco Zoo (annual average of 0.3 MGD) are expected to begin in late 2027, following modernization work and cross-connection testing. The SFPUC also plans to begin deliveries to the Sunset Boulevard medians (annual average of 0.1 MGD) by 2030.

6.2.2.2 Treasure Island Water Resource Recovery Facility Project

The Treasure Island Water Resource Recovery Facility (TIWRRF) will be constructed adjacent to the existing Treasure Island Wastewater Treatment Plant on the northeast corner of Treasure Island, on a geotechnically improved 10-acre greenfield site. The TIWRRF will provide tertiary wastewater treatment and include constructed wetlands, with an average dry-weather capacity of at least 1.3 MGD and peak wet-weather capacity of 3.9 MGD. The TIWRRF will replace aging infrastructure, ensure regulatory compliance, and meet the wastewater needs of future Treasure Island and Yerba Buena Island residents and businesses, and recycled water needs of the Treasure Island development. The City's redevelopment of Treasure Island is anticipated to add open space, hotels, restaurants, shops, entertainment venues, and up to 8,000 new homes capable of housing more than 20,000 new residents by 2036.

The TIWRRF will include liquid treatment processes, solids handling, odor control, and a wetland, and will produce disinfected tertiary effluent meeting Title 22 requirements. The Treasure Island development is expected to use an average of 0.4 MGD and a peak of 1.0 MGD of recycled water for dual plumbing in buildings, outdoor irrigation, and urban agriculture. The TIWRRF and associated wetlands align with the open space vision for the development. Construction began in September 2023 and will be completed by the end of 2026.

6.2.2.3 Other Actions to Expand Recycled Water Use

Ordinances, Programs, and Services. The SFPUC administers or helps to administer several ordinances, programs, and services in the City that expand recycled water and onsite water reuse. Many of these ordinances, programs, and services have been in place for many years and continue to drive long-term reductions in potable water demand.

- **Recycled Water Program and Ordinance:** The City adopted Ordinances 390-91 and 391-91, collectively referred to as the Recycled Water Ordinance, to expand recycled water use.[6] This ordinance requires dual-plumbed systems in designated areas of the City for new, remodeled, or converted buildings; subdivisions of 40,000 square feet or more; and irrigated areas of 10,000 square feet or more. As new construction and rehabilitation projects move forward, the number of dual-plumbed systems continues to grow in the City.

- **Soil Compaction and Dust Control:** In 1991, the City passed Ordinance 175-91,[7] which restricts the use of potable water for soil compaction and dust control on construction and demolition sites when reclaimed water, well water, or groundwater is available in sufficient quality and quantity within 10 miles of the site. In addition, Section E of the SFPUC Rules and Regulations Governing Water Service to Customer prohibits using potable water for backfill consolidation around non-potable piping, soil compaction, or dust control for construction or demolition projects if recycled water, well water, or groundwater are available within San Francisco.

- **Large Landscape Grant Program:** The SFPUC launched the Large Landscape Grant Program in 2009. In-City retail customers with at least 1/4 acre of irrigated landscape (reduced from the original 2.5-acre threshold when the program first started) may apply. The program funds water-saving and recycled water irrigation retrofits that reduce potable water use. The SFPUC provides technical assistance during implementation. Harding Park and Sharp Park both received grant funding for recycled water irrigation retrofits through this program.

- **Non-potable Water Program and Ordinance:** As described in Section 4.1.4, the City adopted the Non-potable Water Ordinance in 2012 to allow the collection, treatment, and use of alternate water sources for non-potable applications. The Non-potable Water Program outlines the oversight of the SFPUC, the San Francisco Department of Public Health-Environmental Health, and the San Francisco Department of Building Inspection during the review process. The City amended the ordinance in 2015 to require onsite water systems in new developments that meet specified criteria. Under the most recent amendments, adopted in October 2021, new development projects of 100,000 gross square feet or more that apply for a site permit after January 1, 2022, must install and operate an onsite water reuse system. Required alternate water sources and required non-potable uses vary by project type. For commercial buildings, the project must meet its toilet and urinal flushing and drain trap priming demands using treated blackwater and condensate (water vapor collected from air conditioning systems). For residential and mixed-use buildings, the project must meet its toilet and urinal flushing, irrigation, clothes washing, and drain trap priming demands using treated graywater and condensate. These requirements apply to both single building and multiple building developments. The 2021 amendments exempt 100% homeless supportive housing and 100% affordable housing to reduce barriers to construction and address water affordability challenges. However, thoughtfully designed onsite water reuse systems can deliver financial savings to residents, owners, and municipalities, while also providing broader quality-of-life benefits. San Francisco continues to explore ways to expand onsite reuse and ensure all communities have equitable access to these benefits.

[6] San Francisco Public Works Code, Article 22, Sections 1200-1210. Note that this ordinance was amended in 1994 by Ordinance 393-94, which expanded the designated recycled water use area to include Treasure Island, Yerba Buena Island, and Hunters Point Shipyard.

[7] San Francisco Public Works Code, Article 21, Sections 1100-1107.

- **Public Outreach:** The SFPUC actively promotes programs that conserve, diversify, and supplement RWS supplies. Staff develop and distribute outreach campaigns, factsheets, and articles to media outlets, customers, and public officials.

Projects and Partnerships. As demonstrated by the Harding Park and Pacifica Recycled Water Projects, the SFPUC continues to pursue regional recycled water partnerships with Bay Area agencies. These collaborations aim to develop projects that reduce demands on RWS supplies and/or free up groundwater for potable use or basin recharge.

Research and Knowledge Sharing. The SFPUC participates in several organizations and committees that advance recycled water and water reuse including: (1) the Bay Area Clean Water Agencies (BACWA) Recycled Water Committee, (2) the national WateReuse Association and its California Section, (3) the Water Research Foundation, and (4) the California Urban Water Association water reuse committee. The SFPUC also participates in the Bay Area Regional Reliability (BARR) Partnership, where Bay Area water utilities share best practices, coordinate water resource planning, and collaborate on drought contingency measures (see Section 7.5 for more detail).

6.2.3 Water Quality of Local Supplies

Local groundwater, recycled water, and non-potable water supplies primarily support irrigation and other non-potable uses. The SFPUC works to meet or exceed state water quality standards for these end uses and works closely with regulatory agencies and partners to maintain high water quality.

6.2.3.1 Local Groundwater Quality

This section summarizes the water quality of existing and future groundwater supplies.

Westside Groundwater Basin. Beginning in the 1920s, groundwater from the Westside Groundwater Basin has supplied drinking water to Daly City, San Bruno, and South San Francisco. In 2017, the SFPUC began incorporating groundwater from the basin into the in-City drinking water supply using the SFGW project wells. The SFPUC disinfects pumped groundwater with sodium hypochlorite, adjusts pH for corrosion control, and blends the water with RWS supplies before distribution. The resulting blend meets all SWRCB DDW health-based drinking water standards.

As described in Section 6.2.1.1, the SFPUC manages the Westside Basin Groundwater Monitoring Program, which includes water quality sampling from 85 wells to provide early warning for potential saltwater intrusion and other potential sources of contamination. The SFPUC will continue monitoring these wells and expand the network as needed to evaluate basin response to SFGW and related operations.

Castlewood Well System. The SFPUC disinfects groundwater supplies from the Castlewood Well System using sodium hypochlorite injection. The water is potable when delivered to Castlewood CSA, and the SFPUC monitors water quality weekly.

6.2.3.2 Local Recycled Water Quality

This subsection describes the water quality of existing and future recycled water supplies.

Harding Park. The North San Mateo County Sanitation District produces tertiary-treated recycled water at its treatment plant in Daly City for irrigation at the Harding Park and Fleming Golf Courses. This water meets Title 22 requirements for approved non-potable uses.

Sharp Park. The City of Pacifica's Calera Creek Water Recycling Plant produces tertiary-treated recycled water, delivered by the North Coast County Water District, for irrigation at portions of the Sharp Park Golf Course. This water also meets Title 22 requirements for approved non-potable uses.

Westside Enhanced Water Recycling Project. The SFPUC's Westside Enhanced Water Recycling Project will produce tertiary-treated recycled water followed by reverse osmosis and ultraviolet disinfection. The resulting water will meet Title 22 requirements and irrigate Golden Gate Park, Lincoln Park and Golf Course, the Presidio Golf Course, and other landscaped areas in the Presidio.

6.2.4 Climate Change Impacts to Local Supplies

The SFPUC's primary concern related to climate change is the potential impact to RWS supplies, as discussed in Section 6.1.3. Implementation of the Groundwater Sustainability Plan for the northern Westside Basin will help maintain in-City groundwater supplies for current and future uses. Recycled water remains a drought-resistant supply that is not affected by precipitation or hydrologic year type.

6.2.5 Summary of Existing and Future Local Supplies

Table 6-5 summarizes the SFPUC's current and projected water supply sources for meeting retail demand through 2050. Up to 81 MGD of RWS supplies are available to retail customers in normal years. The SFPUC also remains committed to expanding local supplies, such as groundwater and recycled water, to supplement RWS supplies and meet future retail demands.

Table 6-5. Actual and Projected Retail Supplies (MGD)

[Standardized Table 6-4 Retail: Recycled Water Direct Beneficial Uses Within Service Area]

[Standardized Table 6-8 Retail: Water Supplies – 2025 Actual]

[Standardized Table 6-9 Retail: Water Supplies – Projected]

Retail Supply	Actual 2025 Supplies	2030	2035	2040	2045	2050
RWS Supply Utilized by Retail Customers[a]	60.5	62.7	61.2	61.9	64.0	66.7
Groundwater						
In-City Potable[b]	0.1	1.5	3.0	4.0	4.0	4.0
In-City Irrigation[b,c]	1.6	0.5	0.0	0.0	0.0	0.0
Castlewood Well System[d]	0.2	0.3	0.3	0.3	0.3	0.3
Subtotal Groundwater	1.9	2.3	3.3	4.3	4.3	4.3
Recycled Water						
Westside Enhanced Water Recycling Project[e]	—	1.7	1.7	1.7	1.7	1.7
Harding Park Recycled Water Project[f]	0.1	0.2	0.2	0.2	0.2	0.2
Sharp Park Recycled Water Project[g]	0.01	0.1	0.1	0.1	0.1	0.1
Treasure Island Water Resource Recovery Facility Project[h]	0.0	0.04	0.04	0.4	0.4	0.4
Subtotal Recycled Water	0.1	2.0	2.0	2.4	2.4	2.4
Total Retail Supply	62.5	67.0	66.5	68.6	70.7	73.4

a If the retail supply allocation remains 81 MGD through 2050, up to 81 MGD of RWS supply may be used.

b The San Francisco Groundwater Supply Project will ramp up potable water production from 1.5 MGD in 2029 to 4 MGD by 2040. About 1.5 MGD of groundwater currently serves irrigation at Golden Gate Park, the San Francisco Zoo, and the Great Highway medians. This 1.5 MGD of groundwater will be converted to potable supply under the San Francisco Groundwater Supply Project.

c Groundwater use for in-City irrigation will be phased out once the Westside Enhanced Water Recycling Project comes online.

d Castlewood CSA is served by the Castlewood Well System.

e The Westside Enhanced Water Recycling Project will supply Golden Gate Park (1.2 MGD), Lincoln Park (0.1 MGD), SF Zoo and the Lower Great Highway (0.28 MGD) by 2027, and Sunset Boulevard (0.1 MGD) by 2030.

f Irrigation at Harding Park and Fleming Golf Courses receives recycled water from the North San Mateo County Sanitation District.

g Irrigation at Sharp Park Golf Course is provided recycled water from the North Coast County Water District. The Sharp Park Recycled Water Project provided approximately 0.01 MGD of recycled water in 2025.

h Recycled water production at the Treasure Island Water Resource Recovery Facility is scheduled to start in 2026 with an initial output of approximately 0.04 MGD. However, the full delivery infrastructure will not be in place at that time; the facility is expected to reach its full capacity of 0.43 MGD each year by 2037.

6.3 ENERGY INTENSITY ANALYSIS

In accordance with Section 10631.2(a) of the California Water Code, this section and Appendix A provide energy intensity data for FY 2024-25 for the SFPUC system.

Because of the design of the SFPUC's water delivery system, the SFPUC cannot separate energy intensity data for retail and wholesale water deliveries. Instead, the SFPUC uses the Total Utility Approach to report system-wide energy intensity information, as detailed further in Appendix A. The SFPUC also does not have access to the Wholesale Customers' electricity meter records for the electricity that they use to distribute purchased water within their service areas, so that information is not included in the energy intensity analysis. In addition, the SFPUC's energy intensity analysis excludes electricity consumed by other entities to produce recycled water delivered to SFPUC customers.

The reported energy consumption includes the consequential hydropower generated by the Hetch Hetchy Water and Power Project as a result of water deliveries through the RWS. The RWS is almost entirely gravity-driven from Sierra Nevada reservoirs to the Bay Area, and no electricity is used for pumping at Wholesale Customer turnouts. Electricity use in the SFPUC's analysis primarily reflects pumping water supplies to off-stream storage in the Bay Area, in-City pumping for distribution, and electricity consumed at the Sunol and Harry Tracy Water Treatment Plants. It also includes electricity used at administrative and support facilities.

The Hetch Hetchy Regional Power System consists of four hydroelectric powerhouses (Moccasin Powerhouse, Moccasin Low Head Powerhouse, Kirkwood Powerhouse, and Holm Powerhouse), which account for a combined hydroelectric generating capacity of nearly 400 megawatts.

This page intentionally left blank.

SECTION 7: WATER SUPPLY RELIABILITY

This section describes how reliably the RWS and local supplies can meet retail and wholesale demands through 2050. The SFPUC delivers approximately one-third of the RWS's annual supplies to retail customers and the remaining two-thirds to wholesale customers. RWS reliability reflects the system's ability to deliver water during water shortage emergencies and is measured by how often and how much deliveries must be reduced to balance demand with available supply. The SFPUC plans for the possibility of a water shortage emergency more severe than the worst drought on record. This section also outlines the nearly completed Water System Improvement Program (WSIP), the factors currently affecting supply reliability, and the SFPUC's Alternative Water Supply Program, which aims to address potential supply shortfalls.

7.1 WATER SYSTEM IMPROVEMENT PROGRAM

Initiated in 2008, WSIP is a $4.8 billion, multi-year capital program to upgrade the RWS as well as the SFPUC's local water system. The program has delivered capital improvements that enhance the SFPUC's ability to provide reliable, affordable, high quality drinking water in an environmentally sustainable manner to its retail and wholesale customers. The SFPUC structured WSIP to cost-effectively meet water quality requirements, improve seismic and delivery reliability goals through the year 2030, and fulfill water supply objectives through the year 2018. The SFPUC completed the San Francisco portion of WSIP in October 2020. As of June 30, 2025, the regional portion of WSIP was 99.3% complete, having repaired, replaced, and seismically upgraded crucial portions of the RWS; only two regional projects remain in planning and construction, while 49 regional projects have been completed or are in close-out. The SFPUC forecasts that the overall WSIP will be complete in June 2032.

The SFPUC undertook the WSIP to ensure the ability of the RWS to meet Level of Service (LOS) Goals and Objectives for water quality, seismic reliability, delivery reliability, and water supply. The Water Supply LOS goal, stated in the WSIP and adopted in 2008, is to meet customer water needs in non-drought and drought periods. The SFPUC amended and updated the LOS Goals and Objectives in November 2023. The SFPUC's current LOS Goals and Objectives related to water supply include the following:

- Meet an average annual water demand of 265 MGD from the SFPUC watersheds for Retail and Wholesale Customers during non-drought years consistent with the Water Supply Agreement between San Francisco and its Wholesale Customers in Alameda, San Mateo, and Santa Clara Counties.
- Meet dry-year delivery needs while limiting rationing to a maximum 20 percent system-wide reduction in water service during extended droughts.
- Diversify and improve use of new water sources and drought management, including groundwater, recycled water, conservation, transfers, storage expansion, purified water, desalinated water, and technological innovations that can increase supply and/or water use efficiency.
- Maintain San Francisco retail residential potable water use below 45 gallons per capita per day.
- Realize annual Real Water Losses of less than 10% of water supplied to San Francisco.

- Meet 80% of San Francisco's Recreation and Parks Department irrigation demands with recycled water by December 31, 2025.

7.2 WSIP DRY-YEAR WATER SUPPLY PROJECTS

With WSIP, the SFPUC has undertaken several water supply projects to meet dry-year demands. Those projects include the following:

Calaveras Dam Replacement Project. Calaveras Dam is in the East Bay near a seismically active fault zone, and following the Loma Prieta earthquake in 1989, it was determined to be seismically vulnerable. To address the dam's vulnerability, the SFPUC constructed a new dam of equal height downstream of the existing dam. This project was completed in 2022. Calaveras Reservoir was completely refilled in 2023 and is now operating at full capacity.

Alameda Creek Recapture Project. The Alameda Creek Recapture Project includes new facilities in and around an existing quarry pit in Sunol Valley to recover the loss of water supply associated with instream flow release and bypass requirements related to the Calaveras Dam Replacement Project. The project is anticipated to be completed in 2032.

Lower Crystal Springs Dam Improvements Project. The Lower Crystal Springs Dam Improvements Project was completed in May 2012. The related joint San Mateo County/SFPUC Bridge Replacement Project to replace the bridge across the Lower Crystal Springs Dam was completed in January 2019.

Regional Groundwater Storage and Recovery Project. The Regional Groundwater Storage and Recovery (RGSR) Project is a strategic partnership between the SFPUC and three Wholesale Customers in San Mateo County: the California Water Service Company (serving South San Francisco and Colma), the City of Daly City, and the City of San Bruno. The project sustainably manages groundwater and surface water resources to provide the RWS with additional supplies during times of drought. During years of normal or heavy rainfall, the SFPUC provides additional surface water from the RWS to the three agencies in northern San Mateo County, allowing them to reduce the amount of groundwater that they pump from the southern Westside Groundwater Basin. Over time, the reduced pumping allows the aquifer to naturally recharge and result in increased groundwater storage of up to 61,000 acre-feet of new water supply available during dry years. As of December 2025, the SFPUC had accumulated approximately 14 billion gallons of groundwater storage credits (about 43,093 acre-feet) through the project.

The RGSR project has two phases. Phase 1, which included building thirteen production wells and treatment facilities, is complete. Phase 2 design began in early 2020 and covers rehabilitating and reinstalling well pumps, installing two new variable frequency drivers, and conducting start-up testing and well disinfection. Pumps at the Hickey, Southwood Drive, and Mission well were rehabilitated, packed, and stored due to staff shortages, operational challenges, and elevated ammonia levels at the Southwood Drive well; they may be reinstalled later. Construction on Phase 2B began in 2024 and would transport groundwater from SFPUC South San Francisco Main Well to California Water Service Company Treatment Station in South San Francisco. The project will make improvements at the existing well site which includes mechanical, electrical, structural, and corrosion protection upgrades. The SFPUC also prepared a conceptual engineering design for additional groundwater treatment to address the high ammonia levels at the South Spruce Lane Well and Treatment Facility. Minor amounts of groundwater pumping from RGSR wells have occurred during start-up testing and monthly maintenance.

Regional Groundwater Treatment Improvements Project. The SFPUC approved this new project in the 10-Year Water Enterprise Capital Improvement Program for FY 2021-2030. The project includes treatment facilities for several of the RGSR project wells to address groundwater quality issues that have emerged since the wells were constructed.

Water Transfers. During the planning and phased implementation of the WSIP, the SFPUC pursued a long-term agreement to transfer 2 MGD from Modesto Irrigation District to the SFPUC in drought years. Negotiations with Modesto Irrigation District ended in 2012 when an agreement could not be reached. The dry-year transfer project is now being included as part of the new SFPUC Alternative Water Supply Program and is described in further detail in Section 7.3.9.

7.3 FACTORS AFFECTING FUTURE RWS SUPPLIES

There are several factors that may impact future RWS supplies; these factors are described below.

7.3.1 Adoption of the 2018 Bay-Delta Plan Amendment

In December 2018, the SWRCB adopted amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan Amendment) to establish water quality objectives for the San Francisco Bay-Delta watershed. The SWRCB is required by law to regularly review this plan. The adopted Bay-Delta Plan Amendment was developed with the stated goal of increasing salmonid populations in three San Joaquin River tributaries (the Stanislaus, Merced, and Tuolumne Rivers) and the San Francisco Bay-Delta. The Bay-Delta Plan Amendment requires the release of 30-50% of the “unimpaired flow”[8] on the three tributaries from February through June in every year type. In SFPUC modeling of the new flow standard, it is assumed that the required release is 40% of unimpaired flow.

If the Bay-Delta Plan Amendment is implemented, the SFPUC will be able to meet the projected water demands presented in this 2025 UWMP in normal years but is expected to experience supply shortages in single dry years or multiple dry years. Implementation of the Bay-Delta Plan Amendment could require rationing in all single dry years and multiple dry years.

Implementation of the Bay-Delta Plan Amendment remains uncertain for multiple reasons.

- Over a dozen lawsuits have been filed in both state and federal courts challenging the SWRCB’s adoption of the Bay-Delta Plan Amendment, including a legal challenge filed by the federal government at the request of the U.S. Department of Interior, Bureau of Reclamation. This litigation is currently at the appellate level.
- The Bay-Delta Plan Amendment is not self-implementing and does not automatically allocate responsibility for meeting its new flow requirements to San Francisco or any other water rights holders. Rather, the Bay-

[8] "Unimpaired flow represents the natural water production of a river basin, unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds." (Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Dec. 12, 2018) p.17, fn. 14, available at https://www.waterboards.ca.gov/plans_policies/docs/2018wqcp.pdf.)

Delta Plan Amendment provides a regulatory framework for implementing water quality objectives, which SWRCB must implement by subsequent proceedings, such as a comprehensive water rights adjudication or, in the case of the Tuolumne River, potentially through the water quality certification process set forth in section 401 of the Clean Water Act as part of the Federal Energy Regulatory Commission's licensing proceedings for the Don Pedro and La Grange hydroelectric projects. It is currently unclear when the license amendment process is expected to be completed. This process and any other adjudicatory proceedings may face legal challenges and have lengthy timelines, and quite possibly could result in a different assignment of flow responsibility (and therefore a different water supply impact on the RWS).

In recognition of the obstacles to implementation of the Bay-Delta Plan Amendment, the SWRCB in Resolution No. 2018-0059 adopting the Bay-Delta Plan Amendment directed staff to help complete a "Delta watershed-wide agreement, including potential flow measures for the Tuolumne River," and to incorporate such agreements as an "alternative" for a future amendment to the Bay-Delta Plan to be presented to the SWRCB "as early as possible after December 1, 2019." On March 26, 2019, the SFPUC adopted Resolution No. 19-0057 to support the SFPUC's participation in the Voluntary Agreement negotiation process. On November 10, 2022, the SFPUC along with the Modesto and Turlock Irrigation Districts signed a Memorandum of Understanding Advancing the Term Sheet for the Voluntary Agreements to Update and Implement the Bay-Delta Water Quality Control Plan and Other Actions. The Voluntary Agreements are now referred to as the Agreements to Support Healthy Rivers and Landscapes (HRL). The SWRCB is in the process of evaluating the Healthy Rivers and Landscapes Program. Specifically, in the fall of 2025 the SWRCB released a draft Scientific Basis Report for the Tuolumne HRL which evaluated the biological benefits of the proposal. The SWRCB also released a Notice of Preparation for the CEQA analysis of the Tuolumne HRL in spring of 2023.

Because of the uncertainty surrounding implementation of the Bay-Delta Plan Amendment, the water supply reliability assessment presented in the 2025 UWMP looks at two future supply scenarios: (1) implementation of the Bay-Delta Plan Amendment and (2) SFPUC system's current conditions without implementation of the Bay-Delta Plan Amendment.

7.3.2 Potential State and Federal Regulations

The SFPUC's operation of the RWS is subject to numerous State and federal agency permits designed to protect drinking water quality and the environment. Some permit requirements have been in place for decades and influence the way the SFPUC manages water supply. Requirements for instream flows, for example, may increase the releases or bypass flow from SFPUC facilities. In the Tuolumne River watershed, the SFPUC currently maintains a specific flow release schedule downstream of Hetch Hetchy Reservoir, Cherry Lake, and Lake Eleanor. When the WSIP was analyzed in the Programmatic Environmental Impact Report, local system reservoirs had no formal flow release requirements, so no instream flow release and bypass requirements were reflected in the water supply program for the Calaveras Dam Replacement and Lower Crystal Springs Dam Improvement Projects. However, changes to the flow schedules for dams on Alameda and San Mateo Creeks that resulted from project permitting impacted the water supply reliability of the RWS. Permitting for future projects may further impact water supply reliability through additional instream flow release or bypass requirements.

As described in Section 3.1.4., the SFPUC uses a portion of the storage capacity of Don Pedro Reservoir as a water bank under agreement with the Districts. The re-licensing of the Don Pedro Reservoir by FERC may require additional water released from the reservoir for the preservation of aquatic species in the lower Tuolumne River, potentially affecting the yield of the RWS by reducing the balance of water stored in the water bank. FERC released the final Environmental Impact Statement for the re-licensing on July 7, 2020. There is currently no schedule for when FERC will issue the licenses.

7.3.3 Future Water Supply Decisions

In the 2009 WSA, the SFPUC committed to make two decisions before the end of 2018 regarding future water supplies, with the prerequisite of the SFPUC having completed any necessary California Environmental Quality Act (CEQA) review relevant to those decisions:

- Whether or not to make the cities of San Jose and Santa Clara permanent customers of the RWS, if the SFPUC determines that RWS long-term water supplies are available to support their permanent status, and
- Whether or not to increase Supply Assurance above 184 MGD to meet future Wholesale Customer demands.

Prior to 2018, the SFPUC determined that it was prudent to defer these decisions due to uncertainty about water supply availability and future growth patterns in the Bay Area, as well as unprecedented reductions in demands on the RWS, which indicated that total Wholesale Customer demands (including the demands of San Jose and Santa Clara, who do not share in the 184 MGD Supply Assurance) would be 173.9 MGD in 2040. Accordingly, the SFPUC and the Wholesale Customers amended the WSA in 2018, deferring the future water supply decisions to the end of 2028 to allow the SFPUC to conduct further water supply planning, including a reevaluation of RWS demands and supply options, and any necessary CEQA analysis. Based on current projections, Wholesale Customer demands (including the demands of San Jose and Santa Clara) will continue to be less than the 184 MGD Supply Assurance through the year 2050.

The SFPUC's planning efforts to support its decisions regarding the status of San Jose and Santa Clara are a part of the SFPUC's Alternative Water Supply Program as described in Section 7.4.

7.4 ALTERNATIVE WATER SUPPLY PROGRAM

In 2019, the SFPUC established the Alternative Water Supply (AWS) Program to identify and plan water supply and storage projects and actions that increase the dry-year reliability of the RWS. Based on the 2045 planning horizon that the SFPUC applied in its February 2024 AWS Plan, the SFPUC anticipates a water supply gap will occur in future dry years. The AWS Program aims to help fill the gap through local and regional capital projects. The February 2024 AWS Plan identified six regional projects that might partially address the future water supply gap and the priorities for this planning effort. Since the development of that plan, three projects have been deferred (Daly City Recycled Water Expansion, Alameda County Water District-Union Sanitary District Purified Water, and Calaveras Reservoir Expansion) and one project has been canceled (Los Vaqueros Reservoir Expansion). The AWS Program is continuing to pursue the following two projects:

- **PureWater Peninsula**. PureWater Peninsula (formerly known as the Crystal Springs Purified Water Project) is a purified water project that could provide 6 MGD of additional potable water supply to the RWS through surface water augmentation at the SFPUC's Crystal Springs Reservoir. The currently proposed project involves treating wastewater effluent from Silicon Valley Clean Water at a new advanced purified water facility located on the Peninsula and transmitting that purified water to Crystal Springs Reservoir, where it would blend with RWS surface water supplies before the SFPUC treats it again at Harry Tracy Water Treatment Plant. A future phase could provide an additional 6 MGD of additional potable water supply to the RWS. Project partners include the SFPUC, Silicon Valley Clean Water, BAWSCA, Mid-Peninsula Water District, California Water Service Company, City of Redwood City, City of Foster City, and City of San Mateo.

- **South Bay Purified Water**. In 2023, the SFPUC, the City of San Jose, and the City of Santa Clara completed an initial feasibility study for the South Bay Purified Water project, envisioned as a 10 MGD purified water project that would serve the local demands of San Jose and Santa Clara during all types of water years and deliver an additional volume of water supply to the RWS in dry years. Currently, Santa Clara Valley Water District (Valley Water) is working with San Jose and Santa Clara to design a larger project to meet broader regional needs. The SFPUC's participation in this project will be based on the regional benefits to the SFPUC's customers. This project may also assist the SFPUC with its decision regarding San Jose and Santa Clara's status as RWS customers, discussed above.

If both AWS projects that SFPUC staff have identified through the current planning process can be implemented, there would still be a supply shortfall to meet projected needs associated with implementation of the Bay-Delta Plan Amendment. Furthermore, both alternative water supply options are in the planning phase and are subject to changes in institutional structure and design. Given the limited availability of water supply alternatives, unless the supply risks are significantly reduced, the SFPUC will continue to plan, develop, and implement all potential projects that can help bridge the anticipated water supply gap during droughts.

Outside of the AWS Program, the following additional regional projects have been explored by the SFPUC in the past and have been included in previous planning documents. The SFPUC continues to seek opportunities to partner in such projects.

- **Groundwater Banking.** Groundwater banking projects in the Modesto Irrigation District and Turlock Irrigation District service areas could provide the SFPUC with some additional water supply to meet instream flow releases in dry years, reducing water supply impacts on the RWS.

- **Inter-Basin Collaborations.** Inter-Basin Collaborations could include establishing a partnership between agencies on the Tuolumne River (such as the SFPUC) 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 system, and this excess flow could potentially 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.

- **Dry-Year Transfers.** The SFPUC initiated discussions with the Tuolumne River irrigation districts under WSIP to secure a dry-year transfer (see WSIP Dry-Year Water Supply Projects section above). While no transfer was secured, the SFPUC continues to engage in discussions with irrigation districts to explore potential transfer opportunities.

The SFPUC's AWS Plan published in February 2024 included a planning framework for the SFPUC to consider water supply needs and related tradeoffs; guide the decisions to proceed with environmental review; and continue the development of projects that can best meet anticipated water supply needs. In June 2025, the SFPUC prepared a progress report that provided status updates on the AWS projects. In 2027, the SFPUC plans to review and revise its Alternative Water Supply Plan based on updated information.

7.5 BAY AREA REGIONAL EFFORTS TO IMPROVE WATER SUPPLY RELIABILITY

The following projects and efforts in the San Francisco Bay Area region are currently underway or completed and will help to improve RWS water supply reliability. Some of these projects are reflected in the SFPUC's current strategy for meeting water supply needs described above. As the remainder of these projects move through the planning stages, they will continue to inform the SFPUC's water supply strategy.

Bay Area Regional Reliability. The SFPUC is continuing to work with seven water agencies in the Bay Area (Alameda County Water District, BAWSCA, Contra Costa Water District, East Bay Municipal Utility District [EBMUD], Marin Municipal Water District, Valley Water and Zone 7 Water Agency) to investigate opportunities for collaboration, particularly during future droughts. The purpose of this planning effort, known as Bay Area Regional Reliability (BARR) Partnership, is to collaborate regionally and potentially (1) identify projects and processes to enhance water supply reliability in the Bay Area, (2) leverage existing infrastructure investments, (3) facilitate water transfers during critical shortages, and (4) improve climate change resiliency. BARR water agencies continue to track short-term response actions and longer-term projects that were identified in the 2017 Bay Area Regional Reliability Drought Contingency Plan.

Regional Interties. Regional interties, which connect the RWS with systems of other water agencies, help increase the reliability of the RWS by allowing for water exchanges between the SFPUC and other water agencies during emergencies, water shortages, or maintenance.

- **EBMUD-Hayward-SFPUC Emergency Intertie:** In 2002, the SFPUC formed a partnership with EBMUD and the City of Hayward to construct Skywest Pump Station and 1.5 miles of pipeline to link the SFPUC, EBMUD, and Hayward water systems. These facilities can convey up to 30 MGD among these three agencies to boost water supply reliability during emergencies. EBMUD and the SFPUC own these facilities jointly, while the City of Hayward maintains and operates them in coordination with EBMUD and the SFPUC.

- **SFPUC-Valley Water Intertie:** The SFPUC and Valley Water maintain a 40-MGD intertie between their two systems at Milpitas to exchange water during emergencies and planned maintenance. The intertie has been used on several occasions during maintenance of Valley Water's system.

- **South Bay Aqueduct Intertie:** An intertie connecting the South Bay Aqueduct and the SFPUC's San Antonio Reservoir that the SFPUC used in 1991-1992 for a two-year water transfer. The SFPUC may upgrade this intertie to receive State Water Project water in the event of a future emergency.

SECTION 8: WATER SUPPLY RELIABILITY ASSESSMENT

8.1 CONSTRAINTS ON SUPPLIES

The SFPUC has identified potential constraints on its water supplies. The list below summarizes the legal, environmental, water quality, climatic, and other factors potentially resulting in inconsistent supply.

- **RWS:** As described previously, there may be shortfalls of RWS supplies in dry years as a result of several factors, including required instream flow releases (see Section 7.3) as well as climate change (see Section 6.1.3).

- **Retail Groundwater:** Groundwater supplies are typically limited by the quality and quantity of available supplies. However, the probability of these impacts occurring is low with proper management of the Westside Groundwater Basin as described in Section 6.2.1.1.

- **Retail Recycled Water:** Recycled water is limited by water quality requirements that legally restrict recycled water supply for some uses. However, recycled water supplies discussed herein are treated, or are planned to be treated, to the standards established by State agencies that are required for each designated end use. As a result, no limitations on use of recycled water for designated purposes are expected to occur.

The 2018 adoption of the Bay-Delta Plan Amendment may significantly impact the supply available from the RWS. The SFPUC recognizes that the Bay-Delta Plan Amendment has been adopted and that, given that it is now state law, the SFPUC must plan for a future in which it is fully implemented. The SFPUC also acknowledges that the plan is not self-implementing and therefore does not automatically go into effect. Similarly, there is active litigation at the appellate level regarding the Bay-Delta Plan Amendment. The SFPUC is also pursuing a voluntary agreement, known as the Healthy Rivers and Landscapes Program (HRL). The HRL is currently undergoing evaluation at the SWRCB. In fall of 2025, the SWRCB released a Scientific Basis Report evaluating the biological benefits of the Tuolumne River component of the HRL. The next step is for SWRCB to finalize this report including scientific peer review. At the same time, the SWRCB is undergoing CEQA evaluation of the Tuolumne HRL. No timeline has been provided for when the HRL will be considered for adoption by the SWRCB.

Because of the uncertainty surrounding implementation of the Bay-Delta Plan Amendment, the following water supply reliability assessment includes a set of tables for two future supply scenarios: (1) a scenario in which the Bay-Delta Plan Amendment is implemented and (2) a scenario that considers the SFPUC system’s current conditions without implementation of the Bay-Delta Plan Amendment. The two scenarios provide a bookend for the possible future scenarios regarding RWS supplies. The Bay-Delta Plan Amendment implementation start date is unknown, for the purposes of the supply reliability analysis, it is included in the 2030 modeling scenarios. The standardized tables associated with this UWMP contain the future scenario that assumes implementation of the Bay-Delta Plan Amendment.

There are additional factors that could affect the availability of water supply regarding the SWRCB curtailments and agreements with Turlock and Modesto Irrigation Districts pertaining to instream flow obligations on the Tuolumne River. The following describes these and how they were incorporated into the water supply reliability analysis.

- During the last two drought periods, 2013-2016 and 2021-2023, the SWRCB implemented curtailments through emergency regulations and curtailment orders that attempted to limit diversions from Central Valley watersheds including the Tuolumne River at certain times. Due to the uncertain legality of the SWRCB's curtailment actions as well as the uncertainties regarding any potential future curtailment actions against San Francisco, the SFPUC's RWS supply reliability analyses do not assume curtailments are in effect.

- Through a 1966 agreement with the Modesto and Turlock Irrigation Districts (Districts), who are more senior downstream appropriative water rights holders on the Tuolumne River, San Francisco may become responsible for up to approximately 51.7% of any flow releases the Federal Energy Regulatory Commission (FERC) may require through issuance of a new license for the Districts' Don Pedro Hydropower Project. The exact flow contribution for which San Francisco may become responsible is highly uncertain and may depend on multiple currently unknown factors, including an anticipated Endangered Species Act biological opinion from the National Marine Fisheries Service and a Clean Water Act section 401 water quality certification from the SWRCB. San Francisco's potential responsibility for FERC-ordered flows may further depend on San Francisco's ability to enter into a new or extended agreement with the Districts to offset a portion of San Francisco's flow contributions in exchange for payment. Due to the high levels of uncertainty surrounding the Districts' FERC-relicensing process, as well as the unknown timing for license issuance, the SFPUC's RWS water supply reliability analyses do not assume additional water supply losses from any potential new FERC-ordered flow releases.

- The simulation of the Bay-Delta Plan Amendment scenario assumes that a 1996 agreement between San Francisco and the Districts (the Side Agreement), which allows San Francisco to pay the Districts in lieu of contributing a portion of current FERC-ordered flow releases, remains in effect, and that the San Francisco share of flows in excess of and not covered by the Side Agreement is approximately 51.7%. These assumptions were made for the purpose of completing the modeling for the UWMP update, and they do not represent a commitment by San Francisco or the Districts to any future agreement or of San Francisco accepting responsibility for any future FERC-ordered flow releases.

8.2 WATER SUPPLY MODELING

8.2.1 Data and Methods

The SFPUC used its Hetch Hetchy and Local Simulation Model (HHLSM) to perform the water supply analyses for the supply reliability assessment and the drought risk assessment within this 2025 UWMP. HHLSM combines a historical record of hydrology from 1920 through 2025 with a current representation of RWS infrastructure and operations. The simulated operations include decisions on water supply rationing during droughts. The use of those results is described below.

A key input for the HHLSM is the anticipated level of demand on the RWS. Supply modeling results presented in this 2025 UWMP reflect an input of projected demands on the RWS consisting of (1) projected retail customer demands on the RWS (total retail customer demands minus local groundwater and recycled water supplies, see Table 4-1 and Table 6-5), and (2) projected Wholesale Customer purchases (see Table 4-5). The SFPUC has estimated total RWS demands for 2030 through 2050 and used these estimates in HHLSM simulation of RWS water supply reliability. The SFPUC has a Level of Service objective of meeting average annual water demand of 265 MGD from the SFPUC watersheds for Retail and Wholesale Customers during non-drought years consistent with the WSA, under which the SFPUC has a contractual obligation to supply up to 184 MGD to the Wholesale Customers. Therefore, the SFPUC has also conducted modeling that assumes Wholesale Customer demand is 184 MGD to facilitate planning that supports meeting this Level of Service objective and contractual obligation. The results of this modeling are in Appendix E.

As shown in Appendix E, in a normal year, the SFPUC can provide up to 265 MGD of supply from the RWS. However, as described previously in Section 6.1.4, the SFPUC has defined normal year RWS supply in the context of this 2025 UWMP as the supply that it will use to meet the full demands on the RWS in a non-drought year.

8.2.2 Design Drought

In the six-year period of 1987-92, a shortfall developed between the SFPUC's supplies and its customers' demands such that significant rationing of water supply became necessary. Following the 1987-92 drought experience, the SFPUC included the concept of its "firm" capability in water supply planning, which is defined as the amount of water the RWS can be expected to deliver during drought periods.

The SFPUC uses a hypothetical drought that is more severe than what the RWS has historically experienced. This drought sequence is referred to as the "design drought" and serves as the basis for planning and modeling of future scenarios. The design drought consists of the 1987-92 drought, followed by an additional 2.5 years of dry conditions from the hydrologic record that include the 1976-77 drought. While the 2012-2016 and 2020-2023 droughts include some of the driest years on record for the SFPUC's watersheds, the design drought still represents a more severe drought in duration and overall water supply deficit.

More specifically, the design drought sequence used by the SFPUC for reliability planning is an 8.5-year period composed of the following elements:

- **Historical Hydrology:** A six-year sequence of hydrology from the historical drought that occurred from July 1986 to June 1992;

- **Prospective Drought:** A 2.5-year period that includes the 1976-77 drought (to represent a drought sequence worse than historical); and

- **System Recovery Period:** The last six months of the design drought are the beginning of the system recovery period. The precipitation begins in the fall, and by approximately the month of December, inflow to RWS reservoirs exceeds customer demands and SFPUC system storage begins to recover.

8.2.3 Definition of Water Supply Scenarios *(Normal, Dry, and Multiple Dry Years)*

The total amount of water the SFPUC can deliver to the retail and wholesale customers depends on several factors, including the amount of water that is available to the SFPUC from natural runoff, the amount of water in reservoir storage, and the amount of water that the SFPUC must release from the RWS for purposes other than customer deliveries (e.g., required instream flow releases below RWS reservoirs). For planning purposes, the SFPUC "normal year" is based on historical hydrology under conditions that allow the RWS reservoirs to be filled over the course of the snowmelt season, allowing full deliveries to customers. Normal year supply corresponds to supply that will be used to meet the full demands on the RWS in a normal year, as shown in Table 6-1.

For dry-year supply scenarios, the SFPUC plans its water deliveries using indicators for water supply rationing that are developed through analysis with the design drought sequence described above. As a result, the SFPUC designs its system operations to provide sufficient carry-over water in SFPUC reservoirs to continue delivering water, although at reduced levels, during and after multiple dry years. Normal, single dry, and multiple dry year conditions are on a water year basis. Dry year availability is presented in terms of percentage of normal year availability.

The water supply reliability assessment presented in this section assumed the statuses of the WSIP projects shown in Table 8-1 over the 2025 UWMP planning horizon. The WSIP projects will collectively contribute to minimizing the anticipated RWS supply reductions in multiple dry years.

Table 8-2 summarizes the expected availability of local groundwater and local recycled water which are only available to meet retail demands. Groundwater and recycled water availability are not impacted by the implementation of the Bay-Delta Plan Amendment. Tables 8-3 and 8-4 show RWS supplies under normal, single dry, and multiple dry year conditions and for the two supply scenarios. Collectively, Tables 8-1 through 8-4 form the basis for the retail and wholesale supply reliability assessments presented in Sections 8.3 and 8.4.

The SFPUC estimated the levels of water supply deficiency—presented in this 2025 UWMP—using the design drought methodology discussed above. The five consecutive dry-year sequence shown in Tables 8-3 through Table 8-8 represent years 2 through 6 of the design drought. The SFPUC chose this sequence because year 2 is the first year in which system-wide water use reductions could take effect, since the design drought sequence generally begins year 1 with full reservoirs. The SFPUC has presented the results in the standardized format prescribed by DWR. Additionally, the SFPUC has a Water Shortage Contingency Plan (WSCP) that defines six distinct shortage levels that the RWS may be in and the corresponding actions that the SFPUC would take to address the water shortage, ranging from use of dry year water supplies (when available), voluntary water use reductions, and mandatory water use reductions.

The SFPUC modeled two scenarios for RWS supplies: with implementation of the Bay-Delta Plan Amendment, and without the implementation of the Bay-Delta Plan Amendment. These modeled scenarios show significantly different supply reliability projections for the RWS and are summarized as follows:

- **With Implementation of the Bay-Delta Plan Amendment:** The SFPUC anticipates RWS supplies will experience a reduction of up to 43% from normal year supplies through the multiple dry-year sequence. The implementation of the Alternative Water Supply Program and associated potential projects will help reduce the anticipated supply shortfalls.

- **Without Implementation of the Bay-Delta Plan Amendment:** There are no anticipated shortages of RWS supplies.

Table 8-1. WSIP Project Assumptions for RWS Supply Modeling

Projects	Base Year 2025	Base Year 2030	Base Year 2040 and Beyond
Lower Crystal Springs Dam Improvements	Crystal Springs storage not fully restored	Crystal Springs storage not fully restored	Crystal Springs storage not fully restored
Regional Groundwater Storage and Recovery (GSR) Project	GSR account partially filled at spring 2020 level of 43,000 AF; GSR recovery rate of 5.2 MGD[a]	GSR account fully filled; GSR recovery rate of 5.2 MGD[a]	GSR account fully filled; GSR recovery rate of 6.2 MGD[a]
Alameda Creek Recapture Project	Project not built	Project built and operating	Project built and operating
Dry-Year Transfers	Not in effect	Not in effect	Not in effect

[a] The GSR Project was intended to provide 7.2 MGD over 7.5 years, however current limitations on the number of wells available will result in deliveries less than 7.2 MGD over 7.5 years.

Table 8-2. Retail Groundwater and Recycled Water Supply Availability During Normal and Dry Years

[Standardized Table 7-1 Retail: Bases of Water Year Data]

Water Supply	Normal Year	Single Dry Year	Dry Year 1	Dry Year 2	Dry Year 3	Dry Year 4	Dry Year 5
Local Groundwater	100%	100%	100%	100%	100%	100%	100%
Local Recycled Water	100%	100%	100%	100%	100%	100%	100%

Table 8-3. Regional Water System Supply Availability During Normal and Dry Years for Base Years 2030 through 2050 – With Bay-Delta Plan Amendment

Base Year	Normal Year	Single Dry Year	Dry Year 1	Dry Year 2	Dry Year 3	Dry Year 4	Dry Year 5
2030	100%	75%	75%	63%	63%	63%	63%
2035	100%	74%	74%	63%	63%	63%	63%
2040	100%	72%	72%	61%	61%	61%	61%
2045	100%	70%	70%	59%	59%	59%	59%
2050	100%	68%	68%	57%	57%	57%	57%

Table 8-4. Regional Water System Supply Availability During Normal and Dry Years for Base Years 2030 through 2050 – Without Bay-Delta Plan Amendment

Base Year	Normal Year	Single Dry Year	Dry Year 1	Dry Year 2	Dry Year 3	Dry Year 4	Dry Year 5
2030	100%	100%	100%	100%	100%	100%	100%
2035	100%	100%	100%	100%	100%	100%	100%
2040	100%	100%	100%	100%	100%	100%	100%
2045	100%	100%	100%	100%	100%	100%	100%
2050	100%	100%	100%	100%	100%	100%	100%

8.2.4 Allocating Regional Water System Supply

The Water Shortage Allocation Plan (WSAP), also known as the Tier 1 Shortage Plan, is incorporated in the WSA and describes the method for allocating water between the SFPUC and Wholesale Customers during shortages caused by drought. The WSAP also implements a method for allocating water among the individual Wholesale Customers, known as the Tier 2 Drought Response Implementation Plan, which has separately been adopted by the Wholesale Customers and does not include the SFPUC.

The WSAP identifies the Retail Customers' and Wholesale Customers' respective shares of the annual water supply available during shortages that require system-wide reductions in water use of 20% or less. For example, when the required level of system-wide reduction in water use is 6 to 10%, the Retail Customer Tier 1 Allocation is 36% of the annual water supply available, and the Wholesale Customer Tier 1 Allocation is 64% of the annual water supply available. The WSCP, which further describes the WSAP, includes a table illustrating the Retail Customers' and Wholesale Customers' respective percentage shares at different shortage levels. Under the WSAP, if the Retail Customers' share of the available water supply results in the Retail Customers having a "positive allocation" (i.e., a supply of additional water rather than a percentage reduction in water use), then the Retail Customers' percentage share of the available water supply would be reduced to eliminate any positive allocation to the Retail Customers, with a corresponding increase in the percentage share of the available water supply allocated to the Wholesale Customers. For any level of required reduction in system-wide water use, the SFPUC shall require the Retail Customers to conserve a minimum of 5%, with any resulting reallocated supply credited to storage for inclusion in the calculation of projected available RWS supply in a subsequent year. For planning purposes, it is assumed that Retail Customers collectively achieve a 5% reduction if projected Retail Customer demand is greater than the Retail Customer allocation in dry years.

8.3 WATER SUPPLY AND DEMAND COMPARISONS, WITH BAY-DELTA PLAN AMENDMENT

The following sections summarize the projected retail and wholesale supplies and demands during normal, single dry, and multiple dry years (on a water year basis) for the scenario with implementation of the Bay-Delta Plan Amendment. The demand assumptions for this analysis are as follows:

- Total retail demands are those presented in Table 4-1, which reflect active and passive conservation, onsite water reuse savings, and water loss.
- Total wholesale demands are the Wholesale Customer purchase requests presented in Table 4-5, including those of the cities of San Jose and Santa Clara. A reliability assessment which includes the Supply Assurance of 184 MGD is presented in Appendix E.

Supplies are listed by source: RWS, groundwater (retail only), and recycled water (retail only). The difference between supply and demand, resulting in either a supply surplus or deficit, is also provided for each scenario. As noted earlier, Groveland CSD is accounted for as a retail customer in this section, but as a wholesale customer in the corresponding standardized tables.

8.3.1 Retail Water Service Reliability Assessment – With Bay-Delta Plan Amendment

The instream flow requirements of the Bay-Delta Plan Amendment would affect RWS supplies in both single dry year and multiple dry year scenarios. Table 8-5 compares projected retail demands and supplies under the Bay-Delta Plan Amendment and shows the following:

- **Normal Years:** The SFPUC will have sufficient supplies to meet projected retail demands.

- **Single Dry Year:** RWS supplies show an anticipated shortfall between 25–32% (see Table 8-3). After allocating available RWS supplies between retail and Wholesale Customers and comparing total retail supplies (RWS plus local supplies) to projected retail demands, the retail portion of supplies show a shortage of 8–17% (5–12 MGD).

- **Multiple Dry Years:** RWS supplies show an anticipated shortfall between 25–43%. After allocating available RWS supplies between retail and Wholesale Customers and comparing total retail supplies (RWS plus local supplies) to projected retail demands, the retail portion of supplies show a shortage of up to 29%, or nearly 21 MGD, by the fifth consecutive dry year at 2050 demand levels.

8.3.2 Wholesale Water Service Reliability Assessment – With Bay-Delta Plan Amendment

The comparison of wholesale demands and supplies under the Bay-Delta Plan Amendment, shown in Table 8-6, demonstrates the following:

- **Normal Years:** The SFPUC will have sufficient supplies to meet projected wholesale water demands.

- **Single Dry Year:** RWS supplies show an anticipated shortfall between 25–32%, (see Table 8-3). After allocating available RWS supplies between retail customers and Wholesale Customers and comparing Wholesale Customer allocation to projected Wholesale Customer demands, the Wholesale Customer portion of supplies show a shortage between 6–39% (7–57 MGD).

- **Multiple Dry Years:** RWS supplies show an anticipated shortfall between 25–43%. After allocating available RWS supplies between retail and Wholesale Customers and comparing Wholesale Customer allocation to projected Wholesale Customer demands, the Wholesale Customer portion of supplies show a shortage of up to 49%, or nearly 72 MGD, by the fifth consecutive dry year at 2050 demand levels.

Table 8-5. Retail Supply and Demand Comparison for Projected Normal and Dry Year Scenarios With Bay-Delta Plan Amendment (MGD)

[Standardized Table 7-2 Retail: Normal Year Supply and Demand Comparison]
[Standardized Table 7-3 Retail: Single Dry Year Supply and Demand Comparison]
[Standardized Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison]

Year	Retail Supply and Demand	Normal Year	Single Dry Year[a]	Dry Year 1[b]	Dry Year 2[b]	Dry Year 3[b]	Dry Year 4[b]	Dry Year 5[b]
2030	Total Retail Demand	67.0	67.0	67.0	67.0	67.0	67.0	67.0
2030	Total Retail Supply	67.0	59.6	59.6	50.8	50.8	50.8	50.8
2030	*Retail Groundwater[c]*	*2.3*	*2.3*	*2.3*	*2.3*	*2.3*	*2.3*	*2.3*
2030	*Retail Recycled Water[d]*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
2030	*RWS Supply Utilized by Retail[e]*	*62.7*	*55.3*	*55.3*	*46.4*	*46.4*	*46.4*	*46.4*
2030	Difference (Supply Surplus or Shortfall)	0.0	-7.4	-7.4	-16.2	-16.2	-16.2	-16.2
2030	Difference as Percentage of Demand	0.0%	-11.0%	-11.0%	-24.2%	-24.2%	-24.2%	-24.2%
2035	Total Retail Demand	66.5	66.5	66.5	66.5	66.5	66.5	66.5
2035	Total Retail Supply	66.5	60.1	60.1	52.0	52.0	52.0	52.0
2035	*Retail Groundwater[c]*	*3.3*	*3.3*	*3.3*	*3.3*	*3.3*	*3.3*	*3.3*
2035	*Retail Recycled Water[d]*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
2035	*RWS Supply Utilized by Retail[e]*	*61.2*	*54.8*	*54.8*	*46.7*	*46.7*	*46.7*	*46.7*
2035	Difference (Supply Surplus or Shortfall)	0.0	-6.4	-6.4	-14.5	-14.5	-14.5	-14.5
2035	Difference as Percentage of Demand	0.0%	-9.6%	-9.6%	-20.3%	-20.3%	-20.3%	-20.3%
2040	Total Retail Demand	68.6	68.6	68.6	68.6	68.6	68.6	68.6
2040	Total Retail Supply	68.6	61.4	61.4	53.0	53.0	53.0	53.0
2040	*Retail Groundwater[c]*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*
2040	*Retail Recycled Water[d]*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*
2040	*RWS Supply Utilized by Retail[e]*	*61.9*	*54.7*	*54.7*	*46.3*	*46.3*	*46.3*	46.3
2040	Difference (Supply Surplus or Shortfall)	0.0	-7.2	-7.2	-15.6	-15.6	-15.6	-15.6
2040	Difference as Percentage of Demand	0.0%	-10.5%	-10.5%	-22.7%	-22.7%	-22.7%	-22.7%
2045	Total Retail Demand	70.7	70.7	70.7	70.7	70.7	70.7	70.7
2045	Total Retail Supply	70.7	61.4	61.4	52.8	52.8	52.8	52.8
2045	*Retail Groundwater[c]*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*
2045	*Retail Recycled Water[d]*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*
2045	*RWS Supply Utilized by Retail[e]*	*64.0*	*54.6*	*54.6*	*46.1*	*46.1*	*46.1*	*46.1*
2045	Difference (Supply Surplus or Shortfall)	0.0	-9.3	-9.3	-17.9	-17.9	-17.9	-17.9

Year	Retail Supply and Demand	Normal Year	Single Dry Year[a]	Dry Year 1[b]	Dry Year 2[b]	Dry Year 3[b]	Dry Year 4[b]	Dry Year 5[b]
2045	Difference as Percentage of Demand	0.0%	-13.2%	-13.2%	-25.4%	-25.4%	-25.4%	-25.4%
2050	Total Retail Demand	73.4	73.4	73.4	73.4	73.4	73.4	73.4
2050	Total Retail Supply	73.4	61.6	61.6	52.7	52.7	52.7	52.7
2050	*Retail Groundwater[c]*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*
2050	*Retail Recycled Water[d]*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*
2050	*RWS Supply Utilized by Retail[e]*	*66.7*	*54.8*	*54.8*	*46.0*	*46.0*	*46.0*	*46.0*
2050	Difference (Supply Surplus or Shortfall)	0.0	-11.8	-11.8	-20.7	-20.7	-20.7	-20.7
2050	Difference as Percentage of Demand	0.0%	-16.1%	-16.1%	-28.2%	-28.2%	-28.2%	-28.2%

a During a single dry year, system-wide shortages of 25─32% apply (see Table 8-3). For this analysis, any shortage greater than 20% uses the same retail and wholesale allocation as the WSCP Shortage Level 6, in which 37.5% of available RWS supply is allocated to Retail Customers and 62.5% to Wholesale Customers.

b During multiple dry years, system-wide shortages of 25─43% apply (see Table 8-3). For this analysis, any shortage greater than 20% uses the same retail and wholesale allocation as the WSCP Shortage Level 6, in which 37.5% of available RWS supply is allocated to Retail Customers and 62.5% to Wholesale Customers.

c Groundwater supplies are assumed to equal projected demands for the San Francisco Groundwater Supply Project (ramping up to 4 MGD by 2040) and Castlewood CSA (0.3 MGD). Groundwater availability is not expected to be affected by dry-year conditions.

d Recycled water supplies are assumed to equal projected demands for the Westside Recycled Water Project (1.58 MGD by 2027 and 1.68 MGD by 2030), Harding Park and Fleming Golf Courses (0.20 MGD), Sharp Park Golf Course (up to 0.1 MGD), and Treasure Island (0.04 MGD by 2025 and 0.43 MGD by 2037). Recycled water availability would not be affected by dry-year conditions.

e Groundwater and recycled water are assumed to be used before RWS supplies to meet retail demand. However, in normal years, if groundwater and recycled water are not available, up to 81 MGD of RWS supply may be used.

Table 8-6. Wholesale Supply and Demand Comparison for Projected Normal and Dry Year Scenarios With Bay-Delta Plan Amendment (MGD)

[Standardized Table 7-2 Wholesale: Normal Year Supply and Demand Comparison]
[Standardized Table 7-3 Wholesale: Single Dry Year Supply and Demand Comparison]
[Standardized Table 7-4 Wholesale: Multiple Dry Years Supply and Demand Comparison]

Year	Wholesale Supply and Demand	Normal Year	Single Dry Year[a]	Dry Year 1[b]	Dry Year 2[b]	Dry Year 3[b]	Dry Year 4[b]	Dry Year 5[b]
2030	Total Wholesale Demand	133.9	133.9	133.9	133.9	133.9	133.9	133.9
2030	Total Wholesale RWS Supply[c]	133.9	92.1	92.1	77.4	77.4	77.4	77.4
2030	Difference (Surplus or Shortfall)	0.0	-41.8	-41.8	-56.5	-56.5	-56.5	-56.5
2030	Difference as % of Demand	0.0%	-31.2%	-31.2%	-42.2%	-42.2%	-42.2%	-42.2%
2035	Total Wholesale Demand	136.3	136.3	136.3	136.3	136.3	136.3	136.3
2035	Total Wholesale RWS Supply[c]	136.3	91.3	91.3	77.8	77.8	77.8	77.8
2035	Difference (Surplus or Shortfall)	0.0	-45.0	-45.0	-58.6	-58.6	-58.6	-58.6
2035	Difference as % of Demand	0.0%	-33.0%	-33.0%	-43.0%	-43.0%	-43.0%	-43.0%
2040	Total Wholesale Demand	140.6	140.6	140.6	140.6	140.6	140.6	140.6
2040	Total Wholesale RWS Supply[c]	140.6	91.1	91.1	77.2	77.2	77.2	77.2
2040	Difference (Surplus or Shortfall)	0.0	-49.5	-49.5	-63.4	-63.4	-63.4	-63.4
2040	Difference as % of Demand	0.0%	-35.2%	-35.2%	-45.1%	-45.1%	-45.1%	-45.1%
2045	Total Wholesale Demand	144.1	144.1	144.1	144.1	144.1	144.1	144.1
2045	Total Wholesale RWS Supply[c]	144.1	91.1	91.1	76.8	76.8	76.8	76.8
2045	Difference (Surplus or Shortfall)	0.0	-53.0	-53.0	-67.3	-67.3	-67.3	-67.3
2045	Difference as % of Demand	0.0%	-36.8%	-36.8%	-46.7%	-46.7%	-46.7%	-46.7%
2050	Total Wholesale Demand	148.4	148.4	148.4	148.4	148.4	148.4	148.4
2050	Total Wholesale RWS Supply[c]	148.4	91.4	91.4	76.6	76.6	76.6	76.6
2050	Difference (Surplus or Shortfall)	0.0	-56.9	-56.9	-71.7	-71.7	-71.7	-71.7
2050	Difference as % of Demand	0.0%	-38.4%	-38.4%	-48.3%	-48.3%	-48.3%	-48.3%

a During a single dry year, system-wide shortages of 25–32% apply (see Table 8-3). For this analysis, any shortage greater than 20% uses the same retail and wholesale allocation as WSCP Shortage Level 6, in which 37.5% of available RWS supply is allocated to Retail Customers and 62.5% to Wholesale Customers.

b During multiple dry years, system-wide shortages of 25–43% apply (see Table 8-3). For this analysis, any shortage greater than 20% uses the same retail and wholesale allocation as WSCP Shortage Level 6, in which 37.5% of available RWS supply is allocated to Retail Customers and 62.5% to Wholesale Customers.

c The WSAP sets forth the procedures for allocating available RWS supplies between the Retail and Wholesale Customers during water shortages.

8.4 WATER SUPPLY AND DEMAND COMPARISONS, WITHOUT BAY-DELTA PLAN AMENDMENT

The following subsections summarize the projected retail and wholesale supplies and demands during normal, single dry, and multiple dry years (on a water year basis) for the scenario without implementation of the Bay-Delta Plan Amendment.

8.4.1 Retail Water Service Reliability Assessment – Without Bay-Delta Plan Amendment

Table 8-7 compares projected retail demands and supplies in this scenario and demonstrate the following:

- **Normal Years:** The SFPUC will have sufficient supplies to meet its projected retail demands.
- **Single Dry Year:** The SFPUC will have sufficient supplies to meet its projected retail demands.
- **Multiple Dry Years:** The SFPUC will have sufficient supplies to meet its projected retail demands.

8.4.2 Wholesale Water Service Reliability Assessment – Without Bay-Delta Plan Amendment

Total wholesale demands correspond to the wholesale purchase projections, including those of the cities of San Jose and Santa Clara. Groveland CSD is not treated as a wholesale customer for the purpose of this section. However, in the corresponding standardized tables, Groveland CSD is reported as wholesale rather than retail.

The comparison of wholesale demands and supplies under this scenario, presented in Table 8-8, demonstrate the following:

- **Normal Years:** The SFPUC will have sufficient supplies to meet its projected wholesale demands.
- **Single Dry Year:** The SFPUC will have sufficient supplies to meet its projected wholesale demands.
- **Multiple Dry Years:** The SFPUC will have sufficient supplies to meet its projected wholesale demands.

Table 8-7. Retail Supply and Demand Comparison for Projected Normal and Dry Year Scenarios Without Bay-Delta Plan Amendment (MGD)

Year	Retail Supply and Demand	Normal Year	Single Dry Year	Dry Year 1	Dry Year 2	Dry Year 3	Dry Year 4	Dry Year 5
2030	Total Retail Demand	67.0	67.0	67.0	67.0	67.0	67.0	67.0
2030	Total Retail Supply	67.0	67.0	67.0	67.0	67.0	67.0	67.0
2030	*Retail Groundwater*[a]	*2.3*	*2.3*	*2.3*	*2.3*	*2.3*	*2.3*	*2.3*
2030	*Retail Recycled Water*[b]	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
2030	*RWS Supply Utilized by Retail*[c]	*62.7*	*62.7*	*62.7*	*62.7*	*62.7*	*62.7*	*62.7*
2030	Difference (Supply Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2030	Difference as Percentage of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2035	Total Retail Demand	66.5	66.5	66.5	66.5	66.5	66.5	66.5
2035	Total Retail Supply	66.5	66.5	66.5	66.5	66.5	66.5	66.5
2035	*Retail Groundwater*[a]	*3.3*	*3.3*	*3.3*	*3.3*	*3.3*	*3.3*	*3.3*
2035	*Retail Recycled Water*[b]	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
2035	*RWS Supply Utilized by Retail*[c]	*61.2*	*61.2*	*61.2*	*61.2*	*61.2*	*61.2*	*61.2*
2035	Difference (Supply Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2035	Difference as Percentage of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2040	Total Retail Demand	68.6	68.6	68.6	68.6	68.6	68.6	68.6
2040	Total Retail Supply	68.6	68.6	68.6	68.6	68.6	68.6	68.6
2040	*Retail Groundwater*[a]	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*
2040	*Retail Recycled Water*[b]	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*
2040	*RWS Supply Utilized by Retail*[c]	*61.9*	*61.9*	*61.9*	*61.9*	*61.9*	*61.9*	*61.9*
2040	Difference (Supply Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2040	Difference as Percentage of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2045	Total Retail Demand	70.7	70.7	70.7	70.7	70.7	70.7	70.7
2045	Total Retail Supply	70.7	70.7	70.7	70.7	70.7	70.7	70.7
2045	*Retail Groundwater*[a]	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*
2045	*Retail Recycled Water*[b]	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*
2045	*RWS Supply Utilized by Retail*[c]	*64.0*	*64.0*	*64.0*	*64.0*	*64.0*	*64.0*	*64.0*
2045	Difference (Supply Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2045	Difference as Percentage of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Year	Retail Supply and Demand	Normal Year	Single Dry Year	Dry Year 1	Dry Year 2	Dry Year 3	Dry Year 4	Dry Year 5
2050	Total Retail Demand	73.4	73.4	73.4	73.4	73.4	73.4	73.4
2050	Total Retail Supply	73.4	73.4	73.4	73.4	73.4	73.4	73.4
2050	*Retail Groundwater*[a]	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*
2050	*Retail Recycled Water*[b]	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*
2050	*RWS Supply Utilized by Retail*[c]	*66.7*	*66.7*	*66.7*	*66.7*	*66.7*	*66.7*	*66.7*
2050	Difference (Supply Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2050	Difference as Percentage of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

a Groundwater supplies are assumed to equal projected demands for the San Francisco Groundwater Supply Project (ramping up to 4 MGD by 2040) and Castlewood CSA (0.3 MGD). Groundwater availability would not be affected by dry-year conditions.

b Recycled water supplies are assumed to equal projected demands for the Westside Recycled Water Project (1.58 MGD by 2027 and 1.68 MGD by 2030), Harding Park and Fleming Golf Courses (0.20 MGD), Sharp Park Golf Course (up to 0.1 MGD), and Treasure Island (0.04 MGD by 2025 and 0.43 MGD by 2037). Recycled water availability would not be affected by dry-year conditions.

c Groundwater and recycled water are assumed to be used before RWS supplies to meet retail demand. However, in normal years, if groundwater and recycled water are not available, up to 81 MGD of RWS supply may be used.

Table 8-8. Wholesale Supply and Demand Comparison for Projected Normal and Dry Year Scenarios Without Bay-Delta Plan Amendment (MGD)

Year	Wholesale Supply and Demand	Normal Year	Single Dry Year	Dry Year 1	Dry Year 2	Dry Year 3	Dry Year 4	Dry Year 5
2030	Total Wholesale Demand	133.9	133.9	133.9	133.9	133.9	133.9	133.9
2030	Total Wholesale RWS Supply	133.9	133.9	133.9	133.9	133.9	133.9	133.9
2030	Difference (Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2030	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2035	Total Wholesale Demand	136.3	136.3	136.3	136.3	136.3	136.3	136.3
2035	Total Wholesale RWS Supply	136.3	136.3	136.3	136.3	136.3	136.3	136.3
2035	Difference (Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2035	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2040	Total Wholesale Demand	140.6	140.6	140.6	140.6	140.6	140.6	140.6
2040	Total Wholesale RWS Supply	140.6	140.6	140.6	140.6	140.6	140.6	140.6
2040	Difference (Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2040	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2045	Total Wholesale Demand	144.1	144.1	144.1	144.1	144.1	144.1	144.1
2045	Total Wholesale RWS Supply	144.1	144.1	144.1	144.1	144.1	144.1	144.1
2045	Difference (Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2045	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2050	Total Wholesale Demand	148.4	148.4	148.4	148.4	148.4	148.4	148.4
2050	Total Wholesale RWS Supply	148.4	148.4	148.4	148.4	148.4	148.4	148.4
2050	Difference (Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2050	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

8.5 DROUGHT RISK ASSESSMENT

The SFPUC developed the following Drought Risk Assessment (DRA) in compliance with Water Code Section 10635(b). The analysis presents a methodical assessment of water supplies and water uses under a hypothetical five-year drought scenario that extends from 2026 to 2030.

8.5.1 Data and Methods

The data and methods used to determine the RWS supply for the DRA dry-year sequence are the same as those described in Section 8.2. The SFPUC used the HHLSM with the design drought sequence to perform the water supply analyses and simulate the water supply shortage conditions over the five-year drought period.

Because the start date of the implementation of the Bay-Delta Plan Amendment is unknown, the DRA considers the supply scenario without the implementation of the Bay-Delta Plan Amendment.

The DRA also takes into consideration the roll-out of recycled water and groundwater supply projects that the SFPUC has planned to be in operation by 2030. In addition, the retail demands for the DRA are based on linear interpolation between the current 2025 retail demands of 62.5 MGD and the projected 2030 retail demands of 67.0 MGD, as presented in Section 4.

8.5.2 Basis for Supply Shortage Conditions

Assuming the availability of existing supplies at current demand levels, there are no anticipated reductions in RWS supply.

8.5.3 DRA Water Source Reliability

The DRA accounts for the supplies from the RWS, local groundwater, and local recycled water. The recycled water and groundwater projects that the SFPUC has planned for implementation within the next five years are integrated into the available supply portfolio for this five-year drought scenario. The SFPUC plans to increase recycled water supplies from 0.12 MGD in 2025 to 2.0 MGD in 2030 through the implementation of the Westside Recycled Water Project and the Treasure Island Recycled Water Project. It is assumed that the Westside Recycled Water Project will supply approximately 1.3 MGD to Golden Gate Park and Lincoln Park, and approximately 0.3 MGD to the San Francisco Zoo and Lower Great Highway by 2027. In 2026, groundwater supplies used for irrigation will be replaced by recycled water from the Westside Recycled Water Project. The groundwater production from 2026 to 2030 includes the in-City potable use (~0.25 MGD) and the Castlewood well system (~0.3 MGD). In-City potable groundwater is assumed to increase from 0.25 MGD in 2025 to 1.5 MGD in 2029.

8.5.4 Water Supply and Demand Comparison for 5-Year Drought Sequence

The supply and demand comparisons for the hypothetical drought sequence from 2026 to 2030 are presented below in Table 8-9 for the scenario without implementation of the Bay-Delta Plan Amendment since the start date of implementation is unknown. Under this scenario, the SFPUC has sufficient supplies to serve its retail demands in the event of a five-year drought starting in 2026.

Table 8-9. Retail Supply and Demand Comparison for Five-Year Drought Risk Assessment

[Standardized Table 7-5 Five-Year Drought Risk Assessment to address Water Code Section 106359b)]

	2026	2027	2028	2029	2030
Gross Water Use[a]	63.4	64.3	65.2	66.1	67.0
Supply Sources					
RWS Supply[b]	61.0	61.7	62.6	62.3	63.1
Groundwater[c]	2.1	0.7	0.7	1.9	1.9
Recycled Water[d]	0.3	1.9	1.9	1.9	2.0
Total Supplies[e]	63.4	64.3	65.2	66.1	67.0
Surplus/Shortfall) w/o WSCP Action	0.0	0.0	0.0	0.0	0.0

a Total retail demands reflect active and passive conservation, onsite water reuse savings, and water loss and demands are linearly interpolated between 2025 and 2030.

b Groundwater and recycled water are assumed to be used before RWS supplies to meet retail demand. However, in normal years, if groundwater and recycled water are not available, up to 81 MGD of RWS supply may be used.

c Assuming that the in-City groundwater capacity for irrigation accounts for approximately 1.5 MGD, the in-City groundwater for potable use is 0.25 MGD, and Castlewood CSA uses 0.3 MGD in 2026. When the Westside Recycled Water Project comes online in 2027 and the groundwater for irrigation is decreased to 0.5 MGD. The groundwater production from 2026 to 2029 assumes 0.25 MGD for in-City potable use and 0.4 MGD supplied by the Castlewood Well System. The potable groundwater production is anticipated to increase to 1.5 MGD in 2029.

d Assuming that Treasure Island Recycled Water Project will add 0.04 MGD by 2026; the Westside Recycled Water Project will supply 1.7 MGD of recycled water to Golden Gate Park (1.2 MGD), Lincoln Park (0.1 MGD), SF Zoo and the Lower Great Highway (0.3 MGD) by 2027 and to Sunset Boulevard will add 0.1 MGD by 2030; in addition to existing production from Sharp Park (0.1 MGD) and Harding Park (0.2 MGD) Recycled Water Projects.

e Rows above may not sum to total due to rounding.

SECTION 9: WATER SHORTAGE CONTINGENCY PLAN

The Water Shortage Contingency Plan is included as Appendix F.

This page intentionally left blank.

SECTION 10: DEMAND MANAGEMENT MEASURES

This section describes the SFPUC's efforts to promote water conservation and to reduce demand on water supply. Several demand management measures (DMMs)—including metering, public education and outreach, and water conservation program coordination—are addressed below.

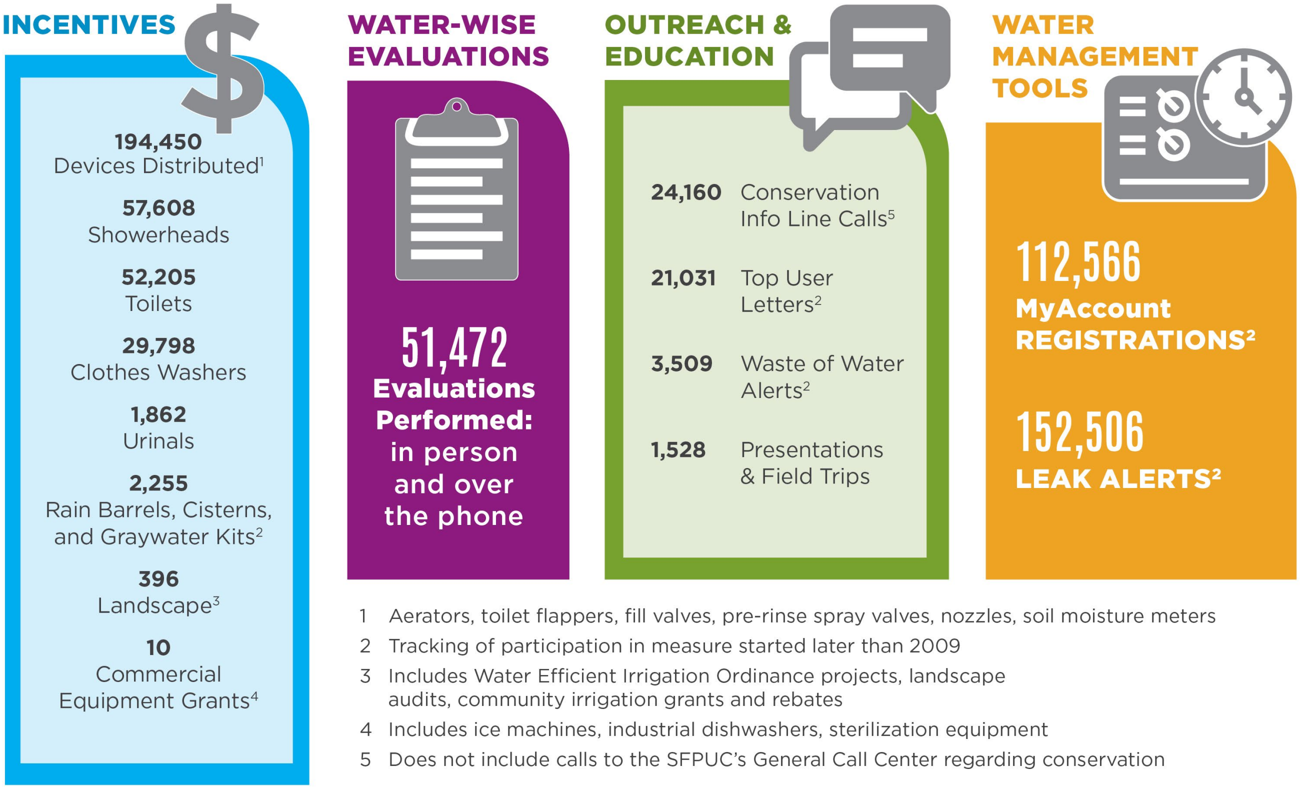
10.1 RETAIL WATER CONSERVATION PROGRAM

The SFPUC's retail water conservation program combines financial incentives, technical assistance, water management tools, education and outreach, and mandates. The SFPUC will continue all of these program elements throughout this UWMP planning horizon and beyond. Between 2005 and 2025, the SFPUC evaluated and implemented over 80 conservation measures and mandates, helping customers significantly reduce water use over the past 20 years. Current conservation measures and mandates include: (1) conservation best management practices proven effective by major water utilities and efficiency experts nationwide; (2) measures validated by third-party studies to deliver water savings and customer benefits; and (3) measures tailored to the site conditions and characteristics unique to San Francisco's retail water service area.

The SFPUC established its retail water conservation program in 2004 with modeled water savings and goals. In 2010, it reassessed the program to incorporate updated demographic data and new regulations affecting retail water use trends. This work informed the 2011 Retail Water Conservation Plan, which established a five-year review cycle for evaluating and updating the conservation program. The Retail Water Conservation Plan is a voluntary document outlining the SFPUC's planned conservation activities over the next 25 years. During the 2011, 2015, 2020, and 2025 updates, the SFPUC analyzed all existing measures, potential new measures, and previously discontinued measures to ensure the program remained effective and current.

The SFPUC estimates "past savings" from its conservation programs included in its conservation savings model and efficient plumbing codes to be approximately 151,415 AF (49,339 MG or 7.1 MGD) between 2005 (the year the SFPUC developed its first conservation forecast model) and 2024. "Future savings" are estimated to be 123,636 AF (40,287 MG or 4 MGD) between 2025 and 2050. The future savings reflect anticipated savings from modelled measures described in this section, including anticipated savings from the Onsite Water Reuse Program. This estimate does not reflect water savings from conservation measures the SFPUC offers but does not model or from SFPUC efforts that are not part of its conservation program but may generate potable water savings, including its supply-side water loss program, recycled water program, and stormwater management program. Additionally, the conservation measure savings that the SFPUC modeled and presented in its 2025 Retail Water Conservation Plan do not reflect potential savings from short-term demand reduction actions that could be implemented if the SFPUC had to activate its WSCP. The SFPUC has provided water-saving assistance to many thousands of residential and non-residential customers. Figure 10-1 highlights the SFPUC's water conservation accomplishments between 2010 and 2025.

Figure 10-1. Summary of SFPUC's Water Conservation Achievements



The SFPUC's current conservation measures and mandates fall into two categories:

1. Customer assistance measures and water efficiency mandates—such as evaluations, site usage reports and tools, free devices, education and outreach, and mandates—that the SFPUC expects to continue through the 2050 planning horizon with no defined end date;
2. Incentive-based measures with specific end dates that vary based on factors such as plumbing code changes and market saturation levels.

Together, the measures and mandates support the SFPUC's strategy for capturing remaining water-saving opportunities. These measures and mandates include, but are not limited to, the following:

- Water-wise evaluations for customers to improve water efficiency, reduce irrigation runoff, and identify outdated plumbing fixtures.
- Free high-efficiency plumbing devices, such as showerheads, faucet aerators, garden spray hose nozzles, soil moisture meters, and toilet leak repair parts, to help customers conserve water.
- Rebates and financial incentives for customers to install water-efficient clothes washers, toilets, irrigation controllers, soil moisture meters, and other devices.
- Rebates to encourage non-residential facilities to replace or upgrade large indoor water-using equipment and systems.

- Rebates for installing rain barrels, cisterns, and simple graywater systems for subsurface irrigation at small residential sites.
- Grants for large-scale onsite reuse systems.
- Leak alert notifications for single family, multi-family, irrigation, commercial, and municipal customers when the SFPUC detects constant or unusual water use that may indicate a leak.
- Large landscape grant and community garden assistance to help customers with irrigated landscape areas over 10,000 square feet implement irrigation and planting improvements that reduce water use.
- Courtesy monthly water budget reports for irrigation customers to promote efficient irrigation practices.
- Demonstration garden with youth and adult training to promote water-efficient gardening.
- Affordability initiatives that help ensure all residents have access to essential utility services, including the Customer Assistance Program. In response to historic COVID-era arrearages, the SFPUC secured state and federal relief funds, streamlined enrollment to expand access to discounts, and piloted an arrearage management program offering substantial bill reductions for low-income residents in the most cost-burdened neighborhoods of the city.
- Waste of Water Program that restricts inefficient outdoor water use practices, such as irrigating during rain, irrigation that causes runoff, and watering of non-functional turf on City and commercial properties, paired with outreach and notices to encourage more water-efficient practices.
- Online customer portal that helps customers view and pay their bills and track hourly, daily, weekly, and monthly water use to identify water use patterns and unusual spikes in water use.
- Direct outreach to top large residential and non-residential water users about ways to conserve water and financial incentives to save money on their utility bills.
- A mix of demand-side, customer-focused water-saving strategies, including voluntary incentives, assistance services, water management tools, education and outreach, and indoor and outdoor water efficiency mandates.

10.2 RETAIL DEMAND MANAGEMENT MEASURES (DMMs)

The SFPUC's DMMs are guided by a combination of SFPUC and City policy directives and evolving state and local water efficiency requirements. Since 2009, state requirements for urban water suppliers have progressed from (1) meeting Best Management Practices (BMPs) to (2) meeting per capita water reduction targets under the Water Conservation Act of 2009 (SB X7-7) to (3) complying with the SWRCB's Making Conservation a California Way of Life Framework (effective January 1, 2025), which sets efficiency standards for indoor water use, outdoor water use, supply-side water loss, and requires urban water suppliers to provide a broad range of BMPs for commercial, industrial, and institutional top water users.

San Francisco has implemented a range of local requirements to promote water efficiency, including standards for plumbing fixtures, landscapes, and irrigation systems, as well as rules limiting outdoor water waste. New multi-family buildings must also include sub-metering to track individual water use. The SFPUC sets its own conservation and sustainability targets. One key goal, stemming from the Level of Service Goal, is to maintain average in-City residential water use to below 45 gallons per person per day across both indoor and outdoor uses. Historically, the SFPUC has met the state's BMP requirements for the years they were in effect, remained well below its SB X7-7 per capita water use target for 2020, and continued to comply with the SWRCB's Making Conservation a California

Way of Life efficiency standards. More detailed information on the DMMs planned for the next five to 25 years can be found in the **2025 Retail Water Conservation Plan**.

The SFPUC has implemented conservation measures for decades. Through sustained and intensive efforts to promote conservation and educate retail customers on efficient water use, San Franciscans have consistently maintained one of the lowest per capita water use levels in the State. As noted in Section 4.1, FY 2024-25 gross and residential per capita consumption by in-City retail customers are 69.5 and 42.9 GPCD, respectively. Including suburban retail customers, gross and residential per capita consumption are 74.1 and 42.9 GPCD, respectively.

10.2.1 Water Waste Prevention Ordinances

10.2.1.1 Past Implementation

During the 1987-92 drought, the SFPUC enacted numerous additional water use restrictions to address the severe water shortage. Following that drought, the SFPUC kept several restrictions in place to support long-term conservation. In 2016, the SFPUC added permanent water waste restrictions to Section E, Rule 12 of the SFPUC's Rules and Regulations Governing Water Service to Customers. The SFPUC has since updated and expanded these restrictions multiple times in response to subsequent State requirements, including changes in 2022 and 2023. These restrictions, excerpted below and in the WSCP, are listed in the Rules and Regulations Governing Water and Electric Services.

1. The customer will be in violation of the SFPUC's Water Waste Restrictions if the customer is found to be using water in the following ways:
    a) Application of potable water to outdoor landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots or structures
    b) Use of hoses for any purpose without a positive shut-off valve
    c) Use of potable water to wash sidewalks, driveways, plazas and other outdoor hardscapes for reasons other than health, safety, or to meet City of San Francisco standards for sidewalk cleanliness and in a manner that causes runoff to storm drains and sewer catch basins
    d) Use of single pass cooling systems, fountains and decorative water features, and commercial car washes
    e) Application of potable water to outdoor landscapes during and within 48 hours after measurable rainfall
    f) Irrigation with potable water of ornamental turf on public street medians
    g) Use of potable water for backfill consolidation around non-potable piping, soil compaction, or dust control for construction or demolition projects within the boundaries of the City and County of San Francisco, if recycled water, well water, or groundwater are available. Recycled water must be used in accordance with State Water Resources Control Board, San Francisco Bay Regional Water Quality Control Board, San Francisco Department of Health, and SFPUC standards, regulations and requirements. The SFPUC will review the customer's fire hydrant meter application and allow temporary water supply from fire hydrants, if SFPUC determines that recycled water, well water, or groundwater are not available for the construction or

demolition project

h) Serving drinking water other than upon request at eating or drinking establishments, including restaurants, hotels, cafes, cafeterias, bars or other public places where food or drink are served

i) To promote conservation, hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily and display notice of this option in guestrooms

2. Any homeowner's association or community service organization or similar entity is prohibited from:
    a) Taking or threatening to take any action to enforce any provision of the governing documents or architectural or landscaping guidelines or policies of a common interest development where that provision is void or unenforceable under section 4735, subdivisions (a) and (b) of the Civil Code
    b) Imposing or threatening to impose a fine, assessment, or other monetary penalty against any owner of a separate interest for reducing or eliminating the watering of vegetation or lawns during a declared drought emergency, as described in section 4735, subdivision (c) of the Civil Code
    c) Requiring an owner of a separate interest upon which water-efficient landscaping measures have been installed in response to a declared drought emergency, as described in section 4735, subdivisions (c) and (d) of the Civil Code, to reverse or remove the water-efficient landscaping measures upon the conclusion of the state of emergency

The SFPUC directs the public to report potential water waste violations through San Francisco's 311 system. Staff review and respond to these reports regularly. When the SFPUC receives or observes a water waste violation, the SFPUC notifies the customer or entity and explains the corrective action needed. Notifications may include letters, phone calls, and/or an inspector visit. Customers and other entities subject to the SFPUC's Water Waste Restrictions may face enforcement actions such as fines on their water bill, installation of flow restriction devices, injunctions, or other appropriate actions.

Section F of the SFPUC's Rules and Regulations Governing Water Service to Customers—implemented through the City's Water Efficient Irrigation Ordinance—took effect in 2010 and was updated in 2015 and 2022. Section F establishes water efficient irrigation requirements and prohibits runoff from landscapes of any size caused by low head drainage, overspray, broken irrigation hardware, or other conditions that allow water to flow onto adjacent property, sidewalks, roadways, parking lots, or structures.

10.2.1.2 Planned Implementation

The SFPUC will continue to implement the water waste restrictions (Section E) and water efficient irrigation rules (Section F) in its Rules and Regulations Governing Water Service to Customers, as discussed above, and continue to monitor and respond to reports of water waste.

10.2.2 Metering

10.2.2.1 Past Implementation

All in-City retail customers have been metered and billed by volume since 1916. Suburban retail customers are also fully metered and are billed by volume. There are approximately 182,000 water meters in the City and about 225 water meters in the suburban retail service area.

In 2018, the SFPUC completed major deployment of its Automated Water Meter Program, upgrading in-City and suburban retail water meters with wireless advanced metering technology. The SFPUC was the first major water utility in California to implement a system of this scale. By 2025, 99% of retail water meters were automated. This automated water meter reading system enabled new tools for tracking customer water use and identifying high or unusual consumption through (1) My Account, an online bill management system and water use portal and (2) the Leak Alert Program.

The SFPUC launched My Account in May 2014 and later upgraded it to display hourly and daily water use data from automated water meters. The SFPUC plans to further update and replace its online customer portal by 2027 to expand customer interaction and water use tracking. The SFPUC also launched a Leak Alert Program in April 2015 and has since expanded it to provide courtesy alerts to all customer types when water usage patterns suggest a potential leak.

Sub-metering requirements come from the San Francisco Green Building Code and Section F of the SFPUC's Rules and Regulations Governing Water Service to Customers. Under the Green Building Code, new non-residential buildings must install a separate sub-meter for each individual building tenant expected to consume more than 1,000 gallons per day. For new non-residential buildings over 50,000 square feet, a sub-meter must be installed for each tenant expected to consume more than 100 gallons per day. Section F requires non-residential projects with 1,000 to 5,000 square feet of landscape area to install a privately-owned sub-meter or a utility landscape meter, and projects with more than 5,000 square feet of landscape must install a utility landscape water meter. State regulations effective in 2018 require dwelling units in new apartment buildings to be individually metered or sub-metered and tenants to be billed accordingly. In response, the SFPUC—working with the San Francisco Department of Building Inspection and Department of Public Health—now requires proof of sub-metering before approving water service requests for new multi-family residential buildings.

10.2.2.2 Planned Implementation

The SFPUC is in the process of replacing a small number of old meters with automated meters. The SFPUC will also continue to expand its Leak Alert Program.

10.2.3 Conservation Pricing

10.2.3.1 Past Implementation

SFPUC sets its water rates to recover the proportional cost to provide water service to parcels within its retail service area. The volumetric component of SFPUC's water rates may send a price signal, which may, in turn, prompt some customers to seek ways to reduce their monthly water use to save money on their water bills. SFPUC set its water rates for both single family and multi-family residential accounts with a two-tier increasing block rate structure, where the Tier 1 threshold is 4 CCF for single-family and 3 CCF for multi-family. Non-residential (e.g., commercial) water rates are set with a uniform rate structure. The SFPUC may apply a drought surcharge on volumetric water rates following a Commission resolution declaring a stage of water delivery reduction in accordance with the WSCP. The SFPUC recognizes water rates can indirectly impact consumer behavior and takes those potential effects into account in water usage projections, as described in Section 4.1.2.

10.2.3.2 Planned Implementation

The SFPUC's current rate schedule is in effect through FY 2025-26. The SFPUC conducts an independent rate study every four to five years to inform the next rate schedule.

10.2.4 Public Education and Outreach

10.2.4.1 Past Implementation

Throughout the year, the SFPUC promotes its conservation services and assistance programs through social media, digital and print newsletters, bill inserts, email blasts, direct mailings, local media and trade publications, and its website. The SFPUC also periodically contacts top residential and non-residential water users to encourage efficiency, alert them of potential plumbing leaks, and offer free Water Wise Evaluations. The SFPUC's newsletters, both print and digital, almost always feature conservation-related articles or water-saving tips.

The SFPUC participates in community events and presentations on water use and conservation that reach residents, businesses, and targeted industry groups. Water conservation staff and education partners also conduct in-class presentations during the school year. These programs align with State curriculum standards and often include placed-based or outdoor learning opportunities that complement classroom instruction. The SFPUC provides free teacher resources, including guides, lesson plans, fact sheets, and activity sheets on water use and conservation. The SFPUC maintains several demonstration gardens that offer public access and organized programming for adults and youth, showcasing water-efficient gardening and irrigation practices.

Below is a summary of key educational and outreach activities conducted between FY 2020-21 and FY 2024-25.

Table 10-1. Summary of SFPUC Retail Educational and Outreach Activities Over Five Years (Conducted between FY 2020-21 and FY 2024-25)

Activity	Total
School Presentations and Field Trips	358
Conservation Information Line Calls	6,482
Waste of Water Reports	885
Leak Incidents Notified by Alerts	69,313
Top User Letters	15,233
My Account Online Portal Users	Over 112,586

10.2.4.2 Planned Implementation

The SFPUC plans to continue public education and outreach efforts over the next five years and beyond to promote water efficiency among residents, businesses, and customers.

10.2.5 Management of System Losses

10.2.5.1 Past Implementation

The SFPUC manages system losses primarily through asset renewal and proactive leak management. The Linear Assets Management Program replaces and upgrades distribution system pipelines and customer service connections across roughly 1,280 miles of drinking water mains in the City. A planning analysis determined that improving about 15 miles of pipeline per year is necessary to meet the SFPUC's Level of Service goals for uninterrupted service. These improvements include pipeline replacement, rehabilitation, and cathodic protection across all pipe sizes to extend or renew pipeline useful life.

The SFPUC has a program to replace assets between the water main and the customer's service connection when they reach their end of life. These assets include (1) 1-inch to 8-inch service pipes made of cast iron, galvanized steel, or plastic to be replaced with copper or ductile iron; (2) broken meter boxes; (3) outdated or undersized meters and associated piping; and (4) related sidewalk and roadway restoration.

The SFPUC has completed several pilot programs for proactive leak detection by testing different approaches. Proactive leak management uses acoustic leak detection to accurately pinpoint leaks in mains of all material types. In addition, the SFPUC prioritizes leak repairs to meet Level of Services goals and to reduce real water losses.

The SFPUC completed the Linear Assets and Initial 10-Year Replacement and Renewal Plan in November 2012, which includes a Linear Assets Prioritization Technical Memorandum. The memorandum documents the methodology used to assess pipeline condition and the risk-based approach to estimate a pipeline's risk score. The risk score is a function of a pipeline's likelihood of failure and its consequences of failure. Using the risk score and pipeline category (e.g., distribution, feeder or transmission), pipeline segments were identified and prioritized as part of the replacement and renewal plan, which addresses non-surfacing leakage. The Automated Water Meter Program (described in Section 10.2.2) involves the regular maintenance and operation of water meters, including its appurtenances. Regular maintenance and operations of water meters help ensure water meter accuracy and data quality in accounting for non-revenue water.

The SFPUC also references the American Water Works Association's optimization goal of fewer than 15 leaks and main breaks and leaks per 100 miles of pipe. Table 10-2 summarizes historical main break and leak data from FY 2020-21 through FY 2024-25.

Several main breaks result from incidental construction damage, typically when an excavator strikes a water main or service connection. To reduce these incidences, the SFPUC is working to (1) improve procedures and documentation for marking pipes, (2) expand training for inspection staff and other departments to better monitor contractors, and (3) develop standards for project sponsors to better protect water facilities.

Table 10-2. Summary of Historical Leaks and Breaks Within In-City Retail Distribution System (FY 2020-21 to FY 2024-25)

	2020-21	2021-22	2022-23	2023-24	2024-2025
Total number of leaks and breaks	141	163	188	108	140
Leaks and breaks compared to the previous FY	-	+16%	+15%	-43%	+30%
Number of leaks and breaks per 100 miles	11.00	12.71	14.66	8.42	10.92

10.2.5.2 Planned Implementation

The SFPUC has ongoing water loss reduction efforts planned to manage both real and apparent water losses.

To manage real water losses, the SFPUC will be continuing to implement a lift-and-shift acoustic leak logger program for proactive leak detection, select equipment for optimized pressure monitoring, and will be working towards meeting the leak registry requirements set by the State.

To manage apparent water losses, the SFPUC will be engaging in the following efforts:

- Implementation of in-situ large meter mechanical diagnostics and flow testing,
- Preventative maintenance of large meters via replacements of unitized measuring elements,
- Continuous replacement of small meters due to reception of battery issues, and
- Meter manifold conversions.

10.2.6 Water Conservation Program

10.2.6.1 Past Implementation

The SFPUC Water Conservation Section includes 12 full-time positions under the direction of a Water Conservation Section Manager. Conservation staff implement various programs for residential, landscape, commercial, industrial, and institutional customers. The Water Conservation Program offers incentives, services, and educational assistance, including rebates for high-efficiency fixtures, grants for large landscape irrigation upgrades, and free water-efficient devices. Services include conservation surveys, landscape plan review, and school education programs. The SFPUC also provides tools and notifications to help customers understand and manage their water use, including an online portal and automatic leak alerts. Below is a summary of key activities accomplished between FY 2021-22 and 2024-25.

Table 10-3. Summary of Key Water Conservation Programs Over Five Years (Conducted Between FY 2021-22 and FY 2024-25)

Activity	Total
Surveys	9,316
Toilet Installations	3,590
Washer Rebates	1,342
Showerheads Distributed	2,912
Landscape and Irrigation Meter Grants	12
Rain Barrel Discounts	701
Water-Saving Devices Distributed	7,211

10.2.6.2 Planned Implementation

The SFPUC will continue evaluating and adapting its conservation measures to respond to changing conditions and regulations. This flexible approach has helped reduce water demand even as the population has grown. Moving forward, the SFPUC will rely on a mix of demand-side, water-saving strategies, including voluntary incentives, assistance services, tools that help customers track and manage their water use, education and outreach, and indoor and outdoor efficiency requirements. Core customer assistance measures will continue to include water evaluation surveys, site usage reports, free devices, landscape water budgets, and public education and outreach. Fixture-based incentives—such as rebates for toilets, clothes washers, rain barrels and cisterns, residential graywater system parts, and large commercial equipment—will remain in place over the next five years. The SFPUC also plans to introduce new incentives, including rebates on residential on-demand recirculating hot water pumps and weather-based irrigation controllers.

10.2.7 Other DMMs

In addition to DMMs administered through the Water Conservation Section, the SFPUC implements other programs that contribute to potable water savings. These programs include (1) the Onsite Water Reuse Program that requires new construction over a certain size to use available graywater, rainwater, and foundation drainage for toilet and urinal flushing and irrigation; (2) the Stormwater Management Program that mandates and incentivizes the use of stormwater for irrigation; and (3) a high bill adjustment program that may reduce water waste through faster leak repair.

10.3 WHOLESALE DEMAND MANAGEMENT MEASURES

BAWSCA is the only organization authorized to conduct regional water supply reliability planning for its member agencies, and it coordinates water conservation programs and services on their behalf. While the SFPUC may not provide direct financial assistance to individual Wholesale Customers for conservation programs, the WSA allows the SFPUC (at BAWSCA's request) to place a water management charge on Wholesale Customer billing statements and transfer the collected revenue to BAWSCA to support the conservation programs within each Wholesale Customer's service area. Through its Regional Water Conservation Program, BAWSCA implements a range of measures that help its member agencies' customers use water more efficiently. These efforts include regional initiatives, water-efficient landscape education, and turf removal incentives. More information about BAWSCA-coordinated conservation measures in the SFPUC's wholesale service area is available at **bawsca.org**.

10.3.1 Metering

The Wholesale Customers are fully metered, and about 97% of wholesale meters have wireless transmitters that send quarter-hourly water consumption through a cellular endpoint without requiring a fixed network infrastructure. The remaining 3% that are not on a wireless transmitter are either not compatible with the advanced metering transmitter or are located in an area where no cellular coverage exists (i.e., Pilarcitos Creek watershed). An advanced metering software analyzes and records this data, allowing both the SFPUC and the Wholesale Customers to view quarter-hourly, hourly, and daily water consumption instead of waiting for monthly billing reads. The software also provides custom alerts for system issues or unusual consumption patterns, such as leaks, supporting demand management across the Wholesale Customer service area.

The SFPUC's ongoing preventative maintenance program ensures that the Wholesale Customers' meters are regularly inspected, maintained, and calibrated. In 2023, the SFPUC Water Supply and Treatment Division published its Water Meter Maintenance and Testing Procedures Manual, which describes the maintenance, testing, and calibration procedures for all RWS and large customer meters. The SFPUC updated this manual in 2024 and continues to implement its procedures as part of its preventative maintenance program.

10.3.2 Public Education and Outreach

The SFPUC provides technical and administrative assistance for public education and outreach campaigns to BAWSCA and the Wholesale Customers as requested. In 2021 to 2022, the SFPUC assisted BAWSCA and the Wholesale Customers with a regional drought awareness and public outreach campaign that covered the Wholesale Customer service area and retail service area. The SFPUC also coordinated smaller, summer conservation awareness campaigns with the San Francisco Giants in 2023 and 2025. These efforts included in-stadium and direct messaging to Giants fans, which is generally assumed to reach people throughout the SFPUC's wholesale region.

10.3.3 Water Conservation Program Coordination and Staffing Support

BAWSCA manages a Regional Water Conservation Program for the Wholesale Customers (see **bayareaconservation.org**). The program employs several different conservation measures and is designed to support BAWSCA member agencies' efforts to encourage efficient water use among the retail customers in their respective service areas.

Under the terms of the WSA, the SFPUC may provide staff support for certain Wholesale Customer conservation activities and develop regional conservation programs funded jointly by retail and Wholesale Customers in coordination with BAWSCA.

10.3.4 Asset Management

In the early 1990s, the SFPUC initiated a Pipeline Inspection Program for the 350 miles of water transmission pipelines in the RWS. Because the RWS does not include distribution system components, the SFPUC does not inspect those components via this asset management program.

Routine inspections are preventive maintenance measures that enable early detection of localized pipe water loss to prevent leaks. The SFPUC also uses the data collected during inspections to determine how to prioritize pipeline repair, rehabilitation, and replacement projects.

Through the Pipeline Inspection Program, the SFPUC inspects every water transmission pipeline in the RWS on a 20-year cycle (except for prestressed concrete cylinder pipes, which the SFPUC inspects every 10 years to monitor condition changes). After every 20-year (or 10-year cycle), the schedule repeats, ensuring regular inspection of all major pipeline sections. The SFPUC typically conducts inspections year-round, with no more than one major pipeline section out of service at any given time.

The SFPUC has a goal to inspect one pipeline section per quarter, averaging 10 to 12 miles per year. In 2020, the inspection rate decreased to approximately 3.6 miles due to health and safety concerns related to confined space work during the COVID-19 pandemic, but the inspection rate returned to an average of 10 to 12 miles per year in 2023. Recently, the SFPUC revised its inspection approach. Instead of inspecting shorter sections quarterly, the SFPUC will take longer sections out of service for inspection twice per year. This adjustment reduces the overall frequency of inspections but minimizes operational disruptions for both the SFPUC and the Wholesale Customers.

In addition to inspections, SFPUC staff regularly compare production volumes with customer consumption to help identify the leakage rate.

10.3.4.1 Past Implementation

The major focus of asset management for the RWS was the Water System Improvement Program (WSIP). As of June 30, 2025, the regional portion of WSIP was 99.3% complete. With most WSIP projects concluded, the SFPUC has shifted its focus to maintaining the aging infrastructure within the RWS. In the last five years, the Water Enterprise Capital Improvement Program (CIP) has undertaken system improvements, including significant pipeline and tunnel construction, rehabilitation, and replacement projects. Since 2020, the completed Water Enterprise CIP projects include:

- Replacement of 1.5 miles of the 54-inch San Andreas Pipeline No. 2 in San Bruno due to severe corrosion of lock bar steel pipe segments.
- Replacement of the Town of Sunol's potable and raw water transmission pipelines across State Highway I-680, prompted by severe pitting and recurring leaks.
- Sliplining of Bay Division Pipelines Nos. 3 and 4 in Santa Clara, necessitated by the addition of a new railroad track above both pipelines.

In addition to pipeline replacement, these CIP projects included installation of new access manholes to improve future inspection and maintenance and upgrades to existing appurtenances to meet current water quality standards.

10.3.4.2 Planned Implementation

During WSIP's implementation, the SFPUC replaced approximately half of the RWS transmission pipelines. The SFPUC will prioritize the remaining transmission lines for replacement based on findings from the Pipeline

Inspection Program discussed above and additional factors such as material type, age, redundancy, leak history, and water quality issues.

The SFPUC also continues to enhance its Safe Pipeline Entry Program, which incorporates additional isolation valve installations into pipeline replacement projects and emphasizes the use of unmanned inspection technologies.

Under the Water Enterprise Capital Improvement Program, several major pipeline rehabilitation and replacement projects are currently in planning or design phase, with construction anticipated to begin within the next five to 10 years. These projects include:

- Rehabilitation of a key segment (Reach 5) of Crystal Springs Pipeline No. 2, involving the replacement of 3.8 miles of coal tar lining with cement mortar lining, upgrading approximately 30 appurtenances to meet current standards, and improving access and shutdown flexibility for maintenance by installing manway structures and a new 48-inch diameter valve on San Andreas Pipeline No.1 (SAPL1) near Baden Pump Station.
- Internal lining repairs for Bay Division Pipelines Nos. 1-4, which will involve the removal of corrosion at joints and damaged mortar lining, cleaning of metal surfaces, construction of new mortar lining, and removal of debris and sediment within the pipe. New isolation valves will be installed to provide permanent safe entry measures to pipelines.
- Targeted rehabilitation or replacement of 1.3 miles of prestressed concrete pipe on Bay Division Pipeline No. 4, due to the high number of broken prestressed wires posing leak or rupture risks.
- Sliplining of sections of Bay Division Pipelines Nos. 1 and 2 beneath the Caltrain railroad tracks in Redwood City to address deterioration in the existing pipe protection system.

10.3.5 Assistance to Wholesale Customers

BAWSCA is the only organization authorized to conduct regional water supply reliability planning for its member agencies. See Section 10.3 for a summary of how the SFPUC may provide conservation program assistance to Wholesale Customers.

This page intentionally left blank.

SECTION 11: UWMP ADOPTION, SUBMITTAL, AND IMPLEMENTATION

This section describes the SFPUC's adoption, submittal, and implementation of its 2025 UWMP. As noted below, the SFPUC's UWMP checklist is also provided in Appendix H to facilitate DWR's review of the 2025 UWMP.

11.1 NOTICE OF PLAN PREPARATION AND PUBLIC HEARING

Under Water Code Sections 10620 and 10621, every urban water supplier that is required to prepare a UWMP must update it at least once every five years. At least 60 days before holding a public hearing on the UWMP update, the supplier must notify each city and county to which the supplier provides water that it will be reviewing and considering amendments to the UWMP. The SFPUC sent this required notification for the 2025 UWMP to the cities or counties it provides water to on February 12, 2026, which was at least 60 days before the public hearing.

The Water Code Section 10642 requires the urban water supplier to make the UWMP available to the public and hold a public hearing before adopting the plan. Prior to the public hearing, the supplier must publish a notice once a week for two successive weeks. The SFPUC will coordinate the publication of the required notices for the public hearing of the 2025 UWMP in a local newspaper by March 29, 2026 and April 5, 2026. Copies of these notices will be included in Appendix B.

11.2 PUBLIC HEARING AND ADOPTION

The SFPUC prepared the draft 2025 UWMP and will conduct a public hearing at the SFPUC Commission meeting on April 14, 2026. Following that meeting, the SFPUC will prepare a final draft of the 2025 UWMP and bring it back to the SFPUC Commission for consideration of adoption no later than June 30, 2026. A copy of the Commission resolution adopting this 2025 UWMP will be provided in Appendix G.

11.3 PLAN SUBMITTAL, AVAILABILITY, AND IMPLEMENTATION

Within 30 days of SFPUC Commission approval, SFPUC staff will electronically submit the adopted 2025 UWMP to DWR through the Water Use Efficiency online submittal tool at **wuedata.water.ca.gov**. The SFPUC will also provide electronic copies on compact disk to the California State Library and by e-mail to the cities or counties to which the SFPUC provides water. Additionally, the adopted 2025 UWMP will be available for public review on the SFPUC's website at **www.sfpuc.gov/uwmp**.

The SFPUC will implement the adopted 2025 UWMP in accordance with the California Urban Water Management Planning Act. Following adoption, the SFPUC will also continue to implement the water supply planning programs and projects identified in this 2025 UWMP, including those related to conservation, groundwater, recycled water, onsite water reuse, and alternative water supply planning.

11.4 UWMP CHECKLIST

The SFPUC's UWMP checklist is provided in Appendix H to facilitate DWR's review of the completeness of this 2025 UWMP. The UWMP checklist is organized by subject matter. In addition, complete sets of the standardized tables prescribed by DWR are provided in Appendix B.

This page intentionally left blank.

2025 URBAN WATER MANAGEMENT PLAN
FOR THE CITY AND COUNTY OF SAN FRANCISCO

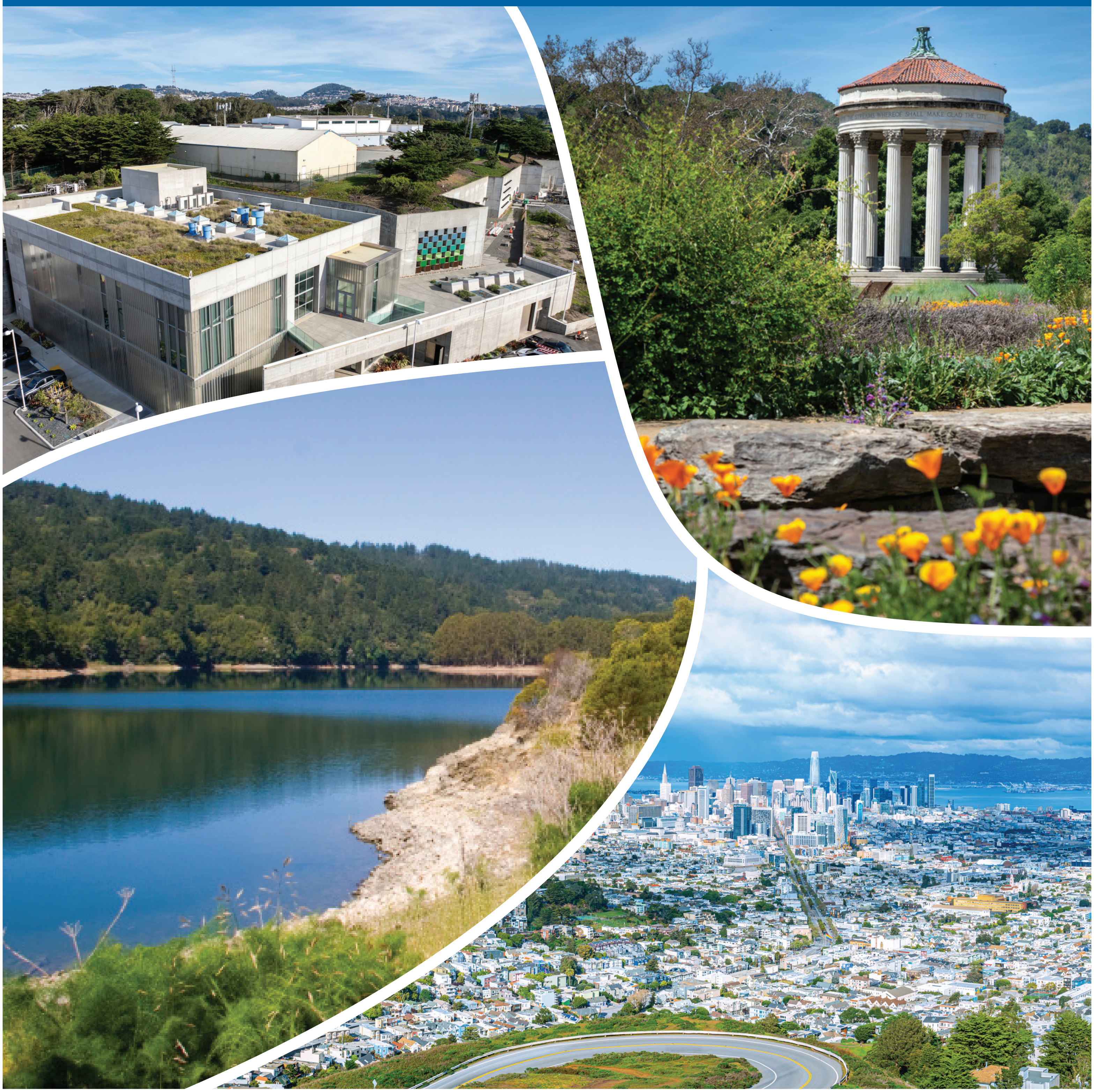
APPENDICES

PUBLIC REVIEW DRAFT

March 2026

Prepared by: The San Francisco Public Utilities Commission

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission



This page intentionally left blank.

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

APPENDIX A

UWMP Standardized Tables

2025 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

PUBLIC REVIEW DRAFT

March 2026

Prepared by: The San Francisco Public Utilities Commission

This page intentionally left blank.

Submittal Table 2-1 Retail: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2025	Volume of Water Supplied 2025 (MG)
Add additional rows as needed			
CA3810011	San Francisco Water System	180,895	70,279
CA0110012	Town of Sunol Water System	148	20
CA0110018	Pleasanton Well Field Water System	1	73
	Total	181,044	70,372

DWR NOTES:
Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.

NOTES: This list is comprehensive of all PWSIDs in the San Francisco RWS (Note that Pleasanton WellField Water System is not part of the SFRWS). However, not all PWSIDs are required to be reported in the UWMP.

Submittal Table 2-2: Plan Identification		
Select One	**Type of Plan**	**Name of Regional Alliance or RUWMP** (Drop Down List)
☑	**Individual UWMP**	
	If Water Supplier is also a member of a SB X7-7 Regional Alliance, select name from the drop-down.	
☐	**Regional Urban Water Management Plan (RUWMP)**	
	If Supplier selected RUWMP, select name from the drop-down.	
NOTES:		

Submittal Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
☑	Supplier is a wholesale supplier
☑	Supplier is a retail supplier
Fiscal or Calendar Year (select one)	
☐	UWMP Tables are in calendar years
☑	UWMP Tables are in fiscal years
If using fiscal years provide month and date that the fiscal year begins (mm/dd)	
7/1	
Units of measure used in UWMP (Select from the drop down list).	
Unit	MG
DWR NOTES: **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3.	
NOTES: Values are rounded to the nearest MG in the standardized tables. The unit of measure used in the body of the UWMP is millions of gallons per day (MGD).	

Submittal Table 2-4 Retail: Water Supplier Information Exchange Water Code Section 10631(h)
The retail Supplier has informed the following wholesale supplier(s) of projected water use.
Wholesale Water Supplier Name
Add additional rows as needed
Not applicable. The SFPUC does not receive water from any wholesale supplier.
NOTES:

10631(h) An urban water supplier that relies upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available.

Submittal Table 2-4 Wholesale: Water Supplier Information Exchange Water Code Section 10631(h)	
☑	Check the box if the Supplier has informed more than 10 other water suppliers of water supplies available. **Completion of the table below is optional. If not completed, include a list of the water suppliers that were informed.**
	Provide page number for location of the list.
☐	Check the box if the Supplier has informed 10 or fewer other water suppliers of water supplies available. **Complete the table below.**

Water Supplier Name
Add additional rows as needed
City of Brisbane
City of Burlingame
City of Daly City
City of East Palo Alto
City of Hayward
City of Menlo Park
City of Millbrae
City of Milpitas
City of Mountain View
City of Palo Alto
City of Redwood City
City of San Bruno
City of San Jose
City of Santa Clara
City of Sunnyvale
Town of Hillsborough
Alameda County Water District
Coastside County Water District
Cordilleras Mutual Water Company
Estero Municipal Improvement District
Guadalupe Valley Municipal Improvement District
Mid-Peninsula Water District
North Coast County Water District
Purissima Hills Water District
Westborough Water District
California Water Service Company
Stanford University
Groveland Community Services District [1]
NOTES: 1. Groveland Community Services District (CSD) is contractually defined as a retail customer of the SFPUC and is accounted as such in SFPUC's previous planning documents. However, for the purpose of the 2025 UWMP update, SFPUC was directed by DWR **to report Groveland CSD as a wholesale customer.**

10631(h) ... The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five‐year increments, and during various water-year types in accordance with subdivision (f).

Submittal Table 3-1 Retail: Population - Current and Projected Water Code Section 10631(a)						
Population Served	2025	2030	2035	2040	2045	2050(opt)
	843,881	1,010,187	1,065,774	1,121,654	1,176,654	1,231,654
NOTES: Population projections reflect the total population of in-City and suburban retail customers. Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore reported in Table 3-1W instead of this table.						

CWC 10631(a) describe the current and projected population of the service area including current and projected population…

Submittal Table 3-1 Wholesale: Population - Current and Projected Water Code Section 10631(a)						
Population Served	2025	2030	2035	2040	2045	2050(opt)
	1,900,388	2,053,967	2,177,567	2,310,846	2,441,618	2,605,394
NOTES: Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is included this table.						

CWC 10631(a) describe the current and projected population of the service area…

Submittal Table 4-1 Retail: Total Uses for Potable and Non-Potable Water — Actual Water Code Section 10631(d)(1)			
Use Type	Additional Description (as needed)	2025 Actual Water Use	
Drop down list May select each use multiple times These are the only use types that will be recognized by the WUEdata online submittal tool		**Potable or Non-Potable** (OPTIONAL) Drop down list	Volume (MG)
Add additional rows as needed			
Single Family		Potable	4,636
Multi-Family		Potable	8,103
Commercial	Includes commercial & industrial demands	Potable	5,460
Institutional/Governmental		Potable	869
Landscape		Non-Potable	825
Distribution System Water Loss	Includes both apparent and real losses	Potable	2,628
Other (optional)	Authorized unbilled	Potable	146
		Subtotal Potable	21841.6
		Subtotal Non-Potable	824.9
		Total	22,667
DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.			
NOTES: 1. Retail demands include in-city and suburban retail demands. 2. Per DWR direction, Groveland CSD is not accounted for as a retail customer, but as wholesale customer in all the standardized tables. Their demand is included in Table 4-1W. However, the corresponding retail table in the UWMP includes Groveland CSD.			

CWC 10631(d)(1) For an urban retail water supplier, quantify, to the extent records are available, past and current water use…identifying the uses among water use sectors including but not limited to:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.

(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.
(J) Distribution system water loss

Optional Submittal Table 4-1 Wholesale: Total Uses for Potable and Non-Potable Water — Actual Water Code Section 10631(d)(1)			
Use Type	Additional Description (as needed)	2025 Actual Water Use	
Drop down list May select each use multiple times These are the only use types that will be recognized by the WUEdata online submittal tool		**Potable or Non-Potable** (OPTIONAL) Drop down list	Volume (MG)
Add additional rows as needed			
Sales to other agencies	Wholesale customers [1]	Potable	47,231
Sales to other agencies	Coastside County Water District	Non-Potable	365
		Subtotal Potable	47,231
		Subtotal Non-Potable	365
		Total	47,596
DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.			
NOTES: 1. Includes all wholesale customers except Coastside County Water District that receive raw water and is included in a separate line item. 2. Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is included in this table. However, the corresponding wholesale table in the UWMP excludes Groveland CSD.			

10631(d) (1) for an urban retail water supplier, quantify to the extent records are available, past and current water use…

Submittal Table 4-2 Retail: Total Uses for Potable, and Non-Potable Water — Projected Water Code Section 10631(d)(1)							
Use Type	Additional Description (as needed)	**Projected Water Use** (Report To the Extent that Records are Available)					
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool		**Potable or Non-Potable** (OPTIONAL) Drop down list	**2030**	**2035**	**2040**	**2045**	**2050**
Single Family		Potable	4,891	4,782	4,782	4,782	4,782
Multi-Family		Potable	9,563	9,892	10,476	11,096	11,753
Commercial	Includes commercial & industrial demands	Potable	5,351	4,876	5,022	5,168	5,424
Institutional/Governmental		Potable	869	869	869	869	869
Landscape		Non-Potable	825	825	825	825	825
Distribution System Water Loss	Includes both apparent and real losses	Potable	2,592	2,592	2,592	2,592	2,592
Other (optional)	Authorized unbilled consumption	Potable	256	256	256	256	256
		Subtotal Potable	23,521	23,265	23,995	24,762	25,674
		Subtotal Non-Potable	825	825	825	825	825
		Total	24,346	24,090	24,820	25,587	26,499
DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.							
NOTES: 1. Retail demands include in-city and suburban retail demands. 2. Per DWR direction, Groveland CSD is not accounted for as a retail customer, but rather wholesale customer in all the standardized tables. Their demand is included in Table 4-1W. However, the corresponding retail table in the UWMP includes Groveland CSD.							

CWC 10631(d)(1) For an urban retail water supplier, quantify, to the extent records are available... projected water use…identifying the uses among water use sectors…

Optional Submittal Table 4-2 Wholesale: Total Uses for Potable and Non-Potable Water — Projected Water Code Section 10631(d)(1)							
Use Type		**Projected Water Use** (Report To the Extent that Records are Available)					
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool.	Additional Description (as needed)	**Potable or Non-Potable** (OPTIONAL) Drop down list	**2030**	**2035**	**2040**	**2045**	**2050**
Add additional rows as needed							
Sales to other agencies	Wholesale customers	Potable	48,592	49,509	51,115	52,429	54,071
Sales to other agencies	CCWD	Non-Potable	427	423	423	423	423
		Subtotal Potable	48,592	49,509	51,115	52,429	54,071
		Subtotal Non-Potable	427	423	423	423	423
		Total	49,020	49,932	51,538	52,852	54,495
DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.							
NOTES: Per DWR direction, Groveland CSD is not accounted for as a retail customer, but rather wholesale customer in all the standardized tables. Their demand is included in Table 4-1W. However, the corresponding wholesale table in the UWMP does not include Groveland CSD.							

10631(d) (1) for an urban retail water supplier, quantify to the extent records are available, past and current water use...

Submittal Table 4-3 Retail: Inclusion in Water Use Projections Water Code Section 10631 (a), 10631 (d)(4)(A), and 10631 (d)(4)(B)	
Are Future Water Savings Included in Projections? **Drop down list (y/n)**	Yes
If "Yes" to above, **state the section or page number**, in the cell to the right, where citations of the codes, ordinances, or otherwise are utilized in demand projections are found. ***Optional*** Suppliers may complete Optional Submittal Table 4-4 R to quantify the expected savings.	Appendix D
Are Lower Income Residential Demands Included In Projections? **Drop down list (y/n)**	Yes
Optional If the method for accounting Lower Income Residential Demands has been included, provide page number where this accounting can be found.	Section 4.1.5
DWR NOTES: Additional guidance is provided in Appendix K.	
NOTES:	

CWC10631 (d) (4) (A) Water use projections, where available, shall display and account for water savings estimated to result from adopted codes, standards, ordinances, or transpotation and land use plans identified by the urban water supplier, as applicable to the service area.

CWC 10631 (d) (4) (B) to the extent that an urban water supplier reports the information described in subparagraph (A), an urban water supplier shall do both of the following: (i) Provide citations of the various codes, standards, ordinances or transportation and land use plans utilized in making the projections.
(ii) Indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall be noted of that fact.
CWC 10631(a) Water use projections required by section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county, in the service area of the supplier .

Submittal Table 4-5 Retail: Water Loss Audit Reporting Water Code Section 10631(d)(3)(A)		
Public Water System ID # Reported in Table 2-1 R	Reporting Period	Submitted to DWR Water Loss Audit Program (yes/no)
Report submittal status for all five years for each Public Water System as available. Add rows as needed		
CA3810011	**2020**	Yes
	2021	Yes
	2022	Yes
	2023	Yes
	2024	Yes
CA0110018	**2020**	No
	2021	No
	2022	No
	2023	No
	2024	No
CA0110012	**2020**	No
	2021	No
	2022	No
	2023	No
	2024	No
DWR NOTES: Suppliers will provide a link to the WUEdata submittals of their Water Loss Audit Reports.		
NOTES:		

CWC 10631(d)(3) (A) The distribution system water loss shall be quantified for each of the five years preceding the plan update, in accordance with rules adopted pursuant to Section 10608.34.

Submittal Table 4-6 Retail: Progress Towards 2028 Water Loss Standard
Water Code Section 10631(d)(3)(C)

Public Water System ID # Reported in Submittal Table 2-1 R	Did the Water Board Calculate a Water Loss Standard for this Public Water System? (y/n) If no, Supplier will not complete this row.	Real Water Loss					Apparent Water Loss				
		State Water Board Standard		Most Recent AWWA Water Loss Audit			State Water Board Standard		Most Recent AWWA Water Loss Audit		
		2028 Real Water Loss Standard per Unit per day	Units for Real Water Loss Drop down list	Number of Units (Connections or Miles corresponding with units selected)	Volume of Total Real Loss (from AWWA Water Loss Audit) (MG)	Real Water Loss Per Unit per Day	2028 Apparent Water Loss Standard per Unit per Day	Units for Apparent Water Loss	Number of Connections	Volume of Total Apparent Loss (from AWWA Water Loss Audit) (MG)	Apparent Water Loss Per Unit per Day
Add additional rows as needed.											
CA3810011	Yes	27.1	Gallons per Service Connection per Day (GPSCD)	180895	2179	33.0	7.3	Gallons per Service Connection per Day (GPSCD)	180895	434.35	6.6
								Gallons per Service Connection per Day (GPSCD)			
								Gallons per Service Connection per Day (GPSCD)			

Water Board's Calculated Water Loss Standards

DWR NOTES: Units of measure (AF, CCF, MG) for Water Loss **MUST** remain consistent with units reported in Submittal Table 2-3. The units reported in Submittal Table 2-3 are used in this table's calculations.

NOTES:

CWC 10631(d)(3)(C) In the plan due July 1, 2021, and in each update thereafter, data shall be included to show whether the urban retail water supplier met the distribution loss standards enacted by the board pursuant to Section 10608.34.

Submittal Table 5-1 Retail: SB X7-7 2020 Target Progress Water Code Section 10608.40						
☐	Check the box if the Supplier was not an Urban Water Supplier during or before the 2020 UWMP reporting cycle. Proceed to the next table.					
Was Supplier part of a merger or consolidation since 2020?	Regional Alliance Target or Individual Target? Drop down list	2020 Target	Actual 2020 GPCD	Did Supplier Achieve Targeted Reduction for 2020?	Only for suppliers that did not meet the Target in 2020 See DWR NOTES below.	
					Actual 2025 GPCD (From SB X7-7 Compliance Form)	Did Supplier meet the 2020 Target in 2025?
No	Individual Target	96	76	Yes		NA
DWR NOTES: **Suppliers calculating a 2025 GPCD** will need to complete and submit SB X 7-7 Compliance Tables to verify the use of SB X7-7 Methodologies. **Suppliers that were part of a merger or consolidation since 2020** see Chapter 5 and Appendix P for guidance. NA=Not Applicable						
NOTES: Per DWR direction, Groveland CSD is accounted for as a wholesale customer and was therefore excluded from SB X7-7 calculations.						

10608.40 Urban water retail suppliers shall report to the department on their progress in meeting their urban water use targets as part of their urban water management plans submitted pursuant to Section 10631.

Submittal Table 6-1 Retail: Groundwater Volume Pumped Water Code Section 10631(4) and 10631(4)(c)							
☐	Check the box if the Supplier does not pump groundwater. Proceed to the next table.						
☐	Check the box if all or part of the groundwater described below is desalinated. (OPTIONAL)						
Groundwater Type **Drop Down List** May use each category multiple times	Potable or Non-Potable (OPTIONAL) **Drop down list**	Location or Basin Name	**2021**	**2022**	**2023**	**2024**	**2025**
Add additional rows as needed							
Alluvial Basin		Westside Groundwater Basin [1]	657	511	511	547.5	620.5
Alluvial Basin		Livermore Valley Basin, Central Groundwater Sub	109.5	146	109.5	73	73
		Total	767	657	621	621	694

DWR NOTES:
Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.

NOTES:
1. Data from 2020-2024 are obtained from the 2024 Annual Groundwater Monitoring Report, Westside Basin (SFPUC, April 2025), Pumping volumes are reported on a calendar year basis, but are used to approximate fiscal year data for this table.
2. This basin is the source of water for the Castlewood Well System. Pumping volumes are assumed to be equivalent to billed consumption for Castlewood CSA; obtained from customer billing data.

10631(4) If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information:

(C) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

Submittal Table 6-1 Wholesale: Groundwater Volume Pumped Water Code Section 10631(4) and 10631(4)(C)							
☐	Check the box if the Supplier does not pump groundwater. Proceed to the next table.						
☐	Check the box if all or part of the groundwater described below is desalinated. (OPTIONAL)						
Groundwater Type **Drop Down List** May use each category multiple times	Potable or Non-Potable (OPTIONAL) Drop down list	Location or Basin Name	2021 (MG)	2022 (MG)	2023 (MG)	2024 (MG)	2025 (MG)
Add additional rows as needed							
		Total	0	0	0	0	0
DWR NOTES:							
NOTES:							

10631(4) If groundwater is identified as an existing or planned source of water available to the supplier, all of the following
(C) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

Submittal Table 6-2 Retail: Wastewater Collected Within Service Area Water Code Section 10633(a)				
☐	Check the box if there is no wastewater collection system. Proceed to the next table.			
100%	Percentage of 2025 service area served by wastewater collection system (OPTIONAL)			
100%	Percentage of 2025 service area population served by wastewater collection system (OPTIONAL)			
Wastewater Collection			Recipient of Collected Wastewater	
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? OPTIONAL **Drop Down List**	Volume of Wastewater Collected from UWMP Service Area 2025 (MG)	Name of Wastewater Treatment Plant (WWTP) and Place ID Number **Drop down list**	Is WWTP Located Within UWMP Area? **Drop Down List**
City and County of San Francisco (SFPUC)	Metered	20,696	SF-SE Water Pollution Control Plant, N-Point & Bayside, Place ID 256499	Yes
City and County of San Francisco (SFPUC)	Metered	5,074	SF - OCEANSIDE Water Pollution Control Plant, Place ID 256498	Yes
City and County of San Francisco (SFPUC, operator	Metered	183	Treasure Island WWTP/DOD, Place ID 266328	Yes
City and County of San Francisco (SFPUC)	Metered	365	SF Airport Mel Leong TP-Sanitary Waste, Place ID 256507	Yes
Total Wastewater Received from UWMP Service Area in 2025:		26,317		

DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.
Additional Guidance: See Appendix M, Section M.21 for detailed guidance on this table.

NOTES:
1. At the Southeast and Oceanside WPCPs, metered effluent flows include both primary-only and secondary treated effluent (the bulk of which is secondary treated) and flows include treated combined wastewater and stormwater because the collection systems are predominantly combined systems.
2. The Mel Leong Treatment Plant is the only wastewater facility that treats and discharges wastewater generated by a suburban retail customer within the suburban retail service area. Wastewater utilities serving other suburban retail customers do not treat or dispose of wastewater within the suburban retail service area.
3. Volumes of wastewater treated at and discharged from the Mel Leong Treatment Plant correspond to calendar year 2025.

CWC 10633(a) A description of the wastewater collection and treatment systems in the supplier’s service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

Submittal Table 6-3 Retail: Wastewater Treatment and Outcomes Within UWMP Service Area
Water Code Section 10633(b)

☐	**Check the box if no wastewater is treated or disposed of within the UWMP service area.** Proceed to the next table.

Wastewater Treatment Plant Name and Place ID Number **Drop down list**	Does This Plant Treat Wastewater Generated Outside the UWMP Service Area? (OPTIONAL) **Drop down list**	2025 Volume of Wastewater Received from UWMP Service Area (As Reported in Submittal Table 6-2 R) (MG)	Total 2025 Volume of Water Treated (MG)	**2025 Outcomes of Treated Wastewater**										
				Water Recycled Within UWMP Service Area (enter data as applicable)		**Water Recycled Outside of UWMP Service Area** (enter data as applicable)		**Effluent Discharge that is not a Permitted Recycled Water Use** (enter data as applicable)		**Required Discharge for Instream Flow** (enter data as applicable)		**Delivered to Another Entity for Additional Treatment** (enter data as applicable)		
				Treatment Level **Drop down**	Volume (MG)	Treatment Level **Drop down list**	Volume (MG)	Treatment Level **Drop down list**	Volume (MG)	Treatment Level **Drop**	Volume (MG)	Treatment Level **Drop**	Volume (MG)	Name of other entity
Add additional rows as needed														
SF-SE Water Pollution Control Plant, N-Point & Bayside, Place ID 256499	Yes	20696	20,696		-		-	Secondary, Undisinfected	19017		-		-	
SF - OCEANSIDE Water Pollution Control Plant, Place ID 256498	Yes	5074	5,074		-		-	Secondary, Undisinfected	5475		-		-	
Treasure Island WWTP/DOD, Place ID 266328	No	183	183		-		-	Secondary, Undisinfected	183		-		-	
SF Airport Mel Leong TP-Sanitary Waste, Place ID 256507	No	365	365		-		-	Secondary, Undisinfected	365		-		-	
Total		26,317	26,317		0		0		25,039		0		0	

DWR NOTES:
Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.
IPR: Indirect Potable Reuse would have the treatment level of its end use requirement in the Level of Treatment drop-down.

NOTES:
1. At the Southeast and Oceanside WPCPs, metered effluent flows include both primary-only and secondary treated effluent (the bulk of which is secondary treated) and flows include treated combined wastewater and stormwater because the collection systems are predominantly combined systems.
2. At the Southeast Water Pollution Control Plant, Treasure Island Wastewater Treatment Plant, and Mel Leong Treatment Plant, wastewater are secondary treated and disinfected (option not available in the spreadsheet's dropdown menu.)
3. The volume discharged at the Southeast WPCP is less than the volume collected because a small volume of the discharged wastewater is treated to secondary, disinfected-23 level and used for other purposes.
4. The volume discharged at the Oceanside WPCP is greater than the volume collected because the discharged volume includes additional plant recycle streams.
5. Volumes of wastewater treated at and discharged from the Mel Leong Treatment Plant correspond to calendar year 2025.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier...and shall include all of the following:
(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

Submittal Table 6-3 Wholesale: Wastewater Treatment and Discharge Within Service Area Water Code Section 10633(b)														
☑	Check the box if the Wholesale Supplier neither distributes nor provides supplemental treatment to recycled water. Proceed to the next table.													
Wastewater Treatment Plant Name and Place ID Number **Drop down list**	Does This Plant Treat Wastewater Generated Outside the UWMP Service Area? (OPTIONAL) **Drop down list**	2025 Volume of Wastewater Received from UWMP Service Area (MG)	Total 2025 Volume of Water Treated (MG)	**2025 Outcomes of Treated Wastewater**										
				Water Recycled Within UWMP Service Area (enter data as applicable)		**Water Recycled Outside of UWMP Service Area** (enter data as applicable)		**Effluent Discharge that is not a Permitted Recycled Water Use** (enter data as applicable)		**Required Discharge for Instream Flow** (enter data as applicable)		**Delivered to Another Entity for Additional Treatment** (enter data as applicable)		
				Treatment Level **Drop down list**	Volume (MG)	Treatment Level **Drop down list**	Volume (MG)	Treatment Level **Drop down list**	Volume (MG)	Treatment Level **Drop down list**	Volume (MG)	Treatment Level **Drop down list**	Volume (MG)	Name of other entity
Add additional rows as needed.														
Total		0	0		0		0		0		0		0	
DWR NOTES: **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3. **IPR:** Indirect Potable Reuse would have the treatment level of its end use requirement in the Level of Treatment drop-down. **Additional Guidance:** See Appendix M, Section M.21 for detailed guidance on this table.														
NOTES:														

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. ...and shall include all of the following: **(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.**

Submittal Table 6-4 Retail: Recycled Water Direct Beneficial Uses Within Service Area Water Code Section 10633 (c),(d),(e)	
☐	Check box if recycled water is not used and is not planned for use within the service area of the supplier. The supplier will only complete the column on "Potential Recycled Water Use" and submit an accompanying narrative on the feasibility of that potential recycled water use.
Name(s) of Facility/ies Producing (Treating) the Recycled Water (OPTIONAL) :	Oceanside Water Pollution Control Plant (Westside Recycled Water Project) and Treasure Island Water Resource Recovery Facility
Name of Supplier Operating the Recycled Water Distribution System (OPTIONAL) :	SFPUC
Volume of Supplemental Water Added in 2025 (OPTIONAL) :	0
Source of 2025 Supplemental Water (OPTIONAL) :	Not applicable

Use Type **Drop down list**	**Potable or Non-Potable** (after treatment if treated) (OPTIONAL) Drop down list	Additional Information (as needed)	2025 (MG)	2030 (MG)	2035 (MG)	2040 (MG)	2045 (MG)	2050 (MG)	**Potential Recycled Water Use**	
									Volume	Narrative page number (OPTIONAL)
Add additional rows as needed										
Landscape irrigation (exc golf courses)	Non-Potable	Landscape irrigation for Golden Gate Park, Lincoln Park, SF Zoo, Lower Great Highway and Sunset	0	620.5	620.5	620.5	620.5	620.5		
Landscape irrigation (exc golf courses)	Non-Potable	Landscape irrigation for Treasure Island	0	14.6	14.6	146	146	146		
		Subtotal Potable	0	0	0	0	0	0	0	
		Subtotal Non-Potable	0	635	635	767	767	767	0	
		Total	0	635.1	635.1	766.5	766.5	766.5	0	0

DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.
Additional Guidance: See Appendix M, Section M.21 for detailed guidance on this table.
Potential recycled water use: a description of the feasibility of these uses must be included in the narrative.
Multiple Producers: If you have multiple recycled water producers, submit a separate table for each.

NOTES:

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier... and shall include...
(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use
d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.
(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

Submittal Table 6-4 Retail: Recycled Water Direct Beneficial Uses Within Service Area Water Code Section 10633 (c),(d),(e)	
	Check box if recycled water is not used and is not planned for use within the service area of the supplier. The supplier will only complete the column on "Potential Recycled
Name(s) of Facility/ies Producing (Treating) the Recycled Water (OPTIONAL) :	North San Mateo County Sanitation District Wastewater Treatment Plant
Name of Supplier Operating the Recycled Water Distribution System (OPTIONAL) :	North San Mateo County Sanitation District (portion of transmission line within the City and County of San Francisco is operated by SFPUC)
Volume of Supplemental Water Added in 2025 (OPTIONAL) :	0
Source of 2025 Supplemental Water (OPTIONAL) :	Not applicable

Use Type **Drop down list**	**Potable or Non-Potable** (after treatment if treated) (OPTIONAL) Drop down list	Additional Information (as needed)	2025 (MG)	2030 (MG)	2035 (MG)	2040 (MG)	2045 (MG)	2050 (MG)	**Potential Recycled Water Use**	
									Volume	Narrative page number (OPTIONAL)
Add additional rows as needed										
Golf course irrigation	Non-Potable	Golf course irrigation for Harding Park and Fleming golf courses	36.5	73	73	73	73	73		
		Subtotal Potable	0	0	0	0	0	0	0	
		Subtotal Non-Potable	37	73	73	73	73	73	0	
		Total	36.5	73	73	73	73	73	0	0

DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.
NOTES:

Submittal Table 6-4 Retail: Recycled Water Direct Beneficial Uses Within Service Area Water Code Section 10633 (c),(d),(e)	
	Check box if recycled water is not used and is not planned for use within the service area of the supplier. The supplier will only complete the column on "Potential Recycled
Name(s) of Facility/ies Producing (Treating) the Recycled Water (OPTIONAL) :	Calera Creek Plant
Name of Supplier Operating the Recycled Water Distribution System (OPTIONAL) :	North Coast County Water District
Volume of Supplemental Water Added in 2025 (OPTIONAL) :	0
Source of 2025 Supplemental Water (OPTIONAL) :	Not applicable

Use Type **Drop down list**	**Potable or Non-Potable** (after treatment if treated) (OPTIONAL) Drop down list	Additional Information (as needed)	2025 (MG)	2030 (MG)	2035 (MG)	2040 (MG)	2045 (MG)	2050 (MG)	**Potential Recycled Water Use**	
									Volume	Narrative page number (OPTIONAL)
Add additional rows as needed										
Golf course irrigation	Non-Potable	Golf course irrigation for Sharp Park golf course	3.65	36.5	36.5	36.5	36.5	36.5		
		Subtotal Potable	0	0	0	0	0	0	0	
		Subtotal Non-Potable	4	37	37	37	37	37	0	
		Total	3.65	36.5	36.5	36.5	36.5	36.5	0	0

DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.
NOTES:

Submittal Table 6-4 Wholesale: Current and Projected Recycled Water Uses Water Code Section 10633(c),(d),(e)										
☑	Check box if recycled water is not used and is not planned for use within the service area of the supplier. The supplier will only complete the column on "Potential Recycled Water Use" and submit an accompanying narrative on the feasibility of that potential recycled water use.									
Name(s) of Facility/ies Producing (Treating) the Recycled Water (OPTIONAL) :										
Name of Supplier Operating the Recycled Water Distribution System (OPTIONAL) :										
Volume of Supplemental Water Added in 2025 (OPTIONAL) :										
Source of 2025 Supplemental Water (OPTIONAL) :										
Name of Receiving Supplier or Direct Use by Wholesale Supplier	Potable or Non-Potable (after treatment if treated) (OPTIONAL) Drop down list	Additional Information (as needed)	2025 (MG)	2030 (MG)	2035 (MG)	2040 (MG)	2045 (MG)	2050 (MG)	Potential Recycled Water Use	
									Volume (MG)	Narrative page number (OPTIONAL)
Add additional rows as needed										
		Subtotal Potable	0	0	0	0	0	0	0	
		Subtotal Non-Potable	0	0	0	0	0	0	0	
		Total	0	0	0	0	0	0	0	0

DWR NOTES:
Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table reports the unit of measure selected in Submittal Table 2-3.
Additional Guidance: See Appendix M, Section M.21 for detailed guidance on this table.
Potential recycled water use: a description of the feasibility of these uses must be included in the narrative.

NOTES:

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier... and shall include...
(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use
d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.
(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

Submittal Table 6-5 Retail: 2020 UWMP Recycled Water Use Projection Compared to 2025 Actual Water Code Section 10633(e)		
☐ Check the box if recycled water was not used in 2025 nor previously projected for use in 2020. Proceed to the next table.		
Use Type Drop Down list	2020 Projection for 2025 (MG)	2025 Actual Use (MG)
Add additional rows as needed		
Golf course irrigation	110	44
Landscape irrigation (exc golf courses)	657	0
Total	767	44

DWR NOTES:
Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure reported in Submittal Table 2-3
Additional Guidance: See Appendix M, Section M.21 for detailed guidance on this table.

NOTES:
1. Golf course irrigation includes Harding Park, Fleming and Sharp Park golf courses. The Harding Park recycled water treatment plant at Harding Park being offline for most of the year due to infrastructure upgrades, which created a disparity between the 2025 projected recycled water use and the 2025 actual recycled water use for golf course irrigation.
2. The 2020 projection for the 2025 landscape irrigation recycled water use planned for the implementation of the Westside Enhanced Recycled Water Project and the Treasure Island Water Resource Recovery Project. The delay in the completion of these two projects causes the disparity between the 2025 projected recycled water use and the 2025 actual recycled water use for landscape irrigation.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier’s service area, and shall include all of the following: (e) ...a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision

Submittal Table 6-5 Wholesale: 2020 UWMP Recycled Water Use Projection Compared to 2025 Actual Water Code Section 10633(e)		
☑	Check the box if recycled water was not used or distributed by the supplier in 2025, nor projected for use or distribution in 2020. Proceed to the next table.	
Name of Receiving Supplier or Direct Use by Wholesale Supplier	2020 Projection for 2025 (MG)	2025 Actual Use (MG)
Add additional rows as needed		
Total	0	0
DWR NOTES: **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3. **Additional Guidance:** See Appendix M, Section M.21 for detailed guidance on this table.		
NOTES:		

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the serv`ice area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following: (e) ...a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision

Submittal Table 6-6 Retail: Methods to Encourage Future Recycled Water Use Water Code Section 10633(f)			
☐	Check the box if the Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
Section 6.2.2	Provide page location of narrative in the UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use (MG)
Add additional rows as needed			
Westside Enhanced Water Recycling Project and Associated Zoo Recycled Water Project	Construction of a Recycled Water Treatment Plant at the Oceanside Water Pollution Control Plant to serve recycled water for landscape irrigation at Golden Gate Park, Lincoln Park Golf Course, the San Francisco Zoo, the Lower Great Highway, and Sunset Boulevard.	2027	475
Treasure Island Water Resource Recovery Facility Project	Construction of a wastewater treatment facility that will provide Title-22 disinfected tertiary-level treated effluent that will serve dual-plumbed buildings, and supply water for outdoor urban agriculture and irrigation.	2027	15
Ordinances, Programs, and Services	The SFPUC administers or helps to administer various ordinances, programs, and services in the City related to recycled water and water reuse. The majority of these ordinances, programs, and services have been established for many years and are ongoing, resulting in increased water reuse. These include Soil Compaction and Dust Control Ordinance, Recycled Water Ordinance, Large Landscape Grant Program and Onsite Potable Reuse Program.	Ongoing	
		Total (MG)	489
		Unit Conversion to AF	1,501

DWR NOTES:
Units of measure (AF, CCF, MG) MUST remain consistent with units reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.
The unit conversion to Acre Feet addresses the Water Code's requirement that this value be provided in acre-feet.

NOTES:
1. Recycled water deliveries to Golden Gate Park and Lincoln Park (annual average of 475 MG) are expected to begin in 2027. Deliveries to the San Francisco Zoo (annual average of an additional 110 MG) are expected to begin in late 2027, following modernization work and cross-connection testing. The SFPUC also plans to begin deliveries Sunset Boulevard (annual average of an additional 73 MG) by 2030.
2. The Treasure Island Resource Recovery Facility is anticipated to produce approximately 15 MG of recyccled water by 2027, with

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:
(f) a description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre feet of recycled water used per year.

Submittal Table 6-7 Retail: Expected Future Water Supply Projects or Programs Water Code Section 10631(f)							
☐	Check the box if there are no expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Proceed to the next table.						
☐	Check the box if some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.						
Sections 6.2.2.2 & 7.2	Provide page location of narrative in the UWMP						
Name of Future Projects or Programs	Joint Project with other suppliers?		Additional Description (as needed)	**Potable or Non-Potable** (after treatment if treated) (OPTIONAL) Drop Down list	Planned Implementation Year	Planned for Use in Year Type **Drop Down List**	Expected Increase in Water Supply to Supplier (This may be a range) (MG)
	Drop Down List (yes/no)	If Yes, Supplier Name					
Add additional rows as needed							
Westside Recycled Water Project	No			Non-Potable	2027	All Year Types	475-620
Treasure Island Recycled Water Project	No			Non-Potable	2027	All Year Types	15-146
San Francisco Groundwater Supply Project	No			Potable	Existing and progressive expansion	All Year Types	548-1460
DWR NOTES: **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure reported in Submittal Table 2-3.							
NOTES: 1. Part of the San Francisco Groundwater Supply Project has been implemented, and currently produces approximately 36.1 MG of potable water. A progressive expansion is planned, adding 365 MG of supply at a time, with a total anticipated capacity of 1,460 MG per year.							

10631 (f) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use, as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in normal and single-dry water years and for a period of drought lasting five consecutive water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

Submittal Table 6-7 Wholesale: Expected Future Water Supply Projects or Programs Water Code Section 10631(f)							
☐	Check the box if there are no expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Proceed to the next table.						
☑	Check the box if some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.						
	Provide page location of narrative in the UWMP						
Name of Future Projects or Programs	Joint Project with other suppliers?		Additional Description (as needed)	Potable or Non-Potable (after treatment if treated) (OPTIONAL) Drop down list	Planned Implementation Year	Planned for Use in Year Type **Drop Down list**	Expected Increase in Water Supply to Supplier (This may be a range) (MG)
	Drop Down List (yes/no)	If Yes, Supplier Name					
Add additional rows as needed							
DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure reported in Submittal Table 2-3.							
NOTES:							

10631 (f) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use, as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in normal and single-dry water years and for a period of drought lasting five consecutive water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

Submittal Table 6-8 Retail: Water Supplies — Actual Water Code Section 10631(b)				
Water Supply		**2025**		
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool	Additional Description (as needed)	**Potable or Non-Potable** (after treatment if treated) (OPTIONAL) Drop Down list	Actual Volume (MG)	Total Entitlement (OPTIONAL) See 'DWR Notes' below (MG)
Add additional rows as needed				
Surface water (not desalinated)		Potable	21,973	
Groundwater (not desalinated)		Potable	110	
Groundwater (not desalinated)		Non-Potable	584	
Purchased or Imported Water	Sharp Park	Non-Potable	4	
Purchased or Imported Water	Harding Park	Non-Potable	37	
		Subtotal Potable	22,083	0
		Subtotal Non-Potable	624	0
		Total	22,707	0

DWR NOTES:
Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.
Total Entitlement: e.g. Water Right, Groundwater Allocation, Contracted Amount.

NOTES: Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore reported in Table 6-8 Wholesale instead of this table. However, the corresponding retail table in the UWMP includes Groveland CSD.

10631. A plan shall be adopted in accordance with this chapter that shall do all of the following... (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a), providing supporting and related information...

Submittal Table 6-8 Wholesale: Water Supplies — Actual Water Code Section 10631(b)				
Water Supply	Additional Description (as needed)	2025		
Drop down list May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool		**Potable or Non-Potable** (after treatment if treated) (OPTIONAL) Drop Down list	Actual Volume (MG)	Total Entitlement (OPTIONAL) See 'DWR Notes' below (MG)
Add additional rows as needed				
Surface water (not desalinated)	All wholesale customers, except Coastside County Water District	Potable	47,231	
Surface water (not desalinated)	Raw water deliveries to Coastside County Water District	Non-Potable	365	
		Subtotal Potable	47,231	0
		Subtotal Non-Potable	365	0
		Total	47,596	0

DWR NOTES:
Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in Submittal Table 2-3.
Total Entitlement: e.g. Water Right, Groundwater Allocation, Contracted Amount.

NOTES:

10631. A plan shall be adopted in accordance with this chapter that shall do all of the following... (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a), providing supporting and related information

Submittal Table 6-9 Retail: Water Supplies — Projected
Water Code Section 10631 (b)

Water Supply	Additional Detail on Water Supply	Potable or Non-Potable	Projected Water Supply (Report to the Extent Practicable)									
			2030		2035		2040		2045		2050 (opt)	
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool		**Potable or Non-Potable** (after treatment if treated) (OPTIONAL) Drop Down list	Reasonably Available Volume (MG)	Total Entitlement (OPTIONAL) See 'DWR Notes' below (MG)	Reasonably Available Volume (MG)	Total Entitlement (OPTIONAL) See 'DWR Notes' below (MG)	Reasonably Available Volume (MG)	Total Entitlement (OPTIONAL) See 'DWR Notes' below (MG)	Reasonably Available Volume (MG)	Total Entitlement (OPTIONAL) See 'DWR Notes' below (MG)	Reasonably Available Volume (MG)	Total Entitlement (OPTIONAL) See 'DWR Notes' below (MG)
Add additional rows as needed												
Surface water (not desalinated)		Potable	22,740		22,156		22,375		23,105		24,017	
Groundwater (not desalinated)		Potable	657		1,205		1,570		1,570		1,570	
Groundwater (not desalinated)		Non-Potable	183		0		0		0		0	
Recycled Water	See Table 6-4R for recycled water supplies	Non-Potable	730		730		876		876		876	
		Subtotal Potable	23,397	0	23,360	0	23,944	0	24,674	0	25,587	0
		Subtotal Non-Potable	913	0	730	0	876	0	876	0	876	0
		Total	24,309	0	24,090	0	24,820	0	25,550	0	26,463	0

DWR NOTES:
Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3.
Total Entitlement: e.g. Water Right, Groundwater Allocation, Contracted Amount.

NOTES: Per DWR direction, Groveland CSD is reported as a wholesale customer.

10631. A plan shall be adopted in accordance with this chapter that shall do all of the following... (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year

Submittal Table 6-9 Wholesale: Water Supplies — Projected
Water Code Section 10631 (b)

Water Supply			Projected Water Supply (Report to the Extent Practicable)									
			2030		2035		2040		2045		2050 (opt)	
Drop down list May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool	Additional Detail on Water Supply	**Potable or Non-Potable** (after treatment if treated) (OPTIONAL) Drop Down list	Reasonably Available Volume (MG)	Total Entitlement (OPTIONAL) See 'DWR Notes' below (MG)	Reasonably Available Volume (MG)	Total Entitlement (OPTIONAL) See 'DWR Notes' below (MG)	Reasonably Available Volume (MG)	Total Entitlement (OPTIONAL) See 'DWR Notes' below (MG)	Reasonably Available Volume (MG)	Total Entitlement (OPTIONAL) See 'DWR Notes' below (MG)	Reasonably Available Volume (MG)	Total Entitlement (OPTIONAL) See 'DWR Notes' below (MG)
Add additional rows as needed												
Surface water (not desalinated)		Potable	49,020		49,932		51,538		52,852		54,495	
		Subtotal Potable	49,020	0	49,932	0	51,538	0	52,852	0	54,495	0
		Subtotal Non-Potable	0	0	0	0	0	0	0	0	0	0
		Total	49,020	0	49,932	0	51,538	0	52,852	0	54,495	0

DWR NOTES:
Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table identifies the unit of measure selected in a Submittal Table 2-3.
Total Entitlement: e.g. Water Right, Groundwater Allocation, Contracted Amount.

NOTES: Per DWR direction, Groveland CSD is reported as a wholesale customer.

10631. A plan shall be adopted in accordance with this chapter that shall do all of the following... (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year

Optional Submittal Table O-1B: Recommended Energy Reporting - SINGLE DELIVERY PRODUCT - TOTAL UTILITY APPROACH

Water Delivery Product drop down list (If delivering more than one type of product recommend using Table O-1C)	Other	**Only for Water Delivery Products Under the Urban Water Supplier's Operational Control**		
Start Date of Reporting Period	7/1/2024	**Sum of All Water Management Processes**	**Non-Consequential Hydropower**	
End Date of Reporting Period	6/30/2025			
Is upstream embedded energy in the values reported?	No			
Units of Measure for Water	MG	**Total Utility** See DWR NOTES	**Hydropower**	**Net Utility**
Volume of Water Entering Process		74,132		74,132
Energy Consumed (kWh)		(1,110,821,187)		(1,110,821,187)
Energy Intensity (kWh/vol. converted to MG)		(14,984)	-	(14,984)

DWR NOTES:
Total Utility: The volume of water entered in the "Total Utility" column should equal the volume of water entering the distribution system (excluding recycled water); in most cases, this is the total volume calculated in UWMP Table 4-1: 2025 Actual Total Uses for Potable and Non-Potable Water. Note if recycled water is included in your Submittal Table 4-1, you must exclude it from your volume in this table.

Quantity of Self-Generated Renewable Energy

0 kWh

Data Quality (Estimate, Metered Data, Combination of Estimates and Metered Data)

Metered Data

Data Quality Narrative:

The data reported covers FY2024-2025 (July 2024 to June 2025). The water production metering data includes the water supplied by the Regional Water System (RWS) to both retail and wholesale customers. The electricity usage data is based on billing records from meter data. The consequential hydroelectricity production data is based on metered data at the respective hydroelectric power houses. The energy intensity calculation focuses on water supplied by the RWS, since it is the main source of water supplied by SFPUC. In addition, the electricity consumed by other entities to produce recycled water is not included.
While the total volume of water delivered includes both retail and wholesale usage, SFPUC does not have access to electricity meter records for the electricity usage of its wholesale customers to distribute water within their own service areas, and is therefore not included in this analysis.
The data reported covers FY2024-2025 (July 2024 to June 2025). The water production metering data includes the water supplied by the Regional Water System (RWS) to both retail and wholesale customers. The electricity usage data is based on billing records from meter data. The consequential hydroelectricity production data is based on metered data at the respective hydroelectric power houses. The energy intensity calculation focuses on water supplied by the RWS, since it is the main source of water supplied by SFPUC. In addition, the electricity consumed by other entities to produce recycled water is not included.
While the total volume of water delivered includes both retail and wholesale usage, SFPUC does not have access to electricity meter records for the electricity usage of its wholesale customers to distribute water within their own service areas, and is therefore not included in this analysis.

Narrative:

As required, the amount of energy estimated includes the energy used to extract, convey, store, treat and distribute water, and also includes the consequential hydropower produced as a result of the water delivery. The Regional Water System (RWS) is almost entirely gravity-driven from its Sierra Reservoir to the Bay Area; no electricity is used for pumping at wholesale customer turnouts. Electricity usage taken into account in this analysis primarily represents pumping to off-stream storage inthe Bay Area, in-city pumping for water distribution, and usage at the SFPUC's two water treatment plants (Sunol and Harry Tracy WTPs). The electricity usage also includes administrative and support facilities. The Hetch Hetchy Regional Power System is composed of four (4) hydroelectric powerhouses, which account of a total hydroelectric generating capacity of 385 MW: Moccasin Powerhouse, Moccasin Low Head Powerhouse, Kirkwood Powerhouse and Holm Powerhouse.

NOTES:

10631.2. (a) In addition to the requirements of Section 10631, an urban water management plan shall include any of the following information that
(1) An estimate of the amount of energy used to extract or divert water supplies.
(2) An estimate of the amount of energy used to convey water supplies to the water treatment plants or distribution systems.
(3) An estimate of the amount of energy used to treat water supplies.
(4) An estimate of the amount of energy used to distribute water supplies though its distribution systems.

(5) An estimate of the amount of energy used for treated water supplies in comparison to the amount used for nontreated water supplies.
(6) An estimate of the amount of energy used to place water into or withdraw from storage.

(7) Any other energy-related information the urban water supplier deems appropriate.

10631.2 (b) The Department shall include in its guidance for the preparation of urban water management plans a methodology for the voluntary calculation or estimation of the energy intensity of urban water systems.

Optional Submittal Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment)			
Year Type	**Base Year** If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2024-2025, use 2025	**Available Supplies if Year Type Repeats**	
		☑ Check the box if quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. **Location:** Tables 8-2 and 8-3	
		Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available (MG)	**% of Average Supply**
Average Year			100%
Single-Dry Year			
Consecutive Dry Years 1st Year			
Consecutive Dry Years 2nd Year			
Consecutive Dry Years 3rd Year			
Consecutive Dry Years 4th Year			
Consecutive Dry Years 5th Year			

DWR NOTES: Supplier may use multiple versions of Submittal Table 7-1 R if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Submittal Table 7-1 R, in the "Note" section of each submittal table, state that multiple versions of Submittal Table 7-1 R are being used and identify the particular water source that is being reported in each submittal table.
Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table reports the units of measure reported in Submittal Table 2-3.

NOTES:

OPTIONAL Submittal Table 7-1 Wholesale: Basis of Water Year Data (Reliability Assessment)			
Year Type	**Base Year** If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2024-2025, use 2025	**Available Supplies if Year Type Repeats**	
		☑ Check the box if quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. **Location:** Table 8-3	
		Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available (MG)	**% of Average Supply**
Average Year			100%
Single-Dry Year			
Consecutive Dry Years 1st Year			
Consecutive Dry Years 2nd Year			
Consecutive Dry Years 3rd Year			
Consecutive Dry Years 4th Year			
Consecutive Dry Years 5th Year			

DWR NOTES: Supplier may use multiple versions of Submittal Table 7-1 W if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Submittal Table 7-1 W, in the "Note" section of each submittal table, state that multiple versions of Submittal Table 7-1 W are being used and identify the particular water source that is being reported in each submittal table.
Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3. This table reports the unit of measure selected in Submittal Table 2-3.

NOTES:

Submittal Table 7-2 Retail: Normal Year Supply and Use Comparison Water Code Section 10635 (a)					
	2030 (MG)	2035 (MG)	2040 (MG)	2045 (MG)	2050 (MG)
Supply totals (autofill from Submittal Table 6-9 R)	24,309	24,090	24,820	25,550	26,463
Use totals (autofill from Submittal Table 4-2 R)	24,346	24,090	24,820	25,587	26,499
Surplus/(shortfall)	(37)	0	0	(37)	(37)
OPTIONAL Planned WSCP Actions					
WSCP - supply augmentation benefit					
WSCP - use reduction savings benefit					
Revised Surplus/(shortfall)					
DWR NOTES : Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3.					
NOTES:					

10635. (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment **shall compare the total water supply sources available to the water supplier with the long-term total projected water use over the next 20 years, in five-year increments,** for a **normal**

Submittal Table 7-2 Wholesale: Normal Year Supply and Use Comparison Water Code Section 10635 (a)					
	2030 (MG)	**2035 (MG)**	**2040 (MG)**	**2045 (MG)**	**2050 (MG)**
Supply totals (autofill from Submittal Table 6-9 W)	49,020	49,932	51,538	52,852	54,495
Use totals (see OPTIONAL Submittal Table 4-2 W)	49,020	49,932	51,538	52,852	54,495
Surplus/(shortfall)	(0)	0	(0)	(0)	0
OPTIONAL Planned WSCP Actions					
WSCP - supply augmentation benefit					
WSCP - use reduction savings benefit					
Revised Surplus/(shortfall)					
DWR NOTES : Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3.					
NOTES:					

Submittal Table 7-3 Retail: Single Dry Year Supply and Use Comparison Water Code Section 10635(a)					
	2030 (MG)	**2035 (MG)**	**2040 (MG)**	**2045 (MG)**	**2050 (MG)**
Supply totals	21,754	22,302	22,411	22,375	22,448
Use totals	24,455	24,273	25,039	25,806	26,791
Surplus/(shortfall)	(2,701)	(1,971)	(2,628)	(3,431)	(4,344)
OPTIONAL Planned WSCP Actions					
WSCP - supply augmentation benefit					
WSCP - use reduction savings benefit					
Revised Surplus/(shortfall)					
DWR NOTES : Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3.					
NOTES: This table assumes the implementation of the Bay-Delta Plan Amendment.					

10635. (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment **shall compare the total water supply sources available to the water supplier with the long-term total projected water use over the next 20 years, in five-year increments,** for a normal water year, a **single dry water year**, and a drought lasting five consecutive water years.

Submittal Table 7-3 Wholesale: Single Dry Year Supply and Use Comparison Water Code Section 10635(a)					
	2030 (MG)	**2035 (MG)**	**2040 (MG)**	**2045 (MG)**	**2050 (MG)**
Supply totals	33,653	33,325	33,252	33,215	33,361
Use totals	48,874	49,750	51,319	52,597	54,166
Surplus/(shortfall)	(15,221)	(16,425)	(18,068)	(19,382)	(20,805)
OPTIONAL Planned WSCP Actions					
WSCP - supply augmentation benefit					
WSCP - use reduction savings benefit					
Revised Surplus/(shortfall)					
DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3.					
NOTES: This table assumes the implementation of the Bay-Delta Plan Amendment.					

Submittal Table 7-4 Retail: Multiple Dry Years Supply and Use Comparison Water Code Section 10635(a)						
		2030 (MG)	2035 (MG)	2040 (MG)	2045 (MG)	2050 (MG)
First year	Supply totals	21,754	22,302	22411	22,375	22,448
	Use totals	24,455	24,273	25,039	25,806	26,791
	Surplus/(shortfall)	(2,701)	(1,971)	(5,694)	(3,431)	(4,344)
	OPTIONAL Planned WSCP Actions					
	WSCP - supply augmentation benefit					
	WSCP - use reduction savings benefit					
	Revised Surplus/(shortfall)					
Second year	Supply totals	18,542	19,345	19,345	19,272	19,236
	Use totals	24,455	24,273	25,039	25,806	26,791
	Surplus/(shortfall)	(5,913)	(4,928)	(5,694)	(6,534)	(7,556)
	OPTIONAL WSCP Actions					
	WSCP - supply augmentation benefit					
	WSCP - use reduction savings benefit					
	Revised Surplus/(shortfall)					
Third year	Supply totals	18,542	19,345	19,345	19,272	19,236
	Use totals	24,455	24,273	25,039	25,806	26,791
	Surplus/(shortfall)	(5,913)	(4,928)	(5,694)	(6,534)	(7,556)
	OPTIONAL Planned WSCP Actions					
	WSCP - supply augmentation benefit					
	WSCP - use reduction savings benefit					
	Revised Surplus/(shortfall)					
Fourth year	Supply totals	18,542	19,345	19,345	19,272	19,236
	Use totals	24,455	24,273	25,039	25,806	26,791
	Surplus/(shortfall)	(5,913)	(4,928)	(5,694)	(6,534)	(7,556)
	OPTIONAL Planned WSCP Actions					
	WSCP - supply augmentation benefit					
	WSCP - use reduction savings benefit					
	Revised Surplus/(shortfall)					
Fifth year	Supply totals	18,542	19,345	19,345	19,272	19,236
	Use totals	24,455	24,273	25,039	25,806	26,791
	Surplus/(shortfall)	(5,913)	(4,928)	(5,694)	(6,534)	(7,556)
	OPTIONAL Planned WSCP Actions					
	WSCP - supply augmentation benefit					
	WSCP - use reduction savings benefit					
	Revised Surplus/(shortfall)					
DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3.						
NOTES: This table assumes the implementation of the Bay-Delta Plan Amendment.						

10635. (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment **shall compare the total water supply sources available to the water supplier with the long-term total projected water use over the next 20 years, in five-year increments,** for a normal water

Submittal Table 7-4 Wholesale: Multiple Dry Years Supply and Use Comparison Water Code Section 10635(a)						
		2030 (MG)	**2035 (MG)**	**2040 (MG)**	**2045 (MG)**	**2050 (MG)**
First year	Supply totals	33,653	33,325	33,288	33,215	33,361
	Use totals	48,874	49,750	51,319	52,597	54,166
	Surplus/(shortfall)	(15,221)	(16,425)	(18,031)	(19,382)	(20,805)
	OPTIONAL Planned WSCP Actions					
	WSCP - supply augmentation benefit					
	WSCP - use reduction savings benefit					
	Revised Surplus/(shortfall)					
Second year	Supply totals	28,251	28,397	28,178	27,996	27,959
	Use totals	48,874	49,750	51,319	52,597	54,166
	Surplus/(shortfall)	(20,623)	(21,353)	(23,141)	(24,601)	(26,207)
	OPTIONAL Planned WSCP Actions					
	WSCP - supply augmentation benefit					
	WSCP - use reduction savings benefit					
	Revised Surplus/(shortfall)					
Third year	Supply totals	28,251	28,397	28,178	27,996	27,959
	Use totals	48,874	49,750	51,319	52,597	54,166
	Surplus/(shortfall)	(20,623)	(21,353)	(23,141)	(24,601)	(26,207)
	OPTIONAL Planned WSCP Actions					
	WSCP - supply augmentation benefit					
	WSCP - use reduction savings benefit					
	Revised Surplus/(shortfall)					
Fourth year	Supply totals	28,251	28,397	28,178	27,996	27,959
	Use totals	48,874	49,750	51,319	52,597	54,166
	Surplus/(shortfall)	(20,623)	(21,353)	(23,141)	(24,601)	(26,207)
	OPTIONAL Planned WSCP Actions					
	WSCP - supply augmentation benefit					
	WSCP - use reduction savings benefit					
	Revised Surplus/(shortfall)					
Fifth year	Supply totals	28,251	28,397	28,178	27,996	27,959
	Use totals	48,874	49,750	51,319	52,597	54,166
	Surplus/(shortfall)	(20,623)	(21,353)	(23,141)	(24,601)	(26,207)
	OPTIONAL Planned WSCP Actions					
	WSCP - supply augmentation benefit					
	WSCP - use reduction savings benefit					
	Revised Surplus/(shortfall)					

DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3.

NOTES:
This table assumes the implementation of the Bay-Delta Plan Amendment.

Submittal Table 7-5 Retail: Five-Year Drought Risk Assessment Water Code Section 10635(b)(3)	
2026	**Total**
Total Water Use (MG)	23,141
Total Supplies (MG)	23,141
Surplus/Shortfall w/o WSCP Action	0
OPTIONAL Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (MG)	
WSCP - use reduction savings benefit (MG)	
Revised Surplus/(shortfall)	
2027	**Total**
Total Water Use (MG)	23,470
Total Supplies (MG)	23,470
Surplus/Shortfall w/o WSCP Action	0
OPTIONAL Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (MG)	
WSCP - use reduction savings benefit (MG)	
Revised Surplus/(shortfall)	
2028	**Total**
Total Water Use (MG)	23,798
Total Supplies (MG)	23,798
Surplus/Shortfall w/o WSCP Action	0
OPTIONAL Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (MG)	
WSCP - use reduction savings benefit (MG)	
Revised Surplus/(shortfall)	
2029	**Total**
Total Water Use (MG)	24,127
Total Supplies (MG)	24,127
Surplus/Shortfall w/o WSCP Action	0
OPTIONAL Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (MG)	
WSCP - use reduction savings benefit (MG)	
Revised Surplus/(shortfall)	
2030	**Total**
Total Water Use (MG)	24,455
Total Supplies (MG)	24,455
Surplus/Shortfall w/o WSCP Action	0
OPTIONAL Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (MG)	
WSCP - use reduction savings benefit (MG)	
Revised Surplus/(shortfall)	
DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3.	
NOTES: This Table assumes the current regulatory context is in effect (and assumes that the Bay Delta Plan would not get implemented before 2030).	

10635 (b) Every urban water supplier shall include, as part of its urban water management plan, a **drought risk assessment** for its water service... The drought risk assessment shall include each of the following:

(1) A description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts five consecutive water years, starting from the year following when the assessment is conducted.
(2) A determination of the reliability of each source of supply under a variety of water shortage conditions. This may include a determination that a particular source of water supply is fully reliable under most, if not all, conditions.
(3) A comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.
(4) Considerations of the historical drought hydrology, ...

Submittal Table 7-5 Wholesale: Five-Year Drought Risk Assessment Water Code Section 10635(b)(3)	
2026	**Total**
Total Water Use (MG)	
Total Supplies (MG)	
Surplus/Shortfall w/o WSCP Action	0
OPTIONAL Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (MG)	
WSCP - use reduction savings benefit (MG)	
Revised Surplus/(shortfall)	
2027	**Total**
Total Water Use (MG)	
Total Supplies (MG)	
Surplus/Shortfall w/o WSCP Action	0
OPTIONAL Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (MG)	
WSCP - use reduction savings benefit (MG)	
Revised Surplus/(shortfall)	
2028	**Total**
Total Water Use (MG)	
Total Supplies (MG)	
Surplus/Shortfall w/o WSCP Action	0
OPTIONAL Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (MG)	
WSCP - use reduction savings benefit (MG)	
Revised Surplus/(shortfall)	
2029	**Total**
Total Water Use (MG)	
Total Supplies (MG)	
Surplus/Shortfall w/o WSCP Action	0
OPTIONAL Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (MG)	
WSCP - use reduction savings benefit (MG)	
Revised Surplus/(shortfall)	
2030	**Total**
Total Water Use (MG)	
Total Supplies (MG)	
Surplus/Shortfall w/o WSCP Action	0
OPTIONAL Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit (MG)	
WSCP - use reduction savings benefit (MG)	
Revised Surplus/(shortfall)	
DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3.	
NOTES:	

10635 (b) Every urban water supplier shall include, as part of its urban water management plan, a **drought risk assessment** for its water service... The drought risk assessment shall include each of the following:

(1) A description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts five consecutive water years, starting from the year following when the assessment is conducted.
(3) A comparison of the total water supply sources available to
the water supplier with the total projected water use for the
drought period.
(4) Considerations of the historical drought hydrology, ...

(2) A determination of the reliability of each source of supply under a variety of water shortage conditions. This may include a determination that a particular source of water supply is fully reliable under most, if not all, conditions.

(3) A comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.

Submittal Table 8-1: Cross-reference for Standard vs Supplier Shortage Levels Water Code Section 10632(a)(3)(B)			
☑	Check the box if the Supplier uses the Standard six levels of water shortage. Proceed to the next table.		
Standard Shortage Levels	**Percent Shortage Range**	**Suppliers Shortage Levels**	**Percent Shortage Range**
1	Up to 10%		
2	Up to 20%		
3	Up to 30%		
4	Up to 40%		
5	Up to 50%		
6	>50%		
NOTES:			

10632 (a) Every urban water supplier shall prepare and adopt a water shortage contingency plan as part of its urban water management plan that consists of each of the following elements:

(3)(A)Six standard water shortage levels corresponding to progressive ranges of up to 10, 20, 30, 40, and 50 percent shortages and greater than 50 percent shortage. **Urban water suppliers shall define these shortage levels based on the suppliers' water supply conditions, including percentage reductions in water supply, changes in groundwater levels, changes in surface elevation or level of subsidence, or other changes in hydrological or other local conditions indicative of the water supply available for use.** Shortage levels shall also apply to catastrophic interruption of water supplies, including, but not limited to, a regional power outage, an earthquake, and other potential emergency events.

(B) An urban water supplier with an existing water shortage contingency plan that uses different water shortage levels may comply with the requirement in subparagaph (A) by developing and including a cross-reference relating its existing categores to the six standard water shortage levels.

Submittal Table 8-2 Retail: Supply Augmentation and Other Actions Water Code Section 10632(a)(4)(A),(C) and (E)				
	Is the Supplier completing this table using the standard six levels? (yes/no)			
Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier **Drop down list** These are the only categories that will be accepted by the WUEdata online submittal tool	How much is this going to reduce the shortage gap?		Additional Explanation or Reference (OPTIONAL)
		Volume or Percentage Drop down	Shortage Gap Reduction Value (May be a range) (MG)	
Add additional rows as needed				
DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3.				
NOTES:				

10632(a)(4) Shortage response actions that align with the defined shortage levels and include, at a minimum, all of the following:

(A) Locally appropriate supply augmentation actions.

(C) Locally appropriate operational changes.

(E) For each action, an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of the action.

Submittal Table 8-2 Wholesale: Supply Augmentation and Other Actions Water Code Section 10632(a)(4)(A),(C) and (E)				
	Is the Supplier completing this table using the standard six levels? (yes/no)			
Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier **Drop down list** These are the only categories that will be accepted by the WUEdata online submittal tool	How much is this going to reduce the shortage gap?		Additional Explanation or Reference (OPTIONAL)
		Volume or Percentage Drop down	Shortage Gap Reduction Value (May be a range) (MG)	
Add additional rows as needed				
DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal				
NOTES:				

10632(a)(4) Shortage response actions that align with the defined shortage levels and include, at a minimum, all of the following:

(A) Locally appropriate supply augmentation actions.

(C) Locally appropriate operational changes.

(E) For each action, an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of

Submittal Table 8-3 Retail: Demand Reduction Actions Water Code Section 10632(a)(4)(B),(D), and (E)					
	Is the Supplier completing this table using the standard six levels? (yes/no)				
Shortage Level	Demand Reduction Actions **Drop down list** These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.	How much is this going to reduce the shortage gap?		Additional Explanation or Reference (OPTIONAL)	Penalty, Charge, or Other Enforcement? **For Retail Suppliers Only** Drop Down List
		Volume or Percentage Drop down	Shortage Gap Reduction Value (May be a range) (MG)		
Add additional rows as needed					
1	Other	Percentage	5%	Voluntary call for water use reductions	No
2	Other	Percentage	5%	Voluntary call for water use reductions	No
3	Other	Percentage	5%	Voluntary call for water use reductions	No
4	Other	Percentage	18%	Mandatory water use reduction	Yes
5	Other	Percentage	32%	Mandatory water use reduction	Yes
6	Other	Percentage	32%	Mandatory water use reduction	Yes
DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3.					
NOTES: 1. For Shortage Levels 1-3, the SFPUC expects to have enough supply to meet projected unconstrained retail demands. However, SFPUC has a contractual obligation that for any level of required reduction in system-wide water use during shortages, the SFPUC shall require Retail Customers to conserve a minimum of 5 percent. A 5 percent reduction in retail demand can be achieved with a voluntary call for reductions in water use.					

1. Associated volume of reduction is based on 2025 projected unconstrained SFPUC Retail customer demands on the Regional Water System of 65.9 mgd. Volumes shown for each level represent the total shortage that must be met with the associated response action at that shortage level.
2. For Shortage Levels 1-3, the SFPUC expects to have enough supply to meet projected unconstrained retail demands. However, SFPUC has a contractual obligation that for any level of required reduction in system-wide water use during shortages, the SFPUC shall require Retail Customers to conserve a minimum of 5 percent. A 5 percent reduction in retail demand can be achieved with a voluntary call for reductions in water use.
3. The Level 6 shortage (assumed to be 55% system-wide supply reduction) has an associated 21.2 mgd shortage gap in 2025. The demand reductions are assumed to ultimately be met with a demand reduction approach consisting of a 25 gpcd floor for residential accounts, a 50% demand reduction in irrigation accounts, and 30% demand reduction in other non-residential accounts.

10632(a)(4) Shortage response actions that align with the defined shortage levels and include, at a minimum, all of the following:
(B) Locally appropriate demand reduction actions to adequately respond to shortages.
(D) Additional, mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions and appropriate to the local conditions.

(E) For each action, an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of the action.

Submittal Table 8-3 Wholesale: Demand Reduction Actions Water Code Section 10632(a)(4)(B) and (E)				
	Is the Supplier completing this table using the standard six levels? (yes/no)			
Shortage Level	Demand Reduction Actions **Drop down list** These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.	How much is this going to reduce the shortage gap?		Additional Explanation or Reference (OPTIONAL)
		Volume or Percentage Drop down	Shortage Gap Reduction Value (May be a range) (MG)	
Add additional rows as needed				
DWR NOTES: Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Submittal Table 2-3.				
NOTES:				

10632(a)(4) Shortage response actions that align with the defined shortage levels and include, at a minimum, all of the following:
(B) Locally appropriate demand reduction actions to adequately respond to shortages.
(E) For each action, an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of the action.

Submittal Table 10-1 Retail: Notification to Cities and Counties
Water Code Section 10621(b) and 10642

City Name	60 Day Notice **Drop Down (yes/no)**	Notice of Public Hearing **Drop Down (yes/no)**
Add additional rows as needed		
City of San Francisco	Yes	Yes
City of Brisbane	Yes	Yes
City of Burlingame	Yes	Yes
City of Daly City	Yes	Yes
City of East Palo Alto	Yes	Yes
City of Foster City	Yes	Yes
City of Hayward	Yes	Yes
Town of Hillsborough	Yes	Yes
City of Menlo Park	Yes	Yes
City of Millbrae	Yes	Yes
City of Milpitas	Yes	Yes
City of Mountain View	Yes	Yes
City of Palo Alto	Yes	Yes
City of Redwood City	Yes	Yes
City of San Bruno	Yes	Yes
City of San Jose	Yes	Yes
City of Santa Clara	Yes	Yes
City of Sunnyvale	Yes	Yes

County Name **Drop Down List**	60 Day Notice **Drop Down (yes/no)**	Notice of Public Hearing **Drop Down (yes/no)**
Add additional rows as needed		
Alameda County	Yes	Yes
San Mateo County	Yes	Yes
Santa Clara County	Yes	Yes
San Joaquin County	Yes	Yes
Tuolumne County	Yes	Yes

NOTES: In addition to those listed above, the SFPUC also notified water districts, government agencies, private organizations, and community members that may be interested in participating in the UWMP process.

CWC 10621 (b)Notify at least 60 days prior to the public hearing any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.
CWC 10642 The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.

Submittal Table 10-1 Wholesale: Notification to Cities and Counties Water Code Section 10621(b) and 10642		
☑	Check the box if the Supplier has notified more than 10 cities or counties. **Completion of the table below is not required. Provide a separate list of the cities and counties that were notified.**	
Appendix B	Provide the page or location of this list in the UWMP.	
☐	Check the box if the Supplier has notified 10 or fewer cities or counties. **Complete the table below.**	
City Name	60 Day Notice **Drop Down (yes/no)**	Notice of Public Hearing **Drop Down (yes/no)**
Add additional rows as needed		
County Name **Drop Down List**	60 Day Notice **Drop Down (yes/no)**	Notice of Public Hearing **Drop Down (yes/no)**
Add additional rows as needed		
NOTES:		

CWC 10621 (b)Notify at least 60 days prior to the public hearing any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan.

CWC 10642 The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.

This page intentionally left blank.

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

APPENDIX B

Evidence of Compliance with Outreach Requirements

2025 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

PUBLIC REVIEW DRAFT

March 2026

Prepared by: The San Francisco Public Utilities Commission

This page intentionally left blank.

Content for this section will be added upon formal adoption of the 2025 Urban Water Management Plan.

This page intentionally left blank.

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

APPENDIX C

2025 Retail Demand Model and Projections Technical Memorandum

2025 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

PUBLIC REVIEW DRAFT

March 2026

Prepared by: The San Francisco Public Utilities Commission

This page intentionally left blank.

Water Demand Projections for the City and County of San Francisco

2025-2050

San Francisco Public Utilities Commission

David Sunding, Berkeley Research Group
Oliver Browne, WestWater Research

March 13, 2025

Table of Contents

Tables and Figures

1 Executive Summary

The San Francisco Public Utilities Commission (SFPUC) commissioned Berkeley Research Group (BRG) and WestWater Research to update the project of water demand within the SFPUC's in-City retail service area, encompassing the City and County of San Francisco (CCSF). Previously, Brattle Research Group prepared projections to support the preparation of SFPUC's 2015 and 2020 Urban Water Management Plans, as well as in 2023 to align with San Francisco's Housing Element 2022 Update. We project demands for the following three types of accounts within the in-City retail service area:

- Single Family Residential,
- Multi-Family Residential, and
- Commercial and Industrial.

To project future water demands, we obtained data on monthly water consumption and billing for each account of the above types in the City and County of San Francisco. We merged this data with property characteristics held by the Office of the Assessor-Recorder, demographic characteristics from the American Community Survey (ACS) at the census block-group level, and historical climate data from the PRISM dataset.

We project account-level water demand based on each household's or business's historical average water consumption between 2010 and 2025 and statistical relationships between each household's water consumption and demand drivers such as water rates, weather, and other factors such as drought and the COVID-19 pandemic (2020-2022). For each account, we estimate the relationship between water use and these demand factors using a multiple regression analysis. In a regression analysis, changes in the demand variable, namely account-level water use, are explained by the control variables such as rates, climate, and macro-economic factors. The statistical estimates are not based on differences in the average level of water use between accounts, which we adjust for using a statistical technique called 'fixed-effects'. Rather, our estimates are based on the different trends in how each account's water use changes in response to changes in rates, climate, and macro-economic factors.

The results of our statistical model are a set of "demand elasticities" with respect to water rates, average monthly temperature, and monthly precipitation. These elasticities describe the percentage change in water consumption predicted in response to a one-percentage change in each of these control variables.

For each account, future demand from 2025 to 2050 is based on historical aggregate water use, expected future changes in rates and climate, and revised growth assumptions. The 2050 planning horizon aligns with the planning period for the SFPUC's 2025 Urban Water Management Plan (UWMP). The assumptions for future rates and climate were developed in consultation with SFPUC. The projections assume that by 2050 total water rates (including wastewater) increase by almost 100% in real terms (after inflation), average temperatures in San Francisco increase by 0.7°C relative to 2025, and average precipitation will increase by 3.4 mm per month.

San Francisco Planning Department (SF Planning) provides both the housing (units) and employment growth projections to the SFPUC. For each type of account, the SFPUC uses an econometric model that estimates the relationship between water consumption and demand factors (e.g., rates, temperature, precipitation) using multiple regression analysis with account-level fixed effects. These models generate monthly consumption projections for each individual account, which incorporate the projected housing and employment growth along with anticipated changes in rates and weather patterns. Total demand for the in-City retail service area is calculated by aggregating the monthly account-level projections by sector.

Table 1-1 summarizes our projections. Single family residential consumption assumes no increase in housing units and is projected to increase from 12.6 million gallons per day (MGD) in FY 2024-25 to 13.0 MGD in FY 2049-50; multi-family residential consumption assumes a 44% increase in housing units and is projected to grow from 22.2 MGD in FY 2024-25 to 32.2 MGD in FY 2049-50; and commercial and industrial consumption assumes a 28% increase in jobs but demands will slightly decline from 12.3 MGD in FY 2024-25 to 12.2 MGD in FY 2049-50. These projections account for all single family, multi-family, and commercial/industrial water use in the SFPUC retail service area. These projections are then combined with estimates of future demands for dedicated irrigation, municipal, and suburban retail accounts, which are assumed to be equal to the last fiscal year's consumption (i.e., FY 2024-25). For water losses and unbilled consumption, the SFPUC projects these demands to be equal to the latest three-year average (i.e., FY 2022-23 through FY 2024-25). Total water demand is projected to change from 62.5 MGD in FY 2024-25 to 73.4 MGD in FY 2049-50.

This projection uses the same methodology as the demand projection produced as part of the 2020 UWMP process by the same authors. This report estimates the parameters of the econometric model after incorporating additional data from 2020-2024 into our dataset and updates the projection using the new econometric model parameters and updated projections for household and employment growth.

Compared to the 2020 water demand projections, the 2025 projections made the following key updates:

- It recalibrates the baseline year from FY 2019-20 to FY 2023-24.
- It applies updated housing and employment to projections.
- This report also introduces two new demand scenarios (Appendix A) that reflect uncertainty in the long-term housing and employment growth rates within the City.

Table 1-1: Summary of Demand Projections by Sector (MGD)

		FY 2024-25 (Actual)	FY 2029-30	FY 2034-35	FY 2039-40	FY 2044-45	FY 2049-50
		(millions of gallons per day)					
Single Family Residential							
Raw Prediction		12.6	13.4	13.1	13.1	13.1	13.1
Conservation:	*Active*	0.0	-0.1	-0.1	-0.1	-0.1	-0.1
	Total	*12.6*	*13.3*	*13.0*	*13.0*	*13.0*	*13.0*
Multi-Family Residential							
Raw Prediction		22.2	26.3	27.3	29.0	30.6	32.4
Conservation:	*Active*	0.0	-0.1	-0.1	-0.1	-0.1	-0.1
	Non-Potable / Onsite Reuse	0.0	-0.1	-0.2	-0.2	-0.2	-0.2
	Total	*22.2*	*26.2*	*27.1*	*28.7*	*30.4*	*32.2*
Commercial and Industrial							
Raw Prediction		12.6	12.9	12.4	12.9	13.3	14.0
Conservation:	*Active*	0.0	-0.4	-0.5	-0.4	-0.4	-0.4
	Non-Potable / Onsite Reuse	-0.2	-0.5	-1.3	-1.4	-1.4	-1.4
	Total	*12.4*	*12.0*	*10.7*	*11.1*	*11.5*	*12.2*
Others							
Estimations	*Irrigation*	1.5	1.5	1.5	1.5	1.5	1.5
	Municipal	2.2	2.2	2.2	2.2	2.2	2.2
	Suburban Retail	4.0	4.1	4.2	4.3	4.4	4.5
	Water Loss and Other[a]	7.6	7.8	7.8	7.8	7.8	7.8
	Total	*15.3*	*15.6*	*15.7*	*15.8*	*15.9*	*16.0*
Grand Total							
		62.5	***67.0***	***66.5***	***68.6***	***70.7***	***73.4***

Notes: Raw predictions in each sector include both standard accounts and combination-fire accounts.
Minor 'inconsistencies' in subtotal are result of rounding significant figures.
[a] Other uses include authorized, unbilled, unmetered consumption or water that is used in activities such as firefighting, water or sewer main flushing, street cleaning, etc.

2 Methodology

Our estimation process has several steps that we discuss in the respective subsections below. The first subsection discusses the raw data that we collect and how we pre-adjust our raw data to remove the impact of the SFPUC's active water conservation programs, which we account for separately after projecting future demand. The second subsection discusses the econometric model that we built. The third subsection discusses the assumptions and calculations that we use to produce both individual-level and aggregate demand estimates from the econometric model.

2.1. Data

2.1.1 Data Sources and Construction

Our estimates rely on account-level data from the SFPUC's in-City retail service area, matched with data on parcel characteristics, and local weather fluctuations. We matched the SFPUC's monthly billing data from FY 2009 -10 through FY 2023-24[1] to publicly available data on land use and building characteristics based on addresses provided in San Francisco's 2023 Tax Assessor roll[2] and 2022 Land Use inventory.[3] We then used these parcels to add characteristics about each water meter from the CCSF Assessor-Recorder Department and land use data, as well as historical weather data from the Oregon State University's PRISM dataset, US Census block-group characteristics and tract characteristics from the 2019-2023 ACS five-year estimates, and employment and household projections provided by SF Planning.

San Francisco's public agencies do not keep a data key that links information between the parcel identifiers in the Tax Assessor's records and the account numbers used in the SFPUC's records. Therefore, to merge assessor information into our dataset, we matched accounts based on their reported addresses. Due to inconsistencies in address reporting between the two datasets, we could not match all records; however, we managed to match over 95% of all accounts. Based on a comparison of summary statistics between all accounts and only matched summary statistics, these accounts appear to be a representative sample, and therefore, we are confident using these data as the basis for our projection model.

We use climate data from California's Fourth Climate Change Assessment (data retrieved from Cal-Adapt, a climate adaptation planning tool developed by UC Berkeley with support from the California

[1] In FY 2023-24, a technical problem led to some customers not receiving a water and sewer bill for several months. The problem was caused by certain transponders on water meters. The water meters were accurately reading the water usage, but the transponders were not sending that data electronically to the SFPUC's billing system. As a result, while these customers continued to receive water and sewer service, they did not receive bills for a period of time. This caused raw billing consumption data for FY 2023-24 to be artificially lower (by about 0.4 mgd) than actual demands. To correct this error, the SFPUC has manually added the delayed consumption to the FY 2023-24 billing data to more accurately reflect usage during this period.

[2] Property assessment data. SF.gov. https://www.sf.gov/resource--2024--secured-property-tax-data

[3] 2022 San Francisco Housing Inventory. https://sfplanning.org/sites/default/files/documents/reports/2022_Housing_Inventory.pdf

Energy Commission).[4,5] This dataset gathers climate observations from a wide range of monitoring networks, applies sophisticated quality control measures, and develops spatial climate datasets to reveal short- and long-term climate patterns. Climate data uses Representative Concentration Pathway 4.5, which is "a 'medium' emissions scenario that models a future where societies attempt to reduce greenhouse gas emissions" (Pierce et. al). We use a dataset of monthly average temperature and precipitation at a resolution of 1/16° (about 6 km, or 3.7 miles) . These dataset's spatial resolution allow us to identify microclimates at a high spatial resolution within San Francisco and identify how these microclimates affect water use.

From the assessor's parcel data, we can match each account with the land use category of the property on which it lies. The San Francisco Assessor's dataset includes land use classifications and the North American Industry Classification System (NAICS) codes used for business and tax registration. We aggregate these NAICS codes into five broader categories— Office/Professional, Health/Education/Recreation, Manufacturing/Wholesale, Retail, and Other. These aggregated categories can then be linked to local employment projections produced by ABAG to support projections of future water demand by sector.

Consumption data is also matched with past water rate data (FY 2023-24) and projected rate increases out to 2050, which were provided by the SFPUC Financial Services.[6] Rate data used in our analysis are adjusted for inflation to 2025 dollars using consumer price index (CPI) data from the St. Louis Federal Reserve's Economic Data (FRED).[7]

2.1.2 Remove Water Conservation Policy from Raw Data

In addition to the fundamental determinants, we also explicitly adjust the projected demand based on expected future water conservation from active water conservation programs and non-potable onsite water reuse programs administered by the SFPUC. This approach of explicitly accounting for active conservation programs in demand projections has been advocated as best practice by local researchers and advocacy groups.[8] However, explicitly adjusting for water conservation introduces

[4] https://cal-adapt.org/

[5] Pierce et al. (2018). Climate, drought, and sea level rise scenarios for California's fourth climate change assessment. California's Fourth Climate Change Assessment, California Energy Commission. Publication Number: CNRA-CEC-2018-006.

[6] The price elasticity estimates in this report are based on historical *marginal volumetric water rates* only. For each account and billing period, the econometric model identifies the applicable marginal Tier 1 or Tier 2 water rate corresponding to the customer's actual consumption. Consistent with the methodology adopted in the previous demand projection study, the historical price variable did not incorporate wastewater, nor did it include fixed service charges. However, during the review process, SFPUC highlighted that future wastewater and stormwater rate increases are expected to diverge materially from water-only increases (particularly given the phased introduction of the stormwater charge through FY 2029-30). Although the historical price elasticity was estimated using water-only marginal rates, the projection component of this study incorporates the updated water, wastewater and increases from the FYE 2026 Financial Plan, applying only the volumetric wastewater rate changes (SIC Group 4) and excluding fixed stormwater charges. This adjustment ensures that projected average customer bills reflect the anticipated relative growth in wastewater rates while maintaining consistency with the historical estimation framework based on marginal volumetric water prices.

[7] U.S. Bureau of Labor Statistics, *Consumer Price Index for All Urban Consumers: All Items (CPI-U)* [CPIAUCSL], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/CPIEALL, October 15, 2025.

[8] See, for example: Sarah E. Diringer, Heather Cooley, Matthew Heberger, Rapichan Phurisamban, Andrea Turner, John McKibbin, and Mary Ann Dickinson, "Integrating Water Efficiency Standards and Codes into Long-Term Demand Forecasting," *Water Research Foundation* (2018); Sonali Abraham, Sarah Diringer, and Heather Cooley, *An Assessment of Water Demand Forecasts in California*, 2020 (Oakland, California: Pacific Institute).

some challenges into the demand estimation process. Specifically, care needs to be taken not to double-count savings from conservation programs with consumers' responses to rates, drought, and climate. To do this, we adjust our historical data by adding back in the savings that the SFPUC estimates have been generated as a result of their active conservation programs. These savings are calculated using SFPUC's customized version of the Alliance for Water Efficiency Conservation Tracking Tool. Savings for water conservation are calculated at an aggregate level by sector, but we split these savings down to the household level by calculating the share of conservation attributable to each household and adding these savings back onto each household's daily water use.[9]

After adding these savings back in, we derive an estimate of "pre-conservation" demand, which describes what demand would have been but-for the SFPUC's conservation programs. We estimate our statistical demand model and predict demand based on this "pre-conservation" data.

Future demand reductions from onsite water reuse programs are also incorporated into the multi-family and commercial sector models. Estimates of savings from onsite water reuse programs were provided by the SFPUC staff and are subtracted from the raw demand projections.

In the last step of our analysis, we add back in the active conservation savings and savings from non-potable onsite water reuse programs to generate the final demand estimate.

2.2. Econometric Model

For consistency, the methodology employed in this update remains the same as that used in the previous demand projection report included in the 2020 UWMP.

To predict how water demand in the SFPUC's retail service area will change over time, it is necessary to estimate a relationship between water use and the demand factors used in this analysis (e.g., rates and climate). Generally, water use and water price are negatively correlated. In other words, as water becomes more expensive, users will reduce their demands to offset the higher costs. As temperature increases or precipitation decreases, water demand is expected to increase.

For each account, we estimate the relationship between water use and these demand factors using a regression analysis with account-level fixed effects. In a regression analysis, changes in the explanatory variable, customer water use, are explained by the dependent variables, such as rates, climate, and macro-economic factors. In a regression with account-level fixed effects, we also control for the average level of water consumption for every premise in the in-City retail service area. All explanatory variables in our empirical model are estimated in natural logarithms, which allows us to interpret their corresponding regression coefficients as elasticities.

[9] Although we make explicit adjustments for active water conservation programs, demand for which is driven by SFPUC outreach, we do not make a similar adjustment for passive water saving. Passive water savings are primarily driven by consumers taking water-saving actions in response to changes in rates and so are implicitly accounted for in our demand elasticity estimates. Including an explicit adjustment for these savings would risk double-counting and underestimating future water use.

An elasticity is the relationship between a variable, such as price, and water demand, which is calculated and interpreted as the percent change in water demand for a given percent change in the variable, water price. For example, a price elasticity of -0.2 implies that users reduce water demand by 0.2% for each 1% increase in price. We estimate similar elasticities with respect to elements of climate such as temperature and precipitation. These elasticities can be used to estimate the impact of anticipated future climate change.

To estimate demand for single family and multi-family water use, we estimate the following equation,

$$\ln(q_{it}) = \ln(rate_t)\,\beta^{rate} + \ln(temp_t)\,\beta^{temp} + \ln(ppt_{it})\,\beta^{ppt} + \gamma^{COVID} + \gamma^{drght} + \gamma_i + \varepsilon_{it}$$

Where, the dependent variable, $\ln(q_{it})$, is the natural logarithm of household i's pre-conservation water consumption in month t. Dependent Variables:

- Monthly Rate $rate_t$: The volumetric rate paid by households in each month. Rates are expressed as a Real Rate Index (year 2023 = 100), which adjusts nominal rates for inflation to enable consistent comparisons over time. An index value of 100 represents the average 2023 rates; values below 100 indicate lower inflation-adjusted rates, while values above 100 indicate higher inflation-adjusted rates.

- Weather $temp_t$ and ppt_{it} : We obtain panel of modelled climate characteristics of 1/16° (about 6 km, or 3.7 miles) from Cal-Adapt. We control each month's average precipitation and mean temperature.

- Drought[10] and COVID-19 Emergencies[11] γ^{drght} and γ^{COVID}: We include fixed-effect dummy variables that take a value of 1 during periods of declared drought or COVID-19 emergency, and 0 otherwise. These variables capture temporary impacts on demand during those events. Both factors are not included in the projection period, as the projection assumes normal (non-emergency) conditions.

- Individual Fixed Effects γ_i: Using this high-resolution data, we can control the average level of water use for each account in our data. Adjusting the average level of our water use within each household allows us to estimate how an individual account responds to changes in rates, precipitation, and temperature, rather than basing the estimates on differences in average water use across accounts at a point in time.

- Idiosyncratic error term ε_{it}: This term is standard in statistical regression analysis and is used to rationalize unexplained variation in the model. The model coefficients β are chosen to minimize idiosyncratic errors. The variance of ε_{it} is a key factor that is used to calculate the 95% confidence interval that characterizes the uncertainty associated with the model's

[10] The drought variable in the model was defined based on the SFPUC's Drought Emergency Declarations, covering February 2014 to April 2017 and November 2021 to April 2023.

[11] The COVID variable in the model was defined based on San Francisco's municipal COVID-19 restrictions, which were in effect between March 2020 and December 2022.

parameters estimates β. We adopt two-way cluster-robust method, clustered at the census block-group and year level to account for unexplained correlations in water use either within years or within neighborhoods.

To estimate demand for commercial and industrial accounts, we use the following equation:

$$\ln(q_{ijt}) = \ln(rate_t)\,\beta_j^{rate} + \ln(temp_{it})\,\beta^{temp} + \ln(ppt_{it})\,\beta^{ppt} + \gamma_j^{COVID} + \gamma^{drght} + \gamma_i + \varepsilon_{it}$$

This specification is the same as for the residential model, except the key differences is that the parameter estimates for rates β_j^{rate} and for COVID-19 γ_j^{COVID} are allowed to vary by land use with a different parameter being chosen in each different type of land use in the commercial and industrial sector.

2.3. Projection Data

2.3.1 Projection Assumptions

Table 2-1 and Table 2-2 summarize the assumptions that we adopt in our projections. Assumptions about growth in the number of single family and multi-family units come from SF Planning.[12] Note that all future residential growth is expected to be in the multi-family sector, with no growth expected for single family units. Assumptions for the number of employees by sector are from the UWMP out to the year 2050. Assumptions about future climate are based on the average of outcomes across multiple climate models.

[12] 2023 San Francisco Housing Inventory, SF Planning. https://sfplanning.org/sites/default/files/resources/2024-04/2023_Housing_Inventory.pdf

Table 2-1: Demand Projection Assumptions – Housing Unit and Employment Growth

		FY 2024-25 (Actual)	FY 2029-30	FY 2034-35	FY 2039-40	FY 2044-45	FY 2049-50
No. Housing Units	*Single Family Residential*	95,071	95,071	95,071	95,071	95,071	95,071
	Multi-Family Residential	322,753	363,262	388,529	413,929	438,929	463,929
	Total	***432,667***	***458,333***	***483,600***	***509,000***	***534,000***	***559,000***
No. Employees	*Office/Professional*	155,250	171,672	174,515	182,850	188,458	198,470
	Health/Education/Recreation	306,304	338,704	344,313	360,758	371,822	391,575
	Manufacturing/Wholesale	34,766	38,444	39,081	40,947	42,203	44,445
	Retail	25,775	28,502	28,974	30,357	31,288	32,951
	Other	203,204	224,698	228,419	239,329	246,668	259,773
	Total	***725,300***	***802,020***	***815,302***	***854,241***	***880,439***	***927,214***

Table 2-2: Demand Projection Assumptions- Covariates

	FY 2024-25 (Actual)	FY 2029-30	FY 2034-35	FY 2039-40	FY 2044-45	FY 2049-50
Real Rate Index *(2023 = 100)*	100	143	189	199	205	204
Monthly Average Temperature *(°C)*	14.7	14.8	15.0	15.1	15.2	15.4
Monthly Average Precipitation *(mm)*	46.0	46.9	48.3	46.8	47.8	49.4
COVID-19	0.0	0.0	0.0	0.0	0.0	0.0
Drought	0.0	0.0	0.0	0.0	0.0	0.0

2.3.2 Econometric Projections

The econometric model that we use in the single family and multi-family sectors is estimated on a per-unit basis, and our projections are also on a per-unit basis. Characteristics and fixed-effects for existing accounts are estimated from our data. For new multi-family residential and commercial and industrial accounts, we simulate firm fixed-effects. Based on these individual effects, we estimate individual level demand using the following equation:

$$\widehat{q_{it}} = e^{\ln(rate_t)\beta^{rate} + \ln(temp_{it})\beta^{\widehat{temp}} + \ln(ppt_{it})\beta^{\widehat{ppt}} + \gamma^{\widehat{COVID}} + \gamma^{\widehat{drght}} + \gamma_i}$$

Once we have calculated individual-level demand for each account, we calculate total demand by aggregating each of the individual estimates in our data:

$$\widehat{Q_{it}}^{Raw} = \sum_i q_{it}$$

2.3.3 Reincorporating Conservation Estimates and Other Demand Adjustments

The final steps of the projection process are to (1) subtract the estimated savings from active conservation programs and non-potable onsite reuse programs, as well as (2) add the additional residential and commercial/industrial demands not covered in our model. Specifically, this includes residential and non-residential fire accounts, docks and ships accounts, and builder/contractor accounts. The projections for these accounts are outside of our model and were developed by the SFPUC. Note that this econometric model does not project other sectors of water use, including water losses, dedicated irrigation accounts, municipal accounts, and suburban retail accounts.

$$\widehat{Q_t}^{Final} = \widehat{Q_t}^{Raw} - Q^{Conservation} + Q^{Other}$$

3 Single Family Residential Projection

3.1. Model Estimates

Table 3-1 summarizes the estimates of the demand model for the single family residential sector. The model fits the data well due to account-level fixed effects that adjust for the average level of water use of every household. Specifically, the model has an R-squared value of 0.67, implying that our estimate explains 67% of the total variation in demand. This represents a strong model fit and is consistent with the R-squared value reported in the 2020 analysis.

Across all units in the sample, we estimate a price-elasticity of demand of -0.12. This elasticity implies that a 10% increase in water rates will lead to a 1.2% reduction in demand. This estimate is statistically significant and has a confidence interval from -0.17 to -0.08. Note that the SFPUC charges two tiers of variable rates and a fixed rate. The demand elasticity estimate is with respect to the two tiers of variable rates, but not the fixed rate.

We estimate an elasticity of demand with respect to temperature of 0.10 and with respect to precipitation of -0.0067. This estimate implies that a 10% increase in average temperature will lead to a 1.0% increase in demand, and that a 10% increase in precipitation will lead to a 0.067% decrease in demand. These estimates are also both statistically significant. The difference between these coefficients and those estimated in the 2020 report is not statistically significant.

During COVID-19 restrictions (2020-2022), single family residential water demand is estimated to be 2.6% lower; however, this effect is not statistically significant.[13] Based on the patterns of water use in our data, we predict that during periods of drought single family residential water demand is 8.3% lower and this effect is statistically significant.[14] Following the COVID-19 pandemic, water sales declined more rapidly than population and did not rebound following the end of the 2021-23 drought, suggesting a secular decline in water use due to more efficient consumption incentivized by both the drought and other conservation programs).

Table 3-1: Model Estimates – Single Family Residential Sector

	Coefficient	95% Confidence Interval	Change in Consumption from 10% Predictor Change
log(Marginal Rates)	-0.12	[-0.17, -0.08]	-1.2%
log(Temperature)	0.10	[0.02, 0.18]	1.0%
log(Precipitation)	-0.007	[-0.012, -0.001]	-0.07%
			Change in Consumption from Predictor Event
COVID-19	-0.026	[-0.06, 0.01]	-2.6%
Drought	-0.09	[-0.11, -0.06]	-8.3%
Account Fixed-Effects	Yes		
R-squared	0.67		

3.2. Demand Projection

[13] The estimate COVID-19 coefficient differs from that estimated in our 2020 demand projections, which estimated a 9.3% increase in single family residential water use during COVID-19. The earlier report was based on data through July 2020 and reflected increased consumption during initial stay-at-home orders. The current coefficient captures the average effect across the entire pandemic (2020-2022), including both the initial increase and subsequent decline as San Francisco experienced significant population outmigration.

[14] In the model drought periods are defined based on SFPUC drought declarations, which occurred from February 2014 to April 2017 and from November 2021 to April 2023. This model estimates a smaller drought coefficient than the previous report (-0.03 in 2025 compared to -0.13 in 2020). The reason for this is that water consumption showed little rebound following the end of the drought in April 2023, suggesting that the observed declines in water use represent secular reductions in average consumption rather than temporary drought-related impacts.

Table 3-2 summarizes our demand projection for the single family residential sector. The SF Planning Department does not anticipate any growth in San Francisco's single family housing stock through FY 2049-50, keeping the inventory constant at 95,071 units. The projection is calibrated to FY 2024-25 consumption levels, where total demand was 12.6 MGD or 145.1 gallons per occupied unit per day and incorporates an 8.6% vacancy rate based on the latest estimate from the California Department of Finance. SFPUC's conservation model indicates that active conservation programs will reduce single family demand by approximately 0.1 MGD by 2050. After accounting for these savings, total single family demand is projected to rise by 3.2% or to 13.0 MGD due to full occupancy of all units. On a per unit basis, however, average consumption is expected to decline by 5.7% or to 136.8 gallons per day by FY 2049-50.

Table 3-2: Demand Projection – Single Family Residential Sector

		FY 2024-25 (Actual)	FY 2029-30	FY 2034-35	FY 2039-40	FY 2044-45	FY 2049-50
Number of Units		95,071	95,071	95,071	95,071	95,071	95,071
Residents per Unit		2.2	2.2	2.2	2.2	2.2	2.2
Avg. Consumption per Unit (gal / day)							
Unadjusted Baseline Demand		145.1	141.1	138.2	137.7	137.5	137.7
Conservation	*Active*	0.0	-1.0	-1.1	-1.0	-0.9	-0.9
	Demand per Unit	***145.1***	***140.1***	***137.0***	***136.7***	***136.6***	***136.8***
Projection - Total Consumption (MGD)							
Unadjusted Baseline Demand		12.6	13.4	13.1	13.1	13.1	13.1
Conservation	*Active*	0.0	-0.1	-0.1	-0.1	-0.1	-0.1
	Total Demand	***12.6***	***13.3***	***13.0***	***13.0***	***13.0***	***13.0***

Notes: Minor 'inconsistencies' in subtotal are result of rounding significant figures.

4 Multi-Family Residential Demand Projection

4.1. Model Estimates

Table 4-1 summarizes the estimates of the demand model for the multi-family residential sector. Note that projections are made on a per-unit rather than per-account basis, this distinction is important in the multi-family residential sector, where many accounts serve multiple units. The model has good fit to the data, with an R-squared value of 0.7, implying that our estimate explains 70% of the total variation in demand.

Across all units in the sample, we estimate a price-elasticity of demand of -0.14. This elasticity implies that a 10% increase in rates will lead to a 1.4% reduction in demand. This estimate is statistically significant and has a confidence interval from -0.16 to -0.11. Note that SFPUC charges two tiers of variable rates and a fixed rate. The demand elasticity estimate is with respect to the two tiers of variable rates, but not the fixed rate.

We estimate an elasticity of demand with respect to temperature of 0.03 and with respect to precipitation of -0.0014. This estimate implies that a 10% increase in average temperature will lead to a 0.3% increase in demand, and that a 10% increase in precipitation will lead to a 0.014% decrease in demand. The difference between the temperature coefficients estimated now and in the 2020 report is statistically significant; but that of precipitation is not. The temperature elasticity has moved closer to zero, suggesting that demand has become less responsive to temperature over time, consistent with demand hardening.

During periods with COVID-19 restrictions (2020-2022), multi-family residential water demand is estimated to be 1.4% higher; however, this effect is not statistically significant. During a drought, multi-family residential water demand is estimated to be 1.9% lower, and this effect is also not statistically significant. Similarly to what's observed in the SFR sector, water sales declined more rapidly than population following the COVID-19 pandemic, likely due to more efficient water consumption (incentivized by the 2020-2022 drought or other conservation programs).

Table 4-1: Model Estimates – Multi-Family Residential Sector

	Coefficient	95% Confidence Interval	Change in Consumption from 10% Predictor Change
log(Marginal Price)	-0.14	[-0.16, -0.11]	-1.4%
log(Temperature)	0.03	[0.01, 0.05]	0.3%
log(Precipitation)	-0.001	[-0.002, -0.001]	-0.01%
			Change in Consumption from Predictor Event
COVID-19	0.01	[-0.01, 0.04]	1.4%
Drought	-0.02	[-0.03, -0.01]	-1.9%
Account Fixed-Effects	Yes		
R-squared	0.70		

4.2. Demand Projection

Table 4-2 summarizes the multi-family residential demand projection. The SF Planning Department expects growth in the stock of multi-family residential units to increase by 43.7% or from 322,753 units in FY 2024-25 to 463,929 units in FY 2049-50.[15] The projection is calibrated to FY 2024-25 consumption levels, where total demand was 22.2 MGD or 75.4 gallons per occupied unit per day and incorporates an 8.6% vacancy rate based on the latest estimate from the California Department of Finance. After accounting the anticipated effects of active conservation programs and non-potable onsite reuse systems, average per-unit water demand in the multi-family sector is projected to decline from 75.4 gallons per unit per day in FY 2024-25 to 69.4 gallons per unit per day in FY 2049-50.

Because of the substantial increase in the number of multi-family units, total unadjusted baseline demand is expected to rise. Active conservation programs and the implementation of non-potable onsite reuse systems are expected to reduce water use by about 0.3 MGD by FY 2049-50. After accounting for these conservation savings, total multi-family demand is projected to increase by 45% or from 22.2 MGD in FY 2024-25 to 32.2 MGD due to full occupancy of all units. On a per unit basis, however, average consumption is expected to decline by 8.0% or to 69.4 gallons per day by FY 2049-50.

[15] SFPUC. 2023 Interim Water Demand Projections for the City and County of San Francisco. September 2023.

Table 4-2: Demand Projection – Multi-Family Residential Sector

		FY 2024-25	FY 2029-30	FY 2034-35	FY 2039-40	FY 2044-45	FY 2049-50
Number of Units	*Existing*	322,753	322,753	363,262	388,529	413,929	438,929
	New	--	40,509	25,267	25,400	25,000	25,000
	Total	***322,753***	***363,262***	***388,529***	***413,929***	***438,929***	***463,929***
Residents per Unit		2.2	2.2	2.2	2.2	2.2	2.2
Avg. Consumption per Unit (gal / day)							
Unadjusted Baseline Demand		75.4	72.5	70.4	70.0	69.8	69.8
Conservation	*Active*	0.0	-0.2	-0.2	-0.2	-0.1	-0.1
	Non-Potable / Onsite Reuse	0.0	-0.2	-0.4	-0.4	-0.4	-0.3
	Demand per Unit	***75.4***	***72.1***	***69.7***	***69.4***	***69.3***	***69.4***
Projection - Total Consumption (MGD)							
Unadjusted Baseline Demand		22.2	26.3	27.3	29.0	30.6	32.4
Conservation	*Active*	0.0	-0.1	-0.1	-0.1	-0.1	-0.1
	Non-Potable / Onsite Reuse	0.0	-0.1	-0.2	-0.2	-0.2	-0.2
	Total Demand	***22.2***	***26.2***	***27.1***	***28.7***	***30.4***	***32.2***

Notes: Minor 'inconsistencies' in subtotal are result of rounding significant figures

5 Commercial and Industrial Demand Projection

5.1. Model Estimates

Table 5-1 summarizes the estimates of the demand model for the commercial and industrial sectors. Note that we project on a per-unit account basis, but we present our results on a per-employee basis, as this is the input data into our projection model. The model has good fit to the data, with an R-squared value of 0.87, implying that our estimate explains 87% of the total variation in demand.

We estimate five price elasticities, varying from -0.16 in the Manufacturing/Wholesale sector to -0.34 in the Health/Education/Recreation sector. These elasticities imply that a 10% increase in water rates will lead to a reduction in demand between 1.6% and 3.4%, respectively. In general, unlike the residential sector, these elasticities are larger in magnitude compared to the 2020 analysis — that is, C&I sector remains more sensitive to price signals. We further estimate that these demand elasticities are statistically significant in the Office/Professional, Health/Education/Recreation, and Other sectors, but not in the Retail and Manufacturing/Wholesale sectors.[16]

We estimate an elasticity of demand with respect to temperature of 0.15 and with respect to precipitation of 0.00. This estimate implies that a 10% increase in average temperature will lead to a 1.5% increase in demand, and that changes in precipitation do not have a statistically or economically significant impact on demand.

The COVID-19 pandemic led to a statistically significant reduction in average water use among commercial and industrial customers of between 8.9% to 24.2% depending on the sector. We do not find a statistically significant impact of drought on commercial and industrial water use in San Francisco.

[16] Our estimates are deemed to be statistically significant if the estimated 95% confidence interval does not include zero. If the estimated 95% confidence interval does include zero, the estimates are considered to not be statistically significant. Note that to obtain the best-fit model, we include all variables in our projections, regardless of whether or not they are statistically significant.

Table 5-1: Model Estimates – Commercial and Industrial Sector

	Coefficient	95% Confidence Interval	Change in Consumption from 10% Predictor Change
log(Marginal Price): Office/Professional	-0.32	[-0.47, -0.18]	-3.2%
log(Marginal Price): Health/Education/Recreation	-0.34	[-0.47, -0.21]	-3.4%
log(Marginal Price): Manuf./Wholesale/Trade/Trans.	-0.16	[-0.28, -0.04]	-1.6%
log(Marginal Price): Other	-0.31	[-0.46, -0.16]	-3.1%
log(Marginal Price): Retail	-0.31	[-0.44, -0.18]	-3.1%
log(Temperature)	0.15	[0.08, 0.22]	1.5%
log(Precipitation)	0.00	[-0.004, 0.003]	0.00%
			Change in Consumption from Predictor Event
COVID-19: Office/Professional	-0.21	[-0.31, -0.11]	-18.7%
COVID-19: Health/Education/Recreation	-0.24	[-0.37, -0.11]	-21.4%
COVID-19: Manuf./Wholesale/Trade/Trans.	-0.12	[-0.21, -0.04]	-11.6%
COVID-19: Other	-0.09	[-0.16, -0.02]	-8.9%
COVID-19: Retail	-0.28	[-0.43, -0.13]	-24.2%
Drought	-0.002	[-0.06, 0.06]	-0.2%
Account Fixed-Effects	Yes		
R-squared	0.87		

5.2. Demand Projection

Table 5-2 summarizes the commercial and industrial demand projection. The SF Planning Department projects that the City will experience significant employment growth of 27.8%, where the number of jobs will increase from 725,300 in FY 2024-25 to 927,214 in FY 2049-50. The projection is calibrated to match total commercial and industrial consumption in FY 2024-25, which was 12.4 MGD where per-employee demand was 16.9 gallons per day. Active conservation programs and non-potable onsite reuse systems are expected to reduce commercial and industrial water use by 1.8 MGD in FY 2049-50. With conservation, commercial and industrial water use is projected to decline by 13.7% or from 12.4 MGD in FY 2024-25 to 10.7 MGD in FY 2034-35 before rising by 14.0% or to 12.2 MGD in FY 2049-50. On a per-employee basis, average water use is expected to decline by 21.9% or to 13.2 gallons per day, which is partially offset by growth in total employment.

Table 5-2: Demand Projection – Commercial and Industrial Sector

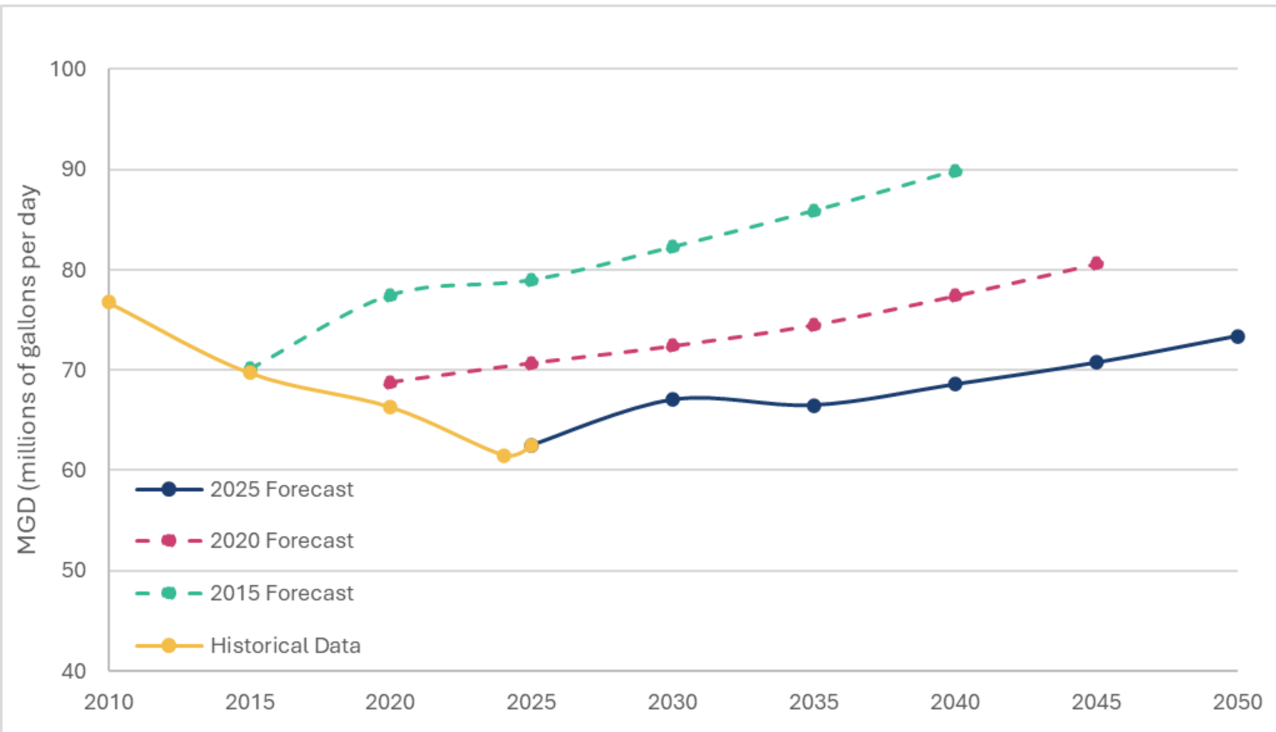
		FY 2024-25 (Actual)	FY 2029-30	FY 2034-35	FY 2039-40	FY 2044-45	FY 2049-50
Number of Employees		725,300	802,020	815,302	854,241	880,439	927,214
Avg. Consumption per Employee (gal / day)							
Unadjusted Baseline Demand		17.1	16.0	15.3	15.1	15.1	15.1
Conservation	*Active*	0.0	-0.4	-0.6	-0.5	-0.4	-0.4
	Non-Potable / Onsite Reuse	-0.2	-0.7	-1.6	-1.6	-1.6	-1.6
	Demand per Employee	***16.9***	***14.9***	***13.1***	***13.0***	***13.0***	***13.2***
Projection - Total Consumption (MGD)							
Unadjusted Baseline Demand		12.6	12.9	12.4	12.9	13.3	14.0
Conservation	*Active*	0.0	-0.4	-0.5	-0.4	-0.4	-0.4
	Non-Potable / Onsite Reuse	-0.2	-0.5	-1.3	-1.4	-1.4	-1.4
	Total Demand	***12.4***	***12.0***	***10.7***	***11.1***	***11.5***	***12.2***

Notes: Minor 'inconsistencies' in subtotal are result of rounding significant figures

6 Comparison to 2020 and 2015 Demand Projections

Figure 6-1 compares the 2025 Demand Projection to the demand projections developed for the UWMPs in 2020 and 2015. The 2020 UWMP projection was produced using the same methodology as the 2025 projection—an econometric model of household-level water use for customers within the City and County of San Francisco—whereas the 2015 projection was based on utility-level econometric model that compared water use between San Francisco and other Bay Area utilities. As noted previously, these demand projections are for single family residential, multi-family residential, commercial, and industrial sectors and does not include other retail demands such as water losses, dedicated irrigation, municipal, or suburban retail accounts.

Figure 6-1: Comparison of Demand Projections from 2025, 2020, and 2015 UWMPs



Several key factors account for the lower projection of water use developed in 2025 relative to projections developed in 2020 and 2015:

- **Lower per-capita water use:** The 2025 projection incorporates more recent data with lower baseline per-capita water use than was included in the 2015 and 2020 analyses, contributing to lower projected total demand. Per-capita water use is 9% lower compared to that of the 2020 analyses (baseline year: 2019), and 17% lower than that of the 2015 analyses (baseline year: 2009).

- **Higher water conservation:** Projected water conservation is slightly higher (about 5% higher in terms of cumulative volume over the projection period) in 2025 than was predicted in the conservation model from 2020.

- **Lower population and employment:** Projected population and employment is lower in 2025 relative to that projected in the 2020 projections, for example, the projected number of employees in 2025 is 3% lower in 2025 than that in the 2020 analysis.

- **Drought and pandemic adjustments:** Upward adjustments were made to the baseline water use projections in 2015 and 2020 to remove the temporary effects of the ongoing drought and the COVID-19 pandemic, respectively, from observed water use data. As a result, projected water use in those years was higher than the historical data. The 2025 projection does not include any such adjustments.

The 2025 projection assumes modest declines in per-capita water use—consistent with past projections—but incorporates increases in population and employment that offset these declines, resulting in an overall increase in total water demand. Retail demands are projected to decrease from 62.5 MGD to 58.8 MGD in FY 2034-35 primarily due to larger rate increases expected in the near-term. From FY 2034-35 to FY 2049-50, demands are anticipated to increase to 73.4 MGD due to growth in housing unit and employment projections outpacing rate increases. To test the robustness of the projection to alternative assumptions about population and employment growth, Appendix A to this report contains a sensitivity analysis that evaluates how projected demand changes under projections from alternative data sources.

7 Conclusion

The 2025 demand model updates the 2020 demand model using the latest billed consumption data. Using FY 2024-25 consumption as a baseline, the model calibrates residential use with an estimated vacancy rate of 8.6% from the California Department of Finance and then assumes full occupancy beginning in FY 2029-30 to reflect the SFPUC's capacity to serve all future households. Under these conditions, single family demand rises modestly from 12.6 MGD to 13.0 MGD despite no increases in unit count, driven by the assumption of full occupancy with some declines in average consumption per household. Multi-family demand grows more substantially due to the addition of new housing and the assumption of full occupancy, yet per unit consumption also trends downward. In the commercial and industrial sectors, demand remains relatively stable through FY 2049-50, even though there is projected employment growth. This is because water use per employee is expected to fall and because conservation and onsite water reuse savings play a larger role than in the residential sectors combined.

Citywide demand increases through FY 2029-30 and decreases in FY 2034-35 due to near-term rate impacts and anticipated conservation savings based on known programs. Demand then gradually rises again as long-term growth in housing and employment become the dominant driver. Despite this growth, continued improvements in water efficiency keep projected demands lower than in past projections. Together, these trends illustrate a system in which expanding population and economic activity are balanced by sustained gains in efficiency.

A. Appendix A: Discussion of Assumptions for Demand Projection and Sensitivity Analysis

This appendix contains further discussion of how the key assumptions used in the demand projections for the 2025 UWMP were developed. It also presents two additional demand scenarios based on alternative assumptions regarding housing and employment growth.

The following scenarios were developed by SFPUC staff in collaboration with Berkeley Research Group, WestWater Research, and Woodard & Curran. The narrative in this section was primarily prepared by SFPUC staff and reflects the collective discussions held among SFPUC and the consultant team. While the text was drafted by SFPUC, the authors of this report support the analytical framework and assumptions underlying this work.

A. Purpose

The SFPUC routinely updates its 20-year demand projections as part of its water supply planning. Included in this effort is the UWMP, which is updated every five years and must reflect local land use planning. As such, the housing and employment growth projections in the UWMP are provided to the SFPUC by SF Planning. The water demand projections which are published in the UWMP are referred to as the "UWMP Scenario".

In 2019, the SFPUC established the Alternative Water Supply (AWS) Program to help meet future dry-year needs. The roadmap for this program is laid out in the AWS Plan (February 2024). During the development of this plan, the SFPUC received several public comments asking the agency to (1) develop additional demand scenarios and (2) conduct a sensitivity analysis similar to what the Bay Area Water Supply and Conservation Agency (BAWSCA) produced in their 2022 Regional Water Demand and Conservation Projections Update.[17] The nature of these comments reflected the general observation across all water suppliers, not just SFPUC, that demand projections provided in the Urban Water Management Plans tend to be higher than actual demands. In response to these comments, the SFPUC included a recommendation in the AWS Plan to develop one to two additional demand scenarios and to conduct a sensitivity analysis. This memo documents the sensitivity analysis and development of the additional demand scenarios which will be used for future water supply planning and incorporated in the next AWS Plan Update (anticipated to begin following completion of the 2025 UWMP).

B. Scope of the Sensitivity Analysis

The SFPUC produces water demand projections for its retail service area, which includes both in-City and suburban demand. To determine future demands for the majority of accounts—in-City single family residential, multi-family residential, commercial, and industrial accounts—the SFPUC uses an econometric model that estimates the relationship between water consumption and demand factors (e.g.,

[17] https://bawsca.org/uploads/userfiles/files/BAWSCA%202022%20Demand%20Study%20Update%20Final%20Report(1).pdf

rates, temperature, precipitation). This relationship is estimated for each household or business account using multiple regression analysis with account-level fixed effects.

Each variable used in the econometric model was evaluated for potential inclusion in the sensitivity analysis. Then, the sensitivity analysis examined the relative impact on demand from using one data source compared to another. For example, the sensitivity analysis estimates how much water demand changes if an additional 5% increase in water savings was assumed on top of the SFPUC's conservation model output. Additionally, the SFPUC closely reviewed the sensitivity analysis described in BAWSCA's 2022 Regional Water Demand and Conservation Projections Update for additional variables to consider. This section describes all the variables and corresponding source data options considered in SFPUC's sensitivity analysis.

Lastly, there are various types of demands that are not projected by an econometric model and instead are projected using estimates based on historical consumption or assumed to remain steady over time. These other types of demand that are not modeled include dedicated irrigation accounts, municipal accounts, suburban retail accounts, and water losses. While these demands are not projected by the SFPUC's econometric model and not included in the sensitivity analysis, their corresponding projections, consistent with the UWMP, are included in the resulting projections of the three demand scenarios.

1. Housing Growth

This section describes the housing and population growth projections considered for the sensitivity analysis.

San Francisco Planning Department

Because the SFPUC is not a land use agency, housing growth projections is provided to the SFPUC by the San Francisco Planning Department for use in the UWMP. The SF Planning Department reviews the information in the City's General Plan Housing Element and routinely updates the citywide Land Use Allocation when the Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC) update their regional projections, which is typically every four years as part of the Plan Bay Area adoption process. This plan is currently being updated, and the next iteration is called Plan Bay Area 2050+. The plan is anticipated to be adopted by early 2026. In the meantime, as of the preparation of this memo, the Final Blueprint for Plan Bay Area 2050+, which contains growth strategies for the region, has been advanced to the environmental phase of the planning process. To meet the timeline of the UWMP, the SF Planning Department has informed the SFPUC to use the housing projections published in the Housing Element (adopted in January 2023). These projections were also used to develop the 2023 Interim Water Demand Projections for the City and County of San Francisco. The average annual growth rate of SF Planning's housing projections is 1.06%.

Historical Growth

Predicting future population based on historical estimates was considered for the sensitivity analysis since past growth may be an indicator of future growth. The SFPUC used historical population estimates from the California Department of Finance (CA DOF) between 2000 and 2025[18] and applied a linear regression to estimate population through year 2050. This produced an average annual growth rate of 0.44%.

Moody's

Moody's Corporation is a globally recognized financial services company specializing in credit ratings, risk analysis, and data-driven insights. Moody's provides credit ratings for bonds, governments, and corporations, including the SFPUC. Their subsidiary, Moody's Analytics, provides economic forecasting and modeling solutions used by governments, financial institutions, corporations, and other organizations worldwide.[19] Population projections from Moody's were used for the sensitivity analysis and the data show that these projections were slightly lower than CA DOF in the near-term but surpassed CA DOF's projections in the long-term with an average annual growth rate at 0.44%.

California Department of Finance

The California Department of Finance releases population projections for the State and counties of California on a periodic basis.[20] These population projections incorporate the latest historical population, birth, death, and migration data available and are informed by U.S. Census data products. The average annual growth rate of the CA DOF's population projection is 0.077% as of September 2025.

Analysis of Housing Growth Inputs

For this sensitivity analysis, the SFPUC evaluated the impact on demand from changing SF Planning Department's housing unit growth assumption to various population projections. However, since the SFPUC's econometric model estimates demand on an account-level basis and the additional growth projections are in terms of population (i.e., number of people), an assumption of 2.2 persons per household was made to convert population to households. The persons per household estimate is an average of the latest estimates from the CA DOF[21] and the U.S. Census (Decennial Census and American Community Survey [ACS] 5-year estimates),[22] see Table A-1.

Table A-1: Population per Household Estimates by Year

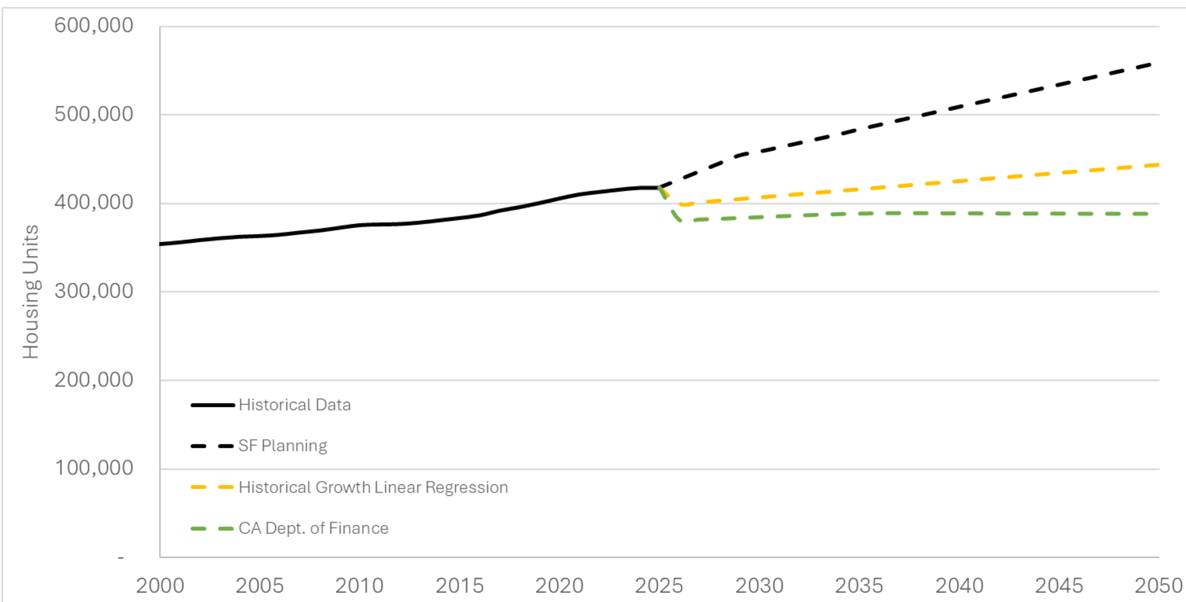
Year	CA DOF	U.S. Census and ACS 5-year Estimates
2020	2.26	2.35
2021	2.21	-
2022	2.15	-
2023	2.14	2.24
2024	2.12	-
2025	2.10	-

[18] https://dof.ca.gov/forecasting/demographics/estimates
[19] https://www.economy.com/products/data
[20] https://dof.ca.gov/forecasting/demographics/projections/
[21] State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State — January 1, 2021-2025. Sacramento, California, May 2025. Retrieved September 17, 2025, from https://dof.ca.gov/forecasting/demographics/estimates/e-5-population-and-housing-estimates-for-cities-counties-and-the-state-2020-2025.
[22] U.S. Census Bureau, U.S. Department of Commerce. (n.d.). Households and Families. American Community Survey, ACS 5-Year Estimates Subject Tables, Table S1101. Retrieved September 17, 2025, from https://data.census.gov/table/ACSST5Y2023.S1101?q=average+household+size+in+san+francisco,+ca.

A comparison of each of the housing projections is shown in Figure A-1. As mentioned above, the SF Planning Department relies on growth projections provided by the Plan Bay Area, which are expressed as the number of households. An assumption of 2.2 persons per household was used to convert CA DOF and Moody's population projections into housing units since that is the unit used by the SF Planning Department. The SF Planning Department's historical housing unit estimates and projected growth reflect the total inventory of the housing stock (i.e., occupied and unoccupied units). While the CA DOF and Moody's population projections are converted into housing units and start with a lower number of housing units than historical estimates since it only reflects occupied units.

Population projections from Moody's and CA DOF reflect a more conservative growth rate for San Francisco. Since CA DOF's projections are the lowest of these data sources when looking at year 2050, it could serve as a low end for scenario planning. In coordination with BAWSCA and their demand projections update, both SFPUC and BAWSCA will be aligned in using population projections from CA DOF as one of the additional demand scenarios.

Figure A-1: Historical and Projected Housing Growth by Source



Note: As stated above, the SF Planning's housing units reflect the total inventory of housing stock (i.e., occupied and unoccupied units). The CA DOF and Moody's population projections have been converted into housing units and only reflect the number of occupied units, which is why there is initially fewer housing units in 2025 compared to historical estimates.

2. Employment Growth

This section describes the employment growth projections considered for the sensitivity analysis.

San Francisco Planning Department

In addition to providing household projections, SF Planning also provides employment growth projections. These projections are also based on the regional projections from ABAG and MTC's Plan Bay Area. The average annual growth rate of SF Planning's employment projections is 0.5%.

Historical Growth

Like estimating future population based on historical estimates, future employment was also estimated based on historical job estimates. The SFPUC used job estimates published by the California Employment Development Department (CA EDD) for the years 2000 through 2023 (the most current estimate available for the CCSF).[23] A linear regression was applied to project the number of jobs through year 2050, and this produced an average annual growth rate of 1.3%.

Moody's

Employment projections from Moody's were also used for sensitivity analysis. These projections were the lowest of the three considered. The average annual growth rate of the Moody's employment projection is 0.5%.

State of California

SFPUC explored datasets published by two state agencies: CA DOF and CA EDD. While the CA DOF conducts economic projections, they do not have employment growth projections by county. The CA EDD publishes 10-year occupational employment projections.[24] However, the most recent projection available was for 2022-2032, which does not cover the UWMP planning period. Moreover, even if the growth rate was assumed to remain constant through 2050, these employment projections were not available by city or county. The projections are only available by state or by metropolitan area where data for the County of San Francisco is combined with the County of San Mateo.

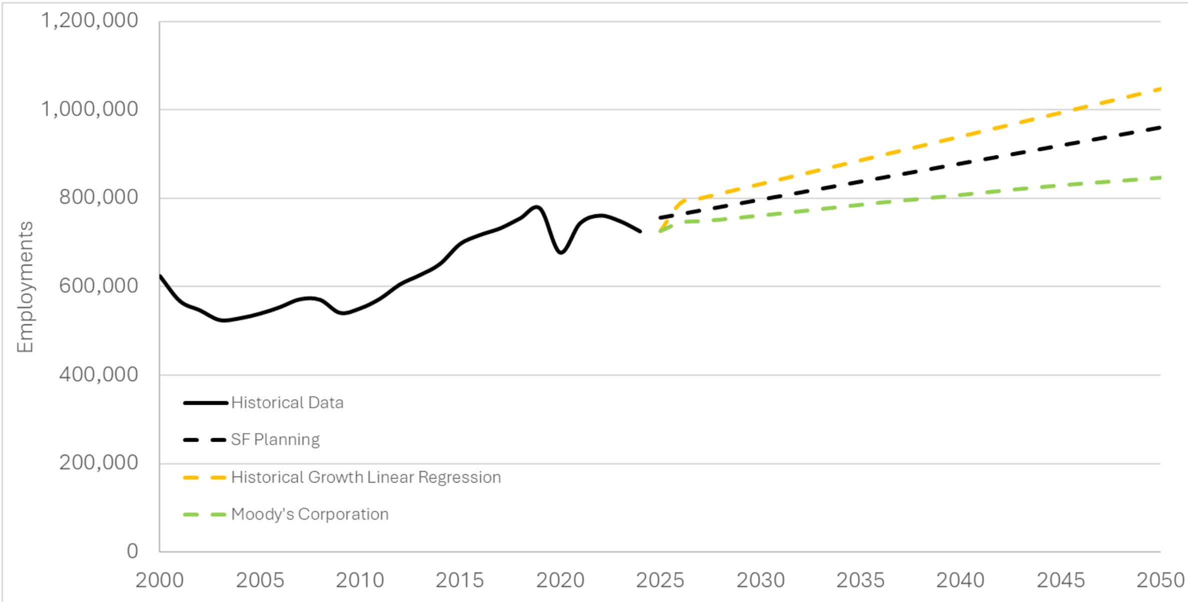
Analysis of Employment Growth Inputs

Three sources of employment growth projections were considered for the sensitivity analysis. The SF Planning Department's projections have been and continue to be used for the UWMP. Additionally, the SFPUC applied a linear regression to historical job estimates which produced the highest growth rate of the three options. A 20+ year time horizon was used for this linear regression since a shorter time frame, particularly 2008-2023, would have yielded a higher average annual growth rate since the beginning of that period was during the Great Recession where the number of jobs steadily increased until the COVID-19 pandemic. Moody's employment forecast was the third data source considered for this analysis and had the most conservative growth of all the options, which could serve as a low end for scenario planning. Refer to Figure A-2 for a comparison of each of the employment projections.

[23] https://data.ca.gov/dataset/current-employment-statistics-ces-2

[24] https://labormarketinfo.edd.ca.gov/data/employment-projections.html

Figure A-2: Historical and Projected Employment by Source



3. Housing Density

The future proportion of single family housing units to multi-family housing units was explored in BAWSCA's 2022 Regional Water Demand and Conservation Projections Update. The SFPUC relies on household growth data from the SF Planning Department and defers to their guidance for a breakdown of single family and multi-family households. In a memo[25] provided by the SF Planning Department, the number of single family homes is expected to stay the same over the next 20 years. This assumption has been incorporated into the single family residential and multi-family residential demand projections for all scenarios.

4. Water Conservation

The SFPUC has an established data-informed process to evaluate and determine the suite of conservation measures to implement in its retail service area and uses conservative, industry-accepted methods and models to estimate water savings. The SFPUC implements some measures, such as public education, that do not have modelled water savings due to the lack of industry standards that make estimating savings difficult. The SFPUC draws on many sources to periodically review and update its conservation program offerings with the goal of maintaining a balanced and effective mix of program measures considered reasonably feasible to implement. Since 2005, the SFPUC has evaluated and implemented over 80 measures and continues to explore new measures. For more details about these measures, see SFPUC's most recent Retail Water Conservation Plan.[26] The SFPUC's conservation

[25] Memo dated 10/27/2020. Re: Projected of growth for San Francisco 2020-2040

[26] The SFPUC's Retail Conservation Plan is available at https://www.sfpuc.gov/about-us/policies-plans/urban-water-management-plan.

model output used for the 2025 UWMP assumes continued implementation of a comprehensive conservation program and generally reflects the upper end of what the SFPUC anticipates achieving.

Projections are more likely to overestimate rather than underestimate customer participation and water savings, based on an analysis of projections and actual participation rates for the last 10 years. Achieving savings greater than SFPUC projections is deemed less likely, but not impossible. For this reason, the sensitivity analysis looked at the impact of further increasing conservation savings to up to 5% more and up to 10% under the standard conservation model output. A small amount of additional projected savings potentially could be assumed by counting savings from implemented measures not modeled, adding new potential measures not yet envisioned for which savings could be modeled, increasing incentive amounts, and reducing eligibility requirements for some existing measures where feasible. Conversely, a small to moderate decrease in projected savings potentially could be assumed if customer participation in some conservation programs declines, and overall demand continues to harden.

An additional 5% increase in water conservation savings translates to a decrease in total demand by about 0.1 MGD. Meanwhile, a decrease of 10% savings from the standard conservation model output translates to an increase in total demand by about 0.2 MGD. The impact from achieving slightly more or less water conservation savings than what the conservation model predicts equates to a small change in overall demand. Changes to the standard conservation model output were explored for this sensitivity analysis but were ultimately not included in the additional demand scenarios.

5. Climate Change

The econometric model uses the Representative Concentration Pathways 4.5 climate change scenario in its demand projections. This climate change scenario is associated with California's Fourth Climate Change Assessment and the data were retrieved from the Cal-Adapt portal.

6. SFPUC Rates

Water, wastewater, and stormwater rates from the approved 10-Year Financial Plan (February 2025)[27] were incorporated into the water demand model. Because the SFPUC Finance Division does not currently have alternative rate scenarios, the water rates in the approved 10-year Financial Plan were used for all demand scenarios.

7. Vacancy Rate

The SFPUC examined whether to apply a vacancy rate for each of the housing growth projections. The SF Planning Department's housing growth projections come from the recently updated Housing Element 2022 Update which projects the number of housing units, not households. If an 8.6% vacancy

[27] https://www.sfpuc.gov/about-us/policies-plans/financial-plans-and-policies

rate[28] was applied to multi-family housing units, this could potentially reduce demands by about 3.2 mgd in 2050. However, for purposes of the UWMP, the SFPUC assumes that all housing units are fully occupied. For historical growth and CA DOF projections, this data are population, not housing units, so a vacancy rate is not applicable.

8. Additional Retail Demands

As described previously, the SFPUC's econometric model estimates demand for single family, multi-family, commercial, and industrial accounts. Retail demands that are not modeled include dedicated irrigation, municipal, suburban retail, and water loss.

Historical irrigation demands have fluctuated between 1.3 to 1.9 MGD in the past five years. During the 2020-2023 drought when the SFPUC declared a water shortage emergency and requested customers to reduce wasteful water use, the SFPUC saw a decrease in irrigation demand from 1.9 to 1.3 MGD between FY 2020-21 to FY 2022-23. Since then, irrigation demand has steadily increased to 1.5 MGD in FY 2024-25. The quantity of dedicated irrigation accounts increases yearly as new projects with landscaping come online. Between 2020 and 2025 the quantity of accounts increased by about 5%, and the SFPUC anticipates the number of dedication irrigation accounts will continue to grow at a similar pace in the future. At the same time, demands from these accounts are also anticipated to use water more efficiently due to local and state water conservation regulations, such as the SFPUC's Water Efficient Irrigation regulations, and State Water Resources Control Board's "Making Conservation a California Way of Life" volumetric standards for efficient outdoor irrigation, and bans on irrigating non-functional turf. Continued efforts to seek greater landscape water efficiency are likely to offset the yearly increase in irrigation accounts, resulting in an estimated steady future demand for this sector over the coming years.

Municipal and suburban retail demands have varied within 1 MGD in the past five years. One of the SFPUC's suburban retail customers, Groveland Community Services District, prepares an Urban Water Management Plan and has prepared water demand projections for their service area. These projections are incorporated into the SFPUC's suburban retail demand projections for all demand scenarios.

Water loss and other demands include water losses from water main breaks, leaks, and unbilled authorized consumption, e.g., water used for firefighting, water main flushing, etc. These demand are projected to be equal to the latest three-year annual average (FY 2022-23 through FY 2024-25) to align with the State Water Resources Control Board's water loss regulations.

Table A-2 shows historical and projected water consumption for these demands based on the assumptions described above.

[28] State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State — January 1, 2021-2025. Sacramento, California, May 2025.

Table A-2: Historical and Projected Demands for Other Retail Types

	Irrigation	Municipal	Suburban Retail	Water Loss and Other[1]
FY 2022-23	1.3	1.9	3.7	7.4
FY 2023-24	1.4	2.0	3.8	8.4
FY 2024-25	1.5	2.2	4.0	7.6
FY 2029-30	*1.5*	*2.2*	*4.1*	*7.8*
FY 2034-35	*1.5*	*2.2*	*4.2*	*7.8*
FY 2039-40	*1.5*	*2.2*	*4.3*	*7.8*
FY 2044-45	*1.5*	*2.2*	*4.4*	*7.8*
FY 2049-50	*1.5*	*2.2*	*4.5*	*7.8*

[1] Other water demands include authorized unbilled unmetered consumption or water that is used in activities such as firefighting, water or sewer main flushing, street cleaning, etc.

C. Sensitivity Scenario Demand Projections

Three demand scenarios were generated from modifying the various inputs described above. These scenarios are described below and summarized in Table A-3.

UWMP Scenario

The UWMP Scenario uses housing and employment growth projections provided by the local land use authority, the SF Planning Department. The SF Planning Department's growth projections are informed by regional growth estimates from ABAG and MTC's Plan Bay Area 2050+. This scenario reflects the upper end of the range of three demand scenarios. Results from this scenario will be reflected in 2025 UWMP.

Historical Growth Scenario

The first additional demand scenario to the UWMP Scenario is the Historical Growth Scenario. This scenario is based on the historical population estimates from the California Department of Finance and historical employment estimates from the California Employment Development Department. A linear regression was applied to each data set to project population and employment growth through 2050 in San Francisco.

DOF / Moody's Scenario

This scenario uses the population projections from the California Department of Finance and employment projections from Moody's Analytics. The lower forecasts of housing and employment result in lower forecasts of water demand compared to the UWMP Scenario and Historical Growth Scenario.

Table A-3: Water Demand Scenarios and Corresponding Data Sources

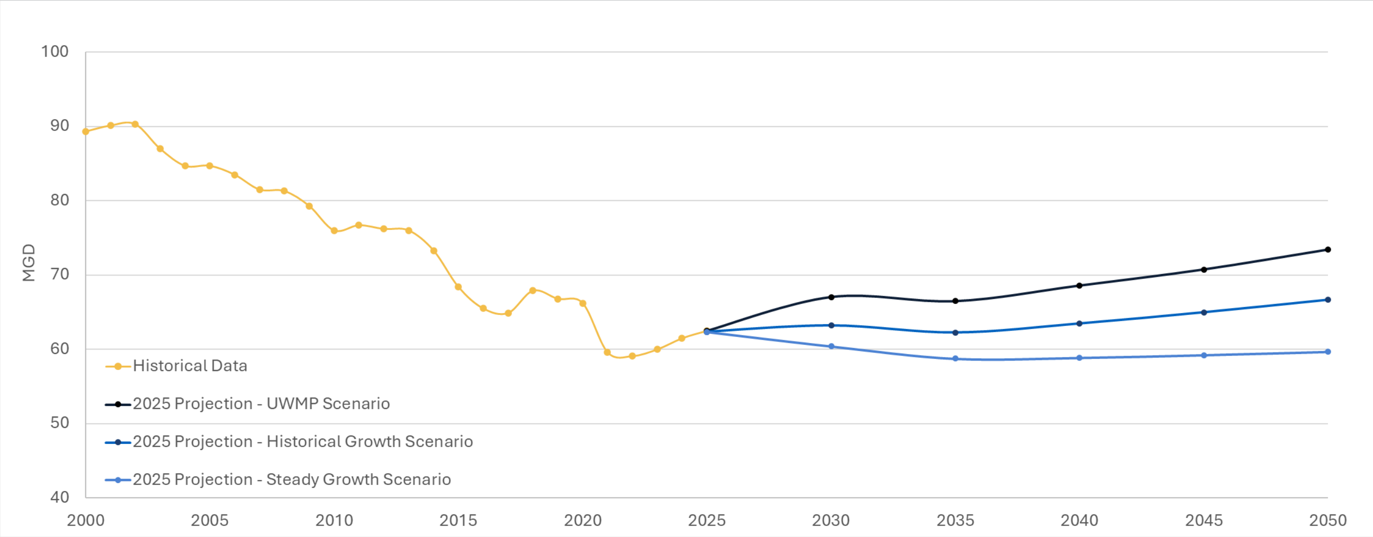
Variable	UWMP Scenario	Historical Growth Scenario	DOF / Moody's Scenario
Housing Growth and Growth Rate	SF Planning 1.1%	Historical Growth 0.4%	California Department of Finance 0.1%
Employment Growth and Growth Rate	SF Planning 0.5%	Historical Growth 1.3%	Moody's 0.5%
Housing Density	SF Planning Department		
Water Conservation Savings	Conservation Model Output		
Climate Change	Representative Concentration Pathway 4.5		
Water Rates	SFPUC's 10-Year Financial Plan		

The projected demands for the three scenarios are shown in Table A-4 and are displayed as a graph in Figure A-3.

Table A-4: Projected Retail Demands (MGD) by Scenario

UWMP Scenario						
Single Family Residential	12.6	13.3	13.0	13.0	13.0	13.0
Multi-Family Residential	22.2	26.2	27.1	28.7	30.4	32.2
Commercial and Industrial	12.4	12.0	10.7	11.1	11.5	12.2
Others	15.3	15.6	15.7	15.8	15.9	16.0
Total	*62.5*	*67.0*	*66.5*	*68.6*	*70.7*	*73.4*
Historical Growth Scenario						
Single Family Residential	12.6	12.2	11.9	11.9	11.9	11.9
Multi-Family Residential	22.2	23.0	22.9	23.5	24.1	24.7
Commercial and Industrial	12.4	12.4	11.8	12.4	13.2	14.1
Others	15.3	15.6	15.7	15.8	15.9	16.0
Total	*62.5*	*63.2*	*62.3*	*63.5*	*65.0*	*66.7*
DOF / Moody's Scenario						
Single Family Residential	12.6	12.2	11.9	11.9	11.9	11.9
Multi-Family Residential	22.2	21.4	20.9	20.9	20.8	20.8
Commercial and Industrial	12.4	11.3	10.3	10.4	10.7	11.0
Others	15.3	15.6	15.7	15.8	15.9	16.0
Total	*62.5*	*60.4*	*58.8*	*58.9*	*59.2*	*59.7*

Figure A-3: Projected Water Demand by Scenario



This page intentionally left blank.

San Francisco Water Power Sewer

Services of the San Francisco Public Utilities Commission

APPENDIX D

2025 Conservation Tracking Model Summary

2025 URBAN WATER MANAGEMENT PLAN

for the City and County of San Francisco

PUBLIC REVIEW DRAFT

March 2026

Prepared by: The San Francisco Public Utilities Commission

This page intentionally left blank.

SFPUC Conservation Tracking Model

Water and Energy Savings Specifications for Conservation Program Measures

David Mitchell, M.Cubed

Last Updated: 02-03-2026

Overview

The SFPUC Conservation Tracking Model is a tool developed to track conservation program activity, water savings, and costs and benefits for SFPUC's retail service area conservation programs. The model is a customized version of the Alliance for Water Efficiency's (AWE) Water Conservation Tracking Tool, an Excel-based water conservation tracking model with more than four hundred registered water utility users throughout North America. In 2014, the SFPUC customized the AWE Conservation Tracking Tool for its retail service area and began using it to forecast water savings from conservation measures.

The purpose of this Water and Energy Savings Specifications for Conservation Program Measures Technical Memorandum is to document the assumptions and methodologies used to estimate water savings for every measure in the SFPUC's Conservation Tracking Model and key updates made over time. This document reflects all measures with modeled water savings included in the Conservation Tracking Model, including measures the SFPUC implements now or plans to in the next five years, implemented in the past, and ones SFPUC has evaluated and not implemented and may or may not do so in the future. It does not reflect conservation measures the SFPUC provides or provided in the past that don't have established or sufficient water-savings methodologies.

History of SFPUC Conservation Forecast Modelling

The SFPUC developed its first model in 2004 to forecast both in-City retail water demands and water savings from conservation measures. The SFPUC used estimated conservation water savings generated by this model to develop its 2004 and 2011 conservation plans. The SFPUC migrated from using this combined demand/forecast model in 2014, and started using a separate econometric demand model originally developed by The Brattle Group to estimate retail demands and to the SFPUC Conservation Tracking Model to estimate water savings from conservation measures. Most recently, in 2025, the SFPUC updated its econometric demand model for its retail service area for use in preparing its 2025 Urban Water Management Plan and for providing updated demand estimates for its 2025 Retail Conservation Plan.

Model Structure

The Conservation Tracking Model is an Excel-based model with an extensive Visual Basic backend. Using the model requires completing Model Setup, Program Specification, and Annual Activity data input tasks. Each data input task is contained on a separate worksheet in the model.

Model Setup consists of providing the model with the baseline forecast of water demand, as well as other basic system information the model uses to calculate the costs and benefits of conservation programs. The baseline water demand forecast comes from the econometric demand models. Setup also includes providing the latest estimates of actual population, housing, and employment which are used to update the estimates of passive water savings to date.

Program Specification consists of parameterizing the conservation programs in the model. The model can hold up to 200 separate programs. Program parameters are grouped into five categories: water saving parameters, utility cost parameters, participant cost parameters, participant non water benefits parameters, and plumbing code parameters. The latter are used to specify interaction effects with plumbing codes to avoid double counting water savings jointly produced by plumbing codes and conservation programs. In terms of forecasting conservation program water savings, the most important parameters are the water savings parameters and the plumbing code interaction parameters.

Annual Activity is simply the number of units of activity that have been done (in the case of historical years) or are expected to be done (in the case of future years). The user enters historical and projected annual activity for each conservation program that was specified during the Program Specification step. For toilets, urinals, and clothes washers, the model includes fixture inventory modules to keep track of how many fixtures have been converted to efficient fixtures due to plumbing codes and conservation programs to ensure the user does not specify levels of fixture replacement that are physically infeasible.

Once the three data input tasks have been completed the model results can be reviewed. Model results are summarized into three categories: (1) program water savings, (2) retail water demand, and (3) costs and benefits.

- Program water savings are the projected annual water savings from each specified conservation program through 2050. Results can be grouped by program category and customer class or shown individually.

- Retail demand results summarize the baseline annual demand forecast with plumbing code and conservation program adjustments through 2050. It is grouped by customer class and shown separately for the in-city and suburban parts of SFPUC's retail service area. Results can be shown in MGD or acre-feet. Gross per capita and residential per capita water use are also reported.
- Costs and benefits of conservation are reported for the utility and program participant perspectives. Unit costs, net present value, and benefit-cost ratios can be reported for the totality of all programs, for individual program categories (e.g. toilet replacement programs), or for individual programs. In addition to financial benefits and costs, the model calculates expected reductions in associated energy use and greenhouse gas emissions.

Model inputs can be saved as scenarios. This allows the model to simultaneously hold more than one set of data inputs. For example, a user could specify scenarios for alternative baseline population and demand forecasts or for alternative levels of conservation program investment. There is no practical limit to the number of scenarios the model can hold.

Summary of Key Updates since 2015

2015 Updates

The conservation program savings presented in SFPUC's 2011 Conservation Plan were developed with the SFPUC's original Retail Demand Model not the Conservation Tracking Model. While the Conservation Tracking Model can be calibrated to replicate the 2011 estimates, the final estimates developed for the 2015 Conservation Plan, which were developed with the Conservation Tracking Model, were generally lower after 2020 than was presented in the 2011 Plan for three main reasons:

- The SFPUC undertook a review of the water saving estimates and assumptions and made several adjustments, including to savings estimates for clothes washers and toilets, both of which were lowered to account for new efficiency standards affecting the long-term savings potential of these programs.
- The 2015 Plan updated the end dates for toilet and clothes washer incentives due to high fixture saturation levels.

- The 2015 Plan focused mainly on the next five years, reflecting that beyond that horizon, there is much less certainty regarding what conservation programs SFPUC will find most beneficial and cost-effective to implement.

2020 Updates
In 2020, the SFPUC made the following changes to the model:

- Revised future participation levels for several measures to better reflect current trends.
- Added several new conservation measures.
- Adjusted the water savings assumptions of several existing measures.
- Updated the water savings module for clothes washer efficiency standards to align it with the approach used in Version 4 of the Alliance for Water Efficiency's Water Conservation Tracking Tool.
- Incorporated the City of San Francisco Planning Department's current population and housing estimates.
- Removed the calculation of plumbing code water savings for new development (post 2020) because they are already embedded in SFPUC's updated retail demand projections.

These updates were based on analysis of historical program participation, updated fixture saturation rates, and new empirical and other water-savings studies and data available since 2015. This document reflects the assumptions and specifications used in the SFPUC's Conservation Tracking Model for purposes of estimating water savings for the SFPUC's 2020 Retail Conservation plan.

2025 Updates
In 2025, the following updates to the model were made:

- Revised the toilet fixture saturation module to account for replacement of 1.6 gpf toilets with 1.28 gpf or less toilets by SFPUC toilet replacement programs.
- Updated savings assumptions of AMI leak alert measures to align with savings estimates reported in the February 2, 2024, technical memorandum: *Water Savings Assessment of SFPUC Leak Alert Programs*.
- Updated savings assumptions for HET replacement programs to account for replacement of existing toilets with HET toilets with flush ratings < 1.28 gpf.
- Added new programs to the model, including direct install and rebate programs to replace 1.6 gpf toilets with ultra-high-efficiency toilets with flush ratings of <= 1.0 gpf; and multi-family and non-residential landscape irrigation timer rebate programs.
- Incorporated into the model updated implementation costs provided by SFPUC for 39 programs.
- Incorporated projected annual implementation levels through 2050 provided by SFPUC for 38 programs.
- Incorporated the estimates of 2025 population, housing, and employment; estimates for 2020 population were revised.

2025 Population and Housing Estimates

SFPUC expects new construction to be built at code and generate no additional passive savings. All future passive savings will come from existing stock. As such, population and housing estimates for 2025 were updated, as described below, and then held constant for the remainder of the planning horizon.

Population Estimate Update

Updated 2025 population of 842,027 was input based on Department of Finance E-5 Housing and Population Estimates (dated January 2025). Residential population in 2025 was updated from the same source. Additionally, the 2020 total population estimate of 941,269 provided by SF Planning was retroactively revised to 873,965 based on the 2020 estimated value from Department of Finance E-5 Housing and Population Estimates (dated January 2025).

The conservation model's original and updated population projections are shown in Table 1. As shown in this table, the population stops growing after 2025 to reflect no additional passive savings to be generated from future growth.

Table 1: Population Projection Update

	Total Population			Residential Population		
Year	2020 Model	2025 Model	% Difference	2020 Model	2025 Model	% Difference
2005	780,187	780,187	0.0%	756,678	756,678	0.0%
2010	805,235	805,235	0.0%	780,971	780,971	0.0%
2015	857,508	857,508	0.0%	831,995	831,995	0.0%
2020	941,269	873,965	-7.2%	913,031	840,986	-7.9%
2025	941,269	842,027	-10.5%	913,031	811,717	-11.1%
2030	941,269	842,027	-10.5%	913,031	811,717	-11.1%
2035	941,269	842,027	-10.5%	913,031	811,717	-11.1%
2040	941,269	842,027	-10.5%	913,031	811,717	-11.1%
2045	941,269	842,027	-10.5%	913,031	811,717	-11.1%
2050	941,269	842,027	-10.5%	913,031	811,717	-11.1%
Source: 2020 total population from San Francisco Planning Department, adjusted to residential population based on 3% group quarters (DOF E-5 and P-4)						

Household Projection Update

Total housing units were sourced from San Francisco Planning's 2024 Housing Inventory. This value is assumed to be an estimate of total constructed housing units as opposed to occupied housing units.

Occupied single-family housing units in 2025 were set equal to the number of single-family residential accounts in the SFPUC's billing system as of June 2025. This includes the number of accounts with the service agreement type residential single family (RES-SWTR), regardless of dwelling unit count, and the service agreement type of residential combination service (COMBO-R) with 1 dwelling unit. Occupied single-family housing units for 2030 and beyond were kept the same as 2025.

Total 2025 housing units from the Planning Department were adjusted to estimate occupied housing units using a vacancy rate of 11.25%, which is an average of the last two estimates provided by the ACS 1-year estimates for the City of San Francisco from 2023 (11.03%) and 2024 (11.48%). Total occupied multi-family housing units in 2025 were estimated by subtracting the number of occupied single-family housing units in 2025 from the total 2025 occupied housing units.

Calculation of Plumbing Code Water Savings

The Conservation Tracking Model calculates the water savings associated with plumbing codes and appliance efficiency standards using models of fixture inventory coupled with usage assumptions. These savings are commonly referred to as passive water savings because they occur regardless of actions taken by the utility. The Tracking Model includes passive savings models for residential toilets, showerheads, and clothes washers, and non-residential toilets, urinals, hotel showerheads, and coin-op clothes washers.

It is important to emphasize that the passive savings estimates do not actually impact the model's estimates of final water demand. This is because the econometric demand model's baseline demand forecasts used in the Tracking Model are net of passive water savings. However, the econometric forecast does not generate an explicit forecast of passive water savings because the adjustment for passive savings is enacted through the model's trend term. Because SFPUC desired explicit estimates of passive water savings, modules for estimating these savings were included in the Conservation Tracking Model. These estimates are added to the econometric demand model's baseline forecast before it is used in the Conservation Tracking Model so that they can be represented explicitly in the Conservation Tracking Model. It is the econometric demand model's baseline forecast adjusted for passive savings that is entered on the conservation Model Setup worksheet. The adjusted baseline forecast is:[1]

Adjusted Baseline Forecast = Econometric Model Baseline Forecast + Passive Water Savings

The final demand forecast generated by the Conservation Tracking Model is then:

Final Demand Forecast = Adjusted Baseline Forecast – Passive Water Savings – Program Water Savings

This is also equal to:

Final Demand Forecast = Econometric Model Baseline Forecast – Program Water Savings

This means the only determinants of the final demand forecast are the Econometric Model Baseline Forecast and the forecast of programmatic water savings from future implementation of SFPUC conservation programs. While the passive savings forecast is useful because it provides an estimate of how much demand reduction can be ascribed to plumbing codes and appliance standards, it does not actually affect the final estimate of future demand.

[1] The passive water savings adjustment also includes water savings expected to be realized after 2015 from the historical implementation of SFPUC conservation programs prior to the start of the Econometric Model's baseline forecast. This is done to prevent the model from double counting these water savings.

Following are descriptions of how passive savings are calculated for each fixture/appliance category. The SFPUC Plumbing Fixture Population and Efficiency Saturation Estimates Technical Memorandum issued on January 13, 2014 and included in Appendix A of the 2015 Retail Conservation Plan and the updated saturation estimates memo dated August 19, 2019, and included in appendices of the 2020 Retail Conservation Plan provide more details on fixture population and saturation estimates.

Residential Toilets

The population of residential toilets is based on available estimates of actual single and multi-family housing units. These estimates are multiplied by the average number of toilets per dwelling unit, which are estimated from recent American Housing Survey data. The model uses an average of 2.22 and 1.26 toilets per dwelling unit for single and multi-family housing, respectively. Toilets installed in new housing constructed between 1991 and 2013 are assumed to be ULFT (1.6 gpf). Toilets installed in new housing constructed after 2013 are assumed to be HET (1.28 gpf). Toilets in existing housing constructed before 1991 are assumed to have an average flush volume of 3.5 gpf. Toilets in existing housing are assumed to be replaced at an annual rate of 3.1% per year. This is the average rate of residential toilet replacement reported in studies done by EBMUD and SCVWD. Existing toilets replaced between 1991 and 2013 are assumed to be replaced by ULFTs. Existing toilets replaced after 2013 are assumed to be replaced by HETs. Using this information, the model calculates the average flush volume for the inventory of new and existing toilets for each year between 1990 and 2064. Water savings per flush is calculated relative to the average flush volume in 1990. Average savings per flush is equal to the average flush volume in 1990 less the average flush volume in each year after 1990. Average savings per flush is multiplied by the estimated number of flushes per year to estimate annual water savings. The estimated number of flushes per year is equal to the residential population multiplied by the average daily per capita flush rate multiplied by 365. The residential population is derived from SFPUC's service area population forecasts. The average daily per capita flush rate of 4.8 is taken from the results for San Francisco reported in the 2011 California Single Family Water Efficiency Study.

Non-Residential Toilets

The population of non-residential toilets for the period 1990-2012 is taken from the Fixture Saturation Task Memo. The population of non-residential toilets for the period 2013-2064 is a linear extrapolation based on the forecast of service area population. The same assumptions used for residential toilets regarding flush volume of new toilets and replacement rate of existing toilets are used for non-residential toilets. The average flush volume of the toilet inventory and the water savings per flush relative to 1990 are calculated the same way as for residential toilets. Average savings per flush is multiplied by the estimated number of flushes per year to estimate annual water savings. Vickers (2001) estimates annual flushes by multiplying daily flushes by a 260-day work year. Male workers are assumed to flush toilets (as opposed to urinals) an average of one time per day while female workers are assumed to flush toilets an average of three times per day. Male workers are assumed to comprise 54% of the labor force, per City of San Francisco (2009). Total employment is taken from SFPUC's employment forecast.

Non-Residential Urinals

Based on an analysis of DBI data, the ratio of urinals to toilets is estimated to be 0.15. This ratio is applied to the estimated stock of non-residential toilets to estimate the stock of urinals. Urinals installed before 1992 are assumed to have an average flush volume of 2 gpf. Urinals installed between 1992 and 2013 are assumed to have an average flush volume of 1 gpd. Urinals installed in 2014 are assumed to have a flush volume of 0.5 gpf. Urinals installed after 2014 are assumed to have a flush volume of 0.125 gpf. Urinals are assumed to have the same replacement rate as toilets. The average flush volume of the urinal inventory and the water savings per flush relative to 1990 are calculated the same way as for residential and commercial toilets. Average savings per flush is multiplied by the estimated number of flushes per year to estimate annual water savings. To calculate total flushes per year, male workers are assumed to have a daily flush rate of 2, per Vickers (2001). Male workers are assumed to comprise 54% of the labor force, per City of San Francisco (2009). Total employment is taken from SFPUC's employment estimate.

Residential Showerheads

The population of residential showerheads is based on available estimates of actual single and multi-family housing units. These forecasts are multiplied by the average number of showerheads per dwelling unit, which are estimated from recent American Housing Survey data. The model uses an average of 1.34 and 1.21 showerheads per dwelling unit for single and multi-family housing, respectively. Showerheads installed in new housing constructed before 2005 are assumed to have an average flow rate of 2.3 gpm. Showerheads installed in new housing constructed between 2005 and 2017 are assumed to have an average flow rate of 2.0 gpm. Showerheads installed after 2017 are assumed to have an average flow rate of 1.8 gpm. Showerheads in existing housing are assumed to be replaced at an annual rate of 12% per year, per the Alliance for Water Efficiency. Using this information, the model calculates the average showerhead flow rate for the inventory of new and existing showerheads for each year between 2005 and 2064. Average savings per minute is equal to the average flow rate in 2005 less the average flow rate in each year after 2005. Annual water savings is calculated as the product of the average flow rate and the annual number of minutes for showering. The annual number of minutes for showering is equal to the average number of shower events per household per day multiplied by the average shower duration in minutes multiplied by the number of households multiplied by 365. An average of 2 shower events per day and an average duration of 9 minutes per shower event are taken from the results for San Francisco from the 2011 California Single Family Water Efficiency Study.[2] The number of residential housing units is taken from SFPUC's housing forecast.

Hotel Showerheads

The population of hotel showerheads is based on an estimate of the total number of hotel rooms in San Francisco. The model assumes one showerhead per room. Showerheads installed before 2005 are assumed to have an average flow rate of 2.5 gpm. Showerheads installed between 2005 and 2017 are assumed to have an average flow rate of 2.2 gpm. Showerheads installed after 2017 are assumed to have an average flow rate of 1.8 gpm. Showerheads are assumed to be replaced at an annual rate of 12% per year, per the Alliance for Water Efficiency. Using this information, the model calculates the average showerhead flow rate for the inventory of new and existing showerheads for each year between 2005 and 2064. Average savings per minute is equal to the average flow rate in 2005 less the average flow rate in each year after 2005. Annual water savings is calculated as the product of the average flow rate and the annual number of minutes for showering. The annual number of minutes for showering is equal to the average number of shower events per occupied room per day multiplied by the average shower duration in minutes multiplied by the number of occupied rooms multiplied by 365. An average of 1.34 shower events per day per occupied room and an average duration of 10 minutes per shower event are taken from the AWWARF Commercial End Uses of Water Study. The average hotel occupancy rate is based on a review of various estimates published on the internet of hotel occupancy in San Francisco.

[2] The estimate of average number of shower events per day for San Francisco from this study is used directly in the single-family residential calculation. For the multi-family calculation, it is scaled by the ratio of multi-family to single-family persons per household to consider the lower density in multi-family housing.

Residential Clothes Washers

The stock of residential clothes washers is based on SFPUC's housing forecast and the average number of washers per dwelling unit. The average number of washers per dwelling unit is 0.937 for single-family and 0.41 for multi-family. The multi-family estimate includes both in-unit and common room washers. Existing washers are replaced at an annual rate of 9%, which is equivalent to assuming washers have an average useful life of 11 years, which is consistent with industry estimates. When a washer is replaced, it is replaced with either a conventional or high-efficiency (Energy Star) washer according to a forecast of market shares informed by market analyses done to support the setting of federal efficiency standards for washers. Water factors for new conventional and high-efficiency washers change over time in the model. Water factors for conventional washers are based on federal energy standards while water factors for high-efficiency washers are based on EPA Energy Star specifications. The average water factor for the stock of residential washers adjusts over the course of the forecast based upon the rate at which existing washers are replaced and new washers are added to the inventory. The model's accuracy in predicting water use by clothes washers is checked against water use benchmarks for 1997, 2007, and 2012 taken from residential end use studies. Washer utilization in single-family households is drawn from the San Francisco End Use of Water Study. Washer utilization in multi-family households scales down the single-family estimate to account for smaller average household size. Water savings are calculated relative to 2005 and are equal to the difference in water use assuming average washer efficiency in 2005 versus average washer efficiency in the forecast year.

Coin-op Clothes Washers

Estimates of passive water savings for coin-op clothes washers use the same methodology used for residential clothes washers. The natural replacement rate for coin-op washers is the average of estimates developed by the Alliance for Water Efficiency (11.1%) and the Department of Energy (13.3%). The stock of coin-op clothes washers is based on an internet search of coin-op washer facilities in San Francisco. The average number of washers per coin-op facility is taken from the Fixture Saturation Task Memo. The average number of loads per day is taken from a PG&E study of coin-op washer water and energy consumption. The water factors for new and replaced washers are based on existing federal efficiency regulations for commercial clothes washers.

Calculation of Programmatic Water Savings

The Conservation Tracking Model calculates the water savings associated with a program as the product of the estimated water savings per unit of activity and the amount of activity completed. These savings are commonly referred to as active water savings because they result from the utility's direct investment in conservation programs intended to reduce demand. In other words, the savings result from the utility's active pursuit of demand reduction.

In the Tracking Model, the user specifies a starting unit water savings for each program. The behavior and duration of the unit savings overtime can then be adjusted with the useful life, annual decay, and plumbing code interaction parameters. When the annual decay and plumbing code interaction parameters are both set to 0, annual savings is equal to the product of the initial unit savings and the amount of activity. Annual savings accrue until the measure's useful life is reached, after which annual savings are assumed to be zero. Thus given initial unit savings S_0, measure useful life u, and activity of A_s in year s, water savings in any year $t \geq s$ are:

$$S_t = A_s S_0 \; if \; t - s + 1 \leq u, 0 \; otherwise$$

When the annual decay parameter takes a value d in the range (0, 1], annual water savings in any year t ≥ s are:

$$S_t = A_s S_0 (1-d)^{t-s}\ if\ t-s+1 \leq u, 0\ otherwise$$

When the plumbing code interaction parameter takes a value p in the range (0, 1] and the plumbing code is in effect for any year t ≥ v, annual water savings in any year t ≥ s are:

$$S_t = \begin{cases} A_s S_0\ if\ u \geq t-s+1\ and\ t < v \\ A_s(1-p)^{t-s} S_0\ if\ t-s+1 \leq u\ and\ t \geq v \\ 0\ if\ t-s+1 > u \end{cases}$$

When the plumbing code interaction parameter takes a value p in the range (0, 1], the plumbing code is in effect for any year t ≥ v, and the annual decay parameter takes a value d in the range (0, 1], annual water savings in any year t ≥ s are:

$$S_t = \begin{cases} A_s S_0 (1-d)^{t-s}\ if\ t-s+1 \leq u\ and\ t < v \\ A_s(1-p)^{t-s} S_0 (1-d)^{t-s}\ if\ t-s+1 \leq u\ and\ t \geq v \\ 0\ if\ \ t-s+1 > u \end{cases}$$

The specification of these parameters are based on current state and federal plumbing codes and appliance standards and findings from empirical evaluations of conservation program performance, as compiled by the California Water Efficiency Partnership (CalWEP) and Alliance for Water Efficiency (AWE). The specific data sources and assumptions used to create the water savings and plumbing code specifications for each program are provided in the remainder of this document.

The model's toilet fixture inventory modules for single- and multi-family toilets also estimate water savings from the City's toilet retrofit-on-resale ordinance that started in 2009. These estimates rest on two simplifying assumptions: (1) 3.5+ gpf toilets are uniformly distributed across the housing stock and (2) each housing unit is equally likely to be put on the market for sale each year. Given these two assumptions, ROR toilet replacements in any year t ≥ 2009 are calculated as:

(Stock of 3.5+ gpf toilets at beginning of year – SFPUC toilet replacements) x housing resale rate

The model assumes ROR toilets are replaced with ULFTs prior to 2014 and HETs thereafter.

Program Water Savings Specifications

The remainder of this document presents the water savings specifications for each conservation measure included in the Conservation Tracking Model. Program specifications are grouped first by customer class and second by programs type.

Confidence in Estimates

The program water savings specifications utilize the best available information on water savings. Only measures with a sufficient level of confidence in the approach to estimating water-savings are included in the Tracking Model. The SFPUC implements a number of measures that are not included in the model that are likely to generate some water savings but for which there are insufficient empirical studies or standard engineering estimates to generate estimates with a reasonable level of confidence. For the measures included in the model there is a range of reliability of savings estimates. While all measures in the tool meet a base level of confidence, for established and widely deployed measures – e.g. toilet replacements -- there is strong empirical evidence on water savings from multiple empirical program evaluations. In other cases, less data is available or the program is so new that empirical performance data is limited or nonexistent. In these cases, the water savings estimates may be based on results of a single evaluation done elsewhere or they may be built up from utilization and flow rate assumptions – commonly referred to as engineering estimates.

A confidence score of 1, 2 and 3 is assigned to each program specification to indicate the level of confidence in the water savings specification. The confidence scores are subjective in the sense that they rely on professional judgement as to the quality and applicability of the data underlying the water savings specification.

Confidence Score	Criteria
1	Savings are based on well-designed empirical evaluations of program performance. The program is widely deployed by other water suppliers and water savings have been evaluated in multiple locations and contexts. Savings estimates are directly applicable or can reasonably be re-scaled to be applicable to SFPUC's service area.
2	Savings are based on simple empirics of program performance (e.g. a simple difference in means or difference-in-differences analysis). The program may not be widely deployed by other water suppliers and may not have been evaluated in multiple locations and contexts.
3	Empirical estimates of program performance are not available or are limited in their applicability to SFPUC's service area. Savings are based on engineering estimates relying on general assumptions about water use with and without the program intervention

Measure Summary Tables

The following tables summarize the measures in the model at the time of this update (August 2020). The tables provides:

- A brief description of each measure

- The unit savings estimate for the measure
- The basis for the estimate
- The expected annual water savings at the planned level of activity
- The confidence score for the water savings estimate

Link to Detailed Specifications
The measure IDs in the summary tables are hyperlinked to the measure's detailed specification. Ctr-clicking the specification ID will take the reader to the measure's detailed specification. Ctr-clicking the ID the detailed specification will take the reader back to the summary table.

Basis for Savings Estimates
The basis for the savings estimate is either:

Empirical Program Evaluations – the savings estimate is based on results from one or more empirical evaluations of water savings for similar programs. The empirical estimate may be adjusted to account for differences between the location(s) where the empirical evaluation was completed and SFPUC's service area. Such adjustments are explained in the measure's detailed specification.

Engineering Estimate – the savings estimate is based on assumptions about fixture/device utilization and the water-using properties of the existing and new fixture/device. Engineering estimates are generally less reliable than estimates based on empirical program evaluations.

Annual Savings Estimates
The annual savings estimates show the expected water savings from one year of planned annual activity. These savings would be expected to persist over the useful life of the measure. Savings for most measures are assumed to be stationary, meaning the model does not assume the savings will change significantly over its useful life. However, this assumption is not adopted for every measure. For example, the model assumes savings from surveys are not constant, but rather decrease with time. The estimates in the summary tables do not reflect these adjustments. Therefore, the estimates should be viewed as upper-bounds for measures whose savings are expected to decrease over time.

Single-Family Measures

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
S1	Mandatory CAP Audit	Free site evaluation required for single-family residents to participate in the SFPUC's Community Assistance Program (CAP) for discounted water and sewer rates. Identify inefficient plumbing fixtures and leaks and suggest improvements.	17.5 gpd	Empirical Program Evaluations	Savings assumed to decay by 20% per year	2
S2	WaterWise Evaluation	Free indoor and outdoor site consultation: review consumption history, check plumbing fixtures and irrigation system components for leaks, determine fixture flow rates, recommend improvements, identify fixtures eligible for replacement through rebate programs, and provide standard repair parts for faulty toilets and free water-saving devices and materials. Customized report of findings sent to customer after visit.	17.5 gpd	Empirical Program Evaluations	Savings assumed to decay by 20% per year	2
S3a	Leak Alerts	SFPUC uses its AMI data to flag accounts that trigger continuous usage thresholds and alerts customers if a leak is suspected. SFPUC provides alerted customers with information on how to check for and repair common leaks	0.56 gpd	Empirical Program Evaluations	Unit savings is per active Single-Family account	1
S3b	Custom Water Use Report	Report with customers' water use information, comparison of water to similar properties, and customized information on ways to save.	8.4 gpd	Empirical Program Evaluations	Multiple empirical evaluations have found home water reports reduce water use by 5-6%. The model assumes 5.5%.	1
S4	1.5 GPM Showerhead Distribution	Up to two free showerheads (as part of measure S2 or in-person pickup from SFPUC) per household.	6.8 gpd	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed	2

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
					in 2018. Assumes 54% installation rate	
S5	1.5 GPM Showerhead Direct Install	Provides free installation of 1.5 gpm showerheads to single family residents. WaterWise Evaluation (S2) is a pre-requisite to this measure.	12.6 gpd	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed in 2018	1
S6	HET Rebate	Cash rebates of up to $125 to replace old toilets (3.5 gpf or more) with approved HETs (1.28 gpf or less).	20.9 gpd	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed in 2018. Direct install savings reduced by 25% to account for rebates used to replace ULF toilets and program free-riders. Program replaced existing toilets rated >= 1.6 gpf with toilets rated <= 1.0 gpf.	2
S7	CAP Direct Install thru SFPUC Funding	Free installation of HETs (1.28 gpf) for single-family residents who are also CAP participants. Only 3.5 gpf toilets replaced except a small number of old, poorly performing 1.6s. **Pre-requisite:** Mandatory CAP Audits (Measure S1).	27.8 gpd	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed in 2018. Program replaced existing toilets rated >= 1.6 gpf	1

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
					with toilets rated <= 1.0 gpf.	
S8	HET Direct Install (Non-CAP)	Same as measure S7 but is open to single-family residents who are not a CAP participant. Program did not start until 2016	27.8 gpd	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed in 2018. Program replaced existing toilets rated >= 1.6 gpf with toilets rated <= 1.0 gpf.	1
S8b	HET Direct Install (Non-CAP, replacing 1.6 gpf toilets)	Same measure as S8 but targets replacement of 1.6 gpf toilets	6.7 gpd	Engineering Estimate	Estimate prepared by SFPUC Staff	3
S9	HET Voucher	A voucher issued to eligible residents to replace their older toilets with HETs.	20.9 gpd	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed in 2018. Direct install savings reduced by 25% to account for rebates used to replace ULF toilets and program free-riders. Program replaced existing toilets rated >= 1.6 gpf	2

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
					with toilets rated <= 1.0 gpf.	
S11	CEE Tier 3 Washer Rebate (IWF 4.0)	Up to $100 rebate from SFPUC and $50 rebate from PG&E for a combined $150 rebate for a washer with 4 IWF or lower.	10.2 gpd	Engineering Estimate	Engineering estimate based on limited data on clothes washer market shares	3
S12	Energy Star Most Efficient Washer Rebate (IWF 3.5)	Up to $100 rebate from SFPUC and $50 rebate from PG&E for a combined $150 rebate for a washer with 3.5 IWF or lower.	11.6 gpd	Engineering Estimate	Engineering estimate based on limited data on clothes washer market shares	3
S16a	Rain Barrel Discount (replaced by S16c)	Subsidy program (through a vendor) that discounts the purchase cost of rain barrel and provides training.	0.8 gpd	Engineering Estimate	60 gal capacity. Estimated with AWE Rain Barrel Harvest & Application Model	3
S16b	Rain Cistern Discount (replaced by S16d)	Subsidy program (through a vendor) that discounts the purchase cost of cisterns and provides training.	2.4 gpd	Engineering Estimate	205 gal capacity. Estimated with AWE Rain Barrel Harvest & Application Model	3
S16c	Rain Barrel Rebate	In-house administered rebate program with required proof of install.	0.8 gpd	Engineering Estimate	60 gal capacity. Estimated with AWE Rain Barrel Harvest & Application Model	3
S16d	Cistern Rebate	In-house administered rebate program with required proof of install.	2.4 gpd	Engineering Estimate	205 gal capacity. Estimated with AWE Rain Barrel Harvest & Application Model	3

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
S18	Weather-Based Irrigation Controller Rebate	Financial rebate towards purchase and installation of a weather-based irrigation controller that uses site specific data and adjusts the irrigation time depending on the local weather.	3.7 gpd	Empirical Program Evaluations	Estimate is based on review of empirical evaluations of WBIC savings in Southern and Northern CA	2
S20	Device Distribution	Various water-efficient fixtures: bathroom aerators (0.5/1.0/1.5 gpm), kitchen/bathroom laminar (1.5 gpm), kitchen aerators (1.5/2.2 gpm), utility aerators (1.5/2.0/2.2), pre-rinse spray nozzles, garden spray hose nozzles, toilet flappers, toilet fill valves, and soil moisture meters.	3.3 gpd	Engineering Estimate	Based on review of end use studies and engineering estimates of savings potential of aerators and other devices	3
S21	ULFT to Ultra-High-Efficiency Toilet Direct Install	Same as S8 but targeting replacement of 1.6 gpf toilets.	6.7 gpd	Engineering Estimate	Estimate prepared by SFPUC Staff	3
S22	ULFT to Ultra-High-Efficiency Toilet Rebate	Same as S6 but targeting replacement of 1.6 gpf toilets.	5.0 gpd	Engineering Estimate	Estimate prepared by SFPUC Staff	3

Multi-Family Measures

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
M1	WaterWise Direct Installation Evaluation	Free, required site evaluation for multi-family residents to participate in the SFPUC's HET/Urinal Direct Install Program). Identify inefficient plumbing fixtures and leaks and suggest improvements.	10.6 gpd	Empirical Program Evaluations	Equal to indoor savings for S1 and S2. Savings assumed to decay by 20% per year	2
M2	WaterWise Evaluation	Free site consultation: review consumption history, check toilets for leaks, determine fixture flow rates, recommend improvements, identify fixtures eligible for replacement through rebate programs, provide standard repair parts for faulty toilets and free water-saving devices and materials.	10.6 gpd	Empirical Program Evaluations	Equal to indoor savings for S1 and S2. Savings assumed to decay by 20% per year	2
M3a	Small Multi-Family Leak Alert	SFPUC uses its AMI data to flag 2-5 dwelling unit multi-family accounts that trigger continuous usage thresholds and alerts customers if a leak is suspected. SFPUC provides alerted customers with information on how to check for and repair common leaks	1.6 gpd	Empirical Program Evaluations	Unit savings applies to all Multi-Family customers with 2-5 dwelling units	1
M3b	Large Multi-Family Leak Alert	Same as M3a but targeting multi-family accounts with more than 5 units	0.0 gpd	Empirical Program Evaluations	Savings not statistically different from 0 in program evaluation	1
M4	Showerhead Distribution	Buildings with 10 or less units are limited to one showerhead per unit. These buildings can pick up showerheads at the customer service counter. Also includes buildings that receive showerheads that are not installed during a Water Wise Evaluation. Buildings with over 10 units must schedule a WaterWise Evaluation (measure M2) in order to receive the free devices	6.8 gpd	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed in 2018. Assumes 54% installation rate	2
M5	Showerhead Direct Install	Free installation of showerheads. **Pre-requisite:** WaterWise Direct Install Evaluations (Measure M1)	12.6 gpd	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit	1

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
					programs completed in 2018	
M6a M6b	HET Rebate	Cash rebates of up to $125 per tank-style HET or up to $300 per flushometer valve HET to replace a high-flow toilet (3.5 gpf or more).	30 gpd	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed in 2018. Direct install savings reduced by 25% to account for rebates used to replace ULF toilets and program free-riders. Program replaced existing toilets rated >= 1.6 gpf with toilets rated <= 1.0 gpf.	2
M7a M7b	HET Direct Install	Free installation of tank-style (T) or flushometer valve (F) HETs. **Pre-requisite:** WaterWise Direct Install Evaluation (Measure M1)	38.6 gpd 38.6 gpd	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed in 2018. Program replaced existing toilets rated >= 1.6 gpf with toilets rated <= 1.0 gpf.	1
M7c	HET Direct Install (replacing 1.6 gpf toilets)	Same as M7 but targeting replacement of 1.6 gpf toilets	9.3 gpd	Engineering Estimate	Estimate prepared by SFPUC Staff	3

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
M8	HET Voucher	A voucher issued to eligible residents to replace their older toilets with HETs	30 gpd	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed in 2018. Direct install savings reduced by 25% to account for rebates used to replace ULF toilets and program free-riders. Program replaced existing toilets rated >= 1.6 gpf with toilets rated <= 1.0 gpf.	2
M9	HET Install thru On-Bill Financing	Partner with third-party vendors to find customers with remaining savings opportunity, sell them the program, and conduct the installation. The customer pays for the program through savings received through their water bill.	38.6 gpd	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed in 2018. Program replaced existing toilets rated >= 1.6 gpf with toilets rated <= 1.0 gpf.	1
M10	CEE Tier 3 Washer Rebate (IWF 4.0)	Rebate for coin-op, common area clothes washer with IWF of 4 or lower. (multi-family in-unit residential style washers are covered under SF measure)	126 gpd	Engineering Estimate	Engineering estimate based on limited data on clothes washer market shares	3

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
M17	Efficient Irrigation Timer Rebate	Financial rebate towards purchase and installation of a weather-based irrigation controller that uses site specific data and adjusts the irrigation time depending on the local weather.	3.7 gpd	Empirical Program Evaluations	Savings assumed to be same as single-family program (S18)	2
M20	Device Distribution	Various water-efficient fixtures: bathroom aerators (0.5/1.0/1.5 gpm), kitchen/bathroom laminar (1.5 gpm), kitchen aerators (1.5/2.2 gpm), utility aerators (1.5/2.0/2.2), pre-rinse spray nozzles, garden spray hose nozzles, toilet flappers, toilet fill valves, and soil moisture meters.	3.3 gpd	Engineering Estimate	Based on review of end use studies and engineering estimates of savings potential of aerators and other devices	3
M21	ULFT to Ultra-High-Efficiency Toilet Direct Install	Same as M7 but targeting replacement of 1.6 gpf toilets.	9.3 gpd	Engineering Estimate	Estimate prepared by SFPUC Staff	3
M22	ULFT to Ultra-High-Efficiency Toilet Rebate	Same as M6 but targeting replacement of 1.6 gpf toilets.	6.9 gpd	Engineering Estimate	Estimate prepared by SFPUC Staff	3

Non-Residential Measures

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
N1	WaterWise Evaluations for Commercial Buildings	Free site consultation: review consumption history, check toilets for leaks, determine fixture flow rates, recommend improvements, identify fixtures eligible for replacement through incentive programs, provide standard repair parts for faulty toilets and free water-saving devices and materials. Customized report of findings sent after visit.	215 gpd	Empirical Program Evaluations	Based on empirical evaluations of CII surveys done in Southern California in the 1990s	3
N2	Commercial Direct Install Audits	Free site consultation similar to measure N1. Required for commercial buildings that applied for direct install programs.	215 gpd	Empirical Program Evaluations	Based on empirical evaluations of CII surveys done in Southern California in the 1990s	3
N3a N3b N3c	Surveys – Hospitals, Hotels, Schools	Free site consultation for hospitals, hotels, and schools	4643 gpd 993 gpd 256 gpd	Empirical Program Evaluations	Based on empirical evaluations of CII surveys done in Southern California in the 1990s	3
N4	Surveys – Large Landscape by Contractors	Free landscape survey provided to eligible customers (0.5 acres or more of irrigated landscapes) under the Landscape Technical Assistance Program. Survey will evaluate the water delivery system to check for inefficiencies that lead to water losses, Surveyors will also determine the site's water budget by cataloguing plant type and will create site-specific recommendations and a cost estimate for improving irrigation efficiency.	161 gpd	Engineering Estimate	Unit savings per acre surveyed. Assumes 10% reduction in average landscape site water use of 1.8 AF/Acre	3

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
N5	Surveys – CII Facilities by Contractors	Free site consultation for other types of non-residential customers provided by third-party consultant or other funding sources.	5120 gpd	Engineering Estimate	SFPUC staff estimate of water savings from consultant audits	2
N6	Landscape Leak Alert	SFPUC uses its AMI data to flag landscape accounts that trigger continuous usage thresholds and alerts customers if a leak is suspected. SFPUC provides alerted customers with information on how to check for and repair common leaks	28.2 gpd	Empirical Program Evaluations		1
N7	1.5 GPM Showerhead Giveaway	Provides free, high-efficiency 1.5 gpm showerheads for San Francisco businesses.	5.6 gpd	Engineering Estimate	Based on review of hotel end use studies and engineering estimates of hotel showerhead savings potential. Assumes 54% installation rate	3
N8	1.5 GPM Showerhead Direct Install	Free installation of high-efficiency 1.5 gpm showerheads for San Francisco businesses. **Pre-requisite:** Direct Install Audit (Measure N2)	10.4 gpd	Engineering Estimate	Based on review of hotel end use studies and engineering estimates of hotel showerhead savings potential.	3
N9	Device Distribution	Various water-efficient fixtures: bathroom aerators (0.5/1.0/1.5 gpm), kitchen/bathroom laminar (1.5 gpm), kitchen aerators (1.5/2.2 gpm), utility aerators (1.5/2.0/2.2), pre-rinse spray nozzles, garden spray hose nozzles, toilet flappers, toilet fill valves, and soil moisture meters.	3.3 gpd	Engineering Estimate	Based on review of end use studies and engineering estimates of savings potential of aerators and other devices	3
N10a N10b	HET Rebate	Cash rebates of up to $125 per tank style toilet and up to $300 per flushometer valve toilet for replacing	28.4 gpd	Empirical Program Evaluations	Based on CUWCC CII Toilet Savings Study. Estimate scales-up	2

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
		high-flow toilets (3.5 gpf or more) with approved HET models (1.28 gpf or less).			ULFT savings to account for improved efficiency of HET	
N11a N11b N11c N11d N11e N11f	HET Rebate – Schools, Hotels, Muni	Cash rebates of up to $125 per tank style toilet and up to $300 per flushometer valve toilet for replacing high-flow toilets (3.5 gpf or more) with approved HET models (1.28 gpf or less).	20.6 gpd	Empirical Program Evaluations	Based on CUWCC CII Toilet Savings Study. Estimate scales-up ULFT savings to account for improved efficiency of HET	2
N12a N12b	HET Direct Install	Free installation of High-Efficiency Toilets for businesses in SF **Pre-requisite:** Direct Install Audit (Measure N2)	29 gpd	Empirical Program Evaluations	Based on CUWCC CII Toilet Savings Study. Estimate scales-up ULFT savings to account for improved efficiency of HET	2
N13	HET Direct Install – Schools, Hotels	Free installation of HETs for schools or hotels in SF. **Pre-requisite:** Direct Install Audit (Measure N2)	19.6 gpd	Empirical Program Evaluations	Based on CUWCC CII Toilet Savings Study. Estimate scales-up ULFT savings to account for improved efficiency of HET	2
N14	HET Voucher	A voucher for HET purchase.	28.4 gpd	Empirical Program Evaluations	Based on CUWCC CII Toilet Savings Study. Estimate scales-up ULFT savings to account for improved efficiency of HET	2

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
N15	HET Voucher – Schools, Hotels	Same as N14 but directed at schools and hotels	17.8 gpd	Empirical Program Evaluations	Based on CUWCC CII Toilet Savings Study. Estimate scales-up ULFT savings to account for improved efficiency of HET	2
N16	HET Install thru On-Bill Financing	Partner with third-party vendors to find customers with savings opportunity, sell them the program, and conduct the installation. The customer pays for the program through savings received through their water bill.	29 gpd	Empirical Program Evaluations	Based on CUWCC CII Toilet Savings Study. Estimate scales-up ULFT savings to account for improved efficiency of HET	2
N17a N17b	HEU Rebate	Cash rebates of up to $300 per urinal for eligible commercial businesses when high flow urinals (1.5 gpf or more) are replaced with High-Efficiency Urinal (HEU) models that are 0.125 gpf or less.	16.2 gpd	Empirical Program Evaluations	Based on CUWCC Urinal Savings Potential PBMP Study	3
N18	HEU Direct Install	A program for replacing 1.5 gallons per flush (gpf) high efficiency urinals with pint flush urinals.	16.2 gpd	Engineering Estimate	Based on CUWCC Urinal Savings Potential PBMP Study	3
N20	Energy Star Washer Rebate (IWF 4.5)	Measure has been discontinued. Cash rebates for commercial high-efficiency clothes washers with a water factor of 4.5 or below.	39 gpd	Engineering Estimate	Engineering estimate based on limited data on clothes washer market shares and coin-op washer utilization rates	3
N21	Energy Star Washer Rebate (IWF 4)	Cash rebates of up to $200 for commercial high-efficiency clothes washers with a water factor of 4.0 or below. For any business where 10 or more washers are being installed, a pre-purchase inspection must be scheduled.	45 gpd	Engineering Estimate	Engineering estimate based on limited data on clothes washer market shares and	3

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
					coin-op washer utilization rates	
N22a	Landscape Grants (pre 2020)	Under Landscape Grant Program, landscapes with over 0.5 acre of irrigated areas are eligible to receive funding to implement retrofits and install fixtures to facilitate water conservation.	179 gpd/acre	Empirical Program Evaluations	Based on SFPUC staff estimates of water savings for 11 large landscape grant projects	2
N22b	Landscape Grants (post 2020)	Under Landscape Grant Program, landscapes with 10,000 sf to 0.5 acre or more of irrigated areas are eligible to receive funding to implement retrofits and install fixtures to facilitate water conservation.	179 gpd/acre	Empirical Program Evaluations	Assumed same as N22a	2
N24	Equipment Retrofit Rebates - Unmetered/Estimated	Incentives to businesses to upgrade indoor equipment. Projects must achieve an annual water savings of 100 ccf or more to qualify. SFPUC will provide qualifying projects incentives of $0.50 per ccf over a 10-year lifespan up to 50% of the equipment costs. Program includes customized incentives as well as standard incentives for equipment with predictable water savings, such as water efficient ice machines, and connectionless food steamers.	2.0	Engineering Estimate	Annual activity entered in units of ccf/yr.	1
N25a	Custom Equipment Retrofit Rebates – Metered (Pre-2025)	Similar to Measure N24, but allows applicants to create customized project tailored toward their specific business needs and water use patterns.	2.0	Engineering Estimate	Annual activity entered in units of ccf/yr.	1
N25b	Custom Equipment Retrofit Rebates – Metered (2025+)	Same as N25a, but with larger incentive cost.	2.0	Engineering Estimate	Annual activity entered in units of ccf/yr.	1
N26	Non-Residential Leak Alert	SFPUC uses its AMI data to flag non-residential accounts that trigger continuous usage thresholds and alerts customers if a leak is suspected. SFPUC provides alerted customers with information on how to check for and repair common leaks	5.0 gpd	Empirical Program Evaluations		1

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
N27	Kitchen Low Flow Spray Valves	Rebate or giveaway of high-efficiency kitchen spray valves used primarily by dishwashing stations	30 gpd	Empirical Program Evaluations	Based on multiple empirical evaluations of savings from kitchen spray-valve retrofits. Estimate assumes 50% installation/retention rate	1
N29	Efficient Irrigation Timer Rebate	Financial rebate towards purchase and installation of a weather-based irrigation controller that uses site specific data and adjusts the irrigation time depending on the local weather.	13.4 gpd	Empirical Program Evaluations	Lower-bound of 95% CI of average savings per station, per A&N Technical's 2011 WBIC savings evaluation. Lower-bound is used because of San Francisco's climate and lower landscape water use.	2
N30	ULFT to Ultra-High-Efficiency Toilet Rebate	Cash rebates to replace tank and flushometer style toilets and up to $300 per flushometer valve toilet. Similar to N10 but targets replacement of 1.6 gpf toilets	7.0 gpd	Engineering Estimate	Estimate prepared by SFPUC	3

Measures Applicable to All Customers

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Notes on Savings Estimate	Water Savings Estimate Confidence Score
A3	Irrigation Customer Large Landscape Budget (Discontinued)	The SFPUC calculates how water use for irrigated landscape sites that received an irrigation or landscape grant or were required to comply with San Francisco's Water Efficient Irrigation Ordinance (WEIO) compares to the maximum allowable water use (MAWA) recommended for the plant types per state calculations. Staff are exploring how to potentially expand the program to all sites served by dedicated irrigation meters	357 gpd	Unit savings per acre surveyed. Assumes 10% reduction in average pre-grant water use of 4 AF/Acre for 9 large landscapes enrolled in SFPUC landscape grant program	3
A4a	Municipal Large Landscape Budget	This measure is for informational/educational monthly water budget reports sent to dedicated irrigation account customers. The monthly water budget report indicates how their water use for the previous month (and all prior months in the year) compares with the estimated amount allotted for their site based on the state MAWA calculation, divided by month and factoring in precipitation. Prior to 2025, the SFPUC provided these reports only to dedicated irrigation customers that had received an irrigation meter or landscape grant from the SFPUC.	48 gpd	Assumes 10% reduction in average pre-budget water use of 0.54 AF/Ac	3
A4b	Non-Municipal Large Landscape Budget	This measure is for informational/educational monthly water budget reports sent to dedicated irrigation account customers. The monthly water budget report indicates how their water use for the previous month (and all prior months in the year) compares with the estimated amount allotted for their site based on the state MAWA calculation, divided by month and factoring in precipitation. Prior to 2025, the SFPUC provided these reports only to dedicated irrigation customers that had received an irrigation meter or landscape grant from the SFPUC.	236	Assumes 10% reduction in average pre-budget water use of 2.64 AF/Ac	3

Measure Specifications

This section contains the water savings specification for each measure used in the conservation savings model. The specifications are grouped by customer class: (1) single-family, (2) multi-family, and (3) non-residential.

Single Family Measures

ID	Name	Class	Category
S1	Mandatory CAP Audit	Single Family	Audits & Reports

Water Savings: Average of savings from residential survey savings reported by Whitcomb (2000), A&N Technical Services (1994b), and Chesnutt, et al. (1995) is 33.9 gpd. Whitcomb (2000) reported 60% of savings are from outdoor uses and 40% are from indoor uses. Single family irrigation area in SFPUC retail service is approximately 34% of state average reported by DeOreo and Mayer (2010). Estimate based on combination of behavioral and fixture retrofits induced by survey recommendations. Savings from showerheads removed from indoor component to avoid double counting savings from S11 and S12. The 3 gpd estimate for showerheads assumes half the site visits get a direct install showerhead and half get a showerhead left for owner-installation, in which 50% are installed.

Water savings = (0.4 x 33.9 gpd – 3 gpd) + 0.6 x 0.34 x 33.9 gpd = 17.5 gpd (6,388 gpy)

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: 20%. Lower-end of decay rate range reported in CUWCC (2005).

Useful Life: 5 yrs. Based on typical useful life of survey savings reported in CUWCC (2005).

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year, 80% of outdoor savings occur in peak period. Peak period runs from May 1 to Sep 30, representing 42% of days.

Peak % = 0.42 x (0.4 x 33.9 gpd – 3 gpd) + 0.8 x 0.6 x 0.34 x 33.9 gpd)/17.5 = 57%

Unit Sewer Savings: Sewer savings = 0.4 x 33.9 gpd – 3 gpd = 10.6 gpd (3,869 gpy)
Wastewater to water savings ratio = 0.606

Unit Electricity Savings: NA

Unit Gas Savings: Assumes energy requirement of 0.0072 therms/gal for hot water heating, per DOE (2006), that hot water comprises 67% of shower/faucet flow - per DOE (2006) – that half of indoor water savings involve reductions in shower/faucet flow, and that indoor savings comprise 66% of total survey savings.

Gas savings = 0.0072 therms/gal x 0.67 x 0.5 x 0.66 = 0.0016 therms/gal

Confidence Score: 2

ID	Name	Class	Category
S2	WaterWise Evaluations	Single Family	Audits & Reports

All assumptions same as S1.

ID	Name	Class	Category
S3a	Leak Alerts	Single Family	Audits & Reports

Water Savings: Detailed empirical analysis of SFPUC's Single-Family Customer Leak Alert Program concluded:

- The Program reduced the mean duration of leak events lasting 72 or more hours by 32.6 hours, from 58 to 25.4 hours.
- The Program reduced the frequency of leak events lasting 72 or more hours from 0.194 to 0.113 leaks per meter-year.
- The Program reduced mean leakage volume from 437.1 to 233.7 gallons per meter-year, or by about 203 gallons per meter-year.

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 1 year.

Peak Period Savings Percent: We assume the same savings pattern as S1 and S2 – where outdoor savings comprise 34% of total savings and 80% of outdoor savings occur in the peak period.

Peak period runs from May 1 to Sep 30, representing 42% of days.

Peak % = 0.42 x 0.66 + 0.8 x 0.34 = 55%

Unit Sewer Savings: We do not have data on how leakage is distributed between indoor and outdoor water uses. We assume the same distribution as indoor and outdoor water use.
Sewer savings = 0.66 x 203 gpy per meter = 134 gpy per meter
Wastewater to water savings ratio = 0.66

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 1

ID	Name	Class	Category
S3b	Custom Water Use Report	Single Family	Audits & Reports

Water Savings: Average water savings are 5.5% of single family daily use, per Mitchell and Chesnutt (2014). Multiple other empirical estimates of water use report savings have measured average saving rates of 4-6% (https://www.watersmart.com/resources/). Median single family water use in SFPUC's retail service area (circa 2005) is 153 gpd, per DeOreo and Mayer (2010a).

Water savings = 0.055 x 153 gpd = 8.4 gpd (3,066 gpy)

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 1 year.

Peak Period Savings Percent: Evaluations of water use reports have not had sufficient data to detect seasonal effects (Mitchell and Chesnutt, 2014). For now we assume the same savings pattern as S1 and S2 – where outdoor savings comprise 34% of total savings and 80% of outdoor savings occur in the peak period.

Peak period runs from May 1 to Sep 30, representing 42% of days.

Peak % = (0.42 x 0.66 x 8.4 gpd + 0.8 x 0.34 x 8.4 gpd) ÷ 8.4 = 55%

Unit Sewer Savings: Evaluations of water use reports have not had sufficient data to determine indoor and outdoor savings as a share of total (Mitchell and Chesnutt, 2014). For now we assume the same savings pattern as S1 and S2 – where indoor savings comprise 66% of total savings

Sewer savings = 0.606 x 8.4 gpd = 5.09 gpd (1,858 gpy)
Wastewater to water savings ratio = 0.606

Unit Electricity Savings: NA

Unit Gas Savings: Assumes energy requirement of 0.0072 therms/gal for hot water heating, per DOE (2006), that hot water comprises 67% of shower/faucet flow - per DOE (2006) – that half of indoor water savings involve reductions in shower/faucet flow, and that indoor savings comprise 66% of total savings.

Gas savings = 0.0072 therms/gal x 0.67 x 0.5 x 0.66 = 0.0016 therms/gal

Confidence Score: 1

ID	Name	Class	Category
S4	1.5 GPM Showerheads Distributions	Single Family	HESH

Water Savings: M.Cubed and A&N Technical Services (2018a, 2018b) estimated toilet, showerhead, and aerator water savings from direct installation bathroom retrofit programs in Bakersfield, Torrance, and East Los Angeles targeting both single- and multi-family bathrooms. Mean savings for showerheads installed in single-family households was 12.6 gpd. Field studies of retrofit kit distributions in Irvine (A&N Technical Services 1992d) and Los Angeles (A&N Technical Services 1991) have found initial installation probabilities that range from 49% to 59%. We assume a 54% installation probability.

Water savings = 0.54 x 12.6 gpd = 6.8 gpd (2482 gpy)

Plumbing Code Savings: Zero. SB 407 mandates showerheads have a maximum capacity of 2.5 gpm. Currently, the average flow rate of showerheads in SFPUC's retail service area is 1.95, per DeOreo and Mayer (2010a).

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 8 yrs, per Alliance for Water Efficiency (2014).

Peak Period Savings Percent:
Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 6.8 gpd (2482 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: Assumes energy requirement of 0.0072 therms/gal for hot water heating, per DOE (2006) and that hot water comprises 67% of shower/faucet flow - average of DOE (2006) and Aquacraft (1999). Gas savings = 0.0072 therms/gal x 0.67 = 0.0048 therms/gal

Confidence Score: 2

ID	Name	Class	Category
S5	1.5 GPM Showerheads Direct Install	Single Family	HESH

Water Savings: M.Cubed and A&N Technical Services (2018a, 2018b) estimated toilet, showerhead, and aerator water savings from direct installation bathroom retrofit programs in Bakersfield, Torrance, and East Los Angeles targeting both single- and multi-family bathrooms. Mean savings for showerheads installed in single-family households was 12.6 gpd (4599 gpy).

Unit Sewer Savings: Sewer savings = 12.6 gpd (4599 gpy)
Wastewater to water savings ratio = 1.000

All other assumptions same as S4.

Confidence Score: 1

ID	Name	Class	Category
S6	HET Rebates (Tank)	Single Family	HET

Water Savings: M.Cubed and A&N Technical Services (2018a, 2018b) estimated toilet, showerhead, and aerator water savings from direct installation bathroom retrofit programs in Bakersfield, Torrance, and East Los Angeles targeting both single- and multi-family bathrooms. Installed HETs had flush rates of 1.1 gpf or less. Mean savings for HETs installed in single-family households was 27.8 gpd (10147 gpy). Direct installation programs can more effectively screen out the replacement of ULF toilets than can rebate programs. Nearly all the toilets replaced in the direct installation programs evaluated by M.Cubed and A&N Technical Services were older non-ULFT toilets. Rebate programs may inadvertently issue rebates for the replacement of ULF toilets. To account for this possibility, mean daily savings estimated for the direct installation programs is reduced by 25%.

Water savings = 27.8 gpd x 0.75 = 20.9 gpd (7629 gpy)

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency. Period of savings attributed to program does not exceed useful life of toilet. On average savings are counted for 25 years, the average useful life of the toilet.

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 20.9 gpd (7629 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 2

ID	Name	Class	Category
S7	CAP Direct Install thru SFPUC Funding	Single Family	HET

Water Savings: M.Cubed and A&N Technical Services (2018a, 2018b) estimated toilet, showerhead, and aerator water savings from direct installation bathroom retrofit programs in Bakersfield, Torrance, and East Los Angeles targeting both single- and multi-family bathrooms. Installed HETs had flush rates of 1.0 gpf or less. Mean savings for HETs installed in single-family households was 27.8 gpd (10147 gpy).

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency. Period of savings attributed to program does not exceed useful life of toilet. On average savings are counted for 33 years, the average useful life of the toilet.

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 27.8 gpd (10147 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 1

ID	Name	Class	Category
S8	HET Direct Install (Non-Cap)	Single Family	HET

Water Savings: M.Cubed and A&N Technical Services (2018a, 2018b) estimated toilet, showerhead, and aerator water savings from direct installation bathroom retrofit programs in Bakersfield, Torrance, and East Los Angeles targeting both single- and multi-family bathrooms. Installed HETs had flush rates of 1.0 gpf or less. Mean savings for HETs installed in single-family households was 27.8 gpd (10147 gpy).

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency. Period of savings attributed to program does not exceed useful life of toilet. On average savings are counted for 33 years, the average useful life of the toilet.

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 27.8 gpd (10147 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 1

ID	Name	Class	Category
S9	HET Vouchers	Single Family	HET

All assumptions same as S6.

ID	Name	Class	Category
S11	CEE Tier 3 Rebate (IWF 4.0)	Single Family	HEW

Water Savings: Assumes participant in market for washer. Without rebate, participant will purchase either top- or front-load washer. Current market share (circa 2012) of top-load washers is 52%, per DOE (2012). Current Energy Star market share (circa 2012) is 50%, per DOE (2012). Maximum allowed IWF for Energy Star washer after 2011 is 6. Maximum allowed IWF for non-Energy Star washer is 9.5, per National Appliance Standard. (National Appliance Standard changes in 2015 to 4.5 IWF for front-load and 8.0 IWF for top-load, and again in 2018 to 6.0 IWF for top-load). Average IWF of new washer is:

Avg IWF of New Washer Without Rebate = 0.5 x 6.0 + 0.5 x 9.5 = 7.75 (note this will overstate avg IWF after 2015 due to nat'l appl stdrd)

Average washer loads per day for single family households in SFPUC retail service area is 0.91, per DeOreo and Mayer (2010a). Average volume of new clothes washer is 3 cubic feet, per DOE (2012).

Water savings = (7.75 – 4.0) x 3 x 0.91 = 10.2 gpd (3,723 gpy)

Plumbing Code Savings: Effective Jan 1, 2015, appliance standard is 4.5 IWF for front-load and 8.0 IWF for top-load. Given current front- and top-load market shares and Energy Star market share, average IWF under appliance standard in 2015 is:

2015 Avg IWF under Nat'l Appl Std = 0.52 x (0.5 x 8.0 + 0.5 x 6.0) + 0.48 x 4.5 = 5.8

Effective Jan 1, 2018, appliance standard is 4.5 IWF for front-load and 6.0 for top-load. Average IWF under appliance standard in 2018 is:

2018 Avg IWF under Nat'l Appl Std = 0.52 x 6.0 + 0.48 x 4.5 = 5.3.

For modeling conservation program benefits, we use the average of these two water factors – 5.6 -- and start the standard in 2015. Plumbing code savings starting in 2015 are:

Plumbing code savings = (7.75 – 5.6) x 3 x 0.91 = 5.9 gpd (2,154)

Plumbing Code NRR: 7.1%. Based on average washer life of 14 years, per DOE (2012).

Annual Decay Rate: NA

Useful Life: 14 years, per DOE (2012)

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 10.2 gpd (3,723 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: 0.0036 KWh/gal. Based on high efficiency washer electricity savings reported in FEMP (2000).

Unit Gas Savings: 0.0035 therms/gal. Based on high efficiency washer gas savings reported in FEMP (2000).

Confidence Score: 3

ID	Name	Class	Category
S12	Energy Star Most Efficient (IWF 3.5) Washer Rebate	Single Family	HEW

Water Savings: See S11 for details.

Water savings = (7.75 – 3.5) x 3 x 0.91 = 11.6 gpd (4,234 gpy)

Unit Sewer Savings: Sewer savings = 11.6 gpd (4,234 gpy)
Wastewater to water savings ratio = 1.000

All other assumptions same as S11.

Confidence Score: 3

ID	Name	Class	Category
S16a, S16b S16c, S16d	Rain Barrels and Cisterns	Single Family, Multi Family, Non-Residential	Grants

Water Savings: Savings based on M.Cubed Rain Barrel Harvest & Application Model (rainbarrel_harvest_and_application_model.xlsx)

60 gal barrel = 302 gpy (assumes 100 sqft irr area)
205 gal cistern = 887 gpy (assumes 300 sqft irr area)

The rain barrel water savings model simulates rain barrel catchment, filling, and application of stored water using daily rainfall and ETO data for the period 2/5/2001 to 10/22/2014. Daily weather data are from the Union City CIMIS weather station. The 60 gallon barrel savings estimate assumes a catchment area of 1000 square feet, irrigation area of 100 square feet, and landscape crop water coefficient (KL) of 0.25. The 205 gallon cistern savings estimate assumes irrigation area is 300 square feet. The other model assumptions are the same. Daily application of stored water is equal to the lesser of daily irrigation requirement and stored water. Daily irrigation requirement in cubic feet is equal to irrigation area x KL x net ETO ÷ 12.

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 15 years. Assumed

Peak Period Savings Percent: 24%. Calculated with M.Cubed Rain Barrel Harvest & Application Model for a 100 gal. barrel. Peak period savings % increases with barrel size, since more water can be stored for use in peak season.

Unit Sewer Savings: NA

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 3

ID	**Name**	**Class**	**Category**
S18	WBIC	Single Family	Grants

Water Savings: Several empirical program evaluations of WBIC performance have been completed since the early 2000s. A good summary of these studies can be found on the Cal WEP website. The following table summarizes findings from these studies.

Study	% Reduction in Outdoor Water Use	% Reduction in Total Household Water Use	Mean Reduction in Gal/Day	Sample Size
Orange County 2001	16-24%	7-10%	37-57	40 SF Homes
Orange County 2004	No estimate	10%	41	97 SF Homes
No & So Cal, 2009	7%	No estimate	58	1,987 SF Homes
Orange County 2010	10%	7%	37	899 SF Homes
Orange County 2011	No estimate	9%	49	70 SF Homes

The mean percentage reduction in outdoor water use estimated by these studies range from 7 to 24%. We are inclined to give more weight to the 2009 and 2010 studies that had large sample sizes. The mean percentage reduction in outdoor water use was 7-10%. We use the lower end of the range to be conservative.

Median single family water use in SFPUC's retail service area (circa 2005) is 153 gpd, per DeOreo and Mayer (2010a). On average, outdoor water use is assumed to be 34% of total water use. Expected WBIC savings are thus: 153 x 0.34 x 0.07 = 3.7 gpd or 1,351 gpy.

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 10 years. Assumed

Peak Period Savings Percent: 100% of savings assumed to occur in peak season.

Unit Sewer Savings: NA

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 2

ID	Name	Class	Category
S20	Device Distribution	Single Family	Grants

Water Savings: Water savings are a quantity-weighted average of devices distributed by SFPUC. The devices, quantity weights, and annual savings are shown in the following table.

Devices	Annual Quantity	Savings (GPY)	
1.5 gpm bathroom aerator	8229	210	
1.0 gpm bathroom aerator	0	361	
0.5 gpm bathroom aerator	1537	511	
1.5 gpm kitchen laminar	0	210	
1.5 gpm bathroom laminar	0	210	
2.2 gpm kitchen aerator	265	0	
1.5 gpm kitchen aerator	4641	210	
1.5 utility aerator	54	210	
2.0 utility aerator	54	60	
2.2 utility aerator	16	0	
Garden spray hose nozzle	295	0	No reliable estimates
Toilet flapper	3603	1212	
Toilet fill valves	1819	1212	Assumed to be same as flapper savings
Soil moisture meter	7	0	No reliable estimates
Total	20520		
Weighted Avg Savings		491	

Annual savings for aerators are based on the following data and assumptions:

- Median SFR faucet use is 29 gpd (source: Aquacraft SFPUC End Use Study).
- An average of 4 faucets per household is assumed.
- Average use per faucet is 7.25 gpd. The calculation assumes uniform faucet usage, which while unlikely to be true is necessary given lack of data on faucet use.
- Aerators reduce free flowing faucet water consumption. It is assumed half of faucet use is for free flowing uses (e.g. brushing teeth or washing vegetables) and half is for fixed volume uses (e.g. filling pots or getting a drink of water). Free flowing faucet use is therefore 3.63 gpd.
- Average faucet flow is assumed to be 2.2 gpm. Therefore, faucets average 1.6 minutes of free flowing use per day.
- It is assumed half of distributed faucets are installed.

Given these assumptions, savings by aerator flow rate are:

Aerator flow rate (gpm)	Avg Use GPD	Potential Savings (GPD)	Install %	Actual Savings (GPD)	Actual Savings (GPY)
2.2	3.63	0.00	50%	0.00	0
2.0	3.30	0.33	50%	0.16	60
1.5	2.47	1.15	50%	0.58	210
1.0	1.65	1.98	50%	0.99	361
0.5	0.82	2.80	50%	1.40	511

Annual savings for flappers and fill valves are based on the following data and assumptions:

- Median SFR leakage rate is 8.3 gpd, per Aquacraft SFPUC End Use Study.
- According to 2004 CUWCC Toilet Flapper Study and 1999 Residential End Use Study most household water leaks can be attributed to toilets. It is assumed toilet leaks account for 80% of the median leakage rate, or 6.64 gpd.
- It is assumed replacing flapper or fill valves will eliminate toilet-related leakage.
- It is assumed half of distributed flappers and fill valves are installed.

Given these assumptions, water savings are 3.32 gpd, or 1212 gpy.

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 5 years

Peak Period Savings Percent:

Unit Sewer Savings: Same as water savings

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 3

ID	Name	Class	Category
S21	ULFT to Ultra-High-Efficiency Toilet Direct Install	Single Family	HET

Water Savings: 6.7 gpd (2446 gpy). Engineering estimate prepared by SFPUC staff.

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency. Period of savings attributed to program does not exceed useful life of toilet. On average savings are counted for 33 years, the average useful life of the toilet.

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 6.7 gpd (2466 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 3

ID	Name	Class	Category
S22	ULFT to Ultra-High-Efficiency Toilet Rebate	Single Family	HET

Water Savings: 5.0 gpd (1825 gpy). Engineering estimate prepared by SFPUC staff.

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency. Period of savings attributed to program does not exceed useful life of toilet. On average savings are counted for 33 years, the average useful life of the toilet.

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 5.0 gpd (1825 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 3

Multi Family Measures

ID	Name	Class	Category
M1	WaterWise Direct Install Evaluations	Multi Family	Audits & Reports

Water Savings: Assumes same as indoor share of savings for S1 and S2

Water savings = 10.6 gpd (3,869 gpy)

Plumbing Code NRR: NA

Annual Decay Rate: 20%. Same as S1 and S2. Lower-end of decay rate range reported in CUWCC (2005).

Useful Life: 5 yrs. Same as S1 and S2. Based on typical useful life of survey savings reported in CUWCC (2005).

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 10.6 gpd (3,869 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: Assumes energy requirement of 0.0072 therms/gal for hot water heating, per DOE (2006), that hot water comprises 67% of shower/faucet flow - per DOE (2006) – that half of indoor water savings involve reductions in shower/faucet flow, and that indoor savings comprise 100% of total survey savings.

Gas savings = 0.0072 therms/gal x 0.67 x 0.5 x 1.00 = 0.0024 therms/gal

Confidence Score: 2

ID	Name	Class	Category
M2	WaterWise Evaluations	Multi Family	Audits & Reports

All assumptions same as M1.

ID	Name	Class	Category
M3a	Small Multi-Family Leak Alert	Multi Family	Audits & Reports

Water Savings: Detailed empirical analysis of SFPUC's Multi-Family Customer Leak Alert Program concluded:

- The Program reduced the mean duration of leak events lasting 72 or more hours from 235.7 to 137.0 hours.
- The Program reduced the frequency of leak events lasting 72 or more hours from 0.656 to 0.453 leaks per meter-year.
- The Program reduced the mean leak volume from 1519 to 925.5 gallons per meter-year, or 593.5 gallons per meter-year (1.6 gpd).

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 1 year.

Peak Period Savings Percent: We assume leaks are more or less distributed uniformly across the year.

Peak period runs from May 1 to Sep 30, representing 42% of days.

Unit Sewer Savings: We do not have data on how leakage is distributed between indoor and outdoor water uses. We assume multi-family water use is dominated by indoor water uses and so too are water savings from leak alerts.
Sewer savings = 0.9 x 593.5 gpy per meter = 534.2 gpy per meter
Wastewater to water savings ratio = 0.9

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 1

ID	Name	Class	Category
M3b	Large Multi-Family Leak Alert	Multi Family	Audits & Reports

Water Savings: A statistically significant reduction in mean leakage volume between the pre- program and program periods was not detected. Thus, we do not estimate any water savings for the large multi-family leak alert program.

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 1 year.

Peak Period Savings Percent: We assume leaks are more or less distributed uniformly across the year.

Peak period runs from May 1 to Sep 30, representing 42% of days.

Unit Sewer Savings: We do not have data on how leakage is distributed between indoor and outdoor water uses. We assume multi-family water use is dominated by indoor water uses and so too are water savings from leak alerts.
Sewer savings = 0.9 x 0 gpy per meter = 0 gpy per meter
Wastewater to water savings ratio = 0.9

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 1

ID	Name	Class	Category
M4	Showerheads Distributions	Multi Family	HESH

Water Savings: M.Cubed and A&N Technical Services (2018a, 2018b) estimated toilet, showerhead, and aerator water savings from direct installation bathroom retrofit programs in Bakersfield, Torrance, and East Los Angeles targeting both single- and multi-family bathrooms. Mean savings for showerheads installed in multi-family households was 12.6 gpd. Field studies of retrofit kit distributions in Irvine (A&N Technical Services 1992d) and Los Angeles (A&N Technical Services 1991) have found initial installation probabilities that range from 49% to 59%. We assume a 54% installation probability.

Water savings = 0.54 x 12.6 gpd = 6.8 gpd (2482 gpy)

Plumbing Code Savings: Zero. SB 407 mandates showerheads have a maximum capacity of 2.5 gpm. Currently, the average flow rate of showerheads in SFPUC's retail service area is 1.95, per DeOreo and Mayer (2010a).

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 8 yrs, per Alliance for Water Efficiency (2014).

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 6.8 gpd (2482 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: Assumes energy requirement of 0.0072 therms/gal for hot water heating, per DOE (2006) and that hot water comprises 67% of shower/faucet flow - average of DOE (2006) and Aquacraft (). Gas savings = 0.0072 therms/gal x 0.67 = 0.0048 therms/gal

Confidence Score: 2

ID	Name	Class	Category
M5	Showerheads Direct Install	Multi Family	HESH

Water Savings: M.Cubed and A&N Technical Services (2018a, 2018b) estimated toilet, showerhead, and aerator water savings from direct installation bathroom retrofit programs in Bakersfield, Torrance, and East Los Angeles targeting both single- and multi-family bathrooms. Mean savings for showerheads installed in multi-family households was 12.6 gpd (4599 gpy).

Unit Sewer Savings: Sewer savings = 12.6 gpd (4599 gpy)

All other assumptions same as M4.

Confidence Score: 1

ID	Name	Class	Category
M6a	HET Rebate (Tank)	Multi Family	HET

Water Savings: M.Cubed and A&N Technical Services (2018a, 2018b) estimated toilet, showerhead, and aerator water savings from direct installation bathroom retrofit programs in Bakersfield, Torrance, and East Los Angeles targeting both single- and multi-family bathrooms. Installed HETs had flush rates of 1.0 gpf or less. Mean savings for HETs installed in multi-family households was 38.6 gpd (14089 gpy). Direct installation programs can more effectively screen out the replacement of ULF toilets than can rebate programs. Nearly all the toilets replaced in the direct installation programs evaluated by M.Cubed and A&N Technical Services were older non-ULFT toilets. Rebate programs may inadvertently issue rebates for the replacement of ULF toilets. To account for this possibility, mean daily savings estimated for the direct installation programs is reduced by 25%.

Water savings = 38.6 gpd x 0.75 = 30.0 gpd (10950 gpy)

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency.

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 30.0 gpd (10950 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 2

ID	Name	Class	Category
M6b	HET Rebate (Flushometer)	Multi Family	HET

All assumptions same as M6a.

ID	Name	Class	Category
M7a	HET Direct Install (Tank)	Multi Family	HET

Water Savings: M.Cubed and A&N Technical Services (2018a, 2018b) estimated toilet, showerhead, and aerator water savings from direct installation bathroom retrofit programs in Bakersfield, Torrance, and East Los Angeles targeting both single- and multi-family bathrooms. Installed HETs had flush rates of 1.0 gpf or less. Mean savings for HETs installed in multi-family households was 38.6 gpd (14089 gpy).

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency.

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 38.6 gpd (14089 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 1

ID	Name	Class	Category
M7b	HET Direct Install (Flushometer)	Multi Family	HET

All assumptions same as M7a.

ID	Name	Class	Category
M7c	ULFT to Ultra-High-Efficiency Toilet Direct Install	Multi Family	HET

Water Savings: 9.3 gpd (3395 gpy). Engineering estimate prepared by SFPUC staff.

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency. Period of savings attributed to program does not exceed useful life of toilet. On average savings are counted for 33 years, the average useful life of the toilet.

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 9.3 gpd (3395 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 1

ID	Name	Class	Category
M8	HET Voucher	Multi Family	HET

All assumptions same as M6a.

ID	Name	Class	Category
M9	HET/Fixture Install thru On-Bill Financing	Multi Family	HET

All assumptions same as M7a.

ID	Name	Class	Category
M10	CEE Tier 3 Rebate (IWF 4.0)	Multi Family	HEW

Note that the model has separate measures for M10a and M10b that are distinguished only by differing rebate amounts provided through time.

Water Savings: Assumes rebates are for common area laundry rooms, not individual apartments. Without rebate, participant will purchase either top- or front-load washer. Current market share (circa 2012) of top-load washers is 52%, per DOE (2012). Current Energy Star market share (circa 2012) is 50%, per DOE (2012). Maximum allowed IWF for Energy Star washer after 2011 is 6. Maximum allowed IWF for non-Energy Star washer is 9.5, per National Appliance Standard. (National Appliance Standard changes in 2015 to 4.5 IWF for front-load and 8.0 IWF for top-load, and again in 2018 to 6.0 IWF for top-load). Average IWF of new washer is:

Avg IWF of New Washer Without Rebate = 0.5 x 6.0 + 0.5 x 9.5 = 7.75 (note this will overstate avg IWF after 2015 due to nat'l appl stdrd)

Average washer loads per day is 8.4, per M.Cubed (2014). Average volume of new clothes washer for common area use is assumed to be 4 cubic feet.

Water savings = (7.75 – 4.0) x 4 x 8.4 = 126 gpd (45,990 gpy) [Get energy star commercial list]

Plumbing Code Savings: Effective Jan 1, 2015, appliance standard is 4.5 IWF for front-load and 8.0 IWF for top-load. Given current front- and top-load market shares and Energy Star market share, average IWF under appliance standard in 2015 is:

2015 Avg IWF under Nat'l Appl Std = 0.52 x (0.5 x 8.0 + 0.5 x 6.0) + 0.48 x 4.5 = 5.8

Effective Jan 1, 2018, appliance standard is 4.5 IWF for front-load and 6.0 for top-load. Average IWF under appliance standard in 2018 is:

2018 Avg IWF under Nat'l Appl Std = 0.52 x 6.0 + 0.48 x 4.5 = 5.3.

For modeling conservation program benefits, we use the average of these two water factors – 5.6 -- and start the standard in 2015. Plumbing code savings starting in 2015 are:

Plumbing code savings = (7.75 – 5.6) x 4 x 8.4 = 72 gpd (26,280)

Plumbing Code NRR: 7.1%. Based on average washer life of 14 years, per DOE (2012).

Annual Decay Rate: NA

Useful Life: 14 years, per DOE (2012)

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 126 gpd (45,990 gpy)

Wastewater to water savings ratio = 1.000

Unit Electricity Savings: 0.0036 KWh/gal. Based on high efficiency washer electricity savings reported in FEMP (2000).

Unit Gas Savings: 0.0035 therms/gal. Based on high efficiency washer gas savings reported in FEMP (2000).

Confidence Score: 3

ID	Name	Class	Category
M17	Efficient Irrigation Timer Rebate	Multi Family	HET

All assumptions same as S18.

ID	Name	Class	Category
M20	Device Distribution	Multi Family	Grants

Water Savings: Water savings are a quantity-weighted average of devices distributed by SFPUC. The devices, quantity weights, and annual savings are shown in the following table.

Devices	Annual Quantity	Savings (GPY)	
1.5 gpm bathroom aerator	8229	210	
1.0 gpm bathroom aerator	0	361	
0.5 gpm bathroom aerator	1537	511	
1.5 gpm kitchen laminar	0	210	
1.5 gpm bathroom laminar	0	210	
2.2 gpm kitchen aerator	265	0	
1.5 gpm kitchen aerator	4641	210	
1.5 utility aerator	54	210	
2.0 utility aerator	54	60	
2.2 utility aerator	16	0	
Garden spray hose nozzle	295	0	No reliable estimates
Toilet flapper	3603	1212	
Toilet fill valves	1819	1212	Assumed to be same as flapper savings
Soil moisture meter	7	0	No reliable estimates
Total	20520		
Weighted Avg Savings		491	

Annual savings for aerators are based on the following data and assumptions:

- Median SFR faucet use is 29 gpd (source: Aquacraft SFPUC End Use Study).
- An average of 4 faucets per household is assumed.
- Average use per faucet is 7.25 gpd. The calculation assumes uniform faucet usage, which while unlikely to be true is necessary given lack of data on faucet use.
- Aerators reduce free flowing faucet water consumption. It is assumed half of faucet use is for free flowing uses (e.g. brushing teeth or washing vegetables) and half is for fixed volume uses (e.g. filling pots or getting a drink of water). Free flowing faucet use is therefore 3.63 gpd.
- Average faucet flow is assumed to be 2.2 gpm. Therefore, faucets average 1.6 minutes of free flowing use per day.
- It is assumed half of distributed faucets are installed.

Given these assumptions, savings by aerator flow rate are:

Aerator flow rate (gpm)	Avg Use GPD	Potential Savings (GPD)	Install %	Actual Savings (GPD)	Actual Savings (GPY)
2.2	3.63	0.00	50%	0.00	0
2.0	3.30	0.33	50%	0.16	60
1.5	2.47	1.15	50%	0.58	210
1.0	1.65	1.98	50%	0.99	361
0.5	0.82	2.80	50%	1.40	511

Annual savings for flappers and fill valves are based on the following data and assumptions:

- Median SFR leakage rate is 8.3 gpd, per Aquacraft SFPUC End Use Study.
- According to 2004 CUWCC Toilet Flapper Study and 1999 Residential End Use Study most household water leaks can be attributed to toilets. It is assumed toilet leaks account for 80% of the median leakage rate, or 6.64 gpd.
- It is assumed replacing flapper or fill valves will eliminate toilet-related leakage.
- It is assumed half of distributed flappers and fill valves are installed.

Given these assumptions, water savings are 3.32 gpd, or 1212 gpy.

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 5 years

Peak Period Savings Percent:

Unit Sewer Savings: Same as water savings

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 3

ID	Name	Class	Category
M21	ULFT to Ultra-High-Efficiency Toilet Direct Install	Multi Family	HET

Water Savings: 9.3 gpd (3395 gpy). Engineering estimate prepared by SFPUC staff.

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency. Period of savings attributed to program does not exceed useful life of toilet. On average savings are counted for 33 years, the average useful life of the toilet.

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 9.3 gpd (3395 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 3

ID	Name	Class	Category
M22	ULFT to Ultra-High-Efficiency Toilet Rebate	Multi Family	HET

Water Savings: 6.9 gpd (2519 gpy). Engineering estimate prepared by SFPUC staff.

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency. Period of savings attributed to program does not exceed useful life of toilet. On average savings are counted for 33 years, the average useful life of the toilet.

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 6.9 gpd (2519 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 3

Non Residential Measures

ID	Name	Class	Category
N1	WaterWise Evaluations for Commercial Buildings	Non Residential	Audits & Reports

Water Savings: Assumes basic analyst or staff evaluations identify an average of 20% potential water savings per site, per CUWCC (2005). For calculating water savings, we assume 50% of potential savings are realized. Average realized water savings is therefore 10% of site use, which matches the assumption used by the SFPUC Retail Demand Model. Average water use per site (circa 2014) is 2,154 gpd, per SFPUC Retail Demand Model.

Water savings = 0.2 x 0.5 x 2,154 gpd = 215 gpd (78,475 gpy)

(NOTE: A higher estimate is warranted if SFPUC targets sites with higher than average use.)

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA. No savings persistence data reported in CUWCC (2005).

Useful Life: No savings persistence data reported in CUWCC (2005). We assume same average life as S1 – 5 years.

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year, 80% of outdoor savings occur in peak period. Peak period runs from May 1 to Sep 30, representing 42% of days. Assumes 18% of savings are irrigation-related, per CUWCC (2005).

Peak % = (0.42 x 0.82 x 215 gpd + 0.8 x 0.18 x 215 gpd)/215 gpd = 49%

Unit Sewer Savings: Sewer savings = 0.82 x 215 gpd = 176 gpd (64,240 gpy)
Wastewater to water savings ratio = 0.820

Unit Electricity Savings: NA. No data on electricity savings

Unit Gas Savings: Assumes energy requirement of 0.0072 therms/gal for hot water heating, per DOE (2006), that hot water comprises 67% of shower/faucet flow - per DOE (2006) – that one-quarter of indoor water savings involve reductions in shower/faucet flow, and that indoor savings comprise 82% of total survey savings. Gas savings = 0.0072 therms/gal x 0.67 x 0.25 x 0.82 = 0.001 therms/gal

Confidence Score: 3

ID	Name	Class	Category
N2	Commercial Direct Install Audits	Non Residential	Audits & Reports

All assumptions same as N1.

ID	Name	Class	Category
N3a,N3b,N3c	Surveys – Hospitals, Hotels, Schools	Non Residential	Audits & Reports

Water Savings: Number of sites and average daily use per site (circa 2013) shown in table are taken from the SFPUC Retail Demand Model.

Category	Number of Sites	Average Daily Use (gpd)
Hospitals	28	46,429
Hotels	421	9,929
Schools	297	2,559
Wtd Avg		8,365

Assumes basic analyst or staff evaluations identify an average of 20% potential water savings per site, per CUWCC (2005). For calculating water savings, we assume 50% of potential savings are realized. Average realized water savings is therefore 10% of site use, which matches the assumption used by the SFPUC Retail Demand Model. Average water use per site is 8,365 gpd, per above table.

Water savings wtd average = 0.2 x 0.5 x 8,365 gpd = 837 gpd (305,505 gpy)
Hospitals = 0.2 x 0.5 x 46,429 gpd = 4643 gpd (1,694,695 gpy)
Hotels = 0.2 x 0.5 x 9,929 gpd = 993 gpd (362,445 gpy)
Schools = 0.2 x 0.5 x 2,559 gpd = 256 gpd (93,440 gpy)

(NOTE: A higher estimate is warranted if SFPUC targets sites with higher than average use.)

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA. No savings persistence data reported in CUWCC (2005).

Useful Life: No savings persistence data reported in CUWCC (2005). We assume same average life as S1 – 5 years.

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year, 80% of outdoor savings occur in peak period. Peak period runs from May 1 to Sep 30, representing 42% of days. Assumes 18% of savings are irrigation-related, per CUWCC (2005).

Peak % = (0.42 x 0.82 x 837 gpd + 0.8 x 0.18 x 837 gpd)/837 gpd = 49%

Unit Sewer Savings: Sewer savings = 0.82 x 837 gpd = 686 gpd (250,390 gpy)
Hospitals = 3,807 gpd (1,389,555 gpy)
Hotels = 814 gpd (297,110 gpy)
Schools = 210 gpd (76,650 gpy)
Wastewater to water savings ratio = 0.820

Unit Electricity Savings: NA. No data on electricity savings

Unit Gas Savings: Assumes energy requirement of 0.0072 therms/gal for hot water heating, per DOE (2006), that hot water comprises 67% of shower/faucet flow - per DOE (2006) – that 50% of indoor water savings involve reductions in shower/faucet flow, and that indoor savings comprise 82% of total survey savings. Gas savings = 0.0072 therms/gal x 0.67 x 0.5 x 0.82 = 0.002 therms/gal

Confidence Score: 3

ID	Name	Class	Category
N4	Surveys – Large Landscape by Contractors	Non Residential	Audits & Reports

Water Savings: Per SFPUC Retail Demand Model, average use per site is 1.8 af/acre. Average water savings is 10%, also per SFPUC Retail Demand Model.

Water savings per acre = 0.1 x 1.8 x 325,851/365 = 161 gpd (58,765 gpy)

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA. No savings persistence data reported in CUWCC (2005).

Useful Life: No savings persistence data reported in CUWCC (2005). We assume same average life as S1 – 5 years. Same assumption used in SFPUC Retail Demand Model.

Peak Period Savings Percent: Assumes 80% of outdoor savings occur in peak period. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 80%

Unit Sewer Savings: NA

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 3

ID	Name	Class	Category
N5	Surveys – CII Facilities by Contractors	Non Residential	Audits & Reports

Water Savings: SFPUC estimates consultant audits save from 2,450 to 7,790 gpd. Model assumes midpoint of range – 5,120 gpd.

Water savings = 0.5 x (2,450 gpd + 7,790 gpd) = 5,120 gpd (1,868,800 gpy)

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA. No savings persistence data reported in CUWCC (2005).

Useful Life: No savings persistence data reported in CUWCC (2005). We assume same average life as S1 – 5 years. Same assumption used in SFPUC Retail Demand Model.

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year, 80% of outdoor savings occur in peak period. Peak period runs from May 1 to Sep 30, representing 42% of days. Assumes 23% of savings are irrigation-related, per CUWCC (2005).

Peak % = (0.42 x 0.77 x 5120 gpd + 0.8 x 0.23 x 5120 gpd)/5120 gpd = 51%

Unit Sewer Savings: Sewer savings = 0.77 x 5120 gpd = 3,942 gpd (1,438,830 gpy)

Unit Electricity Savings: NA. No data on electricity savings

Unit Gas Savings: Assumes energy requirement of 0.0072 therms/gal for hot water heating, per DOE (2006), that hot water comprises 67% of shower/faucet flow - per DOE (2006) – that one-quarter of indoor water savings involve reductions in shower/faucet flow, and that indoor savings comprise 82% of total survey savings. Gas savings = 0.0072 therms/gal x 0.67 x 0.25 x 0.77 = 0.0009 therms/gal

Confidence Score: 2

ID	Name	Class	Category
N6	Landscape Leak Alerts	Non Residential	Audits & Reports

Water Savings: Detailed empirical analysis of SFPUC's Landscape Customer Leak Alert Program concluded:

- The Program reduced the mean duration of leak events lasting 72 or more hours from 598.2 to 434.1 hours.
- The Program reduced the frequency of leak events lasting 72 or more hours from 1.048 to 0.840 leaks per meter-year.
- The Program reduced the mean leak volume by 10311 gallons per meter-year (28.2 gpd).

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 1 year.

Peak Period Savings Percent: We assume leaks are more or less distributed uniformly across the year.

Peak period runs from May 1 to Sep 30, representing 42% of days.

Unit Sewer Savings: Outdoor water use only

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 1

ID	Name	Class	Category
N7	1.5 GPM Showerhead Giveaway	Non Residential	HESH

Water Savings: Water savings estimate assumes program targets lodging establishments where shower water use comprises a significant proportion of total facility water use. Hotel shower water use from data logging done for the 2000 AWWARF CII End Uses of Water Study are summarized in the following table.

Shower Water Use Estimates from AWWARF CII End Uses of Water Study, 2000

Hotel Location	Water Use gpy/showerhead	Implied Utilization Rate minutes/day	Retrofit Water Use gpy/showerhead	Savings gpy/showerhead	% Hot
Irvine	10,203	13	6,957	3,246	71%
Phoenix	13,724	17	9,357	4,367	28%
San Diego	12,446	15	8,486	3,960	
Santa Monica	11,182	14	7,624	3,558	
Average	11,889	15	8,106	3,783	50%
	Mean flow rate (gpm)	2.2			
	Retrofit flow rate (gpm)	1.5			

We assume installed showerheads will have a mean savings rate of 3,800 gpy. Field studies of retrofit kit giveaway programs in Irvine (A&N Technical Services 1992d) and Los Angeles (A&N Technical Services 1991) found initial installation probabilities that ranged from 49% to 59%. We assume a 54% installation probability.

Giveaway showerhead savings = 3,800 gpy/showerhead x 0.54 = 2,052 gpy/showerhead

Plumbing Code Savings: Zero. SB 407 mandates showerheads have a maximum capacity of 2.5 gpm. It is assumed the flow rating of replaced showerheads will be 2.5 gpm or less

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 8 yrs, per Alliance for Water Efficiency (2014).

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 2,052 gpy
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: Assumes energy requirement of 0.0072 therms/gal for hot water heating, per DOE (2006) and that hot water comprises 50% of shower flow per above table. Gas savings = 0.0072 therms/gal x 0.5 = 0.0036therms/gal

Confidence Score: 3

ID	Name	Class	Category
N8	1.5 GPM Showerhead Direct Install	Non Residential	HESH

Water Savings: Water savings estimate assumes program targets lodging establishments where shower water use comprises a significant proportion of total facility water use. Hotel shower water use from data logging done for the 2000 AWWARF CII End Uses of Water Study are summarized in the following table.

Shower Water Use Estimates from AWWARF CII End Uses of Water Study, 2000

Hotel Location	Water Use gpy/showerhead	Implied Utilization Rate minutes/day	Retrofit Water Use gpy/showerhead	Savings gpy/showerhead	% Hot
Irvine	10,203	13	6,957	3,246	71%
Phoenix	13,724	17	9,357	4,367	28%
San Diego	12,446	15	8,486	3,960	
Santa Monica	11,182	14	7,624	3,558	
Average	11,889	15	8,106	3,783	50%
Assumed Mean flow rate (gpm)		2.2			
Retrofit flow rate (gpm)		1.5			

We assume installed showerheads will have a mean savings rate of 3,800 gpy/showerhead installed.

Plumbing Code Savings: Zero. SB 407 mandates showerheads have a maximum capacity of 2.5 gpm. It is assumed the flow rating of replaced showerheads will be 2.5 gpm or less

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 8 yrs, per Alliance for Water Efficiency (2014).

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 3,800 gpy
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: Assumes energy requirement of 0.0072 therms/gal for hot water heating, per DOE (2006) and that hot water comprises 50% of shower flow per above table. Gas savings = 0.0072 therms/gal x 0.5 = 0.0036therms/gal

Confidence Score: 3

ID	**Name**	**Class**	**Category**
N9	Device Distribution	Non Residential	Grants

Water Savings: Water savings are a quantity-weighted average of devices distributed by SFPUC. The devices, quantity weights, and annual savings are shown in the following table.

Devices	Annual Quantity	Savings (GPY)	
1.5 gpm bathroom aerator	8229	210	
1.0 gpm bathroom aerator	0	361	
0.5 gpm bathroom aerator	1537	511	
1.5 gpm kitchen laminar	0	210	
1.5 gpm bathroom laminar	0	210	
2.2 gpm kitchen aerator	265	0	
1.5 gpm kitchen aerator	4641	210	
1.5 utility aerator	54	210	
2.0 utility aerator	54	60	
2.2 utility aerator	16	0	
Garden spray hose nozzle	295	0	No reliable estimates
Toilet flapper	3603	1212	
Toilet fill valves	1819	1212	Assumed to be same as flapper savings
Soil moisture meter	7	0	No reliable estimates
Total	20520		
Weighted Avg Savings		491	

Annual savings for aerators are based on the following data and assumptions:

- Median SFR faucet use is 29 gpd (source: Aquacraft SFPUC End Use Study).
- An average of 4 faucets per household is assumed.
- Average use per faucet is 7.25 gpd. The calculation assumes uniform faucet usage, which while unlikely to be true is necessary given lack of data on faucet use.
- Aerators reduce free flowing faucet water consumption. It is assumed half of faucet use is for free flowing uses (e.g. brushing teeth or washing vegetables) and half is for fixed volume uses (e.g. filling pots or getting a drink of water). Free flowing faucet use is therefore 3.63 gpd.
- Average faucet flow is assumed to be 2.2 gpm. Therefore, faucets average 1.6 minutes of free flowing use per day.
- It is assumed half of distributed faucets are installed.

Given these assumptions, savings by aerator flow rate are:

Aerator flow rate (gpm)	Avg Use GPD	Potential Savings (GPD)	Install %	Actual Savings (GPD)	Actual Savings (GPY)
2.2	3.63	0.00	50%	0.00	0
2.0	3.30	0.33	50%	0.16	60
1.5	2.47	1.15	50%	0.58	210
1.0	1.65	1.98	50%	0.99	361

0.5	0.82	2.80	50%	1.40	511

Annual savings for flappers and fill valves are based on the following data and assumptions:

- Median SFR leakage rate is 8.3 gpd, per Aquacraft SFPUC End Use Study.
- According to 2004 CUWCC Toilet Flapper Study and 1999 Residential End Use Study most household water leaks can be attributed to toilets. It is assumed toilet leaks account for 80% of the median leakage rate, or 6.64 gpd.
- It is assumed replacing flapper or fill valves will eliminate toilet-related leakage.
- It is assumed half of distributed flappers and fill valves are installed.

Given these assumptions, water savings are 3.32 gpd, or 1212 gpy.

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 5 years

Peak Period Savings Percent:

Unit Sewer Savings: Same as water savings

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 3

ID	Name	Class	Category
N10a	HET Rebates (Tank) - CII	Non Residential	HET

Water Savings: Savings based on CUWCC CII Toilet Savings Study (2001). Assume 10% of rebates replace ULFTs
Water savings = 0.9 x 1.15 x 25 gpd + 0.1 x 25 gpd = 28.4 gpd (10,366 gpy)

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency.

Peak Period Savings Percent:
Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days.

Peak % = 42%

Unit Sewer Savings: Sewer savings = same as water savings
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 2

ID	Name	Class	Category
N10b	HET Rebates (Flushometer) - CII	Non Residential	HET

Water Savings: Savings based on CUWCC CII Toilet Savings Study (2001). Assume 10% of rebates replace ULFTs
Water savings = 0.9 x 1.15 x 25 gpd + 0.1 x 25 gpd = 28.4 gpd (10,366 gpy)

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency.

Peak Period Savings Percent:
Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days.

Peak % = 42%

Unit Sewer Savings: Sewer savings = same as water savings
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 2

ID	Name	Class	Category
N11a,N11b,N11c	HET Rebates Schools, Hotels, Muni (Tank)	Non Residential	HET

Water Savings: Assumes program targets non-ULF toilets. CUWCC (2001) estimated replacing non-ULF toilets with ULF toilets in schools, hotels, and government facilities resulted in average daily savings shown in the table.

Category	Avg Savings Per ULF Toilet (gpd)	Imputed Flushes/Day
Schools	18	8.4
Hotels	16	7.4
Government	25	11.6
Avg Savings	20	9.3

Note: GPD savings from CUWCC (2001). Imputed flushes/day assumes avg of replaced toilet was 3.75 gpf

Assume 10% of rebates replace ULFTs
Schools: [0.1(1.6-1.28)+0.9(3.75-1.28)] x 8.4 = 18.9 gpd (6,914)
Hotels: [0.1(1.6-1.28)+0.9(3.75-1.28)] x 7.4 = 16.7 gpd (6,096)
Gov: [0.1(1.6-1.28)+0.9(3.75-1.28)] x 11.6 = 26.2 gpd (9,563)

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency.

Peak Period Savings Percent:
Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days.

Peak % = 42%

Unit Sewer Savings: Sewer savings = same as water savings
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 2

ID	Name	Class	Category
N11d,N11e,N11f	HET Rebates Schools, Hotels, Muni (Flushometer)	Non Residential	HET

All assumptions same as N11a, N11b, N11c.

ID	Name	Class	Category
N12a	HET Direct Install (Tank) - CII	Non Residential	HET

Water Savings: Assumes program targets non-ULF toilets. CUWCC (2001) estimated replacing non-ULF toilets with ULF toilets resulted in average daily savings of 25 gpd. Assuming non-ULF toilets have an average flush volume of 3.75, the HE toilet would save approximately 15% more than a ULF toilet.

Water savings = 1.15 x 25 gpd = 29 gpd (10,585 gpy)

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency.

Peak Period Savings Percent:
Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days.

Peak % = 42%

Unit Sewer Savings: Sewer savings = 29 gpd (10,585 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 2

ID	Name	Class	Category
N12b	HET Direct Install (Flushometer) - CII	Non Residential	HET

All assumptions same as N12a.

ID	Name	Class	Category
N13	HET Direct Install School/Hotel	Non Residential	HET

Water Savings: Assumes program targets non-ULF toilets. CUWCC (2001) estimated replacing non-ULF toilets with ULF toilets in schools and hotels resulted in average daily savings shown in the table.

Category	Avg Savings Per ULF Toilet (gpd)	Imputed Flushes/Day
Schools	18	8.4
Hotels	16	7.4
Avg Savings	17	7.9

Note: GPD savings from CUWCC (2001). Imputed flushes/day assumes avg of replaced toilet was 3.75 gpf

It is assumed direct install toilets would only replace non-ULF. Assuming non-ULF toilets have an average flush volume of 3.75, the HE toilet would save approximately 15% more than a ULF toilet.

Water savings = 1.15 x 17 gpd = 19.6 gpd (7,154 gpy)

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency.

Peak Period Savings Percent:
Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days.

Peak % = 42%

Unit Sewer Savings: Sewer savings = same as water savings
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 2

ID	Name	Class	Category
N14	CII HET Voucher	Non Residential	HET

All assumptions same a N10

ID	Name	Class	Category
N15	HET Voucher School/Hotel	Non Residential	HET

Water Savings: Assumes 90% of vouchers go to non-ULF and 10% go to ULF toilets. CUWCC (2001) estimated replacing non-ULF toilets with ULF toilets in schools and hotels resulted in average daily savings shown in the table.

Category	Avg Savings Per ULF Toilet (gpd)	Imputed Flushes/Day
Schools	18	8.4
Hotels	16	7.4
Avg Savings	17	7.9

Note: GPD savings from CUWCC (2001). Imputed flushes/day assumes avg of replaced toilet was 3.75 gpf

Savings = [0.1 x (1.6 – 1.28) + 0.9 x (3.75 – 1.28)] x 7.9 = 17.8 gpd (6,497 gpy)

Comparison to Retail Demand Model (RDM) Estimate: this measure is not in the RDM.

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency.

Peak Period Savings Percent:
Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days.

Peak % = 42%

Unit Sewer Savings: Sewer savings = same as water savings
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 2

ID	Name	Class	Category
N16	HET/Fixture Install thru On-Bill Financing	Non Residential	HET

All assumptions same as N12a

ID	Name	Class	Category
N17a, N17b	HEU Rebate - CII	Non Residential	HEU

Water Savings: From Koeller & Company (2005). Urinals in CA used an estimated 28,000 AFY in 2005. Average flush rate is 2 times per day per male employee. Total employment in 2005 is 16.8 million, 55% male. Average flush volume = 28000 x 325851/[2 x 16.8 x 10^6 x 0.55 x 365) = 1.35 gpf

25 x 10^6 gal/day / 1.35 gal/flush = 18.5 x 10^6 flushes/day

18.5 x 10^6 flushes/day / 1.4 x 10^6 urinals (circa 2005) = 13.2 flushes/urinal/day

0.5 gpf: (1.35-.5) x 13.2 flush/day = 11.2 gpd (4,088 gpy)
0.25 gpf: (1.35-.25) x 13.2 flush/day = 14.5 gpd (5,293 gpy)
0.125 gpf: (1.35-.125) x 13.2 flush/day = 16.2 gpd (5,913 gpy)

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency.

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Same as water savings
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 3

ID	Name	Class	Category
N18	HEU Direct Install - CII	Non Residential	HEU

All assumptions same as N17.

ID	Name	Class	Category
N20	Energy Star Washer Rebates (IWF 4.5)	Non Residential	HEW

Water Savings: Assumes rebates are for common area laundry rooms, not individual apartments. Without rebate, participant will purchase either top- or front-load washer. Current market share (circa 2012) of top-load washers is 52%, per DOE (2012). Current Energy Star market share (circa 2012) is 50%, per DOE (2012). Maximum allowed IWF for Energy Star washer after 2011 is 6. Maximum allowed IWF for non-Energy Star washer is 9.5, per National Appliance Standard. (National Appliance Standard changes in 2015 to 4.5 IWF for front-load and 8.0 IWF for top-load, and again in 2018 to 6.0 IWF for top-load). Average IWF of new washer is:

Avg IWF of New Washer Without Rebate = 0.5 x 6.0 + 0.5 x 9.5 = 7.75 (note this will overstate avg IWF after 2015 due to nat'l appl stdrd)

Average loads per day for machines with load capacity under 25 pounds is 3, per Sutter and Pope (2006). Average washer volume is assumed to be 4 cubic feet.

Water savings = (7.75 – 4.5) x 4 x 3 = 39 gpd (14,235 gpy)

Plumbing Code Savings: Effective Jan 1, 2015, appliance standard is 4.5 IWF for front-load and 8.0 IWF for top-load. Given current front- and top-load market shares and Energy Star market share, average IWF under appliance standard in 2015 is:

2015 Avg IWF under Nat'l Appl Std = 0.52 x (0.5 x 8.0 + 0.5 x 6.0) + 0.48 x 4.5 = 5.8

Effective Jan 1, 2018, appliance standard is 4.5 IWF for front-load and 6.0 for top-load. Average IWF under appliance standard in 2018 is:

2018 Avg IWF under Nat'l Appl Std = 0.52 x 6.0 + 0.48 x 4.5 = 5.3.

For modeling conservation program benefits, we use the average of these two water factors – 5.6 -- and start the standard in 2015. Plumbing code savings starting in 2015 are:

Plumbing code savings = (7.75 – 5.6) x 4 x 3 = 26 gpd (9,490)

Plumbing Code NRR: 12.2%, average of the turnover rates assumed by AWE (11.1%) and DOE (13.3%) for commercial washers.

Annual Decay Rate: NA

Useful Life: 14 years, per DOE (2012)

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 39 gpd (14,235 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: 0.0036 KWh/gal. Based on high efficiency washer electricity savings reported in FEMP (2000).

Unit Gas Savings: 0.0035 therms/gal. Based on high efficiency washer gas savings reported in FEMP (2000).

Confidence Score: 3

ID	Name	Class	Category
N21	Energy Star Washer Rebates (IWF 4)	Non Residential	HEW

Note that the model has separate measures for N21a and N21b that are distinguished only by differing rebate amounts provided through time.

Water Savings: Assumes rebates are for common area laundry rooms, not individual apartments. Without rebate, participant will purchase either top- or front-load washer. Current market share (circa 2012) of top-load washers is 52%, per DOE (2012). Current Energy Star market share (circa 2012) is 50%, per DOE (2012). Maximum allowed IWF for Energy Star washer after 2011 is 6. Maximum allowed IWF for non-Energy Star washer is 9.5, per National Appliance Standard. (National Appliance Standard changes in 2015 to 4.5 IWF for front-load and 8.0 IWF for top-load, and again in 2018 to 6.0 IWF for top-load). Average IWF of new washer is:

Avg IWF of New Washer Without Rebate = 0.5 x 6.0 + 0.5 x 9.5 = 7.75 (note this will overstate avg IWF after 2015 due to nat'l appl stdrd)

Average loads per day for machines with load capacity under 25 pounds is 3, per Sutter and Pope (2006). Average washer volume is assumed to be 4 cubic feet.

Water savings = (7.75 – 4.0) x 4 x 3 = 45 gpd (16,425 gpy)

Plumbing Code Savings: Effective Jan 1, 2015, appliance standard is 4.5 IWF for front-load and 8.0 IWF for top-load. Given current front- and top-load market shares and Energy Star market share, average IWF under appliance standard in 2015 is:

2015 Avg IWF under Nat'l Appl Std = 0.52 x (0.5 x 8.0 + 0.5 x 6.0) + 0.48 x 4.5 = 5.8

Effective Jan 1, 2018, appliance standard is 4.5 IWF for front-load and 6.0 for top-load. Average IWF under appliance standard in 2018 is:

2018 Avg IWF under Nat'l Appl Std = 0.52 x 6.0 + 0.48 x 4.5 = 5.3.

For modeling conservation program benefits, we use the average of these two water factors – 5.6 -- and start the standard in 2015. Plumbing code savings starting in 2015 are:

Plumbing code savings = (7.75 – 5.6) x 4 x 3 = 26 gpd (9,490)

Plumbing Code NRR: 12.2%, average of the turnover rates assumed by AWE (11.1%) and DOE (13.3%) for commercial washers.

Annual Decay Rate: NA

Useful Life: 14 years, per DOE (2012)

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 45 gpd (16,425 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: 0.0036 KWh/gal. Based on high efficiency washer electricity savings reported in FEMP (2000).

Unit Gas Savings: 0.0035 therms/gal. Based on high efficiency washer gas savings reported in FEMP (2000).

Confidence Score: 3

ID	Name	Class	Category
N22	Landscape Grants	Non Residential	Grants

Water Savings: Average savings for previous grant projects (implemented 2011-2019) is shown in the following table based on calculations performed by SFPUC. The pre-grant average water use per acre is 1.6 AFY/Acre and the average water savings per acre is 0.2 AFY/Acre (11%), or 65,170 gpy (179 gpd).

Project Name	Project Size (acres)	Pre-Grant Use (mgy)	Projected Savings (mgy)	Projected Savings (%)	Observed Savings (mgy)[1]	Observed Savings (%)[1]
Balboa Park Water Conservation Project	17.3	15.4	1.5	10%	-1.24	-8%
Fort Mason Water Conservation Irrigation Upgrades	12.3	25.8	4.6	18%	7.5	29%
Sunset Blvd. Landscape Irrigation Retrofit	3.5	16.7	13.8	83%	N/A	N/A
Jefferson Square Park Water Conservation Project	5.1	6.0	1.7	28%	0.52	9%
Alta Plaza Park Water Conservation Project	4.0	9.7	3.8	39%	-0.65	-7%
Laguna Honda Hospital Water Conservation Project	2.5	2.9	0.96	33%	N/A	N/A
Moscone Recreation Center	6.2	8.8	2.7	30%	-0.36	-4%
Alamo Square Park	9.4	8.8	1.4	16%	2.41	27%
Sunol Glen Elementary School	1.7	2.56	1.17	46%	0.03	1%
Washington Square Park	1.5	3.0	1.7	60%	X	X
Forest Hill Station	0.7	1.13	0.44	39%	0.0	0%

[1] Based on simple comparison of billed consumption before and after project installation, with no controls for factors like weather, price, or drought restrictions.

Program N22a (Landscape Grants Pre2020) in the Tracking Model reflects landscapes with over 0.5 acre of irrigated area that were installed before 2020.

Program N22b (Landscape Grants Post 2020) in the Tracking Model reflects landscapes of 10,000 sf to 0.5 ac or more of irrigated area. Only one project of 10,000 sq ft has been completed between 2020-2025 (Lombard Street in May 2023). The Filoli Center Irrigation System Update Project is 845,000 sq ft (19.4 ac) and begins construction in 2025. Water savings are assumed to be the same as those estimated for N22a projects until updated savings estimates can be calculated from newly installed projects.

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA. No savings persistence data reported in CUWCC (2005).

Useful Life: SFPUC program assumption is 20 years.

Peak Period Savings Percent: Assumes 80% of outdoor savings occur in peak period. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 80%

Unit Sewer Savings: NA

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 2

ID	Name	Class	Category
N24	Equipment Retrofit Rebates	Non Residential	Grants

Water Savings: Water savings are 1 CCF/Yr (748 gpy) because the savings are entered directly as CCF/Yr in the Annual Activity.

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 10 years

Peak Period Savings Percent: 42%

Unit Sewer Savings: Same as water savings
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 1

ID	Name	Class	Category
N25	Custom Equipment Retrofit Rebates	Non Residential	Grants

All assumptions same as N24
N25a and N25b are only distinguished by the unit cost for each program.

ID	Name	Class	Category
N26	Non-Residential Leak Alerts	Non Residential	Audits & Reports

Water Savings: Detailed empirical analysis of SFPUC's Landscape Customer Leak Alert Program concluded:

- The Program reduced the mean duration of leak events lasting 72 or more hours from 495.6 to 438.4 hours.
- The Program did not reduce leak frequency.
- The Program reduced the mean leak volume by 1841.7 gallons per meter-year (5.0 gpd).

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 1 year.

Peak Period Savings Percent: We assume leaks are more or less distributed uniformly across the year.

Peak period runs from May 1 to Sep 30, representing 42% of days.

Unit Sewer Savings: We do not have data on how leakage is distributed between indoor and outdoor water uses. We assume non-residential water use is dominated by indoor water uses and so too are water savings from leak alerts.
Sewer savings = 0.9 x 1841.7 gpy per meter = 1657.5 gpy per meter
Wastewater to water savings ratio = 0.9

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 1

ID	Name	Class	Category
N27	Kitchen Low Flow Spray Valves	Non Residential	Grants

All assumptions taken directly from the SFPUC Retail Demand Model. The SFPUC Retail Demand Model used a daily water savings estimate of 30 gpd (10,950 gpy) and fixture useful life of 10 years. The estimate is based on empirical estimates of daily savings (60 gpd) and a 50% installation and retention rate.

Confidence Score: 1

ID	Name	Class	Category
N29	Efficient Irrigation Timer Rebate	Non-Residential	Grants

Water Savings: 13.4 gpd or 4891 gpy. This is the lower-bound of 95% CI of average savings per station, per A&N Technical's 2011 WBIC savings evaluation. Lower-bound is used because of San Francisco's climate and lower landscape water use.

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 10 years. Assumed

Peak Period Savings Percent: 100% of savings assumed to occur in peak season.

Unit Sewer Savings: NA

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 2

ID	Name	Class	Category
N30	ULFT to Ultra-High-Efficiency Toilet Rebate	Non-Residential	HET

Water Savings: 7.0 gpd (2540 gpy). Engineering estimate prepared by SFPUC staff.

Plumbing Code Savings: Effective Jan 1, 2014, same as water savings

Plumbing Code NRR: 3% per M.Cubed (2014)

Annual Decay Rate: NA. Leakage and double flushing assumed no worse than toilets replaced.

Useful Life: NA. Plumbing code ensures toilet cannot revert to lower efficiency. Period of savings attributed to program does not exceed useful life of toilet. On average savings are counted for 33 years, the average useful life of the toilet.

Peak Period Savings Percent: Assumes indoor savings evenly distributed through year. Peak period runs from May 1 to Sep 30, representing 42% of days. Peak % = 42%

Unit Sewer Savings: Sewer savings = 7.0 gpd (2540 gpy)
Wastewater to water savings ratio = 1.000

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 3

ID	Name	Class	Category
A3	Irrigation Customer Landscape Budgets	Non Residential	Audits & Reports

Water Savings: Many water suppliers have adopted water budgets for their large landscapes, which provides an effective way for both managing and evaluating large landscape programs. Landscape budgets are a form of customer education/information designed to help customers irrigate landscape efficiently. The effectiveness of this intervention can vary significantly depending on existing water use practices, types of landscapes subject to budgets, types of customers receiving budgets, cost of water, etc. There have been several empirical evaluations of landscape budget performance. Cal WEP provides a good summary of these studies.

The impact of landscape education on compliance with water budgets was evaluated in Orange County, California in a 2004 study. The education component was targeted at landscape contractors and property managers at home-owner associations (HOAs). The results were based on the experience of 47 HOAs that had participated in the program up to that point. The impact evaluation concluded that early participants in the program reduced their water demand by 9%, later participants by 20% (the difference between early and later participants was not explained).

Several studies are available that examine the impact of budget-based rates on large landscape water use. An early study, published in 1997 showed that tiered rates tied to landscape water budgets can reduce irrigation demand by about 20-25%.

Cal WEP compiled data from 12 Bay Area retailers on actual water use versus budget for a sample of large landscapes. On average, actual use exceeded budgeted use by 33%. Cal WEP also compared budget exceedence by type of customer. It found budget exceedence was greatest for HOAs and commercial properties (excluding gold courses) and lowest for parks and schools. The average exceedence for HOAs and commercial was 23% and 34%, respectively; for parks and schools it was 10% and 5%, respectively.

This measure assumes budgets would reduce large landscape water use by 10%, on average. This is at the lower-end of the savings range from empirical studies and significantly less than the average budget exceedence for the sample of 12 Bay Area water agencies. A conservative savings assumption is deemed appropriate because:

- Parks and schools, which tend to have lower budge exceedence, comprise most of the large landscape area in SFPUC's retail service area.
- SFPUC's high retail water rates already discourage wasteful irrigation and landscape water use.
- SFPUC's cool summer climate results in lower irrigation application rates relative to other parts of California with dryer, hotter summer climates.

The average pre-grant irrigation application rate at large landscape sites participating in SFPUC's large landscape grant program is 4 AF/acre (see N22).

Savings = 4 AF/acre x 0.1 = 0.4 AF/acre (130,340 gpy/acre)

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 1 year

Peak Period Savings Percent: 100%

Unit Sewer Savings: 0

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 3

ID	Name	Class	Category
A4a	Municipal Large Landscape Budget	Non Residential	Audits & Reports

Water Savings: Assumes 10% reduction in average pre-budget water use of 0.54 AF/Ac. See further detail in Measure A3.
Savings = 0.54 AF/acre x 0.1 = 0.054 AF/acre (17,596 gpy/acre; 48 gpd/acre)

SFPUC analyzed 2020 satellite imagery for all parcels associated with dedicated irrigation meters and identified the area of irrigable, irrigated landscape cover served by each meter and parcel. Based on calendar year 2024 billed consumption, the average pre-budget water use for municipal irrigation accounts was 0.54 AF/ac, based on 867 acres of irrigable, irrigated municipal landscape served by dedicated irrigation meters that are slated to receive regular water budget reports starting in late 2025.

Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 1 year

Peak Period Savings Percent: 100%

Unit Sewer Savings: 0

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 3

ID	Name	Class	Category
A4b	Non-Municipal Large Landscape Budget	Non Residential	Audits & Reports

Water Savings: Assumes 10% reduction in average pre-budget water use of 2.64 AF/Ac. See further detail in Measure A3.

Savings = 2.64 AF/acre x 0.1 = 0.264 AF/acre (86,025 gpy/acre; 236 gpd/acre)

SFPUC analyzed 2020 satellite imagery for all parcels associated with dedicated irrigation meters and identified the area of irrigable, irrigated landscape cover served by each meter and parcel. Based on calendar year 2024 billed consumption, the average pre-budget water use for non-municipal irrigation accounts was 2.64 AF/ac, based on 173 acres of irrigable, irrigated non-municipal landscape served by dedicated irrigation meters that are slated to receive regular water budget reports starting in late 2025.
Plumbing Code Savings: NA

Plumbing Code NRR: NA

Annual Decay Rate: NA

Useful Life: 1 year

Peak Period Savings Percent: 100%

Unit Sewer Savings: 0

Unit Electricity Savings: NA

Unit Gas Savings: NA

Confidence Score: 3

References

A&N Technical Services (1991) Chesnutt, T.W. and C.N. McSpadden, "A Model-Based Evaluation of the Westchester Water Conservation Programs." Prepared for the Metropolitan Water District of Southern California, January.

A&N Technical Services (1992d) Chesnutt, T.W., C.N. McSpadden, S.A. Rahman, and A. Bamezai, "A Model-Based Evaluation of Irvine Ranch Water District Residential Retrofit and Survey Water Conservation Projects." Prepared for the Metropolitan Water District of Southern California, August.

A&N Technical Services (1994a) Bamezai, A. and T.W. Chesnutt, Public Facilities Toilet Retrofits: Evaluation of Program Outcomes and Water Savings, A report for the Metropolitan Water District of Southern California, December.

A&N Technical Services (1994b) Bamezai, A. and T.W. Chesnutt, "Residential Water Audit Program: Evaluation of Program Outcomes and Water Savings," A report for the Metropolitan Water District of Southern California, December.

A&N Technical Services (1997) Pekelney, D. and T. W. Chesnutt, Landscape Water Conservation Programs: Evaluation of Water Budget Based Rate Structures, a report prepared for the Metropolitan Water District of Southern California, 1997

A&N Technical Services (2004) Chesnutt, T.W. et al., Evaluation of the Landscape Performance Certification Program, a report prepared for the Municipal Water District of Orange County, Metropolitan Water District of Southern California, and the US Bureau of Reclamation, 2004

A&N Technical Services (2011), "MWDOC Smart Timer Rebate Program Evaluation," Report prepared for Municipal Water District of Orange County

A&N Technical Services (2013), "Statistical Analysis of Multifamily Residence Bathroom Retrofit Water Savings," Report prepared for California Water Service.

Aquacraft (1999). Residential End Uses of Water Study.

California Urban Water Conservation Council. (2001). *CII ULFT Savings Study, 2nd Edition.* Sacramento: California Urban Water Conservation Council.

California Urban Water Conservation Council. (2005). *Draft Revision BMP Costs & Savings Study: A Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Managemnet Practices.* Sacramento: California Urban Water Conservation Council.

Chesnutt, T.W., C.N. McSpadden, and D.M. Pekelney (1995), "What is the Reliable Yield from Residential Home Water Survey Programs?" presented at the AWWA Conference in Anaheim CA, June.

DeOreo, W., Mayer, P., Henderson, J., Raucher, B., Gleick, P., Cooley, H., & Heberger, M. (2010). *California Single Family Home Water Use Efficiency Study.* Bolder, CO: Aquacraft, Inc.

DeOreo, W., Mayer, P., Henderson, J., Raucher, B., Gleick, P., Cooley, H., & Heberger, M. (2010a). *San Francisco Single Family Home Water Use Efficiency Study.* Bolder, CO: Aquacraft, Inc.

Federal Energy Management Program (FEMP 2000), "Assessment of High-Performance, Family-Sized Commercial Clothes Washers." Produced for the U.S. Department of Energy by Pacific Northwest National Laboratory, May.

Koeller & Company (2005), "High Efficiency Plumbing Fixtures – Toilets and Urinals." Prepared analysis of Potential Best Management Practices for the California Urban Water Conservation Council.

Koeller, J. (2006). *A Report on Potential Best Management Practices: Year Two Annual Report.* Sacramento: California Urban Water Conservation Council.

M.Cubed (2014). SFPUC Plumbing Fixture Population and Efficiency Saturation Estimates. Technical Memorandum prepared for San Francisco Public Utilities Commission.

M.Cubed and A&N Technical Services (2018a). Statistical Analysis of Bathroom Retrofit Water and Energy Savings: California Water Service Dominguez and East Lost Angeles Districts, DWR Grant Agreement No. 4600011093.

M.Cubed and A&N Technical Services (2018b). Statistical Analysis of Bathroom Retrofit Water and Energy Savings: California Water Service Bakersfield District, DWR Grant Agreement No. 4600011092.

M.Cubed (2024). Water Savings Assessment of SFPUC Leak Alert Programs. Technical Memorandum dated February 2, 2024, from David Mitchell, M.Cubed, to Chris Hewes, Woodard & Curran.

Mayer, P., et al., Water Budgets and Rate Structures: Innovative Management Tools, Journal AWWA, Volume 100:5, 2008

Mitchell D., and T. Chesnutt (2014). Evaluation of East Bay Municipal Utility District's Pilot of WaterSmart Home Water Reports. Prepared for California Water Foundation.

Sutter, M., T. Pope, and E. Walther (2006). Estimating Commercial Clothes Washer Use in California Coin Laundry Stores. ACEEE Summer Study on Energy Efficiency in Buildings.

U.S. Department of Energy (DOE 2006), "Energy Cost Calculator for Faucets and Showerheads," http://www1.eere.energy.gov/femp/procurement/eep_faucets_showerheads_calc.html#output . Last updated July 10, 2006.

U.S. Department of Energy (DOE 2012), Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Residential Clothes Washers, April 2012. Accessed at http://www.regulations.gov/#!documentDetail;D=EERE-2008-BT-STD-0019-0047.

Whitcomb, J.B. (2000), "Residential Water Survey Evaluation," prepared for Contra Costa Water District, May.

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

APPENDIX E

Supply Reliability Assessment Based on Level of Service Objective

2025 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

PUBLIC REVIEW DRAFT

March 2026

Prepared by: The San Francisco Public Utilities Commission

This page intentionally left blank

The SFPUC has a Level of Service objective to provide an annual average of 265 MGD in normal years, as well as a contractual obligation to provide 184 MGD to the Wholesale Customers in accordance with the Supply Assurance in the Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County (WSA). In addition to the supply modeling presented in the main body of this UWMP, supply modeling was conducted to assess the SFPUC's ability to meet its Level of Service objective and contractual obligations. For purposes of the 2025 UWMP including this appendix, Groveland Community Services District is reported as a wholesale customer but is considered a retail customer of the SFPUC solely for purposes of allocating Regional Water System (RWS) supplies between Retail Customers and Wholesale Customers. Its demands would be met by the retail supply allocation of 81 MGD.

As discussed in Section 7.1 of the UWMP, deliveries from the RWS to both Retail and Wholesale Customers are limited to an average annual of 265 MGD for the watersheds. Current and projected supply availability from the RWS is presented in Table E-1.

Table E-1. Regional Water System Supply Availability in Normal Years (MGD)

RWS Supply Allocation	Actual 2020 Demands	Projected 2025 Demands	Projected 2030 Demands	Projected 2035 Demands	Projected 2040 Demands	Projected 2045 Demands
Retail Customers[a, b]	81	81	81	81	81	81
Wholesale Customers[c, d]	184	184	184	184	184	184
Total RWS Supplies	265	265	265	265	265	265

a Groundwater and recycled water are assumed to be used before RWS supplies to meet retail demand. However, if these alternative supplies are not available, up to 81 MGD of RWS supply could be used in normal years.

b The Supply Assurance is the 184 MGD maximum annual average metered supply of water dedicated by San Francisco to public use in the Wholesale Customer service area (not including the cities of San Jose and Santa Clara).

c Cordilleras MWC is not a party to the WSA, and it is not included in the Wholesale Customer supply allocation of 184 MGD. The demands of Cordilleras MWC are minor (projected to be less than 0.01 MGD) and are anticipated to be met with RWS supplies through 2050.

Table E-2 summarizes the expected availability of local groundwater and local recycled water which are only available to meet retail demands. Normal, single dry, and multiple dry year conditions are on a water year basis. Dry year availability is presented in terms of percentage of normal year availability. Groundwater and recycled water are assumed to be used before RWS supplies to meet retail demand. However, if groundwater and recycled water supplies are not available, up to 81 MGD of RWS supply could be used. Groundwater and recycled water availability are not impacted by dry year conditions nor the implementation of the Bay-Delta Plan Amendment.

- Groundwater supplies are assumed to be equivalent to projected demands for the San Francisco Groundwater Supply Project (4.0 MGD by 2030) and Castlewood CSA (0.3 MGD).
- Recycled water supplies are assumed to be equivalent to projected demands related to the Westside Recycled Water Project (1.7 MGD by 2050), Harding Park and Fleming Golf Courses (0.2 MGD), and Sharp Park Golf Course (up to 0.1 MGD) and Treasure Island (0.4 MGD by 2050).

Table E-2. Retail Groundwater and Recycled Water Supply Availability During Normal and Dry Years

Water Supply	Normal Year	Single Dry Year	Dry Year 1	Dry Year 2	Dry Year 3	Dry Year 4	Dry Year 5
Local Groundwater	100%	100%	100%	100%	100%	100%	100%
Local Recycled Water	100%	100%	100%	100%	100%	100%	100%

Projected supply reliability for years 2030 through 2050 assume total demand is equivalent to the sum of the projected retail and wholesale demands on the RWS, which includes Wholesale Customer purchase projections provided to the SFPUC by BAWSCA on March 4, 2026. Refer to Table E-3 below.

Table E-3. Retail and Wholesale RWS Demand Assumptions Used for Supply Reliability Modeling (MGD)

Customer	2050
Retail Customers	66.7
Wholesale Customers	184.0
Total	**250.7**

The total amount of water the SFPUC can deliver to the Retail and Wholesale Customers from the RWS depends on several factors, including (1) the amount of water that is available to the SFPUC from natural runoff, (2) the amount of water in reservoir storage, and (3) the amount of water that the SFPUC releases from the RWS for purposes other than customer deliveries (e.g., instream flow releases below RWS reservoirs). For planning purposes, the SFPUC "average year" or "normal year" is based on historical hydrology under conditions that allow the RWS reservoirs to be filled over the course of the snowmelt season, allowing full deliveries to customers. For "dry-year" supply scenarios, the SFPUC plans its water deliveries using a water-supply planning methodology with reference to a simulated 8.5-year design drought. Dry year availability is presented in terms of percentage of normal year availability.

Table E-4 shows RWS supplies under normal, single dry, and multiple dry year conditions (on a water year basis) and for each of the two supply scenarios. The SFPUC estimated RWS deliveries using the standard SFPUC procedure, which includes adding increased levels of rationing as needed in dry years to balance the demands on the RWS with available water supply. The five consecutive dry-year sequence shown in the tables below represent years 2 through 6 of the design drought. The SFPUC chose this sequence because year 2 is the first year in which system-wide water use reductions could take effect, as the design drought sequence generally begins year 1 with full reservoirs. All simulations that the SFPUC has prepared for its 2025 UWMP have increased levels of rationing in the final years of the design drought sequence. The SFPUC has presented the results in the standardized format prescribed by DWR. Additionally, the SFPUC has a Water Shortage Contingency Plan that defines six distinct shortage levels that the RWS may be in and the corresponding actions that the SFPUC would take to address the water shortage, ranging from use of dry year water supplies (when available), voluntary water use reductions, and mandatory water use reductions.

Supply modeling to assess whether the SFPUC can meet its Supply Assurance of providing an annual average of 184 MGD to Wholesale Customers in normal years was conducted using the same methodology described in Section 8.2. Because of the uncertainty surrounding implementation of the Bay-Delta Plan Amendment, the water supply reliability assessment includes a set of tables for each of the two future supply scenarios:

- With Implementation of the Bay-Delta Plan Amendment: Under this scenario, using the demand assumptions shown in Table E-3, the SFPUC anticipates RWS supplies will experience a reduction of up to 52% through the multiple dry-year sequence. The implementation of the Alternative Water Supply Program and associated potential projects will help reduce the anticipated supply shortfalls.

- Without Implementation of the Bay-Delta Plan Amendment: Under this scenario, using the demand assumptions shown in Table E-3, the SFPUC system can expect to experience RWS supply reductions of approximately 10% in a single dry year and across five consecutive dry years.

Table E-4. Water Supply Availability During Normal and Dry Years for Base Year 2050 – With and Without Bay-Delta Plan Amendment

Supply Scenario	Normal Year[a]	Single Dry Year	Dry Year 1	Dry Year 2	Dry Year 3	Dry Year 4	Dry Year 5
With Bay-Delta Plan Amendment	100%	58%	58%	48%	48%	48%	48%
Without Bay-Delta Plan Amendment	100%	90%	90%	90%	90%	90%	90%

The SFPUC utilized the Water Shortage Allocation Plan (WSAP) that is incorporated in the Water Supply Agreement between the SFPUC and the Wholesale Customers to allocate the RWS supply available during dry years between the Retail Customers and the Wholesale Customers in the 2025 UWMP supply reliability analysis. The WSAP, also known as the Tier 1 Plan, defines the method for allocating between the Retail Customers collectively and Wholesale Customers collectively the available RWS supplies during system-wide shortages. For example, when the required level of system-wide reduction in water use is 6 to 10%, the Retail Customer Tier 1 Allocation is 36% of the annual water supply available, and the Wholesale Customer Tier 1 Allocation is 64% of the annual water supply available. The SFPUC and the Wholesale Customers most recently amended the WSAP in 2025. Also in 2025, the Wholesale Customers adopted an updated Tier 2 Plan, which allocates the collective Wholesale Customers' share of available RWS supplies from the Tier 1 Plan among each of the 26 Wholesale Customers. The WSAP addresses shortages that require a system-wide reduction in water use of 20% or less, consistent with the SFPUC's Level of Service Goal. For any shortage scenario requiring a system-wide reduction in water use above 20% in the supply reliability analysis, the SFPUC applied the Tier 1 Plan's allocation of supplies between the Retail Customers and Wholesale Customers for a shortage requiring a system-wide reduction in water use of 16-20%.

Under the WSAP, if the Retail Customers' share of the available water supply results in the Retail Customers having a "positive allocation" (i.e., a supply of additional water rather than a percentage reduction in water use), then the Retail Customers' percentage share of the available water supply would be reduced to eliminate any positive allocation to the Retail Customers, with a corresponding increase in the percentage share of the available water supply allocated to the Wholesale Customers. For any level of required reduction in system-wide water use, the SFPUC shall require the Retail Customers to conserve a minimum of 5%, with any resulting reallocated supply credited to storage for inclusion in the calculation of projected available RWS supply in a subsequent year.

Because of the uncertainty surrounding implementation of the Bay-Delta Plan Amendment, the RWS supply reliability assessment evaluates two future supply scenarios: (1) with implementation of the Bay-Delta Plan Amendment, and (2) without implementation of the Bay-Delta Plan Amendment. It is unknown when implementation may begin on the Bay-Delta Plan Amendment; for the purposes of the 2025 UWMP analysis, the SFPUC included it beginning in the 2030 modeling scenarios.

The SFPUC incorporated additional modeling assumptions in the 2025 UWMP analysis regarding the State Water Resources Control Board (SWRCB) curtailments and assumptions regarding agreements with Turlock and Modesto Irrigation Districts pertaining to instream flow obligations.

1. During the last two drought periods, 2013-2016 and 2021-2023, the SWRCB implemented curtailments through emergency regulations and curtailment orders that attempted to limit diversions from Central Valley watersheds including the Tuolumne River at certain times. Due to the uncertain legality of the SWRCB's curtailment actions as well as the uncertainties regarding any potential future curtailment actions against San Francisco, the SFPUC's RWS supply reliability analyses do not assume curtailments are in effect.

2. Through a 1966 agreement with the Modesto and Turlock Irrigation Districts (Districts), who are more senior downstream appropriative water rights holders on the Tuolumne River, San Francisco may become responsible for up to approximately 51.7% of any flow releases the Federal Energy Regulatory Commission (FERC) may require through issuance of a new license for the Districts' Don Pedro Hydropower Project. The exact flow contribution for which San Francisco may become responsible is highly uncertain and may depend on multiple currently unknown factors, including an anticipated Endangered Species Act biological opinion from the National Marine Fisheries Service and a Clean Water Act section 401 water quality certification from the SWRCB. San Francisco's potential responsibility for FERC-ordered flows may further depend on San Francisco's ability to enter into a new or extended agreement with the Districts to offset a portion of San Francisco's flow contributions in exchange for payment. Due to the high levels of uncertainty surrounding the Districts' FERC-relicensing process, as well as the unknown timing for license issuance, the SFPUC's RWS water supply reliability analyses do not assume additional water supply losses from any potential new FERC-ordered flow releases.

3. The simulation of the Bay-Delta Plan Amendment scenario assumes that a 1996 agreement between San Francisco and the Districts (the Side Agreement), which allows San Francisco to pay the Districts in lieu of contributing a portion of current FERC-ordered flow releases, remains in effect, and that the San Francisco share of flows in excess of and not covered by the Side Agreement is approximately 51.7%. These assumptions were made for the purpose of completing the modeling for the UWMP update, and they do not represent a commitment by San Francisco or the Districts to any future agreement or of San Francisco accepting responsibility for any future FERC-ordered flow releases.

Based on current projected demands for Retail Customers and Wholesale Customers' Supply Assurance of 184 MGD, supply modeling for the two future supply scenarios shows significantly different supply reliability projections for the RWS:

- **With Implementation of the Bay-Delta Plan Amendment**: During a normal year, no shortages are expected for the RWS. During a single dry year and year 1 of a multi-year drought, RWS supplies show an anticipated shortfall of 42% (or 145.4 MGD in available supplies). At shortages 20% or greater, the Retail Customers' allocation is assumed to be 37.5% (or 54.5 MGD) and the Wholesale Customers' allocation is assumed to be 62.5% (or 90.9 MGD). The total retail supply is calculated by adding the retail RWS allocation with local supplies. For wholesale, the total supply is the wholesale allocation. The difference between total supply and total demand is the shortfall (or -12.2 MGD for retail and -93.1 MGD for wholesale). During years 2 through 5 of a multi-year drought, RWS supplies show an anticipated shortfall of 52% (or 120.2 MGD in available supplies). Similar to year 1, the same retail and wholesale allocation split is applied. The shortfall between total supply and total demand during these years for retail is -21.6 MGD and for wholesale is -108.8 MGD. For supply and demand comparisons, see
- Table E-5 and Table E-6 for retail and wholesale supply, respectively.

- **Without Implementation of the Bay-Delta Plan Amendment**: During a normal year, no shortages are expected for the RWS. During a single dry year and years 1 through 5 of a multi-year drought, RWS supplies show an anticipated shortfall of 10% (or 225.6 MGD in available supplies). At a 10% shortage, the Retail Customers' allocation is 36% (or 81.2 MGD) and the Wholesale Customers' allocation is 64% (or 144.4 MGD). Because the retail allocation is above the demand, excess allocation above 66.7 MGD is re-allocated to Wholesale Customers. Therefore, 14.5 MGD is added to the wholesale allocation bringing it to 158.9 MGD. The difference between total supply and total demand is the surplus/shortfall (or 14.5 MGD for retail and -25.3 MGD for wholesale). For supply and demand comparisons, see Table E-7 and Table E-8 for retail and wholesale supply, respectively.

Table E-5. Retail Supply and Demand Comparison for Projected Normal and Dry Year Scenarios, With Bay-Delta Plan Amendment

Year	Retail Supply and Demand	Normal Year	Single Dry Year	Dry Year 1	Dry Year 2	Dry Year 3	Dry Year 4	Dry Year 5
2050	Total Retail Demand	73.4	73.4	73.4	73.4	73.4	73.4	73.4
	Total Retail Supply	73.4	61.2	61.2	51.8	51.8	51.8	51.8
	Retail Groundwater	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*
	Retail Recycled Water	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*
	RWS Supply Available to Retail	*66.7*	*66.7*	*54.5*	*45.1*	*45.1*	*45.1*	*45.1*
	Difference (Supply Surplus or Shortfall)	0.0	-12.2	-12.2	-21.6	-21.6	-21.6	-21.6
	Difference as Percentage of Demand	0.0%	-16.6%	-16.6%	-29.4%	-29.4%	-29.4%	-29.4%

Table E-6. Wholesale Supply and Demand Comparison for Projected Normal and Dry Year Scenarios with Bay-Delta Plan Amendment (MGD)

Year	Wholesale Supply and Demand	Normal Year	Single Dry Year	Dry Year 1	Dry Year 2	Dry Year 3	Dry Year 4	Dry Year 5
2050	Total Wholesale Demand	184.0	184.0	184.0	184.0	184.0	184.0	184.0
	Total Wholesale RWS Supply	184.0	90.9	90.9	75.2	75.2	75.2	75.2
	Difference (Surplus or Shortfall)	0.0	-93.1	-93.1	-108.8	-108.8	-108.8	-108.8
	Difference as % of Demand	0.0%	-50.6%	-50.6%	-59.1%	-59.1%	-59.1%	-59.1%

Table E-7. Retail Supply and Demand Comparison for Projected Normal and Dry Year Scenarios, Without Bay-Delta Plan Amendment

Year	Retail Supply and Demand	Normal Year	Single Dry Year	Dry Year 1	Dry Year 2	Dry Year 3	Dry Year 4	Dry Year 5
2050	Total Retail Demand	73.4	73.4	73.4	73.4	73.4	73.4	73.4
	Total Retail Supply	73.4	87.9	87.9	87.9	87.9	87.9	87.9
	Retail Groundwater	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*
	Retail Recycled Water	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*
	RWS Supply Available to Retail	*66.7*	*81.2*[a]	*81.2*[a]	*81.2*[a]	*81.2*[a]	*81.2*[a]	*81.2*[a]
	Difference (Supply Surplus or Shortfall)	0.0	14.5	14.5	14.5	14.5	14.5	14.5
	Difference as Percentage of Demand	0.0%	19.8%	19.8%	19.8%	19.8%	19.8%	19.8%

a Per the WSA, at 10% shortage (Dry Years 1-5), the retail allocation is 36% (81.2 MGD) and the wholesale RWS supply allocation is 64% (144.4 MGD). Retail allocations above 66.7 MGD (or 14.5 MGD) are re-allocated to Wholesale Customers.

Table E-8. Wholesale Supply and Demand Comparison for Projected Normal and Dry Year Scenarios Without Bay-Delta Plan (MGD)

Year	Wholesale Supply and Demand	Normal Year	Single Dry Year	Dry Year 1	Dry Year 2	Dry Year 3	Dry Year 4	Dry Year 5
2050	Total Wholesale Demand	184.0	184.0	184.0	184.0	184.0	184.0	184.0
	Total Wholesale RWS Supply	184.0	158.9[a]	158.9[a]	158.9[a]	158.9[a]	158.9[a]	158.9[a]
	Difference (Surplus or Shortfall)	0.0	-25.3	-25.3	-25.3	-25.3	-25.3	-25.3
	Difference as % of Demand	0.0%	-13.7%	-13.7%	-13.7%	-13.7%	-13.7%	-13.7%

a Per the WSA, at 10% shortage (Dry Years 1-5), the wholesale RWS supply allocation is 64% (144.4 MGD) and the retail allocation is 36% (81.2 MGD). Retail allocations above 66.7 MGD are re-allocated to Wholesale Customers. Therefore, 14.5 MGD is added to the wholesale allocation, bringing it to 158.9 MGD.

2025 WATER SHORTAGE CONTINGENCY PLAN

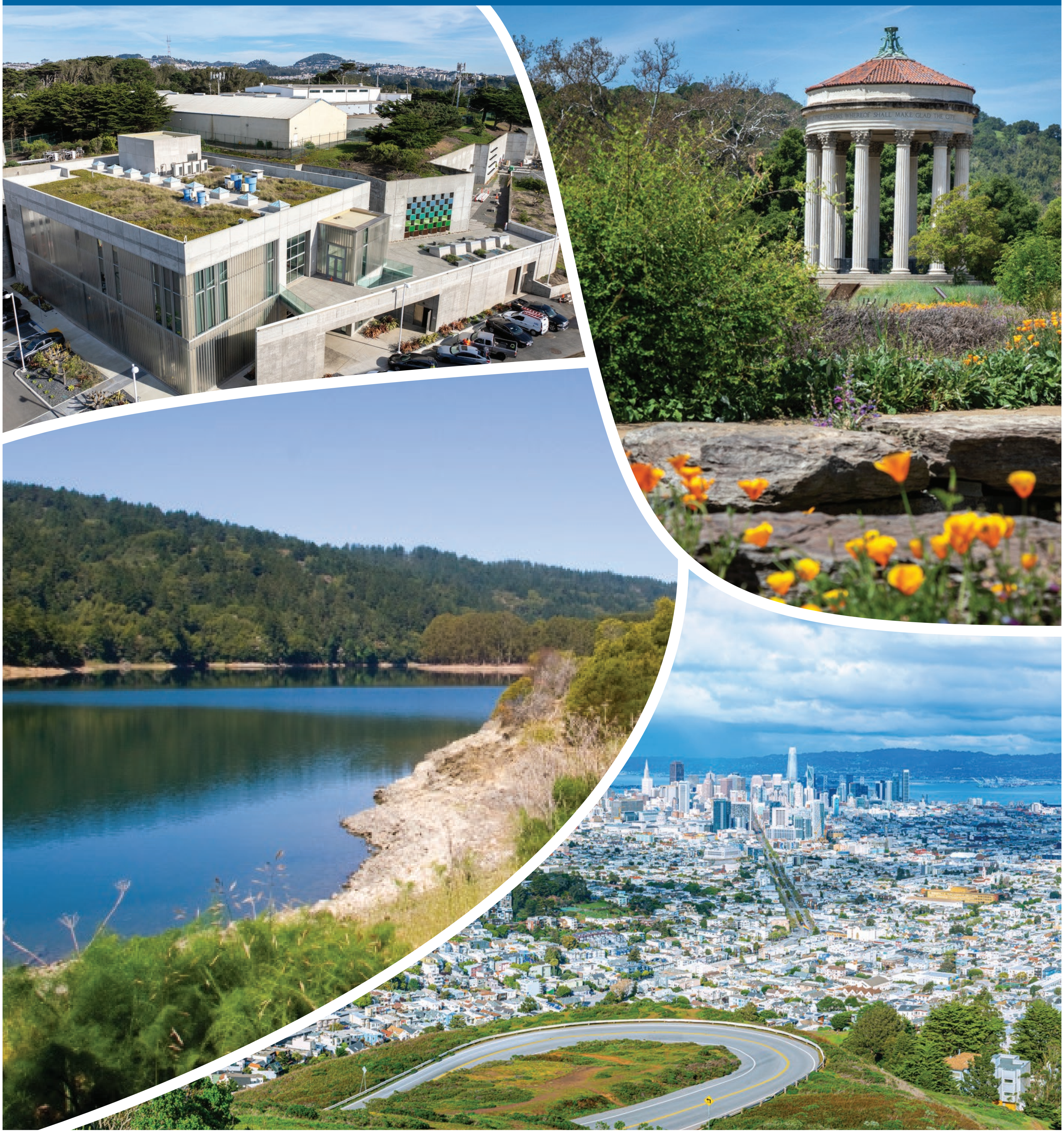
FOR THE CITY AND COUNTY OF SAN FRANCISCO

PUBLIC REVIEW DRAFT

March 2026

Prepared by: The San Francisco Public Utilities Commission

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission



This page intentionally left blank.

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

AF	Acre-feet
BAWSCA	Bay Area Water Supply and Conservation Agency
City	City and County of San Francisco
CSD	Community Services District
CY	Calendar Year
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utility District
EOP	Emergency Operations Plan
FY	Fiscal Year
ISL	Interim Supply Limitation
LOS	Levels of Service
MGD	million gallons per day (flow or usage rate of water)
RWS	San Francisco Regional Water System
RWSAP	Retail Water Shortage Allocation Plan
SAPS	San Antonio Pump Station
SB	Senate Bill
SFPUC	San Francisco Public Utilities Commission
State	State of California
SVCF	Sunol Valley Chloramination Facility
SVWTP	Sunol Valley Water Treatment Plant
SWRCB	State Water Resources Control Board
UWMP	Urban Water Management Plan
Valley Water or VW	Santa Clara Valley Water District
WSA	Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County
WSAP	Water Shortage Allocation Plan
WSCP or Plan	Water Shortage Contingency Plan
WSDA	Water Supply and Demand Assessment
WSIP	Water System Improvement Program

This page intentionally left blank.

SECTION 1 INTRODUCTION

The San Francisco Public Utilities Commission (SFPUC) presents this Water Shortage Contingency Plan (WSCP or Plan) on behalf of the City and County of San Francisco (City). This WSCP complies with California Water Code Section 10632, which requires that every urban water supplier prepare and adopt a WSCP as part of its urban water management plan (UWMP). This WSCP presents the latest information about the SFPUC's annual water supply and demand assessment (WSDA) procedures and describes the SFPUC's water shortage contingency planning. The WSCP describes the SFPUC's water shortage levels and associated response actions to be implemented during a water shortage condition.

1.1 BACKGROUND AND APPLICATION

Over 2.7 million people and businesses in the San Francisco Bay Area rely on water supplied by the SFPUC, a City department, to meet their daily water needs. The San Francisco Regional Water System (RWS) is municipally owned infrastructure operated by the SFPUC that serves both retail and wholesale customers. The RWS supplies high-quality drinking water from the Tuolumne River watershed and from the local Alameda and Peninsula watersheds. The RWS draws an average of 85% of its supply from the Tuolumne River watershed, collected in Hetch Hetchy Reservoir in Yosemite National Park. This water feeds into an aqueduct system delivering water 167 miles by gravity to Bay Area reservoirs and customers. The remaining 15% of the RWS supply is drawn from local surface waters in the Alameda and Peninsula watersheds. The percentage split between these water sources varies from year to year depending on the water year hydrology and operational circumstances.

The SFPUC provides retail water service to customers both inside and outside of San Francisco (collectively referred to as the retail customers). The majority of the retail customers are located inside of San Francisco and are referred to as "in-City" retail customers. The small number of retail customers outside of San Francisco are located along the RWS transmission system and are referred to as "suburban" retail customers. The in-City distribution system serves a residential population of nearly 844,000 in addition to San Francisco-based businesses. The suburban retail customers include a residential population of approximately 2,000, as well as businesses and institutions, in San Mateo, Santa Clara, Alameda, Tuolumne, and San Joaquin Counties. In-City retail customers are primarily served with RWS supply, but some customers also receive groundwater and recycled water from the SFPUC or other providers. Similarly, the suburban retail customers are primarily served with RWS supply with one customer also receiving groundwater from the SFPUC.

Traditional surface water supplies from the SFPUC's Upper Tuolumne, Alameda, and Peninsula watersheds are the backbone of the RWS's water supply. The SFPUC extends and protects those supplies in many ways, including, but not limited to, the following actions within its Retail service area: (1) encouraging its retail customers to help save water through robust conservation programs; (2) reducing the need for additional water to serve new developments in San Francisco through an onsite water reuse program; (3) recycling wastewater resources in San Francisco to deliver water for large non-potable uses; (4) utilizing local groundwater supplies to supplement or offset surface water supplies; (5) investigating new, alternative dry-year water supply options such as purified water; and (6) investing in innovations that allow for creative solutions to meet diverse needs. These efforts help the SFPUC conserve water and diversify supplies to reduce the likelihood of a water shortage condition.

The contents of this WSCP are applicable to all retail customers as identified in Table 1 and shown on the map in Figure 1-1.

Table 1-1. Retail Public Water Systems

Public Water System ID	Public Water System Name	Water Supply Type	Description
CA3810001	SAN FRANCISCO REGIONAL WATER SYSTEM	Treated surface water, groundwater, and raw water	Regional Water System (RWS) that serves the SFPUC's suburban retail customers that are not described in the rows below (in addition to the SFPUC's wholesale customers).
CA3810011	SAN FRANCISCO WATER SYSTEM	Treated surface water and groundwater	The City and County of San Francisco's water distribution system that serves water to in-City retail customers.
CA3810702	TREASURE ISLAND WATER SYSTEM	Treated surface water	An island and neighborhood in the City and County of San Francisco. Water demands from Treasure Island are a part of in-City retail demands.
CA0110012	TOWN OF SUNOL WATER SYSTEM	Treated surface water	Domestic water system for the Town of Sunol in unincorporated Alameda County, which typically serves less than 0.1 MGD.
CA3810008	THOMAS SHAFT WHOLESALE WATER SYSTEM	Treated surface water	Water facilities located at the Lawrence Livermore National Laboratory Site 300 at Thomas Shaft of the Coast Range Tunnel.
CA3810003	MOCCASIN COMPOUND WATER SYSTEM	Treated surface water	Raw water from Hetch Hetchy Reservoir that serves suburban retail customer in the Town of Moccasin in unincorporated Tuolumne County.
CA0110018	PLEASANTON WELL FIELD WATER SYSTEM	Groundwater	Referred to as the Castlewood Well System where approximately 0.3 MGD of treated (potable) groundwater is served to the Castlewood County Service Area in unincorporated Alameda County.
CA3810005	O'SHAUGHNESSY DAM COMPOUND WATER SYSTEM	Raw water	Raw water from Hetch Hetchy Reservoir.
CA3810006	EARLY INTAKE COMPOUND WATER SYSTEM	Raw water	Raw water from Hetch Hetchy Reservoir.

Note: This list includes all public water systems owned and operated by the SFPUC. Pleasanton Well Field is not part of the RWS. The State does not require that the SFPUC report all public water systems on this list in the UWMP.

The SFPUC also delivers water to wholesale customers in the Bay Area that purchase RWS water for retail customers in their individual service areas. The Bay Area Water Supply and Conservation Agency (BAWSCA) represents the interests of 26 wholesale customers of the SFPUC that are in Alameda, Santa Clara, and San Mateo Counties (collectively, Wholesale Customers) and coordinates water conservation programming on their behalf. One SFPUC wholesale customer not represented by BAWSCA is the Cordilleras Mutual Water Company, a small water association serving 18 single-family homes located in Redwood City in San Mateo County. Another SFPUC customer, the Groveland Community Services District (CSD), located in Tuolumne County, is considered a wholesale customer for the purposes of the SFPUC's UWMP and WSCP because it produces its own UWMP and

WSCP, but the SFPUC considers it among its retail customers in the context of allocating RWS supplies between retail and Wholesale Customers. Collectively, the wholesale customers on average receive over two thirds of the RWS's annual deliveries, with the remaining approximately one third provided to the retail customers. See Figure 1-2 for a map showing the wholesale service area encompassing all of the SFPUC's wholesale customers.

Parts of this WSCP are relevant for the SFPUC's wholesale customers, particularly when the RWS is experiencing a system-wide water shortage condition. However, these wholesale customers are also urban water suppliers that are required to prepare their own WSCPs for the retail customers that they serve. Table 1-2 indicates which sections of this Plan, following this introduction section, are applicable to the SFPUC's wholesale customers.

This introduction section provides background and application of this Plan. A summary of the SFPUC's response to past water shortages is found in the following sections:

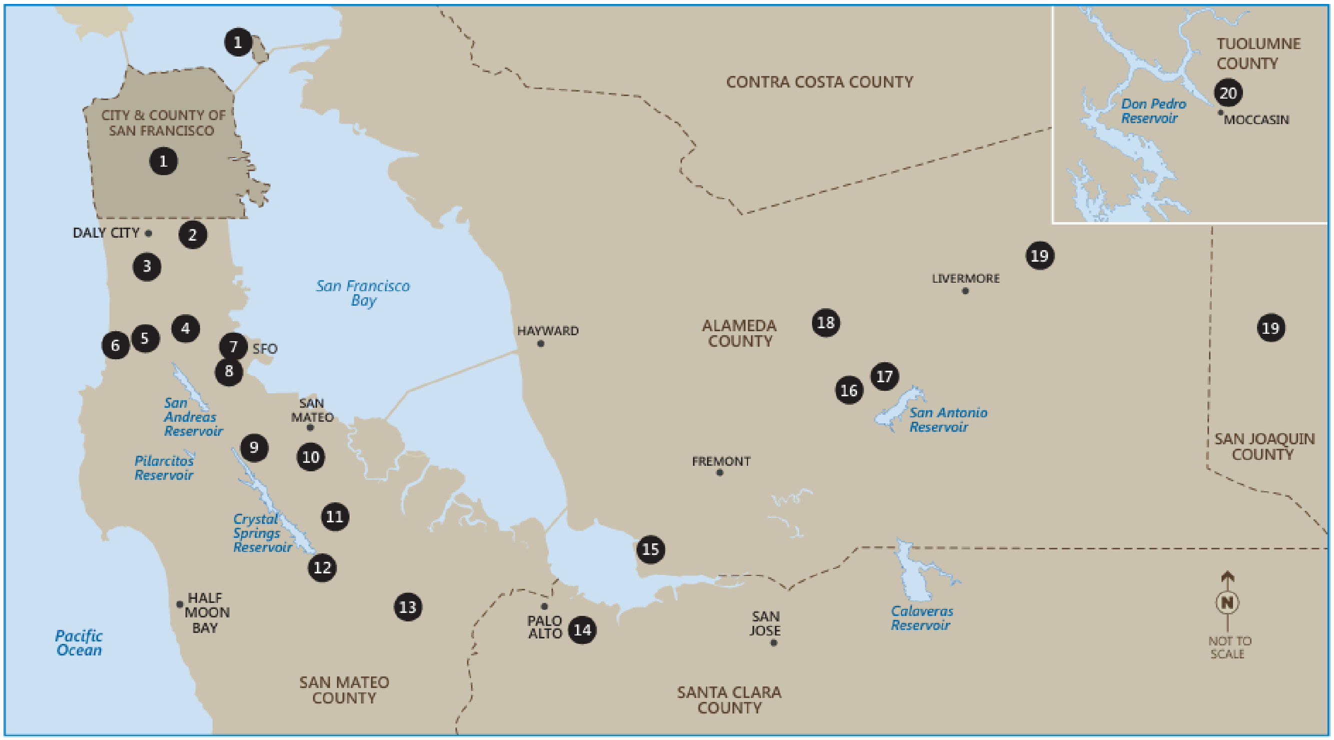
- Pre-2010 water shortages: see Section 1.2, described in more detail in Appendix A
- 2012-2016 drought: see Section 1.3, described in more detail in Appendix B
- 2020-2023 drought: see Section 1.4, described in more detail in Appendix C

Table 1-2. Application of Water Shortage Contingency Plan for Retail vs. Wholesale Customers

Section	Retail	Wholesale
2. Annual Water Supply and Demand Assessment Procedures	✓	✓
3. Water Shortage Levels	✓	✓
4. Retail Water Shortage Response Actions	✓	
5. Communication Protocols	✓	✓*
6. Compliance and Enforcement	✓	
7. Legal Authorities	✓	✓*
8. Financial Consequences of the WSCP	✓	✓*
9. Monitoring and Reporting	✓	
10. Preparation for Catastrophic Supply Interruption	✓	✓
11. WSCP Refinement Procedures	✓	
12. Plan Adoption, Submittal, and Availability	✓	

*Portions of this section are relevant for wholesale customers where noted.

Figure 1-1: Retail Service Customers



IN-CITY RETAIL SERVICE AREA

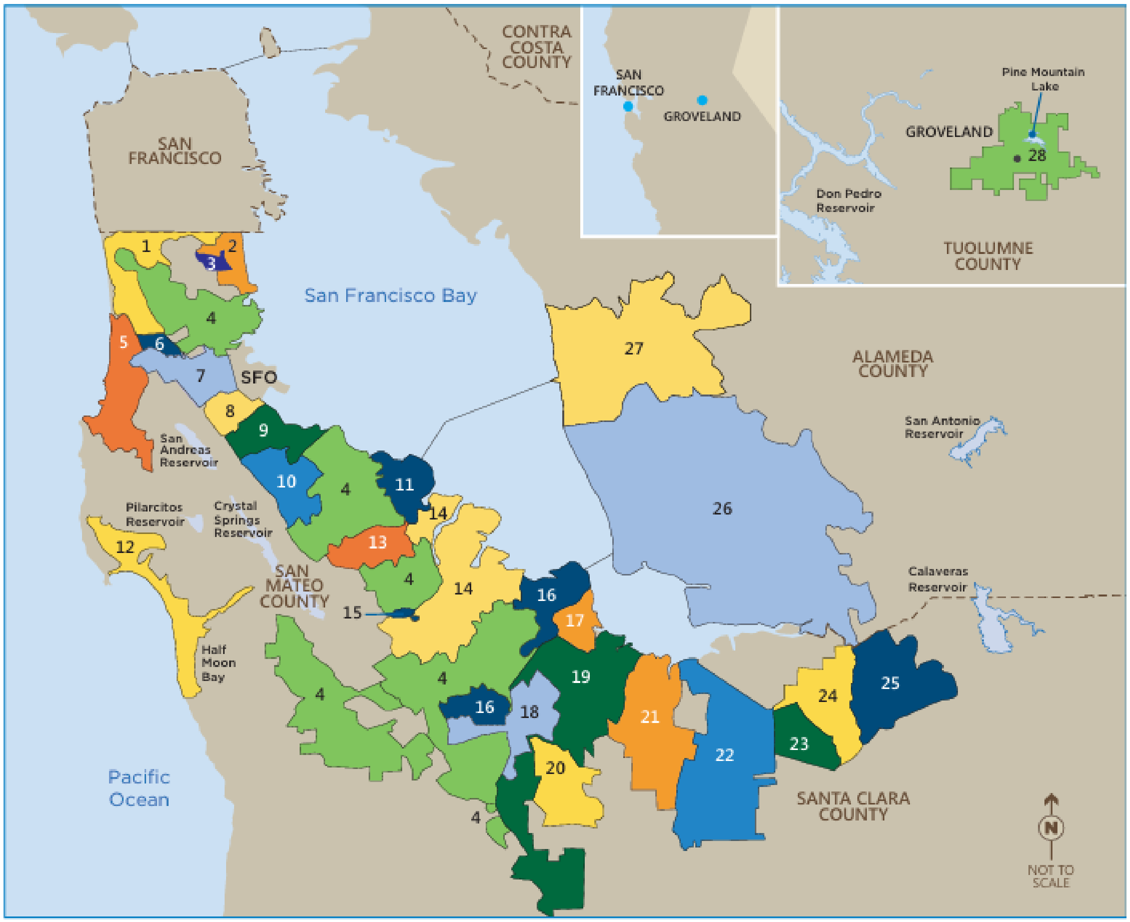
1 City and County of San Francisco

SUBURBAN RETAIL SERVICE AREA

2 Residential and Non-residential Customers in Daly City
3 Cemeteries in Colma
4 Golden Gate National Cemetery
5 San Francisco County Jail #3
6 Sharp Park Golf Course
7 San Francisco International Airport
8 SFPUC Millbrae Headquarters
9 Crystal Springs Golf Course
10 Peninsula Golf and Country Club
11 Residential Customers in Redwood City
12 Filoli Center
13 Menlo Country Club
14 NASA Ames Research Center
15 Cargill Salt
16 Residential and Non-residential Customers in Sunol
17 GE Hitachi Nuclear
18 Castlewood Country Club
19 Lawrence Livermore National Laboratory (Mocho Shaft at Site 200 and Thomas Shaft at Site 300)
20 Residential and non-residential customers in Moccasin

The suburban customers shown above represent the majority of water use in the suburban retail service area but are not comprehensive. Castlewood Country Club receives groundwater from wells that are not connected to the RWS. The SFPUC reports Groveland CSD as a wholesale customer in its UWMP because Groveland CSD is an urban water supplier and prepares its own UWMP and WSCP. Outside of its UWMP and WSCP, the SFPUC considers Groveland CSD as a retail customer in the context of allocating RWS supplies between retail and wholesale customers.

Figure 1-2: Wholesale Service Area



MUNICIPALITIES

- 2 City of Brisbane
- 9 City of Burlingame
- 1 City of Daly City
- 17 City of East Palo Alto
- 27 City of Hayward
- 16 City of Menlo Park
- 8 City of Millbrae
- 25 City of Milpitas
- 21 City of Mountain View
- 19 City of Palo Alto
- 14 City of Redwood City
- 7 City of San Bruno
- 24 City of San Jose[a]
- 23 City of Santa Clara[a]
- 22 City of Sunnyvale
- 10 Town of Hillsborough

WATER PURVEYING DISTRICTS

- 26 Alameda County Water District
- 12 Coastside County Water District
- 11 Estero Municipal Improvement District
- 3 Guadalupe Valley Municipal Improvement District
- 13 Mid-Peninsula Water District
- 5 North Coast County Water District
- 20 Purissima Hills Water District
- 6 Westborough Water District
- 28 Groveland Community Services District[b]

OTHER ENTITIES

- 4 California Water Service Company[c]
- 18 Stanford University
- 15 Cordilleras Mutual Water Company[d]

Notes: The SFPUC provides water on an interruptible basis to fixed service areas in the northern portions of the Cities of San Jose and Santa Clara. California Water Service Company (Cal Water), an investor-owned utility, provides water service to four separate districts in the SFPUC's wholesale service area, which are consolidated into three operating districts: (1) Bear Gulch (serving Portola Valley, Woodside, Atherton, and portions of Menlo Park, Redwood City, and San Mateo County), (2) Mid-Peninsula (serving San Mateo and San Carlos), and (3) South San Francisco.

1.2 EXPERIENCE WITH WATER SHORTAGES PRE-2010

Every water system has vulnerabilities that could impact its ability to provide a safe and reliable supply of water. Water shortages can occur in several ways. Very localized shortages can occur due to distribution system problems, and system-wide shortages can occur due to major facility failures. System-wide shortages may limit the amount of water that is available over a series of years. Water shortage conditions are also not necessarily caused by physical facility limitations. Within the past 50 years, San Francisco has experienced both localized shortages due to earthquakes and system-wide shortages due to drought.

- The 1976-1977 drought was one of the driest periods in California history, which led to severe water shortages across the state.

- In 1987-1992, San Francisco experienced a serious drought, during which the SFPUC adopted various action levels in response to low water levels at Hetch Hetchy Reservoir, which had been being taxed to the point of running out of water.

- Following the October 17, 1989, Loma Prieta earthquake, the SFPUC worked with the Mayor's Office of Emergency Response to reconnect water service for retail customers impacted by the earthquake. Most of the homes that lost water service were reconnected within 72 hours.

- In April 2007, below normal precipitation and snowpack caused the SFPUC to initiate a 10% voluntary reduction in water use in its service area. The call for a voluntary reduction continued through 2009.

The SFPUC's past experiences with water shortages during drought and following major earthquakes shaped its current water shortage preparedness plans and response policies. The longest drought that impacted the SFPUC's ability to maintain full deliveries to its customers was the 1987-1992 drought. During that drought's first few years, as reservoir storage continued to decline, it became evident that the SFPUC could not sustain full deliveries without the risk of running out of water before the drought ended. This circumstance became a reality in early 1991 when Hetch Hetchy Reservoir became so depleted (less than 25,000 AF of storage in a reservoir with over 360,000 AF of capacity) that minimum instream flow releases and anticipated demands required the SFPUC to initiate programs to achieve a 45% reduction in system-wide water deliveries to balance water supplies with deliveries. Fortunately, unexpected runoff in March 1991 relieved the severity of that shortage. The 1987-1992 drought illustrated the deficit between the SFPUC's supplies and its customers' demands. Appendix A provides a more detailed summary of San Francisco's 1987-1992 drought experience and the actions taken at the time.

1.3 EXPERIENCE WITH THE 2012-2016 DROUGHT

In 2012-2016, California experienced a severe drought, which included the driest four consecutive water years based on statewide precipitation (2012-2015) and the lowest April 1 statewide snowpack water equivalent (5% of average in 2015) on record. The unprecedented dry-weather conditions prompted then-Governor Jerry Brown to declare a drought State of Emergency in January 2014, which remained in effect for most of California until 2017. The SFPUC took the following actions in response to the drought:

- **Voluntary call for demand reduction:** Spurred by the Governor's declaration of a State of Emergency in January 2014, the SFPUC requested that all customers of the RWS voluntarily reduce water use by at least 10%. Soon after, the San Francisco Mayor's Office issued a formal executive directive requiring all City departments to develop individual water conservation plans and take immediate steps to achieve a mandatory 10% reduction in water consumption. Ultimately, the SFPUC did not declare a water shortage emergency or impose mandatory system-wide demand reductions and shortage allocations because RWS customers exceeded the 10% voluntary system-wide reduction in conjunction with the statewide mandatory reductions assigned by the State Water Resources Control Board (SWRCB) (see below). The SFPUC lifted the call for a voluntary 10% reduction in April 2017.
- **Statewide mandatory reductions:** In July 2014, new emergency conservation regulations issued by the SWRCB prompted the SFPUC to implement outdoor water waste restrictions and impose a mandatory 10% reduction in outdoor water use only. Additional emergency conservation regulations issued by the SWRCB in the spring of 2015 established more statewide water use restrictions, a mandatory statewide water reduction of 25% compared to 2013 water use, and conservation standards for individual urban water suppliers to meet the statewide 25% reduction. These emergency conservation regulations were the first of their kind, indicative of the State's desire for swift and substantial action to cope with the drought. The State assigned the SFPUC retail service area a conservation standard of 8% in recognition of its already low residential per capita water use. In the SFPUC wholesale service area, Wholesale Customers were assigned a demand reduction standard ranging from 8% to 36%. The conservation standards took effect in June 2015 and remained in effect through April 2017.
- **Mandatory reduction of outdoor water use:** As noted above, the SFPUC imposed a mandatory 10% reduction on outdoor irrigation in response to the State's emergency conservation regulations, along with water use allocations and excess use fines for all retail irrigation customers, starting in August 2014. Following the additional SWRCB regulations in the spring of 2015, the SFPUC increased this mandatory reduction on retail outdoor irrigation from 10% to 25% starting in July 2015. The SFPUC lifted the mandatory reduction on outdoor irrigation in July 2016.

Appendix B provides a more detailed overview of San Francisco's response to the 2012-2016 drought.

1.4 EXPERIENCE WITH THE 2020-2023 DROUGHT

A few years after the 2012-2016 drought, California entered another drought beginning in the winter of 2019-2020. This new drought coincided with the global COVID-19 pandemic, which altered lifestyle and water use patterns in unprecedented ways. In April 2021, after a second consecutive dry winter, Governor Newsom declared a drought State of Emergency Proclamation for Mendocino and Sonoma counties. By the end of October 2021, the proclamation had extended the emergency to all 58 counties, including the City and County of San Francisco.

In November 2021, following the Governor's statewide emergency declaration, the SFPUC declared a Level 1 water shortage emergency under its 2020 WSCP and requested a 10% system-wide water use reduction. In March 2022, the Governor directed the SWRCB to require all urban water suppliers to implement Level 2 actions from their WSCPs. That directive marked the first time the State required uniform implementation of WSCPs across California. The SFPUC complied by moving from Level 1 (a 10% system-wide reduction request) to Level 2 (an 11% system-wide reduction request), effective July 2022. The SFPUC also implemented a temporary drought surcharge for the first time, beginning in April 2022, to offset operational costs as revenues declined.

A series of atmospheric rivers in the winter of 2022-2023 ended the drought. The Governor gradually lifted emergency orders throughout the spring 2023, and the SWRCB rescinded its emergency regulations in June 2023. The SFPUC ended its call for an 11% system-wide water use reduction in April 2023 and discontinued the temporary drought surcharge in May 2023.

Appendix C provides a more detailed overview of San Francisco's response to the 2020-2023 drought.

SECTION 2 ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES

The SFPUC has a robust process for assessing its annual water supply and demand. This process involves considering a range of input factors unique to the SFPUC's water supplies and system configuration and provides the SFPUC with flexibility to consider new factors. The SFPUC reports on an assessment of its system's water supply and demand to the State through the following methods:

- On or before July 1 of each year, the SFPUC prepares a Water Supply and Demand Assessment (WSDA), consistent with California Water Code Section 10632.1 requirements, by evaluating the total amount of water it expects to be in storage within the RWS that year and comparing that amount to expected Retail and Wholesale Customer demands. The following subsections outline the SFPUC's procedures for preparing the annual WSDA.
- Every month, the SFPUC completes the SWRCB's Drought and Conservation Reporting on the SAFER Clearinghouse online portal.

2.1 DEMAND ASSESSMENT

To calculate unconstrained customer demand on the RWS for the purpose of its annual WSDA, the SFPUC collects information on the demands of both the Retail and Wholesale Customers. The SFPUC estimates retail customer demand based on the best available information to date, typically including the previous year's demands as well as consideration of current demand use patterns or other conditions impacting demands, such as weather and growth. For estimated wholesale demands, each February, the SFPUC receives from BAWSCA a report of estimated Wholesale Customer demands on the RWS for the upcoming year. BAWSCA compiles this report based on demand estimates it receives from each of its 26 member agencies. The SFPUC estimates the relatively small demands of Cordilleras Mutual Water Company and Groveland CSD, its other two wholesale customers for the purposes of its UWMP, that are not parties to the WSA and are not BAWSCA member agencies as it does the demands of its retail customers: based on the best available information to date, typically including the previous year's demands as well as consideration of current demand use patterns or other conditions impacting demands, such as weather and growth.

2.2 SUPPLY ASSESSMENT

The RWS collects water from the Upper Tuolumne River watershed in the Sierra Nevada and from the local Alameda and Peninsula watersheds. The RWS draws an average of 85% of its supply from the Tuolumne River watershed. This water feeds into an aqueduct system delivering water 167 miles by gravity to Bay Area reservoirs and customers. The remaining 15% of the RWS supply is drawn from local surface waters in the Alameda and Peninsula watersheds. The percentage split between the Upper Tuolumne River and Bay Area watersheds varies from year to year depending on the water year hydrology and operational circumstances.

To evaluate water supply conditions each year, the SFPUC uses measurements of precipitation and snowpack in the watersheds above Hetch Hetchy, Cherry, and Eleanor Reservoirs. The Cooperative Snow Survey (conducted by the SFPUC in partnership with state and federal agencies) evaluates snowpack conditions every year beginning in late January. The SFPUC also estimates snowpack conditions using information from the Airborne Snow Observatory, which is a developing technology that uses aerial surveys to quantify snowpack, along with other sources. The SFPUC maintains a hydrologic model of the upcountry watersheds that uses this information to project runoff for the coming year. This process also includes a statistical analysis of additional expected precipitation. In addition to projected runoff, the determination of projected available water supply also considers stored water throughout the RWS, water acquired by the SFPUC from non-SFPUC sources, reservoir losses, and allowances for carryover storage.

Additionally, the SFPUC accounts for groundwater provided by the San Francisco Groundwater Supply Project for the in-City retail system and recycled water provided for irrigation at Harding Park, Fleming, and Sharp Park Golf Courses.

The RWS relies on precipitation and snowmelt captured and stored in its reservoirs. During droughts, water supply deliveries can exceed inflows, requiring the use of water stored in previous years to meet demands. Because of the importance of carry-over storage, the SFPUC constantly monitors and evaluates water supply conditions in the RWS, updating look-ahead forecasts as a year's hydrology and operations change. Generally, in early winter of any year, SFPUC staff can begin providing a forecast of water supply conditions for the upcoming year based on known and anticipated winter and spring precipitation and snowpack. The predictive power of this forecast improves greatly through the spring. The annual precipitation, snowmelt, and carry-over storage together constitute the SFPUC's reservoir storage conditions. Using data for each of these factors, the SFPUC can determine whether the reservoir system will be capable of serving full deliveries to its customers. Section 2.4 describes the system modeling SFPUC conducts.

The SFPUC sells water to 26 wholesale customers (collectively referred to as the Wholesale Customers) under the terms of a 25-year contract known as the Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County (WSA) and associated individual water sales contracts with each Wholesale Customer. Collectively, the Wholesale Customers on average receive over two-thirds of the RWS's annual deliveries, with the remaining approximately one-third provided to the SFPUC's retail customers.

The WSA carries forward many components of its predecessor agreement, including the SFPUC's "Supply Assurance" of 184 million gallons per day (MGD) to the Wholesale Customers. The SFPUC has agreed to deliver water to the Wholesale Customers up to the amount of the Supply Assurance, and this agreement is perpetual and survives the expiration of the WSA. The Supply Assurance is, however, subject to reduction due to water shortage, drought, scheduled RWS maintenance activities, and emergencies. As part of the Phased Water System Improvement Plan (WSIP) in 2008, the SFPUC established a temporary 265 MGD annual average limitation on water deliveries from RWS watersheds, the "Interim Supply Limitation" (ISL). The SFPUC has allocated the ISL between the Retail Customers and Wholesale Customers as follows:

- Retail supply allocation: 81 MGD
- Wholesale supply allocation: 184 MGD

Table 2-1 shows the availability of RWS supplies for the SFPUC's Retail Customers and Wholesale Customers in normal years. Table 2-2 shows the current and projected RWS supply needs to meet Retail and Wholesale Customer demands based on information and projections presented in the SFPUC's 2025 UWMP.

Table 2-1. Regional Water System Supply Availability in Normal Years (MGD)

RWS Supply	2030	2035	2040	2045	2050
Retail Customers[a, b]	81	81	81	81	81
Wholesale Customers[c, d]	184	184	184	184	184
Total RWS Supplies	265	265	265	265	265

a Groundwater and recycled water are assumed to be used before RWS supplies to meet retail demand. However, if these alternative supplies are not available, up to 81 MGD of RWS supply could be used in normal years.

b The SFPUC reports Groveland CSD as a wholesale customer in its UWMP, but the SFPUC otherwise considers Groveland CSD a retail customer and includes Groveland CSD's demands (approximately 0.3 MGD) within the retail supply allocation of 81 MGD.

c Projected Wholesale Customer deliveries are limited to 184 MGD, including the demands of the cities of San Jose and Santa Clara, which are supplied on a temporary and interruptible basis.

d Cordilleras Mutual Water Company is a wholesale customer of the SFPUC, but is not a party to the WSA or a BAWSCA member agency, and it is not included in the Wholesale Customer supply allocation of 184 MGD. The demands of Cordilleras Mutual Water Company are minor (projected to be less than 0.01 MGD).

Table 2-2. Regional Water System Supply Utilized in Normal Years (MGD)

RWS Supply	2030	2035	2040	2045	2050
Retail Customers[a, b]	62.7	61.2	61.9	64.0	66.7
Wholesale Customers[c, d]	133.9	136.3	140.6	144.1	148.4
Total RWS Supplies	196.6	197.5	202.5	208.1	215.1

a Groundwater and recycled water are assumed to be used before RWS supplies to meet retail demand. However, if these alternative supplies are not available, up to 81 MGD of RWS supply could be used in normal years.

b The SFPUC reports Groveland CSD as a wholesale customer in its UWMP, but the SFPUC otherwise considers Groveland CSD a retail customer and includes Groveland CSD's demands (approximately 0.3 MGD) within the retail supply allocation of 81 MGD.

c Projected Wholesale Customer deliveries are limited to 184 MGD, including the demands of the cities of San Jose and Santa Clara, which are supplied on a temporary and interruptible basis.

d Cordilleras Mutual Water Company is a wholesale customer of the SFPUC, but is not a party to the WSA or a BAWSCA member agency, and it is not included in the Wholesale Customer supply allocation of 184 MGD. The demands of Cordilleras Mutual Water Company are minor (projected to be less than 0.01 MGD).

2.3 INFRASTRUCTURE CONSIDERATIONS

On an ongoing basis, three groups within the SFPUC's Water Enterprise – Hetch Hetchy Water and Power, Water Supply and Treatment Division, and Hydrology and Water Systems – conduct analyses of the RWS that incorporate planned facility outages and multiple levels of projected system demands to evaluate operational capabilities and plan for potential water delivery constraints. These three groups meet quarterly to share plans and coordinate how facility outages, changes in service area demand, wet or dry weather, and other variables shape the operating plans each year. Facility outages due to maintenance or upgrades are coordinated in an adaptive manner to respond to changes as they occur. For new water supplies or new capital projects related to supply distribution, impacts on the

RWS are evaluated extensively prior to initiation of any changes. Results from these modeling efforts are considered in the annual WSDA.

2.4 SYSTEM MODELING

To proactively plan for conditions that would result in a shortage of water supplies, the SFPUC models conditions using a hypothetical drought that is more severe than what the RWS has historically experienced. This drought sequence is referred to as the "design drought" and serves as the basis for planning and modeling of future scenarios. The design drought consists of an 8.5-year sequence of dry conditions.

In applying its water supply planning methodology, the SFPUC performs an initial model simulation of the system for the design drought sequence and then reviews the ability of the system to deliver water to the service area through the entire design drought sequence. If the projected water supply runs out before the end of the design drought sequence in the initial model run, system-wide water use is reduced by applying water supply reductions and the scenario is re-run. This process continues iteratively until a model simulation of the system is achieved in which the water supply in storage at the end of the design drought sequence is brought to the system "dead pool," where no additional storage is available for delivery (currently simulated as 96,775 acre-feet). Drawing system storage down to the dead pool without going below it indicates that water supply delivery, including the adjusted amount of water use, is maintained through the design drought sequence.

Estimated levels of water supply reduction and corresponding storage threshold values that initiate each level of supply reduction can then be used to simulate the operation of the system through the historical record of hydrology, or to evaluate system water supply conditions during an ongoing drought. While the design drought sequence does not occur in the historical hydrology, the reduced water use and storage threshold values that are adjusted to allow a system configuration to maintain water delivery through the design drought sequence can be used to evaluate system performance in the historical record, or as a basis for comparing with real-time system conditions. Through use of this planning method, the SFPUC can simulate a response to declining water supply in storage that is appropriate for the system conditions being evaluated.

The SFPUC plans its water deliveries using indicators for demand reduction that are developed through analysis with the design drought sequence. As a result, the SFPUC system operations are designed to provide sufficient carry-over water in SFPUC reservoirs to continue delivering water, although at reduced levels, during multiple-year droughts.

2.5 DECISION-MAKING PROCESS

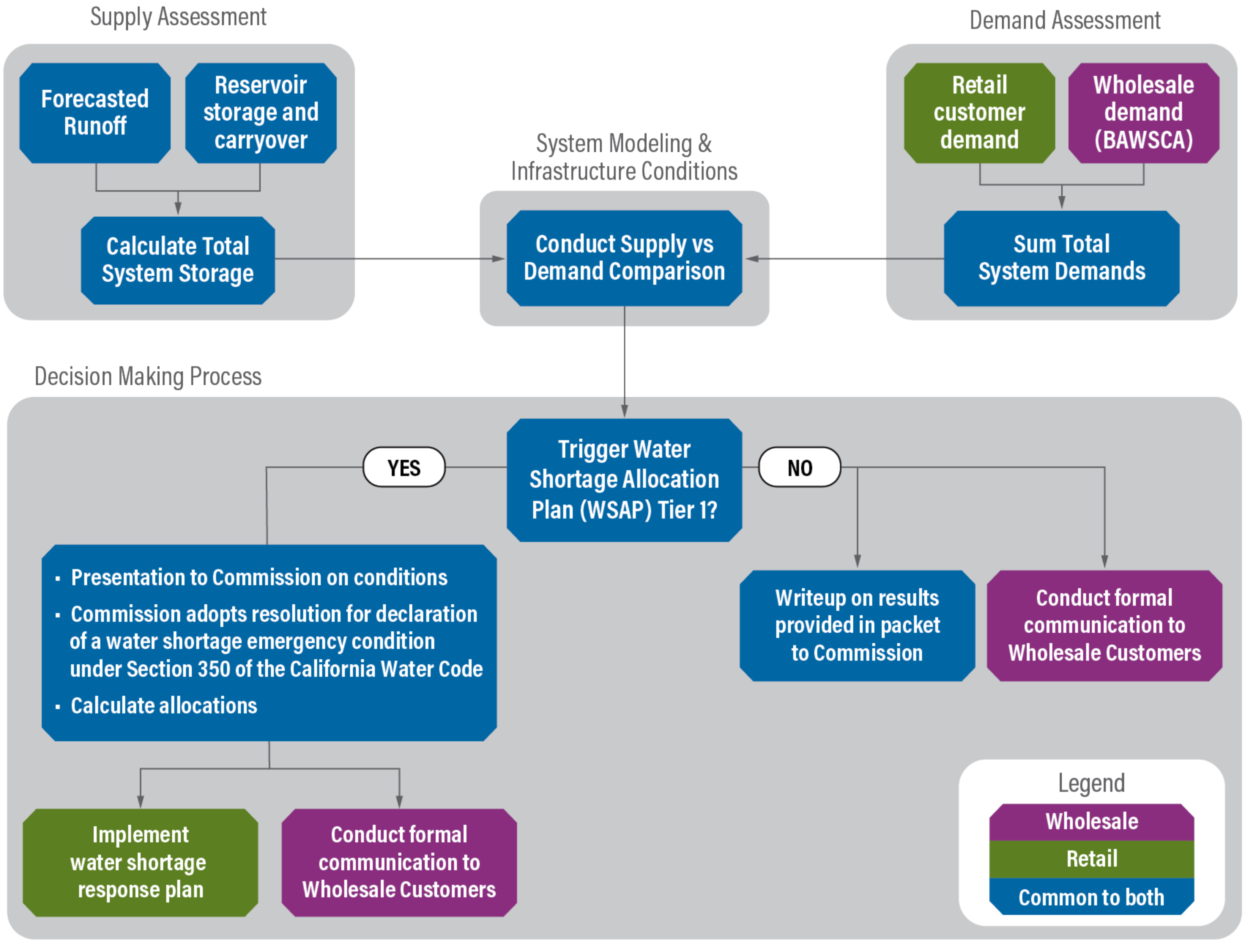
Regardless of the expectation of shortage conditions, as part of the normal course of business, the SFPUC provides a water supply condition update to its executive team every two weeks throughout the year. Pursuant to the Water Shortage Allocation Plan (WSAP), also known as the Tier 1 Shortage Plan, that is incorporated in the WSA and described further in Section 3 below, the SFPUC also provides an initial estimate of available water supply for the upcoming Supply Year (defined as the period between July 1 through June 30) to its Wholesale Customers on February 1 every year. A Wholesale Customer Annual Meeting is held in February at which the SFPUC makes a presentation on current water supply conditions and forecasts. The SFPUC issues a revised estimate of available water supply for the upcoming Supply Year on March 1 and uses the snow survey that occurs in the first week of April and an associated runoff forecast to refine an estimated total system storage expected on July 1. By the middle of April, the SFPUC issues a final estimate of available water supply and determines whether there will be a system-wide shortage for the coming Supply Year.

If the SFPUC determines that a water shortage exists, the SFPUC may call for voluntary demand reductions among its customers or issue a declaration of water shortage emergency pursuant to California Water Code section 350 et seq. In support of a declaration of water shortage emergency, SFPUC staff will deliver a presentation to the Commission with information that explains the basis for the shortage conditions, such as conditions of precipitation to date, snowpack, and storage levels, with more information as necessary depending on the particulars of the supply forecast. Depending on the level of shortage, the SFPUC may determine that voluntary actions by its Retail and Wholesale Customers will be sufficient to accomplish the necessary reduction in water use throughout its service area or that mandatory actions will be required.

Prior to initiating any water delivery reductions to its retail customers, whether it be initial implementation of delivery reductions or implementing a different water shortage level, the SFPUC will outline a water shortage response plan to address the following: the water supply situation; proposed demand reduction objectives; alternatives to demand reductions; methods to calculate water use allocations and adjustments; compliance methodology and enforcement measures; and budget considerations. Details on the expected allocation program are described further in Section 4. SFPUC staff will present this water shortage response plan at a regularly scheduled Commission meeting and advertise it in accordance with the requirements of Section 6066 of the California Government Code. Water demand reductions that are applicable to Wholesale Customers will be formally communicated following the Commission’s declaration of a water shortage emergency under Section 350 of the California Water Code.

An example of the general WSDA process for water shortages caused by a drought is presented in Figure 2-1 for illustrative purposes. Other non-drought water shortages may not trigger the WSAP and therefore would not follow the same process shown below. For more information about procedures in response to non-drought water shortages, such as those caused by a catastrophic supply interruption, see Section 10.

Figure 2-1: Water Supply and Demand Assessment Process



SECTION 3 WATER SHORTAGE LEVELS AND WATER SHORTAGE ALLOCATION PLAN (WSAP)

Pursuant to California Water Code Section 10632(a)(3), water suppliers must include as an element within their WSCPs six standard water shortage levels that represent varying shortage conditions from their systems' normal reliability. The State has standardized the six shortage levels to provide a consistent regional and statewide approach for addressing the relative severity of water supply shortage conditions. The six standard water shortage levels correspond to progressively increasing ranges of shortage conditions: up to 10%, 20%, 30%, 40%, and 50% shortages, and greater than 50% shortage compared to the normal reliability condition. This WSCP presents the shortage response actions aligned with each shortage level that the SFPUC would implement to meet the severity of such shortages.

The SFPUC has two plans that determine how to allocate RWS supplies in the event of a water shortage condition. First, the Water Shortage Allocation Plan (WSAP), also known as the Tier 1 Shortage Plan which is an attachment to the WSA (see Appendix D), defines the method for allocating RWS supplies between the Retail Customers collectively and the Wholesale Customers collectively. Second, this WSCP defines how supplies available to the Retail Customers will be allocated among them (see).

The WSAP identifies the Retail Customers' and Wholesale Customers' respective shares of the annual water supply available during shortages that require system-wide reductions in water use of 20% or less. These percentage shares, referred to as the Retail Customers' Tier 1 Allocation and the Wholesale Customers' Tier 1 Allocation, are shown in the first four rows of Table 3-1 (Shortage Levels 1 and 2). For example, when the required level of system-wide reduction in water use is 6 to 10%, the Retail Customer Tier 1 Allocation is 36% of the annual water supply available, and the Wholesale Customer Tier 1 Allocation is 64% of the annual water supply available. Under the WSAP, if the Retail Customers' Tier 1 Allocation results in the Retail Customers having a "positive" allocation (i.e., a supply of additional water rather than a required percentage reduction in water use), then the Retail Customers' percentage share of the available water supply would be reduced to eliminate any positive allocation to Retail Customers, with a corresponding increase in the percentage share of the available water supply allocated to the Wholesale Customers. For any level of required reduction in system-wide water use, the SFPUC shall require Retail Customers to conserve a minimum of 5%, with any resulting reallocated supply credited to storage for inclusion in the calculation of projected available RWS water supply in a subsequent year.

Table 3-1 includes a cross-reference relating the existing WSAP levels of system-wide water use reduction to the six standard water shortage levels, consistent with California Water Code Section 10632(3)(b). The WSAP does not define Tier 1 Allocations for the Retail Customers and the Wholesale Customers for system-wide shortages requiring greater than a 20% reduction in water use. For the purposes of this WSCP, the SFPUC assumes that the Tier 1 Allocations for the 16-20% reduction in water use level (37.5% for Retail and 62.5% for Wholesale) would apply to all higher shortage levels. In practice, the WSAP defines a process for the SFPUC and the Wholesale Customers to determine whether the application of those Tier 1 Allocations to shortage levels greater than 20% is appropriate or whether a change is required (for further information about this process, see Appendix D).

The WSAP also implements a method for allocating the Wholesale Customers' Tier 1 Allocation among the respective Wholesale Customers, known as the "Tier 2 Drought Response Implementation Plan," which has separately been adopted by the Wholesale Customers and does not include the SFPUC.

The SFPUC's shortage response actions as they relate to the Wholesale Customers are defined in the WSAP (see Appendix D) and are included in this WSCP by reference.

Table 3-1. Retail and Wholesale RWS Allocations during System-wide Shortage

Shortage Level	Required Level of System-wide Reduction in Water Use	SFPUC Retail Share of Available RWS Supply[a]	Collective Wholesale Customers' Share of Available RWS Supply
1	5% or less	35.5%	64.5%
1	6 – 10%	36.0%	64.0%
2	11 – 15%	37.0%	63.0%
2	16 – 20%	37.5%	62.5%
3[b]	Up to 30%	37.5%	62.5%
4[b]	Up to 40%	37.5%	62.5%
5[b]	Up to 50%	37.5%	62.5%
6[b]	>50%	37.5%	62.5%

a While Groveland CSD is reported in the UWMP as a wholesale customer, it is not a party to the WSA, and it is considered a retail customer of the SFPUC for the purpose of allocating RWS supplies between Retail and Wholesale Customers under the WSAP. Thus, RWS supplies to Groveland CSD are accounted for in the Retail supply allocation.

b The WSAP does not define supply allocations for the Retail Customers and the Wholesale Customers for system-wide shortages requiring greater than a 20% reduction in water use. Instead, the WSAP sets forth a process for the SFPUC and the Wholesale Customers to determine whether the application of the allocations for the 16-20% reduction in water use level to shortage levels greater than 20% is appropriate or whether a change is required.

SECTION 4 RETAIL WATER SHORTAGE RESPONSE ACTIONS

Once the SFPUC determines that a water shortage exists, the SFPUC will allocate available water supplies among its retail customers (see Section 4.1). The SFPUC also maintains permanent restrictions on retail customer water use, as well as potential prohibitions related to water use that may be enforced during a drought (see Section 4.2), and implements programs and activities that assist customers with reducing demands (see Section 4.3). The SFPUC may also, depending on the extent of water shortage, implement operational changes (see Section 4.4) or pursue the development of emergency water supplies (see Section 4.5).

4.1 RETAIL WATER SHORTAGE ALLOCATION

The SFPUC initially adopted a Retail Water Shortage Allocation Plan (RWSAP) in 2001 to formalize a program of action to be taken in the retail customer service area to reduce water use during a drought. Since then, in response to the severe drought of 2012-2016, new legislation in 2018 created a WSCP mandate replacing the water shortage contingency analysis under the former law. This WSCP updated and replaced the standalone RWSAP and now outlines the actions the SFPUC may take in response to a declaration of a water shortage due to drought and other water shortage conditions. The actions to be taken depend on the applicable retail water shortage level shown in Table 4-1. The Retail water shortage level also determines the total level of retail customer demand reduction that the SFPUC may require. Demand reduction begins as a voluntary measure and advances to a mandatory measure in higher retail water shortage levels.

4.1.1 Voluntary and Mandatory Demand Reduction

During a declared water shortage emergency, the SFPUC may implement voluntary and/or mandatory demand reductions, depending on the Retail water shortage level. Based on its experience in previous droughts, the SFPUC will likely use voluntary calls for demand reduction if the required level of system-wide reduction is up to 30% or less. If the required level of system-wide reduction is greater than 30%, the SFPUC will likely implement mandatory demand reduction as described further in the sections below.

4.1.2 Types of Allocation Methods for Mandatory Demand Reduction

In the event of a mandatory demand reduction, the SFPUC will adopt a system for allocating water among its retail customers. During a water shortage emergency, multiple allocation methods may be needed for different customer types. During the 1987-1992 drought, the SFPUC considered four allocation methods: (1) the per-capita allocation method, (2) the inside/outside or seasonal allocation method, (3) the uniform allocation method, and (4) the percentage allocation method. The following provides a description of each method and the potential advantages or disadvantages of applying each method.

Per-capita allocation method. The per capita allocation method, which is only applicable for residential customer types, assigns each residential occupant a fixed daily amount of water. This method requires an accurate count of the number of occupants per metered account. Currently, customers can self-report this information, and the SFPUC has collected self-reported occupancy data for most residential accounts. The method does not consider differences in dwelling type, existing landscaping needs, or special individual circumstances. Implementing a per capita allocation is not possible with commercial and industrial customers; those customers would require a different method for determining allocations.

Inside/Outside allocation method. The inside/outside method, also referred to as the seasonal method, applies a percentage reduction to both indoor and outdoor water use by customers. To determine an individual customer's allocation, a base year of water use is selected, and reductions are applied to both inside and outside use. Water use during the winter season is identified as reflecting typical "inside use." The SFPUC would use the average water use by a customer during the winter months (November, December, January, February) of the base year as the baseline for determining inside use for all 12 months. Water use more than the baseline during other months of the year is considered "outside use." The monthly inside/outside allocation is a sum of the inside use and the outside use reduced by their respective percentages. This method is used to distribute water equitably and in previous decades was proven effective in achieving system-wide consumption goals. However, San Francisco's residential water use patterns have changed significantly since the early 2000s, showing very little seasonal use, and San Francisco can only achieve limited savings by focusing on outdoor use only. Additionally, because this method reduces water allocations for all customers regardless of their current use, there is concern that the individual water users who are already consuming very low amounts of water could be disproportionately affected compared to individual water users consuming larger amounts of water.

Uniform allocation method. The uniform allocation method applies a fixed daily amount per dwelling unit for all residential customers. This method does not distribute water equitably to all customers, especially because it does not take into consideration the number of individuals living in each dwelling unit. As with the per capita allocation method, this method could not be applied to commercial and industrial customers.

Percentage allocation method. The percentage allocation method requires customers to reduce their water use by a fixed percentage compared to past use. For example, to achieve a specified Retail service area-wide reduction goal, all customers would need to reduce their water usage by a specified percentage in each billing period based on an established base year. The method requires a much greater reduction in inside use and could cause hardship on both residential and commercial customers. The base year would need to be carefully selected and should reflect demands in a normal, non-drought year.

During the 1987-92 drought, the SFPUC implemented the inside/outside allocation method because it found this method to be the most fair and reasonable among the alternatives. At that time, the SFPUC applied a per-capita allocation to the accounts of those customers that appealed their allocations under the inside/outside allocation method. Since then, Retail residential water consumption patterns have changed significantly, reflecting less seasonality and less outdoor use overall. The SFPUC has also improved its collection of occupancy data per metered account, allowing use of the per-capita method to become the preferred allocation method for residential accounts. The preferred allocation method for non-residential accounts (i.e., irrigation-only, commercial, industrial, and municipal) is the percentage allocation method. During the 2012-2016 drought, the SFPUC implemented mandatory reductions for irrigation customers and used a percentage allocation method.

4.1.3 Per Capita Residential Water Use Floor

SFPUC retail customers already have one of the lowest residential per capita water use rates in California, with an average water use rate of approximately 43 gallons per capita per day in recent years. If the SFPUC institutes a mandatory demand reduction during a water shortage emergency, the SFPUC will adopt a minimum per-capita residential allocation, or water use ”floor,” to ensure enough water is available to its customers for basic health and safety needs. The SFPUC will determine an appropriate floor and will specify it in the water shortage response plan, as further described in Section 5.

4.1.4 Water Shortage Allocation Process

The SFPUC will use voluntary calls for demand reduction to the extent possible. If the SFPUC needs to declare a water shortage emergency to implement a mandatory demand reduction, the SFPUC may apply different actions to different customer types to minimize the economic impact of the mandatory demand reductions. An example of how the SFPUC may apply different actions to different customer types is as follows:

1. The SFPUC will first apply reductions to *irrigation-only* accounts; different levels of reduction may be required among those accounts depending on whether an irrigation-only account is a residential, commercial, or municipal account type. Customers using recycled water for irrigation will not be required to reduce their use of recycled water.
2. If there is still a shortage remaining, the SFPUC will next apply reductions to *municipal and other* accounts, up to 30%.
3. If there is still a shortage remaining, the SFPUC will next apply reductions to *single-family and multi-family residential* accounts, up to 30% or down to the per capita water use floor, whichever occurs first.
4. If there is still a shortage remaining, the SFPUC will next apply reductions to *commercial and industrial* accounts, up to 30%.
5. If there is still a shortage remaining, the SFPUC will next return to *irrigation-only* accounts and make further reductions, proceeding in the same order with additional reductions from each sector.

The SFPUC will inform its retail customers if it determines that there will be a shortage in the new supply year starting July 1. If the SFPUC implements mandatory demand reductions, the SFPUC will determine water allocations for each retail customer account, subject to reductions, using the allocation method that the SFPUC determines to be the most appropriate at the time based on the nature of the water shortage and water use trends. If the SFPUC chooses an allocation method that requires establishing baseline water use levels, the SFPUC will generally select as a baseline customer water use levels in the last year prior to the water shortage emergency declaration. Ideally, the selected baseline year would also avoid periods of severe economic recession or other anomalous events resulting in abnormal water use patterns. The SFPUC will provide water use allocations to all retail customers by May 31. The water use allocations will become effective July 1. Allocations for residential customers will not go below the per capita water use floor that the SFPUC establishes in the water shortage response plan.

4.1.5 Appeal Process

On or before May 31, the SFPUC will notify retail customers of their reduced water allocations. If the SFPUC applies a per-capita allocation method, each retail customer will have the opportunity to appeal the allocation assigned to its account based on higher actual occupancy than the SFPUC has registered for the property associated with the account, medical exemptions, increased business, or other miscellaneous reasons. The SFPUC will provide retail customers with instructions on how to file appeals at the time the customers are notified of the water use allocations. Customers may be required to submit supplemental information in support of their appeal. The SFPUC will also inform customers of the methodology the SFPUC will use to modify allocations if appeals are granted.

4.2 WATER WASTE PROHIBITIONS

Since the 1990s, the SFPUC has had restrictions against various forms of water waste, starting first as drought response measures and later becoming permanent conservation best management practices. During California's 2012-2016 drought, the SFPUC updated and expanded its water waste restrictions to be consistent with the SWRCB's 2015 emergency drought regulations. At that time, the SFPUC also updated its procedures for tracking and responding to reports of water waste, which included establishing the City's 311 system as the central means for reporting water waste; assigning the SFPUC's Water Conservation Section as the responsible party for investigating and responding to reports of water waste; and confirming the SFPUC's policy of progressive notification and education to help people at sites identified with potential water waste. On June 28, 2016, the SFPUC adopted permanent water waste restrictions identical to the prohibited water uses in the SWRCB's 2015 temporary regulations. In 2022, the State adopted new statewide emergency drought regulations that contain all the water waste restrictions that the SFPUC already implements, plus additional restrictions preventing homeowners' associations from penalizing or threatening individual owners who take measures to reduce irrigation use. The SFPUC amended its permanent water waste restrictions to align with this additional restriction and included a new provision that prohibits any homeowners' associations or community service organization from taking or threatening action against any property owner for reducing or eliminating irrigation during a drought or requiring any property owner to remove installed water-efficient landscaping measures once a drought ends. Most recently in 2023, the SFPUC added a new permanent restriction for using potable water for backfill consolidation around non-potable piping, soil compaction, or dust control for construction or demolition projects when recycled water, well water, or groundwater are available.

The permanent restrictions on retail customer water use are established in Section E, Rule 12 of the SFPUC Rules and Regulations Governing Water Service to Customers, and are reproduced below:

1. The customer will be in violation of the SFPUC's Water Waste Restrictions if the customer is found to be using water in the following ways:
    a. Application of potable water to outdoor landscapes in a manner that causes runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots or structures
    b. Use of hoses for any purpose without a positive shut-off valve

c. Use of potable water to wash sidewalks, driveways, plazas and other outdoor hardscapes for reasons other than health, safety, or to meet City and County of San Francisco standards for sidewalk cleanliness and in a manner that causes runoff to storm drains and sewer catch basins
d. Use of single pass cooling systems, fountains and decorative water features, and commercial car washes
e. Application of potable water to outdoor landscapes during and within 48 hours after measurable rainfall
f. Irrigation with potable water of ornamental turf on public street medians
g. Use of potable water for backfill consolidation around non-potable piping, soil compaction, or dust control for construction or demolition projects within San Francisco, if recycled water, well water, or groundwater are available. Recycled water must be used in accordance with State Water Resources Control Board, San Francisco Bay Regional Water Quality Control Board, San Francisco Department of Health, and SFPUC standards, regulations and requirements. The SFPUC will review the customer's fire hydrant meter application and allow temporary water supply from fire hydrants, if SFPUC determines that recycled water, well water, or groundwater are not available for the construction or demolition project
h. Serving drinking water other than upon request at eating or drinking establishments, including restaurants, hotels, cafés, cafeterias, bars or other public places where food or drink are served
i. To promote conservation, hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily and display notice of this option in guestrooms

2. Any homeowner's association or community service organization or similar entity is prohibited from:
    a. Taking or threatening to take any action to enforce any provision of the governing documents or architectural or landscaping guidelines or policies of a common interest development where that provision is void or unenforceable under section 4735, subdivisions (a) and (b) of the Civil Code;
    b. Imposing or threatening to impose a fine, assessment, or other monetary penalty against any owner of a separate interest for reducing or eliminating the watering of vegetation or lawns during a declared drought emergency, as described in section 4735, subdivision (c) of the Civil Code; or
    c. Requiring an owner of a separate interest upon which water-efficient landscaping measures have been installed in response to a declared drought emergency, as described in section 4735, subdivisions (c) and (d) of the Civil Code, to reverse or remove the water-efficient landscaping measures upon the conclusion of the state of emergency

The following are potential temporary prohibitions related to water use that the SFPUC may implement during a water shortage emergency to supplement the permanent water use restrictions:

1. Limit the use of additional water for new or retrofitted landscaping or expansion of existing facilities under all conditions not otherwise subject to San Francisco's Water Efficient Irrigation Ordinance
2. Restrict potable water supplies, other than groundwater or recycled water, for irrigation of golf courses, private median and sidewalk parkway strips, and other turf areas not already covered by the SFPUC's permanent restrictions on use of potable water for turf irrigation
3. Restrict use of potable water on golf courses outside of irrigation of putting greens
4. Restrict use of potable water for street sweepers/washers

5. Restrict the washing of all automobiles, motorcycles, RVs, trucks, transit vehicles, trailers, boats, trains, and airplanes outside of a commercial washing facility; unless required to clean windows on all vehicles and such commercial or safety vehicles for health and safety reasons
6. Restrict the filling of new swimming pools, spas, hot tubs, or the draining and refilling of existing pools, hot tubs, and water features
7. Limit days or times for outdoor irrigation with potable water
8. Activate the SFPUC's regulations regarding excessive residential use during drought (SFPUC Commission Resolution No. 17-0010), which would set an excessive residential household water use threshold and fine single family residential customers who exceed the threshold; customers issued fines for excessive use would be subject to public disclosure
9. Expand water waste patrolling
10. Activate drought surcharge

Appendix A describes the various measures that the SFPUC employed during the 1987-92 drought to achieve a 25% system-wide reduction in retail customer demands (compared to the pre-drought demand). These measures included absolute limitations on water use based on residential customer classification and a proportion of historical use within the non-residential sectors. Appendix B describes the various measures that the SFPUC employed during the 2012-2016 drought to achieve a primarily voluntary 10% system-wide reduction in retail customer demands. Appendix C describes the actions the SFPUC took during the 2020-2023 drought, including implementing Level 2 of this WSCP in alignment with the State's directive and increasing system-wide demand reductions to 11%.

The SFPUC's implementation of each of the temporary prohibition listed above is not directly linked to a particular water shortage level under this WSCP. The only water shortage response action that the SFPUC may implement specifically in response to a particular shortage level is demand reduction (either voluntary or mandatory).

4.3 DEMAND REDUCTION ACTIONS

The SFPUC implements many customer assistance programs to help reduce water use in the Retail service area. The SFPUC implements all program methods on an ongoing basis or as needed, regardless of whether there is a water shortage. Many program methods are also demand-management measures that are described in more detail in the SFPUC's UWMP and Water Conservation Plan. Some of these methods will increase in application, participation, or frequency because of a water shortage (e.g., public outreach, rebates, Water Wise Evaluations), but the increase is not necessarily triggered by a specific level of shortage. Some of the core actions that the SFPUC is most likely to increase during water shortages to reduce demand are as follows:

- **Expand Public Information Campaigns:** Through its conservation program, the SFPUC develops media campaigns and extensive informational materials, and staff performs widespread outreach activities to (1) inform the public of water shortage conditions, (2) relay information about demand reductions and prohibitions, and (3) promote conservation and customer use of the SFPUC's conservation services. The SFPUC regularly notifies the highest residential and commercial water users of their consumption and the SFPUC's conservation services to help reduce demands.

- **Enhance Customer Billing and Water Use Information:** Since 2014, in conjunction with the deployment of its Automated Water Meter Program, the SFPUC has used a bill management system, monthly billing at the 0.01 unit level (i.e. 1 cubic foot), and a web portal to provide customers with more detailed information about their water use and efficiency. The online portal allows all in-City retail water service customers to view their daily and hourly water use data provided by the automated water meter reading system. It also allows residential customers to see how their per capita water use compares to SFPUC's efficiency goals, and for any customer to see how their water use aligns with any reduction targets that might be in place during a declared water shortage. During a water shortage, the SFPUC may also add specific messages or information to customer bills about the water shortage condition and what voluntary or mandatory measures are in place.

- **Offer Water Use Surveys:** The SFPUC provides free Water-Wise Evaluations for homes and businesses through its conservation program. These Water-Wise Evaluations consist of an onsite or phone-based review of indoor fixtures and appliances as well as an onsite review of irrigation systems. Each assessment includes a summary report outlining recommendations to improve efficiency as well as estimated water savings. Interest and participation in this service tends to increase during times of drought.

- **Provide Rebates and Incentives for Replacement of Inefficient Fixtures, Equipment, and Landscapes; and No-Cost Distribution of Water-Saving Devices:** Through its conservation program, the SFPUC provides rebates for replacement of a wide range of plumbing fixtures and water-using equipment, including irrigation system components. It also provides water-saving devices at no cost to retail customers in and outside of San Francisco and tenants of properties served by a Retail water service account. The SFPUC may enhance incentive programs during a water shortage by increasing rebate and grant amounts, expanding the types of fixtures and equipment covered, increasing participation opportunities, and other means.

- **Increase Water Waste Patrols:** SFPUC field inspectors watch for, report, and respond to potential water waste they may encounter as part of their regular patrol throughout the City. The SFPUC also encourages the public to report potential water waste through the City's 311 service request system, as described in Section 4.2. The SFPUC may expand these efforts during water shortages.

4.4 OPERATIONAL CHANGES

The SFPUC may employ the following operational changes to help reduce potable water use. While the SFPUC does not formally enact these methods in the event of a shortage, it may employ them at any time at the discretion of the SFPUC's San Francisco Water Division.

- **Decrease line flushing:** The SFPUC may decrease pipeline and other system flushing, which it standardly conducts to maintain water quality, remove sediment, and ensure proper system operation. In past droughts, the SFPUC temporarily reduced programmatic flushing of dead ends within the in-City distribution system pipelines from a scheduled program to an as-needed basis to respond to water quality issues. The SFPUC has also temporarily reduced regular system maintenance flushing in the Town of Sunol during previous droughts to an as-needed basis.

- **Reduce system water loss:** The SFPUC conducts pressure management, collects main break data, and administers a Linear Asset Management Program to help control distribution system losses. In addition, to address water loss at the customer level, the SFPUC launched a Leak Alert Program in April 2015 to notify single-family residential customers about potential plumbing leaks that may be occurring at their homes. Since then, the SFPUC has expanded this program to notify all customer sectors. This program also meets State mandates requiring water suppliers to notify customers when they are aware of leaks that are within the customer’s control.

- **Increase recycled water and groundwater supply:** The SFPUC may be able to further reduce reliance on RWS surface water supplies during a water shortage by increasing recycled water supply from the Westside Recycled Water Treatment Facility up to the peak design capacity of 4 MGD. The SFPUC could also potentially increase groundwater production, but this capacity is limited to 4 MGD.

4.5 SUPPLY AUGMENTATION ACTIONS

The SFPUC will seek voluntary or mandatory demand reduction during a declared water shortage emergency. Depending on the severity and duration of the water shortage emergency, the SFPUC may also seek to develop emergency water supplies. This could include actions such as initiating water transfers.

4.6 SUMMARY OF RETAIL SHORTAGE RESPONSE ACTIONS

The SFPUC expects to meet water shortages primarily with voluntary demand reductions, escalating to mandatory reductions if needed, and will allocate water among its Retail Customers in accordance with Section 4.1 of this WSCP. The SFPUC will also enforce restrictions and prohibitions of certain water uses (as described in Section 4.2) and implement additional programs to facilitate demand reduction (as described in Section 4.3) in order to support meeting its demand reduction targets. The SFPUC may also implement operational changes to reduce water use (as described in Section 4.4). At this time, the SFPUC has not identified any supply augmentation shortage response actions as a specific response to a shortage, but they would be considered (as described in Section 4.5). As described at the beginning of Section 2, the SFPUC already incorporates supply augmentation with dry-year supplies as a part of normal operations and water management planning to reduce the likelihood or severity of water shortage conditions.

This WSCP contains six water shortage levels corresponding to ranges of up to 10%, 20%, 30%, 40%, and 50% shortages and greater than 50% shortage. For each shortage level, there are corresponding retail demand reduction actions to be implemented and an estimated percentage reduction to the water shortage gap. To calculate the estimated percentage reduction to the water shortage gap, the SFPUC first considers the baseline RWS supply availability in a normal year supply. If the WSAP applies, the SFPUC then follows the WSAP process to determine the Retail Customers’ and Wholesale Customers’ respective percentage shares of the annual RWS supply available during the shortage. The SFPUC then calculates the Retail Customers' projected demands on the RWS (excluding local groundwater and recycled water supplies) and compares that to the Retail Customers' RWS supply allocation to determine the Retail water shortage level.

The Retail water shortage level may be different from the system-wide water shortage level under the WSAP. For example, under the WSAP, when the required level of system-wide reduction in water use is 10%, the Retail Customers would receive an allocation of 81 MGD.[1] Because Retail Customer demands are projected to reach 73.4 MGD in 2050, there would not be Retail water shortage under such circumstances within the planning horizon of 2050. However, because the SFPUC has agreed to conserve a minimum of 5% in the event of any declared water shortage under the WSAP, in this scenario, the SFPUC would implement a 5% voluntary demand reduction for its Retail Customers.

At higher system-wide shortage levels under the WSAP, the Retail Customer allocation from the RWS results in a Retail water shortage level that varies depending on Retail Customer demands. The demand reduction volumes necessary at a given shortage level will change based on the Retail demands at the time of a declared water shortage emergency. The percentage reductions are based on the highest projected unconstrained SFPUC Retail Customer demands on the RWS in the UWMP planning horizon. The corresponding shortage response actions are intended for estimation purposes and are based on the highest projected Retail demand as presented in the SFPUC's 2025 UWMP. As Retail demands increase, the associated necessary demand reductions will increase accordingly.

For Shortage Levels 1-3, the SFPUC expects to have enough supply to meet projected unconstrained Retail demands. However, the SFPUC has a contractual obligation to require Retail Customers to conserve a minimum of 5% for any level of required reduction in system-wide water use during shortages. The SFPUC plans for a 5% reduction in Retail demand with a voluntary call for reductions in water use. If the RWS needs to reduce water use by more than 30%, the SFPUC will implement mandatory demand reductions which would occur starting at Shortage Level 4.

For Shortage Levels 4 through 6, where there is a mandatory demand reduction, the SFPUC would identify the appropriate allocation methods for different customer types as described in Section 4.1.4. A Shortage Level 6 could require the SFPUC to implement strict demand reduction actions such as requiring reductions of 50% to irrigation-only accounts, 30% reductions in other non-residential accounts, and using a per capita allocation of 25 gallons per day for single-family and multi-family residential accounts.

The Water and Wastewater Drought Surcharge in the SFPUC's Rate Schedules and Fees for Water and Sewer Service are based on Table 4-1, where shortage levels are referred to as shortage "stages." The estimated water

---

[1] To arrive at this allocation, the baseline RWS supply availability 265 MGD of supply is first reduced by 10%, which results in 238.5 MGD of available RWS supply. Under the WSAP (see Table 3-1), the Retail Customer share of available RWS supply is 36.0% when the level of system-wide reduction in water use is 10%: 238.5 MGD * 36.0% = 85.9 MGD. Because this calculation results in the Retail Customers having a positive allocation (i.e., a supply of additional water rather than a required percentage reduction in water use, as 85.9 MGD > 81 MGD), the Retail Customer percentage share of the available RWS supply is reduced to the normal Retail supply allocation of 81 MGD to eliminate any positive allocation to the Retail Customers.

usage reduction and drought surcharge on volumetric water rates may change in 2028 when water and sewer rates are updated.

Table 4-1. Demand Reduction Actions

[Standardized UWMP Table 8-3: Demand Reduction Actions]

Standard Shortage Level	Percent Shortage Range	Retail Demand Reduction Actions	Estimated Reduction in Shortage Gap	Penalty, Charge, or Other Enforcement?
1	Up to 10%	Voluntary Reduction	5%	N
2	Up to 20%	Voluntary Reduction	5%	N
3	Up to 30%	Voluntary Reduction	5%	N
4	Up to 40%	Mandatory Reduction	18%	Y
5	Up to 50%	Mandatory Reduction	32%	Y
6	>50%	Mandatory Reduction	32%	Y

SECTION 5 COMMUNICATION PROTOCOLS

Regular communication with the SFPUC's customers and the public is essential during a water shortage, especially when mandatory actions or restrictions are in effect. The SFPUC communicates demand reduction schedules and requirements early and often to all customers. The SFPUC will employ multiple methods and means to inform and educate customers and the public on water use restrictions and ways to conserve water.

Prior to initiating any water delivery reductions to its retail customers or increasing the severity of water shortage response measures, the SFPUC will prepare or revise a water shortage response plan that addresses the following: the water supply situation; proposed demand reduction objectives; alternatives to demand reductions; methods to calculate water use allocations and adjustments; minimum per capita allocation (i.e., residential water use "floor"); enforcement measures; and budget considerations.

SFPUC staff will present this water shortage response plan at a regularly scheduled SFPUC Commission meeting advertised in accordance with the requirements of Section 6066 of the California Government Code. The public will be invited to comment on the SFPUC's plan to address reduced water supply.

5.1 COMMUNICATIONS ABOUT VOLUNTARY REDUCTIONS

Customer and public outreach methods that the SFPUC may employ during a call for voluntary reductions include, but are not limited to:

- Press releases and briefings to media
- Social media posts
- Dedicated and regularly updated information about the drought on the SFPUC's website
- Articles in the SFPUC's digital and print newsletter (*Currents*) to customers
- Bill inserts and messages on customer bills
- Outdoor billboard, transit station, bus, television, radio, and newspaper ads
- Email blasts to interested organizations and groups
- Community presentations
- Letters, emails, phone calls, and mobile text notices directly to customers
- Updates to SFPUC's customer portal to communicate water reduction goals

5.2 COMMUNICATIONS ABOUT MANDATORY DEMAND REDUCTION

The SFPUC would likely also employ the customer and public outreach methods listed in Section 5.1 during a call for mandatory demand reduction. Additional notifications to account holders that the SFPUC will disseminate include:

- Notification letter to all customers informing them of the upcoming activation of mandatory demand reduction measures, including potential excess use fines and the imposition of a drought surcharge.

- Notification letter to all customers affected by mandatory reductions that provides their monthly allocations for the fiscal year, including information about the appeals process, availability of daily and hourly consumption data on the customer portal, and other resources for conservation assistance.
- Notification letter to customers with adjustments to their reduced flow factors, including information about appeals process and resources for conservation assistance.
- Notification letter to all customers informing them that the water shortage emergency has been lifted and the SFPUC is ending the mandatory demand reduction.
- Noticing for public hearings conducted at SFPUC Commission meetings that inform the Commissioners and public about the declaration of a water shortage emergency and any subsequent modifications to the water shortage stage.

5.3 COMMUNICATIONS RELATED TO WHOLESALE CUSTOMERS

Regardless of the expectation of water shortage conditions, as part of normal course of business, SFPUC staff provides an initial estimate of available water supply for the upcoming Supply Year (defined as the period between July 1 through June 30) to its Wholesale Customers on February 1 every year. A Wholesale Customer Annual Meeting is held in February at which the SFPUC makes a presentation on current water supply conditions and forecasts. The SFPUC issues a revised estimate of available water supply for the upcoming Supply Year on March 1 and uses the snow survey that occurs in the first week of April and an associated runoff forecast to refine an estimated total system storage expected on July 1. By the middle of April, the SFPUC issues a final estimate of available water supply and determines whether there will be a system-wide shortage for the coming Supply Year. A flowchart depicting an example annual Water Supply and Demand Assessment process for water shortages caused by a drought, including communication processes, is shown in Figure 2-1.

SECTION 6 COMPLIANCE AND ENFORCEMENT

6.1 ENFORCEMENT OF WATER USE ALLOCATIONS FOR RETAIL CUSTOMERS

The SFPUC’s primary methods for enforcing mandatory water shortage actions applicable to retail customers include excess use fines, installation of flow restrictors on customers’ service lines, and/or water shut off. In addition, a state law passed in 2016 (SB 814, adding Chapter 3.3 to Division 1 of the California Water Code) requires public disclosure of customers who are fined for exceeding water use allocations.

During the 1987-1992 drought, the SFPUC applied drought excess use fines as outlined below. The fines only applied to the amount of water used over a customer’s allotment.

- If a customer consumed up to 10% over its allotment, the customer was fined 2 times the normal rate;
- If a customer consumed 10.01% to 20% over its allotment, the customer was fined 8 times the normal rate; and
- If a customer consumed 20.01% or over its allotment, the customer was fined 10 times the normal rate.

During the 2012-2016 drought, the SFPUC called for a 10% voluntary reduction in water use by all customers system-wide. Additionally, the SFPUC applied mandatory reductions and excess use fines to irrigation customers, a small subset of all retail customers. The SFPUC’s actions during this drought included the following:

- Establishing a 25% mandatory demand reduction for dedicated irrigation customers, subject to excess use fines of 1 time the normal rate.
- Establishing a 30% mandatory demand reduction for Interruptible Water Service accounts, subject to excess use fines of 3 times the normal rate.

During the 2020-2023 drought, the SFPUC declared a water shortage emergency at Shortage Level 1, on November 23, 2021, with a call for a voluntary 10% system-wide demand reduction. The SFPUC also instituted a temporary drought surcharge for retail water and wastewater customers of up to 5% on part of their bill, effective April 1, 2022. On April 21, 2022, the SFPUC released its final water supply availability estimate for the upcoming supply year (FY 2022-23), which indicated that despite lower-than-normal snowpack, Hetch Hetchy Reservoir was expected to fill but the water bank was not, demonstrating that demand reductions continued to be necessary. At the same time, Governor Newsom issued Executive Order N-7-22, directing the SWRCB to adopt emergency drought regulations requiring urban water suppliers to implement Shortage Level 2 of their WSCPs. On May 24, 2022, the SFPUC adopted an 11% system-wide demand reduction associated with Shortage Level 2 of the SFPUC’s 2020 WSCP, which aligned with State requirements. In the months that followed, storms came through California that restored water storage levels in SFPUC reservoirs. As a result, on April 11, 2023, the SFPUC ended the water shortage emergency declaration and lifted the drought surcharge, effective May 1, 2023.

If an individual customer exceeds its water use allocation, the SFPUC may, after issuing one written warning, install a flow restriction device on the customer's service line. If a customer continues to consume water more than its allotment, the SFPUC has the authority to discontinue the customer's water service and charge penalty fees for the violation and the cost of enforcement.

6.2 ENFORCEMENT OF WATER WASTE PROHIBITIONS FOR RETAIL CUSTOMERS

Water waste activities can be reported through the City's 311 service request system or observed by or reported directly to SFPUC staff. The SFPUC reviews each report of potential water waste, and if a report contains sufficient information and reflects a restricted water use, the SFPUC notifies the water account holder, property owner, and/or occupant. If there are additional water waste reports at the same property, the SFPUC may call or visit the site to verify that there is water waste. If water waste is verified and continues, the SFPUC will issue additional warnings to the water account holder. Account holders that receive multiple warnings of verified water waste may be subject to additional enforcement actions. The SFPUC also takes the same actions for incidents of water waste observed by SFPUC Water Conservation field inspectors, and the SFPUC may increase the number of inspectors patrolling for water waste during a drought.

Per the SFPUC Rules and Regulations Governing Water Service to Customers and the SFPUC's water rate schedule, violation of any water use restriction may result in fines on the customer's water bill, installation of flow restriction devices, injunctions, or other actions as deemed appropriate. Continued violation may result in termination of water service.

6.3 ENFORCEMENT OF WATER USE ALLOCATIONS FOR WHOLESALE CUSTOMERS

Section 3 describes the allocation of RWS supplies between Retail and Wholesale Customers in the event of a system-wide water shortage reduction. During periods of mandatory demand reduction, the SFPUC will not assess excess use charges on any of the Wholesale Customers if the Wholesale Customers' collective cumulative purchases over the course of the Supply Year are less than the Wholesale Customers' Tier 1 allocation as reflected in Table 3-1. If the Wholesale Customers' collective cumulative purchases exceed their Tier 1 allocation, the SFPUC can assess excess use charges on each individual Wholesale Customer that exceeded its individual Tier 2 allocation (as established in the Tier 2 Plan) over the course of the Supply Year in proportion to each individual Wholesale Customer's share of the collective purchases that exceeded their Tier 1 allocation. Monthly excess use charges will be determined by the SFPUC at the time of the declared water shortage consistent with the terms of the WSA. For more information about excess use charges for Wholesale Customers, please refer to Section 4 of the WSAP.

SECTION 7 LEGAL AUTHORITIES

The SFPUC will declare a water shortage emergency in accordance with California Water Code Sections 350-359. The SFPUC will coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency (California Government Code Section 8558). The SFPUC is in regular communication with its Wholesale Customers about water supply conditions.

Additional legal authorities for implementation of the WSCP include, but are not limited to, the following:

- Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County (described in more detail in Section 3).
- SFPUC Rules and Regulations Governing Water Service to Customers, originally established by Resolution No. 19.786 passed December 15, 1959, as they are amended from time to time.
- Chapter 3.3 of Division 1 of the California Water Code (Excessive Residential Water Use During Drought).

SECTION 8 FINANCIAL CONSEQUENCES OF THE WSCP

The SFPUC's rate structure is comprised of fixed and variable components. As a result, as per-unit sales decrease, revenues are lost. The marginal cost of water delivery is relatively small, which means that as demand decreases, the cost of providing water service remains the same. Meanwhile, the SFPUC may incur some new costs to implement its water shortage actions, such as efforts required to coordinate implementation of customer-specific allocations in the SFPUC's billing system and the cost of notifying customers. For both retail and wholesale customers, a reduction in water purchases – whether voluntary or mandated – could result in challenges meeting financial obligations for debt-service coverage or financial reserves. To help mitigate these financial risks, the SFPUC's retail water rates have a provision for a drought surcharge that automatically increases rates in the event of an SFPUC-declared water shortage. The SFPUC Commission may pass a resolution to impose a drought surcharge in the form of a percentage increase in the volumetric portion of retail water rates. The percentage increase would be in line with the expected water use reductions and would ensure the SFPUC recovers sufficient revenues to cover ongoing service costs despite lower demands. The drought surcharge would remain in effect until the Commission adopts a resolution to rescind the system-wide demand reduction. The drought surcharge is calculated so that, accounting for the expected reduction in retail water usage, total revenues are approximately equal to what they would have been without the demand reduction. The drought surcharge protects the SFPUC's financial stability during water shortages. More information about drought surcharges is in the SFPUC's Rate Schedules & Fees for Water and Sewer Service.

For Wholesale Customers, the rate-setting process is governed by the terms of the WSA, which provides that, in the event of a water shortage emergency, the SFPUC Commission may adjust wholesale rates in an expedited way concurrently with the imposition of drought surcharges on retail customers. Beyond drought rate setting and emergency rate setting, rates are set annually in coordination with the SFPUC's annual budget process and are based on the forecasted wholesale share of RWS expenditures and total purchases. If Wholesale Customer usage is expected to decrease – either voluntarily or due to water shortages – this would be incorporated into the wholesale rate forecast, and rates may increase to make up for the revenue loss caused by reductions in water use.

SECTION 9 MONITORING AND REPORTING

With respect to water use monitoring and reporting, the SFPUC's customer billing system generates monthly consumption reports through which the SFPUC will track actual water savings during a water shortage. These consumption reports are highly accurate as all retail and wholesale customers are metered. The SFPUC can determine how much both retail and wholesale customers reduced their water use in response to voluntary or mandatory demand reductions by comparing their consumption data month to month. The SFPUC will also use these data to evaluate the effectiveness of the water shortage response plan that the SFPUC will have prepared in accordance with the WSCP. State regulations require the SFPUC to report retail customer consumption to the State on a monthly, quarterly, and annual basis, whether or not water shortage conditions exist. State regulations also require the SFPUC to report to the State if water shortage conditions exist, and, if so, what demand reduction and water supply augmentation actions the SFPUC is taking in response. The SFPUC conducts ongoing monitoring of its watersheds, reservoirs, and other RWS components for reporting on the status of the SFPUC's water supply to determine the applicable water shortage level.

SECTION 10 PREPARATION FOR CATASTROPHIC SUPPLY INTERRUPTION

The SFPUC maintains various planning documents and strategies that collectively address its emergency preparedness and planned response in the event of a catastrophic interruption of water supplies due to power outages, earthquakes, or other disasters. These plans are described in the following subsections 10.1 (Emergency Preparedness Plans), 10.2 (Emergency Drinking Water Planning), and 10.3 (Power Outage Preparedness and Response). Subsection 10.4 further addresses the Seismic Risk Assessment and Mitigation Plan required by California Water Code Section 10632.5.(a). Should a catastrophic interruption occur, the SFPUC will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency (California Government Code, California Emergency Services Act Article 2, Section 8558).

10.1 EMERGENCY PREPAREDNESS PLANS

Following the 1989 Loma Prieta earthquake, the SFPUC created a departmental Emergency Operations Plan (EOP). The SFPUC EOP was originally released in 1992 and has since been updated as necessary. The SFPUC EOP addresses a broad range of potential emergency situations that may affect the SFPUC and supplements the City's Emergency Response Plan, which was prepared by the Department of Emergency Management and most recently updated in 2017. The purpose of the SFPUC EOP is to describe the SFPUC's emergency management organization, roles and responsibilities, and emergency policies and procedures.

In addition, the SFPUC's enterprises each have their own emergency plans (in alignment with the SFPUC EOP), which detail that entity's specific emergency management organization, roles and responsibilities, emergency policies and procedures, and response to hazardous events (e.g., hazardous materials, power interruption, etc.). In 2025, the SFPUC developed a Water Emergency Operations Plan (Water EOP) to comply with the America's Water Infrastructure Act passed in 2018. The Water EOP integrates directly into, and functions as an annex to, the SFPUC

EOP. The Water EOP addresses SFPUC water transmission and distribution systems and identifies the agency's enterprises, divisions, and bureaus with direct roles and responsibilities for those systems. The SFPUC EOP functions as a front end for the SFPUC's enterprise EOPs, covering emergency response at the department level, while each enterprise EOP covers enterprise-specific information on the enterprise's emergency organization and response procedures specific to enterprise responsibilities, assets, technical scope, and operations.

The SFPUC exercises its EOPs on a regular basis by conducting emergency exercises and through real-world response. Through these exercises and activations, the SFPUC learns how well the plans and procedures will or will not work in response to an emergency. EOP improvements are based on the results of these exercises and real-world event response and evaluation. The SFPUC also has an emergency response training plan that is based on federal, State, and local standards and exercise and incident improvement plans. SFPUC employees have emergency training assignments based on their emergency response roles, as identified in the EOPs.

The types of events affecting the SFPUC that require emergency plans include but are not limited to:

- Major earthquake
- Loss of power
- Loss of water supply
- Major fire
- Hazardous material release that threatens water supply or environment
- Major pipeline breaks
- Dam incident
- Significant outage of SFPUC services
- Man-made or intentional acts of terrorism resulting in damage to the system or interruption in service

In addition to the documents described above, the SFPUC also maintains various plans and procedures that deal with the possibility of alternate supply schemes and options. These plans and procedures include:

- Emergency Disinfection and Recovery Plan
- Emergency Response Action Plan
- Emergency Drinking Water Equipment and Alternatives Report
- Disinfection of SFPUC Water Trailers Procedure
- San Francisco Water Division Hydrant Manifold Standard Operating Procedure

10.2 EMERGENCY DRINKING WATER PLANNING

The SFPUC has implemented several projects to increase its capability to provide emergency drinking water during a catastrophic emergency. These projects include:

- Completion of many WSIP projects and other capital upgrades to improve security, detection, and communication (see Section 10.4);
- Development of public information and educational materials for residents and businesses;

- Construction of a disinfection and fill station at the existing San Francisco Zoo well, and obtaining a permit to utilize this well as a standby emergency drinking water source;
- Construction of six wells as part of the San Francisco Groundwater Supply Project, two of which also serve as emergency drinking water supplies, including a distribution system to fill emergency water tankers;
- Purchase and engineering of emergency-related equipment, including water tanker trucks and water distribution manifolds, to help with distribution post-disaster; and
- Coordination of planning with other City departments, neighboring jurisdictions, and other public and private partners to maximize resources and supplies for emergency response.

The SFPUC also maintains a Water Quality Notifications and Communications Plan. Initially prepared in 1996 and most recently updated in 2022, this plan provides contact information and guidelines on notifications that SFPUC staff will issue in the event of water quality impacts that warrant communications internally and externally with the State, the Wholesale Customers, and/or public. The plan treats water quality issues as potential or actual supply problems, which fall under the emergency response structure of the SFPUC EOP.

10.3 POWER OUTAGE PREPAREDNESS AND RESPONSE

The SFPUC's water transmission system is primarily gravity fed from Hetch Hetchy Reservoir to the City. Within the in-City distribution system, key pump stations have generators on site, and all others have connections in place that would allow the use of portable generators.

Although power outages would not greatly impact water conveyance throughout the RWS because it is gravity fed, the SFPUC has prepared for potential regional power outages as follows:

- The Tesla Treatment Facility, the Sunol Valley Water Treatment Plant (SVWTP), the Sunol Valley Chloramination Facility (SVCF), and the San Antonio Pump Station (SAPS) have back-up power on site in the form of generators. Additionally, SVWTP, SVCF, and SAPS would not be impacted by a failure of the regional power grid because these facilities are powered by hydropower generated by Hetch Hetchy Water and Power via the Calaveras Substation.
- Both the Harry Tracy Water Treatment Plant and the Baden Pump Station (part of the Peninsula System) have back-up generators in place.
- Administrative facilities that may act as emergency operation centers also have back-up power.
- The SFPUC has a water supply connection with the Santa Clara Valley Water District (Valley Water or VW), known as the SFPUC-VW Intertie, which also has back-up generators in place.
- Additionally, as described in the next section, various WSIP projects expanded the SFPUC's ability to remain in operation during power outages and other emergency situations.

10.4 SEISMIC RISK ASSESSMENT AND MITIGATION PLAN

As part of the SFPUC's Facilities Reliability Program and WSIP, the SFPUC performed an extensive multi-year evaluation of seismic risks to its water system that resulted in major capital improvements to increase seismic reliability. The goals of WSIP include enhancing the ability of the SFPUC water system to meet identified levels of service goals for water quality, seismic reliability, delivery reliability, and water supply. One of the reasons the SFPUC developed WSIP was to reduce the likelihood of shortages, thereby reducing the likelihood of needing to implement the WSCP. Several WSIP projects located in San Francisco improved the seismic reliability of the in-City distribution system, such as additional wells that can be used as emergency drinking water sources. Many WSIP projects related to the RWS outside of San Francisco, the majority of which are now complete, addressed both seismic reliability and overall system reliability. The SFPUC completed the San Francisco portion of WSIP as of October 2020 and forecasts that the overall WSIP will be complete in June 2032.

WSIP seismic levels of service (LOS) informed development of WSIP capital projects and guided program implementation. The LOS established post-earthquake delivery and recovery objectives under the following seismic scenarios:

- Magnitude 7.9 event on the San Andreas fault
- Magnitude 7.3 event on the Hayward fault
- Magnitude 6.9 event on the Calaveras fault

An assessment of seismic risk and resilience is contained in the body of analysis performed to support the WSIP. The risks associated with the seismic scenarios considered are reflected in the delivery objectives established in the LOS, specifically:

- Delivery of winter month demand 24 hours after a major earthquake, and
- Delivery of average day demand 30 days after a major earthquake

In addition to the improvements that have or will come from the WSIP, the SFPUC has already constructed system interties for use during catastrophic emergencies, short-term facility maintenance and upgrade activities, and times of water shortages. These are listed below:

- **EBMUD-Hayward-SFPUC Emergency Intertie:** An intertie that may transfer up to 30 MGD among East Bay Municipal Utility District (EBMUD), the City of Hayward (an SFPUC Wholesale Customer), and SFPUC to boost water supply reliability during emergencies. EBMUD and the SFPUC own these facilities jointly, while the City of Hayward maintains and operates them in coordination with EBMUD and the SFPUC.

- **SFPUC-Valley Water Intertie:** The SFPUC and Valley Water maintain a 40-MGD intertie between their two systems at Milpitas to exchange water during emergencies and planned maintenance (as mentioned in Section 10.3). The intertie has been used on several occasions during maintenance of Valley Water's system.

- **South Bay Aqueduct Intertie:** An intertie connecting the South Bay Aqueduct and the SFPUC's San Antonio Reservoir that the SFPUC used in 1991-1992 for a two-year water transfer. The SFPUC may upgrade this intertie to receive State Water Project water in the event of a future emergency.

The WSIP also includes projects related to standby power facilities at various locations. These projects provide for standby electrical power at six critical facilities to keep them in operation during power outages and other emergency situations. Permanent engine generators are located at four locations (San Pedro Valve Lot, Millbrae Facility, Alameda West, and Harry Tracy Water Treatment Plant), while hookups for portable engine generators are at two locations (San Antonio Reservoir and Calaveras Reservoir).

The City also has a Hazards and Climate Resilience Plan which was last updated in July 2025, see www.onesanfrancisco.org/hazards-and-climate-resilience-plan. This plan is a roadmap to minimizing the impacts of natural hazards and climate change on buildings, infrastructure, and communities. The plan also serves as San Francisco's Local Hazard Mitigation Plan which it updates every five years to include the latest understanding of natural hazards and climate change impacts, local risks, and community priorities. Examples of hazards analyzed in the plan include dam or reservoir failure, flooding, drought, and wildfire.

SECTION 11 WSCP REFINEMENT PROCEDURES

The SFPUC considers the WSCP a dynamic tool that will be subject to regular refinement as needed to ensure shortage response actions are effective and produce the desired results. If planned shortage response actions are implemented in the future, the SFPUC will conduct an evaluation of their effectiveness using the monitoring and reporting described in Section 9 and incorporate edits as needed to the WSCP.

SECTION 12 PLAN ADOPTION, SUBMITTAL, AND AVAILABILITY

The SFPUC has informed all cities or counties within which the SFPUC provides water supplies of its intent to update the WSCP. In addition, the SFPUC made this WSCP available for public review within 30 days of the SFPUC Commission public hearing by posting an electronic copy on the SFPUC website at **www.sfpuc.gov/uwmp**.

The SFPUC prepared this 2025 WSCP and presented it to the SFPUC Commission for adoption. A copy of the SFPUC resolution adopting this 2025 WSCP is provided in Appendix E. Within 30 days of SFPUC Commission adoption, the SFPUC will submit the adopted 2025 WSCP electronically to DWR via its online submittal tool (WUEdata portal), submit the plan on a compact disk mailed to the California State Library, email an electronic copy to cities and counties within which the SFPUC provides water supplies, and upload an electronic copy to the SFPUC website at **www.sfpuc.gov/uwmp.**

2025 WATER SHORTAGE CONTINGENCY PLAN
FOR THE CITY AND COUNTY OF SAN FRANCISCO

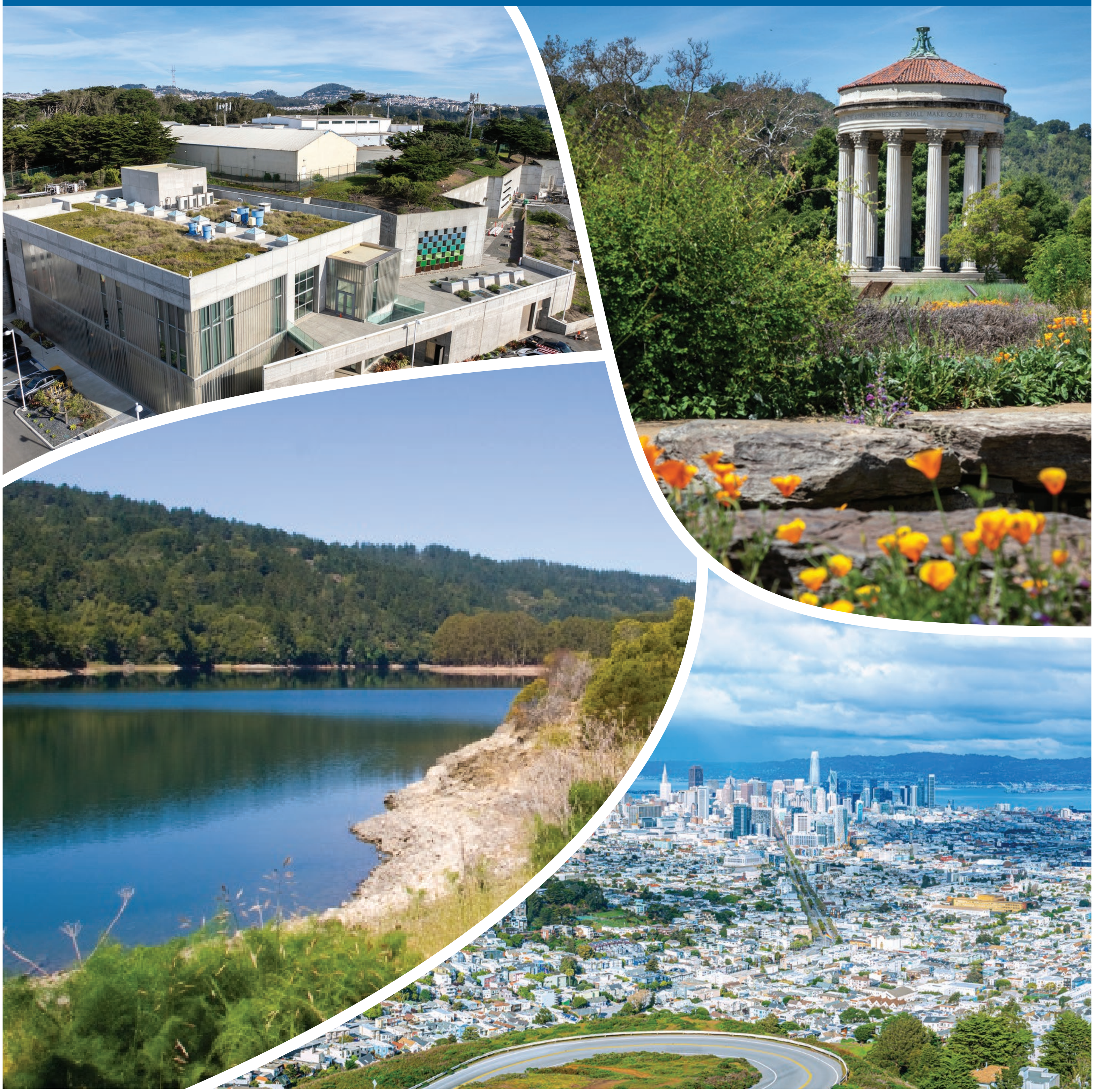
APPENDICES

PUBLIC REVIEW DRAFT

March 2026

Prepared by: The San Francisco Public Utilities Commission

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission



Appendix A

Summary of San Francisco's Response to 1987-1992 Drought Experience

MARCH 2026

WATER SHORTAGE CONTINGENCY PLAN

for the City and County of San Francisco

Prepared by the San Francisco Public Utilities Commission

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

Summary of San Francisco’s Response to 1987-92 Drought Experience

Background:

The 1987-92 six year drought provides an example of how the near-term drought management process works in times when the operational capabilities of Hetch Hetchy and other water supplies available to the SFPUC are taxed to a point that forces drastic actions to avoid running out of water. By the sixth year of that drought period, many of the programs and actions identified in San Francisco’s current Retail Water Shortage Allocation Plan (adopted in December 2001) had been implemented. The following describes some of the major actions that occurred.

Demand Reductions:

The extended drought forced San Francisco to adopt a mandatory rationing program, enforced by stiff excess use charges and the threat of shut-off for continued violations of water use prohibitions. Mandatory rationing was in effect May of 1988 through May of 1989, re-instituted in May of 1990, and continued until March of 1993. A Water Shortage Emergency Resolution was passed by the SFPUC on April 28, 1988 declaring these rationing periods (Resolution No. 88-0155). A copy of this resolution can be found at the end of this appendix.

The SFPUC’s water rationing program was one of the toughest in the state and the most stringent imposed by any major urban water supply agency. Although the specifics of the program varied over time, the basic outline of the mandatory rationing program was to achieve a 25 percent reduction to 1987 (pre-drought) consumption (system-wide), with water allocations set on an account-by-account basis.

To provide a strong incentive for customers to use no more water than their allotment, the SFPUC adopted a rate structure that incorporated excess use charges. Any customer that used less water than its allotment was charged the normal rate per unit of water consumption, while any customer who used more than its allotment was charged a multiple of the normal rate for every unit of consumption above its allotment. As of January 1, 1992 (the last year of the rationing program), the rate structure shown in the table below applied to SFPUC customers.

Excess Use Charges	
If Water Consumption Is (Over Allotment)	Excess Use Charge Will Be (Times Normal Rate)
Up to 10%	2
10.01 - 20%	8
20.01% or over	10

In the event that water was used in excess of the customer's specified allotment, the SFPUC could, after one written warning, install a flow restrictor on the customer's service line. The charge to install and remove the restricting device is shown in the table below. If a customer continued to consume water in excess of its allotment, the SFPUC had the authority to discontinue the customer’s water service and require the customer to bear the cost for the re-connection of water service.

Fee For Installing Flow Restricting Devices	
Meter Size	Installation/Removal Cost
to 1”	$95
1” to 2”	$149
3” and larger	Actual cost

In addition to pricing disincentives for excess water use, numerous water use restrictions were adopted and enforced. San Francisco retail customers were required to comply with the following water use prohibitions and restrictions:

- Water waste, including but not limited to, any flooding or runoff into the street or gutters, was prohibited.
- Hoses could not be used to clean sidewalks, driveways, patios, plazas, homes, businesses, parking lots, roofs, awnings or other hard surfaces areas.
- Hoses used for any purpose had to have positive shutoff valves.
- Restaurants served water to customers only upon request.
- Potable water was not to be used to clean, fill or maintain levels in decorative fountains.
- Use of additional water was not allowed for new landscaping or expansion of existing facilities unless low water use landscaping designs and irrigation systems were employed.
- Water service connections for new construction were granted only if water saving fixtures or devices were incorporated into the plumbing system.
- Use of potable water for consolidation of backfill, dust control or other non-essential construction purposes was prohibited.
- Irrigation of lawns, play fields, parks, golf courses, cemeteries, and landscaping of any type with potable water would be reduced by at least the amount specified for outside use in the adopted rationing plan.
- Verified water waste as determined by the Water Department would serve as prima facie evidence that the allocation assigned to the water account is excessive; therefore, the allocation was subject to review and possible reduction, including termination of service.
- Water used for all cooling purposes was to be recycled.
- The use of groundwater and/or reclaimed water for irrigation of golf courses, median strips, and similar turf areas was strongly encouraged.
- The use of groundwater and/or reclaimed water for street sweepers/washers was strongly encouraged.

In addition to water use prohibitions and directives specifically responsive to the drought, the SFPUC coincidentally was implementing long-term conservation programs, which also lowered water demands during the drought period (refer to the Demand Management discussion). Following the drought, several of the measures described above were adopted by San Francisco into permanent, on-going programs.

Water Management:

In addition to effecting reductions to water demands, the SFPUC also employed water management activities to control the severity of water shortages to its customers.

During the drought and for the first time in history, the SFPUC utilized a Delta supply within its system. The SFPUC imported water from the Delta through use of State Water Project South Bay Aqueduct facilities. The sources of water transferred included transfers via the California Emergency Water Bank, Placer County and the Modesto Irrigation District. The waters were diverted from the South Bay Aqueduct into the SFPUC's San Antonio Reservoir and then treated and integrated into SFPUC's water distribution system.

The amount of water actually delivered to the SFPUC was constrained due to numerous factors including the lack of willing sellers, allocation procedures, lack of priority in use of the State transmission facilities, storage constraints in San Antonio Reservoir, and water treatment constraints within the SFPUC's system. The total water that was imported into the SFPUC's system amounted to a maximum of approximately 31,000 acre-feet in one year, and in total for the drought period amounted to 59,000 acre-feet.

The importation of additional water into the SFPUC's system allowed the continuation of a 25 percent system-wide rationing program as compared to a potentially higher level of rationing had the transfers not occurred.

System Response and Effects:

The system-wide goal of reducing water use by 25 percent was achieved. However, the reduction was not accomplished without cost or hardship.

To achieve its annual 25 percent system-wide rationing goal, the SFPUC targeted a reduction of indoor consumption by 10 percent and outdoor consumption by 60 percent.

Due to the nature of the allocation formula for water allotments and the level of system-wide reduction goals, instances occurred where individual users or wholesale water customers were burdened with up to twice the system-wide average in delivery reductions.

Some of the costs incurred by individuals, property owners and renters include:

- The cost of installing low-flow toilets, retrofit kits for toilets and showerheads, and special low-water use landscaping and irrigation systems

- The financial losses resulting from loss of lawns, plants and trees due to the 60 percent reduction in water available for irrigation

- The cost of excess use charges ($12,300,000 in excess use charges was billed to retail accounts in fiscal year 1991-92 alone)

The ability of SFPUC's retail customers to achieve a 25 percent reduction in the future is highly unlikely due to the "hardening" of water demands that occurred during and subsequent to the drought. The rationing programs implemented by San Francisco during the 1987-92 drought were measured by comparison to calendar year 1987 water deliveries, i.e., pre-drought conditions.

During the 1987-92 drought San Francisco's retail and wholesale water customers implemented numerous conservation measures that have led to permanent per capita water usage savings. San Francisco's current water demand is likely hardened as compared to the 1987 level of water demand. This situation leads to a conclusion that comparable rationing goals (e.g., up to 25 percent reduction) would be more difficult to achieve since the drought, and would require measures in excess of those implemented during the 1987-92 drought to achieve a comparable percentage of delivery reduction.

As the level of rationing increases, the economic and societal impacts become more severe. The SFPUC has first hand experience in attempting to employ rationing to levels, which are intolerable to citizens and businesses.

In 1991, water storage had deteriorated and the SFPUC was forced to immediately adopt a 45 percent system-wide rationing plan. It was proposed the reduction would be achieved through a 33 percent reduction to inside water use and a 90 percent reduction to outside water use.

San Francisco's plan for meeting its rationing goal included the following minimum and maximum criteria:

- *Maximum Allocation for Single and Multi-family Residences.* No single-family residence shall receive an allocation of more than 300 gallons per day: no multi-family residence shall receive an allocation of more than 150 gallons per day times the number of living units in the building.

- *Minimum Allocation for All Residential Accounts.* A minimum of 50 gallons per day per documented resident will be allowed. However, a minimum allocation will not be approved to increase an allocation above current usage absent a documented change in circumstances.

- *Irrigation Services.* Accounts classified for irrigation only will be reduced by 90 percent.

- *Commercial/Industrial Allocations.* Commercial and industrial allocations will be reduced by 32 percent. Hospitals and other health care facilities may be subject to lesser restrictions subject to verification that all conservation measures are in place; such approval shall require an on-site conservation inspection.

- *Allocations for New Accounts.* Initial allocations will be established at 50 gallons per day. These allocations will be re-evaluated after customers have installed retrofit kits provided by the San Francisco Water Department. After verification of installation, allocations will be calculated on the basis of the number of documented residents within a household, or, in the case of commercial or industrial customers, on the basis of business data supplied to the Department.

Additional water use restrictions and prohibitions were enforced:

- The washing of all automobiles, motorcycles, RVS, trucks, transit vehicles, trailers, boats, trains and airplanes was prohibited outside of a commercial washing facility.

- Exceptions to the above use restriction were windows on all vehicles and such commercial or safety vehicles requiring cleaning for health and safety reasons.

- Water used for all cooling purposes or for commercial car washes had to be recycled.

- The use of potable water on golf courses was limited to the irrigation of putting greens. The use of groundwater and reclaimed water was permitted when approved by the Department of Health.

- The filling of new swimming pools, spas, hot tubs or the draining and refilling of existing pools, etc., was prohibited; topping off was allowed to the extent that the designated allocation was not exceeded.

- The irrigation of median strips with potable water was prohibited. The use of groundwater and reclaimed water was permitted when approved by the Department of Health.

- The use of potable water for street sweepers/washers was prohibited. The use of groundwater and reclaimed water was permitted when approved by the Department of Health.

Public and commercial response to 45 percent rationing was overwhelmingly negative. During the first weeks after notification of the program, SFPUC received over 2,000 appeal letters per day. In the month before rationing was returned to 25 percent, 19,000 appeals, 12,000 telephone calls, and 1,500 walk-in complaints occurred.

Both the allocation levels and new prohibitions required to meet this level of rationing would have had a devastating effect on commercial enterprises. Some water uses would have simply been prohibited. Simply put, rationing had been taken to a level that was considered intolerable to citizens and had become economically disastrous.

CITY AND COUNTY OF SAN FRANCISCO

RESOLUTION No. 88-0155

WHEREAS, The San Francisco Water Department obtains water from the reservoirs operated by the Hetch Hetchy Water and Power and from local Bay Area reservoirs; and

WHEREAS, Due to critically low supplies of water within the reservoirs and anticipated low levels of inflow into the reservoirs, such that unless consumption is decreased there may be insufficient water supplies for human consumption, sanitation and fire protection; and

WHEREAS, Decreases in water consumption may be accomplished by reducing allocations to the Water Department's wholesale customers and by imposing water use restrictions on the Water Department's retail customers, as set forth in the Water Rationing Rules and Regulations, issued on April 21, 1988 and attached hereto as Water Rationing Rules and Regulations; and

WHEREAS, This Commission recognizes the need to declare a Water Shortage Emergency (Water Code Sec. 350, et. seq.) due to critically low water supplies now available, and the need for a reduction in water use by the San Francisco Water Department's Suburban Wholesale Customers; and

WHEREAS, This Commission recognizes the need to adopt a Water Conservation Program (Water Code Sec. 375, et. seq.) due to the critically low water supplies now available, and the need for a reduction in water use by the San Francisco Water Department's retail customers; and

WHEREAS, The City of San Jose is, by Resolution 85-0256, a temporary and interruptible wholesale customer of the Water Department, and the Settlement Agreement and Master Water Sales Contract between the City and County of San Francisco and certain Suburban Purchasers in San Mateo County, Santa Clara County and Alameda County (Settlement Agreement) requires action by the Commission to interrupt service to the City of San Jose (Section 8.17); and

WHEREAS, The City of Santa Clara is, by Resolution 85-0257, a temporary and interruptible wholesale customer of the Water Department, and the Settlement Agreement requires action by the Commission to interrupt service to the City of Santa Clara (Section 8.17); and

WHEREAS, Additional funding in the amount of $648,780 for FY 1988/89 has been identified by the Water Department for implementation of a mandatory water rationing program; and

WHEREAS, on April 21, 1988, the Water Department submitted to this Commission a Water Conservation Program; and

WHEREAS, The Conservation Program shall cease to exist in whole or in part at such time as the Commission finds that the supply of water available to the Water Department's service area has been replenished or augmented so that there are sufficient supplies to meet the needs of the Water Department's customers without the continued implementation of these measures; and

UU1YI

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of APRIL 28 1988

Romaine A. Boldridge

Secretary, Public Utilities Commission

RESOLUTION No. 88-0155

WHEREAS, The recommended Water Conservation Program has received wide-spread public distribution; and

WHEREAS, Members of the public have been given an opportunity to, and have expressed their views on the recommended Water Conservation Program in a public hearing; now, therefore be it

RESOLVED, That this Commission declares a Water Shortage Emergency; and

BE IT FURTHER RESOLVED, That this Commission adopts a Water Conservation Program; and

BE IT FURTHER RESOLVED, That this Commission approves the Water Conservation Program dated April 21, 1988 as amended April 28, 1988, and directs that it be placed in force on May 1, 1988; and

BE IT FURTHER RESOLVED, That it is not the Commission's intention to interrupt water service to the cities of San Jose and/or Santa Clara; however, pursuant to its obligation under the Settlement Agreement and Master Water Sales Contract this Commission authorizes the General Manager of the Water Department to interrupt water service to the cities of San Jose and/or Santa Clara if necessary to achieve the required water saving, however, prior to actual interruption of service to either the City of San Jose or Santa Clara, the General Manager of the Water Department shall report to the Commission the need for interruption and receive affirmation from the Commission prior to institution of the interruption; and the Commission further directs the General Manager of the Water Department to mitigate the effect of the interruptions to the extent possible and consistent with the needs of San Francisco's permanent customers; and

BE IT FURTHER RESOLVED, That this Commission hereby authorizes the additional budget needs to be added to the Water Department's Conservation Programmatic Budget, thus amending the Water Department's budget request for FY 1988/89; and

BE IT FURTHER RESOLVED, That this Commission hereby designates Tuesday, May 24, 1988 as the date for a public hearing by the Public Utilities Commission for considering proposals for rate increases and additional charges for water service and water supplied by the San Francisco Water Department to retail customers; and

BE IT FURTHER RESOLVED, That this Commission hereby designates Tuesday, May 24, 1988 as the date for a public hearing by the Public Utilities Commission for considering proposals for rate structure adjustments for water service and water supplied by the San Francisco Water Department to wholesale customers; and

BE IT FURTHER RESOLVED, That the revenue requirements and an analysis of the rate increases, rate structure adjustments and additional charges be made available for public inspection and review beginning Monday, May 16, 1988 in Room 287, City Hall, San Francisco.

0019f

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of APRIL 28 1988

Romaine A. Boldridge
Secretary, Public Utilities Commission

Appendix B

Summary of San Francisco's Response to 2012-2016 Drought Experience

MARCH 2026

WATER SHORTAGE CONTINGENCY PLAN

for the City and County of San Francisco

Prepared by the San Francisco Public Utilities Commission

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

Summary of San Francisco’s Response to 2012-2016 Drought Experience

Appendix to the 2025 Water Shortage Contingency Plan

Introduction

The purpose of this Drought Summary (Summary) is to provide an overview of the SFPUC’s activities in response to the statewide drought, beginning with State of Emergency declared by Governor Brown in January 2014. This drought is unprecedented, not only for being the driest period in California history, but also for the drastic measures taken by the State to mandate reductions in urban water use. This Summary primarily focuses on the SFPUC’s retail service area (e.g., retail sales, excess use charges, customer outreach), but documentation related to the wholesale service area is included to a lesser extent.

This Summary is organized chronologically, with one section for each calendar year (CY): 2014, 2015, 2016, and 2017. The Summary covers activities through the end of Fiscal Year (FY) 2016-17 (i.e., through June 2017).

Each section provides an overview of the main drought-related activities that occurred during the year, and includes a timeline of regulatory actions made at the State and local levels and a summary of retail water use by sector compared to the CY 2013 baseline.

Summary of Activities in Calendar Year 2014

The three-year period from October 2011 to September 2014 was the driest in California's hydrologic record and, as a result, reservoir storage, snowpack, and reservoir inflows were significantly lower than normal throughout the State. The unprecedented dry weather conditions prompted Governor Jerry Brown to declare a drought emergency for the State of California in January 2014 (Proclamation 1-17-2014). This action spurred the SFPUC to request that all customers of the Regional Water System (RWS) voluntarily reduce water use by at least 10% (Press Release 3-14), corresponding to Stage 1 of the Retail Water Shortage Allocation Plan.

Soon after, the San Francisco Mayor's Office issued a formal executive directive requiring that all City departments develop individual water conservation plans and take immediate steps to achieve a mandatory 10% reduction in their water consumption (Executive Directive 14-01). Moreover, in July 2014, new emergency regulations issued by the SWRCB (Resolution 2014-0038) prompted the SFPUC to implement outdoor water waste restrictions and require a mandatory 10% reduction in outdoor water use (Resolutions 14-0121 and 14-0140).

At this time, starting in October 2014, mandatory reductions in water use and corresponding excess use charges applied only to dedicated irrigation customers for a few reasons. First, requiring reductions only in irrigation was in line with the State's regulations targeting outdoor water use. The call for a voluntary reduction of 10% still applied to all customers system-wide. Second, the outdoor sector had the most potential for water savings. Third, the SFPUC's Customer Care and Billing System (CC&B) was undergoing an upgrade in summer 2014, so it was not possible to implement any new rationing programs in CC&B until fall 2014. To implement the Mandatory Irrigation Allocation Program, and a workaround system was created outside of CC&B. Because the pool of dedicated irrigation customers was relatively small (approximately 1,600 accounts), it was manageable with the workaround system. It would not have been feasible or cost-effective to create a workaround system for any large sectors (e.g., residential).

Per the SFPUC's existing Interruptible Water Service rate (Rate Schedules W-3B and W-34), a subset of dedicated irrigation customers, known as interruptible customers, pay reduced rates, but are subject to more stringent reductions during water shortages. Since 2007, this rate was made available only to irrigation customers for public uses within the City and County of San Francisco (i.e., municipal City departments). However, on May 13, 2014, the SFPUC adopted Resolution 14-0070, which expanded Interruptible Water Service to all retail irrigation uses inside and outside the City and County of San Francisco. Coupled with the water use restrictions due to the drought, this resolution prompted SFPUC staff to make changes to and clarify the implementation of the Interruptible Water Service rate effective July 1, 2014. In June 2014, all eligible irrigation account holders, including both municipal and private customers, were notified of the opportunity to opt-in to the Interruptible Water Service program. Most City departments opted to remain in the program, and several private customers also opted to participate in the program. Implementation of the Interruptible Water Service rate was revised again in February 2015 with the adoption of formal rules and regulations for administering Interruptible Water Service; this is described in the chapter for CY 2015.

In June 2014, the SFPUC launched a multilingual "Water Conservation is Smart and Sexy" Citywide public education campaign. The advertisements were designed to capture public attention and present everyday water conservation tips and information about the drought. A combination of television, newspaper, billboard, bus, commuter transit station, and social media advertisements encouraged individuals to adjust their water use practices and pursue water-efficient plumbing fixture upgrades. The campaign also advised individuals to visit SFPUC water conservation web content and learn about the suite of services that are offered. As a result of the campaign, SFPUC water conservation web traffic increased by more than fourfold when comparing June-October of 2013 to June-October of 2014.

The SFPUC also implemented an education and notification program about wasteful outdoor water use activities, such as spraying or washing down outdoor hardscapes unless required for health and safety purposes; watering landscape in a manner that causes runoff to the sidewalk; and operating a hose without the use of an automatic shut-off spray nozzle. One of the key actions included targeted messaging to top water-using residential accounts, individuals demonstrating outdoor water waste, and commercial properties performing maintenance of outdoor hardscapes. The SFPUC also established a public water waste reporting and tracking system through the City of San Francisco's centralized 3-1-1 online and telephone response center.

Retail customers collectively saved 3.3 MGD, or 4.8%, in CY 2014 compared to CY 2013. Wholesale Customers collectively saved 13.4 MGD, or 8.9%, of RWS supplies compared to CY 2013. Both sets of customers fell short of the voluntary system-wide goal of 10% that was declared in January 2014. Taking both the retail and wholesale service areas into account, system-wide savings in CY 2014 was 16.7 MGD, or 7.7%, compared to CY 2013 and did not meet the voluntary 10% goal.

Summary of Activities in Calendar Year 2015

In 2015, California was in its fourth year of a severe drought and entering a fifth year. The drought State of Emergency issued by Governor Brown in January 2014 remained in effect, and the SWRCB enacted additional emergency conservation regulations to promote even more conservation throughout the State (Resolution 2014-0013). These included mandatory restrictions on outdoor water use, as well as prohibitions on water use by businesses, which the SFPUC formally adopted (Resolution 15-0102). Shortly thereafter, the Governor issued an Executive Order (EO) in April 2015 (EO B-29-15), a mandatory statewide water use reduction of 25%, compared to a 2013 baseline, which took effect starting June 2015 (Resolution 2015-0032). When the regulations were initially adopted by the SWRCB, this mandatory reduction was intended to remain in place until February 2016 unless extended or modified if the drought continued.

To help achieve the statewide conservation goal of 25%, the SWRCB assigned the SFPUC a conservation standard of 8% in recognition of its low residential per capita water use. The 8% standard represents the lowest tier in the SWRCB emergency regulations. In response to the mandatory reduction issued by the State, the SFPUC adopted the 2015-2016 Drought Program (Resolution 15-0119 and 15-0149), which:

- Continued the call for a 10% reduction in water use by all customers system-wide
- Increased the mandatory reduction in water use by dedicated irrigation customers from 10% to 25%, subject to excess use charges of 100% (“1x”)
- Established a mandatory reduction in water use by Interruptible Water Service accounts at 30%, subject to excess use charges of 300% (“3x”)
- Adjusted existing reduced wastewater flow factors to reflect a 25% reduction in irrigation usage

The SFPUC decided to maintain its system-wide voluntary 10% reduction for continuity in messaging because (1) retail customers had already achieved about 9% through the first restriction period (i.e., 10% Mandatory Irrigation Allocation Program starting in October 2014), and (2) supply was being successfully managed such that further reductions were not needed. However, a further reduction on irrigation use was imposed to provide additional assurance that the 8% reduction mandated by the SWRCB could be met. The SFPUC continued to target dedicated irrigation customers because, similar to the initiation of the 10% Mandatory Irrigation Allocation Program in October 2014, this sector was considered to have the highest potential for savings and could be most feasibility managed through CC&B. Mandatory rationing for other sectors was discussed, but would have been difficult to set targets equitably and to determine a sensible way to track water use (i.e., volume normalized per dwelling unit, square foot, or occupant). Any additional savings that could have been achieved through rationing would not have been worth the effort to implement rationing given the significant savings already achieved. Ultimately, the SFPUC implemented a program that would avoid mandatory rationing while achieving the targeted level of savings.

In February 2015, prior to development of the 2015-2016 Drought Program and unrelated to the drought, the SFPUC adopted rules and regulations for administering Interruptible Water Service (Resolution 15-0040). The rules and regulations allow eligible irrigation customers to opt into the Interruptible Water Service program and receive water service at a reduced rate (about 9% lower than regular commercial water rates). By opting in, these customers would be subject to service interruption and/or greater mandatory water use reductions, along with greater excess use charges, during water shortages and other emergencies at the discretion of the SFPUC Water Enterprise. The Interruptible Water Service rules had to be amended as part of the 2015-2016 Drought Program because the existing rules did not include a water shortage scenario (or stage) that was set forth by the Drought Program. Specifically, reductions and excess use charges were not defined for interruptible customers during a stage corresponding to a 10% system-wide water reduction with a mandatory reduction on dedicated irrigation. SFPUC staff initially proposed that interruptible customers should be subject to a 25% reduction and excess use charge of 200% ("2x") (Resolution 15-0119). However, the Commission requested that staff evaluate the feasibility and potential impacts of imposing more stringent reductions and excess use charges on interruptible customers. Based on an analysis of hypothetical financial impacts to existing interruptible customers assuming historical water use, with a focus on the largest interruptible customer (the San Francisco Recreation and Parks Department), staff recommended that interruptible customers be subject to a 30% reduction and excess use charge of 300% ("3x"). This proposal was adopted by the Commission and the 2015-2016 Drought Program was amended accordingly (Resolution 15-0149).

With the launch of the 2015-2016 Drought Program in July 2015, the workaround system that was created for the initial 10% Mandatory Irrigation Allocation Program was replaced with full integration of the 25% Mandatory Irrigation Allocation Program in CC&B. However, there was a delay in implementing the rationing program specific to Interruptible Water Service accounts until November 2015 because it took more time than expected to aggregate allocations and usage at the department level.

Although mandatory reductions were not imposed on residential and commercial customers, the SFPUC provided guidance and outreach to those customers on how to track and achieve water savings. In the SFPUC's on-line bill management system My Account, a Drought Water Use Target line was added to daily use charts for each single-family residential, multi-family residential, and non-residential account. The target reflected a 10% reduction from the account's historic 2013 water use. To aid customers in tracking their conservation in the future, the SFPUC started investigating the feasibility of fractional billing which was eventually implemented and launched in January 2017.

In addition to imposing conservation standards on individual urban water suppliers, the emergency regulations adopted by the SWRCB in May 2015 included additional water use prohibitions (Resolution 2015-0032). The SFPUC adopted additional mandatory restrictions to impose the State's prohibitions in the SFPUC retail service area if they had not already been addressed by existing SFPUC water use restrictions. The restrictions adopted by the SFPUC in CY 2015 are listed below:

- Watering outdoor landscapes with potable water during and within forty-eight (48) hours after a rain event (Resolution 15-0102)
- Not providing guests the option to refuse daily laundering of towels and linens at hotels and motels, and not prominently displaying notice of this option in each guestroom (Resolution 15-0102)
- Irrigation with potable water of ornamental turf on public street medians (Resolution 15-0119)

The SFPUC expanded its efforts to educate the public about wasteful water use activities restricted by the State, including runoff from irrigation and hardscape washing. SFPUC field inspectors continued to keep an eye out for water waste during daily rounds, and conservation staff responded to an increasing number of water waste reports submitted through San Francisco's 3-1-1 online and telephone response center.

The SFPUC continued to inform customers on the drought, water efficient practices, and new regulations through a variety of means in addition to those described above. The drought outreach campaign from the previous summer was updated and re-launched. In June 2015, irrigation customers were sent letters describing the Mandatory Irrigation Allocation Program and providing monthly account allocations through February 2016. The letters also provided an opportunity for the account holder to participate in or opt out of the Interruptible Service Program. The SFPUC also sent letters to account holders with reduced flow factors to notify them of adjustments to their reduced flow factor, or lack thereof in the case of adjustments that were too small to implement.

As the 2015-2016 Drought Program was being developed, SFPUC management and staff contemplated temporarily suspending high bill appeals, flow factor appeals, and interruptible rates during the drought as these processes could be considered counterproductive to conservation. However, the City Attorney's Office advised against suspending these processes, and instead, the SFPUC proceeded with the adjustment to reduced flow factors.

In December 2015, SFPUC management and staff met to discuss the effectiveness of the 2015-2016 Drought Program to date in anticipation of an extension to the State mandates in the beginning of 2016 as directed by the Governor (EO B-36-15). In brief, the Drought Program was effective at reducing water use across all customer sectors (except industrial, which is a small sector), and was on track to meet its objectives. Challenges in implementing program criteria and modifications to the billing system (CC&B) were also discussed at this meeting as well as at a follow-up meeting specifically regarding CC&B held in May 2016.

The April 2015 EO B-29-15 directed the California Department of Water Resources (DWR) to update the State's Model Water Efficient Landscape Ordinance (MWELO) to increase water efficiency standards for new and existing landscapes. In July 2015, the California Water Commission approved a revised MWELO. Accordingly, the SFPUC adopted amendments to San Francisco's Water Efficient Irrigation Ordinances and the related SFPUC rules (Section F of the Rules and Regulations Governing Water Service to Customers) to comply with the State's revisions (Resolution 15-0221).

Retail customers collectively saved 7.9 MGD, or 11.7%, in CY 2015 compared to CY 2013, thus exceeding the voluntary system-wide goal of 10%. Looking specifically at retail irrigation use, dedicated irrigation customers collectively saved 0.7 MGD, or 27.9%, over the course of the 10% Mandatory Irrigation Allocation Program (October 2014 through June 2015), far exceeding the program's goal. Wholesale customers also exceeded the voluntary system-wide goal of 10% by collectively saving 33.7 MGD, or 22.4%, of RWS supplies compared to CY 2013. Taking both the retail and wholesale service areas into account, system-wide savings in CY 2015 was 41.6 MGD, or 19.1%, compared to CY 2013 and exceeded the voluntary 10% goal.

Summary of Activities in Calendar Year 2016

Although hydrologic conditions improved during the winter of 2015/2016, the statewide drought continued into its fifth consecutive year. In anticipation of a dry winter, the Governor issued EO B-36-15 in November 2015 directing the SWRCB to extend the emergency regulations adopted in May 2015 beyond their initial expiration date in February 2016. In response, the SWRCB updated and extended the emergency regulations through October 2016 (Resolution 2016-0007). The most significant update to the emergency regulations was the addition of credits and adjustments to urban water suppliers' conservation standards that consider the differences in climate, growth, and investments in creating new, local, drought-resilient sources of potable water supply.

To comply with the SWRCB's extended emergency regulations, the SFPUC maintained its 2015-2016 Drought Program. The SFPUC did not apply for an adjustment to its existing 8% conservation standard because its customers were doing well to conserve well beyond that system-wide. Letters were sent to irrigation customers notifying them of the extension of the 25% Mandatory Irrigation Allocation Program, and included a new batch of monthly allocations from March through October 2016.

Despite improved conditions during the past winter, Governor Brown issued EO B-37-16 in May 2016 aiming to make water conservation a California way of life. Among other directives, the EO directed the SWRCB to extend its emergency regulations, which had previously been extended through October 2016, through January 2017. The regulation was ultimately set to expire on February 28, 2017 per the Office of Administrative Law. Additionally, the EO called for the emergency regulations to be adjusted in recognition of differing water supply conditions throughout the State. In response, the SWRCB required that all urban water suppliers self-certify their water supply reliability and corresponding conservation standard by June 2016 (Resolution 2016-0029). The self-certification process, also referred to as a “stress test,” assumed three additional dry years. The self-certified conservation standard replaces the existing State-developed conservation standard (i.e., 8% for SFPUC), and will remain in effect through February 2017. SFPUC staff analyzed the regulations and described proposed actions for its Commissioners in a memo dated May 18, 2016.

To comply with the revised emergency regulations, the SFPUC conducted the self-certification procedures and determined that potable water supplies would be sufficient to meet both retail and wholesale demands over the next three years. Thus, the revised conservation standard for the SFPUC retail system was established to be 0%, rather than the existing 8% conservation standard. Despite its self-certified conservation standard of 0%, the SFPUC continued to promote and encourage conservation in line with the State mandates. Specifically, the SFPUC maintained its call for a voluntary 10% system-wide reduction in water use over the 2013 baseline considering the proposed SWRCB emergency regulations and the fact that the Hetch Hetchy Regional Water System was still recovering from the drought. System storage was not anticipated to fill in 2016, and the next year’s hydrology remained uncertain.

However, in recognition of improved hydrologic conditions and the reduced conservation standard, the SFPUC adopted changes to the 2015-2016 Drought Program in June 2016 to ease mandatory reductions on outdoor irrigation with potable water (Resolution 16-0130). These changes included:

- Ceasing the 25% mandatory reduction in water use by dedicated irrigation customers and corresponding excess use charges;
- Reducing the mandatory reduction in water use by interruptible customers from 30% to 10%, subject to excess use charges; and
- Reverting reduced wastewater flow factors that had been adjusted to reflect a 25% reduction in irrigation usage back to their pre-adjusted reduced values.

In July 2016, the SFPUC sent letters to irrigation customers and customers with adjusted flow factors regarding the lifted restrictions. The letters to irrigation customers offered account holders the opportunity to participate in the Interruptible Water Service program for FY 2016-17 effective August 2016.

EO B-37-16 also directed the SWRCB to permanently prohibit practices that waste potable water. While the SWRCB has yet to take action to make the prohibitions permanent, the SFPUC updated its water waste restrictions and made temporary restrictions permanent in line with the Executive Order (Resolution 16-0127).

In June 2016, the SFPUC surveyed San Francisco residents to learn what they did at home to achieve water savings during the drought, how long water-savings from these actions might last, and how people got information about the drought and ways to conserve. Overall, the poll showed that most respondents are informed about the drought, cut back their water use, feel they and others could conserve even more but need direction on what more they should do. The SFPUC will use the results to help shape continued outreach about all the ways people can save water whether they own or rent, and live in an apartment or single family home.

In addition to addressing the current drought through temporary regulations, EO B-37-16 also builds on the conservation accomplished during the current drought and seeks to establish longer-term water conservation and efficiency measures through the following directives:

- Use Water More Wisely – Develop new urban water use targets that generate more water conservation than existing SBX7-7 requirements.

- Eliminate Water Waste – Reduce water loss.
- Strengthen Local Drought Resilience – Improve urban Water Shortage Contingency Plans and reporting requirements.

The EO calls for DWR, SWRCB, and the California Department of Food and Agriculture (CDFA), in coordination with the California Public Utilities Commission (CPUC) and California Energy Commission (CEC) (collectively referred to as the "EO State Agencies") to seek input from stakeholders on implementation of EO B-37-16. The Urban Advisory Group (UAG) was formed by the EO State Agencies to provide input and advice on recommendations and approaches regarding EO directives applicable to urban water use.

Although the SFPUC is not a member of the UAG, SFPUC staff closely monitored the development of the recommendations and framework report that was finalized by the EO Agencies in April 2017. SFPUC staff continue to track the development of the resulting legislation. Because this long-term water use efficiency framework was not intended to influence the current drought, ***this Drought Summary does not cover activities related to the long-term directives of EO B-37-16***.

Separate from SWRCB emergency regulations and Governor EOs, State legislation was signed by the Governor on August 29, 2016 requiring urban retail water suppliers to set rules for identifying and discouraging excessive residential water consumption during a prescribed statewide or local drought. The provisions of this legislation, known as Senate Bill (SB) 814, took effect January 1, 2017 and are described further in the next chapter as the SFPUC took action in January 2017 to implement the provisions.

Retail customers collectively saved 8.8 MGD, or 13.0%, in CY 2016 compared to CY 2013, thus exceeding the voluntary system-wide goal of 10%. Looking specifically at retail irrigation use, dedicated irrigation customers collectively saved 1.2 MGD, or 38.5%, over the course of the 25% Mandatory Irrigation Allocation Program (July 2015 through June 2016), far exceeding the program's goal. Wholesale customers also exceeded the voluntary system-wide goal of 10% by collectively saving 31.7 MGD, or 21.1%, of RWS supplies compared to CY 2013. Taking both the retail and wholesale service areas into account, system-wide savings in CY 2016 was 40.5 MGD, or 18.6%, compared to CY 2013 and exceeded the voluntary 10% goal.

Summary of Activities in Calendar Year 2017 (through June 2017)

The winter of 2016-2017 was one of California's wettest winters on record and marked the end of the five-year drought in most of the State. Despite much improved hydrologic conditions, portions of state remained dry and groundwater basins remained depleted. Thus, in February 2017, the SWRCB readopted its emergency regulations (i.e., the stress test approach) and extended them through October 2017 with the intent to reconsider repealing the regulations in May should statewide water supply conditions improve (Resolution 2017-0004). However, on April 7, 2017, Governor Brown issued EO B-40-17 to lift the drought emergency throughout the State except for four counties that continue to suffer from water supply shortages (Fresno, Kings, Tulare, and Tuolumne). In response to this EO, on April 26, 2017, the SWRCB rescinded the stress test and conservation standard portions of its emergency regulations for all of California except for the four counties identified in the EO (Resolution 2017-0024). Monthly water use reporting and water waste prohibitions remain in place until the emergency regulations expire in November 2017, though the SWRCB is working to make these requirements permanent as directed by EO B-37-16.

While EO B-40-17 ended the statewide emergency drought proclamation put in place by the Governor in January 2014 (Proclamation 1-17-2014), it also marks a transition to the long-term water use efficiency framework to make water conservation a California way of life under EO B-37-16.

Prior to the Governor issuing EO B-40-17, SFPUC staff reviewed RWS conditions and determined that precipitation and snowpack were well above normal. It was anticipated that the system would fill over the course of the year. Because of these favorable supply conditions and because the SFPUC was subject to a 0% self-certified conservation standard per the SWRCB emergency regulations at the time, the SFPUC lifted its call for a voluntary 10% reduction in water use system-wide on April 11, 2017 (Resolution 17-0075). The SFPUC also notified its wholesale customers that it would no longer be requesting voluntary reductions.

As noted in the chapter for CY 2016, the Governor signed into law SB 814, which required urban retail water suppliers to set rules for identifying and discouraging excessive residential water consumption during a prescribed statewide or local drought. To implement this legislation locally, in January 2017, the SFPUC adopted rules and regulations to establish a 500-gallon-per-day threshold for single-family households and individually-metered multi-family units (Resolution 17-0010). The threshold would be effective during designated drought periods in which mandatory reduction on residential customers are imposed, and result in a $150 excess use fine for each 30-day period a customer's average daily water use exceeds the threshold.

During the 12-month period of July 2016 to June 2017, retail customers collectively saved slightly less water in FY 2016-17 (with only the voluntary 10% system-wide reduction in place) compared to FY 2015-16 (when 25% Mandatory Irrigation Allocation Program was in place): 8.6 MGD (12.7%) compared to 9.1 MGD (13.4%) savings. For the same periods of time, dedicated irrigation customers also saved slightly less water: 1.1 MGD (35.2%) compared to 1.2 MGD (38.5%) savings. However, both retail and wholesale customers still exceeded the voluntary 10% goal.

Appendix C

Summary of San Francisco's Response to 2020-2023 Drought Experience

MARCH 2026

WATER SHORTAGE CONTINGENCY PLAN

for the City and County of San Francisco

Prepared by the San Francisco Public Utilities Commission

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

Summary of San Francisco’s Response to 2020-2023 Drought Experience

Appendix to the 2025 Water Shortage Contingency Plan

Introduction

The purpose of this Drought Summary (Summary) is to describe the SFPUC’s actions in response to Governor Newsom’s State of Emergency Proclamation for the drought starting in April 2021. This drought was unique and unprecedented, not only because of the severe climatic conditions but also because:

- The COVID-19 public health emergency unfolded at the same time as the drought emergency.
- The State and local agencies had an opportunity to apply lessons learned and use new tools developed after the 2012-2016 drought.
- The State, for the first time, directed urban water suppliers to implement specific levels of their water shortage contingency plans.
- The SFPUC, also for the first time, implemented a drought surcharge.

This Summary focuses primarily on activities within the SFPUC’s in-City retail service area. Because many State mandates applied to the SFPUC’s Regional Water System, the Summary also includes information relevant to the SFPUC’s wholesale service area.

This Summary is organized chronologically, with one chapter for each calendar year (CY): 2021, 2022, and 2023. Although CY 2020 was the first dry year of the multi-year drought, the severity of the drought did not become clear until CY 2021, when the State and the SFPUC began taking regulatory action.

Each chapter outlines the major drought-related activities of that year, the regulatory actions taken at the State and local levels, and—where applicable—water use reductions compared to the Fiscal Year (FY) 2019-20 baseline.

Summary of Activities in Calendar Year 2021

After a second consecutive dry winter, California entered the second year of what became a severe multi-year drought. As drought conditions intensified statewide, Governor Newsom issued a drought State of Emergency proclamation on April 21, first covering Mendocino and Sonoma counties and then expanding it through three updates in 2021. The May 10 proclamation added more counties. On July 8, the Governor issued Executive Order N-10-21, calling on all Californians to voluntarily reduce water use by 15% from 2020 levels and directing the State Water Resources Control Board (SWRCB) to track and report monthly progress toward the statewide goal of a 15% reduction in urban water use. The October 19 proclamation extended the emergency to all 58 counties, including the City and County of San Francisco.

In response to worsening drought conditions and water shortages in the Delta watershed, the SWRCB adopted an emergency regulation authorizing curtailment of diversions when water is unavailable at a water right holder's or claimant's priority of right, effective August 19 for up to one year. On August 20, the SWRCB issued curtailment orders to the SFPUC for its Tuolumne River watershed diversions. This action set a precedent for restricting the SFPUC's ability to divert Water Bank supplies stored in New Don Pedro Reservoir during drought conditions. On October 19, anticipating a significant storm, SWRCB staff temporarily lifted the curtailments for the SFPUC's Tuolumne River diversion points. These curtailments remained suspended until the following summer, when the SWRCB amended and renewed the curtailment regulations (see CY 2022 section).

On April 15, the SFPUC issued its Water Supply Availability Estimate for FY 2021-22, setting a goal to keep summertime water use at or below 2019 pre-pandemic levels and requesting a voluntary 10% reduction in irrigation use. Following the Governor's July 8 Executive Order, the SFPUC issued a revised call to action on July 12, asking all retail and wholesale customers to voluntarily reduce water use by 15% compared to 2020.

Beginning in spring 2021, the SFPUC communicated its drought response to reach the broad public through letters to wholesale and retail irrigation-only customers, outreach to City department heads, social media, newsletters, website, direct outreach to high-use residential customers, and media and community outreach. Because COVID-19 continued to affect the economy and per capita water use in San Francisco was already low, the SFPUC emphasized that water supplies remained sufficient, commended customers for their efficiency, and focused on reducing irrigation and water waste.

Anticipating another dry winter, the SFPUC declared a water shortage emergency on November 23, activating Level 1 of the Water Shortage Contingency Plan and requesting a 10% system-wide water use reduction from FY 2019-20 levels (Resolution 21-0177). This declaration allowed the SFPUC to set a water use reduction target aligned with its service area needs and access additional resources and supplies available only during emergencies. Under a 10% system-wide reduction, the Water Shortage Contingency Plan allocates Regional Water System supplies as 36.0% to retail and 64.0% to wholesale. The November 23 action also approved a drought surcharge effective April 1, 2022. Although the drought surcharge was established after the 2012-2016 drought in the four-year retail water and wastewater rates schedule for FYs ending in 2019-2022, this was the first time it was activated. The drought surcharge is a temporary charge designed to offset operational costs as water use and revenues decline during a declared water shortage emergency. A 5% charge applies to the volumetric portions of a customer's water and wastewater bills, with lower-use customers experiencing a smaller impact. The 5% level corresponds to the amount of conservation requested of retail customers during a 10% system-wide reduction. The drought surcharge is removed once the water shortage emergency ends.

Following the declaration of a water shortage emergency, the SFPUC expanded its fall and winter 2021 outreach to include additional earned media; digital, print, and radio advertising; increased social media and community engagement; and more direct communication with customers, including culturally and linguistically diverse communities. As curtailments and drought conditions worsened, messaging adopted a more urgent tone and encouraged everyone to reduce water waste. Outreach promoted customers to participate in conservation programs and reinforced awareness of permanent water waste restrictions in effect. SFPUC staff coordinated with BAWSCA on messaging and media relevant to the wholesale service area and with California Department of Water Resources' Save Our Water campaign on regional outreach opportunities.

On November 30, the SFPUC notified BAWSCA of the water shortage emergency and the allocation methodology under the Amended and Restated Water Supply Agreement Water Shortage Allocation Plan. On December 15, the SFPUC provided Wholesale Customers with monthly water budgets, with a revision on January 3, 2022 and noted that these monthly reports will compare each agency's water use against its water budget.

Summary of Activities in Calendar Year 2022

Severe drought conditions continued across California into the winter and early spring of 2022. In its January and March Water Supply Availability estimates, the SFPUC maintained its call for a 10% system-wide water use reduction while monitoring local supply conditions and curtailment orders.

On January 4, the SWRCB adopted emergency statewide water use regulations prohibiting certain wasteful water use practices. The SFPUC had already adopted permanent water waste restrictions in 2016 (Resolution 16-0127). To align with the new statewide restrictions, the SFPUC updated its permanent water waste restrictions on February 22 (Resolution 22-0045).

As drought conditions persisted and the dry season approached, Governor Newsom issued Executive Order N-7-22 on March 28, directing the SWRCB to consider emergency regulations that included the following requirements. The SWRCB adopted these regulations on May 24 (Resolution 2022-0018):

- Urban water suppliers must submit a preliminary annual water supply and demand assessment to the Department of Water Resources by June 1, 2022, followed by a final assessment.
- Urban water suppliers must implement Level 2 shortage response actions (up to a 20% water shortage) from their Water Shortage Contingency Plans.
- Consideration of emergency regulations defining "non-functional turf" (ornamental turf not used for recreation, such as sports fields or parks) and prohibiting irrigation of non-functional turf in the commercial, industrial, and institutional sectors, except as needed to maintain trees and other perennial non-turf plantings.

On June 28, the SFPUC adopted a temporary prohibition on irrigating non-functional turf at commercial, industrial, and institutional sites with potable water (Resolution 22-0126).

Up to this point, customers in SFPUC's retail and wholesale service areas were reducing water use, but not enough to meet the system-wide 10% reduction goal compared to FY 2019-20. From July 1 through April 7, retail customers achieved a 13.2% water use reduction, while Wholesale Customers achieved less than 4.7%, resulting in a system-wide reduction of 7.4%. From January 1 through April 7—covering most of the winter—retail customers reduced water use by 9.8%, while Wholesale Customers increased water use by 0.4%, resulting in a system-wide reduction of 3.2%. Wholesale Customers, in particular, were falling short of the reduction target.

As noted in the previous chapter, temporary drought surcharges adopted on November 23, 2021, took effect on April 1, 2022.

To comply with the new emergency regulations and reinforce the need for additional reductions through the summer, the SFPUC increased the system-wide reduction request from 10% to 11% effective July 1 (Resolution 22-0098). This action moved the water shortage emergency from Level 1 to Level 2 of the Water Shortage Contingency Plan. The allocation of Regional Water System supplies also shifted: retail increased from 36% to 37%

and wholesale decreased from 64% to 63%. For retail customers, the increased system-wide reduction did not change the existing voluntary request, as retail customers were already meeting or exceeding the system-wide 10% goal. The 5% drought surcharge that began on April 1 remained in place. For Wholesale Customers, the increased system-wide reduction raised their collective reduction goal from 13.7% to 16.0%.

The SFPUC continued its "We're in a drought, cut waste out" campaign and expanded regional outreach early in the year to highlight drought conditions and encourage simple actions to reduce water waste. Beginning in July, the SFPUC partnered with the Major League Baseball team, San Francisco Giants, on a "Game Up to Save Up" drought awareness campaign during the baseball season. Additional outreach to retail customers included:

- Monthly water use reports to City departments beginning in March
- A drought-focused article in the *Currents* newsletter sent to all customers and interested parties
- Emphasis on reducing outdoor water use
- Bill inserts and factsheets notifying customers of the new drought surcharge

By the end of the year, customers achieved the system-wide 10% reduction goal compared to FY 2019-20. From July 1 through December 31, retail customers reduced water use by 13.7%, and Wholesale Customers reduced water use by 10.8%, resulting in a system-wide reduction of 11.7%.

After three dry years, California experienced an extremely wet fall and winter in 2022. A series of atmospheric rivers quickly ended the drought but caused significant flooding. The SWRCB temporarily suspended Delta watershed curtailment orders on December 6. However, state and local drought-related emergency regulations remained in place until 2023, as described in the next chapter.

Despite the wet conditions, on December 7 the SWRCB extended the emergency water use regulations prohibiting certain wasteful water use practices for another year (Resolution 2022-0054), underscoring the importance of efficient water use regardless of weather.

Summary of Activities in Calendar Year 2023

The winter of 2022-2023 marked the end of California's three-year drought. Statewide emergency orders were gradually rolled back through a series of Executive Orders issued by the Governor on February 13, March 10, and March 23 (Executive Orders N-3-23, N-4-23, and N-5-23). On April 3, the SWRCB rescinded the Delta watershed curtailment orders that had been in place since August 2021. On June 5, the SWRCB ended emergency regulations requiring urban water suppliers to implement Level 2 of their Water Shortage Contingency Plans. However, it extended emergency prohibition on irrigating non-functional turf for one more year, through June 5, 2024.

The SFPUC continued to request an 11% system-wide water use reduction until April 11, when it rescinded the water shortage emergency that had been in place since November 23, 2021 (Resolution 23-0073). As a result, the temporary drought surcharge was lifted effective May 1.

Notably, during this drought the SFPUC did not impose any mandatory water use reductions on any customer sectors. This contrasts with the 2012-2016 drought, when the SFPUC imposed mandatory irrigation reductions even without declaring a water shortage emergency, in response to more prescriptive State-mandated outdoor irrigation targets. Applying lessons from that earlier drought, urban water suppliers were required to update their Water Shortage Contingency Plans in 2020 to uniformly define water shortage levels. This uniformity enabled the Governor, through Executive Order N-7-22, to require all urban water suppliers to implement Level 2 of their Water Shortage Contingency Plans rather than setting individual reduction targets.

This page intentionally left blank.

Appendix D

Water Shortage Allocation Plan

(Attachment H of the 2025 Amended and Restated Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County)

MARCH 2026

WATER SHORTAGE CONTINGENCY PLAN

for the City and County of San Francisco

Prepared by the San Francisco Public Utilities Commission

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

ATTACHMENT H

WATER SHORTAGE ALLOCATION PLAN

This Water Shortage Allocation Plan ("Plan"), also known as the Tier 1 Shortage Plan, describes the method for allocating water between the San Francisco Public Utilities Commission ("SFPUC"), on the one hand, and the Wholesale Customers collectively, on the other, during shortages caused by drought. The Plan also implements a method for allocating water among the individual Wholesale Customers, known as the Tier 2 Drought Response Implementation Plan ("Tier 2 Plan"), which has separately been adopted by the Wholesale Customers and does not include the SFPUC. The Plan includes provisions for transfers, banking, and excess use charges. The Plan applies only when the SFPUC determines that a system-wide water shortage due to drought exists, and all references to "shortages" and "water shortages" are to be so understood. This Plan was initially adopted pursuant to Section 7.03(a) of the 1984 Settlement Agreement and Master Water Sales Contract and has been incorporated and updated to correspond to the terminology used in the 2009 Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County ("Agreement"), as amended and restated from time to time.

SECTION 1. SHORTAGE CONDITIONS

1.1. Projected Available SFPUC Water Supply. The SFPUC shall make an annual determination as to whether or not a shortage condition exists. The determination of projected available water supply shall consider, among other things, stored water, projected runoff, water acquired by the SFPUC from non-SFPUC sources, inactive storage, reservoir losses, allowance for carryover storage, and water bank balances, if any, described in Section 3.

1.2 Projected SFPUC Customer Purchases. The SFPUC will utilize purchase data, including volumes of water purchased by the Wholesale Customers and by Retail Customers (as those terms are used in the Agreement) in the year immediately prior to the drought, along with other available relevant information, as a basis for determining projected system-wide water purchases from the SFPUC for the upcoming Supply Year (defined as the period from July 1 through June 30).

1.3. Shortage Conditions. The SFPUC will compare the projected available water supply (Section 1.1) with projected system-wide water purchases (Section 1.2). A shortage condition exists if the SFPUC determines that the projected available water supply is less than projected system-wide water purchases in the upcoming Supply Year. When a shortage condition exists, SFPUC will determine whether voluntary or mandatory actions will be required to reduce purchases of SFPUC water to required levels.

1.3.1 Voluntary Response. If the SFPUC determines that voluntary actions will be sufficient to accomplish the necessary reduction in water use throughout its service area, the SFPUC and the Wholesale Customers will make good faith efforts to reduce their water purchases to stay within their annual Tier 1 and Tier 2 allocations as applicable (see Section 2 of this Attachment H) and associated monthly water use budgets. The SFPUC will not impose excess use charges during periods of voluntary rationing, but may suspend the prospective accumulation of water bank credits, or impose a ceiling on further accumulation of bank credits, consistent with Section 3.2.1 of this Plan.

1.3.2 Mandatory Response. If the SFPUC determines that mandatory actions will be required to accomplish the necessary reduction in water use in the SFPUC service area, the SFPUC may implement excess use charges as set forth in Section 4 of this Plan.

1.4. Period of Shortage. A shortage period commences when the SFPUC determines that a water shortage exists, as set forth in a declaration of water shortage emergency issued by the SFPUC pursuant to

California Water Code Sections 350 et seq. Termination of the water shortage emergency will be declared by resolution of the SFPUC.

SECTION 2. SHORTAGE ALLOCATIONS

2.1. Annual Tier 1 Allocations between the SFPUC and the Wholesale Customers. The annual water supply available during shortages will be allocated between the SFPUC and the collective Wholesale Customers as follows:

Level of System Wide Reduction in Water Use Required	**Share of Available Water**	
	SFPUC Share	**Wholesale Customers Share**
5% or less	35.5%	64.5%
6% through 10%	36.0%	64.0%
11% through 15%	37.0%	63.0%
16% through 20%	37.5%	62.5%

This Plan refers to the SFPUC's and Wholesale Customers' respective shares of available water so established as the SFPUC's and Wholesale Customers' Tier 1 allocations. The water allocated to the SFPUC shall correspond to the total allocation for all Retail Customers. In the event that the SFPUC share of the available water supply in the above table results in Retail Customers having a positive allocation (i.e., a supply of additional water rather than a required percentage reduction in water use), the SFPUC's percentage share of the available water supply in the table shall be reduced to eliminate any positive allocation to Retail Customers, with a corresponding increase in the percentage share of the available water supply allocated to the Wholesale Customers. For any level of required reduction in system-wide water use during shortages, the SFPUC shall require Retail Customers to conserve a minimum of 5%, with any resulting reallocated supply credited to storage for inclusion in calculation of projected available water SFPUC water supply in a subsequent year (Section 1.1).

The parties agree to reevaluate the percentages of the available water supply allocated to Retail and Wholesale Customers by May 1, 2028.

2.2 Annual Tier 2 Allocations among the Wholesale Customers. The annual water supply allocated to the Wholesale Customers collectively during system wide shortages of 20 percent or less (i.e., the Wholesale Customers' Tier 1 allocation) will be apportioned among them based on a methodology, known as the Tier 2 Plan, that has been separately adopted by all of the Wholesale Customers, and not the SFPUC, as described in Section 3.11(C) of the Agreement. In any year for which the methodology must be applied, the Bay Area Water Supply and Conservation Agency ("BAWSCA") will calculate each Wholesale Customer's individual percentage share of the amount of water allocated to the Wholesale Customers collectively pursuant to Section 2.1. Following the declaration or reconfirmation of a water shortage emergency by the SFPUC, BAWSCA will deliver to the SFPUC General Manager a list, signed by the President of BAWSCA's Board of Directors and its General Manager, showing each Wholesale Customer together with its percentage share and stating that the list has been prepared in accordance with the methodology adopted by the Wholesale Customers. The SFPUC shall allocate water to each Wholesale Customer, as specified in the list. The shortage allocations so established (known as Tier 2 allocations) may be transferred as provided in Section 2.5 of this Plan. If BAWSCA or all Wholesale Customers do not provide the SFPUC with individual allocations, the SFPUC may make a final allocation decision after first meeting and discussing allocations with BAWSCA and the Wholesale Customers.

The Tier 2 Plan methodology adopted by the Wholesale Customers utilizes the rolling average of each individual Wholesale Customer's purchases from the SFPUC during the three immediately preceding Supply Years. The SFPUC agrees to provide BAWSCA by November 1 of each year a list showing the amount of water purchased by each Wholesale Customer during the immediately preceding Supply Year. The list will be prepared using Customer Service Bureau report MGT440 (or comparable official record in use at the time), adjusted as required for any reporting errors or omissions, and will be transmitted by the SFPUC General Manager or his designee.

2.3. Limited Applicability of Plan to System Wide Shortages Greater Than Twenty Percent. The Tier 1 allocations of water between the SFPUC and the Wholesale Customers collectively, provided for in Section 2.1, apply only to shortages of 20 percent or less. The SFPUC and Wholesale Customers recognize the possibility of a drought occurring which could create system-wide shortages greater than 20 percent despite actions taken by the SFPUC aimed at reducing the probability and severity of water shortages in the SFPUC service area. If the SFPUC determines that a system wide water shortage greater than 20 percent exists, the SFPUC and the Wholesale Customers agree to meet within 10 days and discuss whether a change is required to the allocation set forth in Section 2.1 in order to mitigate undue hardships that might otherwise be experienced by individual Wholesale Customers or Retail Customers. Following these discussions, the Tier 1 allocations set forth in Section 2.1 of this Plan, or a modified version thereof, may be adopted by mutual written consent of the SFPUC and the Wholesale Customers. If the SFPUC and Wholesale Customers meet and cannot agree on an appropriate Tier 1 allocation within 30 days of the SFPUC's determination of water shortage greater than 20 percent, then (1) the provisions of Section 3.11(C) of the Agreement will apply, unless (2) all of the Wholesale Customers direct in writing that a Tier 2 allocation methodology agreed to by them be used to apportion the water to be made available to the Wholesale Customers collectively, in lieu of the provisions of Section 3.11(C).

The provisions of this Plan relating to transfers (in Section 2.5), banking (in Section 3), and excess use charges (in Section 4) shall continue to apply during system-wide shortages greater than 20 percent.

2.4. Monthly Water Budgets. Within 10 days after adopting a declaration of water shortage emergency, the SFPUC will determine the amount of Tier 1 water allocated to the Wholesale Customers collectively pursuant to Section 2.1. The SFPUC General Manager, using the Tier 2 allocation percentages shown on the list delivered by BAWSCA pursuant to Section 2.2, will calculate each Wholesale Customer's individual annual Tier 2 allocation. The SFPUC General Manager, or his designee, will then provide each Wholesale Customer with a proposed schedule of monthly water budgets based on the pattern of monthly water purchases during the Supply Year immediately preceding the declaration of shortage (the "Default Schedule"). Each Wholesale Customer may, within two weeks of receiving its Default Schedule, provide the SFPUC with an alternative monthly water budget that reschedules its annual Tier 2 allocation over the course of the succeeding Supply Year. If a Wholesale Customer does not deliver an alternative monthly water budget to the SFPUC within two weeks of its receipt of the Default Schedule, then its monthly budget for the ensuing Supply Year shall be the Default Schedule proposed by the SFPUC.

Monthly Wholesale Customer water budgets will be derived from annual Tier 2 allocations for purposes of accounting for excess use. Monthly Wholesale Customer water budgets shall be adjusted during the year to account for transfers of shortage allocation under Section 2.5 and transfers of banked water under Section 3.4.

2.5. Transfers of Shortage Allocations. Voluntary transfers of shortage allocations between the SFPUC and any Wholesale Customers, and between any Wholesale Customers, will be permitted using the same procedure as that for transfers of banked water set forth in Section 3.4. The SFPUC and BAWSCA shall be notified of each transfer. Transfers of shortage allocations shall be deemed to be an emergency transfer and shall become effective on the third business day after notice of the transfer has been delivered to the SFPUC. Transfers of shortage allocations shall be in compliance with Section 3.05 of the

Agreement. The transferring parties will meet with the SFPUC, if requested, to discuss any effect the transfer may have on its operations.

SECTION 3. SHORTAGE WATER BANKING

3.1. Water Bank Accounts. The SFPUC shall create a water bank account for itself and each Wholesale Customer during shortages in conjunction with its resale customer billing process. Bank accounts will account for amounts of water that are either saved or used in excess of the shortage allocation for each agency; the accounts are not used for tracking billings and payments. When a shortage period is in effect (as defined in Section 1.4), the following provisions for bank credits, debits, and transfers shall be in force. A statement of bank balance for each Wholesale Customer will be included with the SFPUC's monthly water bills.

3.2. Bank Account Credits. Each month, monthly purchases will be compared to the monthly budget for that month. Any unused shortage allocation by an agency will be credited to that agency's water bank account. Credits will accumulate during the entire shortage period, subject to potential restrictions imposed pursuant to Section 3.2.1. Credits remaining at the end of the shortage period will be zeroed out; no financial or other credit shall be granted for banked water.

3.2.1. Maximum Balances. The SFPUC may suspend the prospective accumulation of credits in all accounts. Alternatively, the SFPUC may impose a ceiling on further accumulation of credits in water bank balances based on a uniform ratio of the bank balance to the annual water allocation. In making a decision to suspend the prospective accumulation of water bank credits, the SFPUC shall consider the available water supply as set forth in Section 1.1 of this Plan and other reasonable, relevant factors.

3.3. Account Debits. Each month, monthly purchases will be compared to the budget for that month. Purchases in excess of monthly budgets will be debited against an agency's water bank account. Bank debits remaining at the end of the fiscal year will be subject to excess use charges (see Section 4).

3.4. Transfers of Banked Water. In addition to the transfers of shortage allocations provided for in Section 2.5, voluntary transfers of banked water will also be permitted between the SFPUC and any Wholesale Customer, and among the Wholesale Customers. The volume of transferred water will be credited to the transferee's water bank account and debited against the transferor's water bank account. The transferring parties must notify the SFPUC and BAWSCA of each transfer in writing (so that adjustments can be made to bank accounts), and will meet with the SFPUC, if requested, to discuss any affect the transfer may have on SFPUC operations. Transfers of banked water shall be deemed to be an emergency transfer and shall become effective on the third business day after notice of the transfer has been delivered to the SFPUC. If the SFPUC incurs extraordinary costs in implementing transfers, it will give written notice to the transferring parties within ten (10) business days after receipt of notice of the transfer. Extraordinary costs means additional costs directly attributable to accommodating transfers and which are not incurred in non-drought years nor simply as a result of the shortage condition itself. Extraordinary costs shall be calculated in accordance with the procedures in the Agreement and shall be subject to the disclosure and auditing requirements in the Agreement. In the case of transfers between Wholesale Customers, such extraordinary costs shall be considered to be expenses chargeable solely to individual Wholesale Customers and shall be borne equally by the parties to the transfer. In the case of transfers between the SFPUC and a Wholesale Customer, the SFPUC's share of any extraordinary transfer costs shall not be added to the Wholesale Revenue Requirement.

3.4.1. Transfer Limitations. The agency transferring banked water will be allowed to transfer no more than the accumulated balance in its bank. Transfers of estimated prospective banked credits and the "overdrafting" of accounts shall not be permitted. The price of transfer water originally derived from the SFPUC system is to be determined by the transferring parties and is not specified herein. Transfers of banked water shall be in compliance with Section 3.05 of the Agreement.

SECTION 4. WHOLESALE EXCESS USE CHARGES

4.1. Amount of Excess Use Charges. Monthly excess use charges shall be determined by the SFPUC at the time of the declared water shortage consistent with the calendar in Section 6 and in accordance with Section 6.03 of the Agreement. The excess use charges will be in the form of multipliers applied to the rate in effect at the time the excess use occurs. The same excess use charge multipliers shall apply to the Wholesale Customers and all Retail Customers. The excess use charge multipliers apply only to the charges for water delivered at the rate in effect at the time the excess use occurred.

4.2 Monitoring Suburban Water Use. During periods of voluntary rationing, water usage greater than a customer's allocation (as determined in Section 2) will be indicated on each SFPUC monthly water bill. During periods of mandatory rationing, monthly and cumulative water usage greater than a Wholesale Customer's shortage allocation and the associated excess use charges will be indicated on each SFPUC monthly water bill.

4.3. Suburban Excess Use Charge Payments. An annual reconciliation will be made of monthly excess use charges according to the calendar in Section 6. Annual excess use charges will be calculated by comparing total annual purchases for each Wholesale Customer with its annual shortage allocation (as adjusted for transfers of shortage allocations and banked water, if any). Excess use charge payments by those Wholesale Customers with net excess use will be paid according to the calendar in Section 6. The SFPUC may dedicate excess use charges paid by Wholesale Customers toward the purchase of water from the State Drought Water Bank or other willing sellers in order to provide additional water to the Wholesale Customers. Excess use charges paid by the Wholesale Customers constitute Wholesale Customer revenue and shall be included within the SFPUC's annual Wholesale Revenue Requirement calculation.

4.4. Tier 1 Family Plan. During periods of mandatory rationing, the SFPUC will not assess excess use charges on any of the Wholesale Customers if the Wholesale Customers' collective cumulative purchases over the course of the Supply Year are less than the Wholesale Customers' Tier 1 allocation, as set forth in Section 2.1. If the Wholesale Customers' collective cumulative purchases exceed the Wholesale Customers' Tier 1 allocation, the SFPUC shall assess excess use charges on each individual Wholesale Customer that exceeded its individual Tier 2 allocation (established in accordance with Section 2.2) over the course of the Supply Year in proportion to each individual Wholesale Customer's share of the collective Wholesale Customers' purchases that exceeded the Wholesale Customers' Tier 1 allocation.

SECTION 5. GENERAL PROVISIONS GOVERNING WATER SHORTAGE ALLOCATION PLAN

5.1. Construction of Terms. This Plan is for the sole benefit of the parties and shall not be construed as granting rights to any person other than the parties or imposing obligations on a party to any person other than another party.

5.2. Governing Law. This Plan is made under and shall be governed by the laws of the State of California.

5.3. Effect on Agreement. This Plan describes the method for allocating water between the SFPUC and the collective Wholesale Customers during system-wide water shortages of 20 percent or less. This Plan also provides for the SFPUC to allocate water among the Wholesale Customers in accordance with directions provided by the Wholesale Customers through BAWSCA under Section 2.2, and to implement a program by which such allocations may be voluntarily transferred among the Wholesale Customers. The provisions of this Plan are intended to implement Section 3.11(C) of the Agreement and do not affect, change or modify any other section, term or condition of the Agreement.

5.4. Inapplicability of Plan to Allocation of SFPUC System Water During Non-Shortage Periods. The SFPUC's agreement in this Plan to a respective share of SFPUC system water during years of shortage shall not be construed to provide a basis for the allocation of water between the SFPUC and the Wholesale Customers when no water shortage emergency exists.

5.5. Termination. This Plan shall expire at the end of the Term of the Agreement. The SFPUC and the Wholesale Customers can mutually agree to revise or terminate this Plan prior to that date due to changes in the water delivery capability of the SFPUC system, the acquisition of new water supplies, and other factors affecting the availability of water from the SFPUC system during times of shortage.

SECTION 6. ALLOCATION CALENDAR

6.1. Annual Schedule. The annual schedule for the shortage allocation process is shown below. This schedule may be changed by the SFPUC to facilitate implementation.

6.1.1

	In All Years	Target Dates
1.	SFPUC delivers list of annual purchases by each Wholesale Customer during the immediately preceding Supply Year	November 1
2.	SFPUC meets with the Wholesale Customers and presents water supply forecast for the following Supply Year	February
3.	SFPUC issues initial estimate of available water supply	February 1
4.	SFPUC announces potential first year of drought (if applicable)	February 1
5.	SFPUC and Wholesale Customers meet upon request to exchange information concerning water availability and projected system-wide purchases	February 1-May 31
6.	SFPUC issues revised estimate of available water supply, and confirms continued potential shortage conditions, if applicable	March 1
7.	SFPUC issues final estimate of available water supply	April 15th or sooner if adequate snow course measurement data is available to form a robust estimate on available water supply for the coming year.
8.	SFPUC determines amount of water available to Wholesale Customers collectively	April 15th or sooner if adequate snow course measurement data is available to form a robust estimate on available water supply for the coming year.

	In Drought Years	Target Dates
9.	SFPUC formally declares the existence of water shortage emergency (or end of water shortage emergency, if applicable) under Water Code Sections 350 et. seq.	April 15-30
10.	SFPUC declares the need for a voluntary or mandatory response	April 15-30
11.	BAWSCA submits calculation to SFPUC of individual Wholesale Customers' percentage shares of water allocated to Wholesale Customers collectively	April 15- 30

12. SFPUC determines individual shortage allocations, based on BAWSCA's submittal of individual agency percentage shares to SFPUC, and monthly water budgets (Default Schedule)	April 25—May 10
13. Wholesale Customers submit alternative monthly water budgets (optional)	May 8-May 24
14. Final drought shortage allocations are issued for the Supply Year beginning July 1 through June 30	June 1
15. Monthly water budgets become effective	July 1
16. Excess use charges indicated on monthly Suburban bills	August 1 (of the beginning year) through June 30 (of the succeeding year)
17. Excess use charges paid by Wholesale Customers for prior year	August of the succeeding year

Appendix E

San Francisco Public Utilities Commission Resolution Adopting 2025 Water Shortage Contingency Plan

MARCH 2026

WATER SHORTAGE CONTINGENCY PLAN

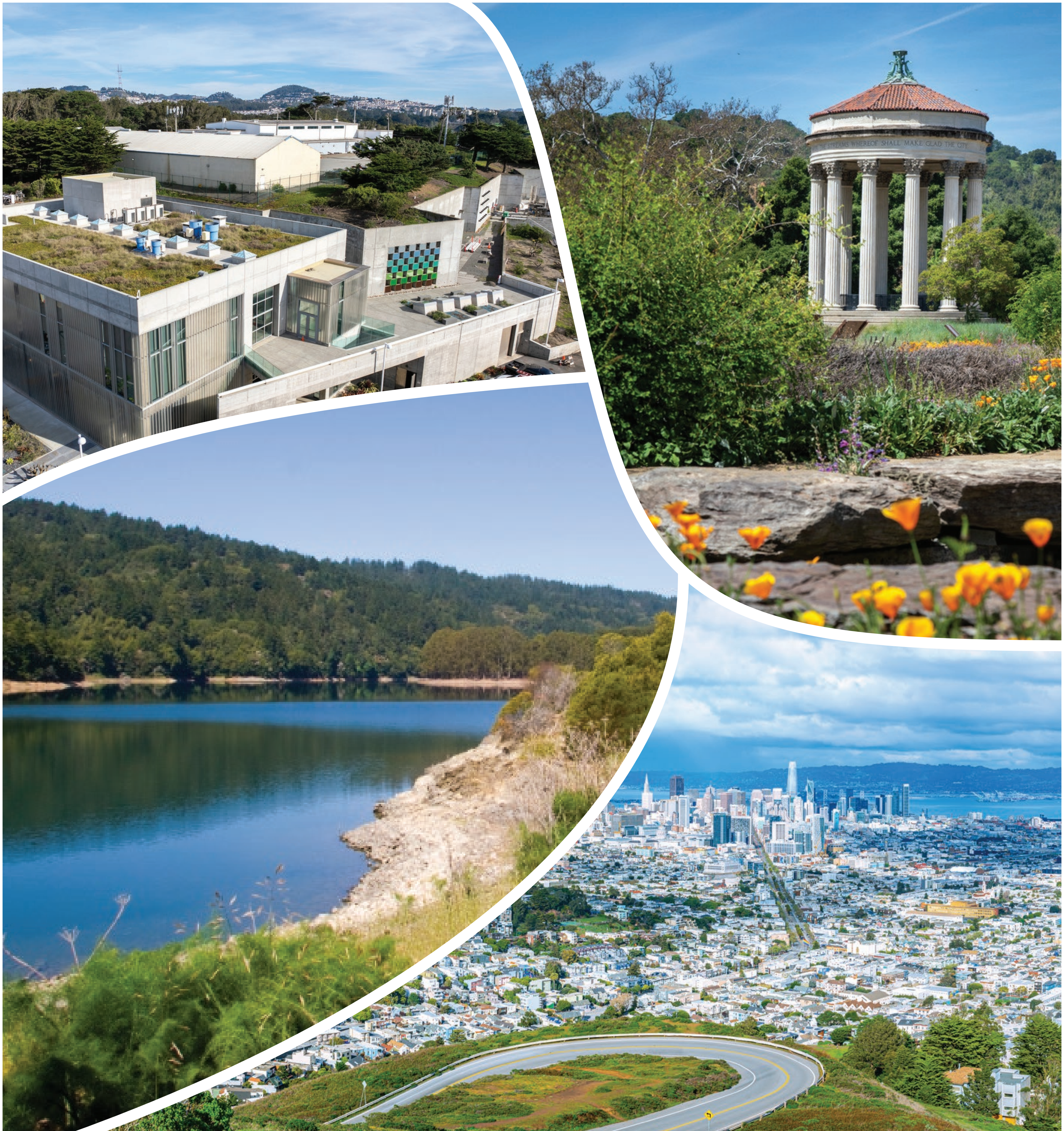
for the City and County of San Francisco

Prepared by the San Francisco Public Utilities Commission

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

This page intentionally left blank.

Content for this section will be added upon formal adoption of the Water Shortage Contingency Plan.



2025 WATER SHORTAGE CONTINGENCY PLAN

FOR THE CITY AND COUNTY OF SAN FRANCISCO

PUBLIC REVIEW DRAFT

March 2026

Prepared by: The San Francisco Public Utilities Commission

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

APPENDIX G

Resolution to Adopt the 2025 UWMP

2025 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

PUBLIC REVIEW DRAFT

March 2026

Prepared by: The San Francisco Public Utilities Commission

This page intentionally left blank.

Content for this section will be added upon formal adoption of the 2025 Urban Water Management Plan.

This page intentionally left blank.

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission

APPENDIX H

UWMP Requirements Checklist

2025 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

PUBLIC REVIEW DRAFT

March 2026

Prepared by: The San Francisco Public Utilities Commission

Water Code Section	Summary as Applies to UWMP	2025 UWMP Location Retail	2025 UWMP Location Wholesale
10615	A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities.	Section 1	Section 1
10630.5	Each plan shall include a simple description of the Supplier's plan including water availability, future requirements, a strategy for meeting needs, and other pertinent information. Additionally, a Supplier may also choose to include a simple description at the beginning of each chapter.	Section 1	Section 1
10620(b)	Every person that becomes a Supplier shall adopt UWMP within one year after it has become a Supplier.	Sections 11.1 and 11.2	Sections 11.1 and 11.2
10644	Supplier shall report the Public Water Systems number, volume of delivered water, and number of connections that are included in this UWMP.	Appendix A Submittal Table 2-1R	N.A
10644	Supplier shall report if this UWMP is an individual UWMP and whether the Supplier belongs to a regional UWMP or regional alliance.	Section 2.1	Section 2.1
10644	Supplier shall report whether the data is in fiscal or calendar years and the units of measure used for reporting water volumes.	Section 2.2	Section 2.2
10642	Provide supporting documentation that the Supplier has encourage~~d~~ active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan and contingency plan.	Appendix C	Appendix C
10620(d)(3)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other Suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Section 2.3	Section 2.3
10631(h)	Retail Suppliers will include documentation that they have provided their Wholesale Supplier(s)—if any—with water use projections from that source.	N.A	N.A
10631(h)	Wholesale Suppliers will provide their Suppliers with identification and quantification of the existing and planned sources of water available from the Wholesale Supplier to the Supplier during various water year types.	N.A	Section 2.3.1.2
10631(a)	Describe the Supplier service area.	Section 3.2	Section 3.3
10631(a)	Describe the climate of the Supplier's service area.	Section 3.2.1	Section 3.3.1
10631(a)	Provide the current and projected service area populations for 2030, 2035, 2040, 2045 and optionally 2050.	Table 3-3	Table 3-4
10631(a)	Describe other social, economic, and demographic factors affecting the Supplier's water management planning.	Section 3.2.2	Section 3.3.2

Water Code Section	Summary as Applies to UWMP	2025 UWMP Location Retail	2025 UWMP Location Wholesale
10631(a)	Describe the land uses within the service area… include the current and projected land uses within the existing or anticipated service area affecting the Supplier's water management planning. Describe the land uses within the service area.	Section 3.2.3	Section 3.3.3
10631(d)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	Section 4.1	Section 4.2
10631(d)(3)(A)	Report the distribution system water loss for each of the five years preceding the plan update.	Section 4.1.3	N.A
10631(d)(3)(C)	Retail Suppliers shall provide data to show the distribution loss standards were met.	Section 4.1.3	N.A
10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the Supplier.	Section 4.1.5	N.A
10631(d)(4)(A)	In projected water use, include estimates of water savings from adopted codes, plans, and other policies or laws.	Section 4.1.2	N.A
10631(d)(4)(B)	Provide citations of codes, standards, ordinances, or plans used to make water use projections.	Appendix E	N.A
10631(d)(4)(B)(ii)	To the extent that a Supplier reports the information described in subparagraph (A), an urban water Supplier shall… Indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall be noted of that fact.	Section 4.1.2.1	N.A
10635(b)	Demands under climate change considerations must be included as part of the drought risk assessment.	6.1.3 and 4.3	N.A
10608.36	Wholesale Suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their Retail Suppliers achieve targeted water use reductions.	N.A	Section 5.3 and 10.3.5
10608.4	Retail Suppliers shall report on their compliance in meeting their water use targets. Reporting requirements will vary depending on whether the Supplier: - Was considered an urban retail water supplier in 2020, - Met its 2020 target in 2020, or - Was part of a merger or consolidation since 2020. Chapter 5 Subsections 5.2.1, 5.2.2, and 5.2.3 address each of these situations.	Section 5	N.A
10631(b)(2)	When multiple sources of water supply are identified, describe the management of each supply in relationship to other identified supplies.	Section 6.2.5	N.A

Water Code Section	Summary as Applies to UWMP	2025 UWMP Location Retail	2025 UWMP Location Wholesale
10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought, including changes in supply due to climate change.	Section 8	Section 9
10631(b)(4)(C)	Indicate whether groundwater is an existing or planned source of water available to the Supplier. If groundwater is identified as an existing or planned source of water… (include) a detailed description and analysis of the location, amount and sufficiency of groundwater pumped by the Supplier for the past five years.	Section 6.2.1.1	N.A
10631(b)(4)(A)	Indicate whether a groundwater sustainability plan or groundwater management plan has been adopted by the Supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	Section 6.2.1.1	N.A
10631(b)(4)(B)	Describe the groundwater basin.	Section 6.2.1.1	N.A
10631(b)(4)(B)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the Supplier has the legal right to pump.	Section 6.2.1.1	N.A
10631(b)(4)(B)	For unadjudicated basins… (include) information as to whether DWR has identified the basin as a high- or medium-priority basin in the most current official departmental bulletin…	Section 6.2.1.1	N.A
10631(b)(4)(B)	For unadjudicated basins… describe efforts by the Supplier to coordinate with sustainability or groundwater agencies to achieve sustainable groundwater conditions.	Section 6.2.1.1	N.A
10631(b)(4)(C)	If groundwater is identified as an existing or planned source of water… (include) a detailed description and analysis of the location, amount and sufficiency of groundwater pumped by the Supplier for the past five years.	Section 6.2.1.1	N.A
10631(b)(4)(D)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	Sections 6.2.2 and 6.2.5	N.A
10631(b)	Identify and quantify the existing and planned sources of water available for 2025, 2030, 2035, 2040, 2045 and optionally 2050.	Table 6-5	N.A
10631(c)	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	Sections 7.2and 7.4	Sections 7.4 and 7.5
10633(a)	Describe the wastewater collection and treatment systems in the Supplier’s service area with quantified amount of collection and treatment and the disposal methods.	Section 6.1.2.4	N.A

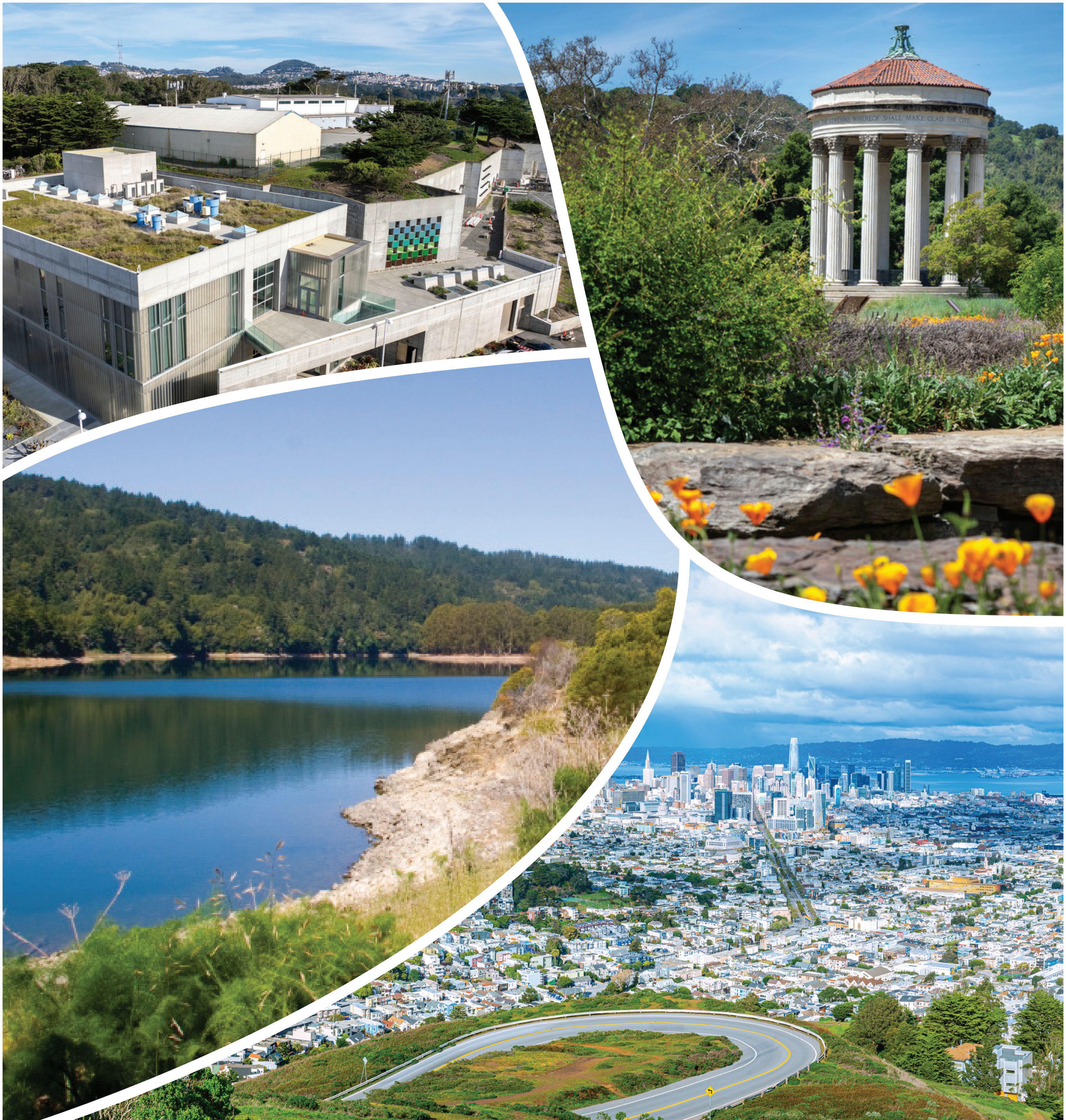
Water Code Section	Summary as Applies to UWMP	2025 UWMP Location Retail	2025 UWMP Location Wholesale
10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	Section 6.2.1.4	N.A
10633(c)	Describe the recycled water currently being used in the Supplier's service area.	Section 6.2.1.3	N.A
10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	Section 6.2.2	N.A
10633(e)	Describe the projected use of recycled water within the Supplier's service area at the end of 5, 10, 15, and 20 years, and describe the actual use of recycled water in comparison to uses previously projected.	Tables 6-2 and 6-5	N.A
10633(f)	Describe the actions that may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	Section 6.2.2	N.A
10633(g)	Provide a plan for optimizing the use of recycled water in the Supplier's service area.	Section 6.2.2	N.A
10631(g)	Describe desalinated water project opportunities for long-term supply.	Section 7.4	Section 7.4
10631(f)	Describe the expected future water supply projects and programs that may be undertaken by the water Supplier to address water supply reliability in average, single-dry, and for a period of drought lasting five consecutive water years.	Section 7.4	Section 7.4
10631.2(a)	The UWMP must include energy information, as stated in the code, that a Supplier can readily obtain.	Section 6.3	N.A
10634	Provide information on the quality of existing sources of water available to the Supplier and the manner in which water quality affects water management strategies and supply reliability.	Sections 6.1.2 and 6.2.3	Section 6.1.2
10635(a)	Service Reliability Assessment: Assess the water supply reliability during normal, dry, and a drought lasting five consecutive water years by comparing the total water supply sources available to the Supplier with the total projected water use over the next 20 years.	Sections 8.3 and 8.4	Sections 8.3 and 8.4
10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Sections 6.2.2 and 7.4	Sections 7.2, 7.4 and 7.5
10635(b)	Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects.	Section 8.5	N.A
10635(b)(1)	Include a description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts five consecutive years.	Sections 8.2 and 8.5	N.A

Water Code Section	Summary as Applies to UWMP	2025 UWMP Location Retail	2025 UWMP Location Wholesale
10635(b)(2)	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Sections 8.1 and 8.5.3	N.A
10635(b)(3)	Include a comparison of the total water supply sources available to the Supplier with the total projected water use for the drought period.	Section 8.5.4	N.A
10635(b)(4)	Include considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.	Sections 8.1 and 8.2.2	N.A
10632(a)	Provide a water shortage contingency plan (WSCP) with specified elements below.	Appendix F	Appendix F
10632(a)(1)	Provide an analysis of water supply reliability (from Guidebook Chapter 7) in the WSCP.	Appendix F Section 2.2	Appendix F Section 2.2
10632(a)(2)(A)	Provide the written decision-making process and other methods that the Supplier will use each year to determine its water reliability.	Appendix F Section 2.5 and Figure 2-1	Appendix F Section 2.5 and Figure 2-1
10632(a)(2)(B)	Provide data and methodology to evaluate the Supplier's water reliability for the current year and one dry year pursuant to factors in the code.	Appendix F Section 2	Appendix F Section 2
10632(a)(3)(A)	Define six standard water shortage levels of 10%, 20%, 30%, 40%, 50% shortage, and greater than 50% shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic interruption of supply.	Appendix F Section 3 and Table 3-1	Appendix F Section 3 and Table 3-1
10632(a)(3)(B)	Suppliers with an existing WSCP that uses different water shortage levels must cross reference their categories with the six standard categories.	N.A - Suppliers uses 6 standard categories	N.A - Suppliers uses 6 standard categories
10632(a)(4)(A)	Suppliers with WSCPs that align with the defined shortage levels must specify locally appropriate supply augmentation actions.	Not Applicable; supplier will meet shortage with demand reduction actions as described in Appendix F, Section 4	Appendix F Section 3
10632(a)(4)(B)	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Appendix F Section 4	Appendix F Section 3
10632(a)(4)(C)	Specify locally appropriate operational changes.	Appendix F Section 4.4	Appendix F Section 3

Water Code Section	Summary as Applies to UWMP	2025 UWMP Location Retail	2025 UWMP Location Wholesale
10632(a)(4)(D)	Specify additional mandatory prohibitions against specific water use practices that are in addition to State-mandated prohibitions are appropriate to local conditions.	Appendix F Section 4.2	Appendix F Section 3
10632(a)(4)(E)	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Appendix F Table 4-1	Appendix F Section 3
10632.5	The UWMP shall include a seismic risk assessment and mitigation plan.	Appendix F Section 10.4	Appendix F Section 10.4
10632(a)(5)(A)	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Appendix F Section 5	Appendix F Section 5
10632(a)(5)(B), 10632(a)(5)(C)	Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other relevant communications.	Appendix F Section 5	Appendix F Section 5
10632(a)(6)	Retail Supplier must describe how it will ensure compliance with and enforce provisions of the WSCP.	Appendix F Sections 6.1 and 6.2	Appendix F Section 6.3
10632(a)(7)(A)	Describe the legal authority that empowers the Supplier to enforce shortage response actions.	Appendix F Section 7	Appendix F Section 7
10632(a)(7)(B)	Provide a statement that the Supplier will declare a water shortage emergency per Water Code Chapter 3. *Water Shortage Emergencies* .	Appendix F Section 7	Appendix F Section 7
10632(a)(7)(C)	Provide a statement that the Supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency.	Appendix F Section 7	Appendix F Section 7
10632(a)(8)(A)	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Appendix F Section 8	Appendix F Section 8
10632(a)(8)(B)	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Appendix F Section 8	Appendix F Section 8
10632(a)(8)(C)	Retail Suppliers must describe the cost of compliance with Water Code Chapter 3.3, *Excessive Residential Water Use During Drought* .	Appendix F Section 8	Appendix F Section 8
10632(a)(9)	Retail Suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data are collected, tracked, and analyzed for purposes of monitoring customer compliance.	Appendix F Section 9	N.A
10632(a)(10)	Describe reevaluation and improvement procedures for monitoring and evaluation the WSCP to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Appendix F Section 11	Appendix F Section 11

Water Code Section	Summary as Applies to UWMP	2025 UWMP Location Retail	2025 UWMP Location Wholesale
10632(b)	Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.	Appendix F Section 4	N.A
10632(c)	Make available the WSCP to customers and any city or county where it provides water within 30 days after adoption of the plan.	Section 12	Section 12
10631(e)(1)	Retail Suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Section 10.2	N.A
10631(e)(2)	Wholesale Suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and Supplier assistance program.	N.A	Section 10.3
10608.26(a)	Retail Suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets (recommended to discuss compliance).	Sections 11.1, 11.2, Apendix B and Appendix G	Sections 11.1, 11.2, Apendix B and Appendix G
10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the Supplier provides water that the Supplier will be reviewing the UWMP and considering amendments or changes to the plan.	Section 11.1 and Appendix B	Section 11.1 and Appendix B
10621(f)	Each urban water Supplier shall update and submit its 2025 plan to DWR by July 1, 202 6.	Section 11.3	Section 11.3
10642	Provide supporting documentation that the Supplier made the UWMP and WSCP available for public inspection, published notice of the public hearing, and held a public hearing about the UWMP and WSCP.	Sections 11.1, 11.2 and Appendix B	Sections 11.1, 11.2 and Appendix B
10642	The Supplier is to provide the time and place of the hearing to any city or county within which the Supplier provides water.	Section 11.2 and Appendix B	Section 11.2 and Appendix B
10642	Provide supporting documentation that the UWMP and WSCP has been adopted as prepared or modified.	Section 11.2 and Appendix G	Section 11.2 and Appendix G
10644(a)	Provide supporting documentation that the Supplier has submitted their UWMP to the California State Library.	Section 11.3 and Appendix B	Section 11.3 and Appendix B
10644(a)(1)	Provide supporting documentation that the Supplier has submitted their UWMP to any city or county within which the Supplier provides water no later than 30 days after adoption.	Section 11.3 and Appendix B	Section 11.3 and Appendix B
10644(a)(2)	The UWMP, or amendments to the UWMP, submitted to DWR shall be submitted electronically.	Section 11.3	Section 11.3
10644(b)	If revised, submit a copy of the WSCP to DWR within 30 days of adoption.	Section 11.3	Section 11.3

Water Code Section	Summary as Applies to UWMP	2025 UWMP Location Retail	2025 UWMP Location Wholesale
10645(a)	Provide supporting documentation that, not later than 30 days after filing a copy of its UWMP with DWR, the Supplier has or will make the plan available for public review during normal business hours.	Section 11.3 and Appendix B	Section 11.3 and Appendix B
10645(b)	Provide supporting documentation that, not later than 30 days after filing a copy of its WSCP with DWR, the Supplier has or will make the plan available for public review during normal business hours.	Section 11.3 and Appendix B	Section 11.3 and Appendix B
10621(c)	If Supplier is regulated by the Public Utilities Commission, include its plan and contingency plan as part of its general rate case filings.	Section 11.3	Section 11.3



2025 URBAN WATER MANAGEMENT PLAN

FOR THE CITY AND COUNTY OF SAN FRANCISCO

PUBLIC REVIEW DRAFT

March 2026

Prepared by: The San Francisco Public Utilities Commission

San Francisco
Water Power Sewer
Services of the San Francisco Public Utilities Commission