Draft

CITY OF MENLO PARK HOUSING ELEMENT UPDATE

Water Supply Assessment for the Water Service Provided by California Water Service (Bear Gulch District) and Menlo Park Municipal Water

Prepared for
City of Menlo Park

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626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300
esassoc.com

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CONTENTS

City of Menlo Park Housing Element Update Water Supply Assessment for the Water Service Provided by California Water Service (Bear Gulch District), and Menlo Park Municipal Water

Page

Appendices

List of Tables

Page

List of Figures

Table 6-4 MPMW Normal Year Water Supply and Demand Comparison (AFY) 6-5
Table 6-5 MPMW Single-Dry-Year Potable Water Supply and Demand Comparison (AFY) with Bay-Delta Plan Amendment 6-6
Table 6-6 MPMW Multiple Dry Years Supply and Demand Comparison (AFY) with Bay-Delta Plan Amendment 6-7
Table 6-7 MPMW Normal, Single Dry and Multiple Dry Years Supply and Demand Comparison (AFY) without the Bay-Delta Plan Amendment 6-8

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
ABAG	Association of Bay Area Governments
ADU	accessory dwelling unit
AF	acre-feet
AFY	acre-feet per year
Agreement	Water Supply Agreement
BAWSCA	Bay Area Water Supply and Conservation Agency
BMP	best management practice
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CIP	Capital Improvement Program
CPUC	California Public Utilities Commission
CUWCC	California Urban Water Conservation Council
Cal Water	California Water Service
Demand Study	SFPUC 2004 Wholesale Customer Water Demand Projections study
DWR	Department of Water Resources
EIR	environmental impact report
GMP	groundwater management plan
gpd	gallons per day
HEU	Housing Element Update
ILTWSP	integrated long-term water supply plan
IRWMP	integrated regional water management plan
ISG	Individual Supply Guarantee
LAFCO	Local Area Formation Commission
MPMW	Menlo Park Municipal Water
MG	million gallons
mgd	million gallons per day
MID	Modesto Irrigation District

Acronym/Abbreviation	**Definition**
MOU	memorandum of understanding
MSA	Settlement Agreement and Master Water Sales Contract
MSR	Municipal Service Review
PEIR	program environmental impact report
RHNA	Regional Housing Needs Allocation
RWS	Regional Water System
SAA	Supply Assurance Allocation
San Francisco	City and County of San Francisco
SB	Senate Bill
SEIR	Subsequent Environmental Impact Report
SFPUC	San Francisco Public Utilities Commission
SR	State Route
Strategy	Long-Term Reliable Water Supply Strategy
SVWTP	Sunol Valley Water Treatment Plant
SWRCB	State Water Resources Control Board
TID	Turlock Irrigation District
UWMP	urban water management plan
Water Code	California Water Code
WSA	water supply assessment
WSAP	water supply allocation plan
WSIP	Water System Improvement Program
WSV	Water Supply Verification

SECTION 1
Introduction

In 2001, California adopted Senate Bill (SB) 610 and SB 221, thereby amending the California Water Code (Water Code). Under these laws, certain types of development projects are required to provide detailed water supply assessments to planning agencies. The requirements for a water supply assessment (WSA) are set forth in the California Water Code (Water Code) Sections 10910 et seq. A WSA connects water supply and land use planning with the environmental review process. The law also reflects the growing awareness of the need to incorporate water supply and demand analysis at the earliest possible stage in the land use planning process. Any proposed project that is subject to the California Environmental Quality Act (CEQA) and would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project, is subject to SB 610 and is required to prepare a WSA.

The primary purpose of a WSA is to determine whether the identified water supply or water supplier will be able to meet projected demands for the Project, in addition to existing and planned future uses, over a 20-year planning period in normal, single-dry, and multiple-dry water years. Secondarily, a WSA provides decision-makers a regional framework on which to base a decision about the sufficiency of water supplies for the proposed Project.

The proposed Project is subject to CEQA and would allow for residential and mixed-use developments that may include more than 500 units. In fact, the proposed Project would allow up to 4,000 new dwelling units as a result of proposed land use strategies and rezoning, and assumes an additional 85 accessory dwelling units (ADUs), within City Council Districts 2, 3, 4 and 5. Therefore, this WSA was prepared in accordance with SB 610 and the Water Code. The SB 610 requirements and their applicability to the proposed Project are addressed in detail in Section 3, Water Supply Planning.

This WSA assesses the availability of identified water supplies under normal-, single-dry-, and multiple-dry-year conditions, accounting for the projected water demand of the proposed Project in addition to other existing and planned future uses of the identified water supply. This WSA examines the regional water providers and their supplies (Section 4.2), the reliability of these sources (Section 4.4), the projected short-term and long-term water demand of the proposed Project (Section 5), and a comparison of supply and demand as required in a WSA (Section 6) and Conclusion (Section 7).

The Project Site is located in the City of Menlo Park (City), within the service areas of Menlo Park Municipal Water (MPMW) and the California Water Service (Cal Water) Bear Gulch District. Therefore, with respect to the proposed Project, Cal Water's Bear Gulch District and MPMW are the water suppliers responsible for preparing WSAs.

1.1 Project Overview

The City is conducting an environmental review under the requirements of CEQA for its Housing Element Update (HEU). This WSA will provide information for use in the CEQA analysis for the proposed project. The City is preparing a Subsequent Environmental Impact Report (SEIR) regarding the HEU, which relies on and supplements information and analyses contained in the Environmental Impact Report (EIR) the City certified in 2016 as part of adopting the ConnectMenlo General Plan Update.

1.2 Project Location

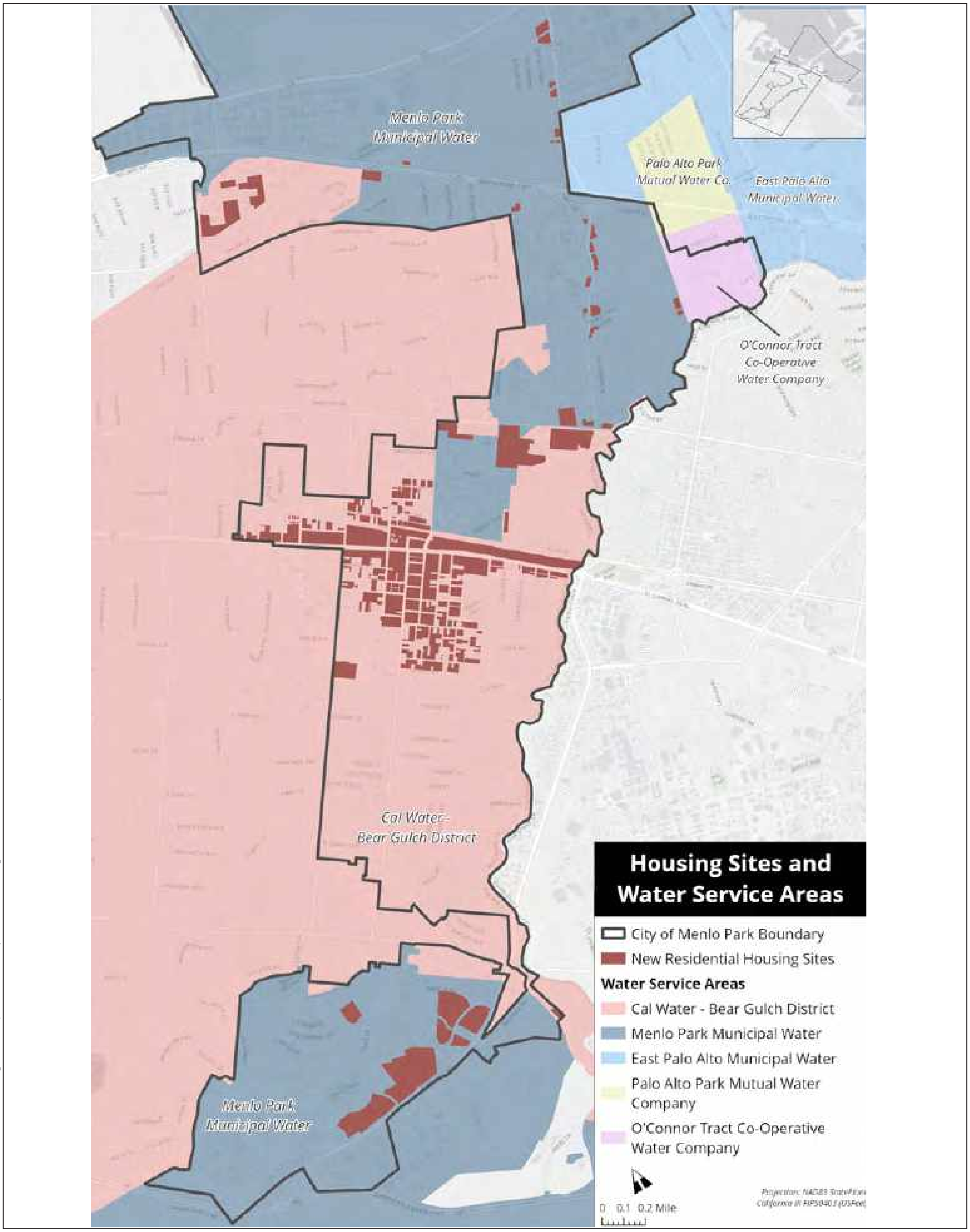
The City is located approximately 30 miles south of San Francisco on the San Francisco Peninsula about 20 miles northwest of San Jose. The City is located at the southern edge of San Mateo County. The City encompasses approximately 17 square miles (approximately seven square miles of which is water) with a population of approximately 35,000 people. The City boundaries and its regional location are shown in **Figure A**.

The City is generally bounded by San Francisco Bay to the north and east; the cities of East Palo Alto and Palo Alto and Stanford University to the southeast; and Atherton, unincorporated North Fair Oaks, and Redwood City to the northwest. The City is accessed by Interstate 280 (I-280), U.S. Highway 101 (US-101), Caltrain, State Route 84 (SR-84, or Bayfront Expressway) via the Dumbarton Bridge, and a variety of arterial roadways, as well as regional and local pedestrian and bicycles routes. The City has a Caltrain station located near the downtown area and is less than one hour from downtown San Francisco via train. The City has a range of urban and suburban land uses, including residential neighborhoods of varied densities, its downtown, parks, established business centers, and an emerging center for innovation and technology.

1.3 Project Summary

The City's current General Plan was last updated in 2016, when ConnectMenlo, an update of the Land Use and Circulation Elements, was adopted. The City's Housing Element was last adopted on April 1, 2014, and in accordance with State law, addresses the planning period from January 31, 2015, through January 31, 2023. As the end of this period is near, State law [Government Code Section 65588] requires the City to update its Housing Element with a due date of January 31, 2023. In accordance with State law, the planning period for the updated "6th Cycle" Housing Element will extend from January 31, 2023 through January 31, 2031.

Concurrent with updating the Housing Element, the City proposes to update the General Plan's Safety Element, prepare and adopt a new Environmental Justice Element, and make conforming amendments to other elements of the General Plan, as needed, to maintain internal consistency. The City also proposes to undertake changes to the City's Zoning Ordinance (Menlo Park Municipal Code Title 16) and the El Camino Real/Downtown Specific Plan (adopted June 12, 2012) that are needed to reflect the updated Housing Element and to maintain consistency with the General Plan, and proposes to rezone housing opportunity sites identified in the Housing Element.



Menlo Park Housing Element Update

Figure A
Housing Sites and Water Service Areas

ESA

1.4 Document Structure

This WSA is organized following a basic hierarchy to describe each issue: regional context (San Francisco Public Utilities Commission (SFPUC) service area); local context (Cal Water Bear Gulch District and MPMW service areas), Project-level analysis for the proposed Project; the assessment as a comparison of water supply and demand for the Project; and existing and future demand in all water year types. The report organization is as follows:

1. Introduction; project overview, location, and description; and document structure
2. City background information and land use planning
3. General information on water supply planning under SB 610
4. Water supply setting including local climate, water supplies, capacities, and reliability
5. Regional, city, and project water demands, including historical, projected, and projected dry-year demands
6. Supply-demand comparisons on a regional, city, and project-level basis
7. Conclusions

SECTION 2

Background Information and Land Use Planning

The City is proposing to update the Housing Element of its General Plan, update the Safety Element, and add a new Environmental Justice Element. These actions would build upon changes to the City's General Plan Update adopted in 2016 and would ensure the City's compliance with state law. The 2016 ConnectMenlo General Plan Update is briefly described below, along with relevant requirements of state law.

2.1 ConnectMenlo and Land Use and Circulation Elements

The purpose of ConnectMenlo was to update the Land Use and Circulation Elements of the City's General Plan, with a particular geographical focus on the Bayfront Area, and to update the zoning provisions to reflect the proposed land use changes within the Bayfront Area. The updated Land Use Element included goals, policies, and programs to guide local decisions regarding land use, and framed the type and scope of potential development that may occur in the City. The updated Circulation Element addressed transportation throughout the City and aimed to improve mobility connections citywide for all modes of travel. The General Plan amendments were accompanied by Zoning Ordinance amendments to foster a new live/work/play environment in the Bayfront Area. The City Council adopted three new zoning districts: Office (O), Life Sciences (LS), and Residential Mixed Use (R-MU) to set the framework for creating the live/work/play concept.

A primary focus of ConnectMenlo was to balance the potential for development impacts with providing community amenities, especially for the Belle Haven neighborhood. Bayfront Area projects may propose development at the bonus level, which allows additional height, floor area ratio (FAR), and/or density above the base level of zoning regulations in exchange for community amenities. Highlighted community amenities included improved transportation alternatives, affordable housing to support both the adjacent neighborhood and the growing workforce, and expanded service and community-serving retail uses.

The new development potential created in the Bayfront Area was analyzed in the ConnectMenlo EIR, along with remaining development potential under the General Plan. The ConnectMenlo EIR was adopted in 2016.

2.2 Land Use, Zoning and Project Elements and Characteristics

2.2.1 Housing Element Update Project Components

The Housing Element Update (HEU) would include adoption of General Plan amendments that would add or modify goals, objectives, policies, and implementation programs related to housing, safety, and environmental justice. General Plan amendments would also include conforming amendments to other elements of the General Plan, as needed, to ensure internal consistency. Amendments to the Housing Element would address among other things, the maintenance, preservation, improvement, and development of housing in the city. In addition, the HEU would include a housing sites inventory with sufficient existing and new housing sites at appropriate densities to meet the City's Regional Housing Needs Allocation (RHNA) requirement plus an ample buffer, and the City would modify provisions of its zoning ordinance, zoning map, and El Camino Real/Downtown Specific Plan as necessary to reflect the housing sites inventory and strategies to meet the City's RHNA.

2.2.2 Housing Sites Inventory

The HEU identifies specific sites appropriate for development of housing (especially affordable units), and the City would rezone those sites as necessary to meet the requirements of State law. The final housing sites inventory will be refined based on additional community input and analysis. The HEU SEIR evaluates the environmental effects of adding up to 4,000 new residential units in the City within the eight-year planning period via a variety of strategies in addition to possible pipeline projects and an additional 85 ADUs, as described below.

2.2.3 Pipeline Projects

Pipeline projects are new housing projects that have been recently approved but not yet occupied or are pending (in review). At the time the Notice of Preparation (NOP) for the HEU SEIR was published (December 23, 2021), there were seven major residential projects in the "pipeline" as either approved or pending housing developments that would provide approximately 3,642 new units. These units, as well as smaller projects in the City, could potentially count towards Menlo Park's RHNA requirement if the residential units were not completed and occupied prior to June 30, 2022. Major pipeline projects are listed in **Table 2-1** and are identified as either "approved" or "pending." Approved projects are considered part of the baseline, and pending projects are considered part of the Project being analyzed. (See the discussion of Growth Projections below.)

2.2.4 Accessory Dwelling Units

California Department of Housing and Community Development allows the City to develop a projection of ADUs that will be built within the planning period based on average annual production between 2018 and 2020. Because the City permitted an average of 10.6 ADUs per year between 2018 and 2020, the City can anticipate development of 85 units during the 6th Cycle Housing Element planning period. These units could potentially count towards Menlo Park's RHNA requirement.

TABLE 2-1
MAJOR PIPELINE PROJECTS

Project	Status	Net New Units
Approved Projects		
111 Independence Dr.	Approved	105
115 Independence Dr. (Menlo Portal)	Approved	335
141 Jefferson Dr. (Menlo Uptown)	Approved	483
Subtotal Approved Projects		*923*
Pending Projects		
123 Independence Dr.	Pending	432
165 Jefferson Dr. (Menlo Flats)	Pending	158
Willow Village	Pending	1,729
333 Ravenswood Ave. (Parkline)	Pending	400
Subtotal Pending Projects		*2,719*
Total		***3,642***

SOURCE: City Council Staff Report #21-210-CC (October 26, 2021), Table 3, Major Pipeline Projects.

NOTE: This table shows major pipeline projects yielding greater than 10 units.

2.3 Growth Projections

Changes to the City's General Plan proposed as part of the HEU would build on the changes adopted in November 2016, when the Land Use and Circulation Elements were comprehensively updated as part of the ConnectMenlo General Plan Update. To assess the increase in residential development planned with the proposed Project, the SEIR will use an updated baseline and updated projections for 2040. The updated baseline and projections are shown in **Table 2-2** and are explained briefly here:

- 2015 Existing Conditions from the ConnectMenlo EIR column is included for informational purposes. Comparison with the 2021 Baseline Conditions allows readers to understand changes since the ConnectMenlo EIR was prepared.
- 2021 Baseline Conditions column reflects conditions on the ground in the City when the NOP for the HEU SEIR was published in December 2021 and also includes development projects that have been approved and are either under construction or expected to commence construction shortly.
- The HEU columns reflect pending (proposed but not yet approved) projects and ADUs that would count towards the City's RHNA along with the 4,000 additional units anticipated as a result of proposed land use strategies and rezoning. Taken together, these represent the Project being analyzed in the HEU SEIR.
- The 2040 Cumulative (Maximum Buildout) Projections from the ConnectMenlo EIR are included for informational purposes and allows readers to understand the maximum buildout of the General Plan that was anticipated in the ConnectMenlo EIR.

- The Updated 2040 Cumulative (Maximum Buildout) Projections with the HEU column provides a summary of the maximum buildout of the General Plan as a result of the proposed Project plus other past, present, and reasonably foreseeable development projects that were not reflected in the ConnectMenlo 2040 projections. The data reflects the ConnectMenlo 2040 projections plus the 85 ADUs and the 4,000 additional units anticipated as a result of the HEU between 2023 and 2031, plus the 123 Independence Drive pipeline project, as well as an increment of additional growth that may occur between 2031 and 2040, in part due to the zoning and specific plan changes that would accompany the HEU. The additional increment of 299 units over nine years is relatively modest because the housing inventory sites included in the HEU represent those parcels most likely to develop by 2031, leaving smaller sites that are less likely to develop in later years.

TABLE 2-2
UPDATED PROJECT BASELINE AND PROJECTIONS

	2015 Baseline (Existing) Conditions from ConnectMenlo EIR	2021 Baseline Conditions[a]		Housing Element Update			2040 Cumulative (Maximum Buildout) Projections from ConnectMenlo EIR	Updated 2040 Cumulative (Maximum Buildout) Projections with Housing Element Update[d]
		Existing	Approved Projects[a]	Pending Projects[b]	ADUs[c]	Additional Units		
Bayfront Areae								
Residential Units	0	735	923	2,319		0	5,430	5,581
Population[f]	0	1,874	2,373	5,960		0	13,960	14,343
Non-Residential SF	8.7 million	9.74 million				0	13.4 million	13.4 million
Hotel Rooms	0	250				0	850	850
Jobs	19,800	32,275[g]	(213)			0	39,950	39,950
Remainder of City								
Residential Units	13,100	13,281	525	414	85	4,000	14,450	19,248
Population[f]	32,900	34,841	1,350	1,064	218	10,280	36,390	49,467
Non-Residential SF	5.9 million	5.93 million				0	6.8 million	6.8 million
Hotel Rooms	570	631				0	640	640
Jobs	11,100	11,416[h]	1,470			0	13,300	13,300
Citywide Totals								
Residential Units	13,100	14,016	1,448	2,733	85	4,000	19,880	24,829
Population[f]	32,900	36,715	3,723	7,024	218	10,280	50,350	63,810
Non-Residential SF	14.6 million	15.7 million				0	20.6 million	20.6 million
Hotel Rooms	570	881				0	1,490	1,490
Jobs	30,900	43,691	1,257			0	53,250	53,250

SOURCE: City of Menlo Park, March 2022.

NOTES:

a. 2021 Baseline conditions reflect existing conditions plus approved projects that are in construction or likely to commence construction in the near term. The approved projects include 111 Independence Drive; Menlo Uptown (141 Jefferson Drive, 180-186 Constitution Drive); and Menlo Portal (104-110 Constitution Drive, 115 Independence Drive) in the Bayfront Area. In the remainder of the City, approved projects include 1275 El Camino Real, 500 El Camino Real, Springline (1300 El Camino Real), 1021 Evelyn Street, 1540 El Camino Real, 115 El Camino Real, 409 Glenwood Avenue, 706-716 Santa Cruz Avenue, 1300 Block of Willow Road, 201 El Camino Real, 1162 El Camino Real, 975 Florence Lane, and 661-687 Partridge Avenue.
b. Pending projects reflect residential development applications that are currently on file for residential development in the City. These projects include Willow Village, Menlo Flats (165 Jefferson Drive), and 123 Independence Drive in the Bayfront Area. In the remainder of the City, pending projects include 1550 El Camino Real, Parkline (333 Ravenswood Avenue), and 1220 Hoover Street.
c. Because the location of future ADUs is unknown, the units are not distributed between the Bayfront Area and the Remainder of the City, and are instead included in the Citywide Totals.
d. The Updated 2040 Cumulative represents the *ConnectMenlo* 2040 Cumulative plus approved and pipeline projects that were not anticipated in the *ConnectMenlo* EIR, plus the 85 ADUs and 4,000 units being zoned for in the Housing Element Update, plus an estimated 299 units that may result from development on small sites affected by zoning and Specific Plan changes as part of the HEU after the end of the planning period in 2031. The estimate of 299 units is based on the assumption that the best sites are those included in the Housing Sites Inventory that are assumed to be built-out by 2031, and the smaller sites remaining may see modest development in later years. Projects that were not anticipated in *ConnectMenlo* include 123 Independence Drive in the Bayfront Area. The 2040 “No Project” condition would include the housing unit and population values in this column, less the 4,000 units from the HEU (10,280 persons), and the 299 additional units noted above (768 persons). Thus the Citywide unit count for the “No Project” condition would be 20,530 units, with a resultant Citywide population of 52,762 persons.
e. The Bayfront Area as defined in the *ConnectMenlo* EIR refers to areas on the Bay side of US-101 with the exception of the Belle Haven neighborhood.
f. Population estimates presented for the *ConnectMenlo* existing baseline and 2040 Cumulative are based on the assumption of 2.57 persons per household used in the *ConnectMenlo* EIR which aligns with the City’s transportation model.
g. This number represents the 19,800 jobs from *ConnectMenlo* EIR Table 3-2 plus 5,412 from the occupied portion of Facebook Campus Expansion Project and 7,063 from space occupied from 2015 through 2021.
h. This number represents the 11,100 jobs from *ConnectMenlo* EIR Table 3-2 plus 316 jobs in space occupied from 2015 through 2021.

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SECTION 3
Water Supply Planning

California has many different processes through which the development and/or maintenance of water supplies are planned on a local and regional level. Urban Water Management Plans (UWMPs), Groundwater Management Plans (GMPs), Integrated Regional Water Management Plans (IRWMPs), Municipal Service Reviews (MSRs) and water resources components of General Plans all integrate a degree of regional planning of water supply and demand. The following are brief descriptions of the plans mentioned above:

- Urban Water Management Plans (UWMP), pursuant to Water Code sections 10610 et seq. are long-range water supply and demand planning documents that provide a connection between land use planning and available water supplies. The UWMPs should make every effort to ensure the appropriate level of reliability in a water service area sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry years.
- Groundwater Management Plans (GMPs) are adaptive management tools and represent a critical step in establishing a framework for maintaining a sustainable groundwater resource for the various users overlying the basins. The GMPs are consistent with the provisions of California Water Code sections 10750 et seq. GMPs are developed in a consensus-based process, and include stakeholders throughout the overlying basins.
- Integrated Regional Water Management Plans (IRWMPs) are collaborative efforts to manage all aspects of water resources in a region. IRWMPs cross jurisdictional, watershed, and political boundaries; involve multiple agencies, stakeholders, individuals, and groups; and attempt to address the issues and differing perspectives of all the entities involved through mutually beneficial solutions.
- Municipal Service Reviews (MSR) are comprehensive studies designed to better inform Local Area Formation Commissions (LAFCO), local agencies, and the community about the provision of municipal services. Service reviews capture and analyze information about the governance structures and efficiencies of service providers and identify opportunities for greater coordination and cooperation between providers. The MSR is a prerequisite to a Sphere of Influence determination and may also lead a LAFCO to take other actions under its authority.
- General Plans are required by California law. The General Plan is designed to guide the long-term physical development and conservation of a city or county's land and environment through a framework of goals, policies, and implementation programs. The General Plan also provides a foundation for more detailed plans and implementation programs to be conducted, such as area or community plans, zoning ordinances, and specific plans.

To complement these large-scale planning processes, California enacted Senate Bill (SB) 610 and 221 in 2002, both of which emphasize the interrelationships between land use and water supply planning, and require the incorporation of water supply and demand analysis at the earliest possible stage in the planning process for sizeable land use projects. These statutes primarily apply to the planning of water supplies and identification of sources for defined "projects" (Water Code, Section 10912) in the case of SB 610 and for individual residential subdivision projects of more than 500 units in the case of SB 221. SB 610 amended portions of the Water Code, including Section 10631, which contains the Urban Water Management Planning Act, and added Sections 10910, 10911, 10912, 10913, and 10915, which describe the required elements of a WSA to be prepared and relied upon during the CEQA process. WSAs are prepared in connection with the environmental review process for defined "projects" (generally very similar to "projects of statewide, regional, or area wide significance," as defined in "CEQA Guidelines" Section 15206), and provide information (along with EIR analysis) to be considered by agency decision-makers at the time of project approval. Nothing in SB 610 prevents a city or county from approving a proposed project even in the face of information concluding that there is not sufficient water supply for build-out of the project.

Under both laws, agencies are required to consider water demands over a 20-year planning horizon, considering normal, single dry, and multiple dry year scenarios in light of the water provider's existing and planned future uses, including agricultural and manufacturing uses.

3.1 Water Supply Planning Under SB 610 and SB 221

As the "public water system" that supplies water to portions of the City including the proposed Project housing sites, Cal Water Bear Gulch District and MPMW are required to prepare WSAs and water supply verifications (WSVs), under the requirements of Senate Bills 610 and 221, and the Government Code (Sections 65867.5, 66455.3 and 66473.7). There are three primary areas to be addressed in a WSA:

(1) A description of all relevant water supply entitlements, water rights, and/or water contracts;

(2) A description of the available water supplies and the infrastructure, either existing or proposed, to deliver the water; and

(3) An analysis of the demand placed on those supplies, by the project, and relevant existing and planned future uses in the area.

Where the description of existing water supply entitlements, water rights, and/or water contracts shows insufficient water supplies to serve the proposed project as well as existing and planned uses over the 20-year planning horizon, additional information is required to describe how and where sufficient supplies may be obtained. Such information must include the estimated costs, financing methods, and regulatory approvals needed to obtain new supplies, as well as a projected time frame for obtaining them. WSVs must also contain information regarding existing supplies, as well as more detailed confirmation that the appropriate infrastructure planning and funding is in place to fully commit water supplies to a project. Senate Bill 610, which is applicable to certain large projects subject to CEQA or considered a "project" under Water Code Section 10912(a) or (b), builds on the information that is typically contained in an UWMP. The amendments to Water Code Section 10631 were designed to make WSAs and UWMPs consistent. A key difference between the WSAs and UWMPs is that pursuant to Water Code Section 10621, UWMPs are required to be updated every five years on or before July 1, in years ending in one and six, while WSAs are required as part of the environmental review process for each individually qualifying project. As a result, the 20-year planning horizons for each type of document may cover slightly different planning periods. Additionally, not all water providers who must prepare a WSA under SB 610 are required to prepare an UWMP because these water systems do not meet the requirements in Water Code section 10631. As stated above, only public water systems providing water for municipal purposes to more than 3,000 customers, or supplying more than 3,000 acre-feet (AF) annually must prepare UWMPs.

3.1.1 SB 610 Water Supply Assessment

The SB 610 water supply assessment process involves answering the following questions:

- Is the project subject to CEQA?
- Is it a project under SB 610?
- Is there a public water system?
- Is there a current UWMP that accounts for the project demand?
- Is groundwater a component of the supplies for the project?
- Are there sufficient supplies available to serve the project over the next 20 years?

"Is the Project Subject to CEQA?"

The first step in the SB 610 process is determining whether the project is subject to CEQA. SB 610 amended Public Resources Code Section 21151.9 to read: "Whenever a City or county determines that a project, as defined in Section 10912 of the Water Code, is subject to this division [i.e., CEQA], it shall comply with part 2.10 (commencing with Section 10910) of Division 6 of the Water Code." The City has determined that the proposed Project is a project subject to CEQA. The information contained in this assessment will be used to inform and support the SEIR for the HEU, and will be appended thereto.

"Is It a Project Under SB 610?"

The second step in the SB 610 process is to determine if a project meets the definition of a "Project" under Water Code Section 10912(a). Under this section, a "Project" is defined as meeting any of the following criteria:

- A proposed residential development of more than 500 dwelling units;
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet (ft2) of floor space;
- A commercial building employing more than 1,000 persons or having more than 250,000 ft2 of floor space;
- A hotel or motel with more than 500 rooms;
- A proposed industrial, manufacturing, or processing plant, or industrial park, planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 ft2 of floor area;

- A mixed-use project that includes one or more of these elements; or
- A project creating the equivalent demand of 500 residential units.

Alternately, if a public water system has less than 5,000 service connections, the definition of a "Project" also includes any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of service connections for the public water system.

As previously stated, the proposed Project would allow for residential and mixed-use developments that may include more than 500 units. In fact, the proposed Project would allow up to 4,000 new dwelling units through zoning modifications, and for that reason, it meets the requirements as a "Project" under the Water Code. As a result, a WSA pursuant to Water Code Section 10912 (a) will need to be prepared prior to completion of the HEU SEIR. (It should be noted that there is some question whether adoption or amendment of a general plan fits the definition of a "project" for purposes of requiring a WSA, as it does not directly create demand for water but instead authorizes the use of land that may be proposed for development requiring water. Notwithstanding this question, the City has determined that a WSA is required as part of the CEQA analysis of the Housing Element Update.)

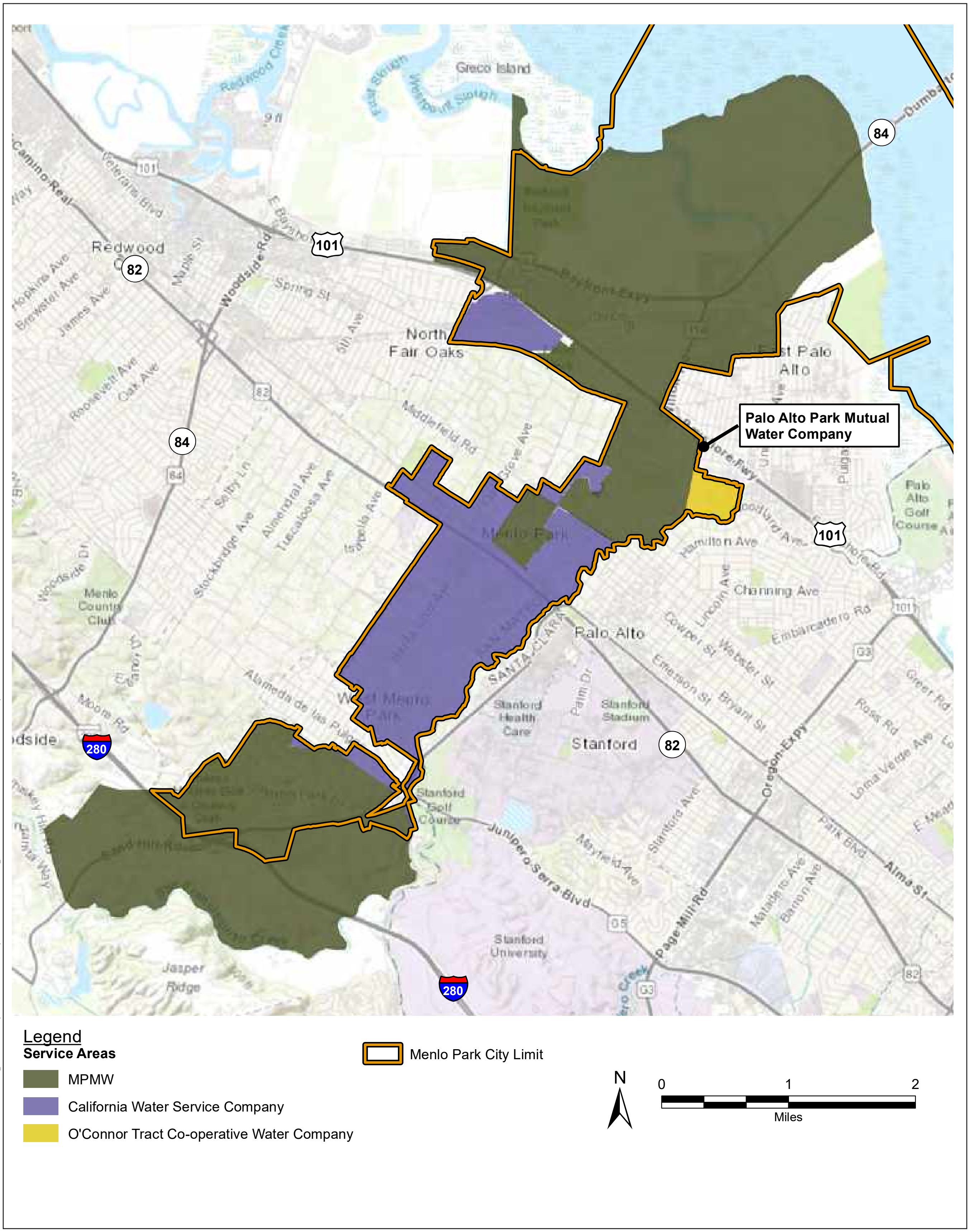
"Is There a Public Water System?"

The third step in the SB 610 process is determining if there is a "public water system" to serve the project. Section 10912(c) of the California Water Code states: "[A] public water system means a system for the provision of piped water to the public for human consumption that has 3,000 or more service connections."

The City is served by four water systems: Cal Water Bear Gulch District, MPMW, O'Connor Tract Co-operative Water Company, and Palo Alto Park Mutual Water Company. The City has determined that two (Cal Water's Bear Gulch District and MPMW, as described in detail below) qualify as public water systems pursuant to Water Code section 10912(c) that would serve the proposed Project's additional housing and therefore require preparation of a WSA. The City does not require WSA's by O'Connor Tract Co-operative Water Company or Palo Alto Park Mutual Water Company, because the new residential development proposed under the Housing Element Update all is outside their service areas. **Figure B** provides an overview of all water suppliers within the City and their service area boundaries.

Cal Water Bear Gulch District

California Water Service Company is an investor-owned private utility supplying water service to 1.7 million Californians through over 440,000 connections. Its twenty-five separate water districts serve over fifty communities from Chico in the north to the Palos Verdes Peninsula in Southern California. Cal Water's operations for individual service districts are regulated by the California Public Utilities Commission (CPUC). CPUC sets different tariff rates for each of Cal Water's individual districts. Cal Water incorporated in 1926, and has provided water service to the Bear Gulch District since 1936.



Menlo Park Housing Element Update EIR

Figure B
Water Suppliers in Menlo Park

ESA

Cal Water's Bear Gulch District is located in San Mateo County approximately 30 miles south-southeast of the City of San Francisco. The area served by Cal Water Bear Gulch District includes the communities of Atherton; Portola Valley; Woodside; portions of Menlo Park including the HEU plan area; and adjacent unincorporated portions of San Mateo County including West Menlo Park, Ladera, North Fair Oaks, and Menlo Oaks. Cal Water's Bear Gulch District's system is bordered on the north by Redwood City; on the east by Palo Alto, Stanford University, and unincorporated Santa Clara County; and on the south and west by unincorporated San Mateo County. Current land uses within the Cal Water's Bear Gulch District are a mixture of low, medium, and high density residential, mixed use, commercial, public facilities, and parks/open space.

Cal Water expanded its Bear Gulch District service area by acquiring three neighboring water service providers (Los Trancos County Water District, Skyline County Water District, and Woodside Mutual Water Company), and in 2020 it served more than 18,000 connections. Residential customers account for most of Bear Gulch District's service connections and 84 percent of its total water use. Non-residential water uses account for 11 percent of total demand while distribution system losses account for 5 percent.

Cal Water's Bear Gulch District serves approximately one-half of the City, with **[X#X]** connections in the City in 2020. **Figure C** illustrates Cal Water's Bear Gulch District's service area, its relationship to the City, and the locations within its service area where implementation of the HEU would support additional housing development.

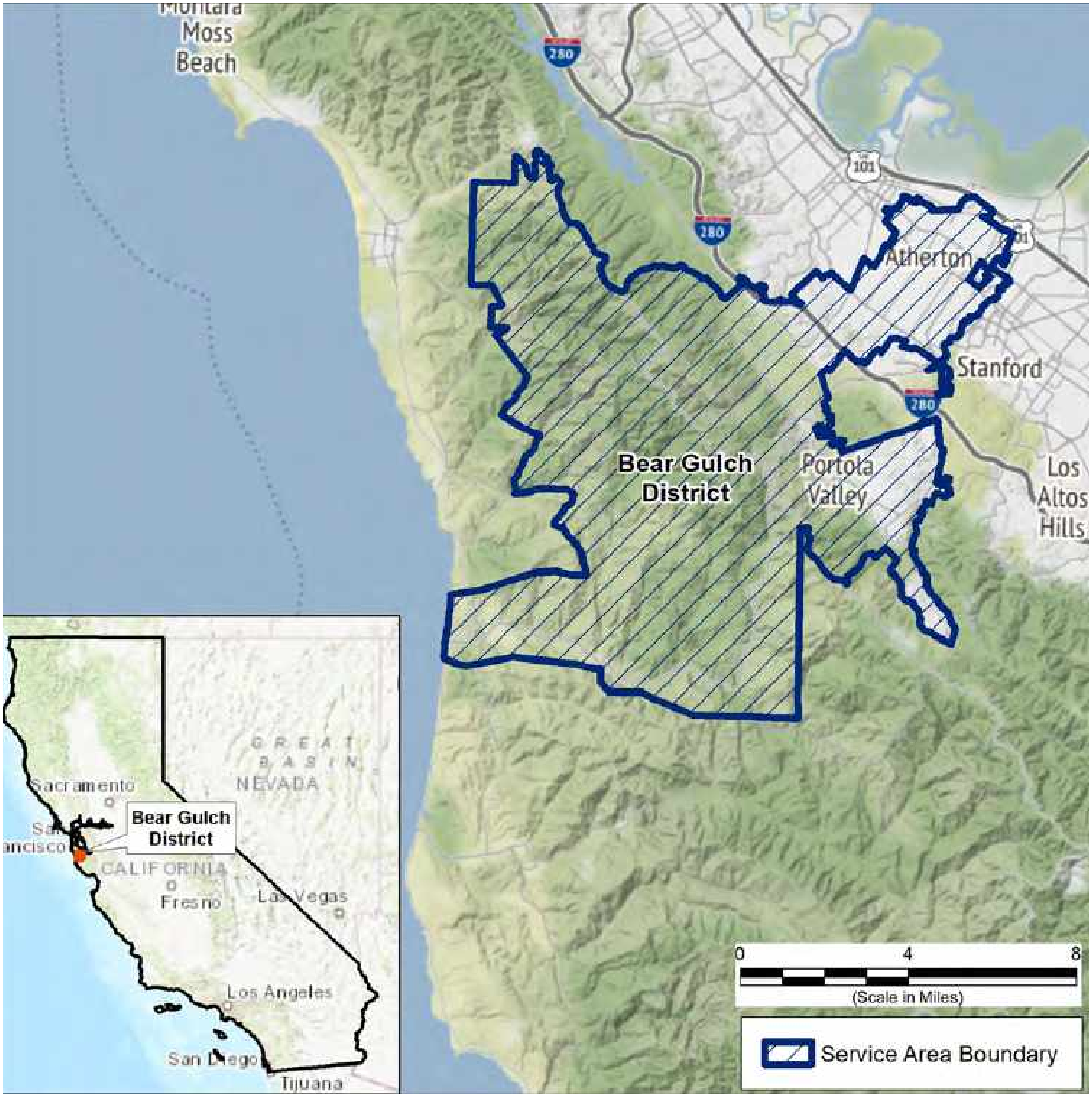
Menlo Park Municipal Water

MPMW provides water service to approximately half of the City, serving an area of approximately 9 square miles. In 2020, MPMW served 4,296 connections. Land uses in the MPMW service area consist of residential, commercial, industrial and institutional. Customer service connections include residential users, industrial connections, commercial service connections, irrigation accounts, institutional and governmental accounts and other connections (including temporary services, private fire services, and hydrant services). **Figure D** illustrates MPMW's service area and its relationship to the City, and the locations within its service area where implementation of the HEU would authorize additional housing development.

"Is There a Current Urban Water Management Plan That Accounts for the Project Demand?"

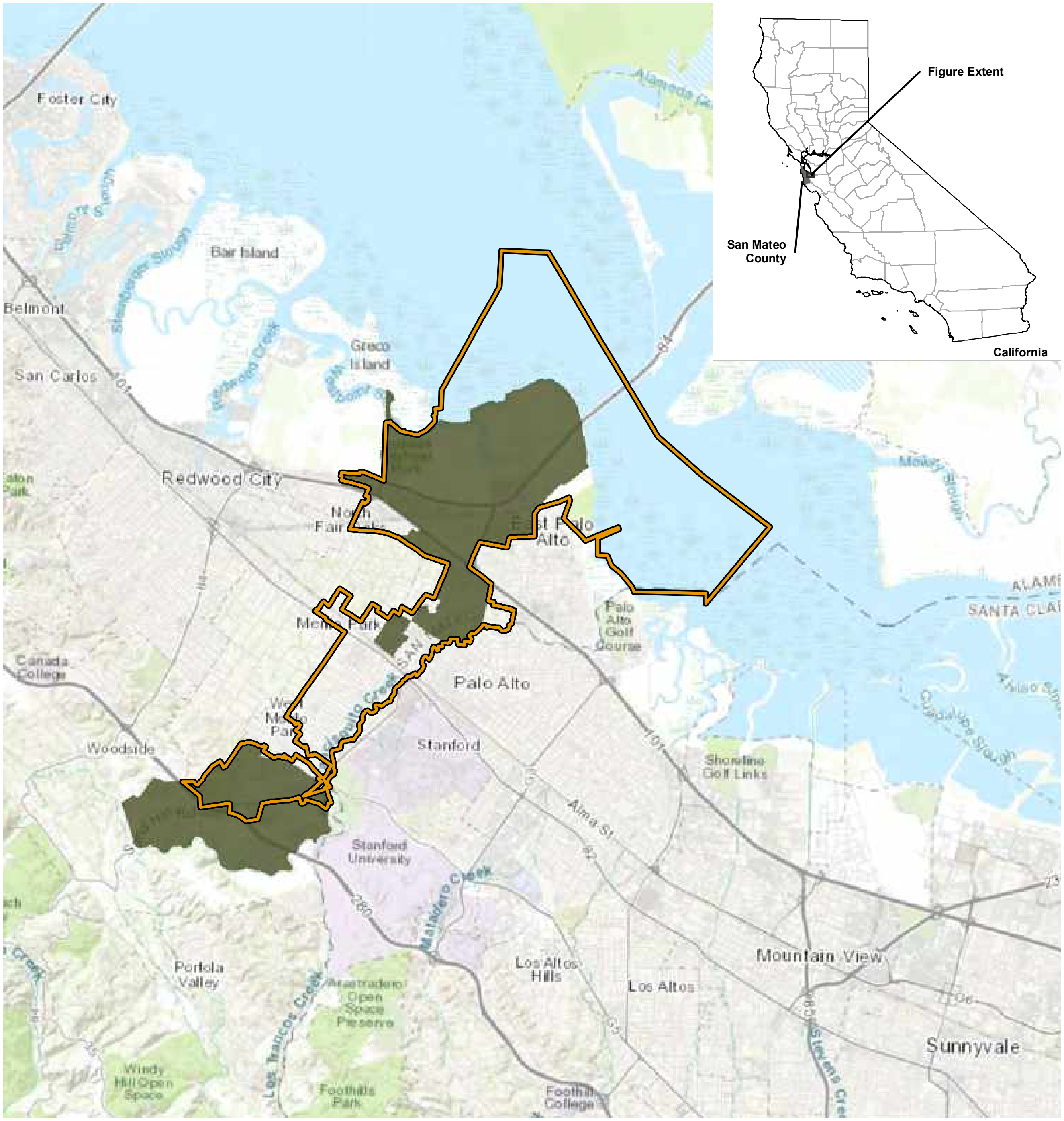
Step four in the SB 610 process involves determining if there is a current UWMP that considers the projected water demand for the project area. The Water Code requires that all public water systems providing water for municipal purposes to more than 3,000 customers, or supplying more than 3,000 AF annually must prepare an UWMP. Pursuant to Water Code Section 10621, UWMPs are required to be updated every five years on or before July 1, in years ending in one and six.

Cal Water Bear Gulch District prepared an UWMP in 2020 (**Appendix A**), which was adopted in June 2021. MPMW's most recently adopted UWMP is the 2020 UWMP, which was adopted in May 2021 (**Appendix B**). Both of the aforementioned 2020 UWMP's are incorporated by reference into this WSA.



SOURCE: M-Group, 2022

Figure C
Bear Gulch District Service Area



Legend

Menlo Park City Limit

MPMW Service Area

Abbreviations

MPMW = Menlo Park Municipal Water

N

0 2 4

Miles

D202100009.00 - Menlo Park Housing Element Update EIR\05 Graphics-GIS-Modeling-USE AZURE\Illustrator\Technical Report

Figure D
Menlo Park Municipal Water

ESA

Water Code Section 10910(c)(2) states: "If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g) [i.e., the WSA]." If projected water demand associated with the proposed project was not accounted for in the most recently adopted urban management plan, Water Code Section 10910(c)(3) states: "the water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses."

The Cal Water Bear Gulch District's 2020 UWMP is currently available online at the Department of Water Resources (DWR) website and MPMW's 2020 UWMP is available at the City's website. As shown in Figure C and Figure D, portions of proposed growth associated with implementation of the HEU and additional projected cumulative growth would occur within each of the water suppliers' service areas. Therefore, new water demand associated with projected growth and implementation of the HEU is also expected to occur within each of the water suppliers' service areas. Both water suppliers' 2020 UWMPs accounted for proportional future growth in demand above the average water demand in each service area over a five-year period (from 2016 through 2020), however, implementation of the HEU and other projected growth forecasted by respective planning agencies was not accounted for in the growth forecasts when Cal Water Bear Gulch District was preparing its 2020 UWMP. Furthermore, additional growth in demand in the MPMW 2020 UWMP did not account for implementation of the HEU, and this WSA, consistent with Water Code Section 10910(c)(3) provides an assessment of supply and demand including new demand associated with implementation of the HEU and other projected growth. Projected growth in residential development in each of the respective water service areas is provided in greater detail below.

It is estimated that Cal Water Bear Gulch District's service area population was 60,814 in 2020. Cal Water Bear Gulch District estimates its service area population using census block population counts from decadal Census data. The decadal Census estimates are converted to average population per single- and multi-family service, which are applied to service counts for years between the decadal Censuses. This method is similar to the approach used by the California DWR Population Tool and population estimates generated by the two methods have been shown to differ by less than one percent in most cases.

Cal Water Bear Gulch District's population and service growth projections are tied to Association of Bay Area Governments (ABAG) census tract level projections of population, housing, and employment. These projections, in turn, are developed by ABAG through detailed land use modeling of the Bay Area. Parcels, or individual units of land ownership, provide the fundamental building block for the ABAG land use model. The land use database includes information linking the parcels to zones they are within, buildings within each parcel, their size, their monetary value, and their current planning constraints. The base year database contains 1.9 million buildings categorized into different land use types, ranging from detached single-family housing to heavy industrial. The ABAG land use model relies on current zoning for all parcels in the region as a representation of the land use controls in place in the base year. Zoning codes, general plans, and specific plans were processed by ABAG to obtain a consistent indication of each jurisdiction's long-term vision for land use type, residential dwelling units per acre, and commercial floor area ratio. However, as previously discussed, the water demand for the proposed Project was not accounted for within projected growth in water demand described in Cal Water Bear Gulch District's 2020 UWMP. Therefore, this WSA, consistent with the City's HEU conducted an analysis of water demand associated with implementation of the HEU and additional growth anticipated in the Updated 2040 Cumulative Growth (Section 5) and evaluated the current and future water supply and demand scenarios in Section 6.

The MPMW 2020 UWMP incorporated the future population, employment and water demand projections for buildout of the General Plan, including the additional allowable development associated with ConnectMenlo and other major development projects within the MPMW service area. As previously described in this WSA, ConnectMenlo identifies the maximum development potential that could occur within the ConnectMenlo study area, including potential bonus-level increased development, and the associated program-level EIR further defines the maximum development that can occur by specific land uses. MPMW and the City's Planning Division are actively tracking projects within the ConnectMenlo study area on a cumulative basis to ensure that developed projects remain within the maximum development permitted in ConnectMenlo and would be consistent with the program-level EIR. The potential units located within the MPMW service area for the proposed Project, if approved, would be in addition to the remaining unallocated total residential development potential for ConnectMenlo, and are being evaluated within the program-level SEIR being prepared for the HEU. Water demand for the proposed Project is described in Section 5.3 and Table 5-5 of this WSA.

Additional discussion on the Cal Water Bear Gulch District and MPMW's existing and projected water demands is provided in Section 5 of this WSA.

"Is Groundwater a Component of the Supplies for the Project?"

According to the requirements of SB 610, if groundwater is identified as a possible source, Section 10910(f) of the Water Code also applies and a description of the groundwater basin or basins from which the proposed project will be supplied must be included in the WSA. Groundwater is a small component of the SFPUC's Retail supply but is not used to provide water to any of the Suburban wholesale customers including the Cal Water Bear Gulch District and MPMW. As recipients of treated water through the SFPUC Regional Water System (RWS), neither the Cal Water Bear Gulch District nor the MPMW use groundwater to meet customer demand within their respective service areas. However, MPMW may use groundwater for emergency purposes and has undertaken a multi-year Emergency Water Storage/Supply Project to construct groundwater wells and storage. As such, this WSA evaluates groundwater basin conditions pursuant to Section 10910(f).

Groundwater Basin Description

The MPMW service area overlies the southern end of the Santa Clara Valley Groundwater Basin's San Mateo Plain Groundwater Subbasin (DWR basin number 2-9.03; DWR, 2004; or "subbasin"). The subbasin is not adjudicated, nor has it been found by DWR to be in a condition of overdraft. As part of the implementation of the Sustainable Groundwater Management Act (SGMA), the subbasin was ranked as a "very low priority" basin under the California Statewide Groundwater Elevation Monitoring basin prioritization process. As such, the subbasin is not subject to the requirements of SGMA.

Located within the 45-square mile San Francisquito Creek Watershed, the MPMW service area contains both mountainous bedrock terrain and comparatively flat alluvial deposits. Coarse- and fine-grained alluvial deposits from the San Francisquito Creek can be found in the MPMW service area. There is a shallow aquifer and a deep aquifer that has an upper and a lower zone in the MPMW service area. Both aquifers lie beneath a laterally extensive confining layer. The shallow aquifer is unconfined while the deep aquifer is semi-confined. Pump tests and empirical transmissivity data show that it is feasible to develop a municipal supply from the groundwater subbasin. It is estimated that the groundwater subbasin can be as thick as 1,000 feet in some locations.

Groundwater in the Santa Clara Valley Groundwater Basin naturally flows toward the San Francisco Bay from the uplands in the southwest. Reverse groundwater gradients, from the San Francisco Bay toward the uplands, have been seen when pumping has exceeded the rate of recharge. The estimated annual recharge rate of the San Francisquito Creek watershed ranges from 4,000 to 8,000 acre-feet per year, equivalent to 3.6 to 7.2 mgd.

Additional discussion of the groundwater conditions and groundwater management is provided in MPMW's 2020 UWMP.

MPMW Emergency Water Storage/Supply Project

The MPMW Emergency Water Storage/Supply Project intends to provide a backup water supply to MPMW's Lower Zone, which lacks emergency storage, in the event water from the SFPUC RWS is reduced or unavailable. The MPMW Emergency Water Storage/Supply Project goal is to provide a total capacity of up to 3,000 gpm, or approximately 4.32 mgd, between two to three wells at separate locations. MPMW initiated this project in 2010 and completed site screening, site ranking, and detailed engineering and hydrologic evaluation in 2013, including extensive community engagement. The City selected the Corporation Yard at 333 Burgess Drive for the first well, completed the CEQA evaluation in 2016, and drilled the well in 2017. Construction of the well facility (e.g., generator, disinfection equipment, associated piping) was completed in late 2020, and MPMW is working with the SWRCB to permit the well.

The MPMW Emergency Water Storage/Supply Project also consists of constructing an underground reservoir and pump station. The wells, underground reservoir, and pump station are identified in the 2018 Water System Master Plan as priority projects and funding has been included in the current five-year capital improvement program. MPMW is currently in the process of identifying locations for the two other wells, the underground reservoir, and pump station.

In addition, MPMW's 2020 UWMP includes utilizing well water for drought stage 5 (up to 50% reduction) and drought stage 6 (greater than 50% reduction) to augment supplies if necessary as part of its Water Shortage Contingency Plan.

The SWRCB Division of Drinking Water classifies wells as "active" or "standby." Active wells require regular, frequent testing to meet Safe Drinking Water Standards; standby wells are tested less frequently. Additionally, standby wells, must meet all primary standards (but not secondary standards) and have restrictions that the well cannot be used for more than 14 days per year or more than five consecutive days. To provide flexibility, the City plans to permit its emergency wells as "active" wells as long as primary and secondary standards can be met. The City's plan is to use the wells for emergency purposes only, but have the flexibility to provide well water during emergencies that last more than 14 days per year or more than five consecutive days.

"Are There Sufficient Supplies to Serve the Project over the Next 20 Years?"

The final step in the SB 610 process is to illustrate the available water supplies, including the availability of these supplies in all water-year conditions (normal year, single dry year, and multiple dry years) over a 20-year planning horizon, and an assessment of how these supplies relate to project-specific and cumulative demands over 20- and 25-year planning periods as compared to the Cal Water Bear Gulch District and MPMW 2020 UWMPs. In this case, the period is projected to 2045 for Cal Water's Bear Gulch District and to 2040 for MPMW. The water supply and demand comparisons are presented and discussed in Section 6. Section 7 of this WSA provides a conclusion. For convenience, the WSA findings are also presented below.

WSA Findings

Regarding the availability of water supplies to serve the HEU, consistent with the two water districts' 2020 UWMPs, this WSA presents water supply scenarios with and without implementation of the Bay-Delta Plan Amendment (as described in section 4.2.3 SFPUC Regional Water System).

Water supply scenario **without implementation** of the Bay-Delta Plan Amendment:

- In years of normal and above-normal precipitation and including local water supply sources, the Cal Water Bear Gulch District and MPMW have adequate supplies to serve 100 percent of normal demand beginning in 2025 and through each of their respective planning horizons.
- SFPUC would be able to meet 100 percent of its water supply guarantees during all water year types through 2045 except during the fourth and fifth consecutive dry years for base year 2045 when 15 percent shortages are projected within the Regional Water System (RWS). In these years, Cal Water Bear Gulch District and MPMW would not have sufficient supplies to meet demand and would need to activate their water shortage contingency plans to balance demand against reduced supplies.
- As discussed in Section 6.7 and presented in Table 6-7, MPMW through its ISG with SFPUC will meet the projected water demand associated with the Updated 2040 Cumulative Demand. If and when supply shortfalls occur in single dry and multiple dry years as soon as 2025,

MPMW expects to meet these supply shortfalls through water demand reductions through implementation of its Demand Management Measures.

Water supply scenario **with implementation** of the Bay-Delta Plan Amendment:

- SFPUC will be able to meet its contractual obligations to its wholesale customers in normal years but would experience significant supply shortages in all dry years. In these years, Cal Water Bear Gulch District and MPMW along would not have sufficient supplies to meet demand and would need to activate their water shortage contingency plans to balance demand against reduced supplies.
- In single dry years, supply shortages in the SFPUC's Regional Water System would range from 36 to 46 percent. In multiple dry years, supply shortages would range from 36 to 54 percent. Notably, implementation of the Bay-Delta Plan Amendment will reduce SFPUC's primary supply source and require rationing in all single dry and multiple dry years through 2040 and 2045. In these years, Cal Water Bear Gulch District and MPMW would not have sufficient supplies to meet demand and would need to activate their water shortage contingency plans to balance demand against reduced supplies.
- As discussed in sections 6.9 through 6.12, SFPUC, BAWSCA, Cal Water and MPMW are working to develop regional and local projects to shore up local supplies and reduce the projected shortfall. If conditions for substantial drought cutbacks to the RWS persist, Cal Water Bear Gulch District and MPMW will need to implement additional demand management practices and prohibitions on potable water use and accelerate efforts to develop alternative supplies of water.

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SECTION 4
Water Supply Setting

This section presents local climate conditions and reviews water supply sources, entitlements, water rights and contracts.

4.1 Climate

The City has a Mediterranean climate with cool, wet winters and warm, dry summers. Climatic statistics are shown in **Table 4-1**. Rainfall in the area averages 15.28 inches per year and is generally confined to the "wet" season from late October to early May. The average reference evapotranspiration (ETo) for the region is 44 inches per year. The ETo is a standard measurement related to the water demand by plants in a specific region. Because the average annual ETo is approximately 30 inches more than the average annual precipitation, and because 90 percent of the annual precipitation occurs between the months of November and April, growing turf or other plantings in this region requires a significant amount of irrigation during the dry season. This irrigation demand contributes to the overall and observed seasonal variation in water demand throughout Cal Water Bear Gulch District's and MPMW's service areas.

TABLE 4-1
CITY OF MENLO PARK CLIMATE SUMMARY

Month	Maximum Average Temperature (°F)	Minimum Average Temperature (°F)	Standard Average ETo (inches)	Average Monthly Rainfall (inches)
January	57.5	39.0	1.4	3.23
February	61.3	41.3	2	2.88
March	64.1	43.2	3.3	2.22
April	68.4	44.8	4.4	0.99
May	72.8	48.5	5.4	0.37
June	77.4	52.5	6	0.08
July	78.2	54.8	6.2	0.02
August	78.5	55.0	5.4	0.05
September	78.2	52.8	4.4	0.18
October	73.1	48.0	3.1	0.71
November	64.5	42.5	1.7	1.86
December	58.0	38.2	1.2	2.69
Annual Average	**69.3**	**46.7**	**44**	**15.28**

SOURCE: City of Menlo Park, *Urban Water Management Plan* (2020)

a. Temperature and precipitation data are from the Western Regional Climate Center for Station #046646 PALO ALTO from September 1, 1953 to June 4, 2016. https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca6646. Accessed July 2022.
b. Reference evapotranspiration data for Union City station #171 are from the Department of Water Resources, California Irrigation Management Information System.

4.2 Water Supply Entitlements, Water Rights and Contracts

Water Code Section 10910(d)(1) states: "The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the City or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights or water service contracts."

4.2.1 Water Supply Sources

All of MPMW's potable water and the majority of potable water for Cal Water Bear Gulch District is provided through the SFPUC of the City and County of San Francisco. The SFPUC, through its Regional Water System (RWS) currently delivers an annual average of approximately 265 million gallons per day (mgd) to retail and wholesale customers primarily within the San Francisco Bay Area. Approximately 85 percent of that water supply is provided by the Hetch Hetchy system, which diverts water from the Tuolumne River in the Sierra Nevada. The balance (approximately 15 percent) comes from runoff in the Alameda Creek watershed, which is stored in the Calaveras and San Antonio reservoirs, and runoff from the San Francisco Peninsula, which is stored in the Crystal Springs, San Andreas, and Pilarcitos reservoirs (which also provide storage for water delivered from the Hetch Hetchy Project).

Table 4-2 shows the quantities and volumes of supply and the respective percentages. The table also shows the approximate volume of supply when a 20 percent system-wide reduction is imposed by the SFPUC on the retail and wholesale customers within the regional Bay Area conveyance system over multiple dry years.

TABLE 4-2
SUPPLY SOURCES AND SYSTEM-WIDE REDUCTIONS

SFPUC Water Sources	Normal-Year Supply Source		Approximate Multiple-Dry-Year Supply Source (20% System-wide Reduction)		
	Origin/System	mgd	Approximate Percent of Supply	mgd	Approximate % of Supply
Local Source	Alameda System[a]	39.75	15	14.84	7
	Peninsula System[b]				
Imported Source	Hetch Hetchy System[c]	225.25	85	197.16	93
	Total	***265.00***	***100***	***212.00***	***100***

SOURCE: San Francisco Public Utilities Commission. 2020 Urban Water Management Plan.

a. Calaveras Reservoir, San Antonio Reservoir.
b. Crystal Springs Reservoirs, San Andreas Reservoir, Pilarcitos Reservoir.
c. Hetch Hetchy Reservoir, Lake Lloyd, Lake Eleanor, New Don Pedro Reservoir, Tuolumne River System.

4.2.2 Surface Water

Appropriative water rights allow the holder to divert water from a source to a place of use not connected to the water source. These rights are based on seniority and use of water must be reasonable, beneficial, and not wasteful. In 1914, California established a formal water rights permit system, which is administered by the SWRCB. The SWRCB has sole authority to issue new appropriative water rights (i.e., permits and licenses) but cannot alter property rights created under a pre-1914 appropriative water right.

The City and County of San Francisco (San Francisco) hold pre-1914 appropriative water rights to store and deliver water from the Tuolumne River in the Sierra Nevada and locally from the Alameda and Peninsula watersheds. San Francisco also diverts and stores water in the San Antonio Reservoir under an appropriative water right license granted by the SWRCB in 1959. The 1912 Freeman Report identified the ultimate diversion rate from the Tuolumne River to the Bay Area as 400 mgd (448,220 acre-feet per year (AFY)) and San Francisco used this as the basis for designing the export capacity of the Hetch Hetchy project for water supply deliveries to San Francisco. San Francisco has sufficient water rights for current diversions and the ultimate planned diversion rate of the Hetch Hetchy Project.[1]

The federal Raker Act, enacted on December 19, 1913, grants to San Francisco rights-of-way and public land use on federal property in the Sierra Nevada Mountains to construct, operate, and maintain reservoirs, dams, conduits, and other structures necessary or incidental to developing and using water and power. It also imposes restrictions, and specific terms and conditions on use of the Hetch Hetchy Reservoir. In terms of water rights, the requirement that San Francisco recognizes the senior water rights of the Turlock and Modesto Irrigation Districts (TID and MID) to divert water from the Tuolumne River. Specifically, the Raker Act requires San Francisco to bypass certain flows through its Tuolumne River reservoirs to TID and MID for beneficial use. By agreement, San Francisco, TID, and MID have supplemented these Raker Act obligations to increase the TID and MID entitlements to account for other senior Tuolumne River water rights and to allow San Francisco to “pre-pay” TID and MID their entitlement by storing water in the Don Pedro water bank. San Francisco is required to bypass inflow to TID and MID sufficient to allow these districts to divert 2,416 cubic feet per second (cfs) or natural daily flow, whichever is less, at all times (as measured at La Grange), except for April 15 to June 13, when the requirement is 4,066 cfs or natural daily flow as measured at La Grange, whichever is less. Other terms and conditions specific to SFPUC’s Settlement Agreement and Master Water Sales Contract (MSA) with the 26 member agencies of the BAWSCA are described in section 4.2.1.1 of SFPUC’s 2020 UWMP (**Appendix C**).

[1] San Francisco made numerous water-rights filings on the Tuolumne River between 1901 and 1911. The Tuolumne River water-rights filings support a *prima facie* diversion rate well over 400 mgd. The 1912 Freeman Report, which provided the basis for San Francisco’s proposals to Congress to develop the Hetch Hetchy Project, identified 400 mgd as the ultimate diversion from the Tuolumne River. SF Planning Department, pg. 2-39, SFPUC Water System Improvement Program PEIR

4.2.3 SFPUC Regional Water System

In 1934, in order to create the RWS, San Francisco combined its newly operational Hetch Hetchy water conveyance system and the existing Spring Valley system, which it had recently acquired with the purchase of the Spring Valley Water Company. With this acquisition, San Francisco also gained water rights to local diversions off existing streams on the San Francisco Peninsula that were originally held by the Spring Valley Water Company.

The RWS currently delivers water to 2.5 million users in Tuolumne, Alameda, Santa Clara, San Mateo, and San Francisco counties. As introduced above, the RWS delivers an annual average of approximately 265 mgd—of this, 81 mgd serves the retail customers within the City and County boundaries of San Francisco, and the other 184 mgd is delivered to the Wholesale customers based primarily on the San Francisco Bay Peninsula, and then the Wholesale customers sell water to its consumers within the individual service areas.

The RWS is a complex system, shown in **Figure E**, and supplies water from two primary sources:

- Tuolumne River through the Hetch Hetchy Reservoir, and
- Local runoff into reservoirs in Bay Area reservoirs in the Alameda and Peninsula watersheds.

Figure E
Regional Water Supply System

Water from Hetch Hetchy Reservoir, through the Hetch Hetchy facilities, represents the majority of the water supply available to the SFPUC. During drought periods of low precipitation in the San Francisco Bay Area, water from the Hetch Hetchy system can amount to over 93 percent of the total water delivered through the RWS.

Bay Area reservoirs provide on average approximately 15 percent of the water delivered by the SFPUC RWS. The local watershed facilities are operated to conserve local runoff for delivery. On the San Francisco Peninsula, the SFPUC utilizes Crystal Springs Reservoir, San Andreas

Reservoir, and Pilarcitos Reservoir to capture local watershed runoff. In the Alameda Creek watershed, the SFPUC constructed the Calaveras Reservoir and San Antonio Reservoir. In addition to capturing runoff, San Antonio, Crystal Springs, and San Andreas reservoirs also provide storage for Hetch Hetchy diversions. The local watershed facilities also serve as an emergency water supply in the event of an interruption to Hetch Hetchy diversions.

Bay-Delta Plan Amendment and Uncertainty in Tuolumne River Water Supply

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 to maintain the health of the Bay-Delta ecosystem. 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 salmon populations in three San Joaquin River tributaries (the Stanislaus, Merced, and Tuolumne Rivers) and the Bay-Delta. The Bay-Delta Plan Amendment requires the release of 30-50 percent of the "unimpaired flow"[2] on the three tributaries from February through June in every water year type including below normal, dry and critical dry years. In SFPUC modeling of the new flow standard, it is assumed that the required release is 40 percent of unimpaired flow.

The SWRCB has stated that it intends to implement the Bay-Delta Plan Amendment on the Tuolumne River by the year 2022, assuming all required approvals are obtained by that time. However, implementation of the Bay-Delta Plan Amendment is uncertain for multiple reasons.

First, since adoption of the Bay-Delta Plan Amendment, 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 in the early stages and there have been no dispositive court rulings as of this date.

Second, the Bay-Delta Plan Amendment is not self-implementing and does not automatically allocate responsibility for meeting its new flow requirements to the SFPUC or any other water rights holders. Rather, the Bay-Delta Plan Amendment merely provides a regulatory framework for flow allocation, which must be accomplished by other regulatory and/or adjudicatory proceedings, such as a comprehensive water rights adjudication or, in the case of the Tuolumne River, may be implemented 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 the other regulatory and/or adjudicatory proceedings would likely 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 SFPUC).

[2] "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.)

Third, in recognition of the obstacles to implementation of the Bay-Delta Plan Amendment, the SWRCB 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" by March 1, 2019, 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." In accordance with the SWRCB's instruction, on March 1, 2019, SFPUC, in partnership with other key stakeholders, submitted a proposed project description for the Tuolumne River that could be the basis for a voluntary substitute agreement with the SWRCB ("March 1st Proposed Voluntary Agreement"). On March 26, 2019, the Commission adopted Resolution No. 19-0057 to support the SFPUC's participation in the Voluntary Agreement negotiation process. To date, those negotiations are ongoing under the California Natural Resources Agency and the leadership of the Newsom administration.[3]

4.2.4 Water Supply Sources for Cal Water Bear Gulch District and Menlo Park Municipal Water

The potable water furnished to customers within the City is a combination of purchased water and treated surface water.

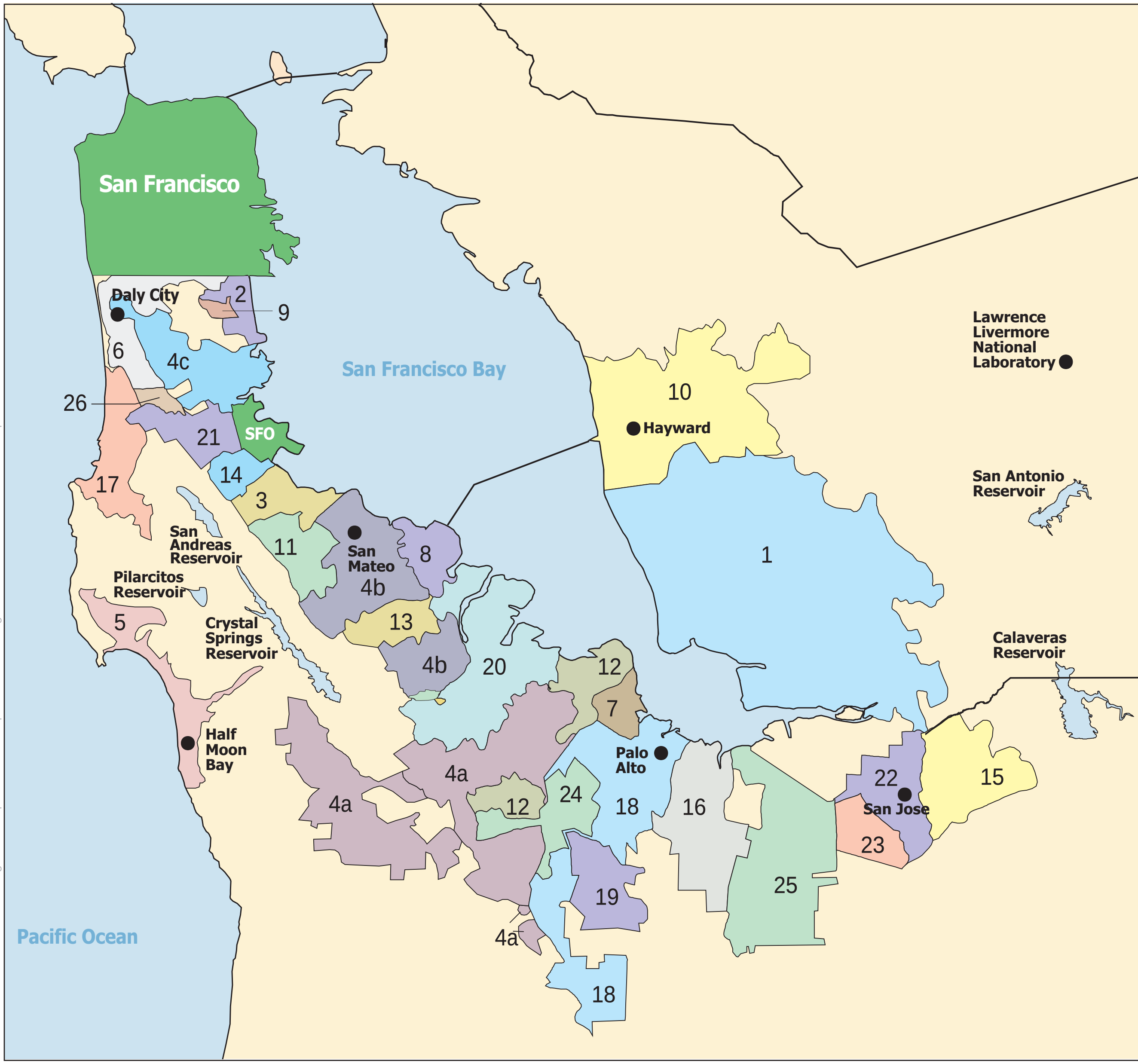
4.2.5 Imported Purchased Water from SFPUC

MPMW and Cal Water's Peninsula's districts including Bear Gulch District, Mid-Peninsula and South San Francisco all receive purchased treated water from SFPUC's RWS. SFPUC utilizes storage and conveyance systems within the RWS to serve all its retail and wholesale water demands with an integrated operation of imported water from Hetch Hetchy and/or locally produced Bay Area water collected and stored in several reservoirs some of which reside on the Peninsula. Notably, the federal Raker Act, as described above, imposes restrictions and specific terms and conditions on use of the Hetch Hetchy Reservoir, preventing privately-owned utilities, like Cal Water, from receiving water from the Hetch Hetchy system, but allows purchases of treated water from local supply sources and storage reservoirs such as Crystal Springs Reservoir, San Andreas Reservoir, and Pilarcitos Reservoir.

4.3 Water Contracts and Agreements

In 1984, the SFPUC executed the Settlement Agreement and Master Water Sales Contract (MSA) with the 26 member agencies of Bay Area Water Supply and Conservation Agency (BAWSA). The BAWSCA members purchase approximately two-thirds of the water delivered by the SFPUC system and the balance is delivered to the City and County of San Francisco and its retail customers. **Figure F** represents the BAWSCA member agencies and their locations and respective service areas. The MSA primarily addressed the rate-making methodology used by SFPUC in setting wholesale water rates for its wholesale customers, in addition to addressing water supply and water shortages within the regional water system. The MSA provides 184 mgd as an annual average of "Supply Assurance" to all BAWSCA wholesale customers, but is subject

3 California Natural Resources Agency, "Voluntary Agreements to Improve Habitat and Flow in the Delta and its Watersheds," available at https://files.resources.ca.gov/voluntary-agreements/.



BAWSCA MEMBERS

Agency Name	Agency Number
Alameda County Water District	1
City of Brisbane	2
City of Burlingame	3
Cal Water Service Co. - Bear Gulch	4a
Cal Water Service Co. - Mid-Peninsula	4b
Cal Water Service Co. - SSF	4c
Coastside County Water District	5
City of Daly City	6
East Palo Alto	7
Estero Municipal Improvement District	8
Guadalupe Valley Municipal Improvement District	9
City of Hayward	10
Town of Hillsborough	11
City of Menlo Park	12
Mid-Peninsula Water District	13
City of Millbrae	14
City of Milpitas	15
City of Mountain View	16
North Coast County Water District	17
City of Palo Alto	18
Purissima Hills Water District	19
City of Redwood City	20
City of San Bruno	21
City of San Jose	22
City of Santa Clara	23
Stanford University	24
City of Sunnyvale	25
Westborough Water District	26

Menlo Park Housing Element Update EIR

Figure F
BAWSCA Member Agencies

ESA

to reductions in the event of droughts, water shortages, earthquakes, other acts of God or system maintenance and rehabilitation. Almost all members hold an individual water supply contract and the MSA governs the contract. The original 25-year contract ended on June 30, 2009.

The SFPUC approved the new 25-year contract, now known as the Water Supply Agreement (Agreement), in June 2009 and the BAWSCA agencies completed their approval of the Agreement in October 2009. This Agreement was amended in 2018 (known as the 2018 Amended and Restated WSA) and expires on June 30, 2034. Section 7.01 of the 1984 MSA states “Supply Assurance continues in effect indefinitely, even after expiration of the MSA in 2009” and this is still the case in the new Agreement. The condition is a reflection of case law, which holds that a municipal utility acts in a trust capacity with respect to water supplied to outside communities (Durant v. City of Beverly Hills, 39 Cal. App. 2d 133, 102 P.2d 759 (1940); and Hansen v. City of San Buenaventura, 42 Cal. 3d 1172 (1986)). In other words, entire communities have developed in reliance on these water supplies. Consequently, the Supply Assurance of up to 184 mgd will survive the termination of the Agreement and the Individual Contracts.

4.4 Individual Supply Guarantees

SFPUC has a perpetual commitment (Supply Assurance) to deliver 184 mgd to the 24 permanent BAWSCA Wholesale Customers collectively. San Jose and Santa Clara are not included in the Supply Assurance commitment and each has temporary and interruptible water supply contracts with San Francisco. The Supply Assurance is allocated among the 24 permanent Wholesale Customers through Individual Supply Guarantees (ISG), which represent each Wholesale Customer’s allocation of the 184 mgd Supply Assurance.

Cal Water’s ISG is 35.68 mgd, or 39,993 acre-feet per year (AFY), which is shared among its Bear Gulch, Mid-Peninsula, and South San Francisco Districts (also referred to herein as the “Peninsula Districts”).

MPMW’s ISG is 4.456 mgd, or 5,002 AFY, which is the equivalent of roughly 1,630 million gallons per year (mgy). Between 2016 and 2020, MPMW purchased between 52 percent and 66 percent of its ISG. MPMW’s 2020 UWMP presented its purchased supplies and demand in millions of gallons. For purposes of consistency between Cal Water Bear Gulch District and MPMW in describing water supply, water use, and HEU water demand, and for comparison purposes, in Section 6, this WSA converted million gallons to acre-feet (AF) or million gallons per year to AFY.

Additional agreements and plans have been developed over the last 25 years. In the early 1990s, for planning and reliability purposes, BAWSCA negotiated, and then formally adopted in 1993, the Supply Assurance Allocation (SAA), which is now referred to as the ISG under the current Agreement. The ISG, like the SAA, quantifies SFPUC’s contract obligation to supply water to each of the BAWSCA members. The Agreement does not guarantee that SFPUC will meet peak or hourly demands if the individual wholesaler’s annual usage exceeds the Supply Assurance Allocation. The ISG helps the wholesaler plan for future demands and growth within their service area; for that reason, the ISG transcends the Agreement expiration and continues indefinitely. The

ISG for Cal Water's Peninsula districts secures 35.68 mgd for normal year deliveries; MPMW's ISG secures 4.456 mgd for normal year deliveries. However, some Wholesale agencies (Hayward, the cities of Santa Clara and San Jose) have been guaranteed the ability to increase water demands at the potential expense of other communities. Hayward and San Francisco executed a contract in 1962. This contract does not place a limit on Hayward's original ISG and SFPUC is contractually bound to meet these increasing demands. The contract stipulates that if Hayward purchases 22.1 mgd for three consecutive years, then SFPUC will recalculate the supply deliveries to the other BAWSCA agencies with an appropriate reduction. This has the potential in the future to affect the ISG for other communities and their water suppliers, including Cal Water's Peninsula Districts and MPMW.

In addition, the cities of San Jose and Santa Clara are also included in the Suburban Wholesalers and receive portions of the 184.0 mgd from SFPUC allocated to wholesale customers. These cities have both been granted 4.5 mgd for a total of 9.0 mgd of the 184.0 mgd. This routinely creates issues with regard to allocating supply shortages and could potentially affect the supply deliveries to Cal Water's Peninsula Districts and MPMW and the other Wholesalers in times of RWS reductions.

In terms of water supply reliability, the SFPUC's UWMP assumes "firm" delivery as "the amount the system can be expected to deliver during historically experienced drought periods." The 1987 to 1992 drought is the basis for this plan, plus an additional period of limited water availability. The SFPUC plans its water deliveries assuming that the worst drought experience is likely to reoccur and then adds an additional period of limited water availability. An 8.5-year drought scenario is referred to as the "design drought" and is ultimately the basis for SFPUC water resource planning and modeling. The "design drought" is based on the 1986-1992 drought plus 2.5 years of "prospective drought", which includes a 6-month recovery period.

Water Shortage Allocation Plan

The SFPUC and the wholesale members developed a long-term strategy to accommodate or rectify the potential of future water shortages throughout its wholesale and retail operations. The methodology for determining water supply reliability during drought years is the Water Shortage Allocation Plan (WSAP). The SFPUC and BAWSCA members agreed upon and adopted the WSAP. Under this plan, the SFPUC will determine the available water supply in drought years for shortages up to 20 percent on an average, system-wide basis.

The WSAP has two components. The Tier One component of the WSAP allocates water between San Francisco and the wholesale customer agencies collectively. In a 20 percent reduction implemented by the SFPUC, the City and County of San Francisco will only face an 18 percent reduction. The Tier Two component of the WSAP allocates the collective wholesale customer share among each of the 26 wholesale customers. This allocation is based on a formula that considers three factors, the first two of which are fixed: (1) each agency's Supply Assurance from SFPUC, with certain exceptions, and (2) each agency's purchases from SFPUC during the three years preceding adoption of the Plan. The third factor is the agency's rolling average of purchases of water from SFPUC during the three years immediately preceding the onset of shortage. The WSAP, also known as the Tier One Plan, was amended in the 2018 Amended and Restated WSA.

The SFPUC 2004 Wholesale Customer Water Demand Projections study (Demand Study) analyzed water demands associated with each customer sector and then forecasted demands over a 25-year planning horizon. The Tier One (SFPUC to BAWSCA) and Tier Two (BAWSCA to wholesale customers) allocation plans were used to determine supply reductions in single and multiple dry year scenarios.

As amended in 2018, the Tier One Plan requires Retail Customers to conserve a minimum of 5 percent during droughts. If Retail Customer demands are lower than the Retail Customer allocation (resulting in a “positive allocation” to Retail) then the excess percentage would be re-allocated to the Wholesale Customers’ share. The additional water conserved by Retail Customers up to the minimum 5 percent level is deemed to remain in storage for allocation in future successive dry years.

The Tier One Plan will expire at the end of the term of the WSA in 2034, unless mutually extended by San Francisco and the Wholesale Customers.

The Tier One Plan applies only when the SFPUC determines that a system-wide water shortage exists and issues a declaration of a water shortage emergency under California Water Code Section 350. Separate from a declaration of a water shortage emergency, the SFPUC may opt to request voluntary cutbacks from its Retail and Wholesale Customers to achieve necessary water use reductions during drought periods.

The Tier Two Plan, the second component of the WSAP, allocates the collective wholesale customer share among each of the 26 wholesale customers. It was last adopted in 2011 by the governing bodies of each wholesale customer and originally expired in 2018. However, use of the Tier Two Plan has been extended by the BAWSCA Board on an annual basis, most recently in November 2021 (which extended use of the Tier Two Plan through December 31, 2022). The BAWSCA wholesale customers are currently in discussions about jointly developing an alternative allocation method that would consider additional equity factors if SFPUC is unable to deliver its contractual supply volume and cutbacks to the RWS supply exceed 20 percent.

Because water use efficiency and conservation efforts are needed to accommodate new growth throughout the Bay Area and it is unknown how or if new supplies would be available in the RWS, the SFPUC assumes that the wholesale customers will purchase 184 mgd from the RWS through 2045. Therefore, this WSA assumes wholesale supplies remain at 184.0 mgd and each of the ISGs are subject to their existing agreements with SFPUC, with no increases: Cal Water’s ISG is 35.68 mgd (39,993 AFY) for all its Peninsula districts and MPMW’s ISG is 4.456 mgd (5,002 AFY).

4.5 Cal Water Bear Gulch District’s Surface Water Supply (Local Watershed)

The Cal Water Bear Gulch District obtains a small fraction of its supplies (approximately 9 percent of annual deliveries during the 1980-2020 time period) from surface water diverted from Bear Gulch Creek, a perennial stream that flows from a watershed in the Coast Range Mountains northeast to its confluence with San Francisquito Creek and eventually into San Francisco Bay.

Cal Water Bear Gulch District diverts water from two points of diversion (PODs) along the creek – the Upper POD (with an upstream watershed area of 2.5 square miles) and the Lower POD (with an upstream watershed area of 9.4 square miles).

Diversions from the Upper and Lower PODs are each governed by separate SWRCB-administered water rights (i.e., pre-1914 claimed water rights and post-1914 SWRCB-issued diversion permits/licenses) that specify the volumes, rates, and timing of allowed diversions at each POD. In addition to these SWRCB-administered water rights, diversions are further constrained by certain diversion limitations and minimum instream flow requirements imposed by the California Department of Fish and Wildlife (CDFW) at the Upper POD and by the National Oceanic and Atmospheric Administration (NOAA) at the Lower POD. There also exists a 1936 agreement with Stanford University that prohibits Cal Water Bear Gulch District from diverting more than 50 percent of the flows that pass by (i.e., are not diverted at) the Upper POD.

Water diverted from the Upper POD flows through a gravity conveyance pipeline to a junction point where it is joined by water diverted from the Lower POD, at which point the water is pumped into the Cal Water Bear Gulch District-owned Bear Gulch Reservoir, a man-made storage facility impounded by an earthen dam. The Bear Gulch Reservoir is operated to have a minimum "dead pool" storage of 50 million gallons (MG), or approximately 153 acre-feet (AF). The maximum storage estimate of the reservoir has been reduced from 149 MG (547 AF) to 142.7 MG (438 AF), a limit imposed by the California Division of Safety of Dams (DSOD), based on a maximum storage elevation of 230 feet above mean sea level. Cal Water Bear Gulch District is undertaking capital improvements to Bear Gulch Reservoir to address DSOD's seismic safety concerns, and may also consider increasing the maximum storage capacity. Outflows from Bear Gulch Reservoir are currently limited by the DSOD to the rate that causes a water surface elevation decline of 0.3 feet per day.

Water stored in Bear Gulch Reservoir is released and sent through the Cal Water Bear Gulch District-owned Bear Gulch Water Treatment Plant (BGWTP) prior to addition to the distribution system. The Bear Gulch Water Treatment Plant, which was placed into operation in 1977, has a rated capacity of 6.0 MGD. There the water is clarified, filtered, and chloraminated[4] in compliance with the Surface Water Treatment Rule and the Safe Drinking Water Act.

4.6 Total Water Supplies

4.6.1 Normal-Year Supplies for Bear Gulch District and MPMW

Purchased supplies from the SFPUC RWS are delivered in millions of gallons per day. Cal Water's ISG of 35.68 mgd or 39,993 AFY is shared among all three of its Peninsula districts, which provides operational flexibility to distribute the supply as needed in each system depending on the availability of local supplies and conditions within each service area. Cal Water's

[4] Chloramination is the treatment of drinking water with a chloramine disinfectant. Both chlorine and small amounts of ammonia are added to the water one at a time which react together to form chloramine (also called combined chlorine), a long lasting disinfectant. Chloramine disinfection is used in both small and large water treatment plants.

collective total from the RWS for the three Peninsula districts is equal to its ISG. However, the “Reasonably Available Volume” shown in the Cal Water Bear Gulch District 2020 UWMP is only a portion of Cal Water’s ISG to meet demand within its service area through 2045.

An estimate of projected SFPUC supply available to the Cal Water Bear Gulch District (i.e., the “Reasonably Available Volume”) was calculated by subtracting the Cal Water Bear Gulch District’s local surface water supply from the Cal Water Bear Gulch District’s total demand over the planning horizon. The reasonably available volume of local surface water (840 AFY) is the projected long-term average diversion amount based on analysis conducted by Cal Water Bear Gulch District considering hydrology and all applicable constraints. The “Total Right or Safe Yield” (1,520 AFY) is based on the upper limit volume of diversion to storage under the Cal Water Bear Gulch District’s SWRCB-administered surface water rights. The local surface water supply amounts in Cal Water Bear Gulch District’s 2020 UWMP are presented in **Table 4-3**. Purchased supplies from the SFPUC RWS, along with local surface water supply to the Cal Water Bear Gulch District, will be sufficient to serve normal year demands through 2045. The availability and reliability of Cal Water Bear Gulch District’s water supplies in dry years is discussed in Section 6 of this WSA.

TABLE 4-3
CAL WATER BEAR GULCH DISTRICT PROJECTED FUTURE WATER SUPPLIES – NORMAL YEARS

	2025	2030	2035	2040	2045
Potable Water – Purchased from SFPUC RWS	11,956	11,859	11,890	11,835	11,854
Bear Gulch Reservoir	840	840	840	840	840
Total	**12,796**	**12,699**	**12,730**	**12,675**	**12,694**

SOURCE: 2020 Cal Water Bear Gulch District 2020 UWMP. Table 6-9A. Water Supplies (Combined Peninsula Districts) – Projected

Table 4-4 provides a summary of MPMW’s current and projected future normal year supplies as presented in MPMW’s 2020 UWMP. Recycled water is estimated to be available at all times and in all water year types. MPMW expects to receive 120 MG (368 AF) of recycled water from the Sharon Heights and Bayfront recycled water facilities. As previously mentioned, MPMW’s 2020 UWMP presented purchased supplies and demand in million gallons; for consistency between Cal Water Bear Gulch District and MPMW and for comparison purposes, this WSA converted million gallons to acre-feet or acre-feet per year. The availability and reliability of MPMW’s water supplies in dry years is discussed in Section 6 of this WSA.

TABLE 4-4
MPMW CURRENT AND PROJECTED FUTURE WATER SUPPLIES – NORMAL YEARS (MG)

	2020	2025	2030	2035	2040
Potable Water - Purchased from SFPUC RWS	1,069	1,630	1,630	1,630	1,630
Recycled Water – Sharon Heights Recycled Water Facility[a]	20	48	48	48	48
Recycled Water – Bayfront Recycled Water Facility[a]	—	0	72	72	72
Total Recycled Water			**120**	**120**	**120**
Total	**1,089**	**1,678**	**1,750**	**1,750**	**1,750**
Total (AFY)	**3,342**	**5,150**	**5,371**	**5,371**	**5,371**

SOURCE: 2020 MPMW 2020 UWMP. Table 6-9 Water Supplies – Projected

NOTE:

a. MPMW expects to receive 120 MG (368 AF) of recycled water from the Sharon Heights and Bayfront recycled water facilities.

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SECTION 5
Water Demand Analysis

This section shows the calculated water demand for the proposed project as well as projected demand for Cal Water's Bear Gulch District and MPMW systems and then compares the demand to the supply.

5.1 Proposed Project Water Demand

The expected water use of the HEU was determined by analyzing similar land uses and assigning a demand factor for residential water use. For consistency with the ConnectMenlo Water Supply Evaluation (WSE), this WSA used the identical residential demand factor to evaluate the net demand at the project level within the HEU Plan area. For conservative water supply planning purposes, water demand associated with the HEU area is assumed to occur immediately and is added to existing demand to present the quantitative data needed to analyze current and future demand within Cal Water Bear Gulch District's and MPMW's service areas. It should be noted and recognized that actual build-out of the HEU is expected to occur incrementally or in phases over the next 25 years as changes in the development market create opportunities for redevelopment. This also aligns more closely with the State's goal for the City to achieve development of its RHNA housing allocation by 2031. As discussed in Section 5.3, projected demand from the HEU, existing demand, and planned future water demands are extended over a 25-year planning horizon for consistency with growth projections in population, household and jobs growth throughout the regional Bay Area.

As stated above, for consistency with the ConnectMenlo WSE, this WSA used identical residential demand factors of 127 gallons per day per residential dwelling unit, which is based on occupancy of 2.57 persons per household multiplied by 49.4 gallons per capita per day (gpcd).[5] Additional outdoor water demand is calculated to be 5.9 gallons per day per residential dwelling unit (2.57 persons per household multiplied by 2.3 gpcd[6]) and is consistent with the outdoor water demand calculated in the ConnectMenlo WSE. In addition to estimating demand associated with implementation of the HEU, the City anticipates population increases through 2040. For water supply planning purposes, HEU water demand per residential unit is calculated to be approximately 133 gallons per day (127 gallons indoor and 5.9 gallons outdoor).[7]

[5] Calculated indoor water demand, 2016 ConnectMenlo WSE, page 10.
[6] Calculated outdoor water use, 2016 ConnectMenlo WSE, page 11.
[7] Calculated indoor and outdoor per residential unit, 2016 ConnectMenlo WSE, page 11.

At the time the ConnectMenlo WSE was prepared, based on the then-current land use assumptions, the per capita residential water use at Project buildout was estimated to be 52 gpcd.[8] As shown in **Table 5-1**, this WSA estimates water use per residential unit, which closely aligns with Executive Order B-37-16, Making Water Conservation a Way of Life of 50 gpcd. Notably, with installation of high-efficiency, low-water use fixtures throughout the new facilities, along with plumbing code changes and little to no outdoor water use or installation of drought-tolerant landscaping materials, water demands from the proposed development components of the HEU could be further reduced.

Table 5-1 shows the land uses, residential units, and population growth that could occur as a result of implementation of the HEU, which is also the City's anticipated buildout scenario. Table 5-1 was derived from Table 2-1 and shows the total residential units that could occur as a result of implementation of the HEU (4,000 dwelling units and 85 ADUs) plus 414 new residential dwelling units outside of the Bayfront that are already on file and pending review by the City. As shown in Table 5-1, an additional 299 residential dwelling units are also anticipated to be implemented under the City's 2040 buildout scenario. Table 5-1 demonstrates the new water demand that is anticipated to occur under the proposed HEU associated zoning and Specific Plan changes.

TABLE 5-1
WATER DEMAND - HOUSING ELEMENT UPDATE AND ADDITIONAL 2040 GROWTH PROJECTIONS

	New Residential Units			Demand Factor (GPD/DU)[d]	GPD[e]	AFY[e]
	Pending Projects[a]	ADUs[b]	Residential Units			
Housing Element Update (HEU) Demand	414	85	4,000	133	598,367	670
Additional 2040 Cumulative Demand	0	0	299[c]		39,767	45
New Residential Units			4,299			
Totals	**414**	**85**	**4,798**		**638,134**	**715**

SOURCE: Menlo Park Housing Element Update, Table 2-2

NOTES: ADU = accessory dwelling unit; GPD = gallons per day; AFY = acre-feet per year;

a. Pending projects (414) reflect applications that are currently on file for residential development. Water demand generated by these Pending Projects was not accounted for in the adopted 2020 UWMPs and would contribute to new water demand associated with implementation of the HEU.
b. Future locations of ADUs are currently unknown and contribute to the Citywide Totals. For water supply planning purposes, these ADUs would be assumed to be developed throughout MPMW's service area.
c. 299 units that may result from development on small sites between 2031 and 2040 affected by zoning and Specific Plan changes as part of the HEU.
d. The estimated annual indoor and outdoor water demand at buildout is based on and consistent with the Water Supply Evaluation Study, ConnectMenlo – General Plan and M-2 Area Zoning Update, pages 9-10.
e. The estimated total annual water demand for residential units is calculated in gallons per day and acre-feet per year and is the sum of indoor and outdoor water demands. Totals may not sum exactly due to rounding.

The land use changes proposed in the HEU would potentially create a net increase in water demand of 670 AFY or an average demand of 598,367 gallons per day (gpd) (0.598 MGD). The

8 Calculated indoor and outdoor per residential unit, 2016 ConnectMenlo WSE, page 11.

zoning and Specific Plan changes proposed to occur by 2040 under the Cumulative (Maximum Buildout) scenario would potentially create an additional net increase in water demand of 45 AFY or an average demand of 39,767gpd (0.040 MGD). The calculated demand associated with implementation of the HEU is assumed to be new demand that would be served by either Cal Water Bear Gulch District or MPMW. However, the actual net change in water demand would be lower as some existing uses on the housing opportunity sites would be removed to accommodate new residential units. It is anticipated that actual demand increases at housing opportunity sites may be lower than calculated demand because of the net change from existing uses to new residential uses. This WSA is a program-level analysis of water supply and demand; therefore, at this time it is not feasible to accurately calculate the net change in demand from replacing existing uses with new residential uses. In addition, as previously mentioned, the HEU would be implemented over a 25-year planning horizon and the net change in demand would likely occur over time commensurate with new development proposals. Considering the net increase of 670 AFY generated from the HEU and 45 AFY from additional cumulative growth, the Updated 2040 Cumulative Growth Build Out scenario is calculated to be 715 AFY or 0.638 MGD.

As previously discussed in Section 2, Cal Water Bear Gulch District and MPMW would provide water service to the new developments proposed in the HEU and also to the additional 299 residential units of cumulative growth expected to be developed by 2040. As shown in Table 5-1, up to approximately 4,085 new units (4,000 residential units plus 85 ADUs) are proposed under the HEU, in addition to 414 pending projects already under review (the proposed distribution of new residential units is shown in Figure A). As shown in Table 5-1, a total of 4,798 new residential units are proposed (including the 299 units from additional cumulative growth) and could be constructed between 2024 and 2040 when the City reaches its proposed cumulative build out scenario.

As shown in **Table 5-2**, based on the proposed distribution of new residential dwelling units (see Figure A) Cal Water Bear Gulch District would serve approximately 63 percent or 3,008 new residential units and MPMW would serve approximately 37 percent or 1,790 new residential units.

TABLE 5-2
HEU RESIDENTIAL UNITS, DISTRIBUTION IN WATER SERVICE AREAS AND DEMAND

	New Residential Units	Percent of new Residential Units	GPD	MGD	AFY
Cal Water Bear Gulch District	3,008	63%	400,064	0.400	448
MPMW	1,790	37%	238,070	0.238	267
Totals	**4,798**	**100%**	**638,134**	**0.638**	**715**

SOURCE: Menlo Park Housing Element Update, Table 2-2; Menlo Park Water Supply Assessment Housing Element Update, ESA 2022

NOTES: ADU = accessory dwelling unit; GPD = gallons per day; AFY = acre-feet per year

Cal Water Bear Gulch District would provide water service to 3,008 new residential units (2,793 + 201 +14 = 3,008) and the MPMW would provide water service to 1,790 new residential units (1,207 + 85 + 98 + 400 = 1,790).

For water supply planning purposes, as shown in Table 5-2, this distribution of water service equates to 400,064 gallons per day (0.400 MGD) or 448 AFY within the Cal Water Bear Gulch District's service area and 238,070 gallons per day (0.238 MGD) or 267 AFY within MPMW's service area.

5.2 Historical and Existing Demand

5.2.1 Bear Gulch District

Table 5-3 presents water uses in the Cal Water Bear Gulch District's service area from 2016 to 2020 and shows the actual demand in each water use category over this same year period. The table shows growth in demand over the last five years with an average of approximately 11,600 AFY.

TABLE 5-3
BEAR GULCH DISTRICT HISTORICAL AND CURRENT WATER USE (AFY)

	2016	2017	2018	2019	2020
Single Family	8,001	9,000	9,742	9,361	10,598
Multi-Family	235	264	285	242	279
Commercial	980	1,048	1,111	1,152	1,038
Institutional/Government	218	292	323	299	303
Industrial	2	2	2	2	3
Other Potable	54	59	28	35	20
Landscape	24	26	29	27	21
Losses[a]	591	705	416	752	711
Total	**10,105**	**11,395**	**11,936**	**11,869**	**12,972**

SOURCE: 2020 Cal Water Bear Gulch District 2020 UWMP. Table 4-1. Demands for Potable and Non-Potable Water – Actual

NOTE:
a. Real and apparent losses

5.2.2 Menlo Park Municipal Water

Prior to 2020, all potable water demands within the MPMW service area were met with water purchased from the SFPUC RWS (**Table 5-4**). Starting in July 2020, recycled water became available and was used to meet a portion of the irrigation demand. The historical and current total water demands within the MPMW service area include the water consumed by metered accounts in the service area ("metered water consumption"), unmetered water used for fire services and flushing ("unmetered water consumption"), and the water that is lost within the distribution system ("losses"). The table shows growth in demand over the last five years with an average of approximately 3,134 AFY.

TABLE 5-4
MPMW HISTORICAL AND CURRENT WATER USE

	2016	2017	2018	2019	2020
Single Family	277	306	315	309	361
Multi-Family	95	106	101	97	113
Commercial	157	179	245	244	203
Industrial	222	240	140	143	140
Institutional/Governmental	42	58	58	67	98
Landscape[a]	97	116	125	122	139
Losses[b]	4	-4[c]	120	42	12
Other[d]	5	2	4	2	3
Total (MG)	**898**	**1,003**	**1,108**	**1,028**	**1,069**
Total (AFY)	**2,756**	**3,078**	**3,400**	**3,155**	**3,281**

SOURCE: 2020 MPMW 2020 UWMP. Table 4-1. Demands for Potable and Non-Potable Water - Actual

NOTES:

Demand data provided by MPMW. Demands did not include accounts that received water from East Palo Alto but were billed by MPMW.

a. Irrigation water use includes water use recorded at dedicated irrigation meters and does not represent all of the outdoor irrigation water use within MPMW.
b. Losses were obtained from the AWWA Water Audit Reports. 2020 water loss was estimated as the difference between production and consumption.
c. The high variability of water losses during this period and the negative value of water losses in 2017 were likely due to the quality of the billing data and differences in meter reading cycles between the SFPUC supply meters and MPMW's meters.
d. Other water uses include other billed metered consumption (e.g., temporary meters and hydrant), billed unmetered consumption and unbilled consumption which are obtained from the AWWA Water Audit Reports.

5.3 Projected System Demand Forecasts

5.3.1 Bear Gulch District Projected Demand

As shown in **Table 5-5**, the projected water demands to year 2030 are based on projected purchases from SFPUC as shown in the Cal Water Bear Gulch District's 2020 UWMP. Although the Cal Water Bear Gulch District's projected water demands delivered from SFPUC include growth beyond current demand, the projections did not include the water demands from specific projects but do include growth in demand from new employment centers, residential housing units and other projects. Notably, according to Cal Water Bear Gulch District's 2020 UWMP, average water use per service is adjusted over the forecast period to account for anticipated reductions in water use from the ongoing effects of domestic appliance standards and plumbing codes, conservation and customer assistance programs, and growth in the inflation-adjusted cost of water service and household income. These factors, in combination, are anticipated to attenuate the projected increase in water use associated with projected growth in Cal Water Bear Gulch District's service area.

Because the demand associated with implementation of the HEU was not included in Cal Water Bear Gulch District's 2020 UWMP, an additional 448 AFY of water demand (as calculated in Section 5.1 of this WSA) must be added to account for the proposed HEU units and additional cumulative residential growth in the Cal Water Bear Gulch District service area. The updated growth in water demand through 2040 is provided in Table 5-5 below. As discussed in

TABLE 5-5
BEAR GULCH DISTRICT SERVICE AREA PROJECTED GROWTH IN WATER DEMAND (AFY)

	2025	2030	2035	2040	2045
Single Family	10,591	10,595	10,629	10,605	10,647
Multi-Family	264	267	277	281	286
Commercial	957	913	897	864	836
Institutional/Government	286	278	279	274	270
Industrial	3	3	3	3	3
Other Potable	18	18	18	18	18
Landscape	21	21	21	21	21
Losses[a]	657	604	607	610	614
2020 UWMP Demand Total (AFY)	**12,796**	**12,699**	**12,730**	**12,675**	**12,694**
HEU Demand plus Cumulative 2040 Demand[b]	448	448	448	448	448
Updated 2040 Cumulative Demand	**13,244**	**13,147**	**13,178**	**13,123**	**13,142**

SOURCE: 2020 Cal Water Bear Gulch District 2020 UWMP. Table 4-2. Use for Potable and Non-Potable Water – Projected

NOTES:

a. Real and apparent losses
b. City of Menlo Park, Housing Element Update, Water Supply Assessment, Table 5-1 – Cal Water Bear Gulch District portion of 715 AFY of new demand generated by implementation of the HEU and Additional 2040 Growth. New water demand of 448 AFY associated with the HEU area is assumed to occur instantaneously. Actual build-out of the HEU is expected to occur incrementally or in phases over the next 25 years as changes in the development market create opportunities for redevelopment.

Section 5.1, for conservative water resources planning purposes, water demand associated with the HEU (448 AFY) is assumed to occur instantaneously as shown in Tables 5-5, 6-1, 6-2 and 6-3. The additional 448 AFY is added to projected demand in five-year increments to present the quantitative data needed to analyze current and future demand within Cal Water Bear Gulch District's service area. It should be recognized that actual build-out of the HEU is expected to occur incrementally or in phases over the next 25 years as changes in the development market create opportunities for redevelopment.

5.3.2 Menlo Park Municipal Water Projected Demand

In 2020, future water demands for MPMW's service area were projected by BAWSCA on behalf of MPMW. Future water demands were projected using the Demand Management Decision Support System Model (DSS Model) and were based on population and employment projections within MPMW's service area. The DSS Model and the associated water demand and conservation projection methodology is documented in detail in the Regional Water Demand and Conservation Projections Report (BAWSCA 2020b).

In 2021, as part of the 2020 UWMP update, MPMW's DSS Model was revised to account for several changes since the demand projections were estimated by BAWSCA. The baseline year for projections was updated to 2019, which was the most recent year with full data. Population and employment inputs were revised by the City's Planning Division based on information related to the City's recently approved projects and the current General Plan.

Demands are projected through 2040 to be consistent with the General Plan's planning horizon. There is a significant increase in demand projected over the next five years (i.e., a 19 percent increase between 2020 and 2025) which reflects conservative assumptions regarding: (1) a potential rebound from the drought-suppressed water demands, and (2) the accelerated growth between 2020 and 2025 attributable to the City's approved and planned projects and implementation of new residential units like those contemplated in the HEU.

After accounting for the recycled water use of 48 MG applied at the Sharon Heights Golf and Country Club, the remaining demand is anticipated to be supplied by potable water from the SFPUC RWS. Potable water demand is anticipated to be approximately 1,363 MG in 2040, an increase of 28 percent compared to 2020. MPMW's projected potable water demand in five-year increments, as outlined in the 2020 UWMP, is summarized in **Table 5-6**.

TABLE 5-6
MPMW SERVICE AREA PROJECTED GROWTH IN WATER DEMAND (MG AND AFY)

	2025	2030	2035	2040
Single Family	306	299	293	288
Multi-Family	158	176	203	230
Commercial	346	345	373	401
Industrial	134	122	112	102
Institutional/Governmental	98	105	115	126
Landscape	95	61	71	85
Losses	110	116	122	128
Other Potable	1	1	1	2
Total (MG)	**1,248**	**1,225**	**1,290**	**1,363**
2020 UWMP Demand Total (AFY)	**3,830**	**3,759**	**3,959**	**4,183**
HEU Demand plus Cumulative 2040 Demand[a]	267	267	267	267
Updated 2040 Cumulative Demand	**4,097**	**4,026**	**4,226**	**4,450**

SOURCE: 2020 MPMW 2020 UWMP. Table 4-6. Use for Potable and Non-Potable Water – Projected

NOTE: Recycled water is not included in total projected water demand.

a. City of Menlo Park, Housing Element Update, Water Supply Assessment, Table 5-1 – MPMW portion of 715 AFY of new demand generated by implementation of the HEU and Additional 2040 Growth. New water demand of 267 AFY associated with the HEU area is assumed to occur instantaneously. Actual build-out of the HEU is expected to occur incrementally or in phases over the next 25 years as changes in the development market create opportunities for redevelopment.

Because the demand associated with implementation of the HEU was not included in MPMW's 2020 UWMP, an additional 267 AFY of water demand (as calculated in Section 5.1 of this WSA) must be added to account for the proposed HEU units and additional cumulative residential growth in the MPMW service area. The updated growth in water demand through 2040 is provided in Table 5-6. As discussed in Section 5.1, for conservative water resources planning purposes, water demand associated with the HEU (267 AFY) is assumed to occur instantaneously as shown in Tables 5-6, 6-4, 6-5, 6-6 and 6-7. The additional 267 AFY is added to projected demand in five-year increments to present the quantitative data needed to analyze current and future demand within Cal Water Bear Gulch District’s service area. It should be recognized that actual build-out of the HEU is expected to occur incrementally or in phases over the next 25 years as changes in the development market create opportunities for redevelopment.

SECTION 6

Comparison of Available Water Supplies versus Demand

Section 10910(c)(3) of the Water Code states, "the water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available for normal, dry and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses."

6.1 Bear Gulch District Supply and Demand Considerations

In order to present a conservative water supply analysis, the supply and demand models in this section assume that the supplies from the SFPUC would be held to 11.18 mgd (12,523 AFY) and surface water from the Cal Water Bear Gulch District's Bear Gulch Reservoir is limited to 1.12 mgd (1,254 AFY) for a total supply of 12.30 mgd or 13,778 AFY. With this understanding, each growth in demand scenario is compared to the Cal Water Bear Gulch District's available supplies. Furthermore, this WSA recognizes that the Cal Water Bear Gulch District could use additional supplies within its ISG to meet demand and because the aggregated demand within the BAWSCA members has not reached its maximum of 184.0 mgd, no supply limitations are being enforced. Therefore, Cal Water could purchase supplemental supplies from the SFPUC and, in fact, Cal Water has purchased additional supplies in the past to meet demand.

6.2 Cal Water Bear Gulch District Supply and Demand in a Normal Year

Table 6-1 shows the projected supply and demand totals for a normal year. The supply and demand totals are consistent with those in Table 6-9B and Table 4-3 in the 2020 Cal Water Bear Gulch District UWMP. The Cal Water Bear Gulch District is expected to have adequate water supplies during normal years to meet its projected demands through 2045. It should be noted that supply reflects 12.30 mgd (13,778 AFY) of committed supplies (SFPUC and Bear Gulch Reservoir water) plus the quantity of potable water amount needed to meet demand that can be purchased from SFPUC or transferred within Cal Water's Peninsula Districts.

TABLE 6-1
BEAR GULCH DISTRICT NORMAL YEAR SUPPLY AND DEMAND PROJECTIONS (AFY)

	2025	2030	2035	2040
2020 UWMP Supply[a]	13,244	13,147	13,178	13,123
2020 UWMP Demand	12,796	12,699	12,730	12,675
HEU Demand plus Additional 2040 Demand	448	448	448	448
HEU Demand plus Cumulative 2040 Demand[a]	**13,244**	**13,147**	**13,178**	**13,123**
Difference [Surplus/(Deficit)]	**0**	**0**	**0**	**0**

SOURCE: Cal Water Bear Gulch District 2020 UWMP. Table 7-3. Normal Year Supply and Demand Comparison

NOTE:

a. City of Menlo Park, Housing Element Update, Water Supply Assessment, Table 5-1 – Cal Water Bear Gulch District portion of 715 AFY of new demand generated by implementation of the HEU and Additional 2040 Growth. New water demand of 448 AFY associated with the HEU area is assumed to occur instantaneously. Actual build-out of the HEU is expected to occur incrementally or in phases over the next 25 years as changes in the development market create opportunities for redevelopment.
[NTR: Cal Water – is there surplus water supplies within the 39,993 AFYU to make this supply and demand assumption?]

6.3 Cal Water Bear Gulch District Water Service Reliability – Single Dry and Multiple Dry Years with Bay-Delta Plan Amendment

The reliability of the RWS is anticipated to vary greatly in different year types. Cal Water Bear Gulch District and MPMW have relied on the supply reliability estimates provided by the SFPUC for the RWS and the drought allocation structure provided by SFPUC and BAWSCA to estimate available RWS supplies in dry year types through 2045. For conservative water supply planning purposes, water demand of 448 AFY associated with the HEU area is assumed to occur instantaneously and is added to existing demand in five-year increments to present the quantitative data needed to analyze current and future demand within Cal Water Bear Gulch District's service area. As previously mentioned that actual build-out of the HEU is expected to occur incrementally or in phases over the next 25 years as changes in the development market create opportunities for redevelopment. These projections indicated that without implementation of the Bay-Delta Plan Amendment, SFPUC would be able to supply 100 percent of projected RWS demands in all year types through 2045, except for the 4th and 5th consecutive dry year in 2045, during which 90 percent of projected RWS demands (85 percent of the Wholesale demands) would be met.

As shown in the tables below, significant water supply shortfalls are currently projected in future single and multiple dry years if the Bay-Delta Plan Amendment is implemented. However, numerous uncertainties remain regarding implementation of the Bay Delta Plan Amendment. The water supply projections presented below likely represent a worst-case scenario in which the Bay-Delta Plan Amendment is implemented without the SFPUC and the SWRCB reaching a Voluntary Agreement, and do not account for implementation of SFPUC's AWSP, described further in Section 6.7 under Alternative Supplies. Under this supply scenario, as modeled, SFPUC would not be able to meet its contractual obligations (i.e., Level of Service Goals) and Cal Water Bear Gulch District's forecasted demands during droughts. **Table 6-2** shows the Cal Water Bear Gulch District projected supply and demand totals for the single dry year. As shown in Table 6-2, demand exceeds supply by greater than 50 percent and Cal Water Bear Gulch District would not be able to meet demand within its service area under single dry years through 2045. Under this water supply and demand scenario as shown in Table 6-2, Cal Water Bear Gulch District would be in Stages 3 and 4 of its Water Shortage Contingency Plan (discussed in Section 6.16). Cal Water Bear Gulch District customers would need to reduce their demand by at least 38 percent in 2025 and up to 48 percent in 2045 to balance demand against significant supply reductions.

TABLE 6-2
BEAR GULCH DISTRICT SINGLE DRY YEAR POTABLE WATER SUPPLY AND DEMAND PROJECTIONS (AFY) WITH BAY-DELTA PLAN AMENDMENT

	2025	2030	2035	2040
2020 UWMP Supply[a]	8,546	8,482	8,503	8,334
2020 UWMP Demand	13,354	13,253	13,285	13,228
HEU Demand plus Cumulative 2040 Demand[b]	448	448	448	448
Updated 2040 Cumulative Demand	**13,802**	**13,701**	**13,733**	**13,676**
Difference [Surplus/(Deficit)]	(5,256)	(5,219)	(5,230)	(5,342)
Percent Demand Reduction to balance Supply	**(38%)**	**(38%)**	**(38%)**	**(39%)**

SOURCE: Cal Water Bear Gulch District 2020 UWMP. Table 7-4. Single Dry Year Supply and Demand Comparison

NOTES:

a. Dry year RWS supply availability is calculated in accordance as a percentage of projected RWS demands for each base year consistent with the revised BAWSCA Drought Methodology that assumes equal percent cutbacks across all Wholesale Agencies.

b. City of Menlo Park, Housing Element Update, Water Supply Assessment, Table 5-1 – Cal Water Bear Gulch District portion of 715 AFY of new demand generated by implementation of the HEU and Additional 2040 Growth. New water demand of 448 AFY associated with the HEU area is assumed to occur instantaneously. Actual build-out of the HEU is expected to occur incrementally or in phases over the next 25 years as changes in the development market create opportunities for redevelopment.

As discussed in Cal Water Bear Gulch District's 2020 UWMP, SFPUC also provided water supply reliability projections without the Bay-Delta Plan Amendment (Cal Water Bear Gulch District, 2020 UWMP Appendix I), which represents a highly optimistic water supply reliability.[9] The large disparity in projected water supply reliability between these two scenarios demonstrates the current level of uncertainty. **Table 6-3** shows the Cal Water Bear Gulch District projected supply and demand totals for multiple dry year periods extending five years with the more conservative Bay-Delta Plan Amendment in effect. As shown in the table, demand exceeds supply by greater than 50 percent and Cal Water Bear Gulch District would not be able to meet demand within its service area under multiple dry years through 2045. Under this water supply and demand scenario as shown in Table 6-6, in the first dry year and identical to the single dry year scenario presented in Table 6-3, Cal Water Bear Gulch District would be in Stages 4 and 5 of its Water Shortage Contingency Plan (discussed Section 6.16). Cal Water Bear Gulch District customers would need to reduce their demand by up to 50 percent in the 3rd year of a multiple dry year and if dry conditions persist up to 55 percent in 2045 in the 5th year to balance demand against significant supply reductions. Under this multiple dry year scenario, Cal Water Bear Gulch District customers would need to reduce their demand significantly to balance city-wide demand against significant supply reductions throughout the RWS. In fact, Stage 6 is an "Emergency Shortage" condition that includes water use allocations and mandatory conservation measures.

9 City of Menlo Park, 2020 Urban Water Management Plan, page 104.

TABLE 6-3
BEAR GULCH DISTRICT MULTIPLE DRY YEARS POTABLE WATER SUPPLY AND DEMAND COMPARISON (AFY) WITH BAY-DELTA PLAN AMENDMENT

		2025	2030	2035	2040	2045
First Year	2020 UWMP Supply[a]	8,767	8,701	8,722	8,549	7,339
	2020 UWMP Demand[a]	13,699	13,595	13,629	13,570	13,591
	HEU Demand plus Cumulative 2040 Demand[b]	448	448	448	448	448
	Updated 2040 Cumulative Demand	14,147	14,043	14,077	14,018	14,039
	Difference [Surplus/(Deficit)]	(5,380)	(5,342)	(5,355)	(5,469)	(6,700)
Percent Demand Reduction to balance Supply		**(38%)**	**(38%)**	**(38%)**	**(39%)**	**(48%)**
Second Year	2020 UWMP Supply[a]	7,534	7,477	7,360	7,328	7,339
	2020 UWMP Demand[a]	13,699	13,595	13,629	13,570	13,591
	HEU Demand plus Cumulative 2040 Demand[b]	448	448	448	448	448
	Updated 2040 Cumulative Demand	14,147	14,043	14,077	14,018	14,039
	Difference [Surplus/(Deficit)]	(6,613)	(6,566)	(6,717)	(6,690)	(6,700)
Percent Demand Reduction to balance Supply		**(38%)**	**(38%)**	**(38%)**	**(39%)**	**(48%)**
Third Year	2020 UWMP Supply[a]	7,534	7,477	7,360	6,514	6,252
	2020 UWMP Demand[a]	13,699	13,595	13,629	13,570	13,591
	HEU Demand plus Cumulative 2040 Demand[b]	448	448	448	448	448
	Updated 2040 Cumulative Demand	14,147	14,043	14,077	14,018	14,039
	Difference [Surplus/(Deficit)]	(6,613)	(6,566)	(6,717)	(7,504)	(7,787)
Percent Demand Reduction to balance Supply		**(47%)**	**(47%)**	**(48%)**	**(54%)**	**(55%)**
Fourth Year	2020 UWMP Supply[a]	7,534	7,477	7,360	6,514	6,252
	2020 UWMP Demand[a]	13,699	13,595	13,629	13,570	13,591
	HEU Demand plus Cumulative 2040 Demand[b]	448	448	448	448	448
	Updated 2040 Cumulative Demand	14,147	14,043	14,077	14,018	14,039
	Difference [Surplus/(Deficit)]	(6,613)	(6,566)	(6,717)	(7,504)	(7,787)
Percent Demand Reduction to balance Supply		**(47%)**	**(47%)**	**(48%)**	**(54%)**	**(55%)**
Fifth Year	2020 UWMP Supply[a]	7,534	7,477	6,814	6,514	6,252
	2020 UWMP Demand[a]	13,699	13,595	13,629	13,570	13,591
	HEU Demand plus Cumulative 2040 Demand[b]	448	448	448	448	448
	Updated 2040 Cumulative Demand	14,147	14,043	14,077	14,018	14,039
	Difference [Surplus/(Deficit)]	(6,613)	(6,566)	(6,717)	(7,504)	(7,787)
Percent Demand Reduction to balance Supply		**(47%)**	**(47%)**	**(48%)**	**(54%)**	**(55%)**

SOURCE: Cal Water Bear Gulch District 2020 UWMP.

NOTES:

a. Table 7-5. Multiple Dry Years Supply and Demand Comparison
b. City of Menlo Park, Housing Element Update, Water Supply Assessment, Table 5-1 – Cal Water Bear Gulch District portion of 715 AFY of new demand generated by implementation of the HEU and Additional 2040 Growth. New water demand of 448 AFY associated with the HEU area is assumed to occur instantaneously. Actual build-out of the HEU is expected to occur incrementally or in phases over the next 25 years as changes in the development market create opportunities for redevelopment.

6.4 [PLACEHOLDER] Cal Water Bear Gulch District Water Service Reliability – Normal, Single Dry and Multiple Dry Years without the Bay-Delta Plan Amendment

Table 6-X summarizes the water supply and demand scenario if the Bay-Delta Plan Amendment is not implemented as adopted by the SWRCB. Under these water supply and demand conditions, the total projected water supplies available to BGD through its ISG with SFPUC will meet the projected water demand associated with the HEU in addition to BGD projected uses through 2040 in normal, single dry and multiple dry years.

As described in Section XX, based on SFPUC's analysis, a 16.5 percent supply shortfall is projected during the 4th and 5th consecutive dry years after base year 2040. These projected supply shortfalls are significantly less than the projected supply shortfalls if the Bay-Delta Plan Amendment is implemented. If and when supply shortfalls do occur, BGD expects to meet these supply shortfalls through water demand reductions and other water shortage response actions by implementation of its WSCP.

6.5 MPMW Supply and Demand in a Normal Year

As presented in MPMW's 2020 UWMP, projected normal year potable water supplies are adequate to satisfy MPMW's projected normal year potable water demands as shown in **Table 6-4** through 2040. Recycled water is estimated to be available at all times at a volume that meets MPMW's projected recycled water demands.

TABLE 6-4
MPMW NORMAL YEAR WATER SUPPLY AND DEMAND COMPARISON (AFY)

	2025	2030	2035	2040
2020 UWMP Supply[a]	5,150	5,371	5,371	5,371
2020 UWMP Demand[a]	3,977	4,128	4,327	4,551
HEU Demand plus Cumulative 2040 Demand[b]	267	267	267	267
Updated 2040 Cumulative Demand	**4,244**	**4,395**	**4,594**	**4,818**
Difference [Surplus/(Deficit)]	**906**	**976**	**777**	**553**

SOURCE: MPMW 2020 UWMP. Table 7-4 Normal Year Supply and Demand Comparison

NOTES:

a. Supply and demand include both potable water and recycled water. MPMW expects to receive 120 MG (368 AF) of recycled water from the Sharon Heights and Bayfront recycled water facilities.
b. City of Menlo Park, Housing Element Update, Water Supply Assessment, Table 5-1 – MPMW portion of 715 AFY of new demand generated by implementation of the HEU and Additional 2040 Growth. New water demand of 267 AFY associated with the HEU area is assumed to occur instantaneously. Actual build-out of the HEU is expected to occur incrementally or in phases over the next 25 years as changes in the development market create opportunities for redevelopment.

6.6 MPMW Water Service Reliability – Single Dry and Multiple Dry Years with Bay-Delta Plan Amendment

The reliability of the SFPUC RWS supply is anticipated to vary greatly in different year types. MPMW has relied on SFPUC's RWS supply reliability estimates and the drought allocation structure provided by SFPUC and BAWSCA to estimate available RWS supplies in dry year types through 2040. This WSA is consistent with MPMW's 2020 UWMP, which recognizes that purchased supplies from the SFPUC RWS assume dry year supply reductions if the Bay-Delta Plan Amendment is implemented, which would significantly reduce dry year allocations for SFPUC wholesale customers. Recycled water supply is expected to be 100 percent reliable in all year types. **Table 6-5** shows the projected potable water supply and demand totals for the single dry year. Under this water supply and demand scenario as shown in Table 6-5, MPMW would be in a Stages 3 and 4 of its Water Shortage Contingency Plan (discussed in Section 6.16). MPMW customers would need to reduce their demand by almost 40 percent in 2025 and up to 32 percent in 2040 to balance demand against significant supply reductions.

TABLE 6-5
MPMW SINGLE-DRY-YEAR POTABLE WATER SUPPLY AND DEMAND COMPARISON (AFY) WITH BAY-DELTA PLAN AMENDMENT

	2025	2030	2035	2040
2020 UWMP Supply[a]	2,691	3,001	3,124	3,259
2020 UWMP Demand[a]	3,977	4,128	4,327	4,551
HEU Demand plus Cumulative 2040 Demand[b]	267	267	267	267
Updated 2040 Cumulative Demand	**4,244**	**4,395**	**4,594**	**4,818**
Difference [Surplus/(Deficit)]	**(1,553)**	**(1,393)**	**(1,470)**	**(1,559)**
Percent Demand Reduction to balance Supply	**(37%)**	**(32%)**	**(32%)**	**(32%)**

SOURCE: MPMW 2020 UWMP; Menlo Park Housing Element WSA Table 5-5

NOTES:

a. Supply and demand include both potable water and recycled water. MPMW expects to receive 120 MG (368 AF) of recycled water from the Sharon Heights and Bayfront recycled water facilities.
b. City of Menlo Park, Housing Element Update, Water Supply Assessment, Table 5-1 – MPMW portion of 715 AFY of new demand generated by implementation of the HEU and Additional 2040 Growth. New water demand of 267 AFY associated with the HEU area is assumed to occur instantaneously. Actual build-out of the HEU is expected to occur incrementally or in phases over the next 25 years as changes in the development market create opportunities for redevelopment.

Based on the supply reliability estimates and allocation structure provided by SFPUC and BAWSCA and the assumed 100 percent reliability for recycled water supply, **Table 6-6** shows the projected potable water supply and demand totals for multiple dry year periods extending in five year increments. Recycled water supply is expected to be 100 percent reliable in all year types.

Table 6-6 shows significant shortfalls under multiple dry years beginning in 2025 and through 2040 if the Bay-Delta Plan Amendment is implemented. Under this water supply and demand scenario as shown in Table 6-6, in the first dry year and identical to the single dry year scenario presented in Table 6-5, MPMW would be in a Stages 3 and 4 of its Water Shortage Contingency Plan (discussed Section 6.16). MPMW customers would need to reduce their demand by almost

TABLE 6-6
MPMW MULTIPLE DRY YEARS SUPPLY AND DEMAND COMPARISON (AFY) WITH BAY-DELTA PLAN AMENDMENT

		2025	2030	2035	2040
First Year	2020 UWMP Supply[a]	2,691	3,001	3,124	3,259
	2020 UWMP Demand[a]	3,977	4,128	4,327	4,551
	HEU Demand plus Cumulative 2040 Demand[b]	267	267	267	267
	Updated 2040 Cumulative Demand	4,244	4,395	4,594	4,818
	Difference [Surplus/(Deficit)]	(1,553)	(1,393)	(1,470)	(1,559)
Demand Reduction needed to balance Supply		**(37%)**	**(32%)**	**(32%)**	**(32%)**
Second Year	2020 UWMP Supply[a]	2,332	2,621	2,722	2,845
	2020 UWMP Demand[a]	3,977	4,128	4,327	4,551
	HEU Demand plus Cumulative 2040 Demand[b]	267	267	267	267
	Updated 2040 Cumulative Demand	4,244	4,395	4,594	4,818
	Difference [Surplus/(Deficit)]	(1,912)	(1,774)	(1,872)	(1,973)
Demand Reduction needed to balance Supply		**(45%)**	**(40%)**	**(41%)**	**(41%)**
Third Year	2020 UWMP Supply[a]	2,332	2,621	2,722	2,845
	2020 UWMP Demand[a]	3,977	4,128	4,327	4,551
	HEU Demand plus Cumulative 2040 Demand[b]	267	267	267	267
	Updated 2040 Cumulative Demand	4,244	4,395	4,594	4,818
	Difference [Surplus/(Deficit)]	(1,912)	(1,774)	(1,872)	(1,973)
Demand Reduction needed to balance Supply		**(45%)**	**(40%)**	**(41%)**	**(41%)**
Fourth Year	2020 UWMP Supply[a]	2,332	2,621	2,722	2,553
	2020 UWMP Demand[a]	3,977	4,128	4,327	4,551
	HEU Demand plus Cumulative 2040 Demand[b]	267	267	267	267
	Updated 2040 Cumulative Demand	4,244	4,395	4,594	4,818
	Difference [Surplus(Deficit)]	(1,912)	(1,774)	(1,872)	(2,265)
Demand Reduction needed to balance Supply		**(45%)**	**(40%)**	**(41%)**	**(47%)**
Fifth Year	2020 UWMP Supply[a]	2,332	2,621	2,529	2,553
	2020 UWMP Demand[a]	3,977	4,128	4,327	4,551
	HEU Demand plus Cumulative 2040 Demand[b]	267	267	267	267
	Updated 2040 Cumulative Demand	4,244	4,395	4,594	4,818
	Difference [Surplus/(Deficit)]	(1,912)	(1,774)	(2,065)	(2,265)
Demand Reduction needed to balance Supply		**(45%)**	**(40%)**	**(45%)**	**(47%)**

SOURCE: MPMW 2020 UWMP, Tables 7-4 and 7-5 Single Dry Year Supply and Demand Comparison. Table 7-6 Multiple Dry Years Supply and Demand Comparison, Menlo Park Housing Element WSA Table 5-5

NOTES:

a. Supply and demand include both potable water and recycled water. MPMW expects to receive 120 MG (368 AF) of recycled water from the Sharon Heights and Bayfront recycled water facilities.

b. City of Menlo Park, Housing Element Update, Water Supply Assessment, Table 5-1 – MPMW portion of 715 AFY of new demand generated by implementation of the HEU and Additional 2040 Growth. New water demand of 267 AFY associated with the HEU area is assumed to occur instantaneously. Actual build-out of the HEU is expected to occur incrementally or in phases over the next 25 years as changes in the development market create opportunities for redevelopment.

40 percent in 2025 and up to 32 percent in 2040 to balance demand against significant supply reductions. Over the next four years, if dry conditions persist, MPMW would need to move to Stages 4 and 5 of its WSCP. Under this multiple dry scenario MPMW customers would need to reduce their demand by 40 or 50 percent, respectively through 2040 to balance city-wide demand against significant supply reductions throughout the RWS.

6.7 MPMW Water Service Reliability – Normal, Single Dry and Multiple Dry Years without the Bay-Delta Plan Amendment

Table 6-7 summarizes the water supply and demand scenario if the Bay-Delta Plan Amendment is not implemented as adopted by the SWRCB. Under these water supply and demand conditions, the total projected water supplies available to MPMW through its ISG with SFPUC will meet the projected water demand associated with the Updated 2040 Cumulative Demand.

TABLE 6-7
MPMW NORMAL, SINGLE DRY AND MULTIPLE DRY YEARS SUPPLY AND DEMAND COMPARISON (AFY) WITHOUT THE BAY-DELTA PLAN AMENDMENT

	2025	2030	2035	2040
Normal Year				
2020 UWMP Supply[a]	5,150	5,371	5,371	5,371
2020 UWMP Demand[a]	3,977	4,128	4,327	4,551
HEU Demand plus Cumulative 2040 Demand[b]	267	267	267	267
Updated 2040 Cumulative Demand	4,244	4,395	4,594	4,818
Difference [Surplus/(Deficit)]	905	976	776	552
Percent Shortfall of Demand	**0%**	**0%**	**0%**	**0%**
Single Dry Year				
2020 UWMP Supply[a]	4,125	4,496	4,695	4,919
2020 UWMP Demand[a]	3,977	4,128	4,327	4,551
HEU Demand plus Cumulative 2040 Demand[b]	267	267	267	267
Updated 2040 Cumulative Demand	4,244	4,395	4,594	4,818
Difference [Surplus/(Deficit)]	(120)	101	101	101
Percent Shortfall of Demand	**(3%)**	**0%**	**0%**	**0%**
Multiple Dry Years				
First Year				
2020 UWMP Supply[a]	4,125	4,496	4,695	4,919
2020 UWMP Demand[a]	3,977	4,128	4,327	4,551
HEU Demand plus Cumulative 2040 Demand[b]	267	267	267	267
Updated 2040 Cumulative Demand	4,244	4,395	4,594	4,818
Difference [Surplus/(Deficit)]	(120)	101	101	101
Percent Shortfall of Demand	**(3%)**	**0%**	**0%**	**0%**

TABLE 6-7
MPMW NORMAL, SINGLE DRY AND MULTIPLE DRY YEARS SUPPLY AND DEMAND COMPARISON (AFY) WITHOUT THE BAY-DELTA PLAN AMENDMENT

	2025	2030	2035	2040
Second Year				
2020 UWMP Supply[a]	4,125	4,496	4,695	4,919
2020 UWMP Demand[a]	3,977	4,128	4,327	4,551
HEU Demand plus Cumulative 2040 Demand[b]	267	267	267	267
Updated 2040 Cumulative Demand	4,244	4,395	4,594	4,818
Difference [Surplus/(Deficit)]	(120)	101	101	101
Percent Shortfall of Demand	**(3%)**	**0%**	**0%**	**0%**
Third Year				
2020 UWMP Supply[a]	4,125	4,496	4,695	4,919
2020 UWMP Demand[a]	3,977	4,128	4,327	4,551
HEU Demand plus Cumulative 2040 Demand[b]	267	267	267	267
Updated 2040 Cumulative Demand	4,244	4,395	4,594	4,818
Difference [Surplus/(Deficit)]	(120)	101	101	101
Percent Shortfall of Demand	**(3%)**	**0%**	**0%**	**0%**
Fourth Year				
2020 UWMP Supply[a]	4,125	4,496	4,695	4,919
2020 UWMP Demand[a]	3,977	4,128	4,327	4,551
HEU Demand plus Cumulative 2040 Demand[b]	267	267	267	267
Updated 2040 Cumulative Demand	4,244	4,395	4,594	4,818
Difference [Surplus/(Deficit)]	(120)	101	101	101
Percent Shortfall of Demand	**(3%)**	**0%**	**0%**	**0%**
Fifth Year				
2020 UWMP Supply[a]	4,125	4,496	4,695	4,919
2020 UWMP Demand[a]	3,977	4,128	4,327	4,551
HEU Demand plus Cumulative 2040 Demand[b]	267	267	267	267
Updated 2040 Cumulative Demand	4,244	4,395	4,594	4,818
Difference [Surplus/(Deficit)]	(120)	101	101	101
Percent Shortfall of Demand	**(3%)**	**0%**	**0%**	**0%**

SOURCE: MPMW 2020 UWMP, Table 7-6 Multiple Dry Years Supply and Demand Comparison, Menlo Park Housing Element WSA Table 5-5

NOTES:

a. Tables 7-4 and 7-5 Single Dry Year Supply and Demand Comparison. Supply and demand include both potable water and recycled water. MPMW expects to receive 120 MG (368 AF) of recycled water from the Sharon Heights and Bayfront recycled water facilities.
b. City of Menlo Park, Housing Element Update, Water Supply Assessment, Table 5-1 – MPMW portion of 715 AFY of new demand generated by implementation of the HEU and Additional 2040 Growth. New water demand of 267 AFY associated with the HEU area is assumed to occur instantaneously. Actual build-out of the HEU is expected to occur incrementally or in phases over the next 25 years as changes in the development market create opportunities for redevelopment.

As described in Section 6.8, based on SFPUC's analysis, a 16.5 percent supply shortfall is projected during the fourth and fifth consecutive dry years after base year 2040. These projected supply shortfalls are significantly less than the projected supply shortfalls if the Bay-Delta Plan Amendment is implemented. If and when supply shortfalls occur in single dry and multiple dry years as soon as 2025, MPMW expects to meet these supply shortfalls through water demand reductions of less than 5 percent pursuant to its Demand Management Measures.

6.8 Uncertainties in Dry Year Water Supply Projections

As shown in the above tables, if the Bay-Delta Plan Amendment is implemented, significant water supply shortfalls are currently projected in future single and multiple dry years. However, numerous uncertainties remain regarding implementation of the Bay-Delta Plan Amendment. The water supply projections presented above likely represent a worst-case scenario in which the Bay-Delta Plan Amendment is implemented without the SFPUC and the SWRCB reaching a Voluntary Agreement, and do not account for implementation of SFPUC's Alternative Water Supply Program (AWSP), described in more detail below. Under this supply scenario, SFPUC appears not to be able to meet its contractual obligations (i.e., Level of Service (LOS) Goals) and Bear Gulch and MPMW's forecasted demands during droughts.

As discussed in Cal Water Bear Gulch District and MPMW UWMP's, SFPUC also provided water supply reliability projections without the Bay-Delta Plan Amendment (refer to Appendix I of each of the 2020 UWMPs), which likely represents a highly optimistic water supply reliability outcome.[10] These projections indicated that without implementation of the Bay-Delta Plan Amendment SFPUC would be able to supply 100 percent of projected RWS demands in all year types through 2045, except for the 4th and 5th consecutive dry years in 2045, during which 90 percent of projected RWS demands (85 percent of the Wholesale demands) would be met.

In addition to these two water supply scenarios, in a March 26, 2021 Special Commission Meeting, SFPUC staff presented Hetch Hetchy and Local Simulation Model modeling results for 10 different scenarios, including scenarios with implementation of the Tuolumne River Voluntary Agreement (TRVA), implementation of the Bay-Delta Plan Amendment and the AWSP, and use of a modified rationing policy and a modified design drought. Results for the scenarios with the TRVA and with the AWSP (particularly with a modified rationing policy and design drought) showed significantly improved RWS supply availability compared to the Bay-Delta Plan Amendment scenario shown herein.

The current sources of uncertainty in the dry year water supply projections are summarized below:

- *Implementation of the Bay-Delta Plan Amendment is under negotiation.* The SFPUC is continuing negotiations with the SWRCB on implementation of the Bay-Delta Plan Amendment for water supply cutbacks, particularly during droughts. The SFPUC, in partnership with other key stakeholders, has proposed a voluntary substitute agreement to the Bay-Delta Plan Amendment, the TRVA, that provides a collaborative approach to protect the

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10 City of Menlo Park, 2020 Urban Water Management Plan, page 104

environment and plan for a reliable and high-quality future potable water supply. This is a dynamic situation and the projected drought cutback allocations may need to be revised before the next cycle of UWMPs (2025) depending on the outcome of ongoing negotiations.

- *Benefits of the AWSP are not accounted for in current supply projections.* SFPUC is exploring options to increase its supplies through the AWSP. Implementation of feasible projects developed under the AWSP is not yet reflected in the supply reliability scenarios presented herein and is anticipated to reduce the projected RWS supply shortfalls.

- *SFPUC is considering modifications to its design drought methodology and rationing policy.* Shortening the 8.5-year design drought or modifying the rationing policy to increase rationing in the early years of a drought are anticipated to reduce projected RWS supply shortfalls. On June 7, 2021, MPMW sent a letter to the SFPUC requesting the inclusion of a reduced duration drought scenario, if and when SFPUC's current climate change study merits doing so.

- *Methodology for Tier One and Tier Two Wholesale drought allocations have not been established for wholesale shortages greater than 20%.* As discussed in Cal Water Bear Gulch District's and MPMW 2020 UWMP's, the current Tier One and Tier Two Plans are not designed for RWS supply shortages greater than 20%. According to BAWSCA guidance, the Tier One Wholesale share for a 16 percent to 20 percent supply reduction (62.5 percent) has been applied for reductions greater than 20 percent and an equal percent reduction has been applied across all Wholesale agencies. BAWSCA member agencies have not formally agreed to adopt this shortage allocation methodology and are in discussions about jointly developing an alternative allocation method that would consider additional equity factors if SFPUC is unable to deliver its contractual supply volume and cutbacks to the RWS supply exceed 20 percent.

- *RWS demands are subject to change.* The RWS supply availability is dependent upon the system demands. The supply scenarios are based on the total projected Wholesale Customer purchases provided by BAWSCA to SFPUC in January 2021. During the UWMP process, many of the BASCWA agencies refined their projected demand estimates. It is notable that RWS demand projections are subject to change in the future based upon future housing needs, increased conservation, and development of additional local supplies.

- *Frequency and duration of cutbacks are also uncertain.* While the projected shortfalls presented in SFPUC's UWMP appear severe, the actual frequency and duration of such shortfalls are uncertain. Based on the HHLSM simulations provided by BAWSCA for the "with Bay-Delta Plan Amendment" scenario, rationing is anticipated to be required 20 percent of years for base year 2025 through 2035, 23 percent of years for base year 2040, and 25 percent of years for base year 2045. In addition to the supply volumes, the above listed uncertainties would also impact the projected frequency and duration of shortfalls.

To further evaluate local options to increase supply reliability, Cal Water and MPMW have placed high priority on working with BAWSCA and SFPUC in the upcoming years to better refine the estimates of RWS supply reliability and may need to amend their respective UWMPs when new information becomes available.

The above uncertainties notwithstanding, BAWSCA's current drought allocation cutbacks will require Cal Water Bear Gulch District and MPMW to apply their Water Shortage Contingency Plan (WSCP) Stage 5 for water use restrictions up to 50 percent and will affect Cal Water Bear Gulch District's and MPMW's short- and long-term water management decisions. As described in their UWMPs, Cal Water Bear Gulch District and MPMW are working independently and with the other BAWSCA agencies to identify regional mitigation measures to improve reliability for regional and local water supplies and meet its customers' water needs. If conditions for large drought cutbacks to the RWS persist, Cal Water Bear Gulch District and MPMW will need to implement additional demand management practices to restrict potable water use and accelerate efforts to develop alternative supplies of water.

6.9 Alternative Supplies

According to the requirements of Water Code Section 10910(c)(3), the water supply assessment shall include a discussion of "whether the public water system's total projected water supplies available…will meet the projected water demand associated with proposed project, in addition to the public water system's existing and planned future uses." According to the requirements of Water Code Section 10911(a), if the results of the assessment conclude that the water supplies are, or will be, insufficient, the water supply assessment shall include plans for acquiring additional water supplies. Those plans may include, but are not limited to, information on costs, financing, permits, and timeframes.

In normal years and above-normal years, Cal Water Bear Gulch District and MPMW have sufficient supplies within their water supply portfolio to meet demand over the 25-year planning horizon. As discussed in the previous section, water supplies are insufficient to meet projected demands of the HEU, in addition to existing and planned uses within the Cal Water Bear Gulch District and the MPMW service area in single dry years and the 4th and 5th years in multiple-dry years. It should be noted that without implementation of the HEU or projected growth, water supplies are insufficient to meet current demands in the Cal Water Bear Gulch District and MPMW service area under these same dry year conditions.

Based on a determination of insufficient supplies, it is necessary to investigate the potential for acquiring additional supplies to serve the HEU and/or projected demand now and in the future. There are several alternative supply actions, which could be implemented by Cal Water Bear Gulch District and MPMW to assist water supply planning for the projected 25-year horizon.

6.10 Strategies and Actions to Address Dry Year Supply Shortfalls

Although there remains significant uncertainty in future supply availability, as discussed above, Cal Water Bear Gulch District, MPMW, SFPUC, and BAWSCA have developed strategies and actions to address the projected dry year supply shortfalls. Regional and local strategies, plans and programs are discussed below.

6.10.1 SFPUC and Other Regional Strategies and Actions

Dry Year Water Supply Projects

The Water Supply Improvement Program (WSIP) authorized the SFPUC to undertake a number of water supply projects to meet dry-year demands with no greater than 20 percent system-wide rationing in any one year. Implementation of these projects is also expected to mitigate impacts of the implementation of the Bay-Delta Plan Amendment.

Those projects include the following:

- **Calaveras Dam Replacement Project.** The new dam replacement was completed in 2018, and began filling in 2019. In December 2020, the Calaveras Reservoir reached 67 percent of capacity but as a result of dry year conditions has subsequently lost water in the last few years. Fill inspections resumed in 2021.

- **Alameda Creek Recapture Project.** The Alameda Creek Recapture Project will recapture the water system yield that is either lost due to instream flow releases at Calaveras Reservoir or bypassed around the Alameda Creek Diversion Dam and return this yield to the RWS through facilities in the Sunol Valley. Construction of this project was scheduled from spring 2021 to spring 2023.

- **Lower Crystal Springs Dam Improvements.** The Lower Crystal Springs Dam (LCSD) Improvements Project was completed in May 2012 and associated projects in support of the LCSD were completed in 2019. While the main improvements to the dam have been completed, environmental permitting issues for reservoir operation remain significant, while the endangered Fountain Thistle is incrementally reinstated above reservoir capacity levels. As a result, it may be several years before pre-project water storage volumes can be realized.

- **Regional Groundwater Storage and Recovery Project.** The Regional Groundwater Storage and Recovery (GSR) Project is a partnership between the SFPUC and three San Mateo County agencies: California Water Service Company (serving South San Francisco and Colma), and the cities of Daly City and San Bruno. The GSR is a conjunctive use program to sustainably manage groundwater and surface water resources to provide the RWS with additional supplies during times of drought. In normal or wet years' supplemental surface water would be provided to the San Mateo County partners allowing them to reduce the amount of groundwater extractions. Over time, the groundwater pumping reductions would allow natural recharge to occur and increase groundwater in storage by up to 61,000 acre feet that would be available during dry years.

  Phase 1 of the GSR installed thirteen well sites and nearly complete. Final construction was completed in 2021. Phase 2 will complete construction the South San Francisco Main well station. Phase 2 design work began in early 2020 and the 100 percent design commenced in 2021. The new Regional Groundwater Treatment Improvements (RGTI) was approved in the 10-Year Water Enterprise Capital Improvement Program (2021 – 2030). The RGTI includes treatment facilities for several of the GSR wells to address groundwater quality issues. The RGTI commenced in 2021.

- **Dry-year Water Transfer**. The SFPUC pursued a long-term agreement to transfer 2 MGD from MID to the SFPUC in drought years. Unsuccessful negotiations with MID ended in 2012. The dry-year transfer project is now being included as part of the new SFPUC Alternative Water Supply Program, as discussed in the next section.

6.11 Alternative Water Supply Program

In early 2020, the SFPUC began implementation of the Alternative Water Supply Planning Program (AWSP), a program designed to investigate and plan for new water supplies to address future long-term water supply reliability challenges and vulnerabilities on the RWS. Included in the AWSP is a suite of diverse, non-traditional supply projects that, to a great degree, leverage regional partnerships and are designed to meet the water supply needs of the SFPUC Retail and Wholesale Customers through 2045. As of the most recent Alternative Water Supply Planning Quarterly Update, SFPUC has budgeted $264 million over the next ten years to fund water supply projects. BAWSCA is heavily engaged with the SFPUC on its AWSP efforts.

6.11.1 SFPUC's Alternative Water Supply Program

The SFPUC is pursuing additional supplies to meet increasing demand and accelerating its efforts to acquire additional water supplies and explore other projects that would increase overall water supply resilience through the AWSP. The drivers for the program include:

1. The "potential" adoption of the Bay-Delta Plan Amendment and the resulting potential limitations to RWS supply during dry years,
2. The net supply shortfall following the implementation of WSIP,
3. San Francisco's perpetual obligation to supply 184 MGD to the Wholesale Customers,
4. Adopted Level of Service Goals (potable water service deliveries) to limit rationing to no more than 20 percent system-wide during droughts, and
5. The potential need to identify water supplies that would be required to offer permanent status to interruptible customers.

Developing additional supplies through this program would reduce water supply shortfalls and reduce rationing associated with such shortfalls.

The planning priorities guiding the framework of the AWSP are as follows:

1. Offset instream flow needs and meet regulatory requirements,
2. Meet existing obligations to existing permanent customers,
3. Make interruptible customers permanent, and
4. Meet increased demands of existing and interruptible customers.

In conjunction with these planning priorities, the SFPUC considers how the program fits within the Level of Service Goals and Objectives related to water supply and sustainability when considering new water supply opportunities. The key Level of Service Goals and Objectives relevant to this effort can be summarized as:

- Meet dry-year delivery needs while limiting rationing to a maximum of 20 percent system-wide reduction in water service during extended droughts;
- Diversify water supply options during non-drought and drought periods;
- Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers;
- Meet, at a minimum, all current and anticipated legal requirements for protection of fish and wildlife habitat;

- Maintain operational flexibility (although this Level of Service Goal was not intended explicitly for the addition of new supplies, it is applicable here).

Together, the planning priorities and Level of Service Goals and Objectives provide a lens through which the SFPUC considers water supply options and opportunities to meet all foreseeable water supply needs. The SFPUC has taken action to fund the study of potential additional water supply projects.

Following are capital projects under consideration to develop additional water supplies including surface water storage expansion, recycled water expansion, water transfers, desalination, and potable reuse.

- **Daly City Recycled Water Expansion** (Regional, Normal- and Dry-Year Supply): This project can produce up to 3 MGD of tertiary recycled water during the irrigation season (~7 months). On an average annual basis, this is equivalent to 1.25 MGD or 1,400 AFY. This potential project was identified in the SFPUC’s 2015 UWMP and has since been approved by the City of Daly City.

- **Alameda County Water District -USD Purified Water Partnership** (Regional, Normal- and Dry-Year Supply). This project could provide a new purified water supply utilizing Union Sanitary District's (USD) treated wastewater. Purified water produced by advanced water treatment at USD could be transmitted to the Quarry Lakes Groundwater Recharge Area to supplement recharge into the Niles Cone Groundwater Basin or put to other uses in Alameda County Water District’s service area. With the additional water supply to ACWD, an in-lieu exchange with the SFPUC would result in more water left in the RWS.

- **Crystal Springs Purified Water** (Regional, Normal- and Dry-Year Supply). The Crystal Springs Purified Water Project is a purified water project that could provide 6-12 MGD of water supply through reservoir water augmentation at Crystal Springs Reservoir, which is a facility of the RWS.

- **Los Vaqueros Reservoir Expansion** (Regional, Dry Year Supply). The Los Vaqueros Reservoir Expansion Project is a storage project that will enlarge the existing reservoir located in northeastern Contra Costa County from 160,000 acre-feet to 275,000 acre-feet. While the existing reservoir is owned and operated by the Contra Costa Water District (CCWD), the expansion will have regional benefits and will be managed by a Joint Powers Authority.

- **Bay Area Brackish Water Desalination** (Regional, Normal- and Dry-Year Supply). The Bay Area Brackish Water Desalination (Regional Desalination) Project is a partnership between CCWD, the SFPUC, Santa Clara Valley Water Agency, and Zone 7 Water Agency. The SFPUC is considering a water supply benefit of between 5 and 15 MGD during drought conditions when combined with storage at the LVE Project.

- **Calaveras Reservoir Expansion** (Regional, Dry Year Supply). Calaveras Reservoir would be expanded to create 289,000 acre-feet additional capacity to store excess Regional Water System supplies or other source water in wet and normal years.

- **Groundwater Banking.** Groundwater banking in the MID and TID service areas could be used to provide some additional water supply to meet instream releases in dry years reducing water supply impacts to the SFPUC service area.

- **Inter-Basin Collaborations.** Inter-Basin Collaborations could provide net water supply benefits in dry years by sharing responsibility for in-stream flows in the San Joaquin River and Delta more broadly among several tributary reservoir systems.

If all the projects identified through the current planning process can be implemented, there would still be a supply shortfall to meet projected needs. Furthermore, each of the supply options being considered has its own inherent challenges and uncertainties that may affect the SFPUC's ability to implement it.

Given the limited availability of water supply alternatives - unless the supply risks are significantly reduced or needs change significantly - the SFPUC will continue to plan, develop and implement all project opportunities that can help bridge the anticipated water supply gaps during droughts.

6.12 Local Strategies and Actions

Cal Water Bear Gulch District is currently in the process of developing multiple regional water supply reliability studies using integrated resource planning practices to create a long-term supply reliability strategy through 2050 for Cal Water Bear Gulch District districts throughout California. The studies will create long-term strategies to address a wide range of water supply challenges including climate change, new regulatory requirements (e.g., the Bay-Delta Plan Amendment), and potential growth in demands due to new development. These water supply reliability studies will be completed on a rolling basis over the next several years, with all studies anticipated to be complete by 2024.

Through its Emergency Water Storage/Supply Project, Menlo Park Municipal Water anticipates providing augmented supply in the event of significant water shortage due to severe drought conditions, loss of SFPUC supply, or other emergency. The project consists of constructing up to three wells, an underground reservoir, and pump station. The first well, located at the City's Corporation Yard, has been constructed and is awaiting final approval from the State. MPMW is currently in the process of identifying locations for the two other wells, the underground reservoir, and pump station. The wells, underground reservoir, and pump station are identified in the 2018 Water System Master Plan as priority projects and funding has been included in the current five-year capital improvement program. In addition, MPMW's 2020 UWMP includes utilizing well water for drought stage 5 (up to 50% reduction) and drought stage 6 (greater than 50% reduction) to augment supplies if necessary as part of its Water Shortage Contingency Plan.

6.13 Water Demand Reductions and Conservation Savings

Cal Water Bear Gulch District also has its own aggressive and comprehensive water conservation program that has and will continue to reduce per-capita usage and therefore demands on critical water sources. Cal Water Bear Gulch District is committed to helping its customers use water efficiently and has developed a range of water conservation programs to support this goal. To ensure that it is providing the right mix of programs in the most cost-effective manner possible, Cal Water Bear Gulch District routinely conducts comprehensive conservation program analysis and planning. This is done on a five-year cycle in tandem with the UWMPs.

Cal Water Bear Gulch District's Conservation Master Plan provides the basis for the information on the implementation of and expected water savings from Demand Management Measures (DMMs).

6.14 Demand Management Measures

DMMs are codified in the California Water Code, Sections 10608.12 and 10608.20, and discussed in detail in the Cal Water Bear Gulch District and MPMW UWMPs. DMMs are used universally across California as the means to achieve water savings through demand reduction. Essentially, DMMs are used to provide education, assistance, and incentives to help customers use water efficiently. These programs have been grouped in accordance with the DMM categories in California Water Code, Section 10631(e). These categories are:

i. Water waste prevention ordinances,
ii. Metering,
iii. Conservation pricing,
iv. Public education and outreach,
v. Programs to assess and manage distribution system real loss,
vi. Water conservation program coordination and staffing support, and
vii. Other demand management measures.

A complete discussion of the Cal Water Bear Gulch District and MPMW DMMs can be found in Section 9 of their respective UWMPs.

6.15 Demand Management Measures Implementation over the Past Five Years

Through implementation of the DMMs, Cal Water Bear Gulch District and MPMW have been able to significantly reduce water demands in their service areas and help customers to achieve water conservation and cost savings. DMMs (e.g., water savings kits, education, rebates, high efficiency (HE) toilet replacements) implemented by Cal Water Bear Gulch District and MPMW over the last five years have proven to be successful to reduce demand within each of their service areas. Within Cal Water Bear Gulch District's service area, estimated reductions do not include savings from water waste prevention ordinances, conservation pricing, public information, or distribution system water loss management.

Ongoing programs and conservation measures are still currently in effect by Cal Water and MPMW. While it is not possible to quantify all the potential water savings associated with these programs, through implementation of DMMs over the five-year period from 2016 through 2020, Cal Water (all Peninsula districts combined) conservatively estimates water savings from its host of DMMs to be 480 AF or an average annual water saving of almost ~100 AF. MPWM has also implemented DMMs over the last five years. Water savings from the high-efficiency toilet (HET) rebates and the Lawn Be Gone! Turf Replacement Program are conservatively estimated to be over 6 million gallons or 18.5 AF. Furthermore, over the 2013–2016 drought, many water service providers observed water-savings of up to 25 percent in their service areas.

6.16 Dry-Year Shortage and Demand Reduction

Pursuant to the Urban Water Management Planning Act (Water Code Section 10632), water suppliers with a water shortage contingency plan can implement subsequent stages of demand reduction measures listed in its UWMP as a strategy to balance supply and demand.

A water shortage contingency plan allows the Cal Water Bear Gulch District and MPMW to reduce water deliveries to customers and implement demand reductions during periods of water shortage. Therefore, to overcome the potential supply deficit expected to occur during critical dry years or over multiple dry years, both the Cal Water Bear Gulch District and MPMW will follow their adopted water shortage contingency plans (WSCPs) to implement drought-planning sequences and associated operating procedures that subsequently initiate different levels of demand management relative to regional water supply rationing imposed by the SFPUC. The WSCPs can be found in each of the UWMPs (Cal Water Bear Gulch District Appendix L and MPMW Appendix K)

The WSCP requires water suppliers to adopt six water shortage stages, which correspond to progressively severe water shortage conditions (up to 10%, 20%, 30%, 40%, 50%, and greater than 50% shortage) as compared to the normal reliability condition. The following six stages list the shortage response actions:

- **Stage 1 (Up to 10% shortage)** – Stage 1 is a “Water Alert” where voluntary conservation is encouraged.
- **Stage 2 (Up to 20% shortage)** – Stage 2 is a “Moderate Shortage” and will be implemented if the Stage 1 restrictions are deemed insufficient to achieve necessary demand reductions due to water supply shortages.
- **Stage 3 (Up to 30% shortage)** – Stage 3 is a “Severe Shortage” that requires water allocations and mandatory conservation.
- **Stage 4 (Up to 40% shortage)** – Stage 4 is a “Critical Shortage” that includes all steps taken in prior stages regarding allocations and mandatory conservation.
- **Stage 5 (Up to 50% shortage)** – Stage 5 is a “Shortage Crisis” that includes all steps taken in prior stages regarding allotments and mandatory conservation. This stage will be implemented in the event that the source of supply is severely curtailed to the level that requires each customer to restrict their water use for only human health and safety purposes.
- **Stage 6 (Greater than 50% shortage)** – Stage 6 is an “Emergency Shortage” condition that includes all steps taken in prior stages regarding allotments and mandatory conservation.

SECTION 7
Conclusion

According to the requirements of Water Code Section 10910(c)(3) "the water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses."

Implementation of the HEU would result in net increases in total average demand within each of the water supplier's service areas. At buildout in 2040, new demand associated with the HEU and all other projected growth through 2040 shown in Table 5-1 would increase water demand by 715 AFY, or 0.638 MGD. The Cal Water Bear Gulch District could expect an increase of 448 AFY or 0.400 MGD within its service area, and MPMW is expected to see an increase of 267 AFY or 0.238 MGD in its service area. In years with normal or above-normal precipitation (years of normal supply), Cal Water Bear Gulch District and MPMW as shown in Tables 6.1 and 6.4, respectively, would have sufficient supplies available within its water supply portfolio (imported water, local surface water, and ISG) to serve development implemented under the HEU plus existing demand and planned future uses between 2020 and 2040. If the Bay-Delta Plan Amendment is implemented as adopted and under below-normal rainfall conditions, i.e. single dry years or multiple dry years as discussed in Section 6, Cal Water Bear Gulch District and MPMW would have insufficient water supplies to meet the projected water demands associated with implementation of the HEU, in addition to existing and planned future uses within Cal Water Bear Gulch District and MPMW service areas. In fact, both water supply agencies would be operating under their respective stage levels outlined in the WSCPs to balance water demand against significant water supply reductions throughout the RWS.

As noted in both UWMPs, significant challenges remain within the regional water supply and demand context as well as throughout California; growth in demand is projected while statewide supplies are waning and unreliable. Regionally, as growth continues within the BAWSCA member service areas, demand will incrementally reach BAWSCA's 184.0 mgd maximum. If the water supplies currently available to the BAWSCA member agencies continue to be unreliable and subject to cutbacks, then all current and future water service connections will be affected. This is true under normal conditions, but as shown in the tables (Section 6) would be exacerbated during droughts and significantly worse with implementation of the Bay-Delta Plan Amendment. BAWSCA is actively planning and investigating numerous ways to improve supply reliability and reduce demand within its service areas. Although these efforts are in the early planning stages, it would appear, based on the projects and programs presented in the BAWSCA's Long-

Term Reliable Water Supply Strategy document that even modest success in these efforts would improve water supply reliability to all BAWSCA members.

As described in this WSA, the sufficiency of supplies to meet the Updated 2040 Cumulative Demand depends on the assumed reliability of the SFPUC RWS supplies, which depends on whether or not the Bay-Delta Plan Amendment is implemented as adopted. If it is assumed the Bay-Delta Plan Amendment is implemented, projected supplies during normal years are sufficient to meet the Proposed Project demands, but significant supply shortfalls are projected in dry years for BAWSCA agencies including Cal Water Bear Gulch District and MPMW that receive water supplies from the SFPUC RWS, as well as other agencies whose water supplies would be affected by the Bay-Delta Plan Amendment. For Cal Water Bear Gulch District and MPMW, supply shortfalls are projected in single dry years (ranging from 30 to 40 percent) and in multiple dry years (ranging from 30 to 55 percent) through 2040, with similar findings through 2045 based on SFPUC's analysis.

Under the scenario shown in Section 6, which assumes the Bay-Delta Plan Amendment is implemented, the projected single dry year and multiple dry year shortfalls would require implementation of Stages 3, 4, and 5 of each water supplier's WSCP. Cal Water Bear Gulch District would be under Stage 6 in the 5th year of a multiple dry scenario. Units developed from implementation of the HEU would be subject to the same water conservation and water use restrictions as other water users within the Cal Water Bear Gulch District and MPMW systems.

As described in Section 6.6, if the Bay-Delta Plan Amendment is not implemented, projected supplies during normal years, single dry years and multiple dry years are sufficient to meet the demands associated with the Updated 2040 Cumulative Demand; based on SFPUC's analysis, a 16.5 percent supply shortfall is projected during the 4th and 5th consecutive dry years for base year 2045. If supply shortfalls occur, Cal Water Bear Gulch District and MPMW expect to meet these supply shortfalls through water demand reductions and other shortage response actions by implementation of its WSCP. Under the scenario which assumes the Bay-Delta Plan Amendment is not implemented, the projected multiple dry year shortfalls in 2045 would require implementation of Stage 2 of the Cal Water Bear Gulch District and MPMW WSCPs.

7.1 WSA Findings

Regarding the availability of water supplies to serve the HEU, consistent with the findings in their 2020 UWMPs, this WSA presents water supply scenarios with and without implementation of the Bay-Delta Plan Amendment. An explanation of the Bay-Delta Plan Amendment is found in section 4.2.3 and explained in detail in the SFPUC's 2020 UWMP and used to support the results found in the Cal Water Bear Gulch District's and MPMW's 2020 UWMPs.

Water supply scenario **without implementation** of the Bay-Delta Plan Amendment:

- In years of normal and above-normal precipitation and including local water supply sources, the Cal Water Bear Gulch District and MPMW have adequate supplies to serve 100 percent of normal demand beginning in 2025 and through each of their respective planning horizons.

- SFPUC would be able to meet 100 percent of its water supply guarantees during all water year types through 2045 except during the fourth and fifth consecutive dry years for base year 2045 when 15 percent shortages are projected within the RWS. In these years, Cal Water Bear Gulch District and MPMW would not have sufficient supplies to meet demand and would need to activate their water shortage contingency plans. The projected multiple dry year shortfalls in 2045 would require implementation of Stage 2 of the Cal Water Bear Gulch District and MPMW WSCPs.
- As discussed in Section 6.7 and presented in Table 6-7, MPMW through its ISG with SFPUC will meet the projected water demand associated with the Updated 2040 Cumulative Demand. If and when supply shortfalls occur in single dry and multiple dry years as soon as 2025, MPMW expects to meet these supply shortfalls through water demand reductions through implementation of its DMMs.

Water supply scenario **with implementation** of the Bay-Delta Plan Amendment:

- SFPUC will be able to meet its contractual obligations to its wholesale customers in normal years but would experience significant supply shortages in dry years. In these years, Cal Water Bear Gulch District and MPMW would not have sufficient supplies to meet demand and would need to activate their water shortage contingency plans. The projected single dry year and multiple dry year shortfalls would require implementation of Stages 3, 4, 5 and/or 6 of their WSCPs.
- In single dry years, supply shortages in the RWS would range from 36 to 46 percent. In multiple dry years, supply shortages would range from 36 to 54 percent. Notably, implementation of the Bay-Delta Plan Amendment would reduce SFPUC's primary supply source and require rationing in all single dry and multiple dry years through 2040 and 2045. In these years, Cal Water Bear Gulch District and MPMW would not have sufficient supplies to meet demand and would need to activate their water shortage contingency plans. The projected single dry year and multiple dry year shortfalls would require implementation of Stages 3, 4, 5 and/or 6 of their WSCPs.

As discussed in sections 6.9 through 6.12, SFPUC, BAWSCA, Cal Water and MPMW are working to develop regional and local projects to shore up local supplies and reduce the projected shortfall. If conditions for large drought cutbacks to the RWS persist, Cal Water Bear Gulch District and MPMW will need to implement additional demand management practices and prohibitions on potable water use and accelerate efforts to develop alternative supplies of water.

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SECTION 8
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Appendix A

California Water Service, Bear Gulch District, 2020 Urban Water Management Plan

2020 Urban Water Management Plan

Bear Gulch District

June 2021

Table of Contents

List of Tables

List of Figures

List of Acronyms

AB	Assembly Bill
ABAG	Association of Bay Area Governments
ACWD	Alameda County Water District
AF	Acre-Feet
AFY	Acre-Feet Per Year
AMI	Advanced Metering Infrastructure
AMR	Automatic Meter Reading
AWSP	Alternative Water Supply Planning Program
AWWA	American Water Works Association
BAIRWMP	Bay Area Integrated Regional Water Management Plan
BARR	Bay Area Regional Reliability
BAWSCA	Bay Area Water Supply and Conservation Agency
BDPL	Bay Division Pipeline
BG	Billions of Gallons
BGWTP	Bear Gulch Water Treatment Plant
CAP	Customer Assistance Program
CCR	California Code of Regulations
CCWD	Contra Costa Water District
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CII	Commercial, Industrial, and Institutional
CPUC	California Public Utilities Commission
CUWCC	California Urban Water Conservation Council
CWC	California Water Code
DBP	Disinfection By-Product
DDW	Division of Drinking Water
DMM	Demand Management Measure
DRA	Drought Risk Assessment
DSOD	Division of Safety of Dams
DWR	Department of Water Resources
EBMUD	East Bay Municipal Utilities District
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Executive Order
FT	Feet
FY	Fiscal Year
GPCD	gallons per capita per day
GSRP	Groundwater Storage and Recovery Project
HHLSM	Hetch Hetchy and Local Simulation Model

HTWTP	Harry Tracy Water Treatment Plant
ILI	Infrastructure Leakage Index
IRWMP	Integrated Regional Water Management Plan
ISG	Individual Supply Guarantees
JPA	Joint Powers Authority
kWh	Kilowatt Hours
kWh/AF	Kilowatt Hours Per Acre-Foot
LCSD	Lower Crystal Springs Dam
LOS	Level of Service
LVE	Los Vaqueros Reservoir Expansion
MCLs	Maximum Contaminant Levels
MG	Million Gallons
MGD	Million Gallons Per Day
MID	Modesto Irrigation District
MMWD	Marin Municipal Water District
NOAA	National Oceanic and Atmospheric Administration
PODs	Points of Diversion
PREP	Crystal Springs Purified Water Project
PWS	Public Water SystemsPublic Water System
RA	Regional Alliance
RUWMP	Regional Urban Water Management Plan
RWS	Regional Water System
SB	Senate Bill
SFPUC	San Francisco Public Utilities Commission
SGMA	Sustainable Groundwater Management Act
SMP	Surface Mining Permit
SRES	Special Report Emissions Scenarios
SVCW	Silicon Valley Clean Water
SVWTP	Sunol Valley Water Treatment Plant
SWAP	Shared Water Access Program
SWRCB	State Water Resources Control Board
TAP	Technical Assistance Program
TDS	Total Dissolved Solids
TID	Turlock Irrigation District
TRVA	Tuolumne River Voluntary Agreement
USD	Union Sanitary District
USEPA	United States Environmental Protection Agency
UV	Ultraviolet
UWMP	Urban Water Management Plan
WQD	Water Quality Division
WSA	Water Supply Agreement
WSAP	Water Shortage Allocation Plan

WSCP	Water Shortage Contingency Plan
WSIP	Water System Improvement Program
WWTP	Wastewater Treatment Plant

Chapter 1
Introduction and Overview

This chapter discusses the importance and uses of this Urban Water Management Plan (UWMP or Plan), the relationship of this Plan to the California Water Code (CWC), the relationship of this Plan to other local and regional planning efforts, and how this Plan is organized and developed in general accordance with the UWMP Guidebook 2020.[1] Specifically, this chapter contains the following sections:

1.1 Background and Purpose

California Water Service Company (Cal Water) is an investor-owned public utility supplying water service to approximately 1.8 million Californians through over 481,000 connections. Its 25 districts serve 63 communities spanning from the Chico-Hamilton City District in the northern portion of the state to the Palos Verdes District in southern California. California Water Service Group, Cal Water's parent company, also provides water service to communities in Washington, New Mexico, and Hawaii.[2] While water rates are set separately for each of Cal Water's 25 districts, oversight of the water rate setting process and district operations is provided by the California Public Utilities Commission (CPUC).

Cal Water incorporated in 1926 and has provided water service to communities served by the Bear Gulch District since 1936. These communities include Portola Valley, Woodside, Atherton, and portions of Menlo Park, Redwood City, and San Mateo County. Skyline County's water system became part of the Bear Gulch district in 2009.

This UWMP is a foundational document and source of information about the Bear Gulch District's historical and projected water demands, water supplies, supply reliability and potential

[1] The UWMP Guidebook 2020 is available at: https://water.ca.gov/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/Urban-Water-Management-Plans

[2] In addition, Cal Water operates the City of Hawthorne's water system on behalf of the City.

vulnerabilities, water shortage contingency planning, and demand management programs. Among other things, it is used as:

- A long-range planning document by Cal Water for water supply and system planning; and
- A source for data on population, housing, water demands, water supplies, and capital improvement projects used in:
  - Regional water resource management plans prepared by wholesale water suppliers and other regional planning authorities (as applicable),
  - General Plans prepared by cities and counties, and
  - Statewide and broad regional water resource plans prepared by the California Department of Water Resources (DWR), the State Water Resources Control Board (SWRCB), or other state agencies.

The District's last UWMP was completed in 2016, referred to herein as the "2015 UWMP." This Plan is an update to the 2015 UWMP and carries forward information from that plan that remains current and relevant, and provides additional information as required by subsequent amendments to the UWMP Act (CWC §10610 – 10657). Although this Plan is an update to the 2015 UWMP, it was developed to be a self-contained, stand-alone document and does not require readers to reference information contained in previous UWMP updates.

1.2 Urban Water Management Planning and the California Water Code

The UWMP Act requires urban water suppliers to prepare an UWMP every five years and to submit this plan to the DWR, the California State Library, and any city or county within which the supplier provides water supplies. All urban water suppliers, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet annually are required to prepare an UWMP (CWC §10617).

The UWMP Act was enacted in 1983. Over the years it has been amended in response to water resource challenges and planning imperatives confronting California. A significant amendment was made in 2009 as a result of the governor's call for a statewide 20 percent reduction in urban water use by 2020, referred to as "20x2020," the Water Conservation Act of 2009, and "SB X7-7." This amendment required urban retail water suppliers to establish water use targets for 2015 and 2020 that would result in statewide water savings of 20 percent by 2020. Beginning in 2016, urban retail water suppliers were required to comply with the water conservation requirements in SB X7-7 in order to be eligible for state water grants or loans. Chapter 5 of this plan contains the data and calculations used to determine compliance with these requirements.

A subsequent substantial revision to the UWMP Act was made in 2018 through a pair of bills (i.e., Assembly Bill 1668 and Senate Bill 606), referred to as "Making Water Conservation a California

Way of Life" or the "2018 Water Conservation Legislation." These changes include, among other things, additional requirements for Water Shortage Contingency Plans (WSCPs), expansion of dry year supply reliability assessments to a five-year drought period, establishment of annual drought risk assessment procedures and reporting, and new conservation targets referred to as "annual water use objectives," which will require retailers to continue to reduce water use beyond the 2020 SB X7-7 targets. The UWMP Act contains numerous other requirements that an UWMP must satisfy. Appendix A to this Plan lists each of these requirements and where in the Plan they are addressed.

1.3 Relationship to Other Planning Efforts

This Plan provides information specific to water management and planning by the Bear Gulch District. However, water management does not happen in isolation; there are other planning processes that integrate with the UWMP to accomplish urban planning. Some of these relevant planning documents include relevant city and county General Plans, Water Master Plans, Recycled Water Master Plans, integrated resource plans, Integrated Regional Water Management Plans, Groundwater Management Plans, Groundwater Sustainability Plans, and others.

This Plan is informed by and helps to inform these other planning efforts. In particular, this Plan utilizes information contained in city and county General Plans and local and regional water resource plans to the extent data from these plans are applicable and available.

1.4 Plan Organization

The organization of this Plan follows the same sequence as outlined in the UWMP Guidebook 2020.[3]

Chapter 1 - Introduction and Overview

Chapter 2- Plan Preparation

Chapter 3 - System Description

Chapter 4 - Water Use Characterization

Chapter 5 - SB X7-7 Baseline and Targets

Chapter 6 - Water Supply Characterization

[3] The UWMP Guidebook 2020 is available at: https://water.ca.gov/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/Urban-Water-Management-Plans

Chapter 7 - Water Supply Reliability Assessment

Chapter 8 - Water Shortage Contingency Planning

Chapter 9 - Demand Management Measures

Chapter 10 - Plan Adoption, Submittal, and Implementation

In addition to these ten chapters, this Plan includes a number of appendices providing supporting documentation and supplemental information. Pursuant to CWC §10644(a)(2), this Plan utilizes the standardized forms, tables, and displays developed by DWR for the reporting of water use and supply information required by the UWMP Act. This Plan also includes additional tables, figures, and maps to augment the set developed by DWR, as appropriate. The table headers indicate if the table is part of DWR's standardized set of submittal tables.

1.5 Demonstration of Consistency with the Delta Plan for Participants in Covered Actions

Although not required by the UWMP Act, in the UWMP Guidebook 2020,[4] DWR recommends that all suppliers that are participating in, or may participate in, receiving water from a proposed project that is considered a "covered action" under the Delta Plan—such as a (1) multiyear water transfer; (2) conveyance facility; or (3) new diversion that involves transferring water through, exporting water from, or using water in the Sacramento-San Joaquin Delta (Delta)—provide information in their UWMP to demonstrate consistency with the Delta Plan policy WR P1, Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance (California Code of Regulations, Title 23, Section 5003). The San Francisco Public Utilities Commission (SFPUC), the District's wholesale agency, has made a legal determination that this requirement does not apply to their water sources.[5]

1.6 Lay Description

☑ ***CWC § 10630.5***

Each plan shall include a simple lay description of how much water the agency has on a reliable basis, how much it needs for the foreseeable future, what the agency's strategy is for meeting its water needs, the challenges facing the agency, and any other information necessary to provide a general understanding of the agency's plan.

[4] The UWMP Guidebook 2020 is available at: https://water.ca.gov/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/Urban-Water-Management-Plans
[5] Email from BAWSCA, dated 9 February 2021.

This Urban Water Management Plan (UWMP or Plan) is prepared for the Cal Water Bear Gulch District (also referred to as "District"), which serves drinking water to a population of approximately 60,800 in San Mateo County, approximately 30 miles south of the City of San Francisco. This UWMP serves as a foundational planning document and includes descriptions of historical and projected water demands, water supplies, and the resulting reliability during a set of defined water supply conditions over a 20-year planning horizon. This document also describes the actions the District is taking to promote water conservation, both by the District itself and by its customers (referred to as "demand management measures"), and includes a plan to address potential water supply shortages such as drought or other impacts to supply availability (the "Water Shortage Contingency Plan"). This UWMP is updated every five years in accordance with state requirements under the Urban Water Management Planning Act and amendments (Division 6 Part 2.6 of the California Water Code [CWC] §10610 – 10656). Past plans developed for the District are available on the California Department of Water Resources (DWR) Water Use Efficiency Data Portal website: https://wuedata.water.ca.gov/. This document includes 10 chapters, which are summarized below.

Chapter 1- Introduction and Overview

This chapter presents the background and purpose of the UWMP, identifies the Plan organization, and provides this lay description overview of the document. For districts that rely on water from the Sacramento-San Joaquin Delta, this section also discusses and demonstrates consistency with the Delta Plan. Based on information provided by the San Francisco Public Utilities Commission (SFPUC) and the Bay Area Water Supply and Conservation Agency (BAWSCA), the adoption of the Delta Plan is anticipated to impact the reliability of the Regional Water System (RWS) supplies in the future. The San Francisco Public Utilities Commission (SFPUC), the District's wholesale agency, has made a legal determination that this requirement does not apply to their water sources.[6]

Chapter 2 - Plan Preparation

This chapter discusses key structural aspects related to the preparation of the UWMP, and describes the coordination and outreach conducted as part of the preparation of the Plan, including coordination with local agencies (i.e., Town of Atherton, Town of Portola Valley, Town of Woodside, City of Menlo Park, and San Mateo County), and the public.

Chapter 3 - System Description

This chapter provides a description of the Bear Gulch District's water system and the service area, including information related to the climate, population, and demographics. The District is located in San Mateo County. The District has a population of approximately 63,800 and has a

[6] Email from BAWSCA, dated 9 February 2021.

climate characterized by mild summers and cool wet winters. The majority of the 37 inches of average annual precipitation falls between October and May. Current land uses within the District is a mixture of low, medium, and high density residential, mixed use, commercial, public facilities, and parks/open space. All water customers are considered urban (i.e., non-agricultural water users).

Chapter 4 - Water Use Characterization

This chapter provides a description and quantifies the Bear Gulch District's current and projected demands through the year 2045. The District provides drinking water (also referred to as "potable water") to customers. Water demands refer not only to the water used by customers, but also includes the water used as part of the system maintenance and operation, as well as unavoidable losses inherent in the operation of a water distribution system. Water demand within the District was 11,655 acre-feet per year (AFY) on average between 2016 and 2020. Taking into account historical water use, expected population increase and other growth, climatic variability, and other assumptions, water demand within the District is projected to increase to a maximum of 12,796 AFY by 2025, a change of nine percent compared to the 2016-2020 average. In dry year periods, water demands are expected to be somewhat higher, potentially up to a maximum of 13,699 AFY by 2025 during an extended five-year drought.

Chapter 5 - SB X7-7 Baseline and Targets

In this chapter, the Bear Gulch District demonstrates compliance with its per capita water use target for the year 2020. The Water Conservation Act of 2009 (Senate Bill X7-7) was enacted in November 2009 and requires the state of California to achieve a 20 percent reduction in urban per capita water use by December 31, 2020. In order to achieve this, each urban retail water supplier was required to establish water use targets for 2015 and 2020 using methodologies established by DWR. Having reduced its water use in 2020 to 190 gallons per capita per day (GPCD), the Bear Gulch District did not meet its individual 2020 water use target of 187 GPCD. However, the District is a member of the California Water Service – San Francisco Bay Regional Alliance and complies with SB X7-7 requirements via this regional alliance. The Regional Alliance's 2020 water use is 130 GPCD, which is in below (i.e., in compliance with) its 2020 target of 150 GPCD.

Chapter 6 - Water Supply Characterization

This chapter presents an analysis of the Bear Gulch District's water supplies, as well as an estimate of water-related energy-consumption. The intent of this chapter is to present a comprehensive overview of the District's water supplies, estimate the volume of available supplies over the 20-year planning horizon, and assess the sufficiency of the District's supplies to meet projected demands under "normal" hydrologic conditions.

The Bear Gulch District derives its water supply from a combination of both local surface water and imported surface water supply purchased from the SFPUC RWS. California Water Service Company (Cal Water)'s annual allocation of SFPUC supply is shared among the Bear Gulch, Mid-Peninsula, and South San Francisco Districts. Local surface water comprises approximately nine percent of annual deliveries from 1980 to 2020.

Calculating and reporting of water system energy intensity is a new requirement for the 2020 UWMPs. Energy intensity is defined as the net energy used for water treatment, pumping, conveyance, and distribution for all water entering the distribution system, and does not include the energy used to treat wastewater. The energy intensity for the Bear Gulch District is estimated to be 345 kilowatt hours per acre-foot of water (kWh/AF).

Chapter 7 - Water Supply Reliability Assessment

This chapter assesses the reliability of the Bear Gulch District's water supplies, with a specific focus on potential constraints such as purchased water and surface water supply availability, water quality, and climate change. The intent of this chapter is to identify any potential constraints that could affect the reliability of the District's supply (such as drought conditions) to support the District's planning efforts to ensure that its customers are well served. Water service reliability is assessed during normal, single dry-year, and multiple dry-year hydrologic conditions.

The Bear Gulch District's local surface water supply is expected to be 100 percent reliable in normal year types. However, it is conservatively estimated that there will be no local surface water supply in dry year types.

The reliability of the RWS is anticipated to vary greatly in different year types. Cal Water has relied on the supply reliability estimates provided by the SFPUC for the RWS and the drought allocation structure provided by SFPUC and BAWSCA to estimate available RWS supplies in dry year types through 2045.

Based on this analysis, the District's supply is expected to be sufficient to meet demands in normal year conditions. However, the District is expected to experience significant shortfalls during single dry and multiple dry year conditions as a result of Bay-Delta Plan Amendment implementation. At this time numerous uncertainties remain in the implementation of the Bay-Delta Plan Amendment and the resultant allocation of the available supply to the District and the other SFPUC Wholesale Customers. Cal Water has developed a Water Shortage Contingency Plan to address potential water shortage conditions.

Potential water quality issues are not expected to affect the quality of water served to the District's customers, as water quality is routinely monitored and the District is able to make all appropriate adjustments to its treatment and distribution system to ensure only high quality drinking water is served.

Chapter 8 - Water Shortage Contingency Planning

This chapter describes the Water Shortage Contingency Plan (WSCP) for the Bear Gulch District. The WSCP serves as a standalone document to be engaged in the case of a water shortage event, such as a drought or supply interruption, and defines specific policies and actions that will be implemented at various shortage level scenarios. For example, implementing customer water budgets and surcharges, or restricting landscape irrigation to specific days and/or times. Consistent with DWR requirements, the WSCP includes six levels to address shortage conditions ranging from up to 10 percent to greater than 50 percent shortage.

Chapter 9 - Demand Management Measures

This chapter includes descriptions of past and planned conservation programs that Cal Water operates within each demand management measure (DMM) category outlined in the UWMP Act, specifically: (1) water waste prevention ordinances, (2) metering, (3) conservation pricing, (4) public education and outreach, (5) distribution system water loss management, (6) water conservation program coordination and staffing support, and (7) "other" DMMs. Cal Water has developed a suite of conservation programs and policies, which address each DMM category.

Chapter 10 - Plan Adoption, Submittal, and Implementation

This chapter provides information on a public hearing, the adoption process for the UWMP and WSCP, the adopted UWMP and WSCP submittal process, plan implementation, and the process for amending the adopted UWMP and WSCP. Prior to adopting the Plan, Cal Water held a formal public hearing to present information on its Bear Gulch District UWMP and WSCP on June 9, 2021, 5:00 PM. This UWMP and the corresponding WSCP were submitted to DWR within 30 days of adoption and by the July 1, 2021 deadline.

Cal Water recommends that users of its 2020 UWMP contact District staff for potential updates about its water supply reliability before using the 2020 UWMP drought cutback projections for their planning projects and referencing the drought allocations.

Chapter 2
Plan Preparation

This chapter discusses the type of Urban Water Management Plan (UWMP or Plan) the Bear Gulch District (also referred to herein as "District") has prepared and includes information that will apply throughout the Plan. Coordination and outreach during the development of the Plan is also discussed. Specifically, this chapter includes the following sections:

2.1 Public Water Systems

2.2 Regional Planning

2.3 Individual or Regional Planning and Compliance (Regional Alliance)

2.4 Plan Preparation, Standard Units, and Basis for Reporting

2.5 Coordination and Outreach

2.1 Public Water Systems

The Bear Gulch District operates the Public Water System (PWS) listed in Table 2-1. Public Water Systems are the systems that provide drinking water for human consumption and are regulated by the State Water Resources Control Board (SWRCB), Division of Drinking Water. The SWRCB requires that water agencies report water usage and other relevant PWS information via the electronic Annual Reports to the Drinking Water Program (eARDWP). These data are used by the state to determine, among other things, whether an urban retail water supplier has reached the threshold (3,000 or more connections or 3,000 acre-feet of water supplied) for submitting an UWMP.

Table 2-1. Public Water Systems (DWR Table 2-1)

Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020
CA4110006	Bear Gulch	18,561	12,972
	TOTAL	18,561	12,972
NOTES: (a) Volumes are in units of AF.			

2.2 Regional Planning

Regional planning can deliver mutually beneficial solutions to all agencies involved by reducing costs for the individual agency, assessing water resources at the appropriate geographic scale, and allowing for solutions that cross jurisdictional boundaries. California Water Service Company (Cal Water) participates in regional water resources planning initiatives throughout California in the regions in which its 25 water districts are located. In the region in which the Bear Gulch District is located, Cal Water participates in regional planning through the Bay Area Water Supply and Conservation Agency (BAWSCA). As a BAWSCA member, Cal Water assisted with development of the San Francisco Bay Area Integrated Regional Water Management Plan and BAWSCA's Long-Term Reliability Water Supply Strategy, discussed further in Section 7.1.1.

2.3 Individual or Regional Planning and Compliance (Regional Alliance)

Urban water suppliers may elect to prepare individual or regional UWMPs. The Bear Gulch District has elected to prepare an individual UWMP (see Table 2-2).

Urban retail water suppliers may report on the requirements of SB X7-7 (2009 California Conservation Act) individually or as a member of a "Regional Alliance." As described in Chapter 5, the Bear Gulch District is a member of a Regional Alliance and this UWMP provides information on the District's compliance with its SB X7-7 water conservation targets both as an individual urban retail water supplier and as a member of a Regional Alliance.

Table 2-2. Plan Identification (DWR Table 2-2)

<table>
<tr><th>Select Only One</th><th colspan="2">Type of Plan</th><th>Name of RUWMP or Regional Alliance
if applicable</th></tr>
<tr><td>X</td><td colspan="3">Individual UWMP</td></tr>
<tr><td rowspan="2"></td><td></td><td>Water Supplier is also a member of a RUWMP</td><td></td></tr>
<tr><td>X</td><td>Water Supplier is also a member of a Regional Alliance</td><td>California Water Service - San Francisco Bay Regional Alliance</td></tr>
<tr><td></td><td colspan="2">Regional Urban Water Management Plan (RUWMP)</td><td></td></tr>
<tr><td colspan="4">NOTES: The Bear Gulch District is a member of a Regional Alliance. Chapter 5 provides information on the District's progress towards meeting its water conservation targets under SB X7-7 both as an individual urban retail water supplier and as a member of its Regional Alliance.</td></tr>
</table>

2.4 Plan Preparation, Standard Units, and Basis for Reporting

☑ ***CWC § 10608.12 (t)***

"Urban retail water supplier" means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.

☑ ***CWC § 10617***

"Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

☑ ***CWC § 10621 (a)***

Each urban water supplier shall update its plan at least once every five years on or before July 1, in years ending in six and one, incorporating updated and new information from the five years preceding each update.

☑ ***CWC § 10621 (f)***

Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.

Per California Water Code (CWC) §10617, the Bear Gulch District is an urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. It is therefore obligated under CWC §10621(f) to develop and submit an UWMP to the California Department of Water Resources (DWR) by July 1, 2021. The Bear Gulch District is an urban retail water supplier, as defined by CWC §10608.12 (t) and §10617, and as identified in Table 2-3. The Bear Gulch District is not a wholesale water supplier.

Annual volumes of water reported in this UWMP are measured in acre-feet (AF) and are reported on a calendar year basis (Table 2-3). Water use and planning data reported in this UWMP for calendar year 2020 cover the full twelve months of the year, as required by the UWMP Guidelines.

Table 2-3. Supplier Identification (DWR Table 2-3)

Type of Supplier	
	Supplier is a wholesaler
X	Supplier is a retailer
Fiscal or Calendar Year	
X	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)	
Units of measure used in UWMP	
Unit	AF
NOTES:	

2.5 Coordination and Outreach

☑ ***CWC § 10620 (d) (3)***

Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

☑ ***CWC § 10631 (a)*** *A plan shall be adopted in accordance with this chapter that shall do all of the following:*

Urban water suppliers shall coordinate with local or regional land use authorities to determine the most appropriate land use information, including, where appropriate, land use information obtained from local or regional land use authorities, as developed pursuant to Article 5 (commencing with Section 65300) of Chapter 3 of Division 1 of Title 7 of the Government Code.

☑ ***CWC § 10642***

Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of both the plan and the water shortage contingency plan. Prior to adopting either, the urban water supplier shall make both the plan and the water shortage contingency plan available for public inspection and shall hold a public hearing or hearings thereon. …

Coordination with other water suppliers, cities, counties, and other community organizations in the region is an important part of preparing a UWMP and Water Shortage Contingency Plan

(WSCP). This section identifies the agencies and organizations the Bear Gulch District sought to coordinate with during preparation of this Plan.

2.5.1 Wholesale and Retail Coordination

☑ ***CWC § 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. 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). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (f).

Urban retail water suppliers relying on one or more wholesalers for water supply are required to provide these wholesalers with information regarding projected water supply and demand. The Bear Gulch District coordinates with the wholesale supplier shown in Table 2-4.

Table 2-4. Water Supplier Information Exchange (DWR Table 2-4)

The retail Supplier has informed the following wholesale supplier(s) of projected water use in accordance with Water Code Section 10631.
Wholesale Water Supplier Name
San Francisco Public Utilities Commission
NOTES:

2.5.2 Coordination with and Notice to Other Agencies and the Community

☑ ***CWC § 10620 (d) (3)***

Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

☑ ***CWC § 10642***

Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of both the plan and the water shortage contingency plan. Prior to adopting either, the urban water supplier shall make both the plan and the water shortage contingency plan available for public inspection and shall hold a public hearing or hearings thereon. Prior to any of these hearings, notice of the time and place of the hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of a hearing to any city or county within which the supplier provides water supplies. Notices by a local public agency pursuant to this section shall be provided pursuant to Chapter 17.5 (commencing with Section 7290) of Division 7 of Title 1 of the Government Code. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing or hearings, the plan or water shortage contingency plan shall be adopted as prepared or as modified after the hearing or hearings.

The Bear Gulch District coordinated with cities, counties, and other community organizations during preparation of this UWMP. Cal Water provided notice to these entities and the communities it serves 60 days prior to the public hearing it held on June 9, 2021, to present the draft of the UWMP, address questions, and receive comments. Cities and counties receiving the public hearing notification from Bear Gulch District as required per CWC §10621 (b) are listed in Table 10-1 in Chapter 10 of this Plan.

Copies of correspondence with other agencies and public notices are provided in Appendix B and Appendix C, respectively.

2.5.3 Coordination with Land Use Authorities

☑ ***CWC § 10631 (a)*** *A plan shall be adopted in accordance with this chapter that shall do all of the following:*

Urban water suppliers shall coordinate with local or regional land use authorities to determine the most appropriate land use information, including, where appropriate, land use information obtained from local or regional land use authorities, as developed pursuant to Article 5 (commencing with Section 65300) of Chapter 3 of Division 1 of Title 7 of the Government Code.

Cal Water coordinated with the Town of Atherton, Town of Portola Valley, Town of Woodside, City of Menlo Park, and San Mateo County staff to review and confirm that appropriate land use assumptions were used to develop the UWMP demand projections. Correspondence with land use authorities is included in Appendix B.

Chapter 3
System Description

☑ ***CWC § 10631 (a)***

A plan shall be adopted in accordance with this chapter that shall do all of the following:

Describe the service area of the supplier, including current and projected population, climate, and other social, economic, and demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available. The description shall include the current and projected land uses within the existing or anticipated service area affecting the supplier's water management planning. Urban water suppliers shall coordinate with local or regional land use authorities to determine the most appropriate land use information, including, where appropriate, land use information obtained from local or regional land use authorities, as developed pursuant to Article 5 (commencing with Section 65300) of Chapter 3 of Division 1 of Title 7 of the Government Code.

This chapter provides a description of the Bear Gulch District (also referred to herein as the "District") water system and service area, including climate, population, demographics, and land uses to help in understanding various elements of water supply and demand. This chapter includes the following sections:

3.1 General Description

3.2 Service Area Boundary Map

3.3 Service Area Climate

3.4 Service Area Population and Demographics

3.5 Land Uses within Service Area

3.1 General Description

The District was formed in 1936 by California Water Service Company (Cal Water), an investor-owned water utility regulated by the California Public Utilities Commission (CPUC), and serves the communities of Portola Valley, Woodside, Atherton, and portions of Menlo Park, Redwood City, and San Mateo County. The District's water supply is comprised of local surface water (approximately nine percent of annual deliveries) and water purchased from the City and County of San Francisco's Hetch Hetchy system. The District delivers roughly 12 million gallons of water per day to more than 18,000 service connections. The District delivers water to residential, commercial, industrial, and governmental customers. Residential customers account for most of the District's service connections and 84 percent of its water uses. Non-residential water uses account for 11 percent of total demand while distribution system losses account for 5 percent.

3.2 Service Area Boundary Map

Figure 3-1 shows the location of the District and its current service area boundaries. The District is located in San Mateo County approximately 30 miles south of the City of San Francisco. The District is bordered on the north by Redwood City; on the east by Palo Alto, Stanford University, and unincorporated Santa Clara County; and on the south and west by unincorporated San Mateo County. The major transportation links through the District are Interstate 280, U.S. Highway 101, El Camino Real, Woodside Road, and Alpine Road. The Dumbarton Bridge connects the area to the East Bay communities.

Elevations in the service area range from just over sea level on the eastern boundary to nearly 1,100 feet above sea level on the western boundary. This marked variation in elevation requires 33 separate pressure zones for effective system operation. Much of the terrain that bounds the service area on the west is too steep for any type of development.

The San Francisquito Creek and its tributaries provide the principal source of drainage to the area. Bear Gulch Creek, one of these tributaries, drains a 1,500-plus acre watershed of which Cal Water owns 1,306 acres. Storm runoff carried by this creek is captured by two separate diversion facilities on the creek providing the only local source of supply available to the District.

The San Andreas Fault rift zone forms the major geologic features of the area as it passes through the western portion of the service area along with the Monta Vista Fault Line. The Hayward Fault lies along the east side of San Francisco Bay. A major earthquake occurring on any of these faults may disrupt water service in the District.

Figure 3-1. District Location and Service Boundaries

3.3 Service Area Climate

The District's climate is characterized by mild summers and cool wet winters (see Figure 3-2).[7] Most rainfall occurs between October and May. Precipitation totals in the summer months are

[7] Precipitation and temperature data downloaded from: https://prism.oregonstate.edu/explorer/. These data represent a 30-year period from 1980 through 2010. The x-axis reflects the end of the 30-year time series.

negligible. On average, the District receives 37 inches of rainfall annually. Maximum daily air temperature averages 81 degrees Fahrenheit during the summer months. In the winter, it averages 56 degrees Fahrenheit.

Figure 3-2. 30-Year Normals, Precipitation and Maximum Daily Air Temperature

Based on a review of data downloaded from the Oregon State PRISM dataset for 1895 to 2019, rainfall varies significantly from year-to-year, as it does in most of California.[8] The standard deviation in annual rainfall is 11 inches, or approximately one-third of average annual rainfall.[9] Consecutive years of below average rainfall are fairly common. Since 1895, runs of below average rainfall lasting three or more years have occurred ten times and runs lasting five or more years have occurred once, running from 1987 through 1991. While rainfall in the region is highly variable, there has been no statistically significant trend in the mean or variance of annual rainfall since 1895.

The District's climate has been warming. Since 1895, average daily temperature has increased at an average rate of 0.014 degrees Fahrenheit per year. Mean annual temperature for 2010-2019 was 1.7 degrees Fahrenheit higher than for 1900-1909.

3.4 Service Area Population and Demographics

It is estimated that the District's service area population was 60,814 in 2020.

The District estimates its service area population using Census Block population counts from decadal Census data. The decadal Census estimates are converted to average population per single- and multi-family service, which are applied to service counts for years between the

[8] Downloaded from: https://prism.oregonstate.edu/explorer/. The x-axis reflects the end of the 30-year time series.
[9] Standard deviation measures the typical or average year-to-year variation in annual rainfall amount. Thus, it is typical for annual rainfall to fluctuate significantly in the District.

decadal Censuses. This method is similar to the approach used by the California Department of Water Resources (DWR) Population Tool and population estimates generated by the two methods have been shown to differ by less than a percent in most cases.[10]

Current and projected service area population are shown in Table 3-1. Projected population is based on population, housing, and employment projections developed by the Association of Bay Area Governments (ABAG).[11]

Table 3-1. Population – Current and Projected (DWR Table 3-1)

Population Served	2020	2025	2030	2035	2040	2045
	60,814	60,907	61,255	61,778	62,302	62,835
NOTES:						

Demographics for the Atherton, Menlo Park, North Fair Oaks, Portola Valley, West Menlo Park and Woodside are summarized in Table 3-2. These data are from the U.S. Census American Community Survey 2019 5-Year Estimates.[12] Relative to the rest of California, the District's population is older and more racially homogenous. Educational attainment is higher than for the state as a whole, as is median household income.

The District's stock of housing is older than for California as a whole. Only 14.8 percent of homes in the District were built after 1990 compared to 25.5 percent for all of California. Homes built after 1990 are more likely to have plumbing fixtures that are compliant with state and federal water and energy efficiency standards.

[10] California Water Service, 2016. 2015 Urban Water Management Plan: Bear Gulch District, dated June 2016.
[11] Association of Bay Area Governments Projections 2040. Accessed from: http://projections.planbayarea.org/
[12] U.S. Census Bureau, 2019. 2015-2019 American Community Survey 5-year Estimates, dated 2019. Retrieved from: https://data.census.gov/cedsci/.

Table 3-2. Demographic and Housing Characteristics

Demographics	Ather-ton	Menlo Park	North Fair Oaks	Portola Valley	West Menlo Park	Wood-side	Cali-fornia
Median Age (Years)	47.4	37.9	33.1	52.8	39.8	47.5	36.5
Racial Makeup (%)							
White	75.5	71.8	55.5	91.2	83.1	87.6	63.8
Black or African American	1.2	5.8	2.7	1.9	1.7	1.5	7.0
American Indian and Alaska Native	1.8	1.3	1.6	0.1	1.0	1.1	1.9
Asian	24.1	18.2	6.7	10.0	19.1	10.2	16.7
Native Hawaiian	1.2	2.4	0.2	0.0	0.0	0.1	0.8
Some other race	1.3	6.2	38.5	1.3	0.0	4.0	15.1
Hispanic or Latino (of any race) (%)	4.4	15.5	73.4	6.7	4.1	9.1	39.0
Educational Attainment (%)							
Bachelor's Degree or Higher	81.9	69.6	26.4	77.1	83.2	78.7	33.9
Primary Language Spoken at Home (%)							
English Only	77.0	67.2	26.0	87.3	87.9	82.8	82.2
Limited English-Speaking Households	1.2	4.4	16.2	0.0	2.5	0.6	8.9
Median Household Income ($)	250,000+	160,784	77,899	224,554	214,167	250,000+	75,235
Population below Federal Poverty Level (%)	3.7	7.6	15.1	1.8	3.9	4.5	13.4
Housing	**Ather-ton**	**Menlo Park**	**North Fair Oaks**	**Portola Valley**	**West Menlo Park**	**Wood-side**	**Cali-fornia**
Median Year Built	1959	1959	1959	1969	1959	1964	1975
Year Housing Built (%)							
2010 or Later	7.3	3.9	2.0	4.4	6.9	3.3	3.5
2000 to 2009	9.6	4.4	1.1	9.0	4.6	8.1	11.2
1990 to 1999	8.6	4.5	7.0	5.5	4.8	7.8	10.9
Before 1990	74.5	87.1	89.9	81.1	83.8	80.8	74.5

3.5 Land Uses within Service Area

Current land uses within the District is a mixture of low, medium, and high density residential, mixed use, commercial, public facilities, and parks/open space. Maps showing General Plan land use designations for communities served by the District are provided in Appendix D.

The District's population and service growth projections are tied to ABAG census tract level projections of population, housing, and employment. These projections, in turn, are developed by ABAG through detailed land use modeling of the Bay Area.[13] The areas included in the ABAG land use model include all incorporated and unincorporated areas of the nine-county Bay Area. ABAG's land use model application is comprised of ten sub models:

1. Employment Transition Model
2. Household Transition Model
3. Real Estate Development Model
4. Scheduled Development Events Model
5. Employment Relocation Model
6. Household Relocation Model
7. Government Growth Model
8. Employment Location Choice Model
9. Household Location Choice Model
10. Real Estate Price Model

Parcels, or individual units of land ownership, provide the fundamental building block for the ABAG land use model. The land use database includes information linking the parcels to zones they are within, buildings within each parcel, their size, their monetary value, and their current planning constraints. The base year database contains 1.9 million buildings categorized into 14 different land use types, ranging from detached single-family housing to heavy industrial.

The ABAG land use model relies on current zoning for all parcels in the region as a representation of the land use controls in place in the base year. Zoning codes, general plans, and specific plans were processed by ABAG to obtain a consistent indication of each jurisdiction's long-term vision for land use type, residential dwelling units per acre, and commercial floor-area-ratio.

[13] Association of Bay Area Governments and Metropolitan Transportation Commission (2017). Land Use Modeling Report, Plan Bay Area 2040 Final Supplemental Report, dated July 2017. Accessed from: http://2040.planbayarea.org/files/2020-02/Land_Use_Modeling_PBA2040_Supplemental%20Report_7-2017.pdf

Chapter 4
Water Use Characterization

☑ ***CWC § 10631 (d) (1)*** *A plan shall be adopted in accordance with this chapter that shall do all of the following:*

For an urban retail water supplier, quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, based upon information developed pursuant to subdivision (a), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following:

(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.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

This chapter provides a description and quantifies the Bear Gulch District's (also referred to herein as the "District") past, current, and projected water uses through 2045. For the purposes of the Urban Water Management Plan (UWMP or Plan), the terms "water use" and "water demand" are used interchangeably. This chapter is divided into the following subsections:

4.1 Non-Potable Versus Potable Water Use

4.2 Past, Current, and Projected Water Uses by Sector

4.3 Climate Change Considerations

Appendix E provides additional information and data related to the development of the water demand projections presented in this chapter.

4.1 Non-Potable Versus Potable Water Use

This Plan maintains a clear distinction between recycled, potable, and raw water uses and supplies. Recycled water is addressed comprehensively in Chapter 6, but a summary of recycled water demand is included in Table 4-3 of this chapter. The primary focus of this chapter is the historical and projected potable water uses in the District.

4.2 Past, Current, and Projected Water Uses by Sector

☑ ***CWC § 10631 (d)***

For an urban retail water supplier, quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, based upon information developed pursuant to subdivision (a), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following:

(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.

4.2.1 Past and Current Water Use

Table 4-1 shows water use in 2016-2020 by use type (referred to as "sector" in CWC §10631). Water use has been decreasing in the District since the mid-2000s. Several factors have contributed to this reduction. First, California Water Service Company (Cal Water) implemented conservation pricing starting in 2009, supplying stronger financial incentives to use water efficiently. Second, starting around 2012, Cal Water tripled the level of expenditure on conservation programs aimed at helping customers use water more efficiently. Third, appliance efficiency standards and plumbing codes have contributed to significant improvement over time in the average water use efficiency of the installed base of appliances and plumbing fixtures. For example, a new toilet uses roughly one-third the amount of water as a toilet manufactured in the 1980s while a new clothes washer uses about half the amount of water as an older washer.[14] Per capita water use in 2020 was 24 percent below its peak in the early 2000s.

[14] Water Research Foundation, 2016. Residential End Uses of Water, Version 2, prepared by DeOreo, William B., Peter Mayer, Benedykt Dziegielewski, and Jack Kiefer, dated April 2016.

Water use in 2020 was 12,972 acre-feet (AF). Residential customers accounted for most of the District's service connections and 84 percent of its water uses. Non-residential water uses accounted for 11 percent of total demand, while distribution system losses accounted for 5 percent.

Table 4-1. Demands for Potable and Non-Potable Water - Actual (DWR Table 4-1)

Use Type	Additional Description *(as needed)*	Level of Treatment When Delivered	Volume (a)				
			2016	2017	2018	2019	2020
Single Family		Drinking Water	8,001	9,000	9,742	9,361	10,598
Multi-Family		Drinking Water	235	264	285	242	279
Commercial		Drinking Water	980	1,048	1,111	1,152	1,038
Institutional/Gov't		Drinking Water	218	292	323	299	303
Industrial		Drinking Water	2	2	2	2	3
Other Potable		Drinking Water	54	59	28	35	20
Landscape		Drinking Water	24	26	29	27	21
Losses	(b)	Drinking Water	591	705	416	752	711
		TOTAL	10,105	11,395	11,936	11,869	12,972

NOTES:
(a) Volumes are in units of AF.
(b) Real and apparent losses.

4.2.2 Projected Water Use

Projected water use through 2045 is summarized in Table 4-2. Projected water use is estimated as a function of expected service growth and a forecast of average water use per service for each of the use types shown in the table. As discussed in Chapter 3, population and service growth projections are based on population, housing, and employment projections developed by the Association of Bay Area Governments (ABAG).[15]

As described later in the chapter, average water use per service is adjusted over the forecast period to account for anticipated reductions in water use due to the ongoing effects of appliance standards and plumbing codes, conservation and customer assistance programs, and growth in the inflation-adjusted cost of water service and household income. These factors, in combination, are projected to attenuate the projected increase in water use associated with projected service and population growth.

[15] Association of Bay Area Governments Projections 2040. Accessed from: http://projections.planbayarea.org/

Table 4-2. Use for Potable and Non-Potable Water – Projected (DWR Table 4-2)

Use Type	Additional Description *(as needed)*	Projected Water Use				
		2025	2030	2035	2040	2045
Single Family		10,591	10,595	10,629	10,605	10,647
Multi-Family		264	267	277	281	286
Commercial		957	913	897	864	836
Institutional/Gov't		286	278	279	274	270
Industrial		3	3	3	3	3
Other Potable		18	18	18	18	18
Landscape		21	21	21	21	21
Losses	(b)	657	604	607	610	614
	TOTAL	12,796	12,699	12,730	12,675	12,694

NOTES:
(a) Volumes are in units of AF.
(b) Real and apparent losses.

Future water demands are expected to be comprised entirely of potable water use, as shown in Table 4-3. Potential opportunities for recycled water use in the District are discussed in Chapter 6.

Table 4-3. Total Gross Water Use (Potable and Non-Potable) (DWR Table 4-3)

	2020	2025	2030	2035	2040	2045
Potable Water, Raw, Other Non-potable *From DWR Tables 4-1 and 4-2*	12,972	12,796	12,699	12,730	12,675	12,694
Recycled Water Demand *From DWR Table 6-4*	0	0	0	0	0	0
Optional Deduction of Recycled Water Put Into Long-Term Storage						
TOTAL WATER USE	12,972	12,796	12,699	12,730	12,675	12,694

NOTES:
(a) Volumes are in units of AF.

4.2.3 Distribution System Water Loss

☑ ***CWC § 10631 (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.

(B) The distribution system water loss quantification shall be reported in accordance with a worksheet approved or developed by the department through a public process. The water loss quantification worksheet shall be based on the water system balance methodology developed by the American Water Works Association.

(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.

Table 4-4 shows distribution system water losses for the previous five years. Water loss is the sum of apparent and real losses. Apparent loss is associated with metering inaccuracies, billing and administrative errors, authorized unmetered uses (e.g., system flushing and firefighting), and unauthorized uses. Real loss is associated with physical water lost through line breaks, leaks and seeps, and overflows of storage tanks. Since 2016, urban retail water suppliers have been required under CWC §10608.34 and California Code of Regulations (CCR) §638.1 et seq to quantify distribution system water losses using the American Water Works Association (AWWA) Free Water Audit Software (referred to as "water loss audit reports"). The water loss audit reports the District submits to DWR provide the basis for the 2016-2019 estimates shown in Table 4-4 and are available through DWR's Water Use Efficiency Data Portal.[16] The District's 2020 water loss audit report had not been completed at the time this Plan was prepared.[17] The 2020 estimate shown in Table 4-4 is therefore drawn from the District's preliminary draft water loss audit results.

Table 4-4. Last Five Years of Water Loss Audit Reporting (DWR Table 4-4)

Reporting Period Start Date	Volume of Water Loss (a)
01/2016	591
01/2017	705
01/2018	416
01/2019	752
01/2020	711
NOTES: (a) Volumes are in units of AF.	

CWC §10631 (3)(c) requires that this UWMP demonstrate whether the distribution loss standards

[16] DWR's Water Use Efficiency Data Portal: https://wuedata.water.ca.gov/awwa_plans
[17] The District's regulatory deadline for filing its 2020 water loss audit report to the state is October 1, 2021.

enacted by the State Water resources Control Board (SWRCB) pursuant to §10608.34 have been met. However, the SWRCB has yet to establish these standards, and thus consistency with these standards cannot be demonstrated herein.

4.2.4 Future Water Savings in Projected Water Use

☑ ***CWC § 10631 (d) (4)***

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

(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.

As affirmed in Table 4-5, both future water savings (discussed below) and lower income residential demands (discussed in Section 4.2.5) are included in the projections of future water use.

Table 4-5. Inclusion in Water Use Projections (DWR Table 4-5)

Are Future Water Savings Included in Projections?	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.	Section 4.2.4
Are Lower Income Residential Demands Included In Projections?	Yes
NOTES:	

As noted above, the District has adjusted the forecast of average water use per service for the effects of appliance standards and plumbing codes, conservation programs, and increases in the real cost of water service and household income. These adjustments are described below.

The District uses forecasts of per capita water savings from appliance standards and plumbing codes prepared for DWR to adjust its projections of average water use per service.[18] These forecasts incorporate the effects of the following codes and regulations:

- Assembly Bill (AB) 715, enacted in 2007, requires that any toilet or urinal sold or installed in California on or after January 1, 2014 cannot have a flush rating exceeding 1.28 and 0.5 gallons per flush, respectively. AB 715 superseded the state's previous standards for toilet and urinal water use set in 1991 of 1.6 and 1.0 gallons per flush, respectively. On April 8, 2015, in response to the Governor's Emergency Drought Response Executive Order (EO B-29-15), the California Energy Commission approved new standards for urinals requiring that they not consume more than 0.125 gallons per flush, 75 percent less than the standard set by AB 715.
- Water use standards for residential and commercial clothes washers and dishwashers are established by the U.S. Department of Energy through its authority under the federal Energy Policy and Conservation Act. Water use efficiency is summarized by the water factor for the appliance which measures the gallons of water used per cycle per cubic foot of capacity. A typical top-loading residential clothes washer manufactured in the 1990s had a water factor of around 12. In 2015, the allowable water factor for top- and front-loading residential clothes was reduced to 8.4 and 4.7, respectively. In 2018, water factor standard for top-loading residential clothes washers will be reduced to 6.5. In 2010 the allowable water factor for top- and front-loading commercial clothes washers was reduced to 8.5 and 5.5, respectively. The maximum water factor for Energy Star compliant top- and front-loading washers is 3.7 and 4.3, respectively. The U.S. Environmental Protection Agency estimates that Energy Star washers made up at least 60 percent of the residential market and 30 percent of the commercial market in 2011.[19] An Energy Star compliant washer uses about two-thirds less water per cycle than washers manufactured in the 1990s. Federal dishwasher water use efficiency standards were last updated in 2013. The maximum water use for standard and compact sized dishwashers is 5.0 and 3.5 gallons per cycle, respectively.
- New construction and renovations in California are now subject to CalGreen Code requirements. CalGreen includes prescriptive indoor provisions for maximum water consumption of plumbing fixtures and fittings in new and renovated properties. CalGreen also allows for an optional performance path to compliance, which requires an overall aggregate 20 percent reduction in indoor water use from a calculated baseline using a set of worksheets provided with the CalGreen guidelines.
- Senate Bill (SB) 407, enacted in 2009, mandates that all buildings in California come up to current State plumbing fixture standards within this decade. This law establishes

[18] M.Cubed, 2016. Projected Statewide and County-Level Effects of Plumbing Codes and Appliance Standards on Indoor GPCD, technical memorandum prepared for the California Department of Water Resources, dated August 2016.

[19] EPA Energy Star Unit Shipment and Market Penetration Report Calendar Year 2011 Summary.

requirements that residential and commercial property built and available for use on or before January 1, 1994 replace plumbing fixtures that are not water conserving, defined as "noncompliant plumbing fixtures." This law also requires effective January 1, 2017 that a seller or transferor of single-family residential property show to the purchaser or transferee, in writing, the specified requirements for replacing plumbing fixtures and whether the real property includes noncompliant plumbing. Similar disclosure requirements went into effect for multi-family and commercial transactions January 1, 2019. SB 837, passed in 2011, reinforces the disclosure requirement by amending the statutorily required transfer disclosure statement to include disclosure about whether the property follows SB 407 requirements.

The District's 2015 Conservation Master Plan forms the basis for the forecast of water savings from conservation programs. Cal Water used the Alliance for Water Efficiency's Water Conservation Tracking Tool to estimate expected water savings from planned program implementation.[20]

Projected increases in water service costs and household income form the basis for the adjustments to average water use due to changes in the real cost of water service. The forecast uses the historical rate of increase in District water rates to project future water service costs. It uses Caltrans income projections for San Mateo County to estimate changes in household income. It uses empirically derived estimates of price and income demand elasticity to adjust future water demand for changes in these variables.[21]

Table 4-6 shows the total water savings from plumbing codes and appliance standards, conservation programs, and increases in the real cost of water service.

Table 4-6. Future Conservation Savings (AF)

2025	2030	2035	2040	2045
165	270	315	443	498

[20] Alliance for Water Efficiency Water Conservation Tracking Tool: https://www.allianceforwaterefficiency.org/resources/topic/water-conservation-tracking-tool

[21] M.Cubed, 2018. California Water Service 2020 Test Year Sales Forecast: 2018 General Rate Case, prepared for California Water Service by M.Cubed, dated January 2018.

4.2.5 Water Use by Lower Income Households in Water Use Projections

☑ ***CWC § 10631.1***

(a) The 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 defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.

(b) It is the intent of the Legislature that the identification of projected water use for single-family and multifamily residential housing for lower income households will assist a supplier in complying with the requirements under Section 65589.7 of the Government Code to grant a priority for the provision of service to housing units affordable to lower income households.

California Senate Bill No. 1087 (SB 1087), Chapter 727, passed in 2005, amended Government Code §65589.7 and CWC §10631.1. This law requires that local governments supply a copy of their adopted housing element to water and sewer providers. Additionally, it requires that water providers grant priority for service allocations to developments that include housing units for lower income families and workers. The UWMP Act requires that water providers estimate water demands by lower income single and multi-family households.

Cal Water must serve all development that occurs within its service area, regardless of the income level of the future residents. Cal Water does not keep records of the income level of its customers and does not discriminate when supplying water to any development. It is the responsibility of the city or county with land use authority over a given area to approve or not approve developments within Cal Water's service areas. Cal Water has a Customer Assistance Program (CAP) to help with water service affordability. CAP discounts the monthly service charge of qualifying lower income households.

Table 4-7 shows projected water use by lower income households. These demands are part of the projected residential water use in Table 4-2. Cal Water used the General Plan Housing Elements from the cities in Bear Gulch District to estimate the number of lower income households which is the basis for the estimates in Table 4-7.[22]

Table 4-7. Residential Demands of Lower Income Households (AF)

2025	2030	2035	2040	2045
3,691	3,693	3,708	3,701	3,717

[22] Town of Atherton Housing Element Update 2007-2014, Table HII-7; Town of Woodside General Plan 2012 Housing Element 2007-2014, page 273; City of Menlo Park Housing Element 2015-2023, Page 71; Town of Portola Valley General Plan Housing Element, Adopted January 14, 2015, page 23.

4.2.6 Characteristic Five-Year Water Use

☑ ***CWC § 10635(b)(3)***

(b) Every urban water supplier shall include, as part of its urban water management plan, a drought risk assessment for its water service to its customers as part of information considered in developing the demand management measures and water supply projects and programs to be included in the urban water management plan. The urban water supplier may conduct an interim update or updates to this drought risk assessment within the five-year cycle of its urban water management plan update. The drought risk assessment shall include each of the following…

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

CWC §10635(b) is a new requirement for 2020 UWMPs. A critical part of this new statutory language is the requirement to prepare a five-year Drought Risk Assessment (see Section 7.5). As a first step, DWR suggests that water suppliers estimate their unconstrained water demand for the next five years (2021-2025). Unconstrained water demand is water use in the absence of drought water use restrictions. Drought conditions cause unconstrained demands to increase. The Drought Risk Assessment presented in Section 7.5 accounts for this increase in unconstrained water demand. Cal Water's demand forecast model separately estimates water use for normal, wet, and dry weather conditions. Table 4-8 shows unconstrained demands for 2021-2025 for normal weather and multiple-dry-year scenarios.

Table 4-8. Characteristic Five-Year Water Use (AF)

Weather Scenario	2021	2022	2023	2024	2025
Multi-Year Dry	13,690	13,689	13,695	13,707	13,699
Normal	12,790	12,788	12,794	12,805	12,796
NOTES: The table shows unconstrained demand (i.e., demand in the absence of drought water use restrictions).					

4.3 Climate Change Considerations

☑ ***CWC § 10635(b)***

(4) 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.

Climate strongly influences the level and seasonal pattern of District water demands. Cal Water has analyzed the effect of climate and weather variability on both aspects of demand.[23] Using

[23] A&N Technical Services, 2014. Cal Water Long-Term Water Demand Forecast Model. Report prepared for California Water Service Company. December 2014.

this information, Cal Water has estimated the effect of alternative climate warming scenarios on future water demand.[24] Table 4-9 summarizes the results of this analysis. It shows that for plausible emission scenarios and corresponding temperature increases, climate change may, on average, increase future District demands by 2 to 3 percent compared to current climate conditions. Two points are worth noting. First, this is the average effect. There is significant variation about the mean. Second, this is a ceteris paribus, or all else equal, result. It assumes existing levels and types of landscaping. However, landscaping choices are partly a function of climate and as the climate changes, so too may these choices. It is reasonable to think households and businesses will adapt their landscaping as the climate warms. This adaptation may mitigate some of the expected demand increase shown in the table.

Table 4-9. Climate Change Effect on Demand

Emissions Scenario	Change in Mean Temperature by 2040 (degree F)	Change from Current Mean Temperature (%)	Effect on Demand (%)
Lower Emissions Scenario (B1)	2.5	3.4%	2.0%
Higher Emissions Scenario (A2)	2.7	3.7%	2.1%
80%ile Temperature Scenario	3.6	4.9%	2.8%

NOTES:
(a) Predicted temperature increases for Southwest United States for alternative emission scenarios reported in Kunkel et al. (2013). Predicted effect on demand derived from weather response models estimated with historical monthly water use, temperature, and rainfall data.
(b) The physical climate framework for the 2013 National Climate Assessment is based on climate model simulations of the future using the high (A2) and low (B1) Special Report Emissions Scenarios (SRES). The A1B emission scenario reflects a middle case between the A2 and B1 scenarios. The 80%ile scenario is the 80th percentile temperature change across the family of emissions scenarios. Further description of emission scenarios can be found at https://www.ipcc.ch/site/assets/uploads/2018/03/sres-en.pdf

[24] Table 4-9 uses climate scenarios for the southwestern United States. These in turn rely on alternative greenhouse gas emission scenarios. Emissions under scenario A2 are higher than under scenario B2. The 80th percentile scenario is the 80th percentile temperature change for the full suite of emission scenarios. For further information, see Kunkel, K.E, L.E. Stevens, S.E. Stevens, L. Sun, E. Janssen, D. Wuebbles, K.T. Redmond, and J.G. Dobson, 2013. Regional Climate Trends and Scenarios for the U.S. National Climate Assessment. Part 5. Climate of the Southwest U.S., NOAA Technical Report NESDIS 142-5, dated 2013.

Chapter 5
SB X7-7 Baseline and Targets

☑ ***CWC § 10608.24 (b)***

Each urban retail water supplier shall meet its urban water use target by December 31, 2020.

☑ ***CWC § 10608.28***

(a) An urban retail water supplier may meet its urban water use target within its retail service area, or through mutual agreement, by any of the following:

(1) Through an urban wholesale water supplier.

(2) Through a regional agency authorized to plan and implement water conservation, including, but not limited to, an agency established under the Bay Area Water Supply and Conservation Agency Act (Division 31 (commencing with Section 81300)).

(3) Through a regional water management group as defined in Section 10537.

(4) By an integrated regional water management funding area.

(5) By hydrologic region.

(6) Through other appropriate geographic scales for which computation methods have been developed by the department.

(b) A regional water management group, with the written consent of its member agencies, may undertake any or all planning, reporting, and implementation functions under this chapter for the member agencies that consent to those activities. Any data or reports shall provide information both for the regional water management group and separately for each consenting urban retail water supplier and urban wholesale water supplier.

The Water Conservation Act of 2009, also known as Senate Bill (SB) X7-7, requires that urban retail water suppliers reduce their per capita water use by 20 percent by 2020. SB X7-7 defines an urban retail water supplier as "a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes" (CWC §10608.12). The Bear Gulch District meets both criteria. The state will assess each urban retail water supplier's 2020 per capita water use against the target it established in its 2015 urban water management plan (UWMP).

This chapter demonstrates the District's compliance with its SB X7-7 per capita water use target and includes the following sections:

5.1 Wholesale Suppliers

5.2 Updates to the 2015 UWMP Calculations

5.3 Service Area Population

5.4 Baseline Periods, Baseline GPCD, and Confirmed SB X7-7 2020 Target

5.5 Demonstration of Compliance with SB X7-7 2020 Target

5.6 Demonstration of Compliance with Regional Alliance SB X7-7 2020 Target

5.1 Wholesale Suppliers

SB X7-7 does not directly apply to wholesale water suppliers. Wholesale suppliers may adopt programs and policies that support SB X7-7 compliance by the retail water suppliers they serve. They may also take part in a Regional Alliance (discussed below) set up to satisfy SB X7-7 requirements on a regional basis. As discussed in Chapter 2, the District is not a wholesale water supplier.

5.2 Updates to the 2015 UWMP Calculations

Urban retail water suppliers may update or correct the water use and population data they used to set their 2020 target in their 2015 UWMP. The District has not made any changes to these data.

5.3 Service Area Population

Service area population estimation must satisfy the requirements in Methodology 2 – Service Area Population – of DWR's *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use*. California Water Service Company (Cal Water)'s population estimation method is similar to the method used by DWR's Population Tool.[25] DWR reviewed and accepted Cal Water's population estimation method as part of the review of its 2015 UWMPs. Cal Water used this method to estimate the District's 2020 service area population. As reported in Chapter 3, the District's population was 60,814 in 2020.

[25] Cal Water estimates service area population using census block population data with the LandView 5 and MARPLOT software programs. In census years, the method estimates service area population using the population counts of census blocks with centroids falling within the District's service boundary. In off-census years, the method estimates population by adjusting the census year estimates for changes in the number of single- and multi-family service connections and dwelling units. As shown in the District's 2015 UWMP, estimates prepared using this method and DWR's Population Tool typically differ by less than a percent. Cal Water prefers using its method to be consistent with its other planning documents.

5.4 Baseline Periods, Baseline GPCD, and Confirmed SB X7-7 2020 Target

Table 5-1 shows the District's 5- and 10-year baseline periods, its baseline gallons per capita per day (GPCD) for these periods, and its confirmed SB X7-7 2020 target. The data used to calculate the baseline and target GPCD values are provided in Appendix F.

Table 5-1. SB X7-7 Baselines and Targets Summary (DWR Table 5-1)

Baseline Period	Start Year	End Year	Average Baseline GPCD	Confirmed 2020 Target GPCD
10-15 year	2000	2009	233	187
5 Year	2004	2008	237	
NOTES:				

5.5 Demonstration of Compliance with SB X7-7 2020 Target

Service area population and water use in 2020 were 60,814 and 12,972 AF, respectively, resulting in per capita water use of 190 GPCD. This is greater than the SB X7-7 target GPCD, as shown in Table 5-2. Supporting population and water use data are in Appendix F.

Table 5-2. SB X7-7 2020 Compliance (DWR Table 5-2)

2020 GPCD			2020 Confirmed Target GPCD	Did Supplier Achieve Targeted Reduction for 2020?
Actual 2020 GPCD	2020 TOTAL Adjustments	Adjusted 2020 GPCD *(Adjusted if applicable)*		
190			187	No
NOTES:				

Although District per capita water use in 2020 was greater than the SB X7-7 target GPCD, the District has complied with SB X7-7 via its membership in the California Water Service – San Francisco Bay Hydrologic Region, as demonstrated in the next section.

5.6 Demonstration of Compliance with Regional Alliance SB X7-7 2020 Target

An urban retail water supplier can satisfy SB X7-7 requirements either individually or as part of a Regional Alliance. The District formed a regional alliance with other Cal Water districts in the San Francisco Bay Hydrologic Region. The name of this Regional Alliance is California Water Service – San Francisco Bay Regional Alliance. Table 5-3 shows 2020 per capita water use for this Regional

Alliance. Table 5-4 demonstrates compliance with the Regional Alliance's SB X7-7 2020 target GPCD.[26]

Table 5-3. SB X7-7 Regional Alliance – 2020 GPCD (DWR RA 2020 GPCD Table)

Participating Member Agency Name	2020 Actual GPCD*	2020 Population	(2020 GPCD) X (2020 Population)	Regional Alliance 2020 GPCD (Actual)
Cal Water Bear Gulch District	190	60,814	11,554,660	
Cal Water Los Altos District	166	70,161	11,646,726	
Cal Water Livermore District	143	59,814	8,553,402	
Cal Water Mid Peninsula District	94	137,486	12,923,684	
Cal Water South San Francisco District	98	63,319	6,205,262	
Regional Alliance Totals	691	391,594	50,883,734	130

**All participating agencies must submit individual SB X7-7 Tables, as applicable, showing the individual agency's calculations. These tables are: SB X7-7 Tables 0 through 6, Table 7, any required supporting tables (as stated in SB X7-7 Table 7), and SB X7-7 Table 9, as applicable. These individual agency tables will be submitted with the individual or Regional Urban Water Management Plan.*

Table 5-4. SB X7-7 Regional Alliance – 2020 Compliance (DWR RA 2020 Compliance Table)

2020 Actual GPCD	Optional Adjustment for Economic Growth[1]	Adjusted 2020 Actual GPCD	2020 Target GPCD [2]	Did Alliance Achieve Targeted Reduction for 2020?
130			150	Yes

[1]Adjustments for economic growth can be applied to either the individual supplier's data or to the aggregate regional alliance data (but not both), depending upon availability of suitable data and methods. [2] 2020 Target GPCD will be taken from the Regional Alliance's SB X7-7 Verification Form, Weighted Target Table.

[26] The population and water use data used to establish the Regional Alliance's 2020 target GPCD are provided in the District's 2015 UWMP.

Chapter 6
Water Supply Characterization

☑ ***CWC § 10631 (b)*** *A plan shall be adopted in accordance with this chapter that shall do all of the following:*

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).

This chapter provides a description of the Bear Gulch District's (also referred to herein as "District") current water supplies, including local and imported surface water and other current and potential supply sources, such as groundwater, stormwater, and recycled water, as well as assessment of the energy intensity used to operate the District's treatment and distribution system. This chapter includes the following sections:

6.1 Purchased Water

6.2 Groundwater

6.3 Surface Water

6.4 Stormwater

6.5 Wastewater and Recycled Water

6.6 Desalinated Water Opportunities

6.7 Water Exchanges and Transfers

6.8 Future Water Projects

6.9 Summary of Existing and Planned Sources of Water

6.10 Special Conditions

6.11 Energy Intensity

To maintain consistency with the Urban Water Management Plans prepared by the San Francisco Public Utilities Commission (SFPUC) and the other Bay Area Water Supply and Conservation Agency (BAWSCA) member agencies, much of the language describing the SFPUC wholesale water supply in the following sections is common language provided by BAWSCA, in coordination with the SFPUC.

6.1 Purchased Water

☑ ***CWC § 10631 (h)*** *A plan shall be adopted in accordance with this chapter and shall do all of the following:*

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. 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). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (f).

The majority of the water supply to the California Water Service Company (Cal Water) Bear Gulch District (i.e., approximately 91 percent over the 1980-2020 time period) is treated water purchased from the City and County of San Francisco's Regional Water System (RWS), which is operated by the SFPUC. Detailed information regarding the SFPUC RWS supply is provided below and in Section 7.1.1. Within the District, Cal Water takes delivery from eight turnouts (connections) from RWS transmission lines.

6.1.1 Description of SFPUC RWS

Approximately 85 percent of the water supply to the SFPUC RWS originates in the Hetch Hetchy watershed, located in Yosemite National Park, and flows down the Tuolumne River into the Hetch Hetchy Reservoir. Water from the Hetch Hetchy watershed is managed through the Hetch Hetchy Water and Power Project. The remaining 15 percent of the water supply to the SFPUC RWS originates locally in the Alameda and Peninsula watersheds and is stored in six different reservoirs in Alameda and San Mateo Counties. Details of the various components of the SFPUC RWS are provided below and are shown on Figure 6-1. Information regarding the Hetch Hetchy, Alameda, and Peninsula water systems is sourced from the SFPUC's 2020 UWMP and is provided verbatim below.

Figure 6-1. Regional Water System

6.1.2 Water Distribution

The RWS, shown in Figure 6-1, consists of more than 280 miles of pipelines, 60 miles of tunnels, 11 reservoirs, five pump stations, and two water treatment plants. It includes the Hetch Hetchy Project and the Bay Area water system facilities. The Hetch Hetchy Project is generally composed of the reservoirs, hydroelectric generation and transmission facilities, and water transmission facilities from the Hetch Hetchy Valley west to the Alameda East Portal of the Coast Range Tunnel in Sunol Valley. Water system components of the Hetch Hetchy Project are also referred to as the Hetch Hetchy System. The local 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 treatment 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.

<u>Hetch Hetchy System</u>: In the Hetch Hetchy System, water is diverted from Hetch Hetchy Reservoir into 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.

<u>Alameda System:</u> The Alameda System includes two reservoirs, San Antonio Reservoir and Calaveras Reservoir, which collect water from the 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 connect the Hetch Hetchy System and Alameda water sources to the Peninsula System. The BDPLs cross the South Bay to the Peninsula System delivering water to customers along the pipeline route. The Sunol Valley Water Treatment Plant (SVWTP) filters and disinfects water supplied from San Antonio Reservoir and Calaveras Reservoir.

<u>Peninsula System:</u> The Peninsula System includes conveyance facilities connecting the BDPLs to the in-City distribution system 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 the Wholesale Customers, the Coastside County Water District (which includes the City of Half Moon Bay), along with 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 the in-City distribution system.

6.1.3 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, which flows down the Tuolumne River to Hetch Hetchy Reservoir. This water meets or exceeds all federal and State criteria for watershed protection. Water from Hetch Hetchy Reservoir is protected in pipes and tunnels as it is conveyed to the Bay Area, and requires pH adjustment to control pipeline corrosion and disinfection for bacteria control. Based on the SFPUC's disinfection treatment practice, extensive bacteriological quality monitoring, and high operational standards, the U.S. Environmental Protection Agency (USEPA) and the 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.

A new USEPA regulation took effect in 2012 requiring secondary disinfection for all unfiltered drinking water systems to control the waterborne parasite cryptosporidium. To comply with this regulation, the SFPUC completed construction of a new ultraviolet (UV) treatment facility in 2011. The Tesla Treatment Facility is a key component of the Water System Improvement Program (WSIP) and enhances the high-quality water from the

RWS. The facility has a capacity of 315 million gallons per day (mgd), making it the third largest UV drinking water disinfection facility in the U.S.

All water derived from sources other than Hetch Hetchy Reservoir is treated at one of two treatment plants: the SVWTP or the HTWTP. The SVWTP primarily treats water from the Alameda System reservoirs and has both a peak capacity and sustainable capacity of 160 mgd. Treatment processes include coagulation, flocculation, sedimentation, filtration, disinfection, fluoridation, corrosion control treatment, and chloramination. Fluoridation, chloramination, and corrosion control treatment can also be provided for the combined Hetch Hetchy System and SVWTP water at the Sunol Valley Chloramination Facility. The HTWTP treats water from the Peninsula System reservoirs and has a peak capacity of 180 mgd and a sustainable capacity of 140 mgd. Treatment processes include ozonation, coagulation, flocculation, filtration, disinfection, fluoridation, corrosion control treatment, and chloramination. Major upgrades to the SVWTP were completed in 2013 and to the HTWTP in 2015.

6.1.4 Water Storage

The majority 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 Reservoir, Lake Lloyd (a.k.a., Cherry Lake), and Lake Eleanor. A “water bank” in Don Pedro Reservoir is also integrated into system operations.[27] 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.

As a by-product of water delivery and water supply management, hydroelectric power is generated by the Hetch Hetchy Water and Power System. Water stored in Hetch Hetchy Reservoir is used for hydroelectric generation and also satisfies instream flow requirements when released downstream. Normally, only Hetch Hetchy Reservoir water supplies are exported to the Bay Area, while releases from Lake Eleanor and Lake Lloyd are used to satisfy instream flow requirements, satisfy Raker Act entitlements to the Districts downstream, and produce hydroelectric power. The Hetch Hetchy Water and Power System includes three major hydroelectric powerhouses along the Tuolumne

[27] The Turlock Irrigation District and Modesto Irrigation District have senior water rights to the City for the 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 Turlock Irrigation District and Modesto Irrigation District. Through this mechanism, the SFPUC may pre-deliver the Turlock Irrigation District’s and Modesto Irrigation District’s entitlements and credit the water bank so that at other times the SFPUC may retain water upstream while the Turlock Irrigation District and Modesto Irrigation District debit the water bank.

River—Holm, Kirkwood, and Moccasin—that have a collective generating capacity of nearly 400 megawatts.

Downstream of the Hetchy Hetchy System, the SFPUC utilizes local watersheds in the Bay Area. 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 Country, capture local runoff in the Alameda watershed. In addition to capturing local runoff, San Andreas, San Antonio, and Crystal Springs Reservoirs also provide storage for water from the Hetch Hetchy System and, along with Calaveras Reservoir, are an important water supply in the event of an interruption to Hetch Hetchy System deliveries.

Calaveras Reservoir had been operating in recent years 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 existing dam. The SFPUC began impounding water behind the new dam in the winter of 2018/2019 and continued the initial fill of the reservoir during the 2019/2020 winter season.

Table 6-A. Regional Water System Storage Capacity

Reservoir	Storage	
	Acre-Feet (AF)	**Billions of Gallons (BG)**
Up-Country[a]		
Hetch Hetchy	360,360	117.4
Lake Lloyd[b]	273,300	89.1
Lake Eleanor	27,100	8.8
Subtotal Up-Country	**660,760**	**215.3**
Local		
Calaveras (East Bay)[c]	96,800	31.5
San Antonio (East Bay)	50,500	16.5
Crystal Springs (Peninsula)[d]	69,300	22.6
San Andreas (Peninsula)	19,000	6.2
Pilarcitos (Peninsula)	3,100	1.0
Subtotal Local	**238,700**	**77.8**
Total Regional Water System[e]	**899,460**	**293.1**

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

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

c Calaveras Reservoir was constructed with a storage capacity of 96,800 AF. Since December 2001, in response to safety concerns about the seismic stability of the dam and a directive from the Division of Safety of Dams (DSOD), the SFPUC has constructed a new comparably sized replacement dam downstream.

d Crystal Springs Reservoir has a maximum storage capacity of 22.1 BG (at 291.8 feet). When the Lower Crystal Springs Dam Improvement is complete, the reservoir will be operated normally at 287.8 feet (4 feet below capacity) based on permit conditions.

e This includes 63,700 AF in dead storage (i.e., the volume in a reservoir below the lowest controllable level). In addition, the SFPUC may draw against a credit of up to 570,000 AF in storage in a water bank account in Don Pedro Reservoir, for total storage for planning purposes of 1,469,460 AF.

6.1.5 Individual Supply Guarantees

San Francisco has a perpetual commitment (Supply Assurance) to deliver 184 mgd to the 24 permanent Wholesale Customers collectively. San Jose and Santa Clara are not included in the Supply Assurance commitment and each has temporary and interruptible water supply contracts with San Francisco. The Supply Assurance is allocated among the 24 permanent Wholesale Customers through Individual Supply Guarantees (ISG), which represent each Wholesale Customer's allocation of the 184 mgd Supply Assurance.

Cal Water's Individual Supply Guarantee (ISG) is 35.68 MGD (39,993 acre-feet per year; AFY), which is shared among its Bear Gulch, Mid-Peninsula, and South San Francisco Districts (also referred to herein as the "Peninsula Districts").

6.1.6 2028 SFPUC Decisions (formerly 2018 SFPUC Decisions)

Information regarding the 2028 SFPUC Decisions (formerly 2018 SFPUC Decision) was provided by BAWSCA in coordination with SFPUC and is provided verbatim below.

> In the 2009 WSA, the SFPUC committed to make three decisions before 2018 that affect water supply development:
>
> - Whether or not to make the cities of San Jose and Santa Clara permanent customers,
> - Whether or not to supply the additional unmet supply needs of the Wholesale Customers beyond 2018, and
> - Whether or not to increase the wholesale customer Supply Assurance above 184 mgd.
>
> Events since 2009 made it difficult for the SFPUC to conduct the necessary water supply planning and CEQA analysis required to make these three decisions before 2018. Therefore, in the 2018 Amended and Restated WSA, the decisions were deferred for 10 years to 2028.

Additionally, there have been recent changes to instream flow requirements and customer demand projections that have affected water supply planning beyond 2018. As a result, the SFPUC has established an Alternative Water Supply Planning program (AWSP) to evaluate several regional and local water supply options. Through this program, the SFPUC will conduct feasibility studies and develop an Alternative Water Supply Plan by July 2023 to support the continued development of water supplies to meet future needs.

6.2 Groundwater

☑ ***CWC § 10631***

(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, including all of the following:

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

(A) The current version of any groundwater sustainability plan or alternative adopted pursuant to Part 2.74 (commencing with Section 10720), any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management for basins underlying the urban water supplier's service area.

(B) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For basins that a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For a basin that has not been adjudicated, information as to whether the department has identified the basin as a high- or medium-priority basin in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to coordinate with groundwater sustainability agencies or groundwater management agencies listed in subdivision (c) of Section 10723 to maintain or achieve sustainable groundwater conditions in accordance with a groundwater sustainability plan or alternative adopted pursuant to Part 2.74 (commencing with Section 10720).

(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.

As shown in Table 6-1, Cal Water does not operate any groundwater wells to supply water for Bear Gulch District.

Table 6-1. Groundwater Volume Pumped (DWR Table 6-1)

X	Supplier does not pump groundwater. The supplier will not complete the table below.					
	All or part of the groundwater described below is desalinated.					
Groundwater Type	Location or Basin Name	2016	2017	2018	2019	2020
	TOTAL					
NOTES:						

6.3 Surface Water

The District obtains a small fraction of its supplies (approximately nine percent of annual deliveries during the 1980-2020 time period) from surface water diverted from Bear Gulch Creek, a perennial stream that flows from a watershed in the Coast Range Mountains northeast to its confluence with San Francisquito Creek and eventually into San Francisco Bay. The District diverts water from two points of diversion (PODs) along the creek – the Upper POD (with an upstream area of 2.5 square miles) and the Lower POD (with an upstream area of 9.4 square miles). Diversions from the Upper and Lower PODs are each governed by separate State Water Resources Control Board (SWRCB)-administered water rights (i.e., pre-1914 claimed water rights and post-1914 SWRCB-issues diversion permits/licenses) that specify the volumes, rates, and timing of allowed diversions at each POD. In addition to these SWRCB-administered water rights, diversions are further constrained by certain diversion limitations and minimum instream flow requirements imposed by the California Department of Fish and Wildlife (CDFW) at the Upper POD and by the National Oceanic and Atmospheric Administration (NOAA) at the Lower POD. There also exists a 1936 agreement with Stanford University that prohibits Cal Water from diverting more than 50 percent of the flows that pass by (i.e., are not diverted at) the Upper POD.

Water diverted from the Upper POD flows through a gravity conveyance pipeline to a junction point where it is joined by water diverted from the Lower POD, at which point the water is pumped into the District-owned Bear Gulch Reservoir, a man-made storage facility impounded by an earthen dam. The Bear Gulch Reservoir is operated to have a minimum "dead pool" storage of 50 million gallons (MG), or approximately 153 acre-feet (AF). The maximum storage capacity of the reservoir has been reduced from 149 MG (547 AF) to 142.7 MG (438 AF), a limit imposed by the California Division of Safety of Dams (DSOD), based on a maximum storage elevation of 230 feet above mean sea level. Cal Water is undertaking capital improvements to Bear Gulch Reservoir to address DSOD's seismic safety concerns, and may also considered increasing the maximum storage capacity. Outflows from Bear Gulch Reservoir are currently limited by the DSOD to the rate that causes a water surface elevation decline of 0.3 feet per day.

Water stored in Bear Gulch Reservoir is released and sent through the District-owned Bear Gulch Water Treatment Plant (BGWTP) prior to addition to the distribution system. The BGWTP, which was placed into operation in 1977, has a rated capacity of 6.0 MGD. There the water is clarified, filtered, and chloraminated in compliance with the Surface Water Treatment Rule and the Safe Drinking Water Act. Based on data from Water Years 1981 through 2019, annual production from the reservoir has ranged from a high of 2,809 AF (915 MG) in 1983 to a low of 0 AF (0 MG) in 2014.

Recent analysis by the District has shown that the projected long-term average annual diversion amount by the District from the Bear Gulch local surface water system is approximately 840 AFY. This estimate considers the hydrology of the watershed, the various regulatory constraints that govern diversions (i.e., water rights and instream flow requirements), and current infrastructure limitations (i.e., pump, pipeline and treatment plant capacity). The storage capacity of Bear Gulch Reservoir is relatively small compared to average annual diversion/production, and therefore there is typically no carryover storage from one year to the next. Furthermore, given the various constraints on diversions at the District's two PODs under the SWRCB-administered water rights and the CDFW/NOAA-governed minimum instream flow requirements, the allowable diversions by the District are significantly lower during dry years even though the creek itself maintains flow.

6.4 Stormwater

There are no plans to divert stormwater for beneficial uses in the Bear Gulch District.

6.5 Wastewater and Recycled Water

☑ ***CWC § 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.

The recycling of wastewater potentially offers several potential benefits to Cal Water and its customers. Perhaps the greatest of these benefits is to help maintain a sustainable groundwater supply either through direct recharge, or by reducing potable supply needs by utilizing recycled water for appropriate uses (e.g., landscape irrigation) now being served by potable water. Currently, however, no wastewater is recycled for direct reuse within the District.

6.5.1 Recycled Water Coordination

The District relies on and coordinates with the following wastewater collection, treatment and recycling agencies:

- Town of Atherton
- City of Menlo Park
- Town of Portola Valley
- Town of Woodside
- City of Redwood City
- Silicon Valley Clean Water (SVCW)[28]

[28] Formerly known as South Bayside System Authority.

6.5.2 Wastewater Collection, Treatment, and Disposal

☑ ***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.

☑ ***CWC § 10633 (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.

Wastewater from the District is treated at the SVCW Wastewater Treatment Plant (WWTP). The SVCW WWTP treats wastewater flows generated from San Carlos, Belmont, Redwood City, Atherton, Menlo Park, East Palo Alto, Woodside, and numerous unincorporated areas in San Mateo County. Municipal wastewater is generated in the SVCW service area by residential and commercial, and industrial sources.

Atherton, Menlo Park, Portola Valley, Woodside, and portions of Redwood City own and operate their own collection systems, while the SVCW owns and operates the regional sewer transmission lines and the associated pump stations. The wastewater at the SVCW WWTP undergoes primary, secondary (activated sludge), dual media filtration, disinfection, and dechlorination treatment before being discharged to a deep-water outfall in the San Francisco Bay. The SVCW WWTP has a capacity to treat 29.5 MGD, but currently receives approximately 20.0 MGD from customers in the SVCW service area. SVCW is currently providing recycled water to sites located in and owned by the Cities of Redwood City and Menlo Park. However, recycled water is not distributed in the District service area at this time.

A summary of wastewater collection for the Bear Gulch District is shown in Table 6-2, including estimates of the volume of wastewater collected from District customers in 2020. The estimate is calculated by annualizing 90 percent of January water use in the service area. As shown in Table 6-3, no wastewater is discharged within the District service area.

As described in Section 6.5.4, there is currently a coordinated effort between Cal Water and other partners to potentially develop recycled water for various uses in the San Francisco Peninsula region. However, a recycled water system for beneficial use within the Bear Gulch District is not planned at this time. Cal Water examined the potential for recycled water use in the Bear Gulch District in the Water Supply and Facilities Master Plan for the District.[29] It was again explored in Cal Water's Integrated Long Term Water Supply Plan for the Three Peninsula Districts. These studies found a potential for 0.76 MGD of recycled water demand in the District. Because of low demand and high unit cost, this supply is not being immediately pursued. Cal Water will continue

[29] California Water Service Company, 2008. Water Supply and Facilities Master Plan – Bear Gulch District.

to evaluate the development of recycled water and will participate in a project if it becomes cost-effective. As such, as shown in Table 6-3, there is no projected recycled water supply for the District through the year 2045, and Cal Water has not implemented any incentive programs to encourage recycled water use.

Table 6-2. Wastewater Collected Within Service Area in 2020 (DWR Table 6-2)

	There is no wastewater collection system. The supplier will not complete the table below.					
	Percentage of 2020 service area covered by wastewater collection system *(optional)*					
	Percentage of 2020 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			Recipient of Collected Wastewater			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected from UWMP Service Area 2020	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area?	Is WWTP Operation Contracted to a Third Party? *(optional)*
Atherton	Estimated	1,345	Silicon Valley Clean Water	Silicon Valley Clean Water Wastewater Treatment Plant	No	
Menlo Park	Estimated	1,594	Silicon Valley Clean Water	Silicon Valley Clean Water Wastewater Treatment Plant	No	
Portola Valley	Estimated	598	Silicon Valley Clean Water	Silicon Valley Clean Water Wastewater Treatment Plant	No	
Woodside	Estimated	996	Silicon Valley Clean Water	Silicon Valley Clean Water Wastewater Treatment Plant	No	
Redwood City	Estimated	448	Silicon Valley Clean Water	Silicon Valley Clean Water Wastewater Treatment Plant	No	
Total Wastewater Collected from Service Area in 2020:		4,981				

NOTES:
(a) Volumes are in units of AF.
(b) The volume of wastewater collected from the Bear Gulch District service area in 2020 is estimated by annualizing 90 percent of January water use in the District.

Table 6-3. Wastewater and Discharge Within Service Area in 2020 (DWR Table 6-3)

X	No wastewater is treated or disposed of within the UWMP service area. The supplier will not complete the table below.										
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	2020 volumes				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
						Total					
NOTES:											

6.5.3 Recycled Water System and Recycled Water Beneficial Uses

☑ ***CWC § 10633 (c-g)***

(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.

(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.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

As shown in Table 6-4 and Table 6-5, the Bear Gulch District does not have any current or projected beneficial use of recycled water.

Table 6-4. Recycled Water Direct Beneficial Uses Within Service Area (DWR Table 6-4)

X	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.									
Name of Supplier Producing (Treating) the Recycled Water:										
Name of Supplier Operating the Recycled Water Distribution System:										
Supplemental Water Added in 2020 (volume)										
Source of 2020 Supplemental Water										
Beneficial Use Type	**Potential** Beneficial Uses of Recycled Water (Describe)	Amount of **Potential** Uses of Recycled Water (Quantity)	General Description of 2020 Uses	Level of Treatment	2020	2025	2030	2035	2040	2045
				Total:						
				2020 Internal Reuse						
NOTES:										

Table 6-5. 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual (DWR Table 6-5)

X	Recycled water was not used in 2015 nor projected for use in 2020. The supplier will not complete the table below.	
Beneficial Use Type	2015 Projection for 2020	2020 Actual Use
Total		
NOTES:		

6.5.4 Actions to Encourage and Optimize Future Recycled Water Use

At this time, as shown in Table 6-6, Cal Water does not have plans to initiate/expand the use of recycled water within the Bear Gulch District. Cal Water's supply portfolio in some districts already includes recycled water; elsewhere, Cal Water is participating in studies of the possibility of adding this supply source.

In the Bear Gulch District, Cal Water is participating in the development of the Crystal Springs Purified Water (PREP) Project, a purified water project that could provide 6 to 12 MGD of water supply through reservoir water augmentation at Crystal Springs Reservoir, which is a facility of the RWS. Treated wastewater from Silicon Valley Clean Water (SVCW) and/or the City of San Mateo would go through an advanced water treatment plant to produce purified water that meets state and federal drinking water quality standards. The purified water would then be transmitted 10 to 20 miles (depending on the alignment) to Crystal Springs Reservoir, blended with regional surface water supplies and treated again at Harry Tracy Water Treatment Plant. Project partners include Cal Water, the SFPUC, Bay Area Water Supply and Conservation Agency (BAWSCA), SVCW, Redwood City, Foster City, and the City of San Mateo. Partner agencies are contributing financial and staff resources towards the work effort.

Potential scenarios include a direct connection to the Bear Gulch District or the Mid-Peninsula District. Additional recycled water expansion efforts by SFPUC are described further in Section 7.1.1.

Table 6-6. Methods to Expand Future Recycled Water Use (DWR Table 6-6)

X	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 6.5.4	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
		Total	
NOTES:			

6.6 Desalinated Water Opportunities

☑ ***CWC § 10631 (g)*** *A plan shall be adopted in accordance with this chapter and shall do all of the following:*

Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

Opportunities to develop desalinated water supplies from ocean water, brackish surface, and brackish groundwater were investigated by BAWSCA as part of Phase II of its Long-Term Reliable Water Supply Strategy (Strategy, see Section 7.1.1). According to BAWSCA, there are high costs and intensive permitting requirements associated with desalination. However, it does potentially provide a substantial yield given the limited options for generating significant new water supplies for the region. The SFPUC is also exploring desalination as part of its Alternative Water Supply Planning (AWSP) Program (see Section 7.1.1) and Cal Water explored the possibility of developing desalinated water as a source of supply in its Water Supply and Facilities Master Plan for the District.[30] At this time, Cal Water has no plans to implement a desalinated water project; however, Cal Water continues to investigate opportunities to add a potential desalination supply to the District's supply portfolio.

[30] California Water Service Company. Water Supply and Facilities Master Plan – Bear Gulch District.

6.7 Water Exchanges and Transfers

☑ ***CWC § 10631 (c)*** *A plan shall be adopted in accordance with this chapter and shall do all of the following:*

Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

Cal Water is not pursuing water transfers or exchanges involving the Bear Gulch District at this time.

6.7.1 Exchanges

Cal Water is not pursuing water exchanges involving the Bear Gulch District and other entities at this time.

6.7.2 Transfers

Cal Water is not pursuing water transfers involving the Bear Gulch District and other entities at this time. However, the water supply agreements with SFPUC allow the transfer of supply between wholesale customers without penalty, or additional charges. The available transfer mechanisms can be used if other wholesale customers have excess supply, either due to their contract capacity, or if Cal Water were to fund other projects within these agencies that may free up SFPUC supply for transfer.

6.7.3 Emergency Interties

Cal Water has emergency interties with the City of Redwood City and the City of Menlo Park.

6.8 Future Water Projects

☑ ***CWC § 10631*** *A plan shall be adopted in accordance with this chapter and shall do all of the following:*

(b) (3) For any planned sources of water supply, a description of the measures that are being undertaken to acquire and develop those water supplies.

(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.

As shown in Table 6-7, there are no currently planned future water supply projects or programs that are expected to provide a quantifiable increase to the District's water supply. However, Cal Water is planning improvement efforts to benefit the Bear Gulch Reservoir including construction of an earth fill buttress to increase the seismic stability of the dam to acceptable DSOD levels and to maintain maximum reservoir operating pool elevation. This project could increase the yield of the local surface water supply source, but the volumetric benefit is not known at this time.

Furthermore, Cal Water is currently in the process of developing a regional water supply reliability study using integrated resource planning practices to create a long-term supply reliability strategy through 2050 for Cal Water districts in the Bay Area. It is anticipated that the forthcoming study will identify feasible water supply projects which may benefit the Bear Gulch District.

The SFPUC has been implementing its Water System Improvement Plan (WSIP) since it was adopted in 2008. The WSIP includes several water supply projects to address the Level of Service (LOS) Goals and Objectives established in the WSIP and updated in February 2020. The SFPUC's AWSP is also being implemented to explore other projects that would increase overall water supply resiliency. These programs and future water supply projects are described in Section 7.1.1.

Cal Water will continue its annual main replacement program to upgrade and improve the distribution system of the Bear Gulch District. To meet the average day and maximum day requirements of District customers, new booster stations and storage facilities will be constructed and replaced as needed.

Table 6-7. Expected Future Water Supply Projects or Programs (DWR Table 6-7)

<table>
<tr><td></td><td colspan="6">No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.</td></tr>
<tr><td>X</td><td colspan="6">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.</td></tr>
<tr><td>Section 7.3.4</td><td colspan="6">Provide page location of narrative in the UWMP</td></tr>
<tr><th rowspan="2">Name of Future Projects or Programs</th><th colspan="2">Joint Project with other suppliers?</th><th rowspan="2">Description (if needed)</th><th rowspan="2">Planned Implementation Year</th><th rowspan="2">Planned for Use in Year Type</th><th rowspan="2">Expected Increase in Water Supply to Supplier</th></tr>
<tr><th>Y/N</th><th>If Yes, Supplier Name</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="7">NOTES:</td></tr>
</table>

6.9 Summary of Existing and Planned Sources of Water

☑ ***CWC § 10631 (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).*

☑ ***CWC § 10631 (b) (2)*** *When multiple sources of water supply are identified, a description of the management of each supply in correlation with the other identified supplies.*

☑ ***CWC § 10631 (b) (4) (D)*** *A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.*

Table 6-8 summarizes the actual volumes of purchased water and local surface water for the Bear Gulch District in 2020. It should be noted that the District-owned BGWTP was not operated in 2020 due to lack of rainfall and surface water diversions. Thus, surface water diverted from Bear Gulch Creek did not serve as a supply source to the District in 2020.

As discussed above, Cal Water's ISG of 39,993 AFY is shared among all three of its districts on the San Francisco Peninsula to provide the operational flexibility to distribute the supply as needed in each system depending on the availability of local supplies and conditions within each district. As such, the collective "Total Right or Safe Yield" from the RWS shown for the three districts in Table 6-8, Table 6-9A, and Table 6-9B is equal to the ISG. However, the "Reasonably Available Volume" shown in the tables is equal to each District's projected RWS demands through 2045, which are collectively less than the ISG.

An estimate of projected SFPUC supply available to the Bear Gulch District (i.e., the "Reasonably Available Volume") was calculated by subtracting the District's local surface water supply from the District's total demand over the planning horizon. The reasonably available volume of local surface water (840 AFY) is the projected long-term average diversion amount based on analysis conducted by Cal Water considering hydrology and all applicable constraints. The "Total Right or Safe Yield" (1,520 AFY) is based on the upper limit volume of diversion to storage under the District's SWRCB-administered surface water rights. Therefore, the local surface water supply amounts shown in Table 6-9A and Table 6-9B equal 840 AFY.

Consistent with the water supply reliability projections that are discussed in Chapter 7, the purchased supplies from the SFPUC RWS, along with local surface water supply to the Bear Gulch District, will be sufficient to serve normal year demands through 2045.

Table 6-8. Water Supplies – Actual (DWR Table 6-8)

Water Supply	Additional Detail on Water Supply	2020		
		Actual Volume	Water Quality	Total Right or Safe Yield *(optional)*
Surface water (not desalinated)	Bear Gulch Creek	0	Drinking Water	1,520 (b)
Purchased or Imported Water	San Francisco Public Utilities Commission	12,972	Drinking Water	39,993 (c)
	Total	12,972		

NOTES:
(a) Volumes are in units of AF.
(b) The "Total Right or Safe Yield" (1,520 AFY) of local surface water is based on the upper limit volume of diversion to storage under the District's SWRCB-administered surface water rights.
(c) Total SFPUC supply is equal to the ISG shared among Cal Water's three Peninsula districts: South San Francisco, Mid-Peninsula, and Bear Gulch.

Table 6-9A. Water Supplies (Combined Peninsula Districts) – Projected

District	Water Supply	Additional Detail on Water Supply	**Projected Water Supply** *Report To the Extent Practicable*									
			2025		**2030**		**2035**		**2040**		**2045** *(opt)*	
			Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
South San Francisco	Purchased or Imported Water	San Francisco Public Utilities Commission	6,009	39,993 (b)	5,949	39,993 (b)	6,101	39,993 (b)	6,466	39,993 (b)	6,889	39,993 (b)
	Groundwater/ In-Lieu Surface Water	Westside Basin	1,534	1,534	1,534	1,534	1,534	1,534	1,534	1,534	1,534	1,534
	District Total		7,543		7,483		7,635		8,000		8,423	
Bear Gulch	Purchased or Imported Water	San Francisco Public Utilities Commission	11,956	39,993 (b)	11,859	39,993 (b)	11,890	39,993 (b)	11,835	39,993 (b)	11,854	39,993 (b)
	Surface water (not desalinated)	Bear Gulch Reservoir (c)	840	1,520	840	1,520	840	1,520	840	1,520	840	1,520
	District Total		12,796		12,699		12,730		12,675		12,694	
Mid-Peninsula	Purchased or Imported Water	San Francisco Public Utilities Commission	14,418	39,993 (b)	14,530	39,993 (b)	14,786	39,993 (b)	14,977	39,993 (b)	15,279	39,993 (b)
	District Total		14,418		14,530		14,786		14,977		15,279	
Total			34,757		34,712		35,151		35,652		36,396	

NOTES:
(a) Volumes are in units of AF.
(b) Total SFPUC supply is equal to the ISG shared among Cal Water's three Peninsula districts: South San Francisco, Mid-Peninsula, and Bear Gulch. The reasonably available supply volume is equal to the districts' projected SFPUC purchases. For all years, the total SFPUC purchase volume is within the ISG of 35.68 MGD (39,993 AFY) shared between the three Peninsula districts.
(c) The "Reasonably Available Volume" of local surface water (840 AFY) is the projected long-term average diversion amount based on analysis conducted by Cal Water considering hydrology and all applicable constraints. The “Total Right or Safe Yield” (1,520 AFY) is based on the upper limit volume of diversion to storage under the District’s surface water rights.

Table 6-9B. Water Supplies – Projected (DWR Table 6-9)

Water Supply	Additional Detail on Water Supply	Projected Water Supply									
		2025		2030		2035		2040		2045	
		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Purchased or Imported Water	San Francisco Public Utilities Commission	11,956	39,993 (b)	11,859	39,993 (b)	11,890	39,993 (b)	11,835	39,993 (b)	11,854	39,993 (b)
Surface water (not desalinated)	Bear Gulch Creek (c)	840	1,520	840	1,520	840	1,520	840	1,520	840	1,520
	Total	12,796		12,699		12,730		12,675		12,694	

NOTES:
(a) Volumes are in units of AF.
(b) Total SFPUC supply is equal to the ISG shared among Cal Water's three Peninsula districts: South San Francisco, Mid-Peninsula, and Bear Gulch.
(c) The "Reasonably Available Volume" of local surface water (840 AFY) is the projected long-term average diversion amount based on analysis conducted by Cal Water considering hydrology and all applicable constraints. The "Total Right or Safe Yield" (1,520 AFY) is based on the upper limit volume of diversion to storage under the District's SWRCB-administered surface water rights.

6.10 Special Conditions

6.10.1 Climate Change Effects

The issue of climate change has become an important factor in water resources planning in California, and is frequently considered in urban water management planning processes, though the extent and precise effects of climate change remain uncertain. There is convincing evidence that increasing concentrations of greenhouse gasses have caused and will 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 and virtually all projections indicate this will continue through the 21st century. These changes will have a direct effect on water resources in California, and numerous studies have been conducted to determine the potential impacts to water resources. Based on these studies, climate change could result in the following types of water resource impacts, including impacts on the watersheds in the Bay Area:

- Reductions in the average annual snowpack due to a rise in the snowline and a shallower snowpack in the low and medium elevation zones, such as in the Tuolumne River basin, 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 rather than 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;
- Increased water temperatures with accompanying potential adverse effects on some fisheries and water quality;
- Increases in evaporation and concomitant increased irrigation need; and
- Changes in urban and agricultural water demand.

Both the SFPUC and BAWSCA participated in the 2020 update of the Bay Area Integrated Regional Water Management Plan (BAIRWMP), which includes an assessment of the potential climate change vulnerabilities of the region's water resources and identifies climate change adaptation strategies. In addition, the SFPUC continues to study the effect of climate change on the RWS. These works are summarized below.

Bay Area Integrated Regional Water Management Plan

Climate change adaptation continues to be an overarching theme for the 2019 BAIRWMP update. As stated in the BAIRWMP, identification of watershed characteristics that could potentially be vulnerable to future climate change is the first step in assessing vulnerabilities of water resources in the Bay Area Region (Region). Vulnerability is defined as the degree to which a system is exposed to, susceptible to, and able to cope with or adjust to, the adverse effects of climate change. A vulnerability assessment was conducted in accordance with the DWR's *Climate Change Handbook for Regional Water Planning* and using the most current science available for the Region. The vulnerability assessment, summarized in the table below, provides the main water planning categories applicable to the Region and a general overview of the qualitative assessment of each category with respect to anticipated climate change impacts.

Summary of BAIRWMP Climate Change Vulnerability Assessment

Vulnerability Areas	General Overview of Vulnerabilities
Water Demand	**Urban and Agricultural Water Demand** – Changes to hydrology in the Region as a result of climate change could lead to changes in total water demand and use patterns. Increased irrigation (outdoor landscape or agricultural) is anticipated to occur with temperature rise, increased evaporative losses due to warmer temperature, and a longer growing season. Water treatment and distribution systems are most vulnerable to increases in maximum day demand.
Water Supply	**Imported Water** – Imported water derived from the Sierra Nevada sources and Delta diversions provide 66 percent of the water resources available to the Region. Potential impacts on the availability of these sources resulting from climate change directly affect the amount of imported water supply delivered to the Region. **Regional Surface Water** – Although future projections suggest that small changes in total annual precipitation over the Region will not change much, there may be changes to when precipitation occurs with reductions in the spring and more intense rainfall in the winter. **Regional Groundwater** – Changes in local hydrology could affect natural recharge to the local groundwater aquifers and the quantity of groundwater that could be pumped sustainably over the long-term in

Vulnerability Areas	General Overview of Vulnerabilities
	some areas. Decreased inflow from more flashy or more intense runoff, increased evaporative losses and warmer and shorter winter seasons can alter natural recharge of groundwater. Salinity intrusion into coastal groundwater aquifers due to sea-level rise could interfere with local groundwater uses. Furthermore, additional reductions in imported water supplies would lead to less imported water available for managed recharge of local groundwater basins and potentially more groundwater pumping in lieu of imported water availability.
Water Quality	**Imported Water** – For sources derived from the Delta, sea-level rise could result in increases in chloride and bromide (a disinfection by-product (DBP) precursor that is also a component of sea water), potentially requiring changes in treatment for drinking water. Increased temperature could result in an increase in algal blooms, taste and odor events, and a general increase in DBP formation **Regional Surface Water** – Increased temperature could result in lower dissolved oxygen in streams and prolong thermocline stratification in lakes and reservoirs forming anoxic bottom conditions and algal blooms. Decrease in annual precipitation could result in higher concentrations of contaminants in streams during droughts or in association with flushing rain events. Increased wildfire risk and flashier or more intense storms could increase turbidity loads for water treatment. **Regional Groundwater** – Sea-level rise could result in increases in chlorides and bromide for some coastal groundwater basins in the Region. Water quality changes in imported water used for recharge could also impact groundwater quality.
Sea-Level Rise	Sea-level rise is additive to tidal range, storm surges, stream flows, and wind waves, which together will increase the potential for higher total water levels, overtopping, and erosion. Much of the bay shoreline is comprised of low-lying diked baylands which are already vulnerable to flooding. In addition to rising mean sea

Vulnerability Areas	General Overview of Vulnerabilities
	level, continued subsidence due to tectonic activity will increase the rate of relative sea-level rise. As sea-level rise increases, both the frequency and consequences of coastal storm events, and the cost of damage to the built and natural environment, will increase. Existing coastal armoring (including levees, breakwaters, and other structures) is likely to be insufficient to protect against projected sea-level rise. Crest elevations of structures will have to be raised or structures relocated to reduce hazards from higher total water levels and larger waves.
Flooding	Climate change projections are not sensitive enough to assess localized flooding, but the general expectation is that more intense storms would occur thereby leading to more frequent, longer and deeper flooding. Changes to precipitation regimes may increase flooding. Elevated Bay elevations due to sea-level rise will increase backwater effects exacerbating the effect of fluvial floods and storm drain backwater flooding.
Ecosystem and Habitat	Changes in the seasonal patterns of temperature, precipitation, and fire due to climate change can dramatically alter ecosystems that provide habitats for California's native species. These impacts can result in species loss, increased invasive species ranges, loss of ecosystem functions, and changes in vegetation growing ranges. Reduced rain and changes in the seasonal distribution of rainfall may alter timing of low flows in streams and rivers, which in turn would have consequences for aquatic ecosystems. Changes in rainfall patterns and air temperature may affect water temperatures, potentially affecting coldwater aquatic species. Bay Area ecosystems and habitat provide important ecosystem services, such as: carbon storage, enhanced water supply and quality,

Vulnerability Areas	General Overview of Vulnerabilities
	flood protection, food and fiber production. Climate change is expected to substantially change several of these services. The region provides substantial aquatic and habitat-related recreational opportunities, including: fishing, wildlife viewing, and wine industry tourism (a significant asset to the region) that may be at risk due to climate change effects.
Hydropower	Currently, several agencies in the Region produce or rely on hydropower produced outside of the Region for a portion of their power needs. As the hydropower is produced in the Sierra, there may be changes in the future in the timing and amount of energy produced due to changes in the timing and amount of runoff as a result of climate change. Some hydropower is also produced within the region and could also be affected by changes in the timing and amount of runoff.

Source: 2019 Bay Area Integrated Regional Water Management Plan (BAIRWMP), Table 16-3.

SFPUC Climate Change Studies

The SFPUC views assessment of the effects of climate change as an ongoing project requiring regular updating to reflect improvements in climate science, atmospheric/ocean modeling, and human response to the threat of greenhouse gas emissions. Climate change research by the SFPUC began in 2009 and continues to be refined. In its 2012 report “Sensitivity of Upper Tuolumne River Flow to Climate Change Scenarios,” the SFPUC assessed the sensitivity of runoff into Hetch Hetchy Reservoir to a range of changes in temperature and precipitation due to climate change. Key conclusions from the report include the following:

- With differing increases in temperature alone, the median annual runoff at Hetch Hetchy would decrease by 0.7-2.1 percent from present-day conditions by 2040 and by 2.6-10.2 percent from present-day by 2100. Adding differing decreases in precipitation on top of temperature increases, the median annual runoff at Hetch Hetchy would decrease by 7.6-8.6 percent from present-day conditions by 2040 and by 24.7-29.4 percent from present-day conditions by 2100.

- In critically dry years, these reductions in annual runoff at Hetch Hetchy would be significantly greater, with runoff decreasing up to 46.5 percent from present day conditions by 2100 utilizing the same climate change scenarios.
- In addition to the total change in runoff, there will be a shift in the annual distribution of runoff. Winter and early spring runoff would increase and late spring and summer runoff would decrease.
- Under all scenarios, snow accumulation would be reduced and snow would melt earlier in the spring, with significant reductions in maximum peak snow water equivalent under most scenarios.

Currently, the SFPUC is conducting a comprehensive assessment of the potential effects of climate change on 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 2020 to 2070. There are many uncertain factors such as climate change, changing regulations, water quality, growth and economic cycles that may create vulnerabilities for the Regional Water System'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 is difficult to predict, but nonetheless they need to be considered in SFPUC planning. To address this planning challenge, the project uses a vulnerability-based planning approach to explore a range of future conditions to identify vulnerabilities, 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.

Cal Water Climate Change Studies

Cal Water is committed to incorporating climate change into its ongoing water supply planning. Section 4.3 of this Urban Water Management Plan (UWMP or Plan) includes a description of plausible changes to projected demands under climate change conditions, and Cal Water is currently working to consider the effects of climate change in future demand modeling. The impact of climate change on District supplies is addressed in detail in the key resources described below, which are incorporated into this Plan by reference:

- Cal Water is currently in the process of developing a multi-phase climate change study. Phase 1, which primarily consisted of a literature and tools review of previous and complementary studies, was completed in December 2020.[31] Phase 2 will include District-level vulnerability assessments of Cal Water's facilities and operations, including developing an assessment approach that evaluates climate impacts to Cal Water,

[31] ICF, 2020. California Water Service Climate Change – Water Resource Monitoring and Adaptation Plan – Phase 1, prepared by ICF, dated December, 17, 2020.

identifies asset vulnerabilities, and prioritizes climate risks. Phase 3 will focus on an assessment of climate-driven impacts to water supply resources and demand. Phase 2 is expected to be completed by December 2021. The executive summary of Phase 1 of this study is included in this Plan in Appendix G.

- In 2016, Cal Water completed a study of climate change impacts on a representative subset of its districts, including the Bear Gulch District, to gain a better understanding of the potential impacts of climate change on the availability of its diverse supplies.[32] The 2016 study relied on the best available projections of changes in climate (temperature and precipitation) through the end of the century to examine how surface water flows and groundwater recharge rates may change. The executive summary of this study is included in this Plan in Appendix G.

6.10.2 Regulatory Conditions and Project Development

Emerging regulatory conditions (e.g., issues surrounding the Water Quality Control Plan for the San Francisco/Sacramento-San Joaquin Delta Estuary [Bay-Delta Plan]) may affect planned future projects and the characterization of future water supply availability and analysis. A detailed description of the potential impacts of Bay-Delta Plan implementation on RWS supply reliability is included in Section 7.1.1. The District does not have any current plans to develop additional supply sources. If the District does move forward with any plans to develop supply projects, emerging regulatory conditions will be considered, and the associated water supply reliability impacts will be assessed in future UWMP updates.

6.10.3 Other Locally Applicable Criteria

Other locally applicable criteria may affect characterization and availability of an identified water supply (e.g., changes in regional water transfer rules may alter the availability of a water supply that had historically been readily available). Reliability of the RWS is further discussed in Section 7.1.1. The District is exploring potential supply augmentation projects but does not have any current plans to develop additional supply sources. If the District does move forward with any plans to develop supply projects, locally applicable criteria will be considered, and the associated water supply reliability impacts will be assessed in future UWMP updates.

[32] California Water Service Company, 2016. Potential Climate Change Impacts on the Water Supplies of California Water Service, prepared by Gary Fiske and Associates, Inc. and Balance Hydrologics, Inc., dated January 2016.

6.11 Energy Intensity

☑ ***CWC § 10631.2***

(a) In addition to the requirements of Section 10631, an urban water management plan shall include any of the following information that the urban water supplier can readily obtain:
(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 through 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.
(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. The department may consider studies and calculations conducted by the Public Utilities Commission in developing the methodology.
(c) The Legislature finds and declares that energy use is only one factor in water supply planning and shall not be considered independently of other factors.

The “Total Utility Approach” as defined by DWR in the UWMP Guidebook 2020 is used to report water-related energy-consumption data for the Bear Gulch District. Calendar year 2019 is selected as the one-year reporting period, and utility bills for the associated time period are used as the source for energy consumption data. Utility bills reported the following energy consumption data for the Bear Gulch District during calendar year 2019:

$$Total\ Energy\ Consumed\ by\ the\ Bear\ Gulch\ District = 4{,}089{,}238\ kilowatt\ hour\ (kWh)$$

Table 6-10 shows the energy consumed for each acre-foot of water entering the distribution system in the Bear Gulch District, including energy associated with the pumping, treatment, conveyance, and distribution of drinking water, but not including energy associated with the treatment of wastewater. Based on this, the energy intensity is estimated to be 345 kilowatt hours per acre-foot (kWh/AF).

Table 6-10. Recommended Energy Intensity – Total Utility Approach (DWR Table O-1B)

Urban Water Supplier: *Bear Gulch District*

Water Delivery Product

Retail Potable Deliveries

Enter Start Date for Reporting Period	1/1/2019	Urban Water Supplier Operational Control		
End Date	12/31/2019			
Is upstream embedded in the values reported?		Sum of All Water Management Processes	Non-Consequential Hydropower	
Water Volume Units Used	AF	Total Utility	Hydro-power	Net Utility
Volume of Water Entering Process (volume unit)		11,869	0	11,869
Energy Consumed (kWh)		4,089,238	0	4,089,238
Energy Intensity (kWh/volume)		344.5	0.0	344.5

Quantity of Self-Generated Renewable Energy

N/A kWh

Data Quality

Metered Data

Data Quality Narrative:

Utility bills for the associated time period are used as the source for energy consumption data.

Narrative:

Total energy consumption represents the energy consumed during pumping, treatment, conveyance, and distribution.

Chapter 7
Water Supply Reliability Assessment

☑ ***CWC § 10620 (f)***

An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

☑ ***CWC § 10630.5***

Each plan shall include a simple lay description of how much water the agency has on a reliable basis, how much it needs for the foreseeable future, what the agency's strategy is for meeting its water needs, the challenges facing the agency, and any other information necessary to provide a general understanding of the agency's plan.

This chapter describes the reliability of the Bear Gulch District's (also referred to herein as "District") water supplies. Assessment of water supply reliability is complex and dependent upon a number of factors, such as the number of water sources, regulatory and legal constraints, hydrological and environmental conditions, climate change, and expected growth, among others. Based on available historical information and projections of future water uses, regulatory and legal constraints, and hydrological and environmental conditions, including climate change, California Water Service Company (Cal Water) has made its best determination of future water supply reliability for the District. This chapter also provides an estimate of the supply volumes available to the District and the corresponding supply and demand reliability assessments in normal years, single dry years, and multiple dry year periods, as well as a drought risk assessment for the next five years. This chapter includes the following sections:

7.1 Constraints on Water Sources

7.2 Reliability by Type of Year

7.3 Supply and Demand Assessment

7.4 Water Supply Management Tools and Options

7.5 Drought Risk Assessment

7.1 Constraints on Water Sources

The Bear Gulch District derives its water supply from a combination of both imported surface water supply purchased from the San Francisco Public Utilities Commission (SFPUC) Regional Water System (RWS) and local surface water supply from Bear Gulch Creek. Cal Water has relied on the supply reliability estimates provided by the SFPUC for the RWS and the drought allocation structure provided by SFPUC and the Bay Area Water Supply and Conservation Agency (BAWSCA) to estimate available RWS supplies in dry year types through 2045. Cal Water has identified several potential constraints on future supply availability, water quality, and climate change. These constraints, along with the management strategies that the Bear Gulch District and other affected agencies have employed or will employ to address these constraints are summarized in the following sections.

7.1.1 Regional Water System Supply Availability

☑ ***CWC § 10631 (h)*** *A plan shall be adopted in accordance with this chapter and shall do all of the following:*

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. 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). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (f).

Detailed information is provided below regarding factors that impact the SFPUC RWS supply reliability. The source for the information is the common language provided by the SFPUC and BAWSCA; see Appendix H.

Level of Service Goals

The SFPUC historically has met demand in its service area in all year types from its watersheds, which consist of:

- Tuolumne River watershed
- Alameda Creek watershed
- San Mateo County watersheds

In general, 85 percent of the supply comes from the Tuolumne River through Hetch Hetchy Reservoir and the remaining 15 percent comes from the local watersheds through the San Antonio, Calaveras, Crystal Springs, Pilarcitos and San Andreas Reservoirs. The adopted Water Supply Improvement Program (WSIP) retains this mix of water supply for all year types.

In 2008, the SFPUC adopted Level of Service (LOS) Goals and Objectives in conjunction with the adoption of the WSIP for the RWS. The SFPUC updated the LOS Goals and

Objectives in February 2020. The SFPUC's LOS Goals and Objectives related to water supply are as follows:

Program Goal	System Performance Objective
Water Supply – *meet customer water needs in non-drought and drought periods*	• Meet all state and federal regulations to support the proper operation of the water system and related power facilities. • Meet average annual water demand of 265 million gallons per day (MGD) from the SFPUC watersheds for retail and Wholesale Customers during non–drought years for system demands consistent with the 2009 Water Supply Agreement (WSA). • Meet dry-year delivery needs while limiting rationing to a maximum 20 percent system-wide reduction in water service during extended droughts. • Diversify water supply options during non-drought and drought periods. • Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers.

Bay-Delta Plan Impacts

Based on information provided by SFPUC and BAWSCA (Appendix H and Appendix I) the adoption of the 2018 Bay-Delta Plan Amendment is anticipated to impact the reliability of the RWS supplies in the future.

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) to establish water quality objectives to maintain the health of the Bay-Delta ecosystem. 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 Bay-Delta. The Bay-

Delta Plan Amendment requires the release of 30-50% of the “unimpaired flow”[33] 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 Urban Water Management Plan (UWMP) in normal years but would experience supply shortages in single dry years or multiple dry years. Implementation of the Bay-Delta Plan Amendment will require rationing in all single dry years and multiple dry years. The SFPUC has initiated an Alternative Water Supply Planning Program (AWSP) to ensure that San Francisco can meet its Retail and Wholesale Customer water needs, address projected dry years shortages, and limit rationing to a maximum 20 percent system-wide in accordance with adopted SFPUC policies. This program is in early planning stages and is intended to meet future water supply challenges and vulnerabilities such as environmental flow needs and other regulatory changes; earthquakes, disasters, and emergencies; increases in population and employment; and climate change. As the region faces future challenges – both known and unknown – the SFPUC is considering this suite of diverse non-traditional supplies and leveraging regional partnerships to meet Retail and Wholesale Customer needs through 2045.

The SWRCB has stated that it intends to implement the Bay-Delta Plan Amendment on the Tuolumne River by the year 2022, assuming all required approvals are obtained by that time. But implementation of the Plan Amendment is uncertain for multiple reasons.

First, since adoption of the Bay-Delta Plan Amendment, 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 in the early stages and there have been no dispositive court rulings as of this date.

Second, the Bay-Delta Plan Amendment is not self-implementing and does not automatically allocate responsibility for meeting its new flow requirements to the SFPUC or any other water rights holders. Rather, the Bay-Delta Plan Amendment merely provides a regulatory framework for flow allocation, which must be accomplished by other regulatory and/or adjudicatory proceedings, such as a comprehensive water rights adjudication or, in the case of the Tuolumne River, may be implemented through the water quality certification process set forth in section 401 of the Clean Water Act as part

[33] "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.)

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 the other regulatory and/or adjudicatory proceedings would likely 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 SFPUC).

Third, in recognition of the obstacles to implementation of the Bay-Delta Plan Amendment, the SWRCB 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" by March 1, 2019, 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." In accordance with the SWRCB's instruction, on March 1, 2019, SFPUC, in partnership with other key stakeholders, submitted a proposed project description for the Tuolumne River that could be the basis for a voluntary substitute agreement with the SWRCB ("March 1st Proposed Voluntary Agreement"). On March 26, 2019, the Commission adopted Resolution No. 19-0057 to support the SFPUC's participation in the Voluntary Agreement negotiation process. To date, those negotiations are ongoing under the California Natural Resources Agency and the leadership of the Newsom administration.[34]

Drought Allocation Methodology

Given the constraints described above, the SFPUC has provided all of the Wholesale Customers with estimates of the RWS reliability in all year types though 2045, as shown in Appendix I. The Tier One Plan describes the method for allocating RWS water between Retail and Wholesale Customers during system-wide shortages of 20 percent or less. The Tier Two Plan allocates the collective Wholesale Customer share from the Tier One Plan among each of SFPUC's 26 Wholesale Customers.

For the purposes of 2020 UWMP development, BAWSCA provided a revised methodology to allocate RWS supplies during projected future single dry and multiple dry years in the instance where the supply shortfalls are greater than 20 percent. SFPUC and BAWSCA assumed that Tier One allocations for system-wide shortfalls of 16 percent to 20 percent would apply for all shortfalls greater than 20 percent. BAWSCA provided a revised methodology to allocate RWS supplies to Wholesale Agencies. The inclusion of these revised methodologies, which serve as the preliminary basis for UWMP supply reliability analyses, does not in any way imply an agreement by BAWSCA member agencies as to the exact allocation methodologies.

[34] California Natural Resources Agency, "Voluntary Agreements to Improve Habitat and Flow in the Delta and its Watersheds," available at https://files.resources.ca.gov/voluntary-agreements/.

The Tier One and Tier Two Plans and the drought allocation methodologies used in the 2020 UWMP for shortfalls of greater than 20 percent are further described below.

Tier One Drought Allocations

In July 2009, San Francisco and its Wholesale Customers in Alameda County, Santa Clara County, and San Mateo County (Wholesale Customers) adopted the WSA, which includes a Water Shortage Allocation Plan (WSAP) that describes the method for allocating water from the RWS between Retail and Wholesale Customers during system-wide shortages of 20 percent or less. The WSAP, also known as the Tier One Plan, was amended in the 2018 Amended and Restated WSA.

The SFPUC allocates water under the Tier One Plan when it determines that the projected available water supply is up to 20 percent less than projected system-wide water purchases. The following table shows the SFPUC (i.e, Retail Customers) share and the Wholesale Customers' share of the annual water supply available during shortages depending on the level of system-wide reduction in water use that is required. The Wholesale Customers' share will be apportioned among the individual Wholesale Customers based on a separate methodology adopted by the Wholesale Customers, known as the Tier Two Plan, discussed further below.

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%

The Tier One Plan allows for voluntary transfers of shortage allocations between the SFPUC and any Wholesale Customer as well as between Wholesale Customers themselves. In addition, water "banked" by a Wholesale Customer, through reductions in usage greater than required, may also be transferred.

As amended in 2018, the Tier One Plan requires Retail Customers to conserve a minimum of 5 percent during droughts. If Retail Customer demands are lower than the Retail

Customer allocation (resulting in a "positive allocation" to Retail[35]) then the excess percentage would be re-allocated to the Wholesale Customers' share. The additional water conserved by Retail Customers up to the minimum 5 percent level is deemed to remain in storage for allocation in future successive dry years.

The Tier One Plan will expire at the end of the term of the WSA in 2034, unless mutually extended by San Francisco and the Wholesale Customers.

The Tier One Plan applies only when the SFPUC determines that a system-wide water shortage exists and issues a declaration of a water shortage emergency under California Water Code Section 350. Separate from a declaration of a water shortage emergency, the SFPUC may opt to request voluntary cutbacks from its Retail and Wholesale Customers to achieve necessary water use reductions during drought periods.

As discussed above, the Tier One Plan only applies to system-wide shortages of 20 percent or less, and there is currently no methodology for sharing available water between SFPUC and Wholesale Customers for system-wide shortages of greater than 20 percent. SFPUC and BAWSCA assumed that Tier One allocations for System-Wide shortfalls of 16 percent to 20 percent would apply for all shortfalls greater than 20 percent for purposes of the UWMP supply reliability analyses. The analysis included herein does not in any way imply an agreement by BAWSCA member agencies with the assumed application of the Tier One allocations by SFPUC and BAWSCA for shortages of greater than 20 percent.

Tier Two Drought Allocations

The Wholesale Customers have negotiated and adopted the Tier Two Plan, referenced above, which allocates the collective Wholesale Customer share from the Tier One Plan among each of the 26 Wholesale Customers. These Tier Two allocations are based on a formula that takes into account multiple factors for each Wholesale Customer including:

- Individual Supply Guarantee;
- Seasonal use of all available water supplies; and
- Residential per capita use.

The water made available to the Wholesale Customers collectively will be allocated among them in proportion to each Wholesale Customer's Allocation Basis, expressed in MGD, which in turn is the weighted average of two components. The first component is the Wholesale Customer's Individual Supply Guarantee, as stated in the WSA, and is fixed. The second component, the Base/Seasonal Component, is variable and is calculated using

[35] See Water Supply Agreement, Water Shortage Allocation Plan (Attachment H), Section 2.1.

the monthly water use for three consecutive years prior to the onset of the drought for each of the Wholesale Customers for all available water supplies. The second component is accorded twice the weight of the first, fixed component in calculating the Allocation Basis. Minor adjustments to the Allocation Basis are then made to ensure a minimum cutback level, a maximum cutback level, and a sufficient supply for certain Wholesale Customers.

The Allocation Basis is used in a fraction, as numerator, over the sum of all Wholesale Customers' Allocation Bases to determine each wholesale customer's Allocation Factor. The final shortage allocation for each Wholesale Customer is determined by multiplying the amount of water available to the Wholesale Customers' collectively under the Tier One Plan, by the Wholesale Customer's Allocation Factor.

The Tier Two Plan requires that the Allocation Factors be calculated by BAWSCA each year in preparation for a potential water shortage emergency. As the Wholesale Customers change their water use characteristics (e.g., increases or decreases in SFPUC purchases and use of other water sources, changes in monthly water use patterns, or changes in residential per capita water use), the Allocation Factor for each Wholesale Customer will also change. However, for long-term planning purposes, each Wholesale Customer shall use as its Allocation Factor, the value identified in the Tier Two Plan when adopted.

Per WSA Section 3.11, the Tier One and Tier Two Plans will be used to allocate water from the Regional Water System between Retail and Wholesale Customers during system-wide shortages of 20% or less. For Regional Water System shortages in excess of 20%, San Francisco shall (a) follow the Tier 1 Shortage Plan allocations up to the 20% reduction, (b) meet and discuss how to implement incremental reductions above 20% with the Wholesale Customers, and (c) make a final determination of allocations above the 20% reduction. After the SFPUC has made the final allocation decision, the Wholesale Customers shall be free to challenge the allocation on any applicable legal or equitable basis. For purposes of the 2020 UWMPs, for San Francisco Regional Water System (RWS) shortages in excess of 20%, the allocations among the Wholesale Customers is assumed to be equivalent among them and to equal the drought cutback to Wholesale Customer by the SFPUC.

The Tier Two Plan, which initially expired in 2018, has been extended by the BAWSCA Board of Directors every year since for one additional calendar year. In November 2020, the BAWSCA Board voted to extend the Tier Two Plan through the end of 2021. BAWSCA's workplan for FY 2021-22 includes development of an updated Tier 2 Plan.

BAWSCA's workplan for FY 2021-22 includes development of an updated Tier 2 Plan.

Revised Drought Allocation Plan

As detailed by BAWSCA in multiple memos and workshops (Appendix I), the Tier Two Plan was not designed for RWS shortages greater than 20 percent.[36] In a memoranda dated February 18, 2021, BAWSCA provided a refined methodology to allocate RWS supplies during projected future single dry and multiple dry years in the instance where the supply shortfalls are greater than 20 percent. The revised methodology developed by BAWSCA allocates the wholesale RWS supplies as follows:

1. When the average Wholesale Customers' RWS shortages are 10 percent or less, an equal percent reduction will be applied across all agencies. This is consistent with the existing Tier Two requirement of a minimum 10 percent cutback in any Tier Two application scenario.
2. When average Wholesale Customers' shortages are between 10 and 20 percent, the Tier Two Plan will be applied.
3. When the average Wholesale Customers' RWS shortages are greater than 20 percent, an equal percent reduction will be applied across all agencies.

The associated allocations based on the updated BAWSCA methodology are included as Appendix I. While this allocation methodology has been used herein, Ca Water notes that, per its memoranda dated February 18, 2021 (Appendix I):

> "BAWSCA recognizes that this is not an ideal situation or method for allocation of available drought supplies. In the event of actual RWS shortages greater than 20 percent, the Member Agencies would have the opportunity to negotiate and agree upon a more nuanced and equitable approach. Such an approach would likely consider basic health and safety needs, the water needs to support critical institutions such as hospitals, and minimizing economic impacts on individual communities and the region."

As such, this allocation method is only intended to serve as the preliminary basis for the 2020 UWMP supply reliability analysis. The analysis provided herein does not in any way imply an agreement by BAWSCA member agencies as to the exact allocation methodology. BAWSCA member agencies are in discussions about jointly developing an allocation method that would consider additional multiple equity factors in the event that SFPUC is not able to deliver its contractual supply volume, and its cutbacks to the RWS supply exceed 20 percent.

[36] Note that the Tier One Drought Allocations were also not designed for shortages greater than 20 percent. SFPUC and BAWSCA have assumed for UWMP planning purposes that the Wholesale Share will remain 62.5 percent for all shortfalls greater than 16 percent.

7.1.2 Local Surface Water Supply Availability

The District's local surface water supply is estimated to be available during normal hydrologic years at a volume of 840 acre-feet per year (AFY), based on analysis of the Bear Gulch Creek watershed yield and with consideration of the various diversion constraints under the District's water rights and minimum instream flow requirements. Although local surface water diversions (and subsequent treatment and use of local surface water) have occurred historically during dry years, and the District's analysis indicates that some diversions are likely to occur in future dry years[37], for the purposes of this UWMP the District conservatively assumes that local surface water supplies will be zero during single dry and multiple dry years over the planning horizon.

7.1.3 Water Quality

☑ ***CWC § 10634***

The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

Impaired water quality also has the potential to affect water supply reliability. Cal Water has and will continue to meet all state and federal water quality regulations. All drinking water standards are set by the U.S. Environmental Protection Agency (USEPA) under the authorization of the Federal Safe Drinking Water Act of 1974. In California, the State Water Resources Control Board (SWRCB), Division of Drinking Water (DDW) can either adopt the USEPA standards or set more stringent standards, which are then codified in Title 22 of the California Code of Regulations. There are two general types of drinking water standards:

- **Primary Maximum Contaminant Levels (MCLs)** are health protective standards and are established using a very conservative risk-based approach for each constituent that takes into potential health effects, detectability and treatability, and costs of treatment. Public water systems may not serve water that exceeds Primary MCLs for any constituent.

- **Secondary MCLs** are based on the aesthetic qualities of the water such as taste, odor, color, and certain mineral content, and are considered limits for constituents that may affect consumer acceptance of the water.

Cal Water routinely monitors the water that is treated and served to customers to ensure that water delivered to customers meets these drinking water standards. The results of this testing are reported to the SWRCB DDW following each test and are summarized annually in Water Quality Reports (also known as "Consumer Confidence Reports"), which are provided to

[37] Diversions from the Bear Gulch Creek system are estimated at 291 AF with a 90% exceedance probability.

customers by mail and made available on Cal Water's website: https://www.calwater.com/waterquality/water-quality-reports/.

As discussed in Chapter 6, the majority of the water supply to the SFPUC RWS is from the Hetch Hetchy Reservoir in the Sierra Nevada Mountains. The Hetch Hetchy Reservoir is considered a very high-quality water source due to low total dissolved solid (TDS) concentrations and other factors. Additional water supplies from the Alameda and Peninsula sources come from areas with restricted access to protect the source water quality.

The SFPUC's Water Quality Division (WQD) regularly collects and tests water samples from reservoirs and designated sampling points throughout the RWS to ensure that the SFPUC's water meets or exceeds federal and state drinking water standards. In 2019, the WQD conducted more than 53,650 drinking water tests in the sources and transmission systems. This is in addition to the extensive treatment process control monitoring performed by the SFPUC's certified operators and online instruments. The SFPUC also has online instruments providing continuous water quality monitoring at numerous locations.

Given Cal Water and SFPUC's proactive monitoring and management of water quality, water quality is not expected to impact the reliability of the District's available supplies within the planning horizon (i.e., through 2045).

7.1.4 Climate Change

☑ ***CWC § 10631 (b) (1)***

…For each source of water supply, consider any information pertinent to the reliability analysis conducted pursuant to Section 10635, including changes in supply due to climate change.

Section 6.10.1 provides a summary of the assessments of the applicable climate change on supplies that Cal Water and SFPUC have previously performed and those planned for the near term. The anticipated effects of climate change have been directly factored into the District's assessment of its supply reliability. As discussed in Section 6.10.1, Cal Water is actively working to further quantify and consider future climate change impacts as part of its Cal Water's ongoing supply and operations planning.

7.2 Reliability by Type of Year

☑ ***CWC § 10631 (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, including all of the following:

☑ ***CWC § 10631 (b)(1)***

A detailed discussion of anticipated supply availability under a normal water year, single dry year, and droughts lasting at least five years, as well as more frequent and severe periods of drought, as described in the drought risk assessment. For each source of water supply, consider any information pertinent to the reliability analysis conducted pursuant to Section 10635, including changes in supply due to climate change.

☑ ***CWC § 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. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

Per the UWMP Guidebook 2020, the water service reliability assessment includes three unique year types:

- A normal hydrologic year represents the water supplies available under normal conditions, this could be an averaged range of years or a single representative year,
- A single dry year represents the lowest available water supply, and
- A five-consecutive year drought represents the driest five-year period in the historical record.

Identification of these dry year periods consistent with the UWMP Guidebook 2020 methodology is provided in the language provided by BAWSCA and the SFPUC in Appendix H and Appendix I, and is presented in Table 7-1 and Table 7-2.

Table 7-1. Basis of Water Year Data (Reliability Assessment) (DWR Table 7-1)

Year Type	Base Year	Available Supplies if Year Type Repeats	
		X	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location: Table 7-2
			Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available	% of Average Supply
Average Year			
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			
NOTES:			

7.2.1 SFPUC Supply Modeled RWS Dry Year Supply Availability

As described in SFPUC's 2020 UWMP, SFPUC used the Hetch Hetchy and Local Simulation Model (HHLSM) to estimate SFPUC RWS supply availability for water service reliability assessment and the drought risk assessment (DRA; Section 7.5). HHLSM simulates supplies over a historical record of hydrology from 1920 through 2017 with a representation of current and planned SFPUC RWS infrastructure and operations.

Water supply shortfalls presented by SFPUC in Appendix I were estimated using SFPUC's design drought methodology. The SFPUC uses a hypothetical 8.5-year design drought that is more severe than what the RWS has historically experienced 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. The five-consecutive-year dry sequence used for the UWMP represents years 2 through 6 of the design drought. However, the modeling approach assumes water supply rationing each year that is designed to provide sufficient carry-over water in SFPUC reservoirs to continue delivering water, although at reduced levels, during each year of the five-consecutive year drought and the remaining years of the design drought.[38]

[38] SFPUC, 2021. 2020 Urban Water Management Plan, dated June 2021.

SFPUC provided results for two modeled scenarios, which show significantly different supply reliability projections for the RWS:

2. With full implementation of the Bay-Delta Plan Amendment in 2023
3. Without implementation of the Bay-Delta Plan Amendment

The SFPUC decided to present the water reliability analysis with full implementation of the Bay-Delta Plan Amendment in the SFPUC 2020 UWMP Submittal Tables and provided the following rationale for that decision:

> The adoption of the Bay-Delta Plan Amendment may significantly impact the supply available from the RWS. SFPUC recognizes that the Bay-Delta Plan Amendment has been adopted and that, given that it is now state law, we must plan for a future in which it is fully implemented. SFPUC also acknowledges that the plan is not self-implementing and therefore does not automatically go into effect. SFPUC is currently pursuing a voluntary agreement as well as a lawsuit which would limit implementation of the Plan. With both of these processes occurring on an unknown timeline, SFPUC does not know at this time when the Bay-Delta Plan Amendment is likely to go into effect. As a result, it makes sense to conduct future supply modeling for a scenario that doesn't include implementation of the Bay-Delta Plan Amendment, as that represents a potential supply reliability scenario.
>
> Because of the uncertainty surrounding implementation of the Bay-Delta Plan Amendment, the SFPUC conducted water service reliability assessment that includes: (1) a scenario in which the Bay-Delta Plan Amendment is fully implemented in 2023, and (2) a scenario that considers the SFPUC system's current situation without the Bay-Delta Plan Amendment. The two scenarios provide a bookend for the possible future scenarios regarding RWS supplies. The standardized tables associated with the SFPUC's UWMP contain the future scenario that assumes implementation of the Bay-Delta Plan Amendment starting in 2023.
>
> Although the SWRCB has stated it intends to implement the Bay-Delta Plan Amendment on the Tuolumne River by the year 2022, given the current level of uncertainty, it is assumed for the purposes of the SFPUC's draft UWMP that the Bay-Delta Plan Amendment will be fully implemented starting in 2023.

As shown in Appendix I, SFPUC also provided results for each of the modeling scenarios described above assuming demands on the RWS equal to both: (1) the total of projected retail demands and projected Wholesale Customer purchases, and (2) a constant water demand of 265 MGD from the SFPUC watersheds for retail and Wholesale Customers, consistent with SFPUC's contractual obligation. According to the SFPUC, the modeling based on a demand of 265 MGD was used to "facilitate planning that supports meeting this Level of Service goal and their contractual obligations." Supply modeling results presented in the text of the SFPUC's 2020 UWMP reflect an input of projected retail and Wholesale demands on the RWS.

Consistent with SFPUC's approach and guidance from SFPUC and BAWSCA, this UWMP presents results for the water service reliability assessment and the DRA (Section 7.5) based on the modeling scenario that assumes full implementation of the Bay-Delta Plan Amendment in 2023 and uses projected demands on the RWS. SFPUC modeling results for this scenario showing the total RWS supply available to Wholesale Customers during the characteristic year types can be found in Tables 3a-3g of the SFPUC letter dated March 30, 2021. These results show total Wholesale RWS supply shortfalls ranging from 36 percent to 54 percent of projected purchases during dry years after 2023.

For comparison purposes, results for the scenario without the Bay-Delta Plan Amendment can be found in Tables 4a-4g of the same SFPUC letter. These results indicated that the SFPUC would be able to meet 100 percent of Wholesale projected purchases during all year types except during the fourth and fifth consecutive dry years for base year 2045 when 15 percent Wholesale supply shortages are projected.

7.2.2 Cal Water's Year Type Characterization

As discussed in Section 6.1, in accordance with the SFPUC's perpetual obligation to Cal Water's Supply Assurance, Cal Water has an Individual Supply Guarantee (ISG) of 35.68 MGD (39,993 AFY), which is shared among its Bear Gulch, Mid-Peninsula, and South San Francisco Districts (also referred to herein as the "Peninsula Districts"). SFPUC is obligated to provide Cal Water with up to 100 percent of Cal Water's ISG during normal years.

Using the SFPUC modeling results presented in the of the SFPUC letter dated March 30, 2021, BAWSCA provided single and five-consecutive dry-year allocations for each agency based on the methodology described in Section 7.1.1. As discussed therein, for the purposes for the 2020 UWMP supply reliability analysis only, Wholesale Agency drought allocations assume an equal percent reduction across all agencies when the average Wholesale Customers' RWS shortages are greater than 20 percent. These percent reductions for the scenario that assumes the implementation of the Bay-Delta Plan Amendment in 2023 are included in Table E of the BAWSCA updated drought allocation memorandum data April 1, 2021 (Appendix I) and reproduced in Table 7-2, below, for base year 2025 through 2045. The percent reductions shown in Table 7-2 are applied to the District's projected potable demands listed in Table 4-3 for each respective base year to calculate the projected dry-year RWS supplies shown in Table 7-4 and Table 7-5.

Table 7-2. RWS Wholesale Supply Availability During Normal and Dry Years for Based Years 2025 through 2045 (Responds to DWR Table 7-1)

Base Year	Normal Year	Single Dry Year	Multiple Dry Years				
			Year 1	Year 2	Year 3	Year 4	Year 5
2025	100%	64%	64%	55%	55%	55%	55%
2030	100%	64%	64%	55%	55%	55%	55%
2035	100%	64%	64%	54%	54%	54%	50%
2040	100%	63%	63%	54%	54%	48%	48%
2045	100%	54%	54%	54%	54%	46%	46%

NOTES:
(a) Normal-year water supply availability is presented in terms of percentage of Cal Water's ISG (35.68 MGD).
(b) Dry-year water supply availability is presented in terms of percentage of projected RWS demands for each base year consistent the revised BAWSCA Drought Methodology that assumes equal percent cutbacks across all Wholesale Agencies.
(c) Results reflect scenario with Bay-Delta Plan Amendment implemented in 2023 and the use projected RWS purchases.

7.3 Supply and Demand Assessment

Water supply and demand patterns change during normal, single dry, and multiple dry years. Cal Water has relied on the demand modeling described in Chapter 4 to forecast demands for normal, single dry and multiple dry years.

7.3.1 Normal Year Supply and Demand Assessment

Table 7-2 shows the projected supply and demand totals for a normal year. The supply and demand totals are consistent with those in Table 6-9B and Table 4-3, respectively. The District is expected to have adequate water supplies during normal years to meet its projected demands through 2045.

Table 7-3. Normal Year Supply and Demand Comparison (DWR Table 7-2)

	2025	2030	2035	2040	2045
Supply totals *From DWR Table 6-9*	12,796	12,699	12,730	12,675	12,694
Demand totals *From DWR Table 4-3*	12,796	12,699	12,730	12,675	12,694
Difference	0	0	0	0	0

NOTES:
(a) Volumes are in units of AF.

7.3.2 Dry Year Supply and Demand Assessment (with Bay-Delta Plan)

The Bear Gulch District's local surface water supply is conservatively assumed to be zero during single dry and multiple dry years over the planning horizon.

The reliability of the RWS is anticipated to vary greatly in different year types. As described above and detailed in Appendix I, Cal Water has relied on the supply reliability estimates provided by the SFPUC for the RWS and the drought allocation structure provided by SFPUC and BAWSCA to estimate available RWS supplies in dry year types through 2045.[39]

Table 7-4 shows the projected supply and demand totals for the single dry year, and Table 7-5 shows the projected supply and demand totals for multiple dry year periods extending five years.

Dry year RWS supply availability is calculated in accordance with Table 7-2, as a percentage of projected RWS demands for each base year consistent with the revised BAWSCA Drought Methodology that assumes equal percent cutbacks across all Wholesale Agencies.

Table 7-4. Single Dry Year Supply and Demand Comparison (DWR Table 7-3)

	2025	2030	2035	2040	2045
Supply totals	8,546	8,482	8,503	8,334	7,154
Demand totals	13,354	13,253	13,285	13,228	13,248
Difference	(4,808)	(4,771)	(4,782)	(4,894)	(6,094)
NOTES: (a) Volumes are in units of AF.					

[39] The balance between supply and demand totals excludes usage reductions that are not directly a function of Cal Water supplies, but are externally-imposed by other entities, such as the 2015 State-mandated cutbacks.

Table 7-5. Multiple Dry Years Supply and Demand Comparison (DWR Table 7-4)

		2025	2030	2035	2040	2045
First year	Supply totals	8,767	8,701	8,722	8,549	7,339
	Demand totals	13,699	13,595	13,629	13,570	13,591
	Difference	(4,932)	(4,894)	(4,906)	(5,021)	(6,252)
Second year	Supply totals	7,534	7,477	7,360	7,328	7,339
	Demand totals	13,699	13,595	13,629	13,570	13,591
	Difference	(6,164)	(6,118)	(6,269)	(6,242)	(6,252)
Third year	Supply totals	7,534	7,477	7,360	7,328	7,339
	Demand totals	13,699	13,595	13,629	13,570	13,591
	Difference	(6,164)	(6,118)	(6,269)	(6,242)	(6,252)
Fourth year	Supply totals	7,534	7,477	7,360	6,514	6,252
	Demand totals	13,699	13,595	13,629	13,570	13,591
	Difference	(6,164)	(6,118)	(6,269)	(7,057)	(7,339)
Fifth year	Supply totals	7,534	7,477	6,814	6,514	6,252
	Demand totals	13,699	13,595	13,629	13,570	13,591
	Difference	(6,164)	(6,118)	(6,814)	(7,057)	(7,339)
NOTES: (a) Volumes are in units of AF.						

7.3.3 Uncertainties in Dry Year Water Supply Projections

As shown in the above tables, significant water supply shortfalls are currently projected in future single and multiple dry years, directly because of the Bay-Delta Plan Amendment implementation. However, numerous uncertainties remain in the implementation of the Bay-Delta Plan Amendment. The water supply projections presented above likely represent a worst-case scenario in which the Bay-Delta Plan Amendment is implemented without the SFPUC and the SWRCB reaching a Voluntary Agreement and do not account for implementation of SFPUC's AWSP, described in more detail below. Under this supply scenario, SFPUC appears not to be able to meet its contractual obligations (i.e., Level of Service goals) and Cal Water's forecasted demands during droughts.

As discussed in Section 7.2.1, SFPUC also provided water supply reliability projections without the Bay-Delta Plan Amendment (see Appendix I), which likely represents a highly optimistic water supply reliability outcome. These projections indicated that without the Bay-Delta Plan Amendment SFPUC would be able to supply 100 percent of projected RWS demands in all year types through 2045, except for the 4th and 5th consecutive dry year in 2045, during which 90 percent of projected RWS demands (85 percent of the Wholesale demands) would be met. The large disparity in projected water supply reliability between these two scenarios demonstrate the current level uncertainty.

In addition to these two UWMP scenarios, in a March 26, 2021 Special Commission Meeting, SFPUC staff presented HHLSM modeling results for 10 different scenarios, including scenarios with the implementation of the Tuolumne River Voluntary Agreement (TRVA), with the implementation of the Bay-Delta Plan Amendment and the AWSP, and with the use of a modified rationing policy and a modified design drought (Appendix J). Results for the scenarios with the TRVA and with the AWSP (particularly with a modified rationing policy and design drought) showed significantly improved RWS supply availability compared to the Bay-Delta Plan Amendment scenario shown herein.

The current sources of uncertainty in the dry year water supply projections are summarized below:

- *Implementation of the Bay-Delta Plan Amendment is under negotiation.* The SFPUC is continuing negotiations with the SWRCB on implementation of the Bay-Delta Plan Amendment for water supply cutbacks, particularly during droughts. The SFPUC, in partnership with other key stakeholders, has proposed a voluntary substitute agreement to the Bay-Delta Plan Amendment, the TRVA, that provides a collaborative approach to protect the environment and plan for a reliable and high-quality future potable water supply. This is a dynamic situation and the projected drought cutback allocations may need to be revised before the next (i.e., 2025) UWMP depending on the outcome of ongoing negotiations.
- *Benefits of the AWSP are not accounted for in current supply projections.* As discussed in Section 7.3.4 and Appendix I, SFPUC is exploring options to increase its supplies through the AWSP. Implementation of feasible projects developed under the AWSP is not yet reflected in the supply reliability scenarios presented herein and is anticipated to reduce the projected RWS supply shortfalls (Appendix J).
- *SFPUC is considering modifications to its design drought methodology and rationing policy.* Shortening the 8.5-year design drought or modifying the rationing policy to increase rationing in the early years of a drought are anticipated to reduce projected RWS supply shortfalls (Appendix J).
- *Methodology for Tier One and Tier Two Wholesale drought allocations have not been established for wholesale shortages greater than 20 percent.* As discussed in Section 7.1.1, the current Tier One and Tier Two Plans are not designed for RWS supply shortages of greater than 20 percent. For UWMP planning purposes per BAWSCA guidance, the Tier One Wholesale share for a 16 percent to 20 percent supply reduction (62.5 percent) has been applied for reductions greater than 20 percent and an equal percent reduction has been applied across all Wholesale agencies. BAWSCA member agencies have not formally agreed to adopt this shortage allocation methodology and are in discussions about jointly developing an alternative allocation method that would consider additional equity factors

if SFPUC is unable to deliver its contractual supply volume and cutbacks to the RWS supply exceed 20 percent.

- _RWS demands are subject to change._ The RWS supply availability is dependent upon the system demands. As discussed in Section 7.2, the supply scenarios are based on the total projected Wholesale Customer purchases provided by BAWSCA to SFPUC in January 2021. Many BAWSCA agencies have refined their projected demands during the UWMP process after these estimates were provided to SFPUC. Furthermore, the RWS demand projections are subject to change in the future based upon future housing needs, increased conservation, and development of additional local supplies.
- _Frequency and duration of cutbacks are also uncertain._ While the projected shortfalls presented in the UWMP appear severe, the actual frequency and duration of such shortfalls are uncertain. Based on the HHLSM simulations provided by BAWSCA for the with Bay-Delta Plan Amendment scenario (Appendix I), rationing is anticipated to be required 20 percent of years for base year 2025 through 2035, 23 percent of all years for base year 2040, and 25 percent of years for base year 2045. In addition to the supply volumes, the above listed uncertainties would also impact the projected frequency and duration of shortfalls. As such, in addition to evaluating local options to increase supply reliability, Cal Water has placed high priority on working with BAWSCA and SFPUC in the upcoming years to better refine the estimates of RWS supply reliability and may amend this UWMP when new information becomes available.

The above uncertainties notwithstanding, BAWSCA's current drought allocation cutbacks will require the District to apply its Water Shortage Contingency Plan (WSCP) Stage 6, for water use restrictions above 50 percent and will affect Cal Water's short- and long-term water management decisions. As described further below (and in Section 7.4), Cal Water is working independently and with the other BAWSCA agencies to identify regional mitigation measures to improve reliability for regional and local water supplies and meet its customers' water needs. If conditions for large drought cutbacks to the RWS persist, Cal Water will need to implement additional demand management practices to invoke strict restrictions on potable water use, and obtain funding to accelerate developing alternate supplies of water.

Cal Water recommends that users of its 2020 UWMP contact District staff for potential updates about its water supply reliability and the DRA before using the 2020 UWMP drought cutback projections for their planning projects and referencing the drought allocations.

7.3.4 Strategies and Actions to Address Dry Year Supply Shortfalls

Although there remains significant uncertainty in future supply availability, as discussed above, Cal Water, SFPUC, and BAWSCA have developed strategies and actions to address the projected dry year supply shortfalls. These efforts are discussed in the following sections.

SFPUC and Other Regional Strategies and Actions

Dry Year Water Supply Projects

The WSIP authorized the SFPUC to undertake a number of water supply projects to meet dry-year demands with no greater than 20 percent system-wide rationing in any one year. Implementation of these projects is also expected to mitigate impacts of the implementation of the Bay-Delta Plan Amendment. Those projects include the following:

- *Calaveras Dam Replacement Project*. Calaveras Dam is located near a seismically active fault zone and was determined to be seismically vulnerable. To address this vulnerability, the SFPUC constructed a new dam of equal height downstream of the existing dam. Construction on the project occurred between 2011 and July 2019. The SFPUC began impounding water behind the new dam in accordance with California Division of Safety of Dams (DSOD) guidance in the winter of 2018/2019.

- *Alameda Creek Recapture Project*. As a part of the regulatory requirements for future operations of Calaveras Reservoir, the SFPUC must implement bypass and instream flow schedules for Alameda Creek. The Alameda Creek Recapture Project will recapture a portion of the water system yield lost due to the instream flow releases at Calaveras Reservoir or bypassed around the Alameda Creek Diversion Dam and return this yield to the RWS through facilities in the Sunol Valley. Water that naturally infiltrates from Alameda Creek will be recaptured into an existing quarry pond known as SMP (Surface Mining Permit)-24 Pond F2. The project will be designed to allow the recaptured water to be pumped to the Sunol Valley Water Treatment Plant or to San Antonio Reservoir. Construction of this project will occur from spring 2021 to fall 2022.

- *Lower Crystal Springs Dam Improvements*. The Lower Crystal Springs Dam (LCSD) Improvements were substantially completed in November 2011. The joint San Mateo County/SFPUC Bridge Replacement Project to replace the bridge across the dam was completed in January 2019. A WSIP follow up project to modify the LCSD Stilling Basin for fish habitat and upgrade the fish water release and other valves started in April 2019. While the main improvements to the dam have been completed, environmental permitting issues for reservoir operation remain significant. While the reservoir elevation was lowered due to DSOD restrictions, the habitat for the Fountain Thistle, an endangered plant, followed the lowered reservoir elevation. Raising the reservoir elevation now requires that new plant populations be restored incrementally before the reservoir elevation is raised. The result is that it may be several years before pre-project water storage volumes can be restored.

- *Regional Groundwater Storage and Recovery Project*. The Groundwater Storage and Recovery Project (GSRP) is a strategic partnership between SFPUC and three San Mateo County agencies – Cal Water, the City of Daly City, and the City of San Bruno – to conjunctively operate the south Westside Groundwater Basin. The project sustainably manages groundwater and surface water resources in a way that provides supplies during times of drought. During years of normal or heavy rainfall, the project would provide additional surface water to the partner agencies in San Mateo County in lieu of groundwater pumping. Over time, reduced pumping creates water storage through natural recharge of up to 20 billion gallons of new water supply available during dry years.

The project's Final Environmental Impact Report was certified in August 2014, and the project also received Commission approval that month. Phase 1 of this project consists of construction of thirteen well sites and is over 99 percent complete. Phase 2 of this project consists of completing construction of the well station at the South San Francisco Main site and some carryover work that has not been completed from Phase 1. Phase 2 design work began in December 2019.

- *2 MGD Dry-year Water Transfer*. In 2012, the dry-year transfer was proposed between the Modesto Irrigation District and the SFPUC. Negotiations were terminated because an agreement could not be reached. Subsequently, the SFPUC had discussions with the Oakdale Irrigation District for a one-year transfer agreement with the SFPUC for 2 MGD (2,240 acre-feet). No progress towards agreement on a transfer was made in 2019, but the irrigation districts recognize SFPUC's continued interest and SFPUC will continue to pursue transfers.

In order to achieve its target of meeting at least 80 percent of its customer demand during droughts with a system demand of 265 MGD, and to mitigate the impacts of the Bay-Delta Plan, the SFPUC must successfully implement the dry-year water supply projects included in the WSIP.

Furthermore, the permitting obligations for the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements include a combined commitment of 12.8 MGD for instream flows on average. When this is reduced for an assumed Alameda Creek Recapture Project recovery of 9.3 MGD, the net loss of water supply is 3.5 MGD.

Alternative Water Supply Planning Program

As discussed, below, BAWSCA has taken steps to ensure that SFPUC develops alternative water supplies:

With the adoption of the Bay-Delta Plan Phase 1 (Bay-Delta Plan) by the State Water Resources Control Board in December of 2018, coupled with the uncertainties associated with litigation and the development of Voluntary Agreements that, if successful, would provide an alternative to the 40% unimpaired flow requirement that is required by the Bay-Delta Plan, BAWSCA redoubled its efforts to ensure that the SFPUC took necessary action to develop alternative water supplies such that they would be in place to fill any potential gap in supply by implementation of the Bay-Delta Plan and that the SFPUC would be able to meet its legal and contractual obligations to its Wholesale Customers.

In 2019, BAWSCA held numerous meetings with the SFPUC encouraging them to develop a division within their organization whose chief mission was to spearhead alternative water supply development. On June 25, 2019, BAWSCA provided a written and oral statement to the Commissioners urging the SFPUC to focus on developing new sources of supply in a manner similar to how it addressed the implementation of the Water System Improvement Program (WSIP). BAWSCA urged that a new water supply program was called for, with clear objectives, persistent focus, a dedicated team, adequate funding, and a plan for successful execution. The SFPUC Commission supported BAWSCA's recommendation and directed staff to undertake such an approach.

In early 2020, the SFPUC began implementation of the Alternative Water Supply Planning Program (AWSP), a program designed to investigate and plan for new water supplies to address future long-term water supply reliability challenges and vulnerabilities on the RWS.

Included in the AWSP is a suite of diverse, non-traditional supply projects that, to a great degree, leverage regional partnerships and are designed to meet the water supply needs of the SFPUC Retail and Wholesale Customers through 2045. As of the most recent Alternative Water Supply Planning Quarterly Update, SFPUC has budgeted $264 million over the next ten years to fund water supply projects. BAWSCA is heavily engaged with the SFPUC on its AWSP efforts.

SFPUC's AWSP is described in more detail below:

The SFPUC is increasing and accelerating its efforts to acquire additional water supplies and explore other projects that would increase overall water supply resilience through the AWSP. The drivers for the program include: (1) the adoption of the Bay-Delta Plan Amendment and the resulting potential limitations to RWS supply during dry years, (2) the net supply shortfall following the implementation of WSIP, (3) San Francisco's perpetual obligation to supply 184 MGD to the Wholesale Customers, (4) adopted LOS Goals to limit rationing to no more than 20 percent system-wide during droughts, and (5) the potential need to identify water supplies that would be required to offer permanent status to interruptible customers. Developing additional supplies through this program would reduce water supply shortfalls and reduce rationing associated with such shortfalls. The planning priorities guiding the framework of the AWSP are as follows:

1. Offset instream flow needs and meet regulatory requirements

2. Meet existing obligations to existing permanent customers

3. Make interruptible customers permanent

4. Meet increased demands of existing and interruptible customers

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

- Meet dry-year delivery needs while limiting rationing to a maximum of 20 percent system-wide reduction in water service during extended droughts;

- Diversify water supply options during non-drought and drought periods;

- Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers;

- Meet, at a minimum, all current and anticipated legal requirements for protection of fish and wildlife habitat;

- Maintain operational flexibility (although this LOS Goal was not intended explicitly for the addition of new supplies, it is applicate here).

Together, the planning priorities and LOS Goals and Objectives provide a lens through which the SFPUC considers water supply options and opportunities to meet all foreseeable water supply needs.

In addition to the Daly City Recycled Water Expansion project[40], which was a potential project identified in the SFPUC's 2015 UWMP and had committed funding at that time, the SFPUC has taken action to fund the study of potential additional water supply projects. Capital projects under consideration to develop additional water supplies include surface water storage expansion, recycled water expansion, water transfers,

[40] While this potential project was identified in the 2015 UWMP, it has since been approved by Daly City following environmental review and has a higher likelihood of being implemented.

desalination, and potable reuse. A more detailed list and descriptions of these efforts are provided below.

The capital projects that are under consideration would be costly and are still in the early feasibility or conceptual planning stages. Because these water supply projects would take 10 to 30 years to implement, and because required environmental permitting negotiations may reduce the amount of water that can be developed, the yield from these projects are not currently incorporated into SFPUC's supply projections. State and federal grants and other financing opportunities would be pursued for eligible projects, to the extent feasible, to offset costs borne by ratepayers.

- *Daly City Recycled Water Expansion (Regional, Normal- and Dry-Year Supply)*. This project can produce up to 3 MGD of tertiary recycled water during the irrigation season (~7 months). On an average annual basis, this is equivalent to 1.25 MGD or 1,400 AFY. The project is envisioned to provide recycled water to 13 cemeteries and other smaller irrigation customers, offsetting existing groundwater pumping from the South Westside Groundwater Basin; this will free up groundwater, enhancing the reliability of the Basin. The project is a regional partnership between the SFPUC and Daly City. The irrigation customers are located largely within California Water Service's (Cal Water's) service area. RWS customers will benefit from the increased reliability of the South Westside Basin for additional drinking water supply during droughts. In this way, this project supports the GSR Project, which is under construction.

- *ACWD-USD Purified Water Partnership (Regional, Normal- and Dry-Year Supply)*. This project could provide a new purified water supply utilizing Union Sanitary District's (USD) treated wastewater. Purified water produced by advanced water treatment at USD could be transmitted to the Quarry Lakes Groundwater Recharge Area to supplement recharge into the Niles Cone Groundwater Basin or put to other uses in Alameda County Water District's (ACWD) service area. With the additional water supply to ACWD, an in-lieu exchange with the SFPUC would result in more water left in the RWS. Additional water supply could also be directly transmitted to the SFPUC through a new intertie between ACWD and the SFPUC.

- *Crystal Springs Purified Water (Regional, Normal- and Dry-Year Supply)*. The Crystal Springs Purified Water (PREP) Project is a purified water project that could provide 6-12 MGD of water supply through reservoir water augmentation at Crystal Springs Reservoir, which is a facility of the RWS. Treated wastewater from Silicon Valley Clean Water (SVCW) and/or the City of San Mateo would go through an advanced water treatment plant to produce purified water that meets state and federal drinking water quality standards. The purified water would then be transmitted 10 to 20 miles (depending on the alignment) to Crystal Springs Reservoir, blended with regional surface water supplies and treated again at Harry Tracy Water Treatment Plant. Project partners include the SFPUC, Bay Area Water Supply and Conservation Agency (BAWSCA), SVCW, CalWater, Redwood City, Foster City, and the City of San Mateo. Partner agencies are contributing financial and staff resources towards the work effort.

- *Los Vaqueros Reservoir Expansion (Regional, Dry Year Supply)*. The Los Vaqueros Reservoir Expansion (LVE) Project is a storage project that will enlarge the existing reservoir located in northeastern Contra Costa County from 160,000 acre-feet to 275,000 acre-feet. While the existing reservoir is owned and operated by the Contra Costa Water District (CCWD), the expansion will have regional benefits and will be managed by a Joint Powers Authority (JPA) that will be set up prior to construction. Meanwhile, CCWD is leading the planning, design and environmental review efforts. CCWD's Board certified the EIS/EIR and approved the LVE Project on May 13, 2020. The additional storage capacity from the LVE Project would provide a dry year water supply benefit to the SFPUC. BAWSCA is working in concert with the SFPUC to support their work effort on the LVE project.
    - Conveyance Alternatives: The SFPUC is considering two main pathways to move water from storage in a prospective LVE Project to the SFPUC's service area, either directly to RWS facilities or indirectly via an exchange with partner agencies. The SFPUC is evaluating potential alignments for conveyance.
    - Bay Area Regional Reliability Shared Water Access Program (BARR SWAP): As part of the BARR Partnership, a consortium of 8 Bay Area water utilities (including ACWD, BAWSCA, CCWD, EBMUD, Marin Municipal Water District (MMWD), SFPUC, Valley Water, and Zone 7 Water Agency) are exploring opportunities to move water across the region as efficiently as possible, particularly during times of drought and emergencies. The BARR agencies are proposing two separate pilot projects in 2020-2021 through the Shared Water Access Program (SWAP) to test conveyance pathways and identify potential hurdles to better prepare for sharing water during a future drought or emergency. A strategy report identifying opportunities and considerations will accompany these pilot transfers and will be completed in 2021.
- *Bay Area Brackish Water Desalination (Regional, Normal- and Dry-Year Supply)*. The Bay Area Brackish Water Desalination (Regional Desalination) Project is a partnership between CCWD, the SFPUC, Valley Water, and Zone 7 Water Agency.

The East Bay Municipal Utilities District (EBMUD) and ACWD may also participate in the project. The project could provide a new drinking water supply to the region by treating brackish water from CCWD's existing Mallard Slough intake in Contra Costa County. While this project has independent utility as a water supply project, for the current planning effort the SFPUC is considering it as a source of supply for storage in LVE. While the allocations remain to be determined among partners, the SFPUC is considering a water supply benefit of between 5 and 15 MGD during drought conditions when combined with storage at LVE.

- *Calaveras Reservoir Expansion (Regional, Dry Year Supply)*. Calaveras Reservoir would be expanded to create 289,000 acre-feet (AF) additional capacity to store excess Regional Water System supplies or other source water in wet and normal years. In addition to reservoir enlargement, the project would involve infrastructure to pump water to the reservoir, such as pump stations and transmission facilities.

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

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

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

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

If all the projects identified through the current planning process can be implemented, there would still be a supply shortfall to meet projected needs. Furthermore, each of the supply options being considered has its own inherent challenges and uncertainties that may affect the SFPUC's ability to implement it.

Given the limited availability of water supply alternatives - unless the supply risks are significantly reduced or our needs change significantly - the SFPUC will continue to plan, develop and implement all project opportunities that can help bridge the anticipated water supply gaps during droughts. In 2019, the SFPUC completed a survey among water and wastewater agencies within the service area to identify additional opportunities for purified water. Such opportunities remain limited, but the SFPUC continues to pursue all possibilities.

BAWSCA's Long Term Reliability Water Supply Strategy

BAWSCA's Long-Term Reliable Water Supply Strategy (Strategy), completed in February 2015, quantified the water supply reliability needs of the BAWSCA member agencies through 2040, identified the water supply management projects and/or programs (projects) that could be developed to meet those needs, and prepared an implementation plan for the Strategy's recommendations.

When the 2015 Demand Study concluded it was determined that while there is no longer a regional normal year supply shortfall, there was a regional drought year supply shortfall of up to 43 MGD. In addition, key findings from the Strategy's project evaluation analysis included:

- Water transfers represent a high priority element of the Strategy.
- Desalination potentially provides substantial yield, but its high effective costs and intensive permitting requirements make it a less attractive drought year supply alternative.
- Other potential regional projects provide tangible, though limited, benefit in reducing dry-year shortfalls given the small average yields in drought years.

Since 2015, BAWSCA has completed a comprehensive update of demand projections and engaged in significant efforts to improve regional reliability and reduce the dry-year water supply shortfall.

- *Water Transfers*. BAWSCA successfully facilitated two transfers of portions of Individual Supply Guarantee (ISG) between BAWSCA agencies in 2017 and 2018. Such transfers benefit all BAWSCA agencies by maximizing use of existing supplies.

BAWSCA is currently working on an amendment to the WSA between the SFPUC and BAWSCA agencies to establish a mechanism by which member agencies that have an ISG may participate in expedited transfers of a portion of ISG and a portion of a Minimum Annual Purchase Requirement. In 2019, BAWSCA participated in a pilot water transfer that, while ultimately unsuccessful, surfaced important lessons learned and produced interagency agreements that will serve as a foundation for future transfers. BAWSCA is currently engaged in the Bay Area Regional Reliability Partnership[41] (BARR), a partnership among eight Bay Area water utilities (including the SFPUC, Alameda County Water District, BAWSCA, Contra Costa Water District, Santa Clara Valley Water District) to identify opportunities to move water across the region as efficiently as possible, particularly during times of drought and emergencies.

- *Regional Projects*. Since 2015, BAWSCA has coordinated with local and State agencies on regional projects with potential dry-year water supply benefits for BAWSCA's agencies. These efforts include storage projects, indirect/direct water reuse projects, and studies to evaluate the capacity and potential for various conveyance systems to bring new supplies to the region.

BAWSCA continues to implement the Strategy recommendations in coordination with BAWSCA member agencies. Strategy implementation will be adaptively managed to account for changing conditions and to ensure that the goals of the Strategy are met in an efficient and cost-effective manner. On an annual basis, BAWSCA will reevaluate Strategy recommendations and results in conjunction with development of the BAWSCA's FY 2021-22 Work Plan. In this way, actions can be modified to accommodate changing conditions and new developments.

Cal Water Strategies and Actions

In addition to the management tools and options discussed below, Cal Water has been involved directly and through BAWSCA to advocate for an alternative to the Bay-Delta Plan Amendment, including submitting letters and testimony (see Appendix K) that identify, among other things, the significant impact to local water supply reliability.

Further, as part of this UWMP process, Cal Water submitted a letter to BAWSCA (see Appendix K) enumerating concerns regarding the SFPUC RWS supply allocation methodology. Cal Water's letter to BAWSCA further states that while it is applying BAWSCA's revised Tier Two allocation methodology for RWS shortages greater than 20 percent for preliminary planning purposes, Cal Water is not agreeing to, or adopting, the revised Tier Two methodology. Among other issues,

[41] https://www.bayareareliability.com/

Cal Water notes that the revised Tier Two methodology does not take minimum health and safety standards into account.

As described in Section 7.4, Cal Water is committed to developing a long-term supply reliability strategy for its Peninsula Districts, including evaluation of alternative supply sources and continued commitment to Cal Water's comprehensive water conservation program.

7.4 Water Supply Management Tools and Options

☑ ***CWC § 10620 (f)***

An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

Cal Water coordinates on an ongoing basis with all relevant agencies in the region to optimize the use of regional water supplies. This includes SFPUC, BAWSCA, Town of Atherton, Town of Portola Valley, Town of Woodside, City of Menlo Park, San Mateo County, and other public and private entities with which Cal Water can collaborate to protect and enhance local surface water resources.

In addition to the work being done by SFPUC and BAWSCA, Cal Water is currently in the process of developing multiple regional water supply reliability studies using integrated resource planning practices to create a long-term supply reliability strategy through 2050 for Cal Water districts throughout California. The studies will create long-term strategies to address a wide range of water supply challenges including climate change, new regulatory requirements (e.g., the Bay-Delta Plan), and potential growth in demands due to new development. These water supply reliability studies will be completed on a rolling basis over the next several years, with all studies anticipated to be complete by 2024. The Bear Gulch District will be included in the Bay Area Water Supply Reliability Analysis.

Cal Water also has its own aggressive and comprehensive water conservation program that has and will continue to reduce per-capita usage and therefore demands on critical water sources. Cal Water is committed to helping its customers use water efficiently and has developed a range of water conservation programs to support this goal. To ensure that it is providing the right mix of programs in the most cost-effective manner possible, Cal Water routinely conducts comprehensive conservation program analysis and planning. This is done on a five-year cycle in tandem with the UWMP. Cal Water's Conservation Master Plan provides the basis for the information on the implementation of and expected water savings from Demand Management Measures (DMMs) presented in Chapter 9.

Cal Water also monitors and supports the goals of the Bay Area Integrated Regional Water Management Plan (IRWMP). These goals include:

- Promote environmental, economic, and social sustainability,
- Improve water supply reliability and quality,
- Protect and improve watershed health and function and Bay water quality,
- Improve regional flood management, and
- Create, protect, enhance, and maintain environmental resources and habitats.

7.5 Drought Risk Assessment

☑ ***CWC § 10635(b)***

Every urban water supplier shall include, as part of its urban water management plan, a drought risk assessment for its water service to its customers as part of information considered in developing the demand management measures and water supply projects and programs to be included in the urban water management plan. The urban water supplier may conduct an interim update or updates to this drought risk assessment within the five-year cycle of its urban water management plan update. 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, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.

In addition to the long-term water service reliability assessment presented above, the DRA evaluates Cal Water's supply risks under a severe drought period lasting for the next five consecutive years after the assessment is completed, i.e., from 2021 through 2025. The DRA is intended to inform the demand management measures (see Chapter 9) and water supply projects and programs to be included in the UWMP. Suppliers may conduct an interim update or updates to this DRA within the five-year cycle of its urban water management plan update, i.e., before the 2025 UWMP.

7.5.1 Data, Methods, and Basis for Water Shortage Condition

The DRA considers the effects on available water supply sources of an assumed five-year drought commencing the year after the assessment is completed, i.e., from 2021 through 2025. The anticipated effects of climate change have been directly factored into the District's assessment of its supply reliability. The available potable water supplies assumed in the DRA are based upon the same methodology and assumptions used for the long-term water service reliability assessment (Sections 7.1, 7.2, and 7.3) and relies on information provided by SFPUC and BAWSCA (Appendix H and Appendix I). The available RWS water supplies are estimated based on the following assumptions: (1) The RWS demands are held constant at 132.1 MGD (i.e., 2020 demand levels), (2) implementation of the Bay-Delta Plan Amendment occurs in 2023, and (3) the 2020 infrastructure conditions are maintained (see Table 1 of the January 22, 2021 SFPUC letter in Appendix I). Details of how the District's available supplies are then estimated as part of the DRA are provided below.

7.5.2 Drought Risk Assessment Water Source Reliability

As described in Chapter 6, the Bear Gulch District derives its water supply from a combination of both imported surface water supply purchased from the SFPUC RWS and local surface water supply from Bear Gulch Creek. For the purposes of this UWMP, the District conservatively assumes that local surface water supplies will be zero during single dry and multiple dry years over the planning horizon.

The District's available potable water supplies during the five-consecutive-year drought are based upon information provided by SFPUC and BAWSCA included in Appendix I, as indicated in Section 7.5.1. Specifically, based on the modeling results presented in the March 30, 2021 SFPUC letter, BAWSCA provided percentage-based cutbacks for 2021 to 2025 in Table F1 of the April 1, 2021 BAWSCA drought allocation tables, which are reproduced in Table 7-6, below, and serve as the basis for the RWS Reliability in the DRA.

As shown in Table 7-6, prior to the assumed implementation of the Bay-Delta Plan Amendment in 2023, sufficient RWS supplies will be available to meet the Wholesale Customers' purchase requests during the first two consecutive dry years (i.e., 2021 and 2022). Shortages are projected to begin in 2023 with the implementation of the Bay-Delta Plan Amendment. In the event of a shortage, the current Tier 2 Drought Allocation Plan (Section 7.1.1) specifies that each agency's Allocation Factor would be calculated once at the onset of a shortage based on the previous year's use and remain the same until the shortage condition is over. Therefore, for the purpose of drought allocations used in the DRA, the available RWS supply is assumed to remain static in 2023-2025 and the percent cutbacks in 2023-2025 shown in Table 7-6 are presented in terms of the percentage of the District's 2022 projected demands.[42]

[42] Note that this DRA is based on the percentages shown in Table F1 of the April 1, 2021 BAWSCA letter assuming equal percent cutbacks between agencies instead of the volumes shown in Table F2. This DRA does not rely on the supply volumes shown in Table F2 because they are based on outdated RWS supply projections for the District. Specifically, the supply available to the City for years 3, 4 and 5 (i.e., 2023-2025 of the DRA) is estimated as 47% of the District's projected 2022 demand.

Table 7-6. 2020 Base Year Multiple Dry Year Drought Allocations

	2021	2022	2023	2024	2025
SFPUC RWS Supply Cutbacks	0%	0%	47%	47%	47%

NOTES:

(a) With system-wide shortages projected starting in 2023, Wholesale RWS demand is assumed to be static for the remainder of the drought sequence per the Water Supply Agreement. Water supply cutbacks in 2023 to 2025 are presented in terms of percentage of the District's 2022 projected demands.
(b) Source: Table F1 from the BAWSCA drought allocation tables dated April 1, 2021.
(c) Five consecutive year drought assumed to start in 2021.
(d) Scenario reflects implementation of the Bay-Delta Plan Amendment in 2023.
(e) Sufficient RWS supplies will be available to meet the Wholesale Customers' purchase requests during the first two consecutive dry years, prior to implementation of the Bay-Delta Plan Amendment.

7.5.3 Drought Risk Assessment Total Water Supply and Use Comparison

As described in Chapter 6, the Bear Gulch District derives its water supply from a combination of both imported surface water supply purchased from the San Francisco Public Utilities Commission (SFPUC) Regional Water System (RWS) and local surface water supply from Bear Gulch Creek.

As shown in Table 7-3, the District's supply is expected to be sufficient to meet demands in normal year conditions. However, based on SFPUC dry year cutbacks (discussed in further detail in Appendix I), the District is expected to experience significant shortfalls during single dry and multiple dry year conditions, as shown in Table 7-4 and Table 7-5.

For the purposes of this UWMP, the District conservatively assumes that local surface water supplies will be zero during single dry and multiple dry years over the planning horizon. Dry year RWS supply availability is calculated in accordance with Table 7-6, as a percentage of projected RWS demands for each base year consistent the revised BAWSCA Drought Methodology that assumes equal percent cutbacks across all Wholesale Agencies.

Table 7-7 provides a comparison of the water supply sources available to the District with the total projected water use for an assumed drought period of 2021 through 2025. This includes current climate change conditions. As described in Section 4.2.6, the District's demand forecast model generates separate forecasts for: (1) normal weather conditions, (2) wet-year weather conditions, (3) single-year dry weather conditions, and (4) multi-year dry weather conditions. The DRA is based on the District's multi-year dry weather demand forecast.

Cal Water has developed a Water Shortage Contingency Plan (WSCP, Appendix L) to address water shortage conditions resulting from any cause (e.g., droughts, impacted distribution system infrastructure, regulatory-imposed shortage restrictions, etc.). The WSCP identifies a variety of actions that Cal Water will implement to reduce demands and further ensure supply reliability at various levels of water shortage.

Given the current uncertainty, Cal Water could update its DRA prior to the 2025 UWMP update if significant new information becomes available. CWC §10635(b) permits urban water suppliers to conduct an interim update or updates to their DRA within the five-year cycle of its UWMP update. Cal Water anticipates that by the 2025 UWMP update, SFPUC will provide more specific information about the AWSP, with estimated water supply contributions from such projects. Additionally, Cal Water expects that SFPUC will provide more specific information and a refined estimate of the Bay-Delta Plan Amendment impacts to the SFPUC supply. Further, it is anticipated that the Wholesale Customers will negotiate a revised Tier Two allocation formula that could affect each agency's share of available supplies in drought years relative to what has been presented herein.

Cal Water recommends that users of its 2020 UWMP contact District staff for potential updates about its water supply reliability and the DRA before using the 2020 UWMP drought cutback projections for their planning projects and referencing the drought allocations.

Table 7-7. Five-Year Drought Risk Assessment Tables (DWR Table 7-5)

2021	Total
Total Water Use	13,690
Total Supplies	13,690
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	N/A

2022	Total
Total Water Use	13,689
Total Supplies	13,689
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	N/A

2023	Total
Total Water Use	13,695
Total Supplies	7,258
Surplus/Shortfall w/o WSCP Action	(6,437)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	6,437
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	47%

Table 7-7. Five-Year Drought Risk Assessment Tables (DWR Table 7-5)

2024	Total
Total Water Use	13,707
Total Supplies	7,265
Surplus/Shortfall w/o WSCP Action	(6,442)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	6,442
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	47%

2025	Total
Total Water Use	13,699
Total Supplies	7,260
Surplus/Shortfall w/o WSCP Action	(6,438)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	6,438
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	47%
NOTES: (a) Volumes are in units of AF.	

Chapter 8
Water Shortage Contingency Planning

☑ ***CWC § 10640***

(a) Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630). The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

(b) Every urban water supplier required to prepare a water shortage contingency plan shall prepare a water shortage contingency plan pursuant to Section 10632. The supplier shall likewise periodically review the water shortage contingency plan as required by paragraph (10) of subdivision (a) of Section 10632 and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

The Water Shortage Contingency Plan (WSCP) for the Bear Gulch District is included in this Urban Water Management Plan (UWMP) as Appendix L. The WSCP serves as a standalone document to be engaged in the case of a water shortage event, such as a drought or supply interruption, and defines specific policies and actions that will be implemented at various shortage level scenarios. The primary objective of the WSCP is to ensure that the District has in place the necessary resources and management responses needed to protect health and human safety, minimize economic disruption, and preserve environmental and community assets during water supply shortages and interruptions. Consistent with CWC §10632, the WSCP includes six levels to address shortage conditions ranging from up to 10 percent to greater than 50 percent shortage, identifies a suite of demand mitigation measures for the District to implement at each level, and identifies procedures for the District to annually assess whether or not a water shortage is likely to occur in the coming year, among other things.

A summary of the key elements of the WSCP including water shortage levels and demand-reduction actions is shown in Table 8-1, Table 8-2, and Table 8-3. Additional details are provided in Appendix L.

Table 8-1. Water Shortage Contingency Plan Levels (DWR Table 8-1)

Shortage Level	Percent Shortage Range	Shortage Response Actions
1	Up to 10%	Demand reduction (See Table 8-2)
2	Up to 20%	Demand reduction (See Table 8-2)
3	Up to 30%	Demand reduction (See Table 8-2)
4	Up to 40%	Demand reduction (See Table 8-2)
5	Up to 50%	Demand reduction (See Table 8-2)
6	>50%	Demand reduction (See Table 8-2)
NOTES:		

Table 8-2. Demand Reduction Actions (DWR Table 8-2)

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap?	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
1	Other	8%	1. Limit landscape irrigation to specific times 2. Customers must repair leaks, breaks, and malfunctions in a timely manner 3. Restrict or prohibit runoff from landscape irrigation 4. Prohibit application of potable water to outdoor landscapes within 48 hours of measurable rainfall 5. Prohibit use of potable water for washing hard surfaces 6. Lodging establishments must offer opt out of linen service	Yes
1	Other	--	1. Expand Public Information/Media Campaign 2. Water Bill Inserts 3. Promote online water waste reporting 4. Expand Rebates or Giveaways of Plumbing Fixtures and Devices 5. Expand Rebates for Landscape Irrigation Efficiency 6. Expand CII Water Use Surveys 7. Expand Res Water Use Surveys	No

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap?	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
2	Other	16%	1. Continue with Stage 1 restrictions and prohibitions except where superseded by more stringent actions. 2. Prohibit the use of non-recirculating systems in all new conveyer car wash and commercial laundry systems 3. Prohibit the use of single pass cooling systems in new connections 4. Restaurants may only serve water upon request 5. No watering of landscape of newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission and the Department of Housing and Community Development 6. Prohibit Potable Water Use for Decorative Water Features that do not Recirculate Water	Yes
2	Other	--	1. Continue with Stage 1 actions except where superseded by more stringent actions. 2. Water Efficiency Workshops, Public Events	No

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap?	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
			3. Offer Water Use Surveys 4. Provide Rebates or Giveaways of Plumbing Fixtures and Devices 5. Provide Rebates for Landscape Irrigation Efficiency	
3	Other	26%	1. Continue with Stage 1 restrictions and prohibitions except where superseded by more stringent actions. 2. Landscape - Limit landscape irrigation to 1-3 days/week 3. Landscape - Prohibit irrigation of ornamental turf on public street medians with potable water 4. Prohibit Filling Ornamental Lakes or Ponds	Yes
3	Other	--	1. Continue with Stage 1 actions except where superseded by more stringent actions. 2. Home or Mobile Water Use Reports 3. Decrease Frequency and Length of Line Flushing 4. Reduce System Water Loss 5. Increase Water Waste Patrols/Enforcement 6. Implement Drought Rate Structure and Customer Water Budgets (Res)	No

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap?	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
			7. Implement Drought Rate Structure and Customer Water Budgets (CII)	
4	Other	34%	1. Continue with Stage 1 restrictions and prohibitions except where superseded by more stringent actions. 2. Prohibit use of potable water for construction and dust control 3. Prohibit use of potable water for street washing 4. Prohibit vehicle washing except with recycled water	Yes
4	Other	35	1. Continue with Stage 1 actions except where superseded by more stringent actions. 2. Promote / Expand Use of Recycled Water	No
5	Other	43%	1. Continue with Stage 1 restrictions and prohibitions except where superseded by more stringent actions. 2. Require net zero demand Increase on new water service connections 3. Prohibit filling of pools 4. Prohibit single-pass cooling systems	Yes

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap?	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
5	Other	--	1. Continue with Stage 1 actions except where superseded by more stringent actions. 2. Require Pool Covers	No
6	Other	57%	1. Continue with Stage 1 restrictions and prohibitions except where superseded by more stringent actions. 2. Moratorium on new water service connections 3. Prohibit all landscape irrigation	Yes
NOTES:				

Table 8-3. Supply Augmentation and Other Actions (DWR Table 8-3)

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier	How much is this going to reduce the shortage gap?	Additional Explanation or Reference *(optional)*
NOTES:			

Chapter 9
Demand Management Measures

☑ ***CWC § 10631 (e)***

Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) (A) For an urban retail water supplier, as defined in Section 10608.12, a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years. The narrative shall describe the water demand management measures that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.20.

(B) The narrative pursuant to this paragraph shall include descriptions of the following water demand management measures:

(i) Water waste prevention ordinances.

(ii) Metering.

(iii) Conservation pricing.

(iv) Public education and outreach.

(v) Programs to assess and manage distribution system real loss.

(vi) Water conservation program coordination and staffing support.

(vii) Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovative measures, if implemented.

This chapter provides a summary of past and planned demand management measure (DMM) implementation in the Bear Gulch District (also referred to herein as the "District"), as well as an overview of the expected water savings.

This chapter contains the following sections:

9.1 Demand Management Measures for Wholesale Agencies

Because the District is a retail water supplier, this section does not apply.

9.2 Demand Management Measures for Retail Suppliers

California Water Service Company (Cal Water) centrally administers its conservation programs for all the districts it operates. For purposes of this section, these programs have been grouped in accordance with the DMM categories in CWC §10631(e). These categories are:

(i) Water waste prevention ordinances
(ii) Metering
(iii) Conservation pricing
(iv) Public education and outreach
(v) Programs to assess and manage distribution system real loss
(vi) Water conservation program coordination and staffing support, and
(vii) Other demand management measures

Following are descriptions of the conservation programs Cal Water operates within each of these DMM categories. The District's Conservation Master Plan, provided in Appendix M, contains additional information on Cal Water's conservation programs.

9.2.1 Water Waste Prevention Ordinances

Cal Water's enforcement of water waste prevention and water use restrictions is authorized and overseen by the California Public Utilities Commission via Rule 14.1 or Schedule 14.1. Local government in districts operated by Cal Water may also adopt ordinances regulating water use. Cal Water coordinates its efforts to prevent water waste with the appropriate local governmental entities.

Rule 14.1 defines the District's Water Shortage Contingency Plan (WSCP, Appendix L), including its prohibitions on water waste and restrictions on water use. Prohibitions include:

- Use of potable water through a broken or defective plumbing fixture or irrigation system when Cal Water has notified the customer in writing to repair the broken or defective plumbing fixture or irrigation system, and the customer has failed to effect such repairs within seven (7) business days of receipt of such notice.
- The application of potable water to 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.
- The use of a hose that dispenses potable water to wash vehicles, including cars, trucks, buses, boats, aircraft, and trailers, whether motorized or not, except where the hose is

fitted with a shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use.

Restrictions on water use during shortages include, but are not necessarily limited to:

- Outdoor irrigation restrictions in terms of time of day and weekly frequency.
- Obligations to fix leaks, breaks, or malfunctions within five (5) business days of written notification by Cal Water.
- Application of potable water to driveways and sidewalks.
- The use of potable water in a water feature, except where the water is part of a recirculating system.
- The application of potable water to outdoor landscapes during and within 48 hours after measurable rainfall.
- The serving of drinking water other than upon request in eating or drinking establishments.
- Irrigation of ornamental landscape on public street medians.
- Irrigation outside of newly constructed homes and buildings with potable water in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission and the Department of Housing and Community Development.
- Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. The hotel or motel shall prominently display notice of this option in each guest room using clear and easily understood language.
- Limits on filling ornamental lakes or ponds.
- Use of potable water for street cleaning with trucks, except for initial wash-down for construction purposes.
- Use of potable water for construction purposes, such as consolidation of backfill, dust control, or other uses unless no other source of water or other method can be used.

9.2.2 Metering

☑ ***CWC § 526 (a)***

Notwithstanding any other provision of law, an urban water supplier that, on or after January 1, 2004, receives water from the federal Central Valley Project under a water service contract or subcontract … shall do both of the following:

(1) On or before January 1, 2013, install water meters on all service connections to residential and nonagricultural commercial buildings constructed prior to January 1, 1992, located within its service area.

(2) On and after March 1, 2013, or according to the terms of the Central Valley Project water contract in operation, charge customers for water based on the actual volume of deliveries, as measured by a water meter.

☑ ***CWC § 527 (a)***

(a) An urban water supplier that is not subject to Section 526 shall do both of the following:

(1) Install water meters on all municipal and industrial service connections located within its service area on or before January 1, 2025.

The District meters all service connections and bills customers for water use monthly. Cal Water is also piloting automatic meter reading (AMR) and advanced metering infrastructure (AMI) in several of its districts. AMI may be used by Cal Water in the future to detect and alert households of leaks and other possible problems as well as to provide customers with tailored water use information to help them use water more efficiently.

9.2.3 Conservation Pricing

The CPUC reviews and authorizes District water rates in a General Rate Case every three years. Currently, the District uses a three-tier increasing block rate design for residential water use and a single-tier uniform rate design for non-residential use. The District provides rate assistance to lower income households through its Customer Assistance Program (CAP).

9.2.4 Public Education and Outreach

The District's public outreach program is divided into four components, as follows:

Public Information Program – Cal Water operates an extensive public information program to provide information to customers on ways to use water efficiently and to market its conservation programs through multiple media outlets, including the Cal Water website, direct mail and bills, digital media, social media, and email.

School Education Program - Cal Water's school education program includes the Cal Water H2O Challenge, a project-based learning competition for grades 4-6, individual student competitions for grades K-12 and general information and learning materials for students and teachers. Cal Water deploys its school education program in all its districts. Cal Water H2O Challenge is a project-based competition for classrooms, grades 4-6. The program is offered in partnership with DoGoodery, the California Association of Science Educators (CASE), and the WestEd K-12 Alliance. The program aligns with the Common Core State Standards and the Next Generation Science Standards. The Cal Water H2O Challenge offers a unique opportunity for upper elementary teachers to facilitate their students' learning of standards-based content, while developing the core understanding of environmental principles necessary to becoming science-literate citizens.

Smart Landscape Tune-Up Program – This program provides customers with an irrigation system evaluation and installation of approved efficient irrigation system equipment, such as a smart irrigation controller and high-efficiency sprinkler nozzles. The program also includes irrigation system adjustments and detection and repair of irrigation system leaks. This program is available to all Cal Water customers at no charge.

Residential Customer Portal – Through its residential customer portal, Cal Water provides tailored assistance to each residential customer via customized water-efficiency targets, water savings calculators, and customer-specific recommendations for programs and water-saving tips.

Non-Residential Customer Assistance – Cal Water provides tailored assistance to commercial customers through customized incentives, commercial water surveys, and large landscape water use surveys. The non-residential assistance program helps commercial customers efficiently use water for sanitation/cleaning, heating/cooling, process, and landscape purposes.

9.2.5 Programs to Assess and Manage Distribution System Real Loss

Cal Water took part in the California Water Loss Technical Assistance Program (TAP) in 2016 and 2017. Cal Water conducts regular distribution system audits using the American Water Works Association (AWWA) Free Water Audit Software. Cal Water is developing a Water Loss Control Optimization Plan and Water Loss Control Policy to guide future water loss management and has solicited technical support with respect to:

- Satisfying current and future CPUC and state water loss standards and regulations
- Improving audit data and validity scores
- Implementing cost-effective water loss control actions

Recently, Cal Water has created a Water Loss Program Analyst position to coordinate and oversee these activities.

9.2.6 Water Conservation Program Coordination and Staffing Support

The CPUC reviews and authorizes Cal Water conservation program and staffing level in a general rate case every three years. Currently, Cal Water has nine full-time conservation positions, as follows:

- Director of Water Resource Sustainability,
- Conservation Program Manager,
- Research, Analytics and Reporting Manager,
- Water Resource Sustainability Analyst,
- Water Loss Program Analyst,
- Three Conservation Program Coordinators, and
- Conservation Assistant.

These staff manage all aspects of Cal Water's conservation programs that are run in 24 districts serving a combined population of 1.8 million people.

9.2.7 Other Demand Management Measures

In addition to the DMM programs described above, Cal Water operates rebate, give-away, and direct installation programs aimed at plumbing fixture replacement and irrigation equipment and landscape efficiency improvements. Following are brief descriptions of each of these DMMs.

High-Efficiency Toilet Replacement – This program replaces old toilets with MaP certified high-efficiency toilets via financial rebates, direct installation, or direct distribution.[43] Current rebate amounts are up to $50/toilet for residential toilet replacement and up to $100/toilet for commercial toilet replacement.

High-Efficiency Urinal Replacement – This program replaces old urinals with high-efficiency urinals meeting the state's 0.125 gallon per flush water use standard via financial rebates and direct installation. While available to all non-residential customers, the program targets sites with higher-than-average bathroom utilization, such as restaurants and office buildings. The current rebate amount is up to $150/urinal.

Clothes Washer Replacement – This program provides a financial rebate to replace an old inefficient clothes washer with a new high-efficiency washer. The program is available to all residential and multi-family customers. The current rebate amount is up to $150/washer.

Residential Conservation Kit Distribution – This program offers residential customers conservation kits featuring a range of water-saving plumbing retrofit devices. The kits are

[43] For information on MaP certified toilets, see: https://www.map-testing.com/.

available at no charge and include two high-efficiency showerheads (1.5 gpm), two bathroom faucet aerators (1.0 gpm), one kitchen faucet aerator (1.5 gpd), toilet leak tablets, and an outside multi-function, full-stop hose nozzle.

Smart Irrigation Controller Installation – This program provides a financial rebate for the installation of a smart irrigation controller that automatically adjusts watering schedule in response to changing weather conditions. The current rebate amount is $125/controller for residential customers and $25/station for commercial customers.

High-Efficiency Sprinkler Nozzle Rebate – This program provides a financial rebate for the installation of high-efficiency sprinkler nozzles. This program is available to all Cal Water customers. The current rebate amount is $5/nozzle.

Large Rotary Nozzle Rebate – This program provides a financial rebate for the installation of high-efficiency large rotary nozzles. This program is available to all Cal Water customers. The current rebate amount is up to $30/nozzle toward the nozzle purchase cost and up to $8/spray body toward installation cost, if installed by a C-27 licensed landscape contractor.

Spray Body with Integrated Pressure Regulation and Check Valve Rebate – This program provides a financial rebate for the installation of high-efficiency spray bodies with integrated pressure regulation. This program is available to all Cal Water customers. The current rebate amount is up to $10/body toward the spray body purchase cost and up to $8/spray body toward installation cost, if installed by a C-27 licensed landscape contractor.

Turf Replacement Rebate – This program provides a financial rebate for replacement of turf with approved drought-tolerant landscaping. Cal Water operated this program in 2015/16 as a drought response measure. The program will be re-started as part of Cal Water's irrigation equipment/landscape upgrade program offerings.

Table 9-1 summarizes the DMMs available to District customers at the time this Plan was prepared.

Table 9-1. Cal Water DMMs Available to District Customers

Programs Offered	Customer Eligibility		
	Single-Family	Multi-Family	Commercial
Plumbing Fixture Replacement			
High-Efficiency Toilet Replacement	✓	✓	✓
High-Efficiency Urinal Replacement			✓
High-Efficiency Clothes Washer Rebate	✓	✓	
Conservation Kits	✓	✓	
Irrigation Equipment/Landscape Upgrades			
Smart Irrigation Controller Rebate	✓	✓	✓
High-Efficiency Sprinkler Nozzle Rebate	✓	✓	✓
Large Rotary Nozzle Rebate		✓	✓
Spray Body Rebate		✓	✓
Turf Replacement Rebate	✓	✓	✓
Customer Assistance			
Smart Landscape Tune-Up Program	✓	✓	✓
Residential Customer Portal	✓		
Non-Residential Customer Assistance		✓	✓

9.3 Implementation over the Past Five Years

Table 9-2 summarizes program implementation for the previous five years. Estimated water savings do not include savings from water waste prevention ordinances, conservation pricing, public information, or distribution system water loss management. Cal Water uses the Alliance for Water Efficiency's Water Conservation Tracking Tool to estimate water savings.

Table 9-2. Implementation of Customer DMMs: 2016-2020

Indoor Programs	2016 – 2020 Total	Average Annual
Toilets & Urinals (number distributed)	1,933	387
Clothes Washers (number distributed)	325	65
Conservation Kits (number distributed)	238	48
Outdoor Programs		
Smart Controllers (number distributed)	422	84
Nozzles & Spray Bodies (number distributed)	1,206	241
Turf Buy-Back (sq ft removed)	52,850	10,570
Residential Assistance Programs		
Surveys/Audits (homes receiving)	60	12
Non-Residential Assistance Programs		
Surveys/Audits (sites receiving)	5	1
Large Landscape Reports (sites receiving)	78	16
Estimated Water Savings (AF)	480	96
NOTES: Estimated water savings for 2016-2020. DMMs will continue to generate savings after 2020 for their useful life.		

9.4 Implementation to Achieve Water Use Targets

All the DMMs described above contributed to the District's compliance with its SB X7-7 2020 target GPCD.

9.5 Water Use Objectives (Future Requirements)

CWC §10609 requires that urban retail water suppliers develop new water use objectives that are based on specific standards for certain water use sectors. These water use objectives will not be developed until 2023. Suppliers are encouraged in this UWMP cycle to consider how they will align their conservation management actions in order to meet these future obligations.

As noted above, Cal Water's conservation programs are subject to review and approval by the CPUC through a General Rate Case every three years. In making conservation program recommendations to the CPUC, Cal Water carefully considers how they will advance multiple objectives, including compliance with the pending water use objectives. Specific objectives identified in Cal Water's most recent General Rate Case included:

- Maintaining continuity with and furthering implementation of conservation programs authorized by the previous General Rate Case.
- Preserving gains in water conservation achieved during the 2013-2017 drought.
- Ensuring Cal Water districts are well-positioned to comply with state regulations and policies pertaining to water conservation, water loss management, and groundwater management, including Executive Order B-37-16, SB 555, and the Sustainable Groundwater Management Act (SGMA).
- Advancing cost-effective water use efficiency alternatives in districts with high water supply costs.

Cal Water developed a scoring methodology to adjust conservation programs and budgets to further these objectives. The methodology specifically considers five distinct conservation policy drivers:

1. State Conservation Standards and Water Use Objectives
2. SGMA Compliance
3. SB 555 Water Loss Management Requirements
4. Commercial, Institutional, and Industrial (CII) Water Management
5. Avoided Water Cost and Affordability

The methodology assigns greater weight to the State Conservation Standards and Water Use Objectives and SGMA Compliance policy drivers, reflecting their importance in terms of overall water resources management.

Scoring for the SGMA Compliance policy driver is based on groundwater basin priority, district dependence on groundwater supply, and basin adjudication status. The highest scores are assigned to districts in unadjudicated and critically overdrafted or high priority basins where groundwater comprises more than 45 percent of the water supply. The Bear Gulch District ranked in the bottom third of Cal Water's districts for this policy driver.

Scoring for the State Conservation Standards and Water Use Objectives policy driver is based on four metrics that are used to gauge which districts are most likely to require adjustments to their conservation program mix or level of implementation to comply with the new standards. These metrics are:

1. Residential per capita landscape area
2. Residential per capita turf area
3. Size and number of large residential landscapes
4. Difference between a simulated water use budget and average water use for 2011-15

The Bear Gulch District ranked in the top third of Cal Water's districts for this policy driver.

Scoring for the SB 555 Water Loss Management Requirements policy driver is based on the district's infrastructure leakage index (ILI) from its most recent validated water loss audit. The ILI is a performance indicator of real (physical) water loss from the water distribution system. A high ILI indicates possible distribution system inefficiencies and may also indicate significant water system leakage. Proposed adjustments to funding for water loss management are based on the ILI scoring criteria. The Bear Gulch District ranked in the bottom third of Cal Water's districts for this policy driver.

Scoring for the CII Water Management policy driver is based on the ratio of CII water uses to total water uses in a district. The Bear Gulch District ranked in the bottom third of Cal Water's districts for this policy driver.

Scoring for the Avoided Water Cost and Affordability policy driver is based on the District's avoided cost of water supply, as estimated by the California Urban Water Conservation Council (CUWCC)/Water Research Foundation Avoided Cost Model. The Bear Gulch District ranked in the top third of Cal Water's districts for this policy driver.

The combination of scores on each policy driver were used by Cal Water to recommend to the CPUC in its most recent General Rate Case adjustments to the conservation budgets of its districts. The purpose of the adjustments is to increase Cal Water's capacity to deploy conservation programs in districts expected to face the most significant regulatory and water management challenges in coming years. Recommended adjustments ranged from a low of 5 percent to a high of 25 percent. The recommended adjustment for the Bear Gulch District was 15 percent.

Chapter 10
Plan Adoption, Submittal, and Implementation

☑ ***CWC § 10621 (b)***

Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days before the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

This chapter provides information on a public hearing, the adoption process for the Urban Water Management Plan (UWMP) and Water Shortage Contingency Plan (WSCP), the adopted UWMP and WSCP submittal process, plan implementation, and the process for amending the adopted UWMP or WSCP. This chapter includes the following sections:

10.1 Inclusion of All 2020 Data

10.2 Notice of Public Hearing

10.3 Public Hearing and Adoption

10.4 Plan Submittal

10.5 Public Availability

10.6 Notification of Public Utilities Commission

10.7 Amending an Adopted UWMP or Water Shortage Contingency Plan

10.1 Inclusion of All 2020 Data

This UWMP includes the water use and planning data for the entire calendar year of 2020, per the UWMP Guidebook 2020.

10.2 Notice of Public Hearing

☑ ***CWC § 10642***

Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of both the plan and the water shortage contingency plan. Prior to adopting either, the urban water supplier shall make both the plan and the water shortage contingency plan available for public inspection and shall hold a public hearing or hearings thereon. Prior to any of these hearings, notice of the time and place of the hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of a hearing to any city or county within which the supplier provides water supplies. Notices by a local public agency pursuant to this section shall be provided pursuant to Chapter 17.5 (commencing with Section 7290) of Division 7 of Title 1 of the Government Code. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing or hearings, the plan or water shortage contingency plan shall be adopted as prepared or as modified after the hearing or hearings.

Prior to adopting the Plan, California Water Service Company (Cal Water) held a virtual public hearing to present information on its Bear Gulch District (also referred to herein as "District") 2020 UWMP and WSCP on June 9, 2021, 5:00 PM.[44]

Relevant entities were notified of the UWMP and WSCP review at least 60 days prior to the public hearing, including: (1) cities and counties, and (2) the public. These same entities were noticed again with the specific date, time and location of the hearing at least two weeks prior to the public hearing. The notice to the public, as specified in Government Code 6066, and letters to relevant agencies can be found in Appendix C and Appendix B, respectively.

10.2.1 Notice to Cities and Counties

☑ ***CWC § 10631 (a)*** *A plan shall be adopted in accordance with this chapter that shall do all of the following:*

Urban water suppliers shall coordinate with local or regional land use authorities to determine the most appropriate land use information, including, where appropriate, land use information obtained from local or regional land use authorities, as developed pursuant to Article 5 (commencing with Section 65300) of Chapter 3 of Division 1 of Title 7 of the Government Code.

Table 10-1 lists the cities and counties that were notified. Copies of these letters are provided in Appendix B.

[44] Restrictions related to the COVID-19 pandemic prevented the District from holding an in-person public hearing as previously planned.

Table 10-1. Notification to Cities and Counties (DWR Table 10-1)

City Name	60 Day Notice	Notice of Public Hearing
Town of Atherton	X	X
Town of Portola Valley	X	X
Town of Woodside	X	X
City of Menlo Park	X	X
County Name	**60 Day Notice**	**Notice of Public Hearing**
San Mateo County	X	X
Other Agency Name	**60 Day Notice**	**Notice of Public Hearing**
Bay Area Water Supply and Conservation Agency	X	X
San Francisco Public Utilities Commission	X	X
Silicon Valley Clean Water	X	X
Tuolumne River Trust	X	X
NOTES:		

10.2.2 Notice to the Public

Notification to the public and to cities and counties also provided instructions on how to view the 2020 UWMP and WSCP prior to the hearing, the revision schedule, and contact information of the UWMP and WSCP preparer. A copy of this notice is included in Appendix C.

10.3 Public Hearing and Adoption

☑ ***CWC § 10608.26***

(a) In complying with this part, an urban retail water supplier shall conduct at least one public hearing to accomplish all of the following:

(1) Allow community input regarding the urban retail water supplier's implementation plan for complying with this part.

(2) Consider the economic impacts of the urban retail water supplier's implementation plan for complying with this part.

(3) Adopt a method, pursuant to subdivision (b) of Section 10608.20, for determining its urban water use target.

☑ ***CWC § 10621 (b)***

Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days before the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

The deadline for public comments on the UWMP and WSCP was June 11, 2021. The final Plan was formally adopted by Cal Water's Vice President of Engineering June 20, 2021, and was submitted to California Department of Water Resources (DWR) within 30 days of approval. Appendix N presents a copy of the signed Resolution of Plan Adoption. Appendix B contains the following:

- Letters sent to and received from various agencies regarding this plan, and
- Correspondence between Cal Water and participating agencies.

10.4 Plan Submittal

☑ ***CWC § 10621 (f)***

(1) Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.

☑ ***CWC § 10635 (c)***

The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

☑ ***CWC § 10644 (a)***

(1) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

(2) The plan, or amendments to the plan, submitted to the department pursuant to paragraph (1) shall be submitted electronically and shall include any standardized forms, tables, or displays specified by the department.

This UWMP and WSCP were submitted to DWR within 30 days of adoption and by the July 1, 2021 deadline. The submittal was done electronically through Water Use Efficiency Data Portal, an online submittal tool. The adopted UWMP and WSCP were also sent to the California State Library and to the cities and counties listed in Table 10-1 no later than 30 days after adoption.

10.5 Public Availability

☑ ***CWC § 10645***

(a) Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

(b) Not later than 30 days after filing a copy of its water shortage contingency plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

On or about May 10, 2021, a an electronic version of the draft 2020 UWMP and WSCP were made available for review by visiting Cal Water's website: https://www.calwater.com/conservation/uwmp-review/.[45]

[45] Restrictions related to the COVID-19 pandemic prevented the District from making a printed hard-copy available for public review as previously planned.

10.6 Notification of Public Utilities Commission

☑ ***CWC § 10621 (c)***

An urban water supplier regulated by the Public Utilities Commission shall include its most recent plan and water shortage contingency plan as part of the supplier's general rate case filings.

Cal Water is an urban water supplier regulated by the California Public Utilities Commission. Cal Water included the District's 2020 UWMP and WSCP as part of its general rate case filings.

10.7 Amending an Adopted UWMP or Water Shortage Contingency Plan

☑ ***CWC § 10644 (b)***

If an urban water supplier revises its water shortage contingency plan, the supplier shall submit to the department a copy of its water shortage contingency plan prepared pursuant to subdivision (a) of Section 10632 no later than 30 days after adoption, in accordance with protocols for submission and using electronic reporting tools developed by the department.

If the 2020 UWMP or WSCP is amended, each of the steps for notification, public hearing, adoption and submittal will also be followed for the amended document.

Appendix A: UWMP Act Checklist

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Chapter 1	10615	A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities.	Introduction and Overview	Chapter 1
x	x	Chapter 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.	Summary	Section 1.6
x	x	Section 2.2	10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.4 and Table 2-1
x	x	Section 2.6	10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 2.5 and Table 2-4
x	x	Section 2.6.2	10642	Provide supporting documentation that the water supplier has encouraged 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.	Plan Preparation	Section 2.5
x		Section 2.6, Section 6.1	10631(h)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) - if any - with water use projections from that source.	System Supplies	Section 2.5.1
	x	Section 2.6	10631(h)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	N/A
x	x	Section 3.1	10631(a)	Describe the water supplier service area.	System Description	Chapter 3
x	x	Section 3.3	10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3
x	x	Section 3.4	10631(a)	Provide population projections for 2025, 2030, 2035, 2040 and optionally 2045.	System Description	Section 3.4 and Table 3-1

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 3.4.2	10631(a)	Describe other social, economic, and demographic factors affecting the supplier's water management planning.	System Description	Section 3.4 and Table 3-2
x	x	Sections 3.4 and 5.4	10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Setion 3.4 and Table 3-2
x	x	Section 3.5	10631(a)	Describe the land uses within the service area.	System Description	Section 3.5
x	x	Section 4.2	10631(d)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2 and Tables 4-1 to 4-3
x	x	Section 4.2.4	10631(d)(3)(C)	Retail suppliers shall provide data to show the distribution loss standards were met.	System Water Use	Section 4.2.3
x	x	Section 4.2.6	10631(d)(4)(A)	In projected water use, include estimates of water savings from adopted codes, plans, and other policies or laws.	System Water Use	Section 4.2.4 and Tables 4-5 and 4-6
x	x	Section 4.2.6	10631(d)(4)(B)	Provide citations of codes, standards, ordinances, or plans used to make water use projections.	System Water Use	Section 4.2.4
x	optional	Section 4.3.2.4	10631(d)(3)(A)	Report the distribution system water loss for each of the 5 years preceding the plan update.	System Water Use	Section 4.2.3 and Table 4-4
x	optional	Section 4.4	10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.2.5 and Table 4-7
x	x	Section 4.5	10635(b)	Demands under climate change considerations must be included as part of the drought risk assessment.	System Water Use	Section 7.5.3
x		Chapter 5	10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	Chapter 5
x		Chapter 5	10608.24(a)	Retail suppliers shall meet their water use target by December 31, 2020.	Baselines and Targets	Section 5.5 and Table 5-2
	x	Section 5.1	10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	N/A

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x		Section 5.2	10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Section 5.4
x		Section 5.5	10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5-year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.4
x		Section 5.5 and Appendix E	10608.4	Retail suppliers shall report on their compliance in meeting their water use targets. The data shall be reported using a standardized form in the SBX7-7 2020 Compliance Form.	Baselines and Targets	Section 5.5
x	x	Sections 6.1 and 6.2	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.	System Supplies	Chapter 7
x	x	Sections 6.1	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.*	System Supplies	Section 7.1.4
x	x	Section 6.1	10631(b)(2)	When multiple sources of water supply are identified, describe the management of each supply in relationship to other identified supplies.	System Supplies	Section 6.9 and Table 6-9A and 6-9B
x	x	Section 6.1.1	10631(b)(3)	Describe measures taken to acquire and develop planned sources of water.	System Supplies	Section 6.8
x	x	Section 6.2.8	10631(b)	Identify and quantify the existing and planned sources of water available for 2020, 2025, 2030, 2035, 2040 and optionally 2045.	System Supplies	Section 6.9
x	x	Section 6.2	10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2
x	x	Section 6.2.2	10631(b)(4)(A)	Indicate whether a groundwater sustainability plan or groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	Section 6.2

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 6.2.2	10631(b)(4)(B)	Describe the groundwater basin.	System Supplies	Section 6.2
x	x	Section 6.2.2	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.	System Supplies	Section 6.2
x	x	Section 6.2.2.1	10631(b)(4)(B)	For unadjudicated basins, indicate whether or not the department has identified the basin as a high or medium priority. Describe efforts by the supplier to coordinate with sustainability or groundwater agencies to achieve sustainable groundwater conditions.	System Supplies	Section 6.2
x	x	Section 6.2.2.4	10631(b)(4)(C)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years.	System Supplies	Section 6.2 and Table 6-1
x	x	Section 6.2.2	10631(b)(4)(D)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Section 6.9
x	x	Section 6.2.7	10631(c)	Describe the opportunities for exchanges or transfers of water on a short-term or long- term basis.	System Supplies	Section 6.7
x	x	Section 6.2.5	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.	System Supplies (Recycled Water)	Section 6.5.2 and Tables 6-4 and 6-5
x	x	Section 6.2.5	10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.3 and Table 6-5
x	x	Section 6.2.5	10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.5.3
x	x	Section 6.2.5	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 a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	Section 6.5.3 and Table 6-4
x	x	Section 6.2.5	10633(f)	Describe the actions 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.	System Supplies (Recycled Water)	Section 6.5.3

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 6.2.5	10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.3 and Table 6-6
x	x	Section 6.2.6	10631(g)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6
x	x	Section 6.2.5	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.	System Supplies (Recycled Water)	Section 6.5.2 and Table 6-3
x	x	Section 6.2.8, Section 6.3.7	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 5 consecutive water years.	System Supplies	Section 6.8 and Table 6-7
x	x	Section 6.4 and Appendix O	10631.2(a)	The UWMP must include energy information, as stated in the code, that a supplier can readily obtain.	System Suppliers, Energy Intensity	Section 6.11 and Table 6-10
x	x	Section 7.2	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.	Water Supply Reliability Assessment	Section 7.1.3
x	x	Section 7.2.4	10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.4
x	x	Section 7.3	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 water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.2 and 7.3 Tables 7-2 to 7-5
x	x	Section 7.3	10635(b)	Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects.	Water Supply Reliability Assessment	Section 7.5
x	x	Section 7.3	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 5 consecutive years.	Water Supply Reliability Assessment	Section 7.5
x	x	Section 7.3	10635(b)(2)	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Water Supply Reliability Assessment	Section 7.5

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 7.3	10635(b)(3)	Include a comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.	Water Supply Reliability Assessment	Section 7.5 and Table 7-7
x	x	Section 7.3	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.	Water Supply Reliability Assessment	Section 7.5
x	x	Chapter 8	10632(a)	Provide a water shortage contingency plan (WSCP) with specified elements below.	Water Shortage Contingency Planning	Appendix L
x	x	Chapter 8	10632(a)(1)	Provide the analysis of water supply reliability (from Chapter 7 of Guidebook) in the WSCP.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.10	10632(a)(10)	Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.2	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.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.2	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.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.3	10632(a)(3)(A)	Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and greater than 50 percent 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.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.3	10632(a)(3)(B)	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.4	10632(a)(4)(A)	Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation actions.	Water Shortage Contingency Planning	Appendix L

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 8.4	10632(a)(4)(B)	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.4	10632(a)(4)(C)	Specify locally appropriate operational changes.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.4	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.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.4	10632(a)(4)(E)	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.4.6	10632.5	The plan shall include a seismic risk assessment and mitigation plan.	Water Shortage Contingency Plan	Appendix L
x	x	Section 8.5	10632(a)(5)(A)	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.5 and 8.6	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.	Water Shortage Contingency Planning	Appendix L
x		Section 8.6	10632(a)(6)	Retail supplier must describe how it will ensure compliance with and enforce provisions of the WSCP.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.7	10632(a)(7)(A)	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.7	10632(a)(7)(B)	Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.7	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.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.8	10632(a)(8)(A)	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Appendix L
x	x	Section 8.8	10632(a)(8)(B)	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Appendix L

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x		Section 8.8	10632(a)(8)(C)	Retail suppliers must describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought.	Water Shortage Contingency Planning	Appendix L
x		Section 8.9	10632(a)(9)	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Water Shortage Contingency Planning	Appendix L
x		Section 8.11	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.	Water Shortage Contingency Planning	Appendix L
x	x	Sections 8.12 and 10.4	10635(c)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 30 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	Section 10.3
x	x	Section 8.14	10632(c)	Make available the Water Shortage Contingency Plan to customers and any city or county where it provides water within 30 after adopted the plan.	Water Shortage Contingency Planning	Section 10.4
	x	Sections 9.1 and 9.3	10631(e)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	N/A
x		Sections 9.2 and 9.3	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.	Demand Management Measures	Chapter 9
x		Chapter 10	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).	Plan Adoption, Submittal, and Implementation	Section 10.3
x	x	Section 10.2.1	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. Reported in Table 10-1.	Plan Adoption, Submittal, and Implementation	Section 10.2

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 10.4	10621(f)	Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.	Plan Adoption, Submittal, and Implementation	Section 10.4
x	x	Sections 10.2.2, 10.3, and 10.5	10642	Provide supporting documentation that the urban water supplier made the plan and contingency plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan and contingency plan.	Plan Adoption, Submittal, and Implementation	Chapter 10
x	x	Section 10.2.2	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.	Plan Adoption, Submittal, and Implementation	Section 10.2.1
x	x	Section 10.3.2	10642	Provide supporting documentation that the plan and contingency plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3
x	x	Section 10.4	10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4
x	x	Section 10.4	10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4
x	x	Sections 10.4.1 and 10.4.2	10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Section 10.4
x	x	Section 10.5	10645(a)	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5
x	x	Section 10.5	10645(b)	Provide supporting documentation that, not later than 30 days after filing a copy of its water shortage contingency plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5
x	x	Section 10.6	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.	Plan Adoption, Submittal, and Implementation	Section 10.6
x	x	Section 10.7.2	10644(b)	If revised, submit a copy of the water shortage contingency plan to DWR within 30 days of adoption.	Plan Adoption, Submittal, and Implementation	Section 10.7

Appendix B: Correspondence

- UWMP Notice of Preparation
- District Mailing List
- Growth Projection and Land Use Letter
- UWMP and WSCP Public Draft Comments

Notice of Preparation of Urban Water Management Plan and Water Shortage Contingency Plan - 2020 Update

The Urban Water Management Planning Act (California Water Code §10608–10656) requires that California Water Service (Cal Water) update its Urban Water Management Plan (UWMP) and associated Water Shortage Contingency Plan (WSCP) every 5 years.

Cal Water is currently reviewing its existing UWMP and associated WSCP, which were updated in 2016, and considering revisions for each plan. Coordination with other water suppliers, cities, counties, and community organizations in the region is an important part of the preparation of Cal Water's UWMP and WSCP. We are available to discuss the assumptions used in the development of the plans including available water supply, water demands, land use, as well as other aspects of the plans.

A draft of the 2020 UWMP and WSCP will be made available for public review and a public hearing will be scheduled in Spring 2021. We will notify you when the draft is available for review, how to access it, and details regarding the public hearing.

The updated UWMP and WSCP are due by July 1, 2021. If you would like more information regarding our 2015 UWMP and WSCP and the schedule for updating these documents, or if you would like to participate in the preparation of the 2020 UWMP and WSCP, please contact:

Michael Bolzowski
Senior Engineer
California Water Service
Phone: (408) 367-8338
Email: PlanningInfo@calwater.com

Rick DeGolia
Council Member
Town of Atherton
rdegolia@ci.atherton.ca.us

Michael Lempres
Vice Mayor
Town of Atherton
mlempres@ci.atherton.ca.us

Elizabeth Lewis
Mayor
Town of Atherton
elewis@ci.atherton.ca.us

George Rodericks
City Manager
Town of Atherton
grodericks@ci.atherton.ca.us

Anthony Suber
City Clerk
Town of Atherton
asuber@ci.atherton.ca.us

Bill Widmer
Council Member
Town of Atherton
bwidmer@ci.atherton.ca.us

Nicole Sandkulla
CEO/General Manager
Bay Area Water Supply and Conservation Agency
nsandkulla@bawsca.org

Nikki Nagaya
Public Works Director
City of Menlo Park
nhnagaya@menlopark.org

Drew Combs
Mayor
City of Menlo Park
dcombs@menlopark.org

Craig Hughes
Vice Mayor
Town of Portola Valley
chughes@portolavalley.net

John Richards
Council Member
Town of Portola Valley
jrichards@portolavalley.net

Howard Young
Public Works Director
Town of Portola Valley
hyoung@portolavalley.net

Sean Rose
Public Works Director
Town of Woodside
srose@woodsidetown.org

Peter Drekmeier
Policy Director
Tuolumne River Trust
Peter@Tuolumne.org

Dick Brown
Council Member
Town of Woodside
d.brown@woodsidetown.org

Kevin Bryant
Town Manager
Town of Woodside
kbryant@woodsidetown.org

Brian Dombkowski
Mayor Pro Tem
Town of Woodside
b.dombkowski@woodsidetown.org

Ned Fluet
Mayor
Town of Woodside
n.fluet@woodsidetown.org

Judi Herren
City Clerk
City of Menlo Park
jaherren@menlopark.org

Starla Jerome-Robinson
City Manager
City of Menlo Park
slrobinson@menlopark.org

Ray Mueller
Council Member
City of Menlo Park
RDMueller@menlopark.org

Betsy Nash
Vice Mayor
City of Menlo Park
bnash@menlopark.org

Cecilia Taylor
Council Member
City of Menlo Park
cttaylor@menlopark.org

Jen Wolosin
Council Member
City of Menlo Park
jwolosin@menlopark.org

Paula Kehoe
Director of Water Resources
San Francisco Public Utilities Commission - Planning Bureau
pkehoe@sfwater.org

Mike Callagy
County Manager's Office
San Mateo County
mcallagy@smcgov.org

Teresa Herrera
General Manager
Silicon Valley Clean Water
therrera@svcw.org

Jennifer Li
Town Clerk
Town of Woodside
jli@woodsidetown.org

Thomas Livermore
Council Member
Town of Woodside
t.livermore@woodsidetown.org

Sean Scott
Council Member
Town of Woodside
s.scott@woodsidetown.org

Chris Shaw
Council Member
Town of Woodside
c.shaw@woodsidetown.org

Daniel Yost
Council Member
Town of Woodside
d.yost@woodsidetown.org

Mike Callagy
County Manager
San Mateo County
mcallagy@smcgov.org

Mark Church
County Clerk
San Mateo County
mchurch@smcgov.org

David Canepa
Board President
San Mateo County Board of Supervisors
dcanepa@smcgov.org

Carole Groom
Supervisor
San Mateo County Board of Supervisors
cgroom@smcgov.org

Jeff Aalfs
Council Member
Town of Portola Valley
jaalfs@portolavalley.net

Jeremy Dennis
Town Manager
Town of Portola Valley
jdennis@portolavalley.net

Maryann Derwin
Mayor
Town of Portola Valley
mderwin@portolavalley.net

Don Horsley
Board Vice President
San Mateo County Board of Supervisors
dhorsley@smcgov.org

Dave Pine
Supervisor
San Mateo County Board of Supervisors
dpine@smcgov.org

Warren Slocum
Supervisor
San Mateo County Board of Supervisors
wslocum@smcgov.org

Bolzowski, Michael R.

From:	Bolzowski, Michael R.
Sent:	Tuesday, June 1, 2021 9:43 PM
To:	slrobinson@menlopark.org
Cc:	McCusker, Kevin; Smithson, Dawn; Ken Jenkins (kjenkins@calwater.com); Michael Hurley (mhurley@calwater.com); Maximilian Storms (Max) (mstorms@calwater.com)
Subject:	Cal Water's 2020 Draft UWMP for Bear Gulch District
Attachments:	Bear Gulch (CM MP) - Cal Water UWMP.pdf

Ms. Jerome-Robinson,

California Water Service (Cal Water) is currently updating its Urban Water Management Plan (UWMP) and Water Shortage Contingency Plan (WSCP) to reflect changed conditions in the Bear Gulch District.

The State requires all urban water suppliers that provide water for municipal purposes either directly or indirectly to more than 3,000 customers or supply more than 3,000 acre-feet of water annually to prepare an UWMP and WSCP at least once every five years. These documents support Cal Water's long-term resource planning to ensure that adequate water supplies are available to meet existing and future water demands under defined conditions.

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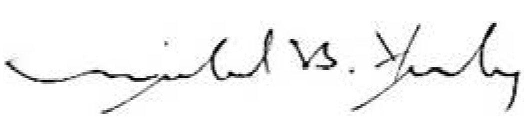
Cal Water is available to discuss the assumptions used in the development of UWMP for the South San Francisco service area, including available supply, water demands, land use, as well as any other aspects of the plan. Should you have any questions or comments, please contact Michael Bolzowski at mbolzowski@calwater.com.

Sincerely,



Michael Hurley
WATER RESOURCES MANAGER
CALIFORNIA WATER SERVICE
(323) 430-0250

Bolzowski, Michael R.

From:	Bolzowski, Michael R.
Sent:	Tuesday, June 1, 2021 9:45 PM
To:	grodericks@ci.atherton.ca.us
Cc:	McCusker, Kevin; Smithson, Dawn; Ken Jenkins (kjenkins@calwater.com); Michael Hurley (mhurley@calwater.com); Maximilian Storms (Max) (mstorms@calwater.com)
Subject:	Cal Water's 2020 Draft UWMP for Bear Gulch District
Attachments:	Bear Gulch (CM TOA) - Cal Water UWMP.pdf

Mr. Rodericks,

California Water Service (Cal Water) is currently updating its Urban Water Management Plan (UWMP) and Water Shortage Contingency Plan (WSCP) to reflect changed conditions in the Bear Gulch District.

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Sincerely,

Michael Hurley
WATER RESOURCES MANAGER
CALIFORNIA WATER SERVICE
(323) 430-0250

Bolzowski, Michael R.

From: Bolzowski, Michael R.
Sent: Tuesday, June 1, 2021 9:39 PM
To: 'mcallagy@smcgov.org'
Cc: McCusker, Kevin; Smithson, Dawn; Ken Jenkins (kjenkins@calwater.com); Michael Hurley (mhurley@calwater.com); Maximilian Storms (Max) (mstorms@calwater.com)
Subject: Cal Water's 2020 Draft UWMP for Bear Gulch District
Attachments: Bear Gulch (CoM) - Cal Water UWMP.pdf

Mr. Callagy,

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Sincerely,

Michael Hurley
WATER RESOURCES MANAGER
CALIFORNIA WATER SERVICE
(323) 430-0250

Bolzowski, Michael R.

From: Bolzowski, Michael R.
Sent: Tuesday, June 1, 2021 9:49 PM
To: jdennis@portolavalley.net
Cc: McCusker, Kevin; Smithson, Dawn; Ken Jenkins (kjenkins@calwater.com); Michael Hurley (mhurley@calwater.com); Maximilian Storms (Max) (mstorms@calwater.com)
Subject: Cal Water's 2020 Draft UWMP for Bear Gulch District
Attachments: Bear Gulch (TM TOPV) - Cal Water UWMP.pdf

Mr. Dennis,

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Michael Hurley
WATER RESOURCES MANAGER
CALIFORNIA WATER SERVICE
(323) 430-0250

Bolzowski, Michael R.

From:	Bolzowski, Michael R.
Sent:	Tuesday, June 1, 2021 9:57 PM
To:	kbryant@woodsidetown.org
Cc:	McCusker, Kevin; Smithson, Dawn; Ken Jenkins (kjenkins@calwater.com); Michael Hurley (mhurley@calwater.com); Maximilian Storms (Max) (mstorms@calwater.com)
Subject:	Cal Water's 2020 Draft UWMP for Bear Gulch District
Attachments:	Bear Gulch (TM TOW) - Cal Water UWMP.pdf

Dear Mr. Bryant,

The attachment with the previous email did not include the draft UWMP. The full attachment is included above.

Sorry for any inconvenience.

Sincerely,

Michael Bolzowski
408-367-8338

From: Bolzowski, Michael R.
Sent: Tuesday, June 1, 2021 9:49 PM
To: kbryant@woodsidetown.org
Cc: McCusker, Kevin <kmccusker@calwater.com>; Smithson, Dawn <dsmithson@calwater.com>; Ken Jenkins (kjenkins@calwater.com) <kjenkins@calwater.com>; Michael Hurley (mhurley@calwater.com) <mhurley@calwater.com>; Maximilian Storms (Max) (mstorms@calwater.com) <mstorms@calwater.com>
Subject: Cal Water's 2020 Draft UWMP for Bear Gulch District

Mr. Bryant,

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Sincerely,

Michael Hurley
WATER RESOURCES MANAGER
CALIFORNIA WATER SERVICE
(323) 430-0250

Quality. Service. Value.
calwater.com

Bolzowski, Michael R.

From: Kevin <greenwoodspecialty@gmail.com>
Sent: Wednesday, June 9, 2021 5:03 PM
To: Bolzowski, Michael R.

Will Call Water consider a water cut off for abusers. During the last drought Woodside residents averaged 421 gallons p/person p/day. As a household that continues to conserve water we didn't see financial incentives work in the last drought - except your profits may have. Rich people just spent the money rather than any meaningful reduction or restriction.

Kevin Greenwood
(650) 701-7017

Appendix C: Public Meeting Notice

- Public Meeting Notice of Intent
- Proof of Publication
- Public Meeting Presentation

Good afternoon!

We hope that this note finds you well.

We wanted to provide you with an update on the preparation of our updated Urban Water Management Plans and Water Shortage Contingency Plans.

These plans are a critical component of the steps we take to ensure there are sufficient water supplies to meet the current and future water needs of our customers, and we look forward to working with you on this important project.

Please let us know if you have any questions or need any additional information.

Cal Water Community Affairs

California Water Service
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Urban Water Management Plan and
Water Shortage Contingency Plan - 2020 Update

As a defined urban water supplier, California Water Service (Cal Water) is preparing an update to its Urban Water Management Plans (UWMP) and Water Shortage Contingency Plans (WSCP) that will address the water service conditions in our service areas. These documents support a water supplier's long-term resource planning to ensure that adequate water supplies are available to meet existing and future water demands under defined conditions. It is Cal Water's intent to adopt the UWMPs, and the incorporated WSCPs, and file the plans as required with the Department of Water Resources, the California State Library, and any city or county within which Cal Water provides service no later than 30 days after adoption.

Schedule of upcoming actions:

After a public review period, a public meeting to receive comments on the Draft UWMP and WSCP will be held. As the information becomes available for each service area, the electronic copy of the UWMP, WSCP, and information on the public meeting, including a link to participate, will be available at the following internet address:

https://www.calwater.com/conservation/uwmp-review/

If you are unable to attend the scheduled public meeting but want to provide comments regarding the proposed UWMP or WSCP, you may send your comments via email to PlanningInfo@calwater.com.

Reliability Runs Deep

California Water Service
1720 North 1st Street - San Jose, CA 95112

CALIFORNIA NEWSPAPER SERVICE BUREAU

DAILY JOURNAL CORPORATION

Mailing Address : 915 E FIRST ST, LOS ANGELES, CA 90012
Telephone (213) 229-5300 / Fax (213) 229-5481
Visit us @ WWW.LEGALADSTORE.COM

EMILY HERNANDEZ
CALIFORNIA WATER SERVICE CO/PLANNING DEPT.
1720 NORTH FIRST ST.
SAN JOSE, CA 95112

CNS 3470053

COPY OF NOTICE

Notice Type: GPN GOVT PUBLIC NOTICE

Ad Description: CALIFORNIA WATER SERVICE ? BEAR GULCH DISTRICT

To the right is a copy of the notice you sent to us for publication in the THE ALMANAC. Please read this notice carefully and call us with any corrections. The Proof of Publication will be filed with the County Clerk, if required, and mailed to you after the last date below. Publication date(s) for this notice is (are):

05/21/2021 , 05/28/2021

The charge(s) for this order is as follows. An invoice will be sent after the last date of publication. If you prepaid this order in full, you will not receive an invoice.

NOTICE OF INTENT TO ADOPT AN URBAN WATER MANAGEMENT PLAN AND WATER SHORTAGE CONTINGENCY PLAN AND HOLD A PUBLIC MEETING TO RECEIVE COMMENTS ON THE PROPOSED PLANS CALIFORNIA WATER SERVICE – BEAR GULCH DISTRICT

California Water Code (CWC) sections 10610 through 10656, known as the "Urban Water Management Planning Act" (Act), require all urban water suppliers that provide water for municipal purposes either directly or indirectly to more than 3,000 customers or supply more than 3,000 acre-feet of water annually to prepare an Urban Water Management Plan (UWMP) at least once every five years.

UWMPs support a water supplier's long-term resource planning to ensure that adequate water supplies are available to meet existing and future water demands under defined conditions. The UWMP must describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation, and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The UWMP must also address measures for residential, commercial, governmental, and industrial water demand management.

Further, Section 10632 of the CWC requires that every urban water supplier shall prepare and adopt a Water Shortage Contingency Plan (WSCP) as part of its plan (UWMP). Section 10632.2 provides that, "An urban water supplier shall follow, where feasible and appropriate, the prescribed procedures and implement determined shortage response actions in its water shortage contingency plan...or reasonable alternative actions, provided that descriptions of the alternative actions are submitted with the annual water shortage assessment report pursuant to Section 10632.1." The WSCP will be incorporated as an appendix of the UWMP.

One of Cal Water's service areas is the Bear Gulch District, which serves Portola Valley, Woodside, Atherton, and portions of Menlo Park and Redwood City, in San Mateo County. As a defined urban water supplier, Cal Water is preparing an update to its UWMP that will address the water service conditions in the Bear Gulch District. It is Cal Water's intent to adopt that UWMP, and the incorporated WSCP, and file that plan as required with the Department of Water Resources, the California State Library, and any city or county within which Cal Water provides service no later than 30 days after adoption.

Schedule of upcoming actions:

On or about May 10, 2021, an electronic copy of the Draft 2020 UWMP and WSCP will be available for review. After a public review period, a public meeting to receive comments on the Draft UWMP and WSCP Plan for the Bear Gulch District will be held online on June 9, 2021, at 5:00 p.m. The electronic copy of the UWMP, WSCP, and additional information on the public meeting, including a link to participate, is available at the following internet address: https://www.calwater.com/conservation/uwmp-review/

If you are unable to attend the scheduled public meeting but want to provide comments regarding the proposed UWMP or WSCP, you may send your comments via email to PlanningInfo@calwater.com. Cal Water will receive comments on the Draft 2021 UWMP and WSCP from May 10 through June 9, 2021.

Please share this notice with others that may have interest in this matter.

5/21, 5/28/21

CNS-3470053#

THE ALMANAC

* A 0 0 0 0 0 5 7 1 5 7 5 3 *

California Water Service

June 9, 2021

Quality. Service. Value.

Bear Gulch District

2020 Urban Water Management Plan
2020 Water Shortage Contingency Plan

Meeting Agenda

- Introduce California Water Service (CWS) staff and consultants
- Purpose and objectives
- Presentation of the 2020 Urban Water Management Plan (UWMP)
- Presentation of 2020 Water Shortage Contingency Plan (WSCP)
- Drought update
- Public comments and questions

2020 UWMP Update: Public Outreach

- Preliminary information sent to relevant entities in February 2021
- Second notice sent to relevant entities in May 2021
- Two notices posted in local newspaper
- Draft 2020 UWMP and WSCP available for review at **https://www.calwater.com/conservation/uwmp-review/**
- Public hearing

Urban Water Management Planning Act

- Supports long-term water resource planning to ensure adequate supplies
- California Water Code - Sections 10610-10656
- Threshold: Utilities with 3,000+ services or 3,000+ acre-feet per year (AFY) water sales
- At least a 20-year planning horizon, Cal Water’s plan covers 25 years
- Must be updated every 5 years and submitted by July 1, 2021
- Basis for SB-610 Water Supply Assessments and SB-221 Water Supply Verifications

UWMP Elements

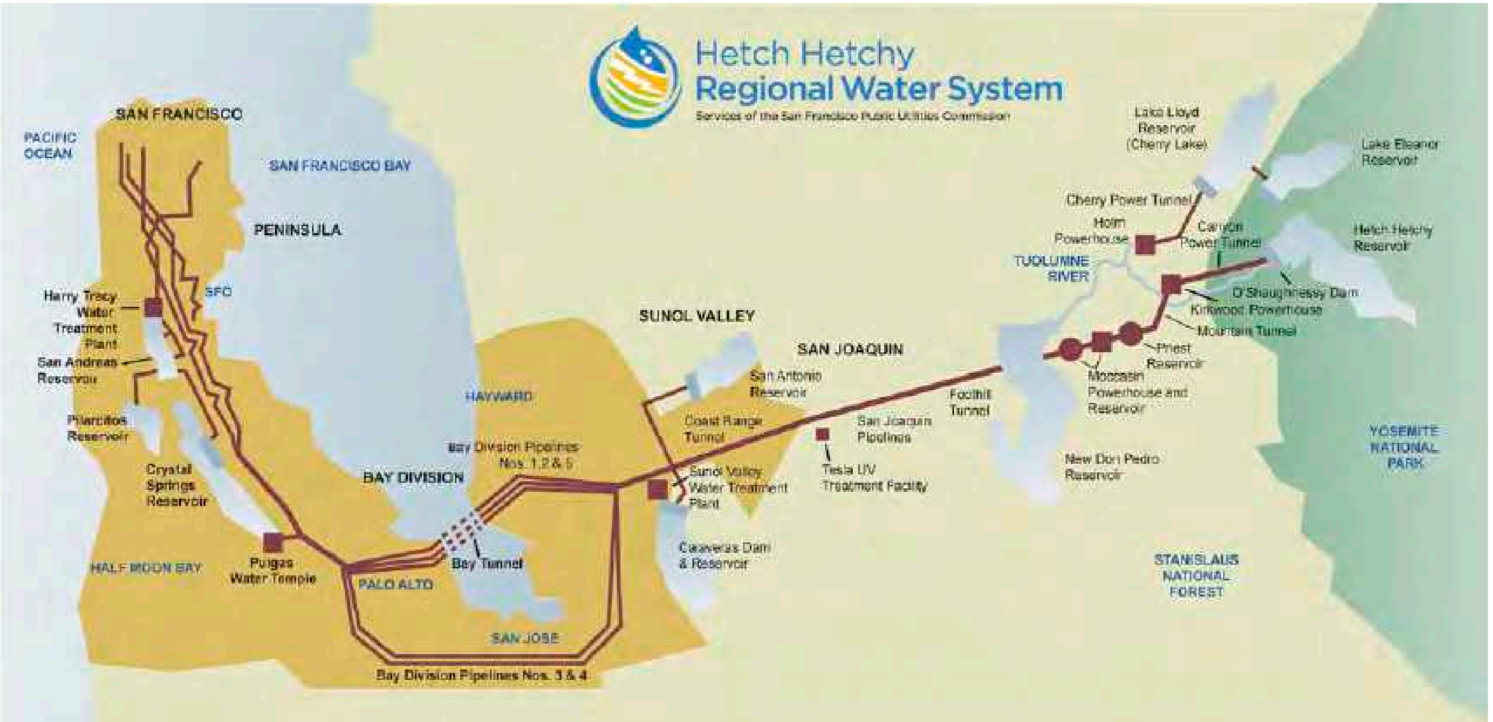
- Service area description
- Population forecast
- Supply and demand projections through 2045 in normal, single dry and multiple dry years
- Water supply reliability
- Conservation/Demand Management Measures
- Climate change
- Water Shortage Contingency Plan

District Overview

- Serving Bear Gulch District since 1936
- One Public Water System
- Surface water purchased from the San Francisco Public Utilities Commission (SFPUC)
- Local surface water diverted from Bear Gulch Creek

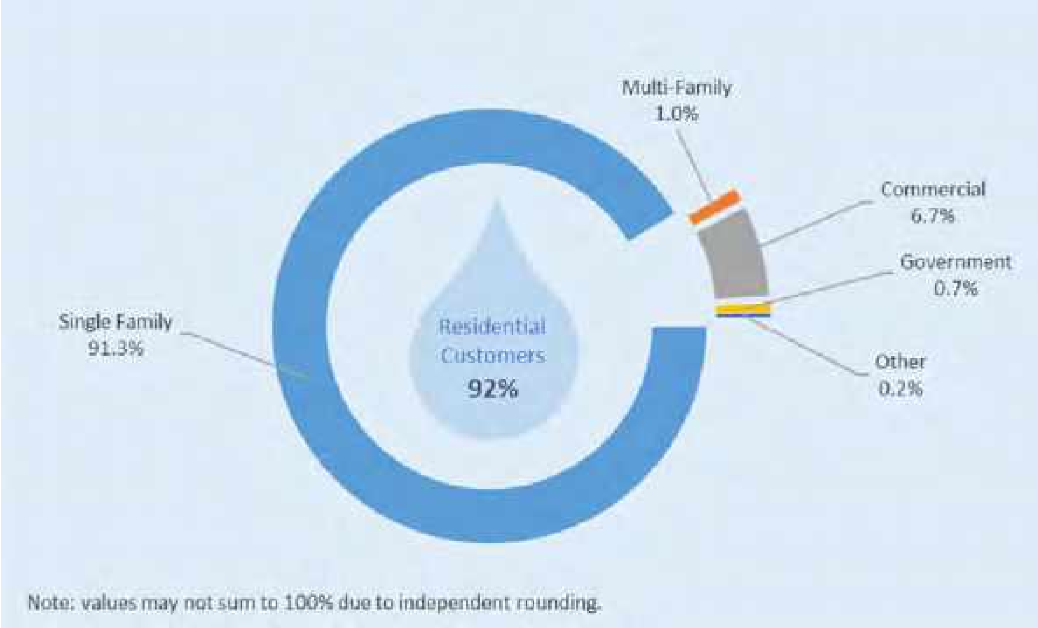
Water Supply Sources

- Main source of water supply is treated water purchased from the SFPUC Regional Water System (RWS)
- Local surface water diverted from Bear Gulch Creek makes up approximately nine percent of annual deliveries
- Cal Water continues to investigate additional supply sources, however there is no current or projected use of recycled water or other supply sources

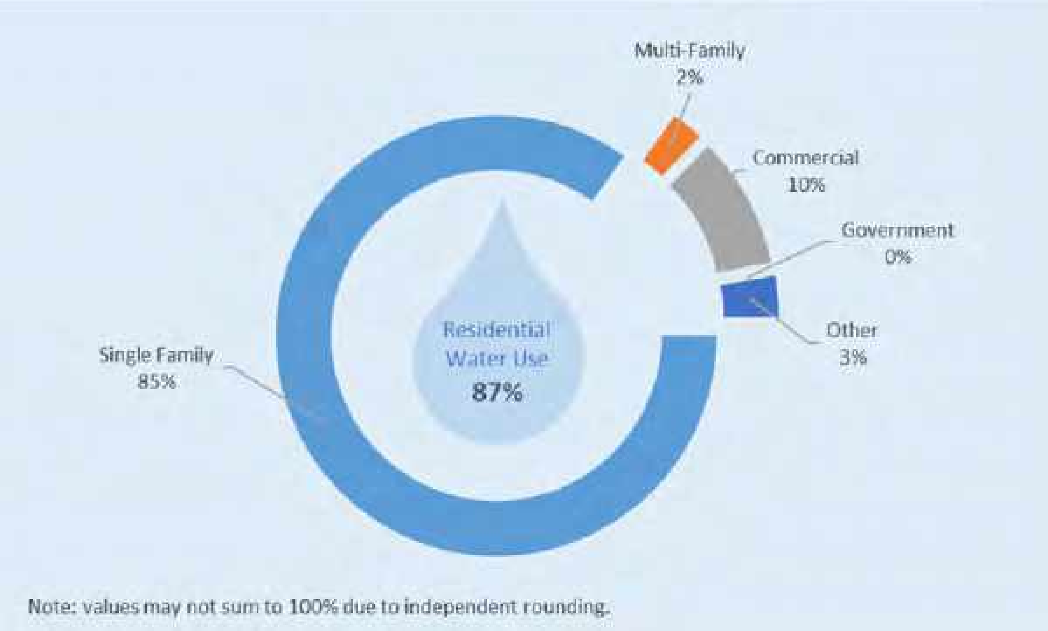


Distribution of Services/Demand

Types of Customers



Demand

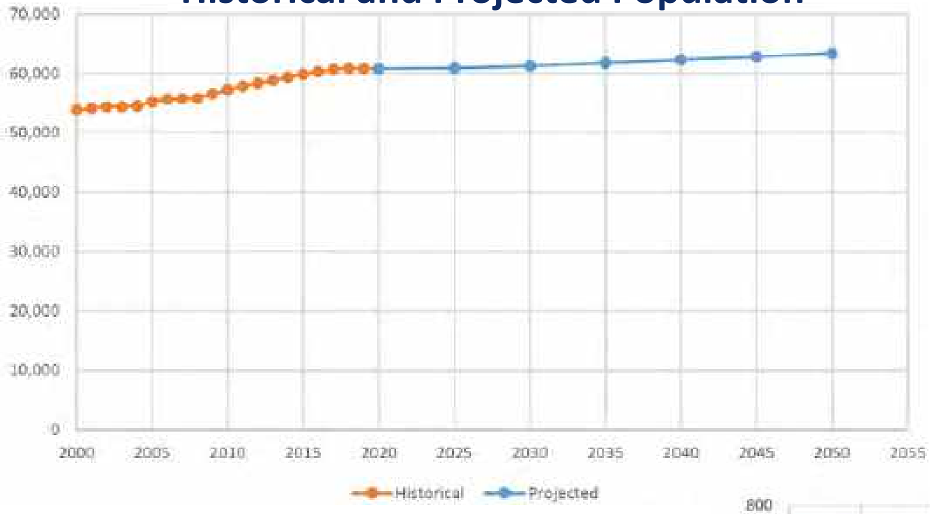


Demand Projection Methodology

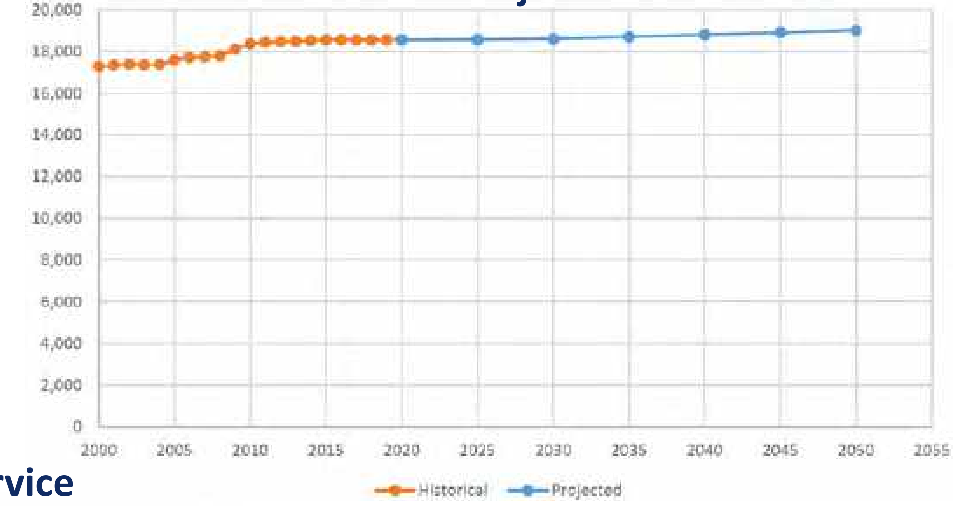
- Forecast horizon is beyond 20 years required by UWMP
- Generates normal-, wet-, and dry-year demand forecasts
- Directly considers impacts of climate change
- Demand model uses historical data on services, sales, production, population, and proposed conservation measures
- Regional Growth Forecast: housing and employment growth forecasts based on census-tract level growth forecasts prepared by the Association of Bay Area Governments (ABAG)

Population & Account Projections

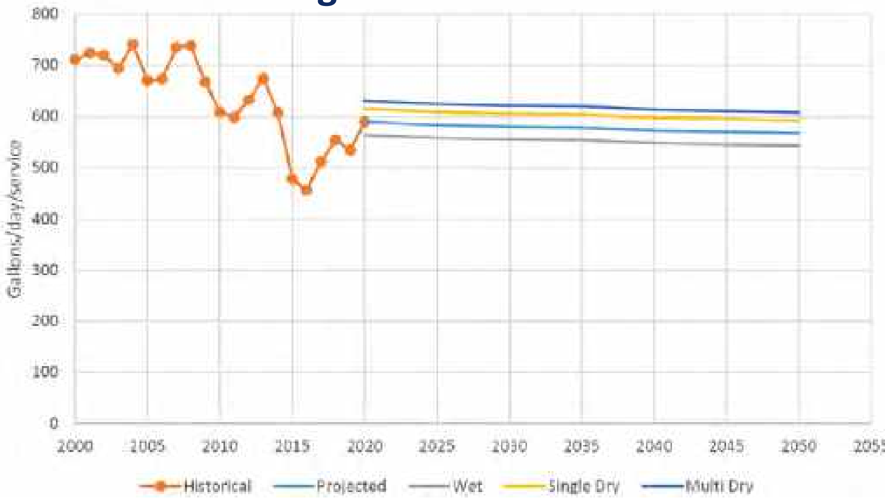
Historical and Projected Population



Historical and Projected Services

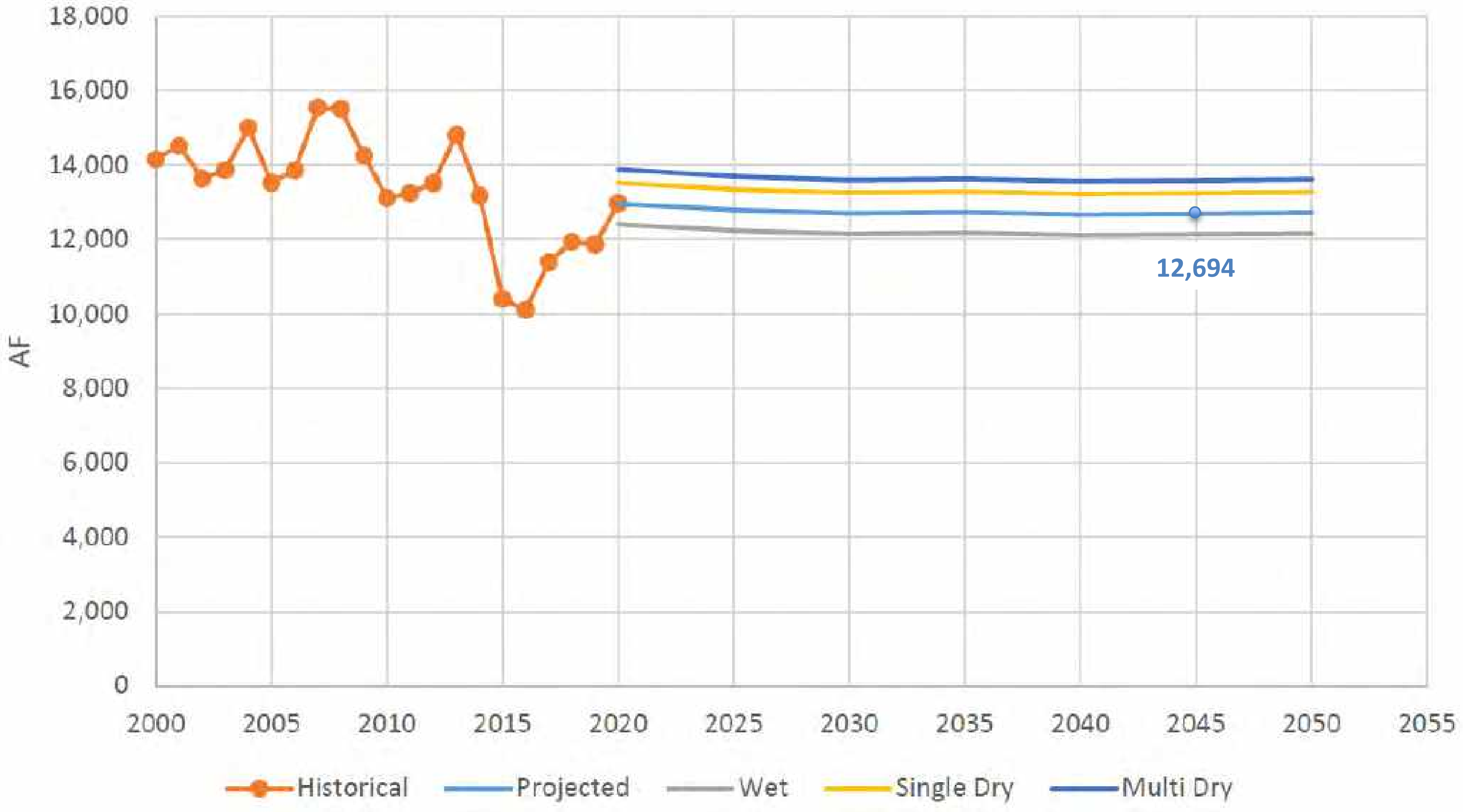


Average Demand Per Service



Demands for Potable Water - Projected

- 2045 demand projected to be 12,694 acre-feet per year
- 2% decrease relative to 2020 demands



SB X7-7 (20% by 2020)

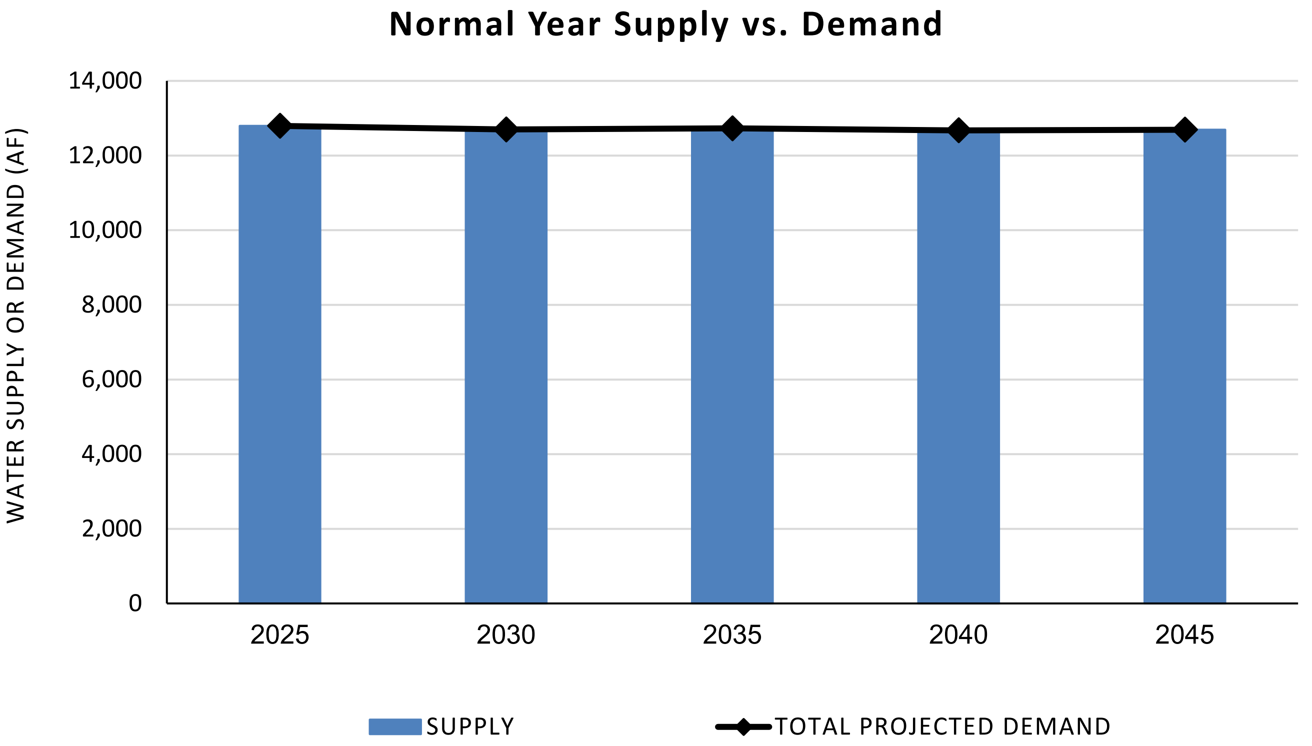
- Goal is to reduce per capita urban water use below baseline by:
  - 10% by Dec. 31, 2015
  - 20% by Dec. 31, 2020
- Bear Gulch District met its 2020 Target via Cal Water - San Francisco Bay Regional Alliance

2020 Actual GPCD	Optional Adjustment for Economic Growth[1]	Adjusted 2020 Actual GPCD	2020 Target GPCD [2]	Did Alliance Achieve Targeted Reduction for 2020?
130			150	Yes

[1]Adjustments for economic growth can be applied to either the individual supplier's data or to the aggregate regional alliance data (but not both), depending upon availability of suitable data and methods. [2] 2020 Target GPCD will be taken from the Regional Alliance's SB X7-7 Verification Form, Weighted Target Table.

Supply Sufficiency

- Supply sufficiency analysis is based on the following:
  - RWS purchased water availability is based on projections provided by BAWSCA and SFPUC
  - Local surface water supply availability during normal hydrologic years estimated to be 840 AFY, conservatively assumed to be zero during dry years
- Supply is projected to be sufficient to meet projected demand under normal year conditions
- Significant shortfalls are projected in single-dry and multiple-dry years if Bay-Delta Plan Amendment is adopted as written, but numerous uncertainties remain
- Any shortages will be addressed by the Water Shortage Contingency Plan

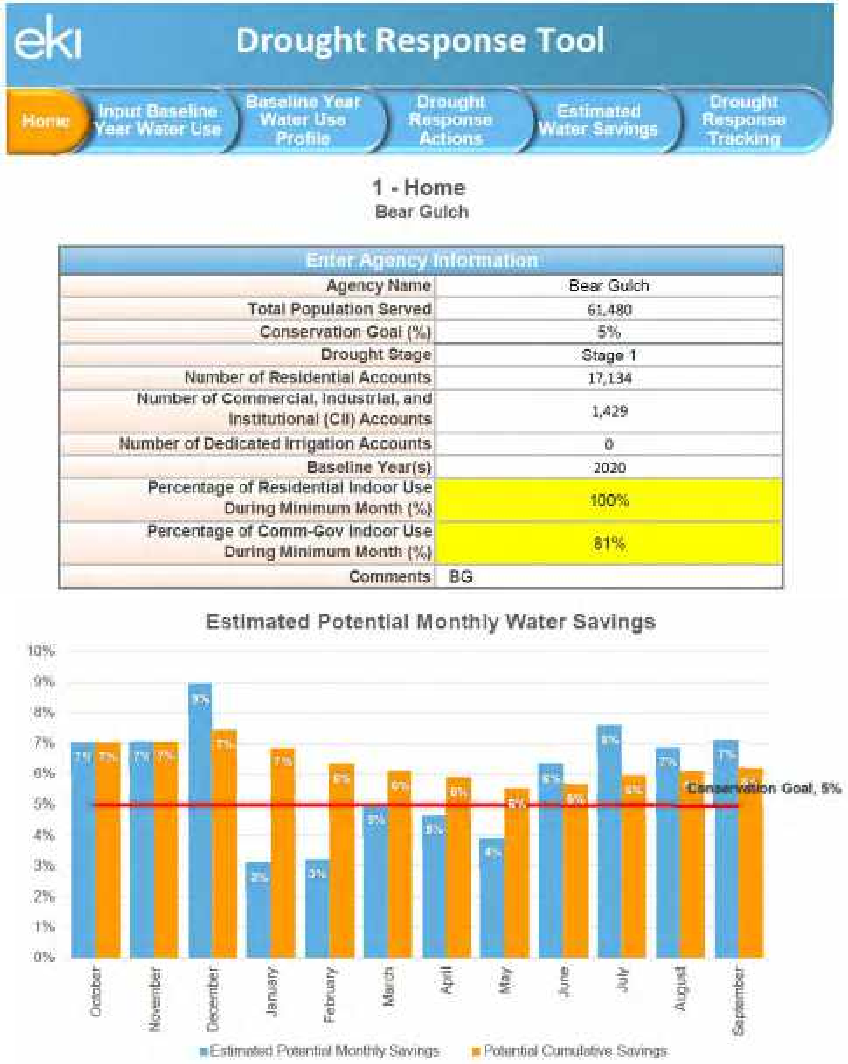


Local Topics – Bear Gulch District

- Implementation of the Bay-Delta Plan Amendment may impact future supply reliability
  – Requires the release of 30-50% of the "unimpaired flow" on the San Joaquin River tributaries from February through June in every year type - SFPUC modeling assumes 40% of unimpaired flow
  – SFPUC has provided all wholesale customers with estimates of RWS reliability, which predict shortfalls in excess of 50% during a five-year extended drought scenario
  – Numerous uncertainties remain and Cal Water is committed to developing a long-term supply reliability strategy for its Peninsula Districts, including evaluation of alternative supply sources and continued commitment to Cal Water's comprehensive water conservation program

Water Shortage Contingency Plan Elements

- Comprehensive drought response plan
  - Annual assessment of water supply reliability
  - Six standard shortage stages (10% to >50%)
  - Shortage response actions
  - Communication protocols
  - Monitoring, enforcement, and reporting
- Quantitatively assessed using Drought Response Tool



Drought Update

- Governor has issued drought emergencies in the majority of counties in California
- Cal Water is monitoring drought conditions in all of its service territories
  - Established a Drought Response Committee
  - Proactively developing conservation messaging
- Cal Water is closely coordinating its drought response with other water agencies and regulatory bodies
- Cal Water will follow protocols outlined in the WSCP as needed
  - Based on local conditions or state mandates

Questions or Comments

- Draft 2020 UWMP and 2020 WSCP available at **https://www.calwater.com/conservation/uwmp-review/**
- Comments on any parts of the UWMP will be accepted through Friday June 11
- Send 2020 UWMP and WSCP comments to: planninginfo@calwater.com

Appendix D: Land Use Maps

- Town of Atherton Zoning Map
- Menlo Park General Plan Land Use Designations
- North Fair Oaks Land Use Designations
- Town of Portola Valley Comprehensive Plan Diagram
- Town of Woodside Zoning Map

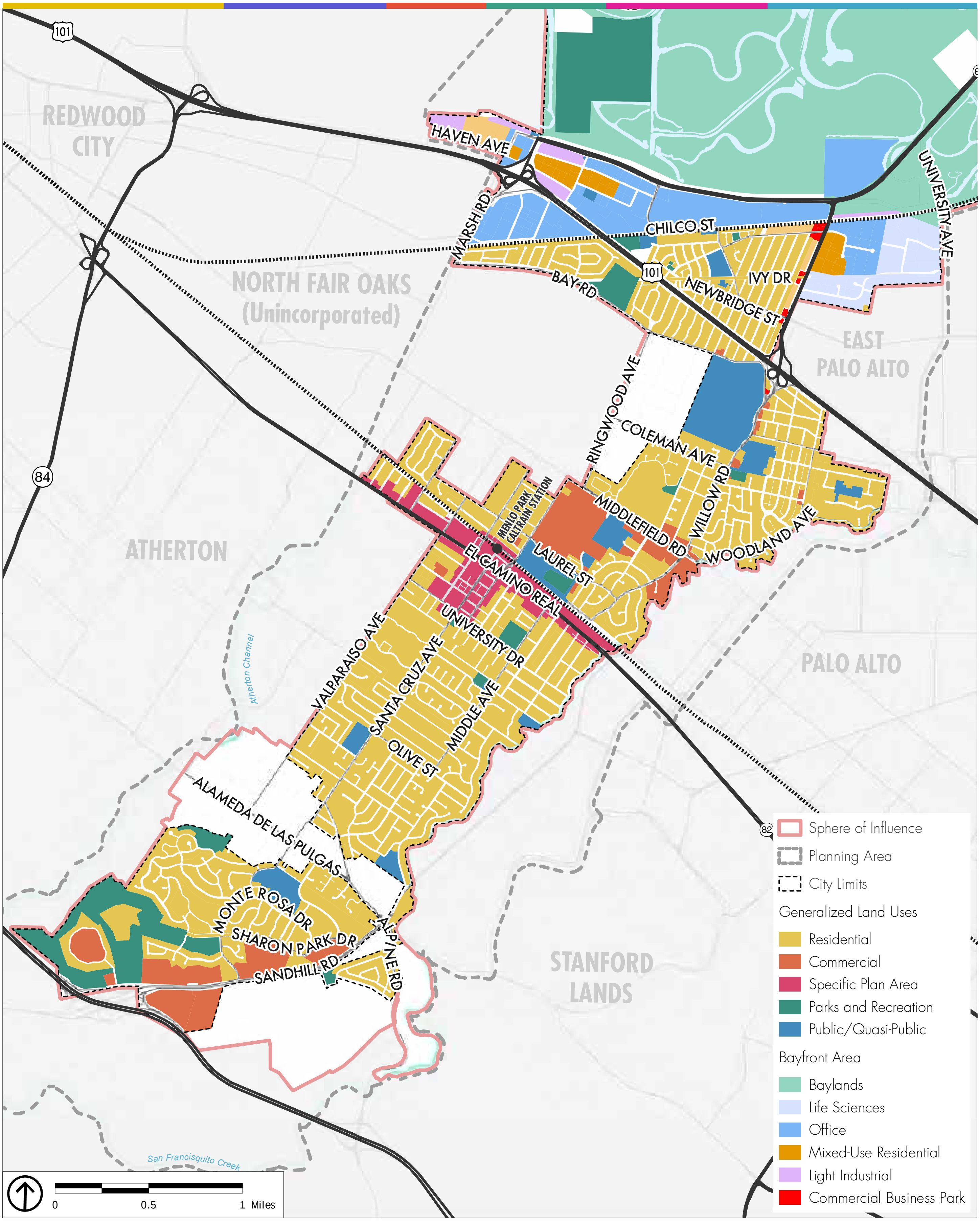
Town of Atherton Zoning Map

0 0.125 0.25 0.5 0.75 1 Miles

Legend: PFS POS R-1A R-1B

Prepared: December 28, 2011

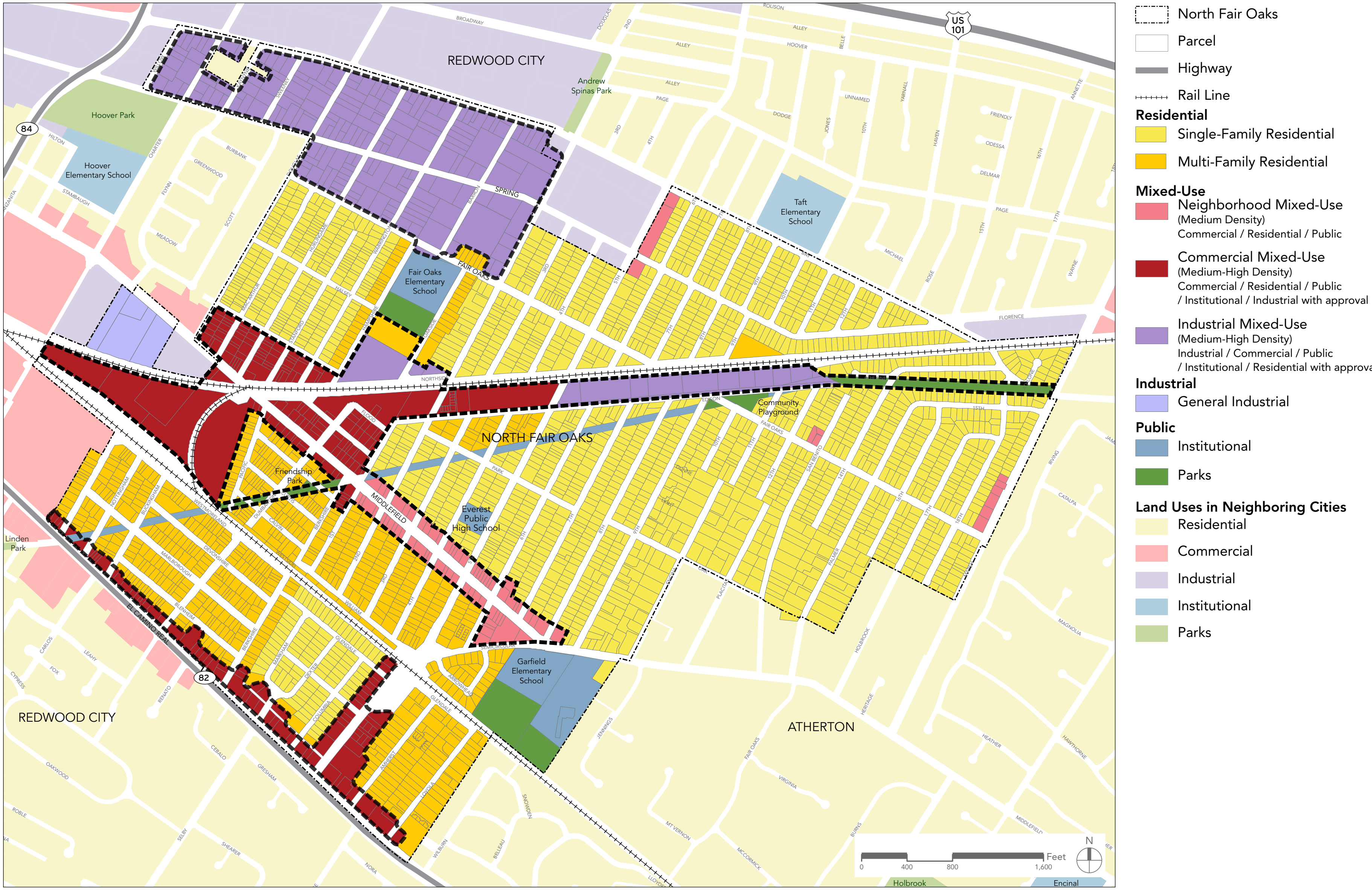
LYNX TECHNOLOGIES
DIGITAL MAPPING CONSULTANTS

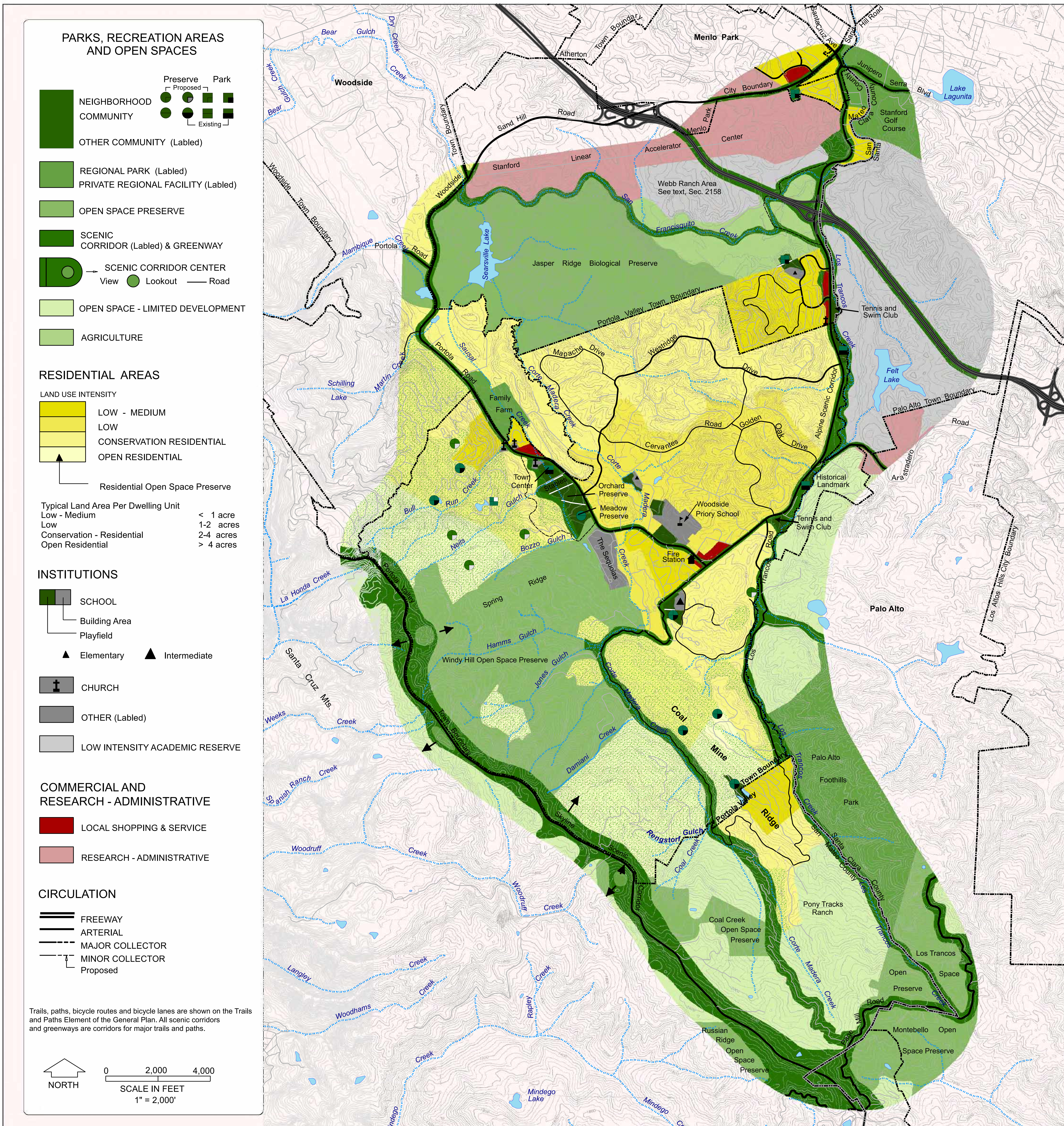


CONNECTMENLO

FIGURE 5: GENERAL PLAN LAND USE DESIGNATIONS

FIGURE 2.5: North Fair Oaks Land Use Designations



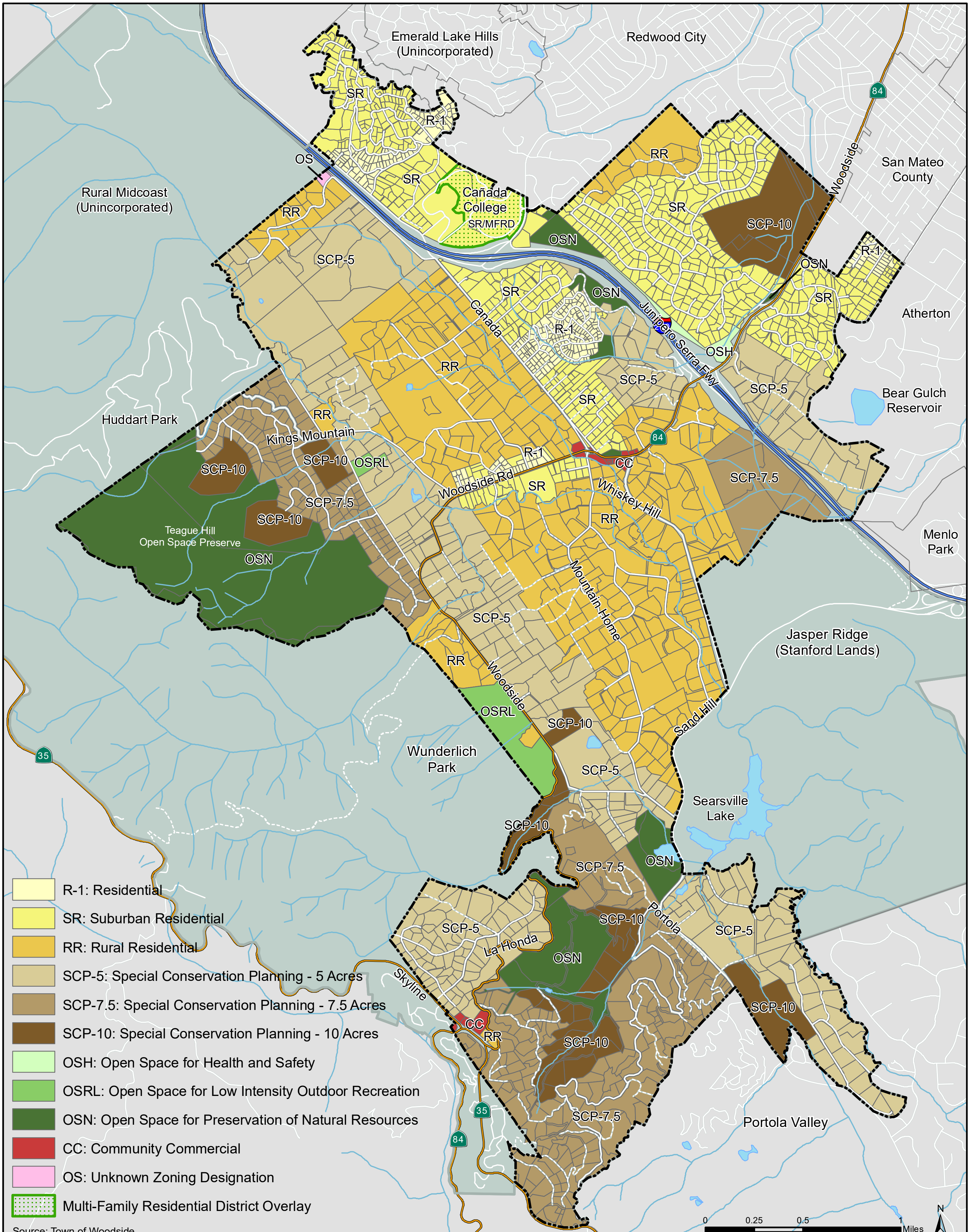


ADOPTED BY TOWN COUNCIL RESOLUTION
1965-17, 07/08/1965
LAST AMENDED BY TOWN COUNCIL RESOLUTION
NO. 1891-2001, 04/25/2001
REPRINTED, 03/2007

PREPARED BY:
SPANGLE ASSOCIATES
URBAN PLANNING AND RESEARCH
770 MENLO AVE. #200, MENLO PARK, CA 94025

COMPREHENSIVE PLAN DIAGRAM

Part 5 of the General Plan - Town of Portola Valley



Zoning Map

Town of Woodside

Created By Woodside GIS 4/17/2012; Revised 03-26-17

Appendix E: Summary of Demand Projection Methodology and Assumptions

Cal Water Long-Term Demand Forecast Model Overview

Forecast Domain
The forecast model generates separate forecasts for each customer class and distribution system. Table 1 lists Cal Water districts and distribution systems. Table 2 lists customer classes.

Forecast Horizon and Time Step
The forecast horizon is 30 years. The forecast has an annual time-step.

Normal, Wet, and Dry Year Forecasts
The forecast model generates normal-, wet-, and dry-year demand forecasts. The normal-year forecast is the default forecast. The wet- and dry-year forecasts can be substituted for the default forecast as necessary for system planning purposes. The model produces two different dry year forecasts: the single dry year forecast and the multiple dry year forecast. The latter represents the expected effect of prolonged drought conditions on unconstrained water demand.[1]

Relationship to GRC Sales Forecast
The first year of the forecast can be set to the current GRC sales forecast or actual consumption.

Relationship to PAWS
The demand model uses historical data on services, sales, production, and population from Cal Water's Production Analysis Worksheets (PAWS).

Accounting Rules
The model uses the following accounting rules to ensure forecast consistency:

- Population and conservation savings forecasts are functions of the service forecast.
- The sales forecast for a distribution system is the sum of the class-level sales forecasts for the distribution system. The production forecast for a distribution system is the sum of the sales and non-revenue water (NRW) forecasts for the distribution system.
- The sales and production forecasts for a district are the sum of the sales and production forecasts for its distribution systems.

Volume Units
Sales and production forecasts are in acre-feet (AF). Average sales and per capita forecasts are in gallons per day.

Per Capita Water Use
The model generates per capita forecasts for water use by single-family customers, water use by multi-family customers, water use by all residential customers, and water use by all district customers.

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[1] Unconstrained demand is what demand would be in the absence of water use restrictions or policies intended to curtail water use.

Service Forecast

The forecast model generates three alternative service forecasts:

- Average Y-Y Change in Services. The model bases the forecast on the historical year-to-year (y-y) change in the number of services. This forecast assumes additive growth.
- Average Y-Y % Change in Services. The model bases the forecast on the historical y-y percentage change in services. This forecast assumes exponential growth.
- Regional Growth Forecast. The model uses regional housing and employment growth forecasts to project future services. Districts in the Bay Area use census-tract level growth forecasts prepared by the Association of Bay Area Governments (ABAG). Districts in Southern California use census-tract-level growth forecasts prepared by the Southern California Association of Governments (SCAG). The remaining districts use county-level forecasts prepared by Caltrans.

Regional Forecasts

Table 3 lists the regional forecasts in the model. Table 4 summarizes how the model uses the regional forecasts to project future services.

Service Floors and Ceilings

The forecast can include floors and ceilings on the service growth. The floor (ceiling) is the minimum (maximum) number of services allowed in the forecast.

User-Specified Growth Rates

The model allows user-specified growth rates.

Water Supply Assessments

The user can add to the forecast projected services and water use from Water Supply Assessments prepared for proposed development projects. The user can specify how much of this projected growth in services and water use the model should treat as additive to the baseline forecast.

Population Forecasts

The population projection is a function of the residential service projections to ensure internal consistency. Population in year t is:

$$Population_t = \left[\frac{persons}{service}\right]_{SFR} \cdot SFRservices_t + \left[\frac{persons}{service}\right]_{MFR} \cdot MFRservices_t$$

For multi-family services, the calculation of average persons per service uses the equation below. The model uses county assessor data linked to Cal Water customer data to estimate average dwelling units per parcel and average parcels per service. It uses census data to estimate average persons per dwelling unit.

$$\left[\frac{persons}{service}\right]_{MFR} = \frac{Avg\ Dwelling\ Units}{Parcel} \cdot \frac{Avg\ Parcels}{Service} \cdot \frac{Avg\ Persons}{Dwelling\ Unit}$$

Sales/Service Forecast

The model generates separate forecasts of sales/service for each customer class and distribution system.

Sales/Service Initialization

The model user sets sales/service for first year of the forecast to either current year water use or the most recent General Rate Case sales forecast. The 2020 UWMP projections start with 2020 actual sales/service.

Sales/Service Adjustments

In each forecast year, the model adjusts the previous year's sales/service estimate for:

1. Rebound from the 2012-16 drought
2. Passive water savings from plumbing codes and appliance standards
3. Active water savings from Cal Water conservation programs
4. Real changes in the marginal cost of water service
5. Real changes in per capita income

The user can select which adjustments to apply. The 2020 UWMP projections include all the adjustments except the drought rebound adjustment. The 2020 UWMP projections exclude the drought rebound adjustment because analysis of recent consumption trends showed that further rebound from the 2012-2016 drought was unlikely.

A description of each adjustment follows.

Drought Rebound

The model adjusts the sales/service forecast for demand recovery following the 2012-2016 drought. The model makes this adjustment using data on the growth in sales/service between 2016 and 2017. The model assumes some of the savings achieved during the drought will be permanent. The user can set the level of permanent drought savings. The default setting is 20%.

Passive Water Savings

The model uses DWR projections of water savings from plumbing/building codes to forecast passive water savings.[2] The model extends the DWR projections, which run through 2040, to 2050.

Active Water Savings

The model uses conservation program savings projections from Cal Water's 2015 Conservation Master Plans to forecast active water savings.

Price and Income Adjustments

The model adjusts average sales for expected changes in real income and cost of water service. The adjustment equation is:[3]

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[2] M.Cubed. 2016. Projected Statewide and County-Level Effects of Plumbing Codes and Appliance Standards on Indoor GPCD. Technical Memorandum prepared by David Mitchell for the California Department of Water Resources. August 30, 2016.

[3] The model uses a constant-elasticity-of-demand specification: $Q_t = AP_t^{\varepsilon} I_t^{\delta}$

$$\Delta Q_t = Q_0 \left(1 - \left(\frac{P_t}{P_0}\right)^{\varepsilon} \left(\frac{I_t}{I_0}\right)^{\delta}\right)$$

where Q_0 is sales/service in the base year of the forecast, $\left(\frac{P_t}{P_0}\right)$ and $\left(\frac{I_t}{I_0}\right)$ are the price of water and income relative to the base year of the forecast, and ε and δ are empirically derived estimates of price and income elasticity.

Sales Forecast

The sales forecast is the product of the service and average use per service forecasts.

Non-Revenue Water Forecast

The non-revenue water forecast is a function of the services forecast. The forecast starts with an initial estimate of non-revenue water, expressed in gallons/connection/day. The model decomposes this estimate into real and apparent loss. The model assumes future apparent loss is equal to the average apparent loss for the five year before the start of the forecast. In the case of real loss, the model assumes Cal Water's loss management program will reduce real losses over time. The amount of reduction depends on the staring estimate of real loss. If this estimate is 10 gallons/connection/day or less, the model assumes no further reduction. Otherwise, the model assumes real losses (in gallons/connection/day) will decrease until they are equal to 75% of the average real loss for the five years before the start of the forecast or the State Water Board draft real water loss standard for the distribution system, whichever is greater.[4] The model assumes the reduction in real loss will occur between 2020 and 2030.

Production Forecast

The production forecast is the sum of the sales and NRW forecasts.

Normal, Wet, Single Dry, and Multiple Dry Year Projections

The model generates normal, wet, single dry, and multiple dry year forecasts of sales and production. The model bases these forecasts on empirically derived relationships between monthly water sales, rainfall, and air temperature estimated for each Cal Water district.[5]

- Wet year – minus one standard deviation weather effect on sales and production
- Single dry year – plus one standard deviation weather effect on sales and production
- Multiple dry year – plus 1.6 standard deviations weather effect on sales and production

In the case of the dry year forecasts, the model is forecasting demand in the absence of drought water use restrictions or other policies that would limit water use in dry years.

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[4] The State Water Board did not develop a draft water loss standard for every Cal Water distribution system. For those without a draft standard, the model assumes real losses will decrease until they are equal to 75% of the average real loss for the five year before the start of the forecast.

[5] A&N Technical Services, Cal Water Long Term Water Demand Forecast Model, December 2014.

Table 1. Long-Term Demand Model Districts and Systems

Label	District-System	Notes
AV	**Antelope Valley District**	
AV-FMT	Fremont System	
AV-LAN	Lancaster System	
AV-LKH	Lake Hughes System	
AV-LVY	Leona Valley System	
BG	**Bear Gulch District**	No sub-systems in district
BK	**Bakersfield District**	
BK-BK	Bakersfield System	
BK-NG	North Garden System	
CH	**Chico District**	
CH-CH	Chico System	
CH-HAM	Hamilton City System	
DIX	**Dixon District**	No sub-systems in district
DOM	**Dominguez District**	No sub-systems in district
ELA	**East Los Angeles District**	No sub-systems in district
HAW	**Hawthorne District**	No sub-systems in district
HR	**Hermosa-Redondo District**	No sub-systems in district
KC	**King City District**	No sub-systems in district
KRV	**Kern River Valley District**	
KRV-BDFLO	Lower Bodfish System	
KRV-BDFUP	Upper Bodfish System	
KRV-KNVARD	Kernville & Arden System	Includes KNV, KRVArdenWaterCo, COUN, MSH, POND
KRV-LKL	Lakeland System	
KRV-ONX	Onyx System	
KRV-SLK	South Lake System	Includes SQM
KRV-SPM	Split Mountain System	
LAS	**Los Altos District**	No sub-systems in district
LIV	**Livermore District**	No sub-systems in district

Label	District-System	Notes
MPS	**Mid-Peninsula District**	
MPS-SM	San Mateo System	
MPS-SC	San Carlos System	
MRL	**Marysville District**	No sub-systems in district
ORO	**Oroville District**	No sub-systems in district
PV	**Palos Verdes District**	No sub-systems in district
RDV	**Redwood Valley District**	
RDV-ARM	Armstrong System	
RDV-CSP	Coast Springs System	
RDV-HKN	Hawkins Water System	
RDV-LUC	Lucerne System	
RDV-NOH	Noel Heights System	
RDV-RPD	Rancho del Paradiso System	
SEL	**Selma District**	No sub-systems in district
SLN	**Salinas District**	
SLN-SLN	Salinas System	Includes Bolsa Knolls, Country Meadows
SLN-SLNH	Salinas Hills System	Includes Buena Vista, Indian Springs
SLN-OH	Oak Hill System	
SLN-LL	Las Lomas System	
SSF	**South San Francisco District**	No sub-systems in district
STK	**Stockton District**	No sub-systems in district
VIS	**Visalia District**	No sub-systems in district
WIL	**Willows District**	No sub-systems in district
WLK	**Westlake District**	No sub-systems in district

Table 2. Long-Term Demand Model Customer Classes

Label	Description	Revenue Class #
SFR	Single-Family Residential	1
FLT	Single-Family Flat Rate	4
RES	SFR + FLT	1, 4
MFR	Multi-Family	15
COM	Commercial/Business	2
GOV	Government/Public Authority	11
IND	Industrial	3
OTH	Other/miscellaneous	8,13
IRR	Dedicated irrigation customers	7

Table 3. Regional Forecasts used in First Generation Long-term Demand Model Forecasts

Regional Forecast	Version	Range
ABAG	Plan Bay Area 2040, GEOID10-level summary	2010 to 2040
SCAG	RTP07 GEOID10-level	2010 to 2035
Caltrans	2017 County Forecasts	2010 to 2050

Table 4. Regional Growth Rates used in the Service Growth Forecasts

Service Class	ABAG	SCAG	Caltrans
SFR	y-y % change in single-family dwelling units	y-y % change in all residential dwelling units	y-y % change in single-family dwelling units
MFR	y-y % change in multi-family dwelling units	y-y % change in all residential dwelling units	y-y % change in multi-family dwelling units
COM	y-y % change in total number of jobs	y-y % change in total number of jobs	y-y % change in county employment in retail, wholesale, information, financial, professional, and leisure sectors
GOV	y-y % change in gov't, information, and construction jobs	y-y % change in total number of jobs	y-y % change in county employment in federal, state, local government and education and healthcare sectors
IND	y-y % change in manufacturing jobs	y-y % change in total number of jobs	y-y % change in county employment in manufacturing sectors

Historical and Projected Services, Water Sales, and Total Production

District Demand Projection Report
Bear Gulch

6/7/2021

General Rate Case Sales Baseline 2020

Historical Data Range
First Year 2000
Last Year 2020

Forecast Range
First Year 2020
Last Year 2050

Service Growth Basis ABAG Growth Forecasts

Service Growth Rates

	ABAG	Historical %Y-Y[1]			
Class	Projected	5-Yr	10-Yr	15-Yr	20-Yr
RES[2]	0.1%	0.0%	0.1%	0.3%	0.3%
MFR	0.7%	10.4%	9.5%	7.5%	5.5%
COM	0.0%	-1.2%	-0.9%	-0.2%	-0.1%
GOV	0.1%	2.7%	1.6%	2.4%	1.7%
IND	-0.7%	0.0%	0.0%	0.0%	0.0%
TOT		0.0%	0.1%	0.4%	0.4%

Water Supply Assessments

	WSA Name	Completion Date	Incorporated into Forecast (Y/N)
1			
2			
3			
4			
5			

Sales Forecast Adjustments

Drought Rebound	OFF
Plumbing Code	ON
Active Conservation	ON
Price Response	ON
Income Response	ON

Non-Revenue Water (NRW) Basis

Real loss (gal/con/day):
2016-2020 average if <= 10 gal/con/day
Draft Water Board standard or 75% of 2016-2020 average, whichever is greater, by 2030.
Apparent loss (gal/con/day): 2016-2020 average.

1. Account reclassifications can impact historical %Y-Y growth rates for individual customer classes.
2. RES = Metered and unmetered single-family residential customers.

Historical Service Counts

YEAR	RES	MFR	COM	GOV	IND	OTH	IRR	TOT
2000	15,816	64	1,276	96	1	34	0	17,288
2001	15,875	64	1,280	95	1	38	0	17,354
2002	15,919	64	1,279	95	1	41	0	17,400
2003	15,890	64	1,278	96	1	31	0	17,359
2004	15,910	64	1,274	97	1	31	2	17,379
2005	16,134	63	1,280	95	1	27	5	17,605
2006	16,256	63	1,274	96	1	23	9	17,721
2007	16,271	63	1,279	96	1	34	10	17,755
2008	16,260	70	1,326	107	1	32	8	17,804
2009	16,528	76	1,364	116	1	28	7	18,119
2010	16,781	75	1,365	116	1	24	7	18,369
2011	16,857	83	1,359	118	1	25	8	18,450
2012	16,884	84	1,351	118	1	27	7	18,473
2013	16,887	85	1,350	117	1	35	8	18,482
2014	16,944	85	1,349	119	1	27	8	18,532
2015	16,970	114	1,326	119	1	23	8	18,560
2016	16,968	175	1,272	119	1	27	8	18,569
2017	16,960	185	1,261	117	1	36	8	18,570
2018	16,958	187	1,250	119	1	35	8	18,558
2019	16,946	187	1,244	136	1	37	8	18,559
2020	16,944	187	1,248	136	1	37	8	18,561
2021								
2022								
2023								
2024								
2025								
2026								
2027								
2028								
2029								
2030								

CAGR	RES	MFR	COM	GOV	IND	OTH	IRR	TOT
5-Year	0.0%	10.4%	-1.2%	2.7%	0.0%	10.1%	0.4%	0.0%
10-Year	0.1%	9.5%	-0.9%	1.6%	0.0%	4.4%	1.0%	0.1%
15-Year	0.3%	7.5%	-0.2%	2.4%	0.0%	2.1%	2.7%	0.4%
20-Year	0.3%	5.5%	-0.1%	1.7%	0.0%	0.4%		0.4%

CAGR = Compound Annual Growth Rate

Historical Sales (AF)

YEAR	RES	MFR	COM	GOV	IND	OTH	IRR	TOT
2000	11,552	268	1,544	269	7	139	0	13,779
2001	11,952	265	1,512	279	5	71	0	14,083
2002	11,995	252	1,442	317	8	21	0	14,035
2003	11,534	248	1,375	274	7	56	0	13,495
2004	12,429	248	1,409	293	6	52	-4	14,434
2005	11,285	250	1,363	255	7	48	15	13,223
2006	11,393	251	1,394	260	5	50	14	13,365
2007	12,600	236	1,388	289	6	66	38	14,623
2008	12,615	231	1,449	339	5	49	38	14,726
2009	11,572	244	1,339	322	6	41	29	13,552
2010	10,629	232	1,309	297	4	20	32	12,523
2011	10,478	232	1,313	303	4	20	25	12,375
2012	11,176	228	1,314	321	5	19	28	13,091
2013	11,973	233	1,308	371	5	26	26	13,941
2014	10,853	220	1,212	287	3	28	24	12,627
2015	8,376	223	1,065	220	2	24	26	9,935
2016	8,001	235	980	218	2	31	24	9,491
2017	9,000	264	1,048	292	2	25	26	10,656
2018	9,742	285	1,111	323	2	22	29	11,514
2019	9,361	242	1,152	299	2	22	27	11,104
2020	10,598	279	1,038	303	3	20	21	12,262
2021								
2022								
2023								
2024								
2025								
2026								
2027								
2028								
2029								
2030								

CAGR	RES	MFR	COM	GOV	IND	OTH	IRR	TOT
5-Year	4.8%	4.6%	-0.5%	6.6%	9.9%	-4.0%	-3.8%	4.3%
10-Year	0.0%	1.8%	-2.3%	0.2%	-5.0%	0.1%	-4.1%	-0.2%
15-Year	-0.4%	0.7%	-1.8%	1.2%	-6.9%	-5.7%	2.6%	-0.5%
20-Year	-0.4%	0.2%	-2.0%	0.6%	-4.8%	-9.2%		-0.6%

CAGR = Compound Annual Growth Rate

Historical Sales/Service (GPD)

YEAR	RES	MFR	COM	GOV	IND	OTH	IRR	TOT
2000	652	3,744	1,080	2,490	6,082	3,613		712
2001	672	3,693	1,054	2,621	4,183	1,644		725
2002	673	3,520	1,007	2,975	7,433	449		720
2003	648	3,460	960	2,560	6,619	1,646		694
2004	697	3,465	987	2,708	5,168	1,518	-1,748	741
2005	624	3,518	951	2,395	6,609	1,587	2,430	671
2006	626	3,569	977	2,415	4,123	1,913	1,337	673
2007	691	3,358	968	2,676	5,730	1,733	3,288	735
2008	693	2,926	976	2,828	4,681	1,380	4,069	738
2009	625	2,882	876	2,480	5,226	1,324	3,556	668
2010	565	2,748	856	2,290	3,773	737	3,974	609
2011	555	2,489	862	2,294	3,492	715	3,005	599
2012	591	2,429	868	2,422	4,547	637	3,394	633
2013	633	2,454	865	2,822	4,195	662	3,052	673
2014	572	2,308	802	2,166	2,859	927	2,743	608
2015	441	1,746	717	1,655	1,414	959	2,930	478
2016	421	1,200	688	1,640	1,748	1,033	2,705	456
2017	474	1,271	741	2,220	1,920	619	2,893	512
2018	513	1,360	794	2,415	1,916	552	3,219	554
2019	493	1,154	826	1,960	1,842	527	2,991	534
2020	558	1,331	743	1,994	2,267	484	2,364	590
2021								
2022								
2023								
2024								
2025								
2026								
2027								
2028								
2029								
2030								

CAGR	RES	MFR	COM	GOV	IND	OTH	IRR	TOT
5-Year	4.9%	-5.3%	0.7%	3.8%	9.9%	-12.8%	-4.2%	4.3%
10-Year	-0.1%	-7.0%	-1.4%	-1.4%	-5.0%	-4.1%	-5.1%	-0.3%
15-Year	-0.7%	-6.3%	-1.6%	-1.2%	-6.9%	-7.6%	-0.2%	-0.9%
20-Year	-0.8%	-5.0%	-1.9%	-1.1%	-4.8%	-9.6%		-0.9%

CAGR = Compound Annual Growth Rate

Historical Production (AF)

YEAR	SALES	NRW	PROD		NRW %	NRW GPD/Svc
2000	13,779	370	14,149		2.6%	19
2001	14,083	435	14,518		3.0%	22
2002	14,035	-396	13,639		-2.9%	-20
2003	13,495	366	13,861		2.6%	19
2004	14,434	574	15,008		3.8%	30
2005	13,223	304	13,527		2.3%	15
2006	13,365	493	13,858		3.6%	25
2007	14,623	931	15,554		6.0%	47
2008	14,726	785	15,510		5.1%	39
2009	13,552	693	14,245		4.9%	34
2010	12,523	598	13,121		4.6%	29
2011	12,375	875	13,250		6.6%	42
2012	13,091	428	13,519		3.2%	21
2013	13,941	872	14,813		5.9%	42
2014	12,627	554	13,181		4.2%	27
2015	9,935	466	10,401		4.5%	22
2016	9,491	614	10,105		6.1%	30
2017	10,656	739	11,395		6.5%	36
2018	11,514	422	11,936		3.5%	20
2019	11,104	766	11,869		6.5%	37
2020	12,262	711	12,972		5.5%	34
2021						
2022						
2023						
2024						
2025						
2026						
2027						
2028						
2029						
2030						

CAGR	SALES	NRW	PROD			NRW GPD/Svc
5-Year	4.3%	8.8%	4.5%			8.8%
10-Year	-0.2%	1.7%	-0.1%			1.6%
15-Year	-0.5%	5.8%	-0.3%			5.4%
20-Year	-0.6%	3.3%	-0.4%			3.0%

CAGR = Compound Annual Growth Rate

Historical GPCD

		GPCD	
YEAR	POPULATION	RESIDENTIAL	TOTAL
2000	53,885	196	234
2001	54,162	201	239
2002	54,392	201	224
2003	54,421	193	227
2004	54,574	207	246
2005	55,252	186	219
2006	55,653	187	222
2007	55,769	205	249
2008	55,812	205	248
2009	56,560	187	225
2010	57,254	169	205
2011	57,876	165	204
2012	58,376	174	207
2013	58,812	185	225
2014	59,387	166	198
2015	59,883	128	155
2016	60,307	122	150
2017	60,719	136	168
2018	60,864	147	175
2019	60,827	141	174
2020	60,814	160	190
2021			
2022			
2023			
2024			
2025			
2026			
2027			
2028			
2029			
2030			

CAGR	POPULATION	RESIDENTIAL GPCD	TOTAL GPCD
5-Year	0.3%	4.5%	4.2%
10-Year	0.6%	-0.6%	-0.7%
15-Year	0.6%	-1.0%	-0.9%
20-Year	0.6%	-1.0%	-1.0%

CAGR = Compound Annual Growth Rate

Projected Services

YEAR	RES	MFR	COM	GOV	IND	OTH	IRR	TOT
2020	16,944	187	1,248	136	1	37	8	18,561
2021	16,945	187	1,251	136	1	33	8	18,561
2022	16,946	187	1,254	136	1	33	8	18,565
2023	16,946	187	1,257	136	1	33	8	18,569
2024	16,947	188	1,260	137	1	33	8	18,574
2025	16,947	189	1,263	137	1	33	8	18,578
2026	16,948	191	1,265	137	1	33	8	18,584
2027	16,949	193	1,268	137	1	33	8	18,589
2028	16,949	195	1,270	137	1	33	8	18,594
2029	16,950	196	1,273	137	1	33	8	18,599
2030	16,956	199	1,279	138	1	33	8	18,615
2031	16,963	201	1,285	139	1	33	8	18,631
2032	16,970	204	1,291	140	1	33	8	18,647
2033	16,977	207	1,297	141	1	33	8	18,663
2034	16,983	209	1,303	142	1	33	8	18,679
2035	17,005	211	1,300	142	1	33	8	18,700
2036	17,027	212	1,298	142	1	33	8	18,721
2037	17,049	213	1,295	142	1	33	8	18,742
2038	17,071	215	1,293	142	1	33	8	18,763
2039	17,094	216	1,290	142	1	33	8	18,784
2040	17,116	217	1,288	142	1	33	8	18,805
2041	17,138	219	1,285	142	1	33	8	18,826
2042	17,160	220	1,283	142	1	33	8	18,847
2043	17,182	222	1,280	142	1	33	8	18,868
2044	17,205	223	1,278	142	1	33	8	18,890
2045	17,227	224	1,275	142	1	33	8	18,911
2046	17,249	226	1,273	142	1	33	8	18,932
2047	17,271	227	1,270	142	1	33	8	18,954
2048	17,294	229	1,268	142	1	33	8	18,975
2049	17,316	230	1,265	142	1	33	8	18,996
2050	17,339	232	1,263	142	1	33	8	19,018

Projected Sales (AF)

YEAR	RES	MFR	COM	GOV	IND	OTH	IRR	TOT
2020	10,598	279	1,038	303	3	20	21	12,262
2021	10,464	271	1,015	298	3	18	21	12,090
2022	10,495	268	999	295	3	18	21	12,099
2023	10,531	266	984	292	3	18	21	12,115
2024	10,572	264	970	289	3	18	21	12,137
2025	10,591	264	957	286	3	18	21	12,139
2026	10,614	264	944	283	3	18	21	12,147
2027	10,597	264	932	281	3	18	21	12,116
2028	10,592	265	922	278	3	18	21	12,099
2029	10,592	266	916	277	3	18	21	12,092
2030	10,595	267	913	278	3	18	21	12,095
2031	10,602	269	910	278	3	18	21	12,101
2032	10,585	271	908	279	3	18	21	12,085
2033	10,603	273	906	280	3	18	21	12,104
2034	10,612	276	904	280	3	18	21	12,114
2035	10,629	277	897	279	3	18	21	12,123
2036	10,620	277	890	278	3	18	21	12,107
2037	10,610	278	883	277	3	18	21	12,090
2038	10,614	279	876	276	3	18	21	12,087
2039	10,608	280	870	275	3	18	21	12,075
2040	10,605	281	864	274	3	18	21	12,065
2041	10,609	282	858	273	3	18	21	12,064
2042	10,617	283	852	272	3	18	21	12,066
2043	10,626	284	847	271	3	18	21	12,070
2044	10,644	285	841	270	3	18	21	12,083
2045	10,647	286	836	270	3	18	21	12,081
2046	10,652	288	830	269	3	18	21	12,081
2047	10,656	289	825	268	3	18	21	12,080
2048	10,664	290	820	267	3	18	21	12,083
2049	10,676	291	815	266	3	18	21	12,090
2050	10,691	293	810	265	3	18	21	12,101

Projected Sales/Service (GPD)

YEAR	RES	MFR	COM	GOV	IND	OTH	IRR	TOT
2020	558	1,331	743	1,994	2,267	484	2,364	590
2021	551	1,294	724	1,957	2,267	484	2,364	581
2022	553	1,279	711	1,932	2,267	484	2,364	582
2023	555	1,267	699	1,910	2,267	484	2,364	582
2024	557	1,255	687	1,888	2,267	484	2,364	583
2025	558	1,244	676	1,867	2,267	484	2,364	583
2026	559	1,234	666	1,846	2,267	484	2,364	584
2027	558	1,224	657	1,828	2,267	484	2,364	582
2028	558	1,215	648	1,811	2,267	484	2,364	581
2029	558	1,207	642	1,801	2,267	484	2,364	580
2030	558	1,200	637	1,793	2,267	484	2,364	580
2031	558	1,193	632	1,785	2,267	484	2,364	580
2032	557	1,187	628	1,777	2,267	484	2,364	579
2033	558	1,182	624	1,769	2,267	484	2,364	579
2034	558	1,177	620	1,762	2,267	484	2,364	579
2035	558	1,173	616	1,755	2,267	484	2,364	579
2036	557	1,168	612	1,748	2,267	484	2,364	577
2037	556	1,164	609	1,741	2,267	484	2,364	576
2038	555	1,160	605	1,735	2,267	484	2,364	575
2039	554	1,157	602	1,728	2,267	484	2,364	574
2040	553	1,153	599	1,722	2,267	484	2,364	573
2041	553	1,150	596	1,716	2,267	484	2,364	572
2042	552	1,147	593	1,710	2,267	484	2,364	572
2043	552	1,145	590	1,704	2,267	484	2,364	571
2044	552	1,142	588	1,698	2,267	484	2,364	571
2045	552	1,140	585	1,692	2,267	484	2,364	570
2046	551	1,137	582	1,687	2,267	484	2,364	570
2047	551	1,134	580	1,681	2,267	484	2,364	569
2048	551	1,132	577	1,675	2,267	484	2,364	568
2049	550	1,130	575	1,670	2,267	484	2,364	568
2050	550	1,128	572	1,664	2,267	484	2,364	568

Projected Production (AF)

YEAR	SALES	NRW	PROD
2020	12,262	711	12,972
2021	12,090	700	12,790
2022	12,099	689	12,788
2023	12,115	679	12,794
2024	12,137	668	12,805
2025	12,139	657	12,796
2026	12,147	647	12,794
2027	12,116	636	12,752
2028	12,099	625	12,724
2029	12,092	614	12,706
2030	12,095	604	12,699
2031	12,101	605	12,706
2032	12,085	605	12,690
2033	12,104	606	12,709
2034	12,114	606	12,720
2035	12,123	607	12,730
2036	12,107	608	12,715
2037	12,090	608	12,698
2038	12,087	609	12,696
2039	12,075	610	12,684
2040	12,065	610	12,675
2041	12,064	611	12,675
2042	12,066	612	12,677
2043	12,070	612	12,682
2044	12,083	613	12,696
2045	12,081	614	12,694
2046	12,081	614	12,695
2047	12,080	615	12,695
2048	12,083	616	12,699
2049	12,090	617	12,707
2050	12,101	617	12,718

% NRW	NRW GPD/Svc
5.5%	34
5.5%	34
5.4%	33
5.3%	33
5.2%	32
5.1%	32
5.1%	31
5.0%	31
4.9%	30
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.8%	29
4.9%	29
4.9%	29

Projected GPCD

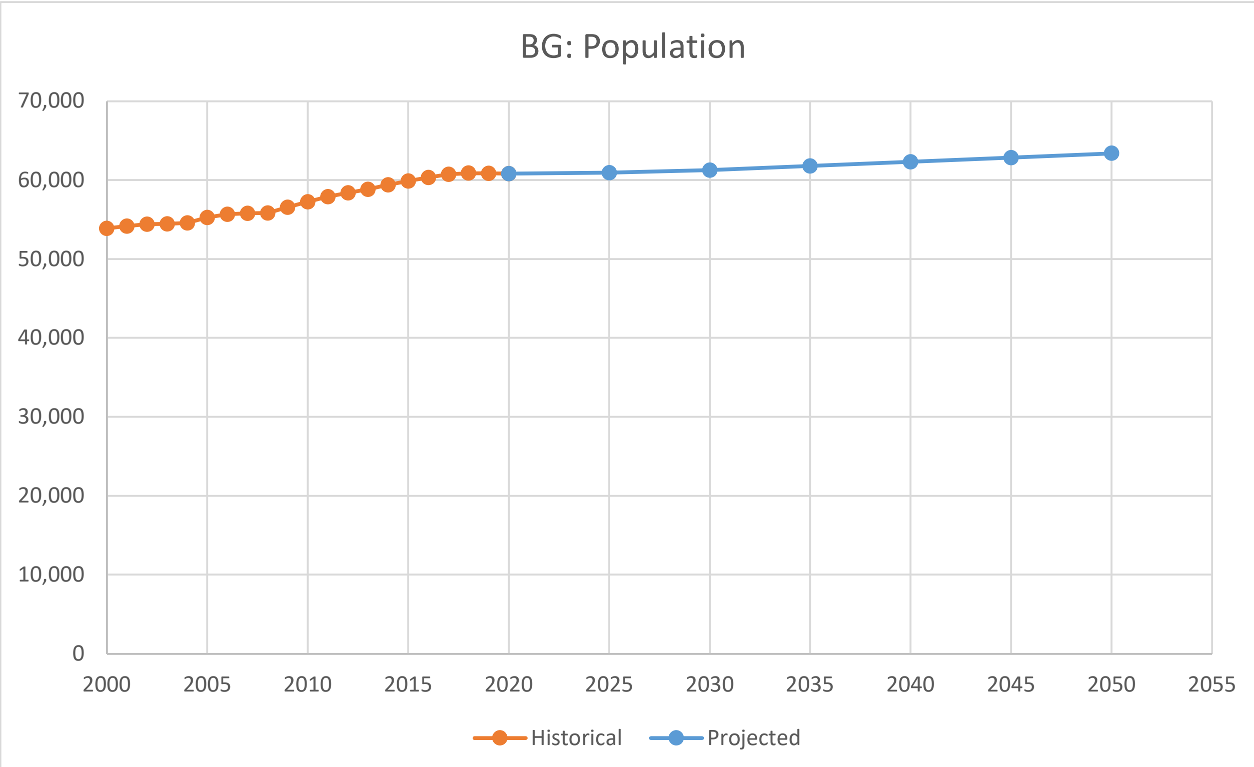
		GPCD	
YEAR	POPULATION	RESIDENTIAL	TOTAL
2020	60,814	189	190
2021	60,822	187	188
2022	60,830	187	188
2023	60,838	188	188
2024	60,846	188	188
2025	60,907	188	188
2026	60,968	189	187
2027	61,029	188	187
2028	61,091	188	186
2029	61,153	188	185
2030	61,255	187	185
2031	61,359	187	185
2032	61,463	187	184
2033	61,568	186	184
2034	61,675	186	184
2035	61,778	186	184
2036	61,882	186	183
2037	61,987	185	183
2038	62,091	185	183
2039	62,196	184	182
2040	62,302	184	182
2041	62,408	184	181
2042	62,514	184	181
2043	62,621	183	181
2044	62,728	183	181
2045	62,835	183	180
2046	62,943	183	180
2047	63,051	182	180
2048	63,159	182	179
2049	63,268	182	179
2050	63,378	182	179

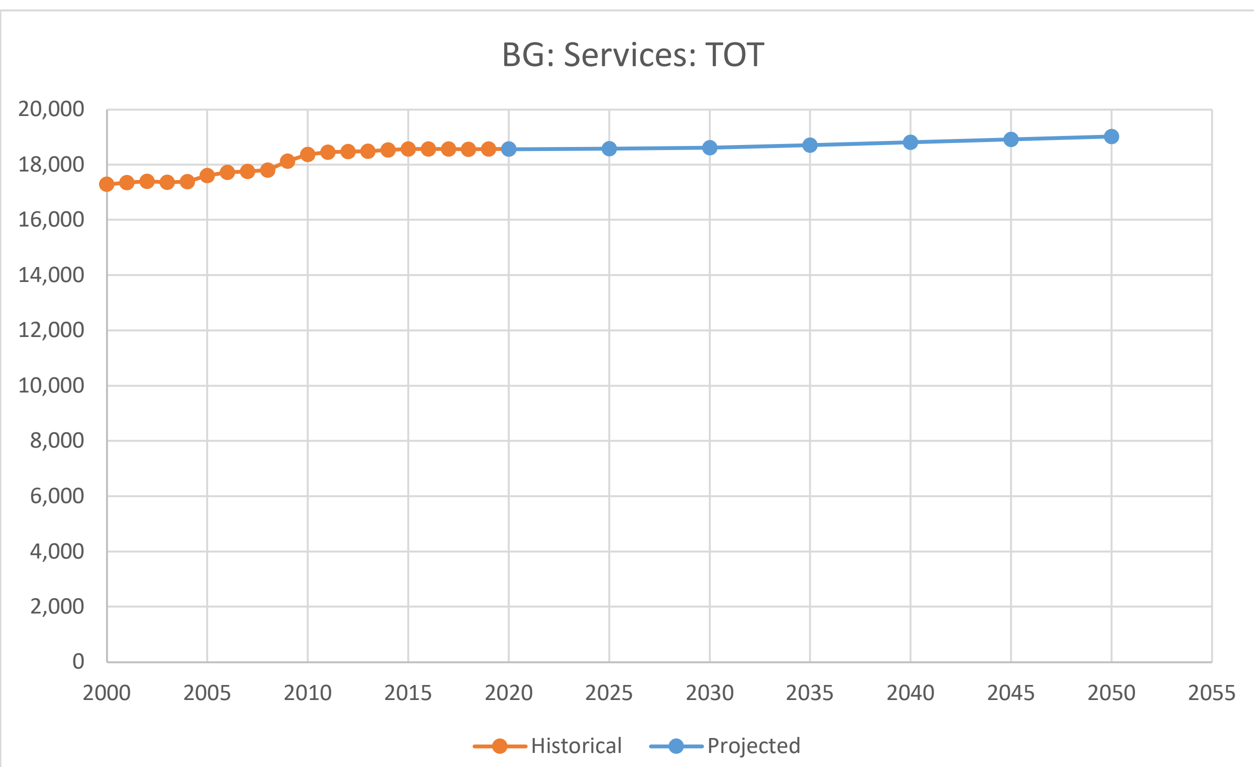
District Demand Projection Report
Bear Gulch

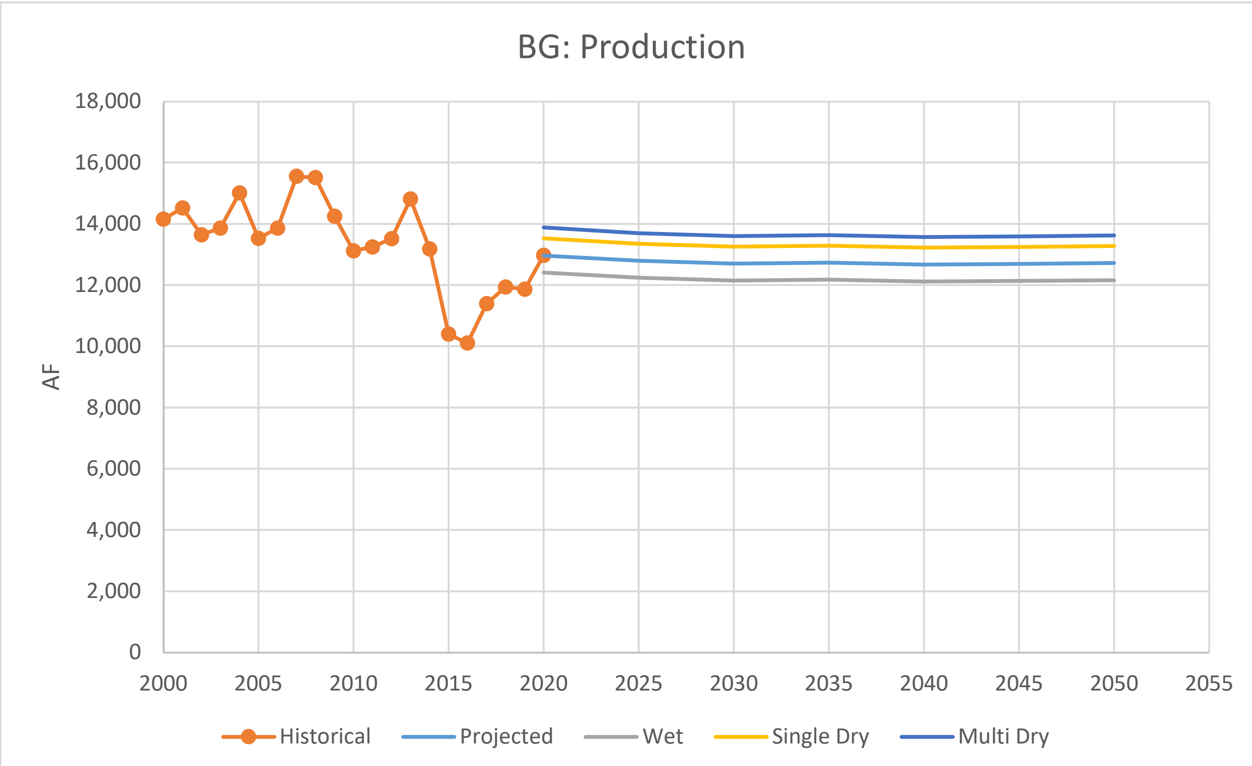
Normal, Single-Year, and Multi-Year Dry Year Demand (AF)

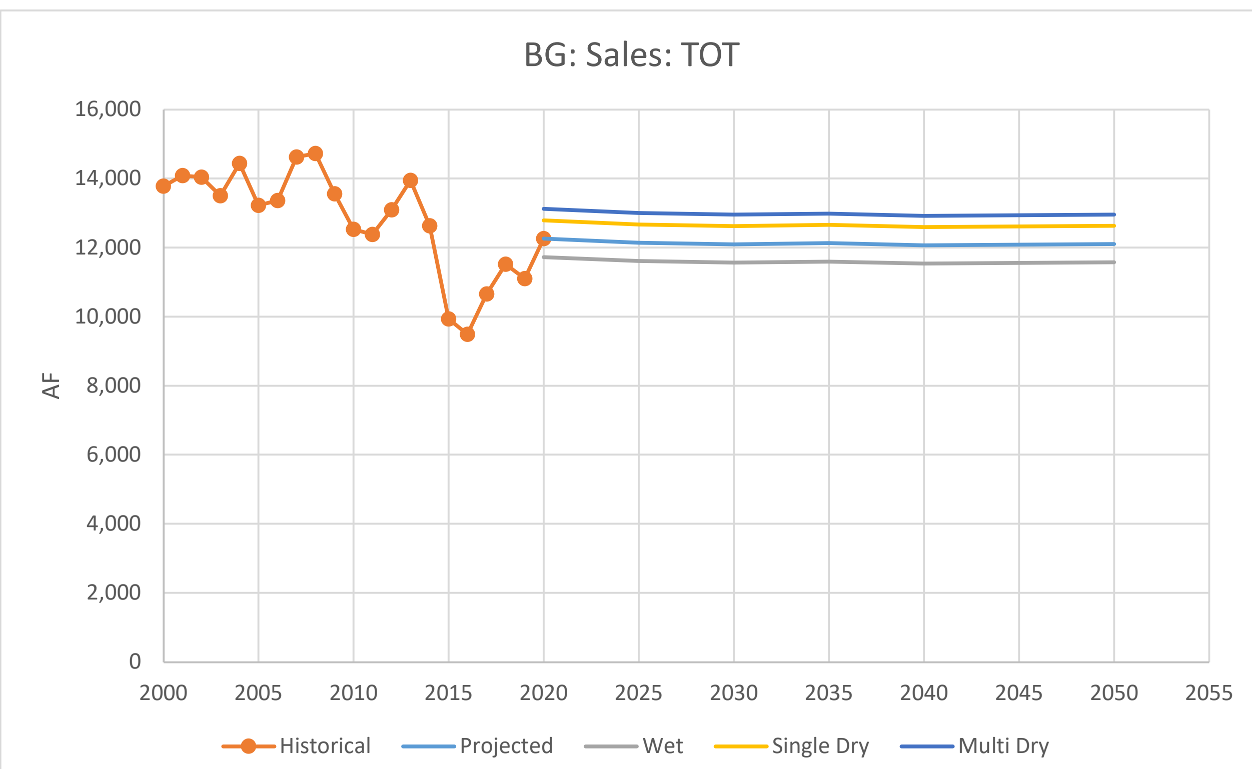
YEAR		NORMAL		SINGLE DRY YEAR	% OF NORMAL		MULTI DRY YEAR	% OF NORMAL
2020		12,972		13,536	104%		13,885	107%
2021		12,790		13,346	104%		13,690	107%
2022		12,788		13,344	104%		13,689	107%
2023		12,794		13,350	104%		13,695	107%
2024		12,805		13,362	104%		13,707	107%
2025		12,796		13,354	104%		13,699	107%
2026		12,794		13,351	104%		13,696	107%
2027		12,752		13,308	104%		13,652	107%
2028		12,724		13,279	104%		13,622	107%
2029		12,706		13,260	104%		13,603	107%
2030		12,699		13,253	104%		13,595	107%
2031		12,706		13,260	104%		13,603	107%
2032		12,690		13,243	104%		13,586	107%
2033		12,709		13,263	104%		13,606	107%
2034		12,720		13,274	104%		13,617	107%
2035		12,730		13,285	104%		13,629	107%
2036		12,715		13,269	104%		13,612	107%
2037		12,698		13,252	104%		13,594	107%
2038		12,696		13,250	104%		13,593	107%
2039		12,684		13,237	104%		13,580	107%
2040		12,675		13,228	104%		13,570	107%
2041		12,675		13,228	104%		13,570	107%
2042		12,677		13,230	104%		13,573	107%
2043		12,682		13,236	104%		13,578	107%
2044		12,696		13,249	104%		13,592	107%
2045		12,694		13,248	104%		13,591	107%
2046		12,695		13,249	104%		13,592	107%
2047		12,695		13,249	104%		13,592	107%
2048		12,699		13,253	104%		13,596	107%
2049		12,707		13,261	104%		13,604	107%
2050		12,718		13,273	104%		13,617	107%

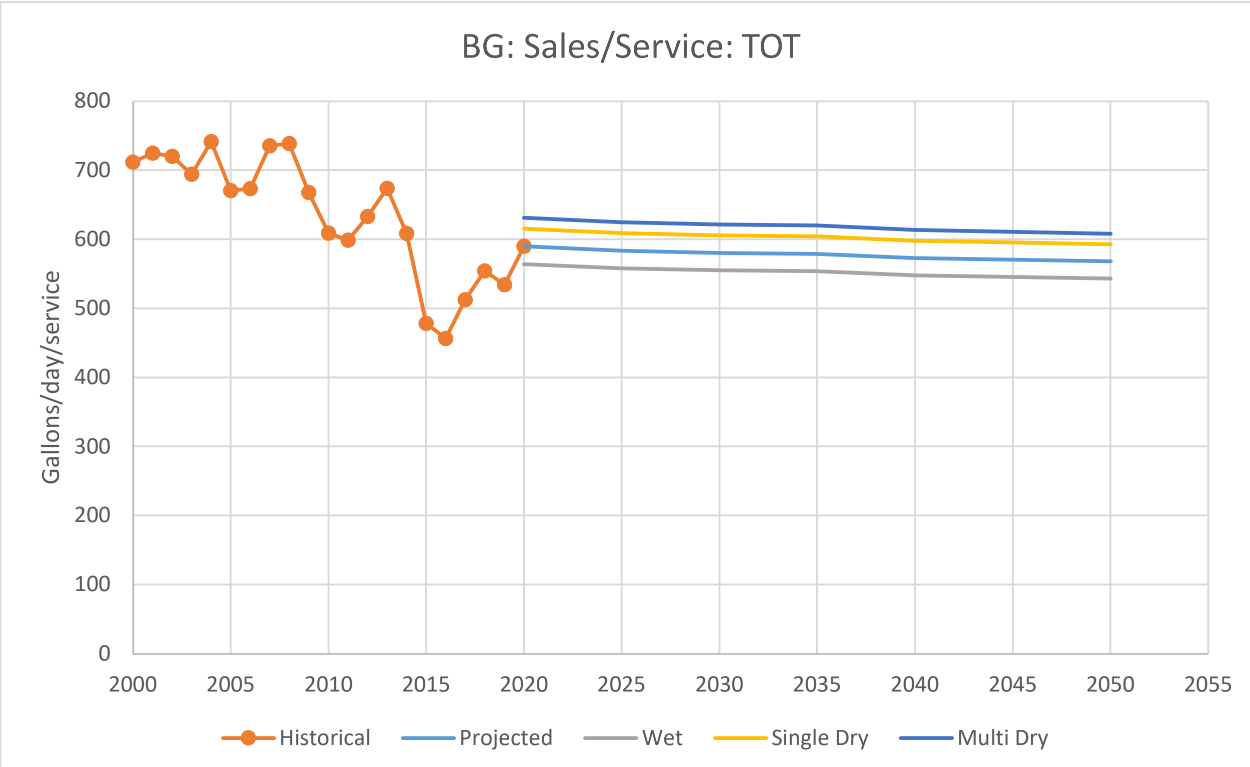
Charts

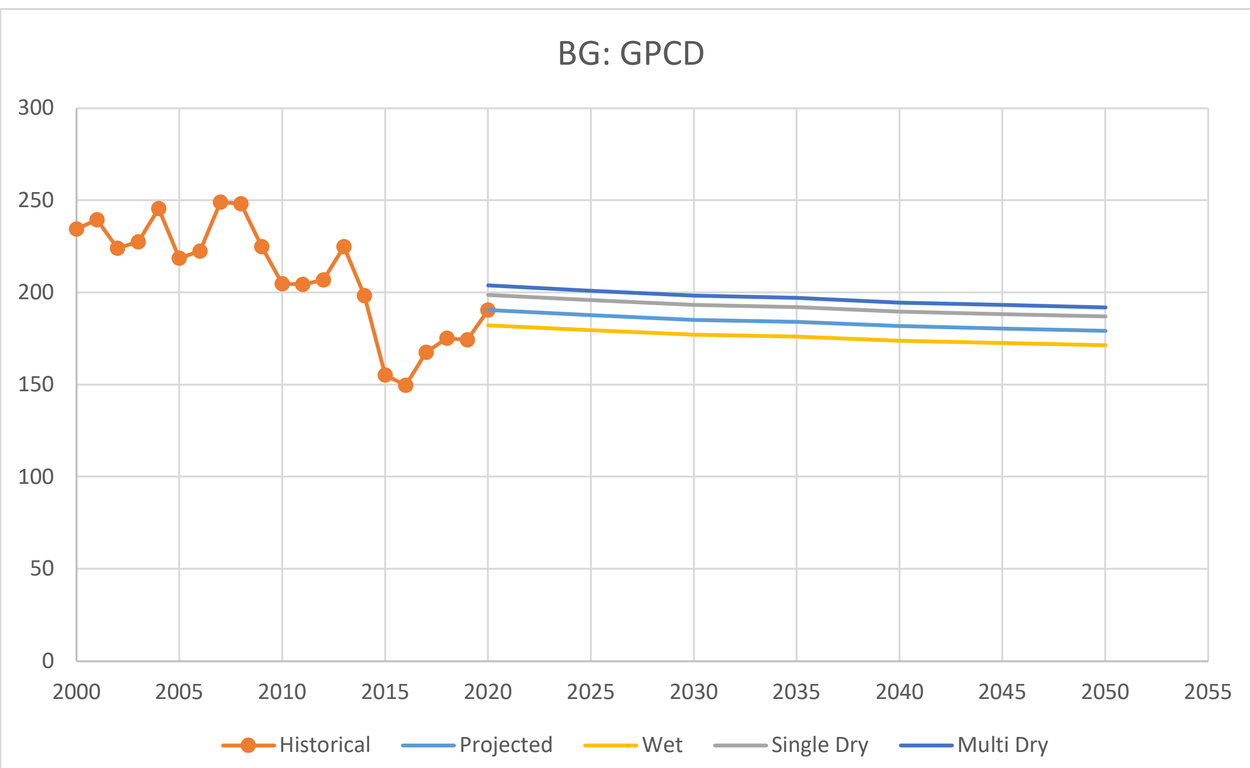

BG: Population
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
2055
Historical
Projected


BG: Services: TOT
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
2055
Historical
Projected


BG: Production
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
AF
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
2055
Historical
Projected
Wet
Single Dry
Multi Dry


BG: Sales: TOT
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
AF
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
2055
Historical
Projected
Wet
Single Dry
Multi Dry


BG: Sales/Service: TOT
Gallons/day/service
800
700
600
500
400
300
200
100
0
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
2055
Historical
Projected
Wet
Single Dry
Multi Dry


BG: GPCD
300
250
200
150
100
50
0
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
2055
Historical
Projected
Wet
Single Dry
Multi Dry

Appendix F: DWR SB X7-7 Verification Forms

Water Conservation Act of 2009
SB X7-7
Verification Forms

Bear Gulch District

2020 Urban Water Management Plan
Appendix F

SB X7-7 Table-1: Baseline Period Ranges			
Baseline	**Parameter**	**Value**	**Units**
10- to 15-year baseline period	2008 total water deliveries	15,510	Acre Feet
	2008 total volume of delivered recycled water	-	Acre Feet
	2008 recycled water as a percent of total deliveries	0.00%	Percent
	Number of years in baseline period[1, 2]	10	Years
	Year beginning baseline period range	2000	
	Year ending baseline period range[3]	2009	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2004	
	Year ending baseline period range[4]	2008	

[1] If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period. [2] The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.

[3] The ending year must be between December 31, 2004 and December 31, 2010.

[4] The ending year must be between December 31, 2007 and December 31, 2010.

SB X7-7 Table 2: Method for Population Estimates	
Method Used to Determine Population (may check more than one)	
☐	**1. Department of Finance** (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☑	**4. Other** DWR recommends pre-review
NOTES: Cal Water uses a population estimation methodology based on overlaying Census Block data from the 2000 and 2010 Censuses with the District's service area. LandView 5 and MARPLOT software are used with these data to estimate population per dwelling unit for 2000 and 2010. The per dwelling unit population estimates are then combined with Cal Water data on number of dwelling units served to estimate service area population for non-Census years. Cal Water also estimated service area population using DWR's Population Tool. The estimates prepared using Cal Water's methodology and DWR's Population Tool differed by less than one percent. Cal Water is electing to use the population estimates produced by its methodology in order to maintain consistency with population projections it has prepared in other planning documents and reports.	

SB X7-7 Table 3: Service Area Population		
Year		Population
10 to 15 Year Baseline Population		
Year 1	2000	53,885
Year 2	2001	54,162
Year 3	2002	54,392
Year 4	2003	54,421
Year 5	2004	54,574
Year 6	2005	55,252
Year 7	2006	55,651
Year 8	2007	55,741
Year 9	2008	55,791
Year 10	2009	56,484
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2004	54,574
Year 2	2005	55,252
Year 3	2006	55,651
Year 4	2007	55,741
Year 5	2008	55,791
2015 Compliance Year Population		
2015		59,883

SB X7-7 Table 4: Annual Gross Water Use *								
Baseline Year *Fm SB X7-7 Table 3*		Volume Into Distribution System *This column will remain blank until SB X7-7 Table 4-A is completed.*	Deductions					Annual Gross Water Use
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water *This column will remain blank until SB X7-7 Table 4-B is completed.*	Water Delivered for Agricultural Use	Process Water *This column will remain blank until SB X7-7 Table 4-D is completed.*	
10 to 15 Year Baseline - Gross Water Use								
Year 1	2000	14,149			-		-	14,149
Year 2	2001	14,518			-		-	14,518
Year 3	2002	13,639			-		-	13,639
Year 4	2003	13,861			-		-	13,861
Year 5	2004	15,008			-		-	15,008
Year 6	2005	13,527			-		-	13,527
Year 7	2006	13,858			-		-	13,858
Year 8	2007	15,554			-		-	15,554
Year 9	2008	15,510			-		-	15,510
Year 10	2009	14,245			-		-	14,245
Year 11	0	-			-		-	-
Year 12	0	-			-		-	-
Year 13	0	-			-		-	-
Year 14	0	-			-		-	-
Year 15	0	-			-		-	-
10 - 15 year baseline average gross water use								**14,387**
5 Year Baseline - Gross Water Use								
Year 1	2004	15,008			-		-	15,008
Year 2	2005	13,527			-		-	13,527
Year 3	2006	13,858			-		-	13,858
Year 4	2007	15,554			-		-	15,554
Year 5	2008	15,510			-		-	15,510
5 year baseline average gross water use								**14,692**
2015 Compliance Year - Gross Water Use								
2015		10,401	-		-		-	**10,401**
* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3								

SB X7-7 Table 4-A: Volume Entering the Distribution System(s) Complete one table for each source.				
Name of Source		Bear Gulch Creek		
This water source is:				
☑	The supplier's own water source			
☐	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	2000	1,557		1,557
Year 2	2001	920		920
Year 3	2002	1,191		1,191
Year 4	2003	1,278		1,278
Year 5	2004	692		692
Year 6	2005	1,774		1,774
Year 7	2006	1,923		1,923
Year 8	2007	754		754
Year 9	2008	528		528
Year 10	2009	716		716
Year 11	0			-
Year 12	0			-
Year 13	0			-
Year 14	0			-
Year 15	0			-
5 Year Baseline - Water into Distribution System				
Year 1	2004	692		692
Year 2	2005	1,774		1,774
Year 3	2006	1,923		1,923
Year 4	2007	754		754
Year 5	2008	528		528
2015 Compliance Year - Water into Distribution System				
2015		437		437
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES:				

SB X7-7 Table 4-A: Volume Entering the Distribution				
Name of Source		SFPUC		
This water source is:				
☐	The supplier's own water source			
☑	A purchased or imported source			
Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	2,000	12592.5139		12,593
Year 2	2,001	13598.3495		13,598
Year 3	2,002	12447.8222		12,448
Year 4	2,003	12582.8346		12,583
Year 5	2,004	14315.7622		14,316
Year 6	2,005	11753.5518		11,754
Year 7	2,006	11935.733		11,936
Year 8	2,007	14800.3297		14,800
Year 9	2,008	14981.9492		14,982
Year 10	2,009	13528.5324		13,529
Year 11	-			0
Year 12	-			0
Year 13	-			0
Year 14	-			0
Year 15	-			0
5 Year Baseline - Water into Distribution System				
Year 1	2,004	14315.7622		14,316
Year 2	2,005	11753.5518		11,754
Year 3	2,006	11935.733		11,936
Year 4	2,007	14800.3297		14,800
Year 5	2,008	14981.9492		14,982
2015 Compliance Year - Water into Distribution System				
2015		9,964		9,964
** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*				
NOTES:				

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	2000	53,885	14,149	234
Year 2	2001	54,162	14,518	239
Year 3	2002	54,392	13,639	224
Year 4	2003	54,421	13,861	227
Year 5	2004	54,574	15,008	246
Year 6	2005	55,252	13,527	219
Year 7	2006	55,651	13,858	222
Year 8	2007	55,741	15,554	249
Year 9	2008	55,791	15,510	248
Year 10	2009	56,484	14,245	225
Year 11	0	-	-	
Year 12	0	-	-	
Year 13	0	-	-	
Year 14	0	-	-	
Year 15	0	-	-	
10-15 Year Average Baseline GPCD				**233**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use
Year 1	2004	54,574	15,008	246
Year 2	2005	55,252	13,527	219
Year 3	2006	55,651	13,858	222
Year 4	2007	55,741	15,554	249
Year 5	2008	55,791	15,510	248
5 Year Average Baseline GPCD				**237**
2015 Compliance Year GPCD				
2015		59,883	10,401	**155**

SB X7-7 Table 6: Gallons per Capita per Day *Summary From Table SB X7-7 Table 5*	
10-15 Year Baseline GPCD	233
5 Year Baseline GPCD	237
2015 Compliance Year GPCD	155

SB X7-7 Table 7: 2020 Target Method *Select Only One*		
Target Method		Supporting Documentation
☑	Method 1	SB X7-7 Table 7A
☐	Method 2	SB X7-7 Tables 7B, 7C, and 7D *Contact DWR for these tables*
☐	Method 3	SB X7-7 Table 7-E
☐	Method 4	Method 4 Calculator

SB X7-7 Table 7-A: Target Method 1 20% Reduction	
10-15 Year Baseline GPCD	**2020 Target GPCD**
233	**187**

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target			
5 Year Baseline GPCD *From SB X7-7 Table 5*	Maximum 2020 Target[1]	Calculated 2020 Target[2]	**Confirmed 2020 Target**
237	225	187	**187**

[1] Maximum 2020 Target is 95% of the 5 Year Baseline GPCD *[2] 2020 Target is calculated based on the selected Target Method, see SB X7-7 Table 7 and corresponding tables for agency's calculated target.*

Appendix G: Climate Change Studies – Executive Summaries

- Climate Change – Water Resource Monitoring and Adaptation Plan – Phase 1
- Potential Climate Change Impacts on the Water Supplies of California Water Service

Climate Change-Water Resource Monitoring and Adaptation Plan – Phase 1

December 17, 2020

California Water Service
1720 North First Street
San Jose, CA 95112

Submitted by:
ICF
555 W 5th St
Suite 3100
Los Angeles, CA 90013

Executive Summary

Shifts in the frequency and severity of natural hazards resulting from climate change, often referred to as climate hazards, increasingly threaten water resources in California. These relevant climate hazards include reductions to snowpack, greater concentrations of precipitation in both a shorter rain season and isolated atmospheric river events, and more volatility between wet and dry water years.

To identify and prepare for impacts from these hazards, California Water Service (Cal Water) is seeking to identify climate change vulnerabilities to water supplies, operations and facilities, and to develop adaptation strategies to address those vulnerabilities through a Climate Change Water Resources Monitoring and Adaptation Plan. This body of work is intended to provide Cal Water with information to inform decisions on water system/asset management and resource planning to better prepare for and respond to current and projected changes to climate. This work represents a forward-looking approach in addressing climate risks for California utilities, as the large majority of water wholesaler and utilities have not completed climate vulnerability and adaptation plans.

In the first phase of this effort, the ICF team collaborated with Cal Water to conduct a literature and tools review as the foundation for subsequent phases of work. In Phase 2 of this project, the ICF team and Cal Water will undertake a vulnerability assessment of Cal Water's facilities and operations by developing an assessment approach that evaluates climate impacts to Cal Water, identifies asset vulnerabilities, and prioritizes climate risks. Phase 3 will focus on an assessment of climate-driven impacts to water supply resources and demand. This first phase of research and assessment will provide Cal Water with a clear "lay of the land" in understanding available methodologies and lessons learned in conducting vulnerability assessments and developing adaptation plans in the water sector. This work can provide key insights for Cal Water, industry practitioners, and Cal Water customers on best practices and needs in climate vulnerability and adaptation efforts.

This first phase will also act as a foundation for Cal Water to build on in subsequent phases of work. ICF and Cal Water will build on research and findings developed in Phase 1 to define the scope of Phases 2 and 3.

In Phase 1, the ICF team undertook three areas of review:

1) Literature and tools related to adaptation planning by water suppliers and other relevant organizations
2) Methods and data in Cal Water's 2016 Vulnerability Study "Potential Climate Change Impacts on the Water Supplies of California Water Service"
3) Climate change impact assessments and adaptation plans beyond Cal Water (wholesalers, state agencies) that could affect Cal Water's vulnerability or adaptive capacity

In the first part of our assessment, the studies we reviewed conclude that there is high certainty of climate-driven reductions to snowpack, wetter winter months, and more volatility between wet and dry water years. While California water systems are designed to operate under a wide range of hydrologic conditions, they are not designed to absorb and adapt to the projected levels of change, which could have impacts on historical supplies from reservoir systems and groundwater systems. These studies also revealed a suite of potential approaches to vulnerability assessment and risk assessment that are applicable to Phases 2 and 3.

Key studies that the ICF team referenced include Brown and Caldwell's "Impacts of Climate Change on Honolulu Water Supplies and Planning Strategies for Mitigation", the Water Research Foundation's (WRF)'s "Mapping Climate Exposure and Climate Information Needs to Water Utility Business Functions", the Metropolitan Water District's (MWD)'s "2015 Integrated Water Resources Plan" and "2015 Urban Water Management Plan", and the U.S. Environmental Protection Agency's (EPA's) Climate Resilience Evaluation and Awareness Toolkit (CREAT).

In the second part of our review, we found that Cal Water's 2016 Climate Change Vulnerability Study undertook a high-level investigation of impacts of climate change on water supply, including surface water, groundwater, and imported water throughout Cal Water service areas. However, the study did not use uniform metrics across water suppliers, was unable to apply the currently available downscaled climate projections, and did not consider the full suite of potential climate impacts to Cal Water's systems, including impacts of compounding climate hazards and impacts on Cal Water facilities and operations.

In the third part of this work, the ICF team researched and assessed existing climate vulnerability assessments and adaptation efforts that have an impact on Cal Water's ability to mitigate impacts from climate change. This included efforts by water supply wholesalers connected to Cal Water's system, and state agencies that regulate Cal Water's supplies, operations, and planning efforts. This will allow Cal Water to build on existing actions and avoid recreating adaptation efforts that are planned or have been implemented.

Cal Water has undertaken key steps toward adaptation planning since the 2016 Vulnerability Study, such as this work to provide additional vulnerability analysis, working locally to identify and prepare to meet Sustainable Groundwater Management Act (SGMA) requirements, and coordinating with wholesalers on their identified climate-driven vulnerabilities. Phases 2 and 3 of this work will further frame system vulnerabilities within an adaptation planning context for a flexible and anticipatory response.

The ICF team's literature review focused on identifying approaches for assessing water utility vulnerabilities of assets and water resources, and adaptation planning needs (summarized in Table 1). To identify these priority approaches, the team reviewed a list of publications with input from Cal Water on key sources. We reviewed and analyzed the relevant literature for applicability to Cal Water, the advantages and fit within a robust plan for assessment, and the potential disadvantages. We highlighted those approaches in the sections on key takeaways and the applicability of approaches to Cal Water. Table 1 provides important considerations raised by the ICF team during this process.

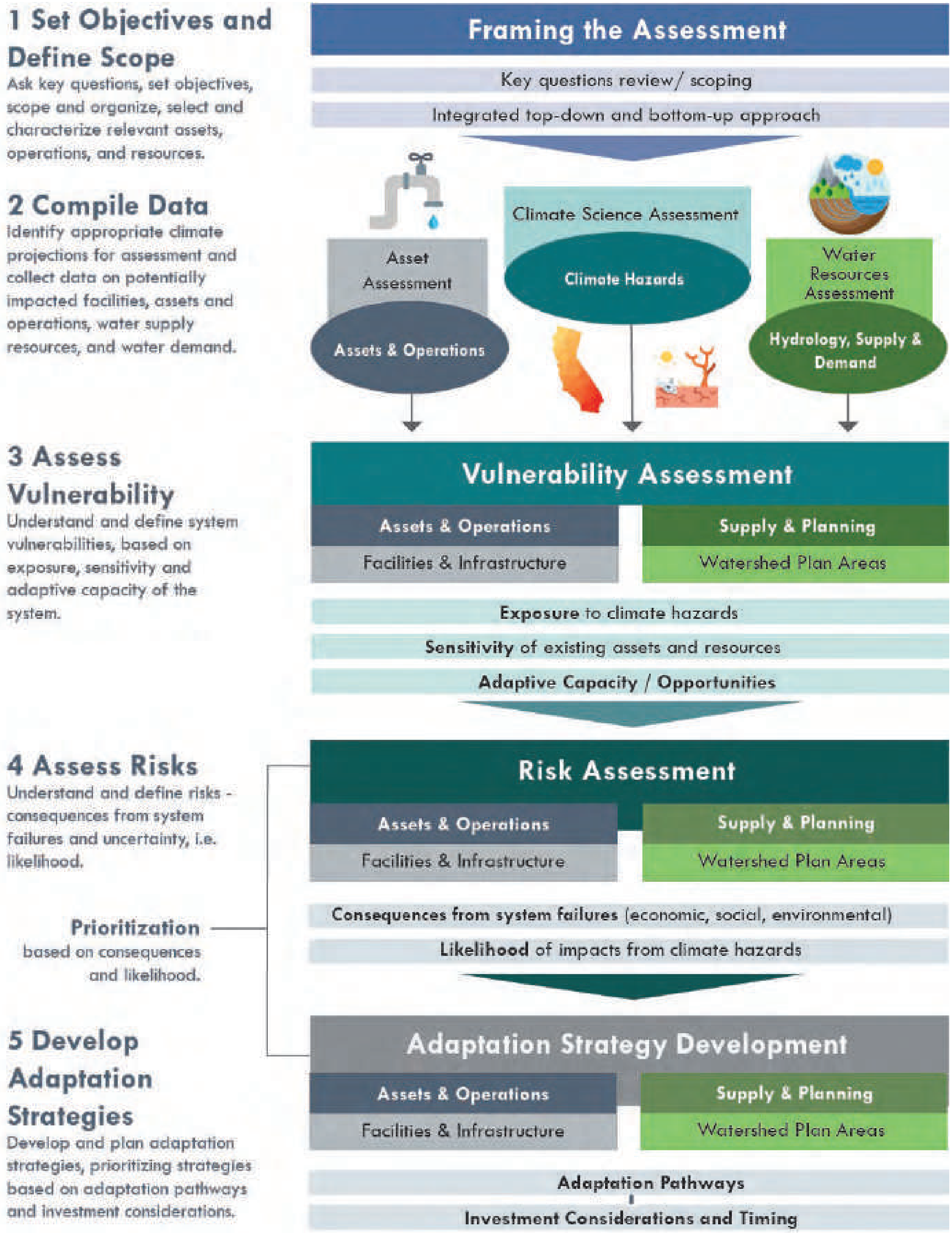
Table 1: Advantages and disadvantages of identified approaches

Identified Approach	Advantages	Disadvantages
Integrated resource-level (i.e., top-down) and asset-level (i.e., bottom-up) approaches to vulnerability assessment	• Allows for matching available information with appropriate methodologies • Supports evaluation of vulnerabilities in both water supply resources and physical systems: an integrated approach can help to address gaps in either area	• Bottom-up approaches can require extensive historical data and asset-level data • Integration of climate projections into hydrological models can be challenging. For example, data inputs for hydrological models and the outputs from climate projections may be incompatible or require additional data processing
Robust Decision-Making	• Supports identification of decisions for response under a range of potential climate futures • Supports alignment between climate impacts and operating units/business functions • Ensures the scope focuses on critical services, assets, and resources • Supports the development of adaptation pathways and measures • Provides a framework for information that can signal the need for critical decisions on adaptation	• Involves significant investment of time to identify performance metrics, business functions, and key variables • Even with significant time invested on the front end, scope can change and require rescoping later in the effort • Requires a strong understanding of utility decision-making
Applying climate projections to hydrologic modeling, future demand and planning scenarios	• Generates better understanding of impacts of extreme scenarios, snowpack loss, drought, increased temperatures, precipitation whiplash, and other hydrologic changes in water supply resources and downstream demands • Allows for modeling of a range of climate scenarios to better account for uncertainties in resource management and climate outcomes • Integrates climate projections with scaled historical time series data	• Can require substantial data, and may introduce bias (due to selected climate scenarios) • It is necessary to identify performance metrics and thresholds related to available climate variables; these can be difficult to identify and thresholds may not exist • Relies on necessary simplifying assumptions to model complex hydrologic systems
Stress testing and scenarios	• Supports management of uncertainty, especially in the absence of data • Allows for understanding of climate impacts on system performance within a risk framework	• Can require refined climate information (e.g. hydrological variables) and detailed asset information • Can require the integration of climate information into hydrological models, which may require

Identified Approach	Advantages	Disadvantages
	• Supports identification of major performance metrics and their potential for failure • Helps in understanding how the severity of impacts varies for facilities, operations, and water supplies under different climate change conditions.	significant data processing to be compatible with one another • Can result in qualitative or directional findings that don't provide straightforward adaptation responses
Engaging staff in climate change vulnerability assessments and adaptation plans	• Provides perspective for setting study parameters • Provides targeted input and data into assessment • Identifies existing data gaps and actions to address gaps • Supports development of institutional capacity for monitoring impacts, adaptation planning, and implementation	• Can be time-consuming for team members attending workshops and interviews; requires a targeted approach to ensure efficiency and that the right data is captured • Requires cross-team coordination that may be outside of "normal" communication pathways, e.g. between engineers and policy specialists
Evaluating costs of inaction	• Helps to prioritize adaptation planning needs • Creates a better understanding of the risks to Cal Water	• Requires scaling information on past costs without clear data on future impacts, creating uncertainties in estimates
Use of Flexible Adaptation Pathways	• Helps to select appropriate timing (including lead time from planning to implementation) and application of adaptation measures • Considers and compares multiple strategies in adaptation planning • Includes triggers that signal when decision-makers should decide on switching to another pathway • Allows for adaptive decisions under uncertainty by integrating points for re-assessing pathway and actions • Considers alternative external developments over time	• Does not provide a fixed timeline for actions • This approach is relatively new and may require coordination with budget cycles and external policy updates, since actions evolve over time • May push decision burden onto future decision-makers who did not develop original pathway

Our team synthesized these identified methodologies, findings, and insights into an overarching approach for characterizing climate vulnerabilities and planning for adaptation at both an asset level and water supply planning level to suit Cal Water's needs in addressing climate change impacts, shown in Figure 1.

Figure 1: Climate Assessment Framework



Source: Silvestrum Climate Associates, October 2020

Based on this review, the ICF team is making the following key recommendations for guiding Cal Water's efforts in identifying climate vulnerabilities and planning for adaptation:

- **Apply a standard conceptual framework to vulnerability assessment which integrates both top-down analysis and bottom-up analysis (see Figure 1).** The standard conceptual framework for assessing climate vulnerabilities and risks includes understanding exposure, sensitivity, and adaptive capacity, and potential impacts as components of vulnerability, and consequence and likelihood as components of risk. Top-down analysis would begin by applying downscaled Global Climate Model (GCM) projections to assess impacts on water supply resources and the bottom-up analysis would begin by identifying system sensitivities to climate hazards. These analyses are complementary.
- **Use a robust decision making (RDM) framework for vulnerability assessment and adaptation planning** by seeking to identify decisions for response under a range of potential climate futures, mapping impacts on operating units/business functions, and ensuring that the scope focuses on critical services, assets, and resources. A robust decision-making framing will support the development of adaptation pathways and measures by monitoring information that signals the need for critical decisions on adaptation.
- **Engage staff and key stakeholders in the planning process** to gain a holistic planning perspective for setting study parameters, providing targeted input into assessment and plan development, and supporting institutional capacity for adaptation.
- **Build off of the 2016 Cal Water Climate Change Impact study by applying updated climate models and projections for additional hydrologic variables** to hydrologic modeling, future demand and planning scenarios, and scaled historical time series data to better understand impacts of extremes, precipitation whiplash, and other hydrologic changes in water supply resources. We recommend presentation of this with uniform metrics for more actionable findings.
- **Assess climate impact consequence by stress-testing key water system performance metrics.** This includes developing a range of impact scenarios to understand how the severity of impacts varies for facilities, operations, and water supplies under different climate change conditions.
- **Evaluating the order of magnitude cost of inaction.** We recommend communicating consequences in terms of direct costs to Cal Water and customers without adaptation actions to prioritize adaptation response.
- **Follow a step-by-step, iterative process to adaptive management which fully aligns with potential exposure to climate hazards and vulnerabilities**, including:
    - Utilizing Flexible Adaptation Pathways in planning for selecting appropriate timing and application of adaptation measures
    - Planning for monitoring and evaluation
    - Evaluating adaptation investment decisions

During Phases 2 and 3 in which Cal Water and the ICF team will further assess vulnerability, we will frame the study outputs within a decision-making context for compatibility with adaptation planning concepts and eventual investment in adaptation measures.

Potential Climate Change Impacts on the Water Supplies of California Water Service

Prepared by

Gary Fiske and Associates, Inc.
Balance Hydrologics, Inc.

January 2016

Executive Summary

Introduction

California Water Service Company (Cal Water) provides water service to roughly 478,000 customers – about 1.7 million people – located in 83 state-wide communities in 24 service districts. Cal Water's districts rely on a variety of supply sources, including local groundwater, local surface water, and imported supplies. It is critical for Cal Water to gain a better understanding of the potential impacts of climate change on the availability of those supplies. Impacts are inherently uncertain, but Cal Water believes that the only responsible course is to carefully incorporate climate change into its ongoing water supply planning.

The present project and report represent a first step in that path. In order for Cal Water to determine how its long-term water supply planning should reflect climate change impacts, it must first have an understanding of what the impacts of climate change on its supply sources might be. That is the purpose of this study.

The work reported on here focuses on the sample of Cal Water districts highlighted in Figure ES-1. These districts account for 85% of Cal Water's total 2014 production and reflect the diversity of all Cal Water districts, including geographic, hydrologic, and climatic conditions and primary and secondary supply sources.

Changes in climate can affect the availability of local groundwater and surface water supplies, as well as purchased imported supplies. This study separately addresses the impacts on each of these for each sample district. It relies on the best available projections of changes in climate (temperature and precipitation) through the end of the century. It then uses the climate projections to examine how surface water flows and groundwater recharge rates may change.

For imported supplies, this study relies on studies already completed by wholesale providers where possible. Where no such studies have been done or where the data from such studies was unavailable, other approaches were developed to estimate climate change impacts on these supplies.

The results reported here provide an integrated view of how projected climate changes may affect water supply availability for Cal Water's service districts. The results also represent a first step in integrating potential future climate change impacts into Cal Water's ongoing supply planning. Because of the inherent uncertainties, a nuanced risk assessment may be needed to guide the incorporation of these results into long-range planning. Beyond the Company's supply/infrastructure planning, the results also can affect the Company's triennial General Rate Cases; they may also have potential operational implications.

Figure ES- 1. Cal Water Service Districts with Sample Districts Highlighted

Estimating Changes in Climate

Climate change is primarily driven by increased concentrations of greenhouse gases (GHGs) in the atmosphere. The trajectory of future climate change is a function of the rate at which those concentrations are projected to increase and the manner in which the atmosphere and oceans respond to increased concentrations. Both are difficult to model. Thus, while the scientific community overwhelmingly agrees that climate change will occur (and indeed may already have begun), the trajectory of those changes is very uncertain.

The projections of temperature and precipitation that underlie this study are based on 40 of the latest Global Circulation Models (GCMs) run as part of the Coupled Model Intercomparison Project Phase 5 (CMIP5). Generally speaking, this type of approach is termed an ensemble analysis, for which the downscaled climate projections for any particular Cal Water Service District were based on the median of the 40 downscaled GCM datasets. The GCMs used by the analysis are driven by two GHG emission pathways that bound the possible trajectories of GHG concentrations.

Impacts of Climate Change on Water Supplies

The supplies for each district consist of a mix of local surface water, local groundwater, and/or purchased imports. Climate change impacts were estimated for each of these components. The approaches used for each are described below. Based on the breakdown of district production among the supply sources, Table ES-1 shows the ranges of projected overall climate change impacts on available supply, relative to the historic average.[1] Table ES-2 groups this vulnerability into 4 categories of expected change, and Figure ES-2 maps the end-of-century vulnerability.

[1] The historical averages used here, and elsewhere in this report, are based on the entire range of historical data available for the district-specific analyses. These ranges vary across districts, and are specified within the district-specific technical memoranda.

Table ES- 1. Projected Changes in Available Supply due to Climate Change

District		Percentage Change in Supply		
		2020	2050	2100
BK	Minimum	-10%	-10%	-12%
	Maximum	-12%	-16%	-20%
VIS	Minimum	-7%	-8%	-8%
	Maximum	-9%	-10%	-14%
KRV	Minimum	-13%	-16%	-19%
	Maximum	-16%	-21%	-31%
MPS/SSF/BG	Minimum	0%	-2%	-6%
	Maximum	0%	-7%	-15%
LAS	Minimum	-3%	-3%	-10%
	Maximum	-4%	-18%	-28%
CH	Minimum	2%	2%	0%
	Maximum	3%	1%	-3%
ORO	Minimum	0%	8%	5%
	Maximum	0%	-8%	-7%
DOM/HR/PV	Minimum	0%	0%	-1%
	Maximum	0%	-2%	-3%
STK	Minimum	0%	0%	-8%
	Maximum	0%	-14%	-17%
SLN	Minimum	-6%	-6%	-6%
	Maximum	-7%	-7%	-7%

Table ES- 2. Categories of Projected Supply Vulnerability

District	Supply Vulnerability		
	2020	2050	2100
KRV	3	4	4
BK	3	3	4
LAS	1	3	4
VIS	2	2	3
STK	1	2	3
SLN	2	2	2
MPS/SSF/BG	1	1	3
DOM/HR/PV	1	1	1
ORO	1	1	1
CH	1	1	1

Districts in Category 1 expect <5% reduction in supply. Category 2 indicates a reduction of 5-10%. Category 3 indicates an expected reduction of 10-15%. Category 4 reductions exceed 15%.

Figure ES- 2. Cal Water 2100 Vulnerability to Climate Change

Vulnerability levels:
Green = Low
Yellow = Moderate
Light Red = High
Dark Red = Very High

Estimating Climate Change Impacts on Local Surface Supplies

For those Cal Water districts that obtain a portion of their water supplies from local surface water, projected average annual precipitation in each of three forecast years (2020, 2050, 2100) were compared to historical precipitation to estimate the projected average annual discharge for that forecast year. Table ES-3 shows the estimated percent changes in surface water availability compared to historical averages.

Table ES- 3. Estimated Impacts on Local Surface Supply Availability

District		Percent Change in Runoff		
		2020	2050	2100
BK	Minimum Impact	-17%	-18%	-19%
	Maximum Impact	-18%	-19%	-23%
KRV	Minimum Impact	-17%	-18%	-19%
	Maximum Impact	-18%	-19%	-23%
MPS/SSF/BG	Minimum Impact	+3%	+6%	+12%
	Maximum Impact	+3%	+5%	+6%

Of the three districts, the two in the southern San Joaquin Valley are projected to experience significant reductions in their local surface supplies. In contrast, the Bear Gulch district surface supply is forecast to increase.

Estimating Climate Change Impacts on Local Groundwater Supplies

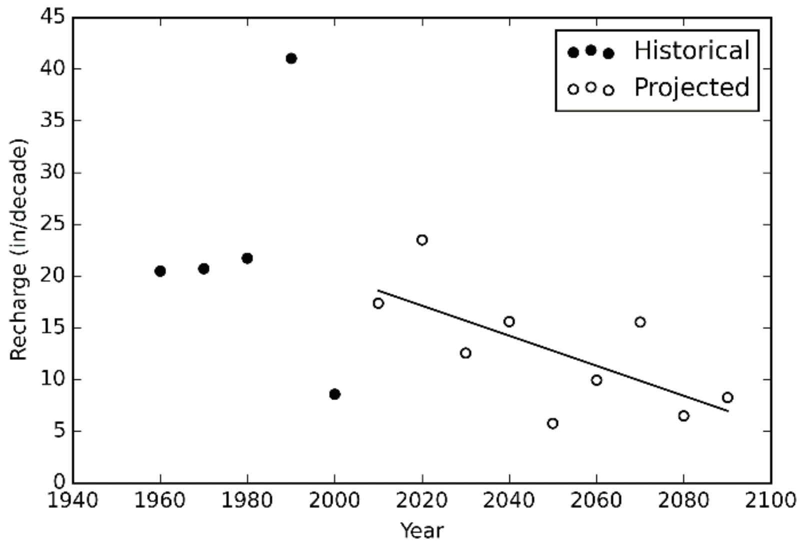
Climate change impacts on Cal Water's local groundwater supplies result from changes in projected groundwater recharge. The three groundwater recharge components include:

- Local river sources;
- Direct recharge from precipitation on the groundwater basin; and
- Recharge from agricultural and urban deep percolation.

The analysis first estimated the split of local recharge among these three components using geographic and geologic data, geochemical markers, and previously published reports and other supporting information. The climate change impacts on each component were then estimated, consolidated into overall projections of recharge impacts, and compared to estimated historical recharge rates.

Estimates of impacts on river recharge used the methodology for local surface supply described above. For the purposes of this phase of work, it was assumed that the change in recharge from the river is proportional to the change in total annual discharge. The estimated amount of water that will recharge directly into a groundwater basin from rain (or snow) is based on a balance of evapotranspiration (ET), precipitation rates, and soil water capacity. Recharge is estimated using both historical and projected precipitation and temperature data. Decadal averages in projected recharge are then used to calculate long-term trends. This is illustrated in Figure ES-3 for Kern River Valley.

Figure ES- 3. Historic and Projected Decadal Direct-Precipitation Recharge for Kern River Valley



A quantitative projection of recharge from deep percolation beneath irrigated fields and urban areas is beyond the scope of this phase. Instead, districts for which a significant proportion of recharge is from agricultural and urban water are identified and expected trends under climate change of this water source for those districts are estimated. At-risk service areas with decreasing agricultural and urban water sources can be explored further in future work.

The estimated percentage impacts on each of the recharge components are multiplied by the expected fractions that each component is of total recharge to calculate the range of expected recharge reductions. Table ES-4 shows those results for each district, excluding the impacts of urban/agricultural applied water percolation.

Actual impacts on Cal Water's ability to pump groundwater may be less than these recharge reductions because the storage volumes in different basins have differing degrees of responsiveness to changes in recharge. The degree to which changes in recharge volumes translate into available groundwater supply is a function of the hydrogeologic attributes of the basin. A detailed understanding of those characteristics would require a level of modeling that is well beyond the scope of this phase of work. Instead, the estimates of basin responsiveness were based on the historical record of how the basin's water level has varied with recent climate variability. For some districts, the basin appears to be highly responsive, while for others changes in climate do not have much impact.

Table ES- 4. Projected Changes in Average Annual Groundwater Recharge

District		Percentage Change in Recharge		
		2020	2050	2100
BK	Minimum	-14%	-15%	-15%
	Maximum	-14%	-15%	-18%
VIS	Minimum	-9%	-10%	-11%
	Maximum	-9%	-10%	-14%
KRV	Minimum	-13.4%	-19%	-23%
	Maximum	-15%	-22%	-35%
MPS/SSF/BG	Minimum	-2%	-4%	-6%
	Maximum	-2%	-6%	-12%
LAS	Minimum	-7%	-8%	-13%
	Maximum	-8%	-18%	-25%
CH	Minimum	6%	4%	1%
	Maximum	6%	2%	-4%
ORO	Minimum	0%	0%	0%
	Maximum	0%	0%	0%
DOM/HR/PV	Minimum	0%	0%	0%
	Maximum	0%	0%	0%
STK	Minimum	-2%	-3%	-6%
	Maximum	-2%	-4%	-7%
SLN	Minimum	-7%	-7%	-7%
	Maximum	-7%	-7%	-7%

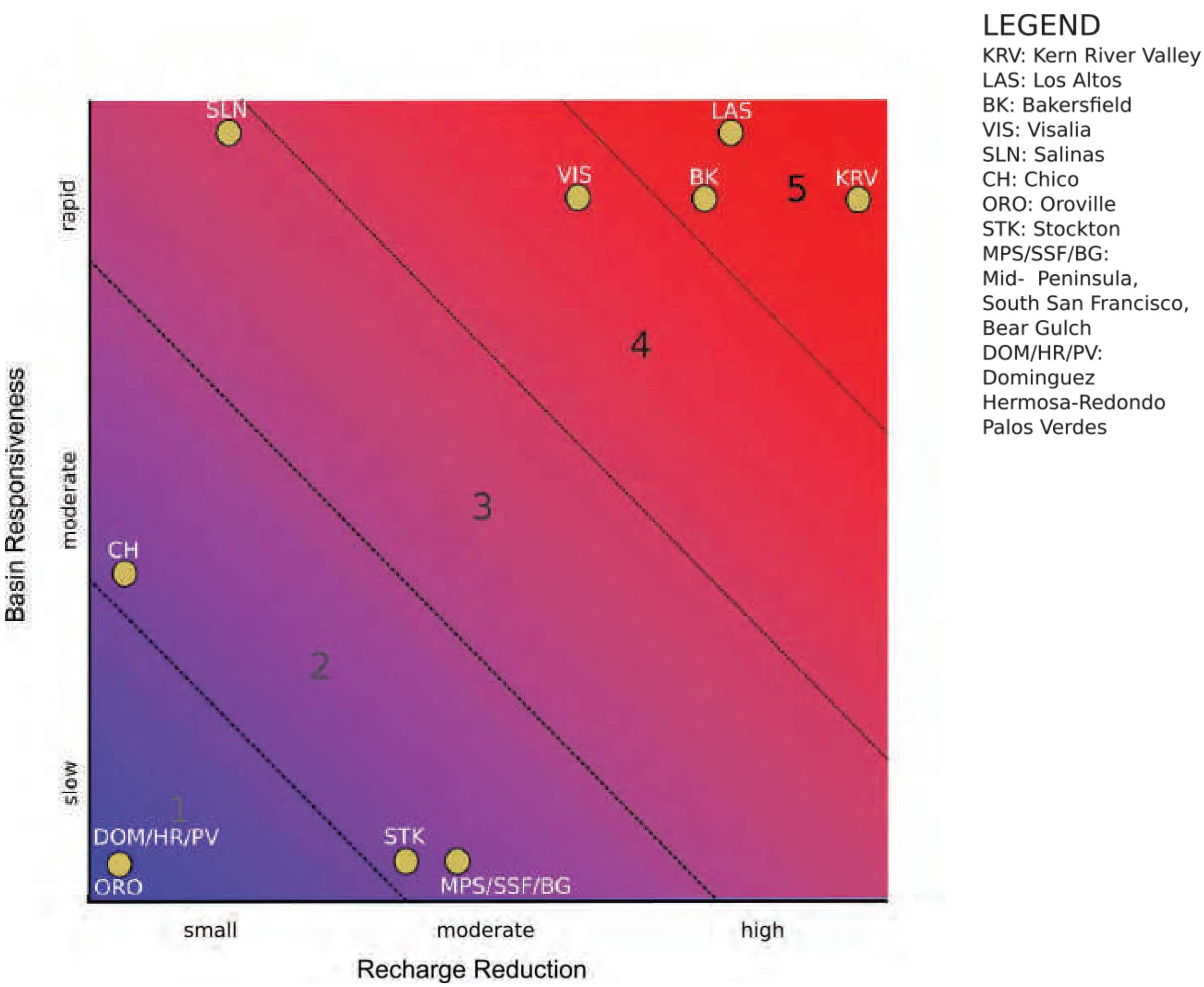
The overall risk to Cal Water's groundwater supplies for each district is based on the expected recharge reductions and the expected responsiveness of basin water level to those reductions. Table ES-5 rates each district's groundwater supply risk on a 1-5 scale, with 1 indicating little or no risk and 5 indicating high risk. Figure ES-4 is a visual depiction of these ratings.

Generally speaking, the groundwater supply impacts are large for the districts in the southern San Joaquin Valley. The Los Altos District also shows a high impact, largely because a significant portion of its recharge is from imported supplies, which are forecast to decrease significantly. Further north in the Central Valley, groundwater supplies are less affected. The Bay Area and Los Angeles Basin districts also show relatively smaller impacts.

Table ES- 5. District Groundwater Risk Ratings

District	Rating
BK	5
KRV	5
LAS	5
VIS	4
SLN	3
CH	2
MPS/SSF/BG	2
STK	2
ORO	1
DOM/HR/PV	1

Figure ES- 4. Groundwater Risk Ratings



Impacts of Climate Change on Imported Water Supplies

About half of Cal Water's supply is imported water that is purchased from wholesale suppliers. The supply and delivery systems of these suppliers are generally very complex and it is impossible within the confines of this project to independently model the impacts of climate change on those systems. The analysis therefore relied on available data, including the results of any climate change modeling that these suppliers themselves have done and other indicators of climate change impacts.

As a result, the climate change scenarios on which the estimates of impacts on different wholesale supplies are based will differ from one another and from the approach described above for the analysis of local supply impacts. The time frames of the results also differ. However, despite those limitations, important information about potential future climate change impacts on wholesale water supply availability was developed. Table ES-6 compares summary measures of central tendency for the potential district-specific climate change impacts on the availability of imported supplies.

Table ES- 6. Projected Climate Change Impacts on Imported Supplies

District	Source	Mid-Century	Late-Century
BK	SWP	-7%	-17%
LAS	SWP, CVP	-9%	-21%
ORO	SWP	-1%	-3%
MPS/SSF/BG	SFPUC	-10%	-20%
DOM/HR/PV	MWD	-1% to -2%	-2% to -5%
STK	USBR	-5%	-10%

Conclusions and Next Steps

The study results indicate significant risks for some districts. This points to the need for Cal Water to account for these risks in its future water supply planning if it is to minimize the adverse effects on its customers. The sole focus of this effort was to assess the potential climate change impacts on Cal Water's supplies. That is an important first step in integrating climate change into supply planning, but this study was not designed to:

- Analyze the impacts of these future supply limitations on Cal Water's ability to serve future customer demands. This is a function of such factors as water rights and contractual arrangements, how future demands are forecast to grow, how water conservation programming will affect those demands, and how Cal Water might modify the manner in which it operates its system.

- Develop mitigation plan to evaluate how potential supply and infrastructure investments and/or acquisition of new supplies might address any adverse impacts on water supply reliability.

- Formally assess alternative approaches to incorporating climate change in Cal Water's supply planning.

Possible next steps for Cal Water include:

- Methodological enhancements to reduce some of the uncertainties in the results reported herein;

- Development and acquisition of better and more complete data;

- Extending this study to other Cal Water districts;

- Developing a plan to mitigate anticipated climate change impacts on supply; and

- Integrating climate change into the Company's ongoing water supply planning.

Despite the study's limitations and uncertainties, three critical messages emerge:

- Cal Water supplies in the 21st century are likely to be adversely affected by climate change.

- These impacts will vary considerably across districts, depending on geography and source mix. For some districts, the impacts can be significant; for others, little or no impacts are projected.

- The impacts will generally increase over time. Anticipated late-century impacts are forecast to be significantly higher in some districts than impacts at mid-century. Moreover, during the period that climate change is forecast to increasingly constrain supplies, demands are also generally forecast to increase, further exacerbating the adverse impacts on water supply reliability.

Appendix H: SFPUC and BAWSCA Common Language

- Draft Common Language for BAWSCA Member Agencies' 2020 UWMPs, dated February 3, 2021
- Common Language for BAWSCA Member Agencies' 2020 UWMP Updates, dated April 30, 2021
- Common Language for Wholesale Customers about Rate Impacts of Water Shortages, dated March 4, 2021
- Additional Language Requested by the Member Agencies, dated March 24, 2021

Draft Common Language for BAWSCA Member Agencies' 2020 UWMPs

Tier One Drought Allocations

In July 2009, San Francisco and its Wholesale Customers in Alameda County, Santa Clara County, and San Mateo County (Wholesale Customers) adopted the Water Supply Agreement (WSA), which includes a Water Shortage Allocation Plan (WSAP) that describes the method for allocating water from the Regional Water System (RWS) between Retail and Wholesale Customers during system-wide shortages of 20 percent or less. The WSAP, also known as the Tier One Plan, was amended in the 2018 Amended and Restated WSA.

The SFPUC allocates water under the Tier One Plan when it determines that the projected available water supply is up to 20 percent less than projected system-wide water purchases. The following table shows the SFPUC (i.e, Retail Customers) share and the Wholesale Customers' share of the annual water supply available during shortages depending on the level of system-wide reduction in water use that is required. The Wholesale Customers' share will be apportioned among the individual Wholesale Customers based on a separate methodology adopted by the Wholesale Customers, known as the Tier Two Plan, discussed further below.

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%

The Tier One Plan allows for voluntary transfers of shortage allocations between the SFPUC and any Wholesale Customer as well as between Wholesale Customers themselves. In addition, water "banked" by a Wholesale Customer, through reductions in usage greater than required, may also be transferred.

As amended in 2018, the Tier One Plan requires Retail Customers to conserve a minimum of 5% during droughts. If Retail Customer demands are lower than the Retail Customer allocation (resulting in a "positive allocation" to Retail[1]) then the excess percentage would be re-allocated to the Wholesale Customers' share. The additional water conserved by Retail Customers up to the minimum 5% level is deemed to remain in storage for allocation in future successive dry years.

The Tier One Plan will expire at the end of the term of the WSA in 2034, unless mutually extended by San Francisco and the Wholesale Customers.

The Tier One Plan applies only when the SFPUC determines that a system-wide water shortage exists and issues a declaration of a water shortage emergency under California Water Code

[1] See Water Supply Agreement, Water Shortage Allocation Plan (Attachment H), Section 2.1.

Section 350. Separate from a declaration of a water shortage emergency, the SFPUC may opt to request voluntary cutbacks from its Retail and Wholesale Customers to achieve necessary water use reductions during drought periods.

Tier Two Drought Allocations

The Wholesale Customers have negotiated and adopted the Tier Two Plan, referenced above, which allocates the collective Wholesale Customer share from the Tier One Plan among each of the 26 Wholesale Customers. These Tier Two allocations are based on a formula that takes into account multiple factors for each Wholesale Customer including:

- Individual Supply Guarantee;
- Seasonal use of all available water supplies; and
- Residential per capita use.

The water made available to the Wholesale Customers collectively will be allocated among them in proportion to each Wholesale Customer's Allocation Basis, expressed in millions of gallons per day (mgd), which in turn is the weighted average of two components. The first component is the Wholesale Customer's Individual Supply Guarantee, as stated in the WSA, and is fixed. The second component, the Base/Seasonal Component, is variable and is calculated using the monthly water use for three consecutive years prior to the onset of the drought for each of the Wholesale Customers for all available water supplies. The second component is accorded twice the weight of the first, fixed component in calculating the Allocation Basis. Minor adjustments to the Allocation Basis are then made to ensure a minimum cutback level, a maximum cutback level, and a sufficient supply for certain Wholesale Customers.

The Allocation Basis is used in a fraction, as numerator, over the sum of all Wholesale Customers' Allocation Bases to determine each wholesale customer's Allocation Factor. The final shortage allocation for each Wholesale Customer is determined by multiplying the amount of water available to the Wholesale Customers' collectively under the Tier One Plan, by the Wholesale Customer's Allocation Factor.

The Tier Two Plan requires that the Allocation Factors be calculated by BAWSCA each year in preparation for a potential water shortage emergency. As the Wholesale Customers change their water use characteristics (e.g., increases or decreases in SFPUC purchases and use of other water sources, changes in monthly water use patterns, or changes in residential per capita water use), the Allocation Factor for each Wholesale Customer will also change. However, for long-term planning purposes, each Wholesale Customer shall use as its Allocation Factor, the value identified in the Tier Two Plan when adopted.

The Tier Two Plan, which initially expired in 2018, has been extended by the BAWSCA Board of Directors every year since for one additional calendar year. In November 2020, the BAWSCA Board voted to extend the Tier Two Plan through the end of 2021.

Individual Supply Guarantee

San Francisco has a perpetual commitment (Supply Assurance) to deliver 184 mgd to the 24 permanent Wholesale Customers collectively. San Jose and Santa Clara are not included in the Supply Assurance commitment and each has temporary and interruptible water supply contracts with San Francisco. The Supply Assurance is allocated among the 24 permanent Wholesale Customers through Individual Supply Guarantees (ISG), which represent each Wholesale Customer's allocation of the 184 mgd Supply Assurance.

[Name of Agency's] ISG is _______ mgd.

2028 SFPUC Decisions (formerly 2018 SFPUC Decisions)
[Note: This section is intended to be optional language that individual BAWSCA member agencies may use.]

In the 2009 WSA, the SFPUC committed to make three decisions before 2018 that affect water supply development:

- Whether or not to make the cities of San Jose and Santa Clara permanent customers,
- Whether or not to supply the additional unmet supply needs of the Wholesale Customers beyond 2018, and
- Whether or not to increase the wholesale customer Supply Assurance above 184 mgd.

Events since 2009 made it difficult for the SFPUC to conduct the necessary water supply planning and CEQA analysis required to make these three decisions before 2018. Therefore, in the 2018 Amended and Restated WSA, the decisions were deferred for 10 years to 2028.

Additionally, there have been recent changes to instream flow requirements and customer demand projections that have affected water supply planning beyond 2018. As a result, the SFPUC has established an Alternative Water Supply Planning program to evaluate several regional and local water supply options. Through this program, the SFPUC will conduct feasibility studies and develop an Alternative Water Supply Plan by July 2023 to support the continued development of water supplies to meet future needs.

Reliability of the Regional Water System

In 2008, the SFPUC adopted Level of Service (LOS) Goals and Objectives in conjunction with the adoption of WSIP. The SFPUC updated the LOS Goals and Objectives in February 2020.

The SFPUC's LOS Goals and Objectives related to water supply are:

Program Goal	System Performance Objective
Water Supply – *meet customer water needs in non-drought and drought periods*	• Meet all state and federal regulations to support the proper operation of the water system and related power facilities. • Meet average annual water demand of 265 mgd from the SFPUC watersheds for retail and Wholesale Customers during non–drought years for system demands consistent with the 2009 Water Supply Agreement. • Meet dry-year delivery needs while limiting rationing to a maximum 20 percent system-wide reduction in water service during extended droughts. • Diversify water supply options during non-drought and drought periods. • Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers.

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Factors Impacting Supply Reliability

Adoption of the 2018 Bay-Delta Plan Amendment

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) to establish water quality objectives to maintain the health of the Bay-Delta ecosystem. 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 Bay-Delta. The Bay-Delta Plan Amendment requires the release of 30-50% of the “unimpaired flow”[2] 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 UWMP in normal years but would experience supply shortages in single dry years or multiple dry years. Implementation of the Bay-Delta Plan Amendment will require rationing in all single dry years and multiple dry years. The SFPUC has initiated an Alternative Water Supply Planning Program to ensure that San Francisco can meet its Retail and Wholesale Customer water needs, address projected dry years shortages, and limit rationing to a maximum 20 percent system-wide in accordance with adopted SFPUC policies. This program is in early planning stages and is intended to meet future water supply challenges and vulnerabilities such as environmental flow needs and other regulatory changes; earthquakes, disasters, and emergencies; increases in population and employment; and climate

[2] "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.)

change. As the region faces future challenges – both known and unknown – the SFPUC is considering this suite of diverse non-traditional supplies and leveraging regional partnerships to meet Retail and Wholesale Customer needs through 2045.

The SWRCB has stated that it intends to implement the Bay-Delta Plan Amendment on the Tuolumne River by the year 2022, assuming all required approvals are obtained by that time. But implementation of the Plan Amendment is uncertain for multiple reasons.

First, since adoption of the Bay-Delta Plan Amendment, 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 in the early stages and there have been no dispositive court rulings as of this date.

Second, the Bay-Delta Plan Amendment is not self-implementing and does not automatically allocate responsibility for meeting its new flow requirements to the SFPUC or any other water rights holders. Rather, the Bay-Delta Plan Amendment merely provides a regulatory framework for flow allocation, which must be accomplished by other regulatory and/or adjudicatory proceedings, such as a comprehensive water rights adjudication or, in the case of the Tuolumne River, may be implemented 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 the other regulatory and/or adjudicatory proceedings would likely 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 SFPUC).

Third, in recognition of the obstacles to implementation of the Bay-Delta Plan Amendment, the SWRCB 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" by March 1, 2019, 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." In accordance with the SWRCB's instruction, on March 1, 2019, SFPUC, in partnership with other key stakeholders, submitted a proposed project description for the Tuolumne River that could be the basis for a voluntary substitute agreement with the SWRCB ("March 1st Proposed Voluntary Agreement"). On March 26, 2019, the Commission adopted Resolution No. 19-0057 to support the SFPUC's participation in the Voluntary Agreement negotiation process. To date, those negotiations are ongoing under the California Natural Resources Agency and the leadership of the Newsom administration.[3]

Water Supply – All Year Types

The SFPUC historically has met demand in its service area in all year types from its watersheds, which consist of:

- Tuolumne River watershed
- Alameda Creek watershed

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[3] California Natural Resources Agency, "Voluntary Agreements to Improve Habitat and Flow in the Delta and its Watersheds," available at https://files.resources.ca.gov/voluntary-agreements/.

- San Mateo County watersheds

In general, 85 percent of the supply comes from the Tuolumne River through Hetch Hetchy Reservoir and the remaining 15 percent comes from the local watersheds through the San Antonio, Calaveras, Crystal Springs, Pilarcitos and San Andreas Reservoirs. The adopted WSIP retains this mix of water supply for all year types.

WSIP Dry Year Water Supply Projects

The WSIP authorized the SFPUC to undertake a number of water supply projects to meet dry-year demands with no greater than 20 percent system-wide rationing in any one year. Those projects include the following:

- **Calaveras Dam Replacement Project**

  Calaveras Dam is located near a seismically active fault zone and was determined to be seismically vulnerable. To address this vulnerability, the SFPUC constructed a new dam of equal height downstream of the existing dam. Construction on the project occurred between 2011 and July 2019. The SFPUC began impounding water behind the new dam in accordance with California Division of Safety of Dams (DSOD) guidance in the winter of 2018/2019.

- **Alameda Creek Recapture Project**

  As a part of the regulatory requirements for future operations of Calaveras Reservoir, the SFPUC must implement bypass and instream flow schedules for Alameda Creek. The Alameda Creek Recapture Project will recapture a portion of the water system yield lost due to the instream flow releases at Calaveras Reservoir or bypassed around the Alameda Creek Diversion Dam and return this yield to the RWS through facilities in the Sunol Valley. Water that naturally infiltrates from Alameda Creek will be recaptured into an existing quarry pond known as SMP (Surface Mining Permit)-24 Pond F2. The project will be designed to allow the recaptured water to be pumped to the Sunol Valley Water Treatment Plant or to San Antonio Reservoir. Construction of this project will occur from spring 2021 to fall 2022.

- **Lower Crystal Springs Dam Improvements**

  The Lower Crystal Springs Dam (LCSD) Improvements were substantially completed in November 2011. The joint San Mateo County/SFPUC Bridge Replacement Project to replace the bridge across the dam was completed in January 2019. A WSIP follow up project to modify the LCSD Stilling Basin for fish habitat and upgrade the fish water release and other valves started in April 2019. While the main improvements to the dam have been completed, environmental permitting issues for reservoir operation remain significant. While the reservoir elevation was lowered due to DSOD restrictions, the habitat for the Fountain Thistle, an endangered plant, followed the lowered reservoir elevation. Raising the reservoir elevation now requires that new plant populations be restored incrementally before the reservoir elevation is raised. The result is that it may be several years before pre-project water storage volumes can be restored.

- **Regional Groundwater Storage and Recovery Project**

  The Groundwater Storage and Recovery (GSR) Project is a strategic partnership between SFPUC and three San Mateo County agencies – the California Water Service Company (serving South San Francisco and Colma), the City of Daly City, and the City of San Bruno – to conjunctively operate the south Westside Groundwater Basin. The project sustainably manages groundwater and surface water resources in a way that provides supplies during times of drought. During years of normal or heavy rainfall, the project would provide additional surface water to the partner agencies in San Mateo County in lieu of groundwater pumping. Over time, reduced pumping creates water storage through natural recharge of up to 20 billion gallons of new water supply available during dry years.

The project's Final Environmental Impact Report was certified in August 2014, and the project also received Commission approval that month. Phase 1 of this project consists of construction of thirteen well sites and is over 99 percent complete. Phase 2 of this project consists of completing construction of the well station at the South San Francisco Main site and some carryover work that has not been completed from Phase 1. Phase 2 design work began in December 2019.

- **2 mgd Dry-year Water Transfer**

  In 2012, the dry-year transfer was proposed between the Modesto Irrigation District and the SFPUC. Negotiations were terminated because an agreement could not be reached. Subsequently, the SFPUC had discussions with the Oakdale Irrigation District for a one-year transfer agreement with the SFPUC for 2 mgd (2,240 acre-feet). No progress towards agreement on a transfer was made in 2019, but the irrigation districts recognize SFPUC's continued interest and SFPUC will continue to pursue transfers.

In order to achieve its target of meeting at least 80 percent of its customer demand during droughts with a system demand of 265 mgd, the SFPUC must successfully implement the dry-year water supply projects included in the WSIP.

Furthermore, the permitting obligations for the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements include a combined commitment of 12.8 mgd for instream flows on average. When this is reduced for an assumed Alameda Creek Recapture Project recovery of 9.3 mgd, the net loss of water supply is 3.5 mgd.

Alternative Water Supply Planning Program

The SFPUC is increasing and accelerating its efforts to acquire additional water supplies and explore other projects that would increase overall water supply resilience through the Alternative Water Supply Planning Program. The drivers for the program include: (1) the adoption of the Bay-Delta Plan Amendment and the resulting potential limitations to RWS supply during dry years, (2) the net supply shortfall following the implementation of WSIP, (3) San Francisco's perpetual obligation to supply 184 MGD to the Wholesale Customers, (4) adopted Level of Service Goals to limit rationing to no more than 20 percent system-wide during droughts, and (5) the potential need to identify water supplies that would be required to offer permanent status to interruptible customers. Developing additional supplies through this program would reduce water supply shortfalls and reduce rationing associated with such shortfalls. The planning priorities guiding the framework of the Alternative Water Supply Planning Program are as follows:

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

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

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

Together, the planning priorities and LOS Goals and Objectives provide a lens through which the SFPUC considers water supply options and opportunities to meet all foreseeable water supply needs.

In addition to the Daly City Recycled Water Expansion project[4], which was a potential project identified in the 2015 UWMP and had committed funding at that time, the SFPUC has taken action to fund the study of potential additional water supply projects. Capital projects under consideration to develop additional water supplies include surface water storage expansion, recycled water expansion, water transfers, desalination, and potable reuse. A more detailed list and descriptions of these efforts are provided below.

The capital projects that are under consideration would be costly and are still in the early feasibility or conceptual planning stages. Because these water supply projects would take 10 to 30 years to implement, and because required environmental permitting negotiations may reduce the amount of water that can be developed, the yield from these projects are not currently incorporated into SFPUC's supply projections. State and federal grants and other financing opportunities would be pursued for eligible projects, to the extent feasible, to offset costs borne by ratepayers.

- **Daly City Recycled Water Expansion** (Regional, Normal- and Dry-Year Supply)

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

[4] While this potential project was identified in the 2015 UWMP, it has since been approved by Daly City following environmental review and has a higher likelihood of being implemented.

- **ACWD-USD Purified Water Partnership** (Regional, Normal- and Dry-Year Supply)

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

- **Crystal Springs Purified Water** (Regional, Normal- and Dry-Year Supply)

  The Crystal Springs Purified Water (PREP) Project is a purified water project that could provide 6-12 mgd of water supply through reservoir water augmentation at Crystal Springs Reservoir, which is a facility of the RWS. Treated wastewater from Silicon Valley Clean Water (SVCW) and/or the City of San Mateo would go through an advanced water treatment plant to produce purified water that meets state and federal drinking water quality standards. The purified water would then be transmitted 10-20 miles (depending on the alignment) to Crystal Springs Reservoir, blended with regional surface water supplies and treated again at Harry Tracy Water Treatment Plant. Project partners include the SFPUC, BAWSCA, SVCW, CalWater, Redwood City, Foster City, and the City of San Mateo. Partner agencies are contributing financial and staff resources towards the work effort.

- **Los Vaqueros Reservoir Expansion** (Regional, Dry Year Supply)

  The Los Vaqueros Reservoir Expansion (LVE) Project is a storage project that will enlarge the existing reservoir located in northeastern Contra Costa County from 160,000 acre-feet to 275,000 acre-feet. While the existing reservoir is owned and operated by the Contra Costa Water District (CCWD), the expansion will have regional benefits and will be managed by a Joint Powers Authority (JPA) that will be set up prior to construction. Meanwhile, CCWD is leading the planning, design and environmental review efforts. CCWD's Board certified the EIS/EIR and approved the LVE Project on May 13, 2020. The additional storage capacity from the LVE Project would provide a dry year water supply benefit to the SFPUC. BAWSCA is working in concert with the SFPUC to support their work effort on the LVE project.

  - **Conveyance Alternatives:** The SFPUC is considering two main pathways to move water from storage in a prospective LVE Project to the SFPUC's service area, either directly to RWS facilities or indirectly via an exchange with partner agencies. The SFPUC is evaluating potential alignments for conveyance.
  - **Bay Area Regional Reliability Shared Water Access Program (BARR SWAP):** As part of the BARR Partnership, a consortium of 8 Bay Area water utilities (including ACWD, BAWSCA, CCWD, EBMUD, Marin Municipal Water District (MMWD), SFPUC, Valley Water, and Zone 7 Water Agency) are exploring opportunities to move water across the region as efficiently as possible, particularly during times of drought and emergencies. The BARR agencies are proposing two separate pilot projects in 2020-2021 through the Shared Water Access Program (SWAP) to test conveyance pathways and identify potential hurdles to better prepare for sharing water during a future drought or emergency. A strategy report identifying opportunities and considerations will accompany these pilot transfers and will be completed in 2021.

- **Bay Area Brackish Water Desalination** (Regional, Normal- and Dry-Year Supply)

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

- **Calaveras Reservoir Expansion** (Regional, Dry Year Supply)

  Calaveras Reservoir would be expanded to create 289,000 AF additional capacity to store excess Regional Water System supplies or other source water in wet and normal years. In addition to reservoir enlargement, the project would involve infrastructure to pump water to the reservoir, such as pump stations and transmission facilities.

- **Groundwater Banking**

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

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

- **Inter-Basin Collaborations**

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

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

If all the projects identified through the current planning process can be implemented, there would still be a supply shortfall to meet projected needs. Furthermore, each of the supply options being considered has its own inherent challenges and uncertainties that may affect the SFPUC's ability to implement it.

Given the limited availability of water supply alternatives - unless the supply risks are significantly reduced or our needs change significantly - the SFPUC will continue to plan, develop and implement all project opportunities that can help bridge the anticipated water supply gaps during droughts. In 2019, the SFPUC completed a survey among water and wastewater agencies within the service area to identify additional opportunities for purified water. Such opportunities remain limited, but the SFPUC continues to pursue all possibilities.

Projected SFPUC Regional Water System Supply Reliability

The SFPUC will provide tables presenting the projected RWS supply reliability under normal, single dry year, and multiple dry year scenarios.

Climate Change

The issue of climate change has become an important factor in water resources planning in the State, and is frequently considered in urban water management planning processes, though the extent and precise effects of climate change remain uncertain. There is convincing evidence that increasing concentrations of greenhouse gasses have caused and will 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 and virtually all projections indicate this will continue through the 21st century. These changes will have a direct effect on water resources in California, and numerous studies have been conducted to determine the potential impacts to water resources. Based on these studies, climate change could result in the following types of water resource impacts, including impacts on the watersheds in the Bay Area:

- Reductions in the average annual snowpack due to a rise in the snowline and a shallower snowpack in the low and medium elevation zones, such as in the Tuolumne River basin, 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 rather than 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;
- Increased water temperatures with accompanying potential adverse effects on some fisheries and water quality;
- Increases in evaporation and concomitant increased irrigation need; and
- Changes in urban and agricultural water demand.

Both the SFPUC and BAWSCA participated in the 2020 update of the Bay Area Integrated Regional Water Management Plan (BAIRWMP), which includes an assessment of the potential climate change vulnerabilities of the region's water resources and identifies climate change adaptation strategies. In addition, the SFPUC continues to study the effect of climate change on the Regional Water System (RWS). These works are summarized below.

Bay Area Integrated Regional Water Management Plan

Climate change adaptation continues to be an overarching theme for the 2019 BAIRWMP update. As stated in the BAIRWMP, identification of watershed characteristics that could potentially be vulnerable to future climate change is the first step in assessing vulnerabilities of water resources in the Bay Area Region (Region). Vulnerability is defined as the degree to which a system is exposed to, susceptible to, and able to cope with or adjust to, the adverse effects of climate change. A vulnerability assessment was conducted in accordance with the Department of Water Resources' (DWR's) *Climate Change Handbook for Regional Water Planning* and using the most current science available for the Region. The vulnerability assessment, summarized in the table below, provides the main water planning categories applicable to the Region and a general overview of the qualitative assessment of each category with respect to anticipated climate change impacts.

Summary of BAIRWMP Climate Change Vulnerability Assessment

Vulnerability Areas	General Overview of Vulnerabilities
Water Demand	**Urban and Agricultural Water Demand** – Changes to hydrology in the Region as a result of climate change could lead to changes in total water demand and use patterns. Increased irrigation (outdoor landscape or agricultural) is anticipated to occur with temperature rise, increased evaporative losses due to warmer temperature, and a longer growing season. Water treatment and distribution systems are most vulnerable to increases in maximum day demand.
Water Supply	**Imported Water** – Imported water derived from the Sierra Nevada sources and Delta diversions provide 66 percent of the water resources available to the Region. Potential impacts on the availability of these sources resulting from climate change directly affect the amount of imported water supply delivered to the Region. **Regional Surface Water** – Although future projections suggest that small changes in total annual precipitation over the Region will not change much, there may be changes to when precipitation occurs with reductions in the spring and more intense rainfall in the winter. **Regional Groundwater** – Changes in local hydrology could affect natural recharge to the local groundwater aquifers and the quantity of groundwater that could be pumped sustainably over the long-term in some areas. Decreased inflow from more flashy or more intense runoff, increased evaporative losses and warmer and shorter winter seasons can alter natural recharge of groundwater. Salinity intrusion into coastal groundwater aquifers due to sea-level rise could interfere with local groundwater uses. Furthermore, additional reductions in imported water supplies would lead to less imported water available for managed recharge of local groundwater basins and potentially more groundwater pumping in lieu of imported water availability.
Water Quality	**Imported Water** – For sources derived from the Delta, sea-level rise could result in increases in chloride and bromide (a disinfection by-product (DBP) precursor that is also a component of sea water),

Vulnerability Areas	General Overview of Vulnerabilities
	potentially requiring changes in treatment for drinking water. Increased temperature could result in an increase in algal blooms, taste and odor events, and a general increase in DBP formation **Regional Surface Water** – Increased temperature could result in lower dissolved oxygen in streams and prolong thermocline stratification in lakes and reservoirs forming anoxic bottom conditions and algal blooms. Decrease in annual precipitation could result in higher concentrations of contaminants in streams during droughts or in association with flushing rain events. Increased wildfire risk and flashier or more intense storms could increase turbidity loads for water treatment. **Regional Groundwater** – Sea-level rise could result in increases in chlorides and bromide for some coastal groundwater basins in the Region. Water quality changes in imported water used for recharge could also impact groundwater quality.
Sea-Level Rise	Sea-level rise is additive to tidal range, storm surges, stream flows, and wind waves, which together will increase the potential for higher total water levels, overtopping, and erosion. Much of the bay shoreline is comprised of low-lying diked baylands which are already vulnerable to flooding. In addition to rising mean sea level, continued subsidence due to tectonic activity will increase the rate of relative sea-level rise. As sea-level rise increases, both the frequency and consequences of coastal storm events, and the cost of damage to the built and natural environment, will increase. Existing coastal armoring (including levees, breakwaters, and other structures) is likely to be insufficient to protect against projected sea-level rise. Crest elevations of structures will have to be raised or structures relocated to reduce hazards from higher total water levels and larger waves.
Flooding	Climate change projections are not sensitive enough to assess localized flooding, but the general expectation is that more intense storms would occur thereby leading to more frequent, longer and deeper flooding. Changes to precipitation regimes may increase flooding. Elevated Bay elevations due to sea-level rise will increase backwater effects exacerbating the effect of fluvial floods and storm drain backwater flooding.

Vulnerability Areas	General Overview of Vulnerabilities
Ecosystem and Habitat	Changes in the seasonal patterns of temperature, precipitation, and fire due to climate change can dramatically alter ecosystems that provide habitats for California's native species. These impacts can result in species loss, increased invasive species ranges, loss of ecosystem functions, and changes in vegetation growing ranges. Reduced rain and changes in the seasonal distribution of rainfall may alter timing of low flows in streams and rivers, which in turn would have consequences for aquatic ecosystems. Changes in rainfall patterns and air temperature may affect water temperatures, potentially affecting coldwater aquatic species. Bay Area ecosystems and habitat provide important ecosystem services, such as: carbon storage, enhanced water supply and quality, flood protection, food and fiber production. Climate change is expected to substantially change several of these services. The region provides substantial aquatic and habitat-related recreational opportunities, including: fishing, wildlife viewing, and wine industry tourism (a significant asset to the region) that may be at risk due to climate change effects.
Hydropower	Currently, several agencies in the Region produce or rely on hydropower produced outside of the Region for a portion of their power needs. As the hydropower is produced in the Sierra, there may be changes in the future in the timing and amount of energy produced due to changes in the timing and amount of runoff as a result of climate change. Some hydropower is also produced within the region and could also be affected by changes in the timing and amount of runoff.

Source: 2019 Bay Area Integrated Regional Water Management Plan (BAIRWMP), Table 16-3.

SFPUC Climate Change Studies

The SFPUC views assessment of the effects of climate change as an ongoing project requiring regular updating to reflect improvements in climate science, atmospheric/ocean modeling, and human response to the threat of greenhouse gas emissions. Climate change research by the SFPUC began in 2009 and continues to be refined. In its 2012 report "Sensitivity of Upper Tuolumne River Flow to Climate Change Scenarios," the SFPUC assessed the sensitivity of runoff into Hetch Hetchy Reservoir to a range of changes in temperature and precipitation due to climate change. Key conclusions from the report include the following:

- With differing increases in temperature alone, the median annual runoff at Hetch Hetchy would decrease by 0.7-2.1% from present-day conditions by 2040 and by 2.6-10.2% from present-day by 2100. Adding differing decreases in precipitation on top of temperature increases, the median annual runoff at Hetch Hetchy would decrease by 7.6-8.6% from present-day conditions by 2040 and by 24.7-29.4% from present-day conditions by 2100.

- In critically dry years, these reductions in annual runoff at Hetch Hetchy would be significantly greater, with runoff decreasing up to 46.5% from present day conditions by 2100 utilizing the same climate change scenarios.
- In addition to the total change in runoff, there will be a shift in the annual distribution of runoff. Winter and early spring runoff would increase and late spring and summer runoff would decrease.
- Under all scenarios, snow accumulation would be reduced and snow would melt earlier in the spring, with significant reductions in maximum peak snow water equivalent under most scenarios.

Currently, the SFPUC is conducting a comprehensive assessment of the potential effects of climate change on 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 2020 to 2070. There are many uncertain factors such as climate change, changing regulations, water quality, growth and economic cycles that may create vulnerabilities for the Regional Water System'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 is difficult to predict, but nonetheless they need to be considered in SFPUC planning. To address this planning challenge, the project uses a vulnerability-based planning approach to explore a range of future conditions to identify vulnerabilities, 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.

Common Language for BAWSCA Member Agencies'

2020 UWMP Updates

BAWSCA

Description of BAWSCA

BAWSCA provides regional water reliability planning and conservation programming for the benefit of its 26 member agencies that purchase wholesale water supplies from the San Francisco Public Utilities Commission (SFPUC). Collectively, the BAWSCA member agencies deliver water to over 1.8 million residents and nearly 40,000 commercial, industrial and institutional accounts in Alameda, San Mateo and Santa Clara Counties.

BAWSCA also represents the collective interests of these wholesale water customers on all significant technical, financial, and policy matters related to the operation and improvement of the SFPUC's Regional Water System (RWS).

BAWSCA's role in the development of the 2020 Urban Water Management Plan (UWMP) updates is to work with its member agencies and the SFPUC to seek consistency among UWMP documents.

Regional Water Demand and Conservation Projections

In June 2020, BAWSCA completed the Regional Water Demand and Conservation Projections Report (Demand Study).[1] The goal of the Demand Study was to develop transparent, defensible, and uniform demand and conservation savings projections for each Wholesale Customer using a common methodology to support both regional and individual agency planning efforts and compliance with the new statewide water efficiency targets required by Assembly Bill (AB) 1668 and Senate Bill (SB) 606.

Through the Demand Study process, BAWSCA and the Wholesale Customers (1) quantified the total average-year water demand for each BAWSCA member agency through 2045, (2) quantified passive and active conservation water savings potential for each individual Wholesale Customer through 2045, and (3) identified 24 conservation programs with high water savings potential and/or member agency interest. Implementation of these conservation measures, along with passive conservation, is anticipated to yield an additional 37.3 MGD of water savings by 2045. Based on the revised water demand projections, the identified water conservation savings, increased development and use of other local supplies by the Wholesale Customers, and other actions, the collective purchases of the BAWSCA member agencies from the SFPUC are projected to stay below 184 MGD through 2045.

As part of the Demand Study, each Wholesale Customer was provided with a demand model that can be used to support ongoing demand and conservation planning efforts, including UWMP preparation.

[1] Phase III Final Report: http://bawsca.org/uploads/pdf/BAWSCA_Regional_Water_Demand_and_Conservation%20Projections%20Report_Final.pdf

Long-Term Reliable Water Supply Strategy

BAWSCA's Long-Term Reliable Water Supply Strategy (Strategy), completed in February 2015, quantified the water supply reliability needs of the BAWSCA member agencies through 2040, identified the water supply management projects and/or programs (projects) that could be developed to meet those needs, and prepared an implementation plan for the Strategy's recommendations.

When the 2015 Demand Study concluded it was determined that while there is no longer a regional normal year supply shortfall, there was a regional drought year supply shortfall of up to 43 MGD. In addition, key findings from the Strategy's project evaluation analysis included:

- Water transfers represent a high priority element of the Strategy.
- Desalination potentially provides substantial yield, but its high effective costs and intensive permitting requirements make it a less attractive drought year supply alternative.
- Other potential regional projects provide tangible, though limited, benefit in reducing dry-year shortfalls given the small average yields in drought years.

Since 2015, BAWSCA has completed a comprehensive update of demand projections and engaged in significant efforts to improve regional reliability and reduce the dry-year water supply shortfall.

Water Transfers. BAWSCA successfully facilitated two transfers of portions of Individual Supply Guarantee (ISG) between BAWSCA agencies in 2017 and 2018. Such transfers benefit all BAWSCA agencies by maximizing use of existing supplies. BAWSCA is currently working on an amendment to the Water Supply Agreement between the SFPUC and BAWSCA agencies to establish a mechanism by which member agencies that have an ISG may participate in expedited transfers of a portion of ISG and a portion of a Minimum Annual Purchase Requirement. In 2019, BAWSCA participated in a pilot water transfer that, while ultimately unsuccessful, surfaced important lessons learned and produced interagency agreements that will serve as a foundation for future transfers. BAWSCA is currently engaged in the Bay Area Regional Reliability Partnership[2] (BARR), a partnership among eight Bay Area water utilities (including the SFPUC, Alameda County Water District, BAWSCA, Contra Costa Water District, Santa Clara Valley Water District) to identify opportunities to move water across the region as efficiently as possible, particularly during times of drought and emergencies.

Regional Projects. Since 2015, BAWSCA has coordinated with local and State agencies on regional projects with potential dry-year water supply benefits for BAWSCA's agencies. These efforts include storage projects, indirect/direct water reuse projects, and studies to evaluate the capacity and potential for various conveyance systems to bring new supplies to the region.

BAWSCA continues to implement the Strategy recommendations in coordination with BAWSCA member agencies. Strategy implementation will be adaptively managed to account for changing conditions and to ensure that the goals of the Strategy are met in an efficient and cost-effective manner. On an annual basis, BAWSCA will reevaluate Strategy recommendations and results in conjunction with development of the BAWSCA's FY 2021-22 Work Plan. In this way, actions can be modified to accommodate changing conditions and new developments.

[2] https://www.bayareareliability.com/

Making Conservation a Way of Life Strategic Plan

Following the 2014-2016 drought, the State of California (State) developed the "Making Water Conservation a California Way of Life" framework to address the long-term water use efficiency requirements called for in executive orders issued by Governor Brown. In May of 2018, AB 1668 and SB 606 (collectively referred to as the efficiency legislation) went into effect, which built upon the executive orders implementing new urban water use objectives for urban retail water suppliers.

BAWSCA led its member agencies in a multi-year effort to develop and implement a strategy to meet these new legislative requirements. BAWSCA's Making Conservation a Way of Life Strategic Plan (Strategic Plan) provided a detailed roadmap for member agencies to improve water efficiency. BAWSCA implementing the following elements of the Strategic Plan:

- Conducted an assessment of the agencies' current practices and water industry best practices for three components of the efficiency legislation that, based on a preliminary review, present the greatest level of uncertainty and potential risk to the BAWSCA agencies. The three components were:
    1. Development of outdoor water use budgets in a manner that incorporates landscape area, local climate, and new satellite imagery data.
    2. Commercial, Industrial, and Institutional water use performance measures.
    3. Water loss requirements.
- Organized an Advanced Metering Infrastructure symposium to enable information exchange, including case studies, implementation strategies, and data analysis techniques.
- Initiated a regional CII audit pilot program, which BAWSCA aims to complete in 2021.[3]
- Implemented a regional program for water loss control to help BAWSCA agencies comply with regulatory requirements and implement cost-effective water loss interventions.
- Engaged with the SFPUC to audit meter testing and calibration practices for SFPUC's meters at BAWSCA agency turnouts.

Finally, BAWSCA's Demand Study developed water demand and conservation projections through 2045 for each BAWSCA agency. These projects are designed to provide valuable insights on long-term water demand patterns and conservation savings potential to support regional efforts, such as implementation of BAWSCA's Long-Term Reliable Water Supply Strategy.

[3] Efforts on the CII audit pilot program stalled in March 2020 due to the COVID 19 pandemic and related shelter-in-place orders.

Tier Two Drought Allocations

The Wholesale Customers have negotiated and adopted the Tier Two Plan, referenced above, which allocates the collective Wholesale Customer share from the Tier One Plan among each of the 26 Wholesale Customers. These Tier Two allocations are based on a formula that takes into account multiple factors for each Wholesale Customer including:

- Individual Supply Guarantee;
- Seasonal use of all available water supplies; and
- Residential per capita use.

The water made available to the Wholesale Customers collectively will be allocated among them in proportion to each Wholesale Customer's Allocation Basis, expressed in millions of gallons per day (mgd), which in turn is the weighted average of two components. The first component is the Wholesale Customer's Individual Supply Guarantee, as stated in the WSA, and is fixed. The second component, the Base/Seasonal Component, is variable and is calculated using the monthly water use for three consecutive years prior to the onset of the drought for each of the Wholesale Customers for all available water supplies. The second component is accorded twice the weight of the first, fixed component in calculating the Allocation Basis. Minor adjustments to the Allocation Basis are then made to ensure a minimum cutback level, a maximum cutback level, and a sufficient supply for certain Wholesale Customers.

The Allocation Basis is used in a fraction, as numerator, over the sum of all Wholesale Customers' Allocation Bases to determine each Wholesale Customer's Allocation Factor. The final shortage allocation for each Wholesale Customer is determined by multiplying the amount of water available to the Wholesale Customers' collectively under the Tier One Plan, by the Wholesale Customer's Allocation Factor.

The Tier Two Plan requires that the Allocation Factors be calculated by BAWSCA each year in preparation for a potential water shortage emergency. As the Wholesale Customers change their water use characteristics (e.g., increases or decreases in SFPUC purchases and use of other water sources, changes in monthly water use patterns, or changes in residential per capita water use), the Allocation Factor for each Wholesale Customer will also change. However, for long-term planning purposes, each Wholesale Customer shall use as its Allocation Factor, the value identified in the Tier Two Plan when adopted.

Per WSA Section 3.11, the Tier One and Tier Two Plans will be used to allocate water from the Regional Water System between Retail and Wholesale Customers during system-wide shortages of 20% or less. For Regional Water System shortages in excess of 20%, San Francisco shall (a) follow the Tier 1 Shortage Plan allocations up to the 20% reduction, (b) meet and discuss how to implement incremental reductions above 20% with the Wholesale Customers, and (c) make a final determination of allocations above the 20% reduction. After the SFPUC has made the final allocation decision, the Wholesale Customers shall be free to challenge the allocation on any applicable legal or equitable basis. For purposes of the 2020 UWMPs, for San Francisco Regional Water System (RWS) shortages in excess of 20%, the allocations among the Wholesale Customers is assumed to be equivalent among them and to equal the drought cutback to Wholesale Customer by the SFPUC.

The Tier Two Plan, which initially expired in 2018, has been extended by the BAWSCA Board of Directors every year since for one additional calendar year. In November 2020, the BAWSCA Board voted to extend the Tier Two Plan through the end of 2021.

SFPUC's Efforts to Develop of Alternative Water Supplies

With the adoption of the Bay-Delta Plan Phase 1 (Bay-Delta Plan) by the State Water Resources Control Board in December of 2018, coupled with the uncertainties associated with litigation and the development of Voluntary Agreements that, if successful, would provide an alternative to the 40% unimpaired flow requirement that is required by the Bay-Delta Plan, BAWSCA redoubled its efforts to ensure that the SFPUC took necessary action to develop alternative water supplies such that they would be in place to fill any potential gap in supply by implementation of the Bay-Delta Plan and that the SFPUC would be able to meet its legal and contractual obligations to its Wholesale Customers.

In 2019, BAWSCA held numerous meetings with the SFPUC encouraging them to develop a division within their organization whose chief mission was to spearhead alternative water supply development. On June 25, 2019, BAWSCA provided a written and oral statement to the Commissioners urging the SFPUC to focus on developing new sources of supply in a manner similar to how it addressed the implementation of the Water System Improvement Program (WSIP). BAWSCA urged that a new water supply program was called for, with clear objectives, persistent focus, a dedicated team, adequate funding, and a plan for successful execution. The SFPUC Commission supported BAWSCA's recommendation and directed staff to undertake such an approach.

In early 2020, the SFPUC began implementation of the Alternative Water Supply Planning Program (AWSP), a program designed to investigate and plan for new water supplies to address future long-term water supply reliability challenges and vulnerabilities on the RWS.

Included in the AWSP is a suite of diverse, non-traditional supply projects that, to a great degree, leverage regional partnerships and are designed to meet the water supply needs of the SFPUC Retail and Wholesale Customers through 2045. As of the most recent Alternative Water Supply Planning Quarterly Update, SFPUC has budgeted $264 million over the next ten years to fund water supply projects. BAWSCA is heavily engaged with the SFPUC on its AWSS efforts.

<u>BAWSCA Conservation Programs</u>

BAWSCA manages a Regional Water Conservation Program comprised of several programs and initiatives that support and augment member agencies' and customers' efforts to use water more efficiently. These efforts extend limited water supplies that are available to meet both current and future water needs; increase drought reliability of the existing water system; and save money for both the member agencies and their customers.

The implementation of the Regional Water Conservation Program builds upon both the Water Conservation Implementation Plan (WCIP, completed in September 2009) and the Regional Demand and Conservation Projections Project (Demand Study, completed in June of 2020). These efforts include both Core Programs (implemented regionally throughout the BAWSCA service area) and Subscription Programs (funded by individual member agencies that elect to participate and implement them within their respective service areas).

BAWSCA’s Core Conservation Programs include organizing classes open to the public on topics such as water efficient landscape education and water-wise gardening, assistance related to automated metering infrastructure, and other associated programs that work to promote smart water use and practices. BAWSCA’s Subscription Programs include numerous rebate programs, educational programs that can be offered to area schools, technical assistance to member agencies in evaluating water loss, and programs to train and certify contractors employed to install water efficient landscape. In total, BAWSCA offers 22 programs to its member agencies and that number continues to grow over time.

Each fiscal year, BAWSCA prepares an Annual Water Conservation Report that documents how all of BAWSCA’s 26 member agencies have benefitted from the Core Conservation Programs. Additionally, the report highlights how all 26 member agencies participate in one or more of the Subscription Programs offered by BAWSCA, such as rebates, water loss management and large landscape audits. The Demand Study indicates that through a combination of active and passive conservation, 37.3 MGD will be conserved by BAWSCA’s member agencies by 2045.

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Common Language for Wholesale Customers about Rate Impacts of Water Shortages

The SFPUC includes a variable component to water rates for most customer classes. As a result, as sales decrease, revenues are lost on a per unit basis. Because the marginal cost of water production is relatively small, as production is reduced, the cost of service remains the same. For both retail and wholesale customers, a reduction in water purchases – whether voluntary or mandated – would require the SFPUC to raise rates, cut costs, or use existing fund balance reserves to cover its expenses. The financial planning and rate-setting process is complex and iterative. While major impacts of a water shortage on rates are described below, the full process, especially for large water shortages, would incorporate significant stakeholder discussion about tradeoffs and financial impacts.

The SFPUC's current retail water rates have a provision for a "drought surcharge" that automatically increases adopted rates in the event of a declared water shortage. The drought surcharge is calculated so that, accounting for the expected reduction in retail water usage, total revenues are equal to what they would have been without the reduction. The drought surcharge protects the SFPUC's financial stability during water shortages, and provides customers an incentive to meet conservation targets.

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 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 annual budget process and are based on the forecasted wholesale share of regional water system expenditures and total purchases. If wholesale customer usage is expected to decrease – either voluntarily, or due to shortages – this would be incorporated into the wholesale rate forecast, and rates may increase.

March 4, 2021

7. Additional language requested by the Member Agencies

SFPUC's Decision to use With Bay-Delta Plan Scenario in UWMP Submittal Tables

The adoption of the Bay-Delta Plan Amendment may significantly impact the supply available from the RWS. SFPUC recognizes that the Bay-Delta Plan Amendment has been adopted and that, given that it is now state law, we must plan for a future in which it is fully implemented. SFPUC also acknowledges that the plan is not self-implementing and therefore does not automatically go into effect. SFPUC is currently pursuing a voluntary agreement as well as a lawsuit which would limit implementation of the Plan. With both of these processes occurring on an unknown timeline, SFPUC does not know at this time when the Bay-Delta Plan Amendment is likely to go into effect. As a result, it makes sense to conduct future supply modeling for a scenario that doesn't include implementation of the Bay-Delta Plan Amendment, as that represents a potential supply reliability scenario.

Because of the uncertainty surrounding implementation of the Bay-Delta Plan Amendment, the SFPUC conducted water service reliability assessment that includes: (1) a scenario in which the Bay-Delta Plan Amendment is fully implemented in 2023, and (2) a scenario that considers the SFPUC system's current situation without the Bay-Delta Plan Amendment. The two scenarios provide a bookend for the possible future scenarios regarding RWS supplies. The standardized tables associated with the SFPUC's UWMP contain the future scenario that assumes implementation of the Bay-Delta Plan Amendment starting in 2023.

Bay-Delta Plan Implementation Starting Year

Because of the uncertainty surrounding implementation of the Bay-Delta Plan Amendment, the water service reliability assessment presented in the SFPUC's draft UWMP looks at two future supply scenarios, both with and without implementation of the Bay-Delta Plan Amendment. Although the SWRCB has stated it intends to implement the Bay-Delta Plan Amendment on the Tuolumne River by the year 2022, given the current level of uncertainty, it is assumed for the purposes of the SFPUC's draft UWMP that the Bay-Delta Plan Amendment will be fully implemented starting in 2023.

SFPUC's Decision to Present Both Modeling Results in its UWMP

A key input for the HHLSM model is the anticipated level of demand on the RWS. Supply modeling results presented in the text of the SFPUC's UWMP reflect an input of projected demands on the RWS consisting of (1) projected retail demands on the RWS (total retail demands minus local groundwater and recycled water supplies), and (2) projected Wholesale Customer purchases. 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, as well as a contractual obligation to supply 184 mgd to the Wholesale Customers. Therefore, the SFPUC has also conducted modeling based on a demand of 265 mgd in order to facilitate planning that supports meeting this Level of Service goal and their contractual obligations.

Appendix I: Regional Water Supply Reliability and BAWSCA Tier 2 Drought Implementation Scenarios

- UWMP 2020 Additional Modeling, dated March 30, 2021
- Updated Drought Allocations, dated April 1, 2021
- Memorandum on Updated Drought Cutbacks, dated February 18, 2021 with Attachment B, dated April 8, 2021
- Memorandum on Regional Water System Supply Reliability and UWMP 2020, dated June 2, 2021

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

525 Golden Gate Avenue, 13th Floor
San Francisco, CA 94102
T 415.554.3155
F 415.554.3161
TTY 415.554.3488

March 30, 2021

Danielle McPherson
Senior Water Resources Specialist
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 650
San Mateo, CA 94402

Dear Ms. McPherson,

Attached please find additional supply reliability modeling results conducted by the SFPUC. The SFPUC has conducted additional supply reliability modeling under the following planning scenarios:

- Projected supply reliability for years 2020 through 2045, assuming that demand is equivalent to the sum of the projected retail demands on the Regional Water System (RWS) and Wholesale Customer purchase request projections provided to SFPUC by BAWSCA on January 21st (see Table 1 below).
- Under the above demand conditions, projected supply reliability for scenarios both with and without implementation of the Bay-Delta Plan Amendment starting in 2023.

The SFPUC will be using this supply modeling in the text of its draft UWMP and moving the original modeling results into an appendix.

Table 1: Retail and Wholesale RWS Demand Assumptions Used for Additional Supply Reliability Modeling (mgd)

	2020	2025	2030	2035	2040	2045
Retail	66.5	67.2	67.5	68.6	70.5	73.7
Wholesale[1, 2]	132.1	146.0	147.9	151.9	156.3	162.8
Total	**198.6**	**213.2**	**215.4**	**220.5**	**226.8**	**236.5**

[1] Wholesale purchase request projections provided to the SFPUC by BAWSCA on January 21st, 2021
[2] Includes demands for Cities of San Jose and Santa Clara

Please note the following about the information presented in the attached tables:

- Assumptions about infrastructure conditions remain the same as what was provided in our January 22nd letter.
- The Tier 1 allocations were applied to the RWS supplies to determine the wholesale supply, as was also described in the January 22nd letter; for any system-wide shortage above 20%, the Tier 1 split for a 20% shortage was applied.
- The SFPUC water supply planning methodology, including simulation of an 8.5-year design drought, is used to develop these estimates of water supply available from the RWS for five dry years. In each demand scenario for 2020 through 2045, the RWS deliveries are estimated using the standard SFPUC procedure, which includes adding increased levels of rationing as needed to balance the demands on the RWS system with available water supply. Some simulations may have increased levels of rationing in the final years of the design drought sequence, which can influence the comparison of results in the first five years of the sequence.
- Tables 7 and 8 in the attached document provide RWS and wholesale supply availability for the five-year drought risk assessment from 2021 to 2025. SFPUC's modeling approach does not allow for varying demands over the course of a dry year sequence. Therefore, the supply projections for 2021 to 2025 are based on meeting 2020 levels of demand. However, in years when the Bay-Delta Plan Amendment is not in effect, sufficient RWS supplies will be available to meet the Wholesale Customers' purchase requests assuming that they are between the 2020 and 2025 projected levels. This is not reflected in Tables 7 and 8 because SFPUC did not want to make assumptions about the growth of purchase requests between 2020 and 2025.

In our draft UWMP, we acknowledge that we have 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, as well as a contractual obligation to supply 184 mgd to the Wholesale Customers. Therefore, we will still include the results of our modeling based on a demand of 265 mgd in order to facilitate planning that supports meeting this Level of Service objective and our contractual obligations. The results of this modeling will be in an appendix to the draft UWMP. As will be shown in this appendix, in a normal year the SFPUC can provide up to 265 mgd of supply from the RWS. The RWS supply projections shown in the attached tables are more accurately characterized as supplies that will be used to meet projected retail and Wholesale Customer demands.

It is our understanding that you will pass this information on to the Wholesale Customers. If you have any questions or need additional information, please do not hesitate to contact Sarah Triolo, at striolo@sfwater.org or (628) 230 0802.

Sincerely,

Paula Kehoe

Paula Kehoe
Director of Water Resources

Table 2: Projected Total RWS Supply Utilized and Portion of RWS Supply Utilized by Wholesale Customers in Normal Years [For Table 6-9]:

Year	2020	2025	2030	2035	2040	2045
RWS Supply Utilized (mgd)	198.6	213.2	215.4	220.5	226.8	236.5
RWS Supply Utilized by Wholesale Customers[a] (mgd)	132.1	146.0	147.9	151.9	156.3	162.8

[a] RWS supply utilized by Wholesale Customers is equivalent to purchase request projections provided to SFPUC by BAWSCA on January 21, 2021, and includes Cities of San Jose and Santa Clara.

Basis of Water Supply Data: With Bay-Delta Plan Amendment

Table 3a: Basis of Water Supply Data [For Table 7-1], Base Year 2020, With Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2020	198.6	100%	132.1	
Single dry year		198.6	100%	132.1	
Consecutive 1st Dry year		198.6	100%	132.1	
Consecutive 2nd Dry year		198.6	100%	132.1	
Consecutive 3rd Dry year[1]		119.2	60%	74.5	• At shortages 20% or greater, wholesale allocation is assumed to be 62.5%
Consecutive 4th Dry year		119.2	60%	74.5	• Same as above
Consecutive 5th Dry year		119.2	60%	74.5	• Same as above

[1] Assuming this year represents 2023, when Bay Delta Plan Amendment would come into effect.

Table 3b: Basis of Water Supply Data [For Table 7-1], Base Year 2025, With Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2025	213.2	100%	146.0	
Single dry year		149.2	70%	93.3	• At shortages 20% or greater, wholesale allocation is assumed to be 62.5%
Consecutive 1st Dry year		149.2	70%	93.3	• Same as above
Consecutive 2nd Dry year		127.9	60%	80.0	• Same as above
Consecutive 3rd Dry year		127.9	60%	80.0	• Same as above
Consecutive 4th Dry year		127.9	60%	80.0	• Same as above
Consecutive 5th Dry year		127.9	60%	80.0	• Same as above

Table 3c: Basis of Water Supply Data [For Table 7-1], Base Year 2030, With Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2030	215.4	100%	147.9	
Single dry year		150.8	70%	94.2	• At shortages 20% or greater, wholesale allocation is assumed to be 62.5%
Consecutive 1st Dry year		150.8	70%	94.2	• Same as above
Consecutive 2nd Dry year		129.2	60%	80.8	• Same as above
Consecutive 3rd Dry year		129.2	60%	80.8	• Same as above
Consecutive 4th Dry year		129.2	60%	80.8	• Same as above
Consecutive 5th Dry year		129.2	60%	80.8	• Same as above

Table 3d: Basis of Water Supply Data [For Table 7-1], Base Year 2035, With Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2035	220.5	100%	151.9	
Single dry year		154.4	70%	96.5	• At shortages 20% or greater, wholesale allocation is assumed to be 62.5%
Consecutive 1st Dry year		154.4	70%	96.5	• Same as above
Consecutive 2nd Dry year		132.3	60%	82.7	• Same as above
Consecutive 3rd Dry year		132.3	60%	82.7	• Same as above
Consecutive 4th Dry year		132.3	60%	82.7	• Same as above
Consecutive 5th Dry year		121.3	55%	75.8	• Same as above

Table 3e: Basis of Water Supply Data [For Table 7-1], Base Year 2040, With Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2040	226.8	100%	156.3	
Single dry year		158.8	70%	99.2	• At shortages 20% or greater, wholesale allocation is assumed to be 62.5%
Consecutive 1st Dry year		158.8	70%	99.2	• Same as above
Consecutive 2nd Dry year		136.1	60%	85.1	• Same as above
Consecutive 3rd Dry year		136.1	60%	85.1	• Same as above
Consecutive 4th Dry year		120.2	53%	75.1	• Same as above
Consecutive 5th Dry year		120.2	53%	75.1	• Same as above

Table 3f: Basis of Water Supply Data [For Table 7-1], Base Year 2045, With Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2045	236.5	100%	162.8	
Single dry year		141.9	60%	88.7	• At shortages 20% or greater, wholesale allocation is assumed to be 62.5%
Consecutive 1st Dry year		141.9	60%	88.7	• Same as above
Consecutive 2nd Dry year		141.9	60%	88.7	• Same as above
Consecutive 3rd Dry year		141.9	60%	88.7	• Same as above
Consecutive 4th Dry year		120.6	51%	75.4	• Same as above
Consecutive 5th Dry year		120.6	51%	75.4	• Same as above

Table 3g: Projected RWS Supply Availability [Alternative to Table 7-1], Years 2020-2045, With Bay-Delta Plan Amendment

Year	2020	2025	2030	2035	2040	2045
Average year	100%	100%	100%	100%	100%	100%
Single dry year	100%	70%	70%	70%	70%	60%
Consecutive 1st Dry year	100%	70%	70%	70%	70%	60%
Consecutive 2nd Dry year	100%	60%	60%	60%	60%	60%
Consecutive 3rd Dry year[1]	60%	60%	60%	60%	60%	60%
Consecutive 4th Dry year	60%	60%	60%	60%	53%	51%
Consecutive 5th Dry year	60%	60%	60%	55%	53%	51%

[1] Assuming that at base year 2020, this year represents 2023, when Bay Delta Plan Amendment would come into effect.

Basis of Water Supply Data: Without Bay-Delta Plan Amendment

Table 4a: Basis of Water Supply Data [For Table 7-1], Base Year 2020, Without Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2020	198.6	100%	132.1	
Single dry year		198.6	100%	132.1	
Consecutive 1st Dry year		198.6	100%	132.1	
Consecutive 2nd Dry year		198.6	100%	132.1	
Consecutive 3rd Dry year		198.6	100%	132.1	
Consecutive 4th Dry year		198.6	100%	132.1	
Consecutive 5th Dry year		198.6	100%	132.1	

Table 4b: Basis of Water Supply Data [For Table 7-1], Base Year 2025, Without Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2025	213.2	100%	146.0	
Single dry year		213.2	100%	146.0	
Consecutive 1st Dry year		213.2	100%	146.0	
Consecutive 2nd Dry year		213.2	100%	146.0	
Consecutive 3rd Dry year		213.2	100%	146.0	
Consecutive 4th Dry year		213.2	100%	146.0	
Consecutive 5th Dry year		213.2	100%	146.0	

Table 4c: Basis of Water Supply Data [For Table 7-1], Base Year 2030, Without Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2030	215.4	100%	147.9	
Single dry year		215.4	100%	147.9	
Consecutive 1st Dry year		215.4	100%	147.9	
Consecutive 2nd Dry year		215.4	100%	147.9	
Consecutive 3rd Dry year		215.4	100%	147.9	
Consecutive 4th Dry year		215.4	100%	147.9	
Consecutive 5th Dry year		215.4	100%	147.9	

Table 4d: Basis of Water Supply Data [For Table 7-1], Base Year 2035, Without Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2035	220.5	100%	151.9	
Single dry year		220.5	100%	151.9	
Consecutive 1st Dry year		220.5	100%	151.9	
Consecutive 2nd Dry year		220.5	100%	151.9	
Consecutive 3rd Dry year		220.5	100%	151.9	
Consecutive 4th Dry year		220.5	100%	151.9	
Consecutive 5th Dry year		220.5	100%	151.9	

Table 4e: Basis of Water Supply Data [For Table 7-1], Base Year 2040, Without Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2040	226.8	100%	156.3	
Single dry year		226.8	100%	156.3	
Consecutive 1st Dry year		226.8	100%	156.3	
Consecutive 2nd Dry year		226.8	100%	156.3	
Consecutive 3rd Dry year		226.8	100%	156.3	
Consecutive 4th Dry year		226.8	100%	156.3	
Consecutive 5th Dry year		226.8	100%	156.3	

Table 4f: Basis of Water Supply Data [For Table 7-1], Base Year 2045, Without Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2045	236.5	100%	162.8	
Single dry year		236.5	100%	162.8	
Consecutive 1st Dry year		236.5	100%	162.8	
Consecutive 2nd Dry year		236.5	100%	162.8	
Consecutive 3rd Dry year		236.5	100%	162.8	
Consecutive 4th Dry year		212.8	90%	139.1	• At a 10% shortage level, the wholesale allocation is 64% of available supply • The retail allocation is 36% of supply, which resulted in a positive allocation to retail of 2.9 mgd, which was re-allocated to the Wholesale Customers
Consecutive 5th Dry year		212.8	90%	139.1	• Same as above

Table 4g: Projected RWS Supply [Alternative to Table 7-1], Years 2020-2045, Without Bay-Delta Plan Amendment

Year	2020	2025	2030	2035	2040	2045
Average year	100%	100%	100%	100%	100%	100%
Single dry year	100%	100%	100%	100%	100%	100%
Consecutive 1st Dry year	100%	100%	100%	100%	100%	100%
Consecutive 2nd Dry year	100%	100%	100%	100%	100%	100%
Consecutive 3rd Dry year	100%	100%	100%	100%	100%	100%
Consecutive 4th Dry year	100%	100%	100%	100%	100%	90%
Consecutive 5th Dry year	100%	100%	100%	100%	100%	90%

Supply Projections for Consecutive Five Dry Year Sequences

Table 5: Projected Multiple Dry Years Wholesale Supply from RWS [For Table 7-4], With Bay-Delta Plan Amendment

	2025	2030	2035	2040	2045
First year	93.3	94.2	96.5	99.2	88.7
Second year	80.0	80.8	82.7	85.1	88.7
Third year	80.0	80.8	82.7	85.1	88.7
Fourth year	80.0	80.8	82.7	75.1	75.4
Fifth year	80.0	80.8	75.8	75.1	75.4

Table 6: Projected Multiple Dry Years Wholesale Supply from RWS [For Table 7-4], Without Bay-Delta Plan Amendment

	2025	2030	2035	2040	2045
First year	146.0	147.9	151.9	156.3	162.8
Second year	146.0	147.9	151.9	156.3	162.8
Third year	146.0	147.9	151.9	156.3	162.8
Fourth year	146.0	147.9	151.9	156.3	139.1
Fifth year	146.0	147.9	151.9	156.3	139.1

Table 7: Projected Regional Water System Supply for 5-Year Drought Risk Assessment [For Table 7-5], With Bay-Delta Plan Amendment. This table assumes Bay Delta Plan comes into effect in 2023.

Year	2021	2022	2023	2024	2025
RWS Supply (mgd)	198.6	198.6	119.2	119.2	119.2
Wholesale Supply (mgd)	132.1	132.1	74.5	74.5	74.5

Table 8: Projected Regional Water System Supply for 5-Year Drought Risk Assessment [For Table 7-5], Without Bay Delta Plan

Year	2021	2022	2023	2024	2025
RWS Supply (mgd)	198.6	198.6	198.6	198.6	198.6
Wholesale Supply (mgd)	132.1	132.1	132.1	132.1	132.1

Section 1: Basis for Calculations. Projected Wholesale RWS Purchases Through 2045

Table A: Wholesale RWS Actual Purchases in 2020 and Projected Purchases for 2025, 2030, 2035, 2040, and 2045 (mgd)[a]

Agency	2020 Actual	Projected Wholesale RWS Purchases 2025	2030	2035	2040	2045
ACWD	7.87	7.68	7.68	7.68	7.68	9.11
Brisbane/GVMID	0.64	0.89	0.89	0.88	0.89	0.89
Burlingame	3.48	4.33	4.40	4.47	4.58	4.69
Coastside	1.02	1.40	1.38	1.36	1.33	1.33
CalWater Total	29.00	29.99	29.74	29.81	30.27	30.70
Daly City	3.97	3.57	3.52	3.49	3.46	3.43
East Palo Alto	1.57	1.88	1.95	2.10	2.49	2.89
Estero	4.34	4.07	4.11	4.18	4.23	4.38
Hayward	13.92	17.86	18.68	19.75	20.82	22.14
Hillsborough	2.62	3.26	3.25	3.26	3.26	3.26
Menlo Park	2.96	3.55	3.68	3.87	4.06	4.29
Mid-Peninsula	2.66	2.86	2.84	2.88	2.89	2.93
Millbrae	1.90	2.29	2.50	2.45	2.82	3.20
Milpitas	5.92	6.59	6.75	7.03	7.27	7.53
Mountain View	7.67	8.60	8.90	9.20	9.51	9.93
North Coast	2.37	2.34	2.33	2.34	2.34	2.34
Palo Alto	9.75	10.06	10.15	10.28	10.51	10.79
Purissima Hills	1.75	2.09	2.09	2.12	2.13	2.15
Redwood City	8.76	8.46	8.49	8.64	8.74	8.90
San Bruno	0.95	3.24	3.22	3.20	3.20	3.21
San Jose	4.26	4.50	4.50	4.50	4.50	4.50
Santa Clara	3.27	4.50	4.50	4.50	4.50	4.50
Stanford	1.43	2.01	2.18	2.35	2.53	2.70
Sunnyvale	9.33	9.16	9.30	10.70	11.44	12.10
Westborough	0.82	0.86	0.85	0.85	0.84	0.84
Total	**132.22**	**146.01**	**147.87**	**151.90**	**156.31**	**162.76**

[a] Wholesale RWS purchase projections for 2025, 2030, 2035, 2040, and 2045 were provided to BAWSCA between July 2020 and January 2021 by the Member Agencies following the completion of the June 2020 Demand Study.

Table B: Basis for the 5-Year Drought Risk Assessment Wholesale RWS Actual Purchases in 2020 and 2021-2025 Projected Purchases (mgd)

Agency	2020 Actual	Projected and Estimated Wholesale RWS Purchases 2021[b]	2022[b]	2023[c]	2024[c]	2025[c]
ACWD	7.87	9.44	9.46	9.46	9.46	9.46
Brisbane/GVMID	0.64	0.62	0.65	0.65	0.65	0.65
Burlingame	3.48	3.34	3.35	3.35	3.35	3.35
Coastside	1.02	1.54	1.23	1.23	1.23	1.23
CalWater Total	29.00	29.66	29.81	29.81	29.81	29.81
Daly City	3.97	4.00	4.01	4.01	4.01	4.01
East Palo Alto	1.57	1.63	1.69	1.69	1.69	1.69
Estero	4.34	4.48	4.51	4.51	4.51	4.51
Hayward	13.92	14.47	15.12	15.12	15.12	15.12
Hillsborough	2.62	2.95	3.05	3.05	3.05	3.05
Menlo Park	2.96	2.92	2.93	2.93	2.93	2.93
Mid-Peninsula	2.66	2.65	2.80	2.80	2.80	2.80
Millbrae	1.90	1.95	2.15	2.15	2.15	2.15
Milpitas	5.92	5.88	5.34	5.34	5.34	5.34
Mountain View	7.67	7.80	8.05	8.05	8.05	8.05
North Coast	2.37	2.58	2.66	2.66	2.66	2.66
Palo Alto	9.75	9.44	9.66	9.66	9.66	9.66
Purissima Hills	1.75	1.97	2.02	2.02	2.02	2.02
Redwood City	8.76	8.72	9.07	9.07	9.07	9.07
San Bruno	0.95	3.39	3.40	3.40	3.40	3.40
San Jose	4.26	4.31	4.51	4.51	4.51	4.51
Santa Clara	3.27	3.29	3.50	3.50	3.50	3.50
Stanford	1.43	1.40	1.54	1.54	1.54	1.54
Sunnyvale	9.33	9.35	9.45	9.45	9.45	9.45
Westborough	0.82	0.84	0.81	0.81	0.81	0.81
Total	**132.22**	**138.61**	**140.77**	**140.77**	**140.77**	**140.77**

[b] Wholesale RWS purchase projections for 2021 and 2022 were provided to Christina Tang, BAWSCA's Finance Manager, by the Member Agencies in January 2021.

[c] The SFPUC's supply reliability tables assume the Bay-Delta Plan takes effect in 2023. In the event of a shortage, the Tier 2 Plan specifies that each agencies' Allocation Factor would be calculated once at the onset of a shortage based on the previous year's use and remains the same until the shortage condition is over. Therefore, for the purpose of drought allocations for the 5-year Drought Risk Assessment, wholesale RWS demand is assumed to remain static from 2022 through the drought sequence.

Section 2: Drought Allocations *With* Bay-Delta Plan

Table C: RWS Supply Available to the Wholesale Customers (Combined Tables 3a-3f from the SFPUC's March 30th letter) *With* Bay-Delta Plan (mgd)

	2020[e]	2025	2030	2035	2040	2045
Projected Purchases[d]	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 1st Dry Year	138.6	93.3	94.2	96.5	99.2	88.7
Consecutive 2nd Dry Year	140.8	80.0	80.8	82.7	85.1	88.7
Consecutive 3rd Dry Year	74.5	80.0	80.8	82.7	85.1	88.7
Consecutive 4th Dry Year	74.5	80.0	80.8	82.7	75.1	75.4
Consecutive 5th Dry Year	74.5	80.0	80.8	75.8	75.1	75.4

[d] Values for 2020 are actual purchases. This row aligns with what is labeled as an "Average Year" in Tables 3a-3f in the SFPUC's March 30th letter. However, these values do not represent an average year and instead are actual purchases for 2020 or projected purchases for 2025 through 2045.

[e] In years when the Bay-Delta Plan is not in effect, sufficient RWS supplies will be available to meet the Wholesale Customers' purchase requests assuming that they are between the 2020 and 2025 projected levels. As such, RWS supply available to the Wholesale Customers in the 1st and 2nd consecutive dry years under base year 2020 is equal to the cumulative projected wholesale RWS purchases for 2021 and 2022, respectively.

Table D: Wholesale RWS Demand (Combined Totals from Tables A and B) (mgd)[f]

	2020	2025	2030	2035	2040	2045
Projected Purchases[d]	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 1st Dry Year	138.6	146.0	147.9	151.9	156.3	162.8
Consecutive 2nd Dry Year	140.8	146.0	147.9	151.9	156.3	162.8
Consecutive 3rd Dry Year	140.8	146.0	147.9	151.9	156.3	162.8
Consecutive 4th Dry Year	140.8	146.0	147.9	151.9	156.3	162.8
Consecutive 5th Dry Year	140.8	146.0	147.9	151.9	156.3	162.8

[f] The SFPUC's modeling approach does not allow for varying demands over the course of a dry year sequence. Additionally, the Tier 2 Plan calculates each agencies' Allocation Factor once at the onset of a drought and it remains the same until the shortage condition is over. When system-wide shortages are projected, wholesale RWS demand is assumed to be static for the remainder of the drought sequence.

Table E: Percent Cutback to the Wholesale Customers *With* Bay-Delta Plan[g]

	2020	2025	2030	2035	2040	2045
Projected Purchases[d]	0%	0%	0%	0%	0%	0%
Consecutive 1st Dry Year	0%	36%	36%	36%	37%	46%
Consecutive 2nd Dry Year	0%	45%	45%	46%	46%	46%
Consecutive 3rd Dry Year	47%	45%	45%	46%	46%	46%
Consecutive 4th Dry Year	47%	45%	45%	46%	52%	54%
Consecutive 5th Dry Year	47%	45%	45%	50%	52%	54%

[g] Agencies that wish to use new or different projected RWS purchases may use the percent cutbacks listed in this table to determine their drought allocation.

Table F1: Basis of Water Supply Data [For Tables 7-1 and 7-5], Base Year 2020, *With* Bay-Delta Plan (mgd)

Year Consecutive Dry Year	2020 Actual	2021 1st	2022 2nd	2023 3rd	2024 4th	2025 5th
Wholesale RWS Demand	132.2	138.6	140.8	140.8	140.8	140.8
Wholesale RWS Supply Available	132.2	138.6	140.8	74.5	74.5	74.5
Percent Cutback	0%	0%	0%	47%	47%	47%

Table F2: Individual Agency Drought Allocations [For Tables 7-1 and 7-5], Base Year 2020, *With* Bay-Delta Plan (mgd)

	2020	Wholesale RWS Drought Allocations				
Agency	**Actual**	**2021**	**2022**	**2023**	**2024**	**2025**
ACWD	7.87	9.44	9.46	5.01	5.01	5.01
Brisbane/GVMID	0.64	0.62	0.65	0.34	0.34	0.34
Burlingame	3.48	3.34	3.35	1.77	1.77	1.77
Coastside	1.02	1.54	1.23	0.65	0.65	0.65
CalWater Total	29.00	29.66	29.81	15.78	15.78	15.78
Daly City	3.97	4.00	4.01	2.12	2.12	2.12
East Palo Alto	1.57	1.63	1.69	0.89	0.89	0.89
Estero	4.34	4.48	4.51	2.39	2.39	2.39
Hayward	13.92	14.47	15.12	8.00	8.00	8.00
Hillsborough	2.62	2.95	3.05	1.61	1.61	1.61
Menlo Park	2.96	2.92	2.93	1.55	1.55	1.55
Mid-Peninsula	2.66	2.65	2.80	1.48	1.48	1.48
Millbrae	1.90	1.95	2.15	1.14	1.14	1.14
Milpitas	5.92	5.88	5.34	2.83	2.83	2.83
Mountain View	7.67	7.80	8.05	4.26	4.26	4.26
North Coast	2.37	2.58	2.66	1.41	1.41	1.41
Palo Alto	9.75	9.44	9.66	5.11	5.11	5.11
Purissima Hills	1.75	1.97	2.02	1.07	1.07	1.07
Redwood City	8.76	8.72	9.07	4.80	4.80	4.80
San Bruno	0.95	3.39	3.40	1.80	1.80	1.80
San Jose	4.26	4.31	4.51	2.39	2.39	2.39
Santa Clara	3.27	3.29	3.50	1.85	1.85	1.85
Stanford	1.43	1.40	1.54	0.82	0.82	0.82
Sunnyvale	9.33	9.35	9.45	5.00	5.00	5.00
Westborough	0.82	0.84	0.81	0.43	0.43	0.43
Total	**132.2**	**138.6**	**140.8**	**74.5**	**74.5**	**74.5**

Table G1: Basis of Water Supply Data [For Tables 7-1 and 7-4], Base Year 2025, *With* Bay-Delta Plan (mgd)

Consecutive Dry Year	1st	2nd	3rd	4th	5th
Wholesale RWS Demand	146.0	146.0	146.0	146.0	146.0
Wholesale RWS Supply Available	93.3	80.0	80.0	80.0	80.0
Percent Cutback	36%	45%	45%	45%	45%

Table G2: Individual Agency Drought Allocations [For Tables 7-1 and 7-4], Base Year 2025, *With* Bay-Delta Plan (mgd)

	Wholesale RWS Drought Allocations				
Consecutive Dry Year	1st	2nd	3rd	4th	5th
ACWD	4.91	4.21	4.21	4.21	4.21
Brisbane/GVMID	0.57	0.49	0.49	0.49	0.49
Burlingame	2.76	2.37	2.37	2.37	2.37
Coastside	0.89	0.77	0.77	0.77	0.77
CalWater Total	19.16	16.43	16.43	16.43	16.43
Daly City	2.28	1.96	1.96	1.96	1.96
East Palo Alto	1.20	1.03	1.03	1.03	1.03
Estero	2.60	2.23	2.23	2.23	2.23
Hayward	11.41	9.78	9.78	9.78	9.78
Hillsborough	2.08	1.79	1.79	1.79	1.79
Menlo Park	2.27	1.95	1.95	1.95	1.95
Mid-Peninsula	1.83	1.57	1.57	1.57	1.57
Millbrae	1.46	1.25	1.25	1.25	1.25
Milpitas	4.21	3.61	3.61	3.61	3.61
Mountain View	5.49	4.71	4.71	4.71	4.71
North Coast	1.49	1.28	1.28	1.28	1.28
Palo Alto	6.43	5.51	5.51	5.51	5.51
Purissima Hills	1.33	1.14	1.14	1.14	1.14
Redwood City	5.40	4.63	4.63	4.63	4.63
San Bruno	2.07	1.77	1.77	1.77	1.77
San Jose	2.88	2.47	2.47	2.47	2.47
Santa Clara	2.88	2.47	2.47	2.47	2.47
Stanford	1.28	1.10	1.10	1.10	1.10
Sunnyvale	5.85	5.02	5.02	5.02	5.02
Westborough	0.55	0.47	0.47	0.47	0.47
Total	**93.3**	**80.0**	**80.0**	**80.0**	**80.0**

Table H1: Basis of Water Supply Data [For Tables 7-1 and 7-4], Base Year 2030, *With* Bay-Delta Plan (mgd)

Consecutive Dry Year	1st	2nd	3rd	4th	5th
Wholesale RWS Demand	147.9	147.9	147.9	147.9	147.9
Wholesale RWS Supply Available	94.2	80.8	80.8	80.8	80.8
Percent Cutback	36%	45%	45%	45%	45%

Table H2: Individual Agency Drought Allocations [For Tables 7-1 and 7-4], Base Year 2030, *With* Bay-Delta Plan (mgd)

	Wholesale RWS Drought Allocations				
Consecutive Dry Year	**1st**	**2nd**	**3rd**	**4th**	**5th**
ACWD	4.89	4.20	4.20	4.20	4.20
Brisbane/GVMID	0.56	0.48	0.48	0.48	0.48
Burlingame	2.80	2.40	2.40	2.40	2.40
Coastside	0.88	0.75	0.75	0.75	0.75
CalWater Total	18.94	16.25	16.25	16.25	16.25
Daly City	2.24	1.92	1.92	1.92	1.92
East Palo Alto	1.24	1.07	1.07	1.07	1.07
Estero	2.62	2.24	2.24	2.24	2.24
Hayward	11.90	10.21	10.21	10.21	10.21
Hillsborough	2.07	1.78	1.78	1.78	1.78
Menlo Park	2.35	2.01	2.01	2.01	2.01
Mid-Peninsula	1.81	1.55	1.55	1.55	1.55
Millbrae	1.59	1.37	1.37	1.37	1.37
Milpitas	4.30	3.69	3.69	3.69	3.69
Mountain View	5.67	4.86	4.86	4.86	4.86
North Coast	1.48	1.27	1.27	1.27	1.27
Palo Alto	6.47	5.55	5.55	5.55	5.55
Purissima Hills	1.33	1.14	1.14	1.14	1.14
Redwood City	5.41	4.64	4.64	4.64	4.64
San Bruno	2.05	1.76	1.76	1.76	1.76
San Jose	2.87	2.46	2.46	2.46	2.46
Santa Clara	2.87	2.46	2.46	2.46	2.46
Stanford	1.39	1.19	1.19	1.19	1.19
Sunnyvale	5.92	5.08	5.08	5.08	5.08
Westborough	0.54	0.47	0.47	0.47	0.47
Total	**94.2**	**80.8**	**80.8**	**80.8**	**80.8**

Table I1: Basis of Water Supply Data [For Tables 7-1 and 7-4], Base Year 2035, *With* Bay-Delta Plan (mgd)

Consecutive Dry Year	1st	2nd	3rd	4th	5th
Wholesale RWS Demand	151.9	151.9	151.9	151.9	151.9
Wholesale RWS Supply Available	96.5	82.7	82.7	82.7	75.8
Percent Cutback	36%	46%	46%	46%	50%

Table I2: Individual Agency Drought Allocations [For Tables 7-1 and 7-4], Base Year 2035, *With* Bay-Delta Plan (mgd)

	Wholesale RWS Drought Allocations				
Consecutive Dry Year	1st	2nd	3rd	4th	5th
ACWD	4.88	4.18	4.18	4.18	3.83
Brisbane/GVMID	0.56	0.48	0.48	0.48	0.44
Burlingame	2.84	2.44	2.44	2.44	2.23
Coastside	0.86	0.74	0.74	0.74	0.68
CalWater Total	18.94	16.23	16.23	16.23	14.88
Daly City	2.22	1.90	1.90	1.90	1.74
East Palo Alto	1.33	1.14	1.14	1.14	1.05
Estero	2.66	2.28	2.28	2.28	2.09
Hayward	12.55	10.75	10.75	10.75	9.86
Hillsborough	2.07	1.78	1.78	1.78	1.63
Menlo Park	2.46	2.10	2.10	2.10	1.93
Mid-Peninsula	1.83	1.57	1.57	1.57	1.44
Millbrae	1.56	1.34	1.34	1.34	1.22
Milpitas	4.47	3.83	3.83	3.83	3.51
Mountain View	5.84	5.01	5.01	5.01	4.59
North Coast	1.49	1.27	1.27	1.27	1.17
Palo Alto	6.53	5.60	5.60	5.60	5.13
Purissima Hills	1.34	1.15	1.15	1.15	1.06
Redwood City	5.49	4.70	4.70	4.70	4.31
San Bruno	2.03	1.74	1.74	1.74	1.60
San Jose	2.86	2.45	2.45	2.45	2.25
Santa Clara	2.86	2.45	2.45	2.45	2.25
Stanford	1.49	1.28	1.28	1.28	1.17
Sunnyvale	6.80	5.83	5.83	5.83	5.34
Westborough	0.54	0.46	0.46	0.46	0.42
Total	**96.5**	**82.7**	**82.7**	**82.7**	**75.8**

Table J1: Basis of Water Supply Data [For Table 7-1 and 7-4], Base Year 2040, *With* Bay-Delta Plan (mgd)

Consecutive Dry Year	1st	2nd	3rd	4th	5th
Wholesale RWS Demand	156.3	156.3	156.3	156.3	156.3
Wholesale RWS Supply Available	99.2	85.1	85.1	75.1	75.1
Percent Cutback	37%	46%	46%	52%	52%

Table J2: Individual Agency Drought Allocations [For Tables 7-1 and 7-4], Base Year 2040, *With* Bay-Delta Plan (mgd)

	Wholesale RWS Drought Allocations				
Consecutive Dry Year	**1st**	**2nd**	**3rd**	**4th**	**5th**
ACWD	4.87	4.18	4.18	3.69	3.69
Brisbane/GVMID	0.56	0.48	0.48	0.43	0.43
Burlingame	2.91	2.49	2.49	2.20	2.20
Coastside	0.85	0.73	0.73	0.64	0.64
CalWater Total	19.21	16.48	16.48	14.54	14.54
Daly City	2.20	1.88	1.88	1.66	1.66
East Palo Alto	1.58	1.36	1.36	1.20	1.20
Estero	2.69	2.30	2.30	2.03	2.03
Hayward	13.21	11.34	11.34	10.00	10.00
Hillsborough	2.07	1.78	1.78	1.57	1.57
Menlo Park	2.58	2.21	2.21	1.95	1.95
Mid-Peninsula	1.84	1.58	1.58	1.39	1.39
Millbrae	1.79	1.53	1.53	1.35	1.35
Milpitas	4.62	3.96	3.96	3.49	3.49
Mountain View	6.03	5.18	5.18	4.57	4.57
North Coast	1.49	1.27	1.27	1.12	1.12
Palo Alto	6.67	5.72	5.72	5.05	5.05
Purissima Hills	1.35	1.16	1.16	1.03	1.03
Redwood City	5.55	4.76	4.76	4.20	4.20
San Bruno	2.03	1.74	1.74	1.54	1.54
San Jose	2.86	2.45	2.45	2.16	2.16
Santa Clara	2.86	2.45	2.45	2.16	2.16
Stanford	1.61	1.38	1.38	1.22	1.22
Sunnyvale	7.26	6.23	6.23	5.49	5.49
Westborough	0.54	0.46	0.46	0.41	0.41
Total	**99.2**	**85.1**	**85.1**	**75.1**	**75.1**

Table K1: Basis of Water Supply Data [For Tables 7-1 and 7-4], Base Year 2045, *With* Bay-Delta Plan (mgd)

Consecutive Dry Year	1st	2nd	3rd	4th	5th
Wholesale RWS Demand	162.8	162.8	162.8	162.8	162.8
Wholesale RWS Supply Available	88.7	88.7	88.7	75.4	75.4
Percent Cutback	46%	46%	46%	54%	54%

Table K2: Individual Agency Drought Allocations [For Tables 7-1 and 7-4], Base Year 2045, *With* Bay-Delta Plan (mgd)

	Wholesale RWS Drought Allocations				
Consecutive Dry Year	1st	2nd	3rd	4th	5th
ACWD	4.97	4.97	4.97	4.22	4.22
Brisbane/GVMID	0.49	0.49	0.49	0.41	0.41
Burlingame	2.56	2.56	2.56	2.17	2.17
Coastside	0.72	0.72	0.72	0.61	0.61
CalWater Total	16.73	16.73	16.73	14.22	14.22
Daly City	1.87	1.87	1.87	1.59	1.59
East Palo Alto	1.58	1.58	1.58	1.34	1.34
Estero	2.39	2.39	2.39	2.03	2.03
Hayward	12.07	12.07	12.07	10.26	10.26
Hillsborough	1.78	1.78	1.78	1.51	1.51
Menlo Park	2.34	2.34	2.34	1.99	1.99
Mid-Peninsula	1.59	1.59	1.59	1.36	1.36
Millbrae	1.74	1.74	1.74	1.48	1.48
Milpitas	4.11	4.11	4.11	3.49	3.49
Mountain View	5.41	5.41	5.41	4.60	4.60
North Coast	1.28	1.28	1.28	1.09	1.09
Palo Alto	5.88	5.88	5.88	5.00	5.00
Purissima Hills	1.17	1.17	1.17	1.00	1.00
Redwood City	4.85	4.85	4.85	4.12	4.12
San Bruno	1.75	1.75	1.75	1.49	1.49
San Jose	2.45	2.45	2.45	2.08	2.08
Santa Clara	2.45	2.45	2.45	2.08	2.08
Stanford	1.47	1.47	1.47	1.25	1.25
Sunnyvale	6.59	6.59	6.59	5.61	5.61
Westborough	0.46	0.46	0.46	0.39	0.39
Total	**88.7**	**88.7**	**88.7**	**75.4**	**75.4**

Section 3: Drought Allocations ***Without*** Bay-Delta Plan

Table L: RWS Supply Available to the Wholesale Customers (Combined Tables 4a-4f from the SFPUC's March 30th letter) *Without* Bay-Delta Plan (mgd)[h]

	2020	2025	2030	2035	2040	2045
Projected Purchases[i]	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 1st Dry Year	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 2nd Dry Year	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 3rd Dry Year	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 4th Dry Year	132.2	146.0	147.9	151.9	156.3	139.1
Consecutive 5th Dry Year	132.2	146.0	147.9	151.9	156.3	139.1

[h] The SFPUC's modeling approach does not allow for varying demands over the course of a dry year sequence. However, the SFPUC has indicated that sufficient supplies are available to meet wholesale RWS demand so long as they reasonably stay within 2020 and 2040 levels. The SFPUC's modeling does not indicate cutbacks will be required till the 4th and 5th consecutive dry year at 2045 levels.

[i] Values for 2020 are actual purchases. This row aligns with what is labeled as an "Average Year" in Tables 4a-4f in the SFPUC's March 30th letter. However, these values do not represent an average year and instead are actual purchases for 2020 or projected purchases for 2025 through 2045.

Table M: Wholesale RWS Demand (Combined Totals from Tables A and B) (mgd)

	2020	2025	2030	2035	2040	2045
Projected Purchases[i]	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 1st Dry Year	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 2nd Dry Year	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 3rd Dry Year	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 4th Dry Year	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 5th Dry Year	132.2	146.0	147.9	151.9	156.3	162.8

Table N: Percent Cutback to the Wholesale Customers *Without* Bay-Delta Plan

	2020	2025	2030	2035	2040	2045
Projected Purchases[i]	0%	0%	0%	0%	0%	0%
Consecutive 1st Dry Year	0%	0%	0%	0%	0%	0%
Consecutive 2nd Dry Year	0%	0%	0%	0%	0%	0%
Consecutive 3rd Dry Year	0%	0%	0%	0%	0%	0%
Consecutive 4th Dry Year	0%	0%	0%	0%	0%	15%
Consecutive 5th Dry Year	0%	0%	0%	0%	0%	15%

Table O1: Basis of Water Supply Data [For Tables 7-1 and 7-4], Base Year 2045, *Without* Bay-Delta Plan (mgd)

Consecutive Dry Year	1st	2nd	3rd	4th	5th
Wholesale RWS Demand	162.8	162.8	162.8	162.8	162.8
Wholesale RWS Supply Available	162.8	162.8	162.8	139.1	139.1
Percent Cutback	0%	0%	0%	Tier 2 Plan	Tier 2 Plan

Table O2: Individual Agency Drought Allocations [For Tables 7-1 and 7-4], Base Year 2045, *Without* Bay-Delta Plan (mgd)

	Wholesale RWS Drought Allocations					Tier 2 Drought Cutback
Consecutive Dry Year	1st	2nd	3rd	4th	5th	
ACWD	9.11	9.11	9.11	8.20	8.20	10.0%
Brisbane/GVMID	0.89	0.89	0.89	0.74	0.74	16.8%
Burlingame	4.69	4.69	4.69	4.02	4.02	14.3%
Coastside	1.33	1.33	1.33	1.19	1.19	10.0%
CalWater Total	30.70	30.70	30.70	26.73	26.73	12.9%
Daly City	3.43	3.43	3.43	3.01	3.01	12.4%
East Palo Alto	2.89	2.89	2.89	2.68	2.68	7.3%
Estero	4.38	4.38	4.38	3.94	3.94	10.0%
Hayward	22.14	22.14	22.14	18.67	18.67	15.7%
Hillsborough	3.26	3.26	3.26	2.93	2.93	10.2%
Menlo Park	4.29	4.29	4.29	3.58	3.58	16.5%
Mid-Peninsula	2.93	2.93	2.93	2.63	2.63	10.0%
Millbrae	3.20	3.20	3.20	2.54	2.54	20.7%
Milpitas	7.53	7.53	7.53	6.55	6.55	13.1%
Mountain View	9.93	9.93	9.93	8.91	8.91	10.3%
North Coast	2.34	2.34	2.34	2.11	2.11	10.0%
Palo Alto	10.79	10.79	10.79	9.71	9.71	10.0%
Purissima Hills	2.15	2.15	2.15	1.41	1.41	34.5%
Redwood City	8.90	8.90	8.90	7.92	7.92	11.1%
San Bruno	3.21	3.21	3.21	2.60	2.60	19.1%
San Jose	4.50	4.50	4.50	2.95	2.95	34.5%
Santa Clara	4.50	4.50	4.50	2.95	2.95	34.5%
Stanford	2.70	2.70	2.70	2.27	2.27	16.0%
Sunnyvale	12.10	12.10	12.10	10.11	10.11	16.5%
Westborough	0.84	0.84	0.84	0.76	0.76	10.0%
Total	**162.8**	**162.8**	**162.8**	**139.1**	**139.1**	

February 18, 2021

TO: BAWSCA Member Agencies

FROM: Danielle McPherson, Senior Water Resources Specialist
Tom Francis, Water Resources Manager

SUBJECT: San Francisco Regional Water System Supply Reliability for 2020 Urban Water Management Plans

The purpose of this memorandum is to provide updated drought allocations among the Member Agencies under the various scenarios provided in the San Francisco Public Utilities Commission (SFPUC) Regional Water System (RWS) Supply Reliability Letter dated January 22, 2021 and transmitted to the Member Agencies via email on January 25th ("Supply Reliability Letter", Attachment A). As presented and discussed at the February 12th BAWSCA Urban Water Management Plan (UWMP) Workshop, the Tier 2 Drought Allocation Plan was not designed for RWS shortages greater than 20 percent. As a result, the Tier 2 allocation tables shared with the Supply Reliability Letter showed unexpected and wide-ranging results between Member Agencies that should not be used for UWMP purposes.

As provided for in the 2018 Amended and Restated Water Supply Agreement (WSA), the SFPUC will honor new Tier 2 allocations agreed upon by all Member Agencies if an RWS shortage greater than 20 percent is declared. However, at this time, there is no method for allocating supplies under such significant cutbacks. Additionally, the time it would take to negotiate a modified Tier 2 plan to address those significant cutbacks would be extensive and greater than the timeline required for BAWSCA to provide your agency with numbers for input into your 2020 UWMP submittals.

For these reasons, BAWSCA is recommending that for the purpose of the 2020 UWMP updates, allocation of wholesale RWS supplies should be as follows:

1. When the average Wholesale Customers' RWS shortages are 10 percent or less, an equal percent reduction will be applied across all agencies. This is consistent with the existing Tier 2 requirement of a minimum 10 percent cutback in any Tier 2 application scenario.
2. When average Wholesale Customers' shortages are between 10 and 20 percent, the Tier 2 Drought Allocation Plan will be applied.
3. When the average Wholesale Customers' RWS shortages are greater than 20 percent, an equal percent reduction will be applied across all agencies.

Attachment B "Updated 2020 UWMP Drought Cutbacks" provides further detail, including recommended wholesale RWS allocation tables, for use in your agency's 2020 UWMP.

BAWSCA recognizes that this is not an ideal situation or method for allocation of available drought supplies. In the event of actual RWS shortages greater than 20 percent, the Member Agencies would have the opportunity to negotiate and agree upon a more nuanced and equitable approach. Such an approach would likely consider basic health and safety needs, the water needs to support critical institutions such as hospitals, and minimizing economic impacts on individual communities and the region.

Enclosed: Attachment A: Supply Reliability Letter
Attachment B: Updated 2020 UWMP Drought Cutbacks

cc: Nicole Sandkulla
Allison Schutte

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

525 Golden Gate Avenue, 13th Floor
San Francisco, CA 94102
T 415.554.3155
F 415.554.3161
TTY 415.554.3488

January 22, 2021

Danielle McPherson
Senior Water Resources Specialist
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 650
San Mateo, CA 94402

Dear Ms. McPherson,

Attached please find the information you requested on the Regional Water System's supply reliability for use in the Wholesale Customer's 2020 Urban Water Management Plan (UWMP) updates. The SFPUC has assessed the water supply reliability under the following planning scenarios:

- Projected supply reliability for year 2020 through 2045
- Projected single dry year and multiple dry year reliability for base year 2020, both with and without implementation of the Bay-Delta Plan Amendment
- Projected single dry year and multiple dry year reliability for base year 2025, both with and without implementation of the Bay-Delta Plan Amendment

The tables presented below assume full implementation of the Bay-Delta Plan Amendment will begin in 2023. All tables assume that the wholesale customers will purchase 184 mgd from the RWS through 2045. Assumptions about the status of the dry-year water supply projects included in the Water Supply Improvement Program (WSIP) are provided below in the table 'WSIP Project Assumptions'. The tables reflect instream flow requirements at San Mateo and Alameda Creeks, as described in the common language provided to BAWSCA separately.

Concerning allocation of supply during dry years, the Water Shortage Allocation Plan (WSAP) was utilized to allocate shortages between the SFPUC and the Wholesale Customers collectively. The WSAP implements a method for allocating water between the SFPUC retail customers and wholesale customers collectively which has been adopted by the Wholesale Customers per the July 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. The WSAP, also known as the Tier One Plan, was amended in the 2018 Amended and Restated Water Supply Agreement. The wholesale customers have adopted the Tier Two Plan, the second component of the WSAP, which allocates the collective wholesale customer share among each of the 26 wholesale customers.

Compared to the reliability projections that were provided previously for the 2015 UWMP update, the biggest difference in projected future deliveries is caused by the implementation of the Bay-Delta Plan Amendment. Given the uncertainty about the implementation of the Amendment (described further in the common language provided to BAWSCA), tables are included to show future projected supplies both with and without the Bay-Delta Plan Amendment.

It is our understanding that you will pass this information on to the Wholesale Customers. If you have any questions or need additional information, please do not hesitate to contact Sarah Triolo, at striolo@sfwater.org or (628) 230 0802.

Sincerely,

Paula Kehoe

Paula Kehoe
Director of Water Resources

Table 1: WSIP Project Assumptions

	2020	2025 and Beyond
Calaveras Dam Replacement Project	Calaveras Reservoir partially refilled at spring 2020 level of 63,900 AF	Calaveras Reservoir fully refilled
Lower Crystal Springs Dam Improvements	Crystal Springs storage not restored	
Regional Groundwater Storage and Recovery (GSR) Project	GSR account partially filled at spring 2020 level of 23,500 AF; GSR recovery rate of 6.2 mgd	GSR account fully filled; GSR recovery rate of 6.2 mgd
Alameda Creek Recapture Project	Project not built	Project built
Dry-year Transfers	Not in effect	

Table 2: Projected Wholesale Supply from Regional Water System [For Table 6-9]:

Year	2020	2025	2030	2035	2040	2045
RWS Supply (mgd)	265	265	265	265	265	265
Wholesale Supply (mgd)	184	184	184	184	184	184

Table 3: Basis of Water Supply Data [For Table 7-1], 2020 Infrastructure Conditions With Bay Delta Plan

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2020	265	100%	184	
Single dry year		238.5	90%	157.5	• At 10% shortage, wholesale allocation is 64%, or 152.6 mgd • Retail allocation is 36%, or 85.9 mgd • Retail allocations above 81 mgd are re-allocated to Wholesale Customers, per the 2018 WSA • 4.9 mgd added to wholesale allocation, bringing it to 157.5 mgd
Consecutive 1st Dry year		238.5	90%	157.5	• Same as above
Consecutive 2nd Dry year		212	80%	132.5	• At a 20% shortage, wholesale allocation is 62.5%, or 132.5 mgd • Retail allocation is 37.5%, or 79.5 mgd
Consecutive 3rd Dry year[1]		119.25	45%	74.5	• WSA does not define percentage split above a 20% shortage level • Assume same split as for a 20% shortage level, i.e. Wholesale Customers receive 62.5%
Consecutive 4th Dry year		119.25	45%	74.5	• Same as above
Consecutive 5th Dry year		119.25	45%	74.5	• Same as above

[1] Assuming this year represents 2023, when Bay Delta Plan Amendment would come into effect.

Table 4: Basis of Water Supply Data [For Table 7-1], 2020 Infrastructure Conditions Without Bay Delta Plan

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2020	265	100%	184	
Single dry year		238.5	90%	157.5	• At 10% shortage, wholesale allocation is 64%, or 152.6 mgd • Retail allocation is 36%, or 85.9 mgd • Retail allocations above 81 mgd are re-allocated to Wholesale Customers, per the 2018 WSA • 4.9 mgd added to wholesale allocation, bringing it to 157.5 mgd
Consecutive 1st Dry year		238.5	90%	157.5	• Same as above
Consecutive 2nd Dry year		212	80%	132.5	• At a 20% shortage, wholesale allocation is 62.5%, or 132.5 mgd • Retail allocation is 37.5%, or 79.5 mgd
Consecutive 3rd Dry year		212	80%	132.5	• Same as above
Consecutive 4th Dry year		212	80%	132.5	• Same as above
Consecutive 5th Dry year		212	80%	132.5	• Same as above

Table 5: Basis of Water Supply Data [For Table 7-1], 2025 Infrastructure With Bay Delta Plan

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2025	265	100%	184	
Single dry year		132.5	50%	82.8	• WSA does not define percentage split above a 20% shortage level • Assume same split as for a 20% shortage level, i.e. Wholesale Customers receive 62.5%
Consecutive 1st Dry year		132.5	50%	82.8	• Same as above
Consecutive 2nd Dry year		119.25	45%	74.5	• Same as above
Consecutive 3rd Dry year		119.25	45%	74.5	• Same as above
Consecutive 4th Dry year		119.25	45%	74.5	• Same as above
Consecutive 5th Dry year		119.25	45%	74.5	• Same as above

Table 6: Basis of Water Supply Data [For Table 7-1], 2025 Infrastructure Without Bay Delta Plan

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2025	265	100%	184	
Single dry year		238.5	90%	157.5	• At 10% shortage, wholesale allocation is 64% • Retail allocation is 36%, or 85.9 mgd; retail allocations above 81 mgd are re-allocated to Wholesaler Customers, per the 2018 WSA • 4.9 mgd added to wholesale allocation, bringing it to 157.5 mgd
Consecutive 1st Dry year		238.5	90%	157.5	• Same as above
Consecutive 2nd Dry year		238.5	90%	157.5	• Same as above
Consecutive 3rd Dry year		238.5	90%	157.5	• Same as above
Consecutive 4th Dry year		212	80%	132.5	• At a 20% shortage, wholesale allocation is 62.5%, or 132.5 mgd • Retail allocation is 37.5%, or 79.5 mgd
Consecutive 5th Dry year		212	80%	132.5	• Same as above

Table 7: Projected Multiple Dry Years Wholesale Supply from RWS [For Table 7-4], With Bay Delta Plan

	2025	2030	2035	2040	2045
First year	82.8	82.8	82.8	82.8	82.8
Second year	74.5	74.5	74.5	74.5	74.5
Third year	74.5	74.5	74.5	74.5	74.5
Fourth year	74.5	74.5	74.5	74.5	74.5
Fifth year	74.5	74.5	74.5	74.5	74.5

Table 8: Projected Multiple Dry Years Wholesale Supply from RWS [For Table 7-4], Without Bay Delta Plan

	2025	2030	2035	2040	2045
First year	157.5	157.5	157.5	157.5	157.5
Second year	157.5	157.5	157.5	157.5	157.5
Third year	157.5	157.5	157.5	157.5	157.5
Fourth year	132.5	132.5	132.5	132.5	132.5
Fifth year	132.5	132.5	132.5	132.5	132.5

Table 9: Projected Regional Water System Supply for 5-Year Drought Risk Assessment [For Table 7-5], With Bay Delta Plan. This table assumes Bay Delta Plan comes into effect in 2023.

Year	2021	2022	2023	2024	2025
RWS Supply (mgd)	238.5	212	119.25	119.25	119.25
Wholesale Supply (mgd)	157.5	132.5	74.5	74.5	74.5

Table 10: Projected Regional Water System Supply for 5-Year Drought Risk Assessment [For Table 7-5], Without Bay Delta Plan

Year	2021	2022	2023	2024	2025
RWS Supply (mgd)	238.5	212	212	212	212
Wholesale Supply (mgd)	157.5	132.5	132.5	132.5	132.5

Attachment B: Updated 2020 UWMP Drought Cutbacks

The January 22, 2021, SFPUC Regional Water System (RWS) Supply Reliability Letter (Supply Reliability Letter) provides RWS supplies available to the Wholesale Customers under two scenarios: (1) With Bay-Delta Plan, and (2) Without Bay-Delta Plan. Your agency must choose which scenario to use for your agency's 2020 UWMP submittal tables. However, you may discuss both scenarios in the body of your agency's UWMP. The purpose of this attachment is to provide further detail about your agency's allocation of total RWS supplies available to the Wholesale Customers under both scenarios.

Data Sources for Projected RWS Purchases

Supply allocations are based on projected RWS purchases provided to BAWSCA by the Member Agencies. Following the completion of the Demand Study in June 2020, BAWSCA used the results to develop a table for each Member Agency listing possible supplies and total demand for 2025, 2030, 2035, 2040, and 2045. BAWSCA populated the tables with total demand after passive conservation and entered active conservation, as calculated in the agencies' DSS Model, as a source of supply. Multi-source agencies were asked to complete the table with supply projections, including from the RWS, to meet total demand. Single-source agencies were offered the opportunity to review the tables upon request. Because active conservation was treated as a source of supply, projected RWS purchases are after passive and active conservation.

Water Management Representatives (WMRs) received a draft copy of all projected wholesale RWS purchase requests as part of the January 7, 2021 WMR meeting agenda packet and meeting slides. Agencies were asked to notify BAWSCA if changes were necessary regarding their purchase requests prior to BAWSCA sending those purchase requests to the SFPUC. Purchase requests were transmitted to the SFPUC via a letter dated January 15, 2021 for use in their 2020 UWMP efforts.

Note that the projected RWS purchases used by BAWSCA for fiscal years 2020-21 and for 2021-22 were provided to Christina Tang, BAWSCA's Finance Manager, by each Member Agency in January 2021. This annual reporting is part of the SFPUC's wholesale rate setting process. Member Agencies have provided BAWSCA with these projected purchases annually for the past 10 years.

UWMP Tables 7-1 and 7-5

UWMP Table 7-1 requests supply reliability for a normal year, a single dry year, and multiple (five) dry years. Tables 3, 4, 5, and 6 provided in the Supply Reliability Letter will help your agency complete UWMP Table 7-1. The Drought Risk Assessment (DRA) in UWMP Table 7-5 also requests a five-year drought sequence but specifies years 2021 through 2025. Supply Reliability Letter Tables 9 and 10 will help your agency complete UWMP Table 7-5.

The Supply Reliability Letter provides four tables for completing UWMP Table 7-1. The Supply Reliability Letter Tables 3 (with Bay-Delta Plan) and 4 (without Bay-Delta Plan) use 2020 as the base year. Depending on which scenario you choose, these will be the basis for your agency's five-year DRA (UWMP Table 7-5). The Supply Reliability Letter Tables 5 (with Bay-Delta Plan) and 6 (without Bay-Delta Plan) use 2025 as the base year. Depending on which scenario you choose, these will be the basis for UWMP Tables 7-2 through 7-4. Your agency may submit multiple UWMP Tables 7-1 with different base years (see Figure 1 below).

Attachment B: Updated 2020 UWMP Drought Cutbacks

Figure 1: Footnote from Draft UWMP Table 7-1

Supplier may use multiple versions of Table 7-1 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 Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.

Total RWS supplies available to the Wholesale Customers in the first through fifth consecutive dry years in Supply Reliability Letter Table 3 align with those in Table 9 of the same letter. Similarly, Supply Reliability Letter Table 4 aligns with Table 10 of the same letter.

Table A below provides a summary of the Member Agencies' RWS supply drought cutbacks under each of the four supply availability conditions and is intended to help you complete UWMP Tables 7-1and 7-5.

Table A: Wholesale Customer Drought Cutbacks Based on a Single Dry Year and Multiple Dry Years (Base Year 2020)

	(a)	(b)	(c)	(d)	(e)	(f)	(g)
(1)	Projected SF RWS Wholesale Purchases	132.2 MGD	138.6 MGD	140.8 MGD	140.8 MGD	140.8 MGD	140.8 MGD
(2)	Supply Available to the Wholesale Customers	Percent Cutback on Wholesale RWS Purchases					
		2020	**2021**	**2022**	**2023**	**2024**	**2025**
(3)	157.5 MGD	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
(4)	132.5 MGD	0.0%	-4.4%	-5.9%	-5.9%	-5.9%	-5.9%
(5)	82.8 MGD	-37.4%	-40.3%	-41.2%	-41.2%	-41.2%	-41.2%
(6)	74.5 MGD	-43.7%	-46.3%	-47.1%	-47.1%	-47.1%	-47.1%

Table A, column (a), rows 3 through 6 lists total RWS supplies available to the Wholesale Customers as provided in the Supply Reliability Letter tables. Row 1 provides cumulative actual wholesale RWS purchases for 2020. In years when the Bay-Delta Plan is not in effect, sufficient RWS supplies will be available to meet the Wholesale Customers' purchase requests assuming that they are between the 2020 and 2025 projected levels. As such, RWS supply available to the Wholesale Customers in the 2021 and 2022 is equal to the cumulative projected wholesale RWS.. Projected RWS purchases for years 2021 and 2022 were provided to Christina Tang, BAWSCA's Finance Manager, by the Member Agencies in January 2021. The SFPUC's modeling approach does not allow for varying demands over the course of a dry year sequence. Additionally, the Tier 2 Plan calculates each agencies' Allocation Factor once at the onset of a drought and it remains the same until the shortage condition is over. Therefore, wholesale RWS demand in 2023 through 2025 is assumed to be static based on the 2022 projected demand.

Table B below provides a summary of the Member Agencies' RWS supply drought cutbacks under each of the four supply availability conditions and is intended to help you complete UWMP Table 7-1.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table B: Wholesale Customer Drought Cutbacks Based on a Single Dry Year and Multiple Dry Years (Base Year 2025)

	(a)	(b)	(c)	(d)	(e)	(f)
(1)	Projected SF RWS Wholesale Purchases	146.0 MGD	146.0 MGD	146.0 MGD	146.0 MGD	146.0 MGD
(2)	Supply Available to the Wholesale Customers	Percent Cutback on Wholesale RWS Purchases				
		2025	**2026**	**2027**	**2028**	**2029**
(3)	157.5 MGD	0.0%	0.0%	0.0%	0.0%	0.0%
(4)	132.5 MGD	-9.2%	-9.2%	-9.2%	-9.2%	-9.2%
(5)	82.8 MGD	-43.3%	-43.3%	-43.3%	-43.3%	-43.3%
(6)	74.5 MGD	-49.0%	-49.0%	-49.0%	-49.0%	-49.0%

Table B, column (a), rows 3 through 6 lists total RWS supplies available to the Wholesale Customers as provided in the Supply Reliability Letter tables. Row 1 provides cumulative projected wholesale RWS purchases for 2025 through 2029. The SFPUC's modeling approach does not allow for varying demands over the course of a dry year sequence. Additionally, the Tier 2 Plan calculates each agencies' Allocation Factor once at the onset of a drought and it remains the same until the shortage condition is over. Therefore, wholesale RWS demand is assumed to be static between 2025 and 2029 based on the 2025 projected demand.

To complete UWMP Tables 7-1 and 7-5, reference tables in the Supply Reliability Letter to identify total RWS supplies available to the Wholesale Customers and apply the percent cutback in the corresponding year of the drought sequence using Tables A and B. For example, in Supply Reliability Letter Table 3, in the 5^{th} consecutive year of a drought, the volume available to the Wholesale Customers is 74.5 MGD. To calculate RWS supplies available to your agency in 2025 using table A, locate the row with 74.5 MGD on the table – row 6 – and the column for 2025 – column (g). Then apply the percent cutback to your agency's RWS demand in 2025.

A list of purchase projections by agency are provided in Tables C, D, E, and F. The table also indicates the percent cutback that should be applied based on total RWS supplies available to the Wholesale Customers. Tables C and E use Scenario 1: <u>With</u> Bay-Delta Plan. Tables D and F use Scenario 2: <u>Without</u> Bay-Delta Plan. Tables C and D use 2020 as the base year and Tables E and F use 2025 as the base year.

BAWSCA understands that agencies are updating projected demands for their 2020 UWMPs and that projected RWS purchases may change from what was previously provided. Additionally, BAWSCA recognizes that not all Member Agencies will choose the same scenario for their UWMP supply reliability tables. For both reasons, projected RWS purchases in each Member Agency's 2020 UWMP may not add up to total Wholesale demands in the SFPUC's 2020 UWMP. This is consistent with direction given by the Department of Water Resources, which encourages suppliers use the UWMP tables to represent what they believe to be the most likely supply reliability scenario and to characterize the five-consecutive year drought in a manner that is best suited for understanding and managing their water service reliability and individual agency level of risk tolerance.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table C: Scenario 1: With Bay-Delta Plan - Projected Wholesale Customer RWS Demand and Percent Cutback for a Single Dry Year and Multiple Dry Years (Base Year 2020)

	2020 (184 MGD)		**2021** (157.5 MGD)		**2022** (132.5 MGD)		**2023** (74.5 MGD)		**2024** (74.5 MGD)		**2025** (74.5 MGD)	
Agency	Actual Purchases	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback
ACWD	7.87	0.0%	9.44	0.0%	9.46	-5.9%	9.46	-47%	9.46	-47%	9.46	-47%
Brisbane/GVMID	0.64	0.0%	0.62	0.0%	0.65	-5.9%	0.65	-47%	0.65	-47%	0.65	-47%
Burlingame	3.48	0.0%	3.34	0.0%	3.35	-5.9%	3.35	-47%	3.35	-47%	3.35	-47%
Coastside	1.02	0.0%	1.54	0.0%	1.23	-5.9%	1.23	-47%	1.23	-47%	1.23	-47%
CalWater Total	29.00	0.0%	29.66	0.0%	29.81	-5.9%	29.81	-47%	29.81	-47%	29.81	-47%
Daly City	3.97	0.0%	4.00	0.0%	4.01	-5.9%	4.01	-47%	4.01	-47%	4.01	-47%
East Palo Alto	1.57	0.0%	1.63	0.0%	1.69	-5.9%	1.69	-47%	1.69	-47%	1.69	-47%
Estero	4.34	0.0%	4.48	0.0%	4.51	-5.9%	4.51	-47%	4.51	-47%	4.51	-47%
Hayward	13.92	0.0%	14.47	0.0%	15.12	-5.9%	15.12	-47%	15.12	-47%	15.12	-47%
Hillsborough	2.62	0.0%	2.95	0.0%	3.05	-5.9%	3.05	-47%	3.05	-47%	3.05	-47%
Menlo Park	2.96	0.0%	2.92	0.0%	2.93	-5.9%	2.93	-47%	2.93	-47%	2.93	-47%
Mid-Peninsula	2.66	0.0%	2.65	0.0%	2.80	-5.9%	2.80	-47%	2.80	-47%	2.80	-47%
Millbrae	1.90	0.0%	1.95	0.0%	2.15	-5.9%	2.15	-47%	2.15	-47%	2.15	-47%
Milpitas	5.92	0.0%	5.88	0.0%	5.34	-5.9%	5.34	-47%	5.34	-47%	5.34	-47%
Mountain View	7.67	0.0%	7.80	0.0%	8.05	-5.9%	8.05	-47%	8.05	-47%	8.05	-47%
North Coast	2.37	0.0%	2.58	0.0%	2.66	-5.9%	2.66	-47%	2.66	-47%	2.66	-47%
Palo Alto	9.75	0.0%	9.44	0.0%	9.66	-5.9%	9.66	-47%	9.66	-47%	9.66	-47%
Purissima Hills	1.75	0.0%	1.97	0.0%	2.02	-5.9%	2.02	-47%	2.02	-47%	2.02	-47%
Redwood City	8.76	0.0%	8.72	0.0%	9.07	-5.9%	9.07	-47%	9.07	-47%	9.07	-47%
San Bruno	0.95	0.0%	3.39	0.0%	3.40	-5.9%	3.40	-47%	3.40	-47%	3.40	-47%
San José	4.26	0.0%	4.31	0.0%	4.51	-5.9%	4.51	-47%	4.51	-47%	4.51	-47%
Santa Clara	3.27	0.0%	3.29	0.0%	3.50	-5.9%	3.50	-47%	3.50	-47%	3.50	-47%
Stanford	1.43	0.0%	1.40	0.0%	1.54	-5.9%	1.54	-47%	1.54	-47%	1.54	-47%
Sunnyvale	9.33	0.0%	9.35	0.0%	9.45	-5.9%	9.45	-47%	9.45	-47%	9.45	-47%
Westborough	0.82	0.0%	0.84	0.0%	0.81	-5.9%	0.81	-47%	0.81	-47%	0.81	-47%
Wholesale Total	**132.2**	**132.2†**	**138.6**	**138.6†**	**140.8**	**132.5†**	**140.8**	**74.5†**	**140.8**	**74.5†**	**140.8**	**74.5†**

† Total supply available to the Wholesale Customers after drought cutback.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table D: Scenario 2: <u>Without</u> Bay-Delta Plan - Projected Wholesale Customer RWS Demand and Percent Cutback for a Single Dry Year and Multiple Dry Years (Base Year 2020)

	2020 (184 MGD)		**2021** (157.5 MGD)		**2022** (132.5 MGD)		**2023** (132.5 MGD)		**2024** (132.5 MGD)		**2025** (132.5 MGD)	
Agency	Actual Purchases	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback
ACWD	7.87	0.0%	9.44	0.0%	9.46	-5.9%	9.46	-5.9%	9.46	-5.9%	9.46	-5.9%
Brisbane/GVMID	0.64	0.0%	0.62	0.0%	0.65	-5.9%	0.65	-5.9%	0.65	-5.9%	0.65	-5.9%
Burlingame	3.48	0.0%	3.34	0.0%	3.35	-5.9%	3.35	-5.9%	3.35	-5.9%	3.35	-5.9%
Coastside	1.02	0.0%	1.54	0.0%	1.23	-5.9%	1.23	-5.9%	1.23	-5.9%	1.23	-5.9%
CalWater Total	29.00	0.0%	29.66	0.0%	29.81	-5.9%	29.81	-5.9%	29.81	-5.9%	29.81	-5.9%
Daly City	3.97	0.0%	4.00	0.0%	4.01	-5.9%	4.01	-5.9%	4.01	-5.9%	4.01	-5.9%
East Palo Alto	1.57	0.0%	1.63	0.0%	1.69	-5.9%	1.69	-5.9%	1.69	-5.9%	1.69	-5.9%
Estero	4.34	0.0%	4.48	0.0%	4.51	-5.9%	4.51	-5.9%	4.51	-5.9%	4.51	-5.9%
Hayward	13.92	0.0%	14.47	0.0%	15.12	-5.9%	15.12	-5.9%	15.12	-5.9%	15.12	-5.9%
Hillsborough	2.62	0.0%	2.95	0.0%	3.05	-5.9%	3.05	-5.9%	3.05	-5.9%	3.05	-5.9%
Menlo Park	2.96	0.0%	2.92	0.0%	2.93	-5.9%	2.93	-5.9%	2.93	-5.9%	2.93	-5.9%
Mid-Peninsula	2.66	0.0%	2.65	0.0%	2.80	-5.9%	2.80	-5.9%	2.80	-5.9%	2.80	-5.9%
Millbrae	1.90	0.0%	1.95	0.0%	2.15	-5.9%	2.15	-5.9%	2.15	-5.9%	2.15	-5.9%
Milpitas	5.92	0.0%	5.88	0.0%	5.34	-5.9%	5.34	-5.9%	5.34	-5.9%	5.34	-5.9%
Mountain View	7.67	0.0%	7.80	0.0%	8.05	-5.9%	8.05	-5.9%	8.05	-5.9%	8.05	-5.9%
North Coast	2.37	0.0%	2.58	0.0%	2.66	-5.9%	2.66	-5.9%	2.66	-5.9%	2.66	-5.9%
Palo Alto	9.75	0.0%	9.44	0.0%	9.66	-5.9%	9.66	-5.9%	9.66	-5.9%	9.66	-5.9%
Purissima Hills	1.75	0.0%	1.97	0.0%	2.02	-5.9%	2.02	-5.9%	2.02	-5.9%	2.02	-5.9%
Redwood City	8.76	0.0%	8.72	0.0%	9.07	-5.9%	9.07	-5.9%	9.07	-5.9%	9.07	-5.9%
San Bruno	0.95	0.0%	3.39	0.0%	3.40	-5.9%	3.40	-5.9%	3.40	-5.9%	3.40	-5.9%
San José	4.26	0.0%	4.31	0.0%	4.51	-5.9%	4.51	-5.9%	4.51	-5.9%	4.51	-5.9%
Santa Clara	3.27	0.0%	3.29	0.0%	3.50	-5.9%	3.50	-5.9%	3.50	-5.9%	3.50	-5.9%
Stanford	1.43	0.0%	1.40	0.0%	1.54	-5.9%	1.54	-5.9%	1.54	-5.9%	1.54	-5.9%
Sunnyvale	9.33	0.0%	9.35	0.0%	9.45	-5.9%	9.45	-5.9%	9.45	-5.9%	9.45	-5.9%
Westborough	0.82	0.0%	0.84	0.0%	0.81	-5.9%	0.81	-5.9%	0.81	-5.9%	0.81	-5.9%
Wholesale Total	**132.2**	**132.2†**	**138.6**	**138.6†**	**140.8**	**132.5†**	**140.8**	**132.5†**	**140.8**	**132.5†**	**140.8**	**132.5†**

† Total supply available to the Wholesale Customers after drought cutback.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table E: Scenario 1: <u>With</u> Bay-Delta Plan - Projected Wholesale Customer RWS Demand and Percent Cutback for a Single Dry Year and Multiple Dry Years (Base Year 2025)

	2025 (184 MGD)		**2026** (82.8 MGD)		**2027** (74.5 MGD)		**2028** (74.5 MGD)		**2029** (74.5 MGD)	
Agency	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback
ACWD	7.68	0%	7.68	-43.3%	7.68	-49%	7.68	-49%	7.68	-49%
Brisbane/GVMID	0.89	0%	0.89	-43.3%	0.89	-49%	0.89	-49%	0.89	-49%
Burlingame	4.33	0%	4.33	-43.3%	4.33	-49%	4.33	-49%	4.33	-49%
Coastside	1.40	0%	1.40	-43.3%	1.40	-49%	1.40	-49%	1.40	-49%
CalWater Total	29.99	0%	29.99	-43.3%	29.99	-49%	29.99	-49%	29.99	-49%
Daly City	3.57	0%	3.57	-43.3%	3.57	-49%	3.57	-49%	3.57	-49%
East Palo Alto	1.88	0%	1.88	-43.3%	1.88	-49%	1.88	-49%	1.88	-49%
Estero	4.07	0%	4.07	-43.3%	4.07	-49%	4.07	-49%	4.07	-49%
Hayward	17.86	0%	17.86	-43.3%	17.86	-49%	17.86	-49%	17.86	-49%
Hillsborough	3.26	0%	3.26	-43.3%	3.26	-49%	3.26	-49%	3.26	-49%
Menlo Park	3.55	0%	3.55	-43.3%	3.55	-49%	3.55	-49%	3.55	-49%
Mid-Peninsula	2.86	0%	2.86	-43.3%	2.86	-49%	2.86	-49%	2.86	-49%
Millbrae	2.29	0%	2.29	-43.3%	2.29	-49%	2.29	-49%	2.29	-49%
Milpitas	6.59	0%	6.59	-43.3%	6.59	-49%	6.59	-49%	6.59	-49%
Mountain View	8.60	0%	8.60	-43.3%	8.60	-49%	8.60	-49%	8.60	-49%
North Coast	2.34	0%	2.34	-43.3%	2.34	-49%	2.34	-49%	2.34	-49%
Palo Alto	10.06	0%	10.06	-43.3%	10.06	-49%	10.06	-49%	10.06	-49%
Purissima Hills	2.09	0%	2.09	-43.3%	2.09	-49%	2.09	-49%	2.09	-49%
Redwood City	8.46	0%	8.46	-43.3%	8.46	-49%	8.46	-49%	8.46	-49%
San Bruno	3.24	0%	3.24	-43.3%	3.24	-49%	3.24	-49%	3.24	-49%
San José	4.50	0%	4.50	-43.3%	4.50	-49%	4.50	-49%	4.50	-49%
Santa Clara	4.50	0%	4.50	-43.3%	4.50	-49%	4.50	-49%	4.50	-49%
Stanford	2.01	0%	2.01	-43.3%	2.01	-49%	2.01	-49%	2.01	-49%
Sunnyvale	9.16	0%	9.16	-43.3%	9.16	-49%	9.16	-49%	9.16	-49%
Westborough	0.86	0%	0.86	-43.3%	0.86	-49%	0.86	-49%	0.86	-49%
Wholesale Total	**146.0**	**146.0†**	**146.0**	**82.8†**	**146.0**	**74.5†**	**146.0**	**74.5†**	**146.0**	**74.5†**

† Total supply available to the Wholesale Customers after drought cutback.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table F: Scenario 2: Without Bay-Delta Plan - Projected Wholesale Customer RWS Demand and Percent Cutback for a Single Dry Year and Multiple Dry Years (Base Year 2025)

	2025 (184 MGD)		**2026** (157.5 MGD)		**2027** (157.5 MGD)		**2028** (157.5 MGD)		**2029** (132.5 MGD)	
Agency	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback
ACWD	7.68	0.0%	7.68	0.0%	7.68	0.0%	7.68	0.0%	7.68	-9.2%
Brisbane/GVMID	0.89	0.0%	0.89	0.0%	0.89	0.0%	0.89	0.0%	0.89	-9.2%
Burlingame	4.33	0.0%	4.33	0.0%	4.33	0.0%	4.33	0.0%	4.33	-9.2%
Coastside	1.40	0.0%	1.40	0.0%	1.40	0.0%	1.40	0.0%	1.40	-9.2%
CalWater Total	29.99	0.0%	29.99	0.0%	29.99	0.0%	29.99	0.0%	29.99	-9.2%
Daly City	3.57	0.0%	3.57	0.0%	3.57	0.0%	3.57	0.0%	3.57	-9.2%
East Palo Alto	1.88	0.0%	1.88	0.0%	1.88	0.0%	1.88	0.0%	1.88	-9.2%
Estero	4.07	0.0%	4.07	0.0%	4.07	0.0%	4.07	0.0%	4.07	-9.2%
Hayward	17.86	0.0%	17.86	0.0%	17.86	0.0%	17.86	0.0%	17.86	-9.2%
Hillsborough	3.26	0.0%	3.26	0.0%	3.26	0.0%	3.26	0.0%	3.26	-9.2%
Menlo Park	3.55	0.0%	3.55	0.0%	3.55	0.0%	3.55	0.0%	3.55	-9.2%
Mid-Peninsula	2.86	0.0%	2.86	0.0%	2.86	0.0%	2.86	0.0%	2.86	-9.2%
Millbrae	2.29	0.0%	2.29	0.0%	2.29	0.0%	2.29	0.0%	2.29	-9.2%
Milpitas	6.59	0.0%	6.59	0.0%	6.59	0.0%	6.59	0.0%	6.59	-9.2%
Mountain View	8.60	0.0%	8.60	0.0%	8.60	0.0%	8.60	0.0%	8.60	-9.2%
North Coast	2.34	0.0%	2.34	0.0%	2.34	0.0%	2.34	0.0%	2.34	-9.2%
Palo Alto	10.06	0.0%	10.06	0.0%	10.06	0.0%	10.06	0.0%	10.06	-9.2%
Purissima Hills	2.09	0.0%	2.09	0.0%	2.09	0.0%	2.09	0.0%	2.09	-9.2%
Redwood City	8.46	0.0%	8.46	0.0%	8.46	0.0%	8.46	0.0%	8.46	-9.2%
San Bruno	3.24	0.0%	3.24	0.0%	3.24	0.0%	3.24	0.0%	3.24	-9.2%
San José	4.50	0.0%	4.50	0.0%	4.50	0.0%	4.50	0.0%	4.50	-9.2%
Santa Clara	4.50	0.0%	4.50	0.0%	4.50	0.0%	4.50	0.0%	4.50	-9.2%
Stanford	2.01	0.0%	2.01	0.0%	2.01	0.0%	2.01	0.0%	2.01	-9.2%
Sunnyvale	9.16	0.0%	9.16	0.0%	9.16	0.0%	9.16	0.0%	9.16	-9.2%
Westborough	0.86	0.0%	0.86	0.0%	0.86	0.0%	0.86	0.0%	0.86	-9.2%
Wholesale Total	**146.0**	**146.0†**	**146.0**	**146.4†**	**146.0**	**146.8†**	**146.0**	**147.1†**	**146.0**	**132.5†**

† Total supply available to the Wholesale Customers after drought cutback.

Attachment B: Updated 2020 UWMP Drought Cutbacks

UWMP Table 7-4

Supply Reliability Letter Tables 7 and 8 will help your agency complete UWMP Table 7-4. Table G below provides a summary of the Member Agencies' RWS supply drought cutbacks under each of the four supply availability conditions and is intended to help you complete UWMP Table 7-4. The table assumes (1) the Tier 2 Plan will be used to allocate supplies available to the Wholesale Customers when average Wholesale Customers' RWS shortages are greater than 10 and up to 20 percent, and (2) an equal percent reduction will be shared across all Wholesale Customers when average Wholesale Customers' RWS shortages are 10 percent or less or greater than 20 percent.

Table G: Drought Cutbacks Based on Projected Demands Under All Water Supply Availability Conditions

	(a)	(b)	(c)	(d)	(e)	(f)
(1)	Projected SF RWS Wholesale Purchases	146.0 MGD	147.9 MGD	151.9 MGD	156.3 MGD	162.8 MGD
(2)	Supply Available to the Wholesale Customers	% Cutback on Wholesale RWS Purchases				
		2025	**2030**	**2035**	**2040**	**2045**
(3)	157.5 MGD	0.0%	0.0%	0.0%	0.0%	-3.2%
(4)	132.5 MGD	-9.3%	-10.4%	Tier 2 Avg. -14%*	Tier 2 Avg. -16%*	Tier 2 Avg. -19%*
(5)	82.8 MGD	-43.3%	-44.0%	-45.5%	-47.0%	-49.1%
(6)	74.5 MGD	-49.0%	-49.6%	-51.0%	-52.3%	-54.2%

* Calculated average. Individual agency cutbacks are calculated in Table H.

Table G, column (a) lists total RWS supplies available to the Wholesale Customers as provided in the Supply Reliability Letter tables. Row 1 provides cumulative projected wholesale RWS purchases for 2025, 2030, 2035, 2040, and 2045.

Tables H, I, J and K provide additional detail by agency for each of the four supply availability conditions listed in Table G. To complete UWMP Table 7-4, reference Table 7 or 8 (depending on which Bay-Delta Plan scenario you choose) in the Supply Reliability Letter to identify total RWS supplies available to the Wholesale Customers and apply the percent cutback in the corresponding year using Table G or input the volumetric drought allocation using Tables H, I, J and K below.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table H: Drought Allocations when Total Supplies Available to the Wholesale Customers are Equal to 157.5 MGD

Projected SF RWS Wholesale Purchases	146.0 MGD	147.9 MGD	151.9 MGD	156.3 MGD	162.8 MGD
	Drought Allocation (MGD)				
Agency	**2025**	**2030**	**2035**	**2040**	**2045**
ACWD	7.68	7.68	7.68	7.68	8.82
Brisbane/GVMID	0.89	0.89	0.88	0.89	0.87
Burlingame	4.33	4.40	4.47	4.58	4.54
Coastside	1.40	1.38	1.36	1.33	1.28
CalWater Total	29.99	29.74	29.81	30.27	29.71
Daly City	3.57	3.52	3.49	3.46	3.32
East Palo Alto	1.88	1.95	2.10	2.49	2.80
Estero	4.07	4.11	4.18	4.23	4.24
Hayward	17.86	18.68	19.75	20.82	21.43
Hillsborough	3.26	3.25	3.26	3.26	3.15
Menlo Park	3.55	3.68	3.87	4.06	4.15
Mid-Peninsula	2.86	2.84	2.88	2.89	2.83
Millbrae	2.29	2.50	2.45	2.82	3.10
Milpitas	6.59	6.75	7.03	7.27	7.29
Mountain View	8.60	8.90	9.20	9.51	9.61
North Coast	2.34	2.33	2.34	2.34	2.27
Palo Alto	10.06	10.15	10.28	10.51	10.44
Purissima Hills	2.09	2.09	2.12	2.13	2.08
Redwood City	8.46	8.49	8.64	8.74	8.62
San Bruno	3.24	3.22	3.20	3.20	3.11
San José	4.50	4.50	4.50	4.50	4.35
Santa Clara	4.50	4.50	4.50	4.50	4.35
Stanford	2.01	2.18	2.35	2.53	2.61
Sunnyvale	9.16	9.30	10.70	11.44	11.71
Westborough	0.86	0.85	0.85	0.84	0.82
Wholesale Total	**146.0**	**147.9**	**151.9**	**156.3**	**157.5**

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table I: Drought Allocations when Total Supplies Available to the Wholesale Customers are Equal to 132.5 MGD

Projected SF RWS Wholesale Purchases	146.0 MGD	147.9 MGD	151.9 MGD	156.3 MGD	162.8 MGD
	Drought Allocation (MGD)				
Agency	**2025**	**2030**	**2035**	**2040**	**2045**
ACWD	6.97	6.88	6.91	6.91	8.20
Brisbane/GVMID	0.81	0.79	0.73	0.73	0.72
Burlingame	3.93	3.94	3.96	3.89	3.80
Coastside	1.27	1.24	1.22	1.20	1.19
CalWater Total	27.21	26.65	26.46	25.69	24.69
Daly City	3.24	3.15	3.04	3.01	2.98
East Palo Alto	1.70	1.75	1.97	2.30	2.62
Estero	3.69	3.68	3.76	3.87	3.77
Hayward	16.20	16.74	17.32	17.69	18.07
Hillsborough	2.96	2.92	2.90	2.75	2.56
Menlo Park	3.22	3.30	3.37	3.33	3.26
Mid-Peninsula	2.59	2.54	2.59	2.62	2.54
Millbrae	2.07	2.24	2.16	2.32	2.45
Milpitas	5.98	6.05	6.25	6.31	6.35
Mountain View	7.80	7.97	8.28	8.49	8.34
North Coast	2.12	2.09	2.11	2.11	2.11
Palo Alto	9.13	9.09	9.26	9.46	9.71
Purissima Hills	1.89	1.87	1.42	1.38	1.32
Redwood City	7.67	7.61	7.89	7.70	7.49
San Bruno	2.94	2.88	2.56	2.51	2.45
San José	4.08	4.03	3.03	2.91	2.76
Santa Clara	4.08	4.03	3.03	2.91	2.76
Stanford	1.82	1.95	2.06	2.13	2.16
Sunnyvale	8.31	8.33	9.46	9.51	9.43
Westborough	0.78	0.76	0.76	0.76	0.76
Wholesale Total	**132.5**	**132.5**	**132.5**	**132.5**	**132.5**

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table J: Drought Allocations when Total Supplies Available to the Wholesale Customers are Equal to 82.8 MGD

Projected SF RWS Wholesale Purchases	146.0 MGD	147.9 MGD	151.9 MGD	156.3 MGD	162.8 MGD
	Drought Allocation (MGD)				
Agency	**2025**	**2030**	**2035**	**2040**	**2045**
ACWD	4.36	4.30	4.19	4.07	4.64
Brisbane/GVMID	0.51	0.50	0.48	0.47	0.45
Burlingame	2.45	2.46	2.44	2.43	2.39
Coastside	0.79	0.77	0.74	0.71	0.68
CalWater Total	17.00	16.65	16.25	16.03	15.62
Daly City	2.02	1.97	1.90	1.83	1.75
East Palo Alto	1.06	1.09	1.14	1.32	1.47
Estero	2.31	2.30	2.28	2.24	2.23
Hayward	10.13	10.46	10.77	11.03	11.26
Hillsborough	1.85	1.82	1.78	1.73	1.66
Menlo Park	2.01	2.06	2.11	2.15	2.18
Mid-Peninsula	1.62	1.59	1.57	1.53	1.49
Millbrae	1.30	1.40	1.34	1.49	1.63
Milpitas	3.74	3.78	3.83	3.85	3.83
Mountain View	4.88	4.98	5.01	5.04	5.05
North Coast	1.33	1.30	1.28	1.24	1.19
Palo Alto	5.71	5.68	5.61	5.57	5.49
Purissima Hills	1.18	1.17	1.15	1.13	1.10
Redwood City	4.80	4.76	4.71	4.63	4.53
San Bruno	1.83	1.80	1.75	1.70	1.63
San José	2.55	2.52	2.45	2.38	2.29
Santa Clara	2.55	2.52	2.45	2.38	2.29
Stanford	1.14	1.22	1.28	1.34	1.37
Sunnyvale	5.19	5.21	5.83	6.06	6.16
Westborough	0.49	0.48	0.46	0.45	0.43
Wholesale Total	**82.8**	**82.8**	**82.8**	**82.8**	**82.8**

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table K: Drought Allocations when Total Supplies Available to the Wholesale Customers are Equal to 74.5 MGD

Projected SF RWS Wholesale Purchases	146.0 MGD	147.9 MGD	151.9 MGD	156.3 MGD	162.8 MGD
	Drought Allocation (MGD)				
Agency	**2025**	**2030**	**2035**	**2040**	**2045**
ACWD	3.92	3.87	3.77	3.66	4.17
Brisbane/GVMID	0.46	0.45	0.43	0.42	0.41
Burlingame	2.21	2.21	2.19	2.18	2.15
Coastside	0.71	0.70	0.67	0.64	0.61
CalWater Total	15.30	14.98	14.62	14.43	14.05
Daly City	1.82	1.77	1.71	1.65	1.57
East Palo Alto	0.96	0.98	1.03	1.19	1.32
Estero	2.08	2.07	2.05	2.02	2.00
Hayward	9.11	9.41	9.69	9.92	10.14
Hillsborough	1.66	1.64	1.60	1.55	1.49
Menlo Park	1.81	1.86	1.90	1.94	1.96
Mid-Peninsula	1.46	1.43	1.41	1.38	1.34
Millbrae	1.17	1.26	1.20	1.34	1.47
Milpitas	3.36	3.40	3.45	3.47	3.45
Mountain View	4.39	4.48	4.51	4.53	4.54
North Coast	1.19	1.17	1.15	1.12	1.07
Palo Alto	5.14	5.11	5.04	5.01	4.94
Purissima Hills	1.06	1.05	1.04	1.02	0.99
Redwood City	4.31	4.28	4.24	4.17	4.08
San Bruno	1.65	1.62	1.57	1.53	1.47
San José	2.30	2.27	2.21	2.14	2.06
Santa Clara	2.30	2.27	2.21	2.14	2.06
Stanford	1.03	1.10	1.15	1.21	1.24
Sunnyvale	4.67	4.69	5.25	5.45	5.54
Westborough	0.44	0.43	0.41	0.40	0.39
Wholesale Total	**74.5**	**74.5**	**74.5**	**74.5**	**74.5**

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

525 Golden Gate Avenue, 13th Floor
San Francisco, CA 94102
T 415.554.3155
F 415.554.3161
TTY 415.554.3488

TO: SFPUC Wholesale Customers

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

DATE: June 2, 2021

RE: Regional Water System Supply Reliability and UWMP 2020

This memo is in response to various comments from Wholesale Customers we have received regarding the reliability of the Regional Water System supply and San Francisco's 2020 Urban Water Management Plan (UWMP).

As you are all aware, the UWMP makes clear the potential effect of the amendments to the Bay-Delta Water Quality Control Plan adopted by the State Water Resources Control Board on December 12, 2018 should it be implemented. Regional Water System-wide water supply shortages of 40-50% could occur until alternative water supplies are developed to replace those shortfalls. Those shortages could increase dramatically if the State Water Board's proposed Water Quality Certification of the Don Pedro Federal Energy Regulatory Commission (FERC) relicensing were implemented.

We are pursuing several courses of action to remedy this situation as detailed below.

Pursuing a Tuolumne River Voluntary Agreement

The State Water Board included in its action of December 12, 2018 a provision allowing for the development of Voluntary Agreements as an alternative to the adopted Plan. Together with the Modesto and Turlock Irrigation Districts, we have been actively pursuing a Tuolumne River Voluntary Agreement (TRVA) since January 2017. We believe the TRVA is a superior approach to producing benefits for fish with a much more modest effect on our water supply. Unfortunately, it has been a challenge to work with the State on this, but we continue to persist, and of course we are still interested in early implementation of the TRVA.

Evaluating our Drought Planning Scenario in light of climate change

Ever since the drought of 1987-92, we have been using a Drought Planning Scenario with a duration of 8.5 years as a stress test of our Regional Water System supplies. Some stakeholders have criticized this methodology as being too conservative. This fall we anticipate our Commission convening a workshop regarding our use of the 8.5-year Drought Planning Scenario, particularly in light of climate change resilience assessment work that we have funded through the Water Research Foundation. We look forward to a valuable discussion with our various stakeholders and the Commission.

Pursuing Alternative Water Supplies

The SFPUC continues to aggressively pursue Alternative Water Supplies to address whatever shortfall may ultimately occur pending the outcome of negotiation and/or litigation. The most extreme degree of Regional Water System supply shortfall is modeled to be 93 million gallons per day under implementation of the Bay-Delta Plan amendments. We are actively pursuing more than a dozen projects, including recycled water for irrigation, purified water for potable use, increased reservoir storage and conveyance, brackish water desalination, and partnerships with other agencies, particularly the Turlock and Modesto Irrigation Districts. Our goal is to have a suite of alternative water supply projects ready for CEQA review by July 1, 2023.

In litigation with the State over the Bay-Delta Plan Amendments

On January 10, 2019, we joined in litigation against the State over the adoption of the Bay-Delta Water Quality Control Plan Amendments on substantive and procedural grounds. The lawsuit was necessary because there is a statute of limitations on CEQA cases of 30 days, and we needed to preserve our legal options in the event that we are unsuccessful in reaching a voluntary agreement for the Tuolumne River. Even then, potential settlement of this litigation is a possibility in the future.

In litigation with the State over the proposed Don Pedro FERC Water Quality Certification

The State Water Board staff raised the stakes on these matters by issuing a Water Quality Certification for the Don Pedro FERC relicensing on January 15, 2021 that goes well beyond the Bay-Delta Plan amendments. The potential impact of the conditions included in the Certification appear to virtually double the water supply impact on our Regional Water System of the Bay-Delta Plan amendments. We requested that the State Water Board reconsider the Certification, including conducting hearings on it, but the State Water Board took no action. As a result, we were left with no choice but to once again file suit against the State. Again, the Certification includes a clause that it could be replaced by a Voluntary Agreement, but that is far from a certainty.

I hope this makes it clear that we are actively pursuing all options to resolve this difficult situation. We remain committed to creating benefits for the Tuolumne River while meeting our Water Supply Level of Service Goals and Objectives for our retail and wholesale customers.

cc.: SFPUC Commissioners
Nicole Sandkulla, CEO/General Manager, BAWSCA

Appendix J: 26 March 2021 SFPUC Commission Special Meeting – Water Workshop Number 3 Water Supply Planning Scenarios SFPUC Staff Presentation Material

Operated by the San Francisco Public Utilities Commission

Water Workshop Number 3
Water Supply Planning Scenarios

March 26, 2021

Introduction

- Ten water supply planning scenarios were run using our HHLSM system modeling tool and the Regional Water System Supply and Demand Worksheet.
- For each scenario the ultimate result is either a surplus or deficit of supply, and each scenario produces different results, demonstrating the effect of the choices that are made.
- The assumptions and results for each scenario will be displayed in this presentation.
- The presentation concludes with a summary table of the bottom-line results for all the scenarios.

The Ten Scenarios

I. Previous Demand Estimates
II. Current Conditions
III. Tuolumne River Voluntary Agreement
IV. Bay-Delta Plan
V. Bay-Delta Plan with Alternative Water Supply Projects
VI. Bay-Delta Plan with Alternative Water Supply Projects and Modified Rationing Policy
VII. Bay-Delta Plan with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought
VIII. Water Quality Certification (401) with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought
IX. NGO scenario 1: Current system, 198 mgd constant demand, Bay-Delta Plan flows
X. NGO Scenario 2: Current system, 223 mgd constant demand, 7 ½ year design drought, Bay-Delta Plan flows

Hetch Hetchy Regional Water System

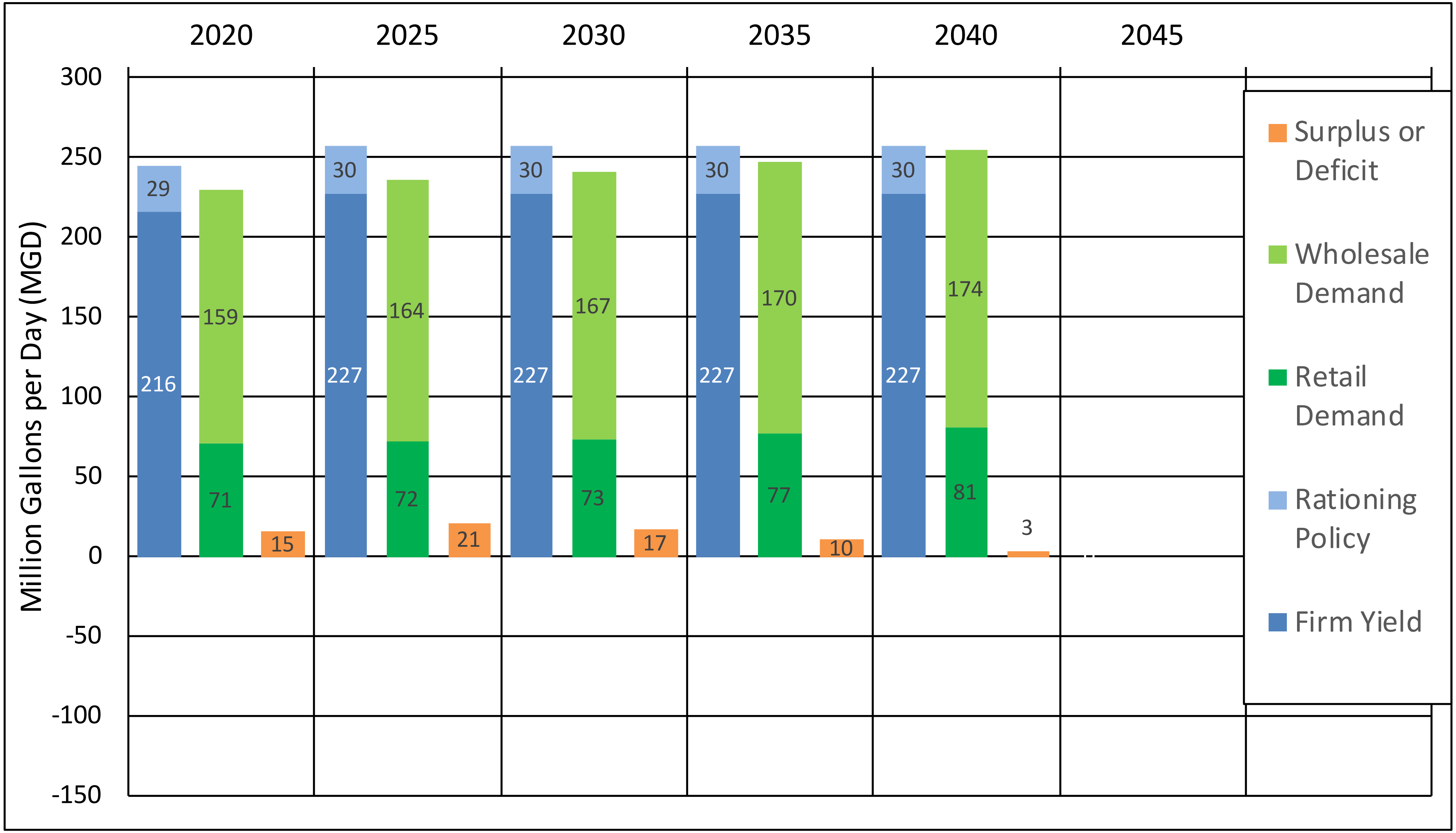
I. Prior Demand Estimates

- Includes retail demand projections from the 2015 Urban Water Management Plan
- Includes 2015 purchase projections from wholesale customers
- Includes current side agreement on flows in the lower Tuolumne River
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	2020	2025	2030	2035	2040	2045
Total Yield:	245	257	257	257	257	NA
RWS Demand:	230	236	241	247	255	NA
Lower Tuolumne Contribution:	NA	NA	NA	NA	NA	NA
Surplus or Deficit:	15	21	17	10	3	NA

I. Prior Demand Estimates



Hetch Hetchy Regional Water System

II. Current Conditions

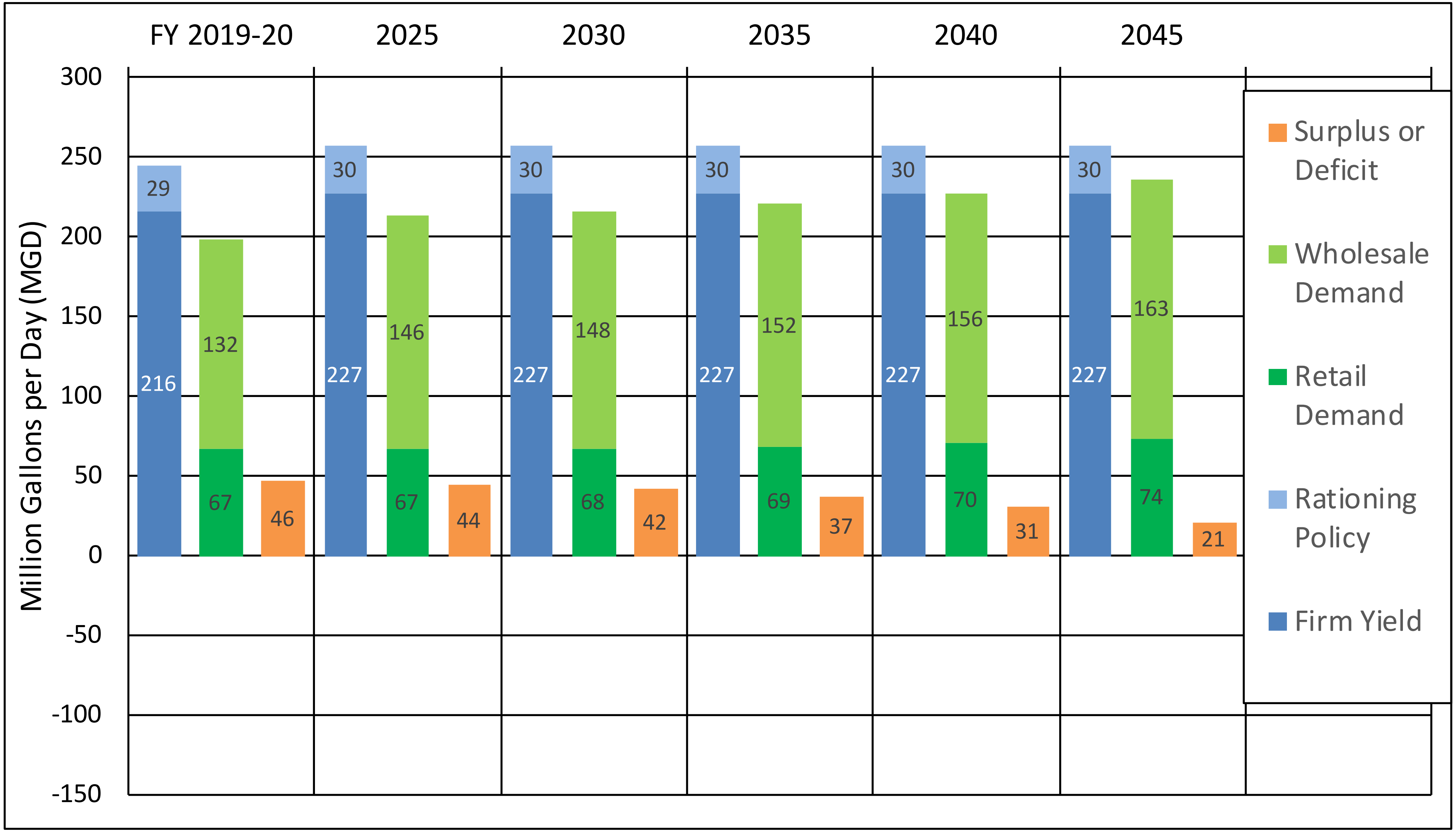
- Includes updated demand projections for anticipated development in retail service area*
- Includes most recent purchase projections from wholesale customers*
- Includes a total of 9 MGD for San Jose and Santa Clara*
- Includes the 1995 side agreement on flows in the lower Tuolumne River
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	245	257	257	257	257	257
RWS Demand:	198	213	215	220	227	236
Lower Tuolumne Contribution:	NA	NA	NA	NA	NA	NA
Surplus or Deficit:	46	44	42	37	31	21

* Base Conditions in later slides

II. Current Conditions



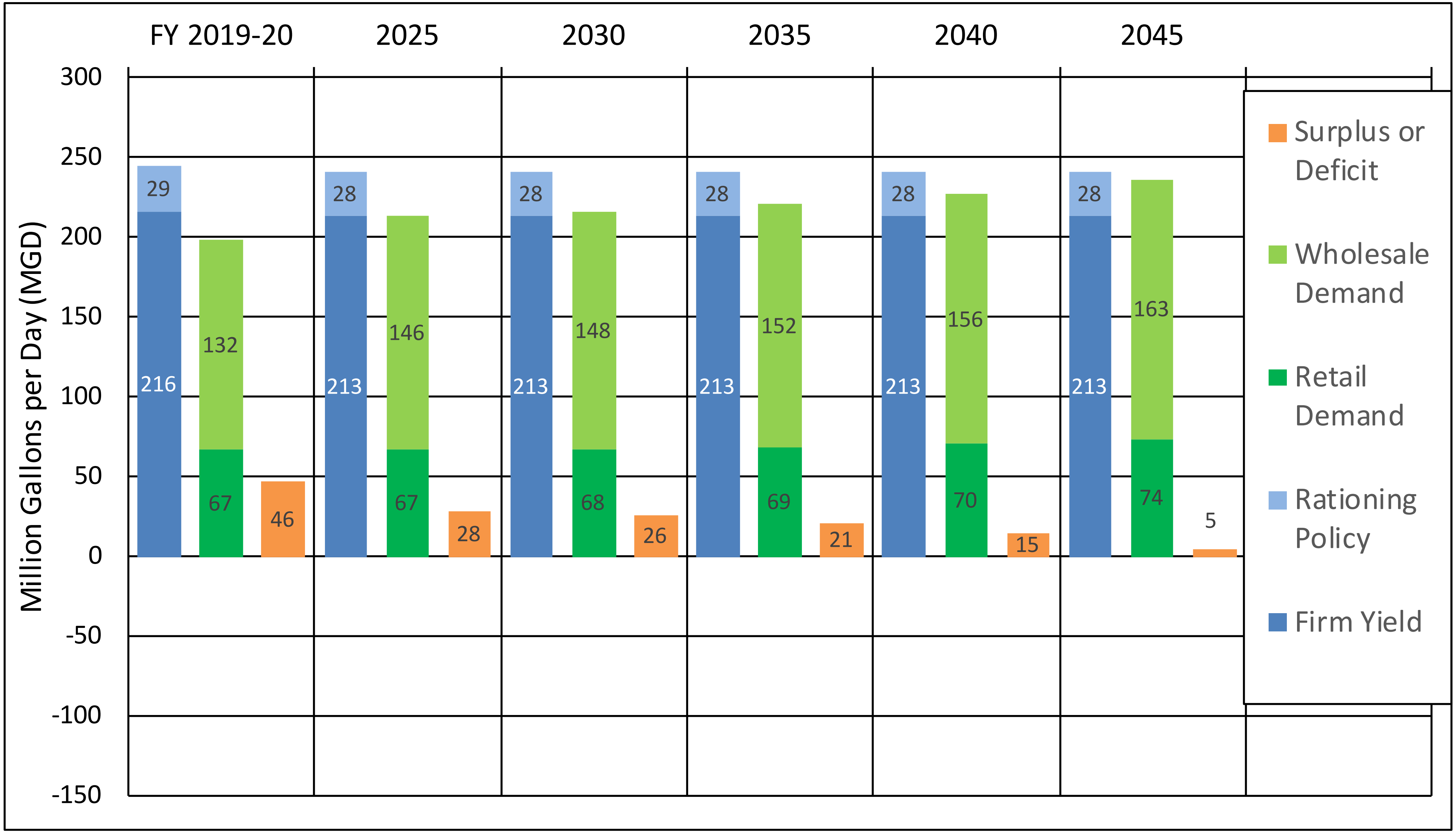
III. Tuolumne River Voluntary Agreement

- Base Conditions
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy
- Includes SFPUC contribution to the TRVA, displayed in the graph as a reduction in Firm Yield
- SFPUC contributions are calculated according to the 4th Agreement and assumes continuation of the 1995 side agreement.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	245	241	241	241	241	241
RWS Demand:	198	213	215	220	227	236
Lower Tuolumne Contribution:	NA	14	14	14	14	14
Surplus or Deficit:	46	28	26	21	15	5

III. Tuolumne River Voluntary Agreement



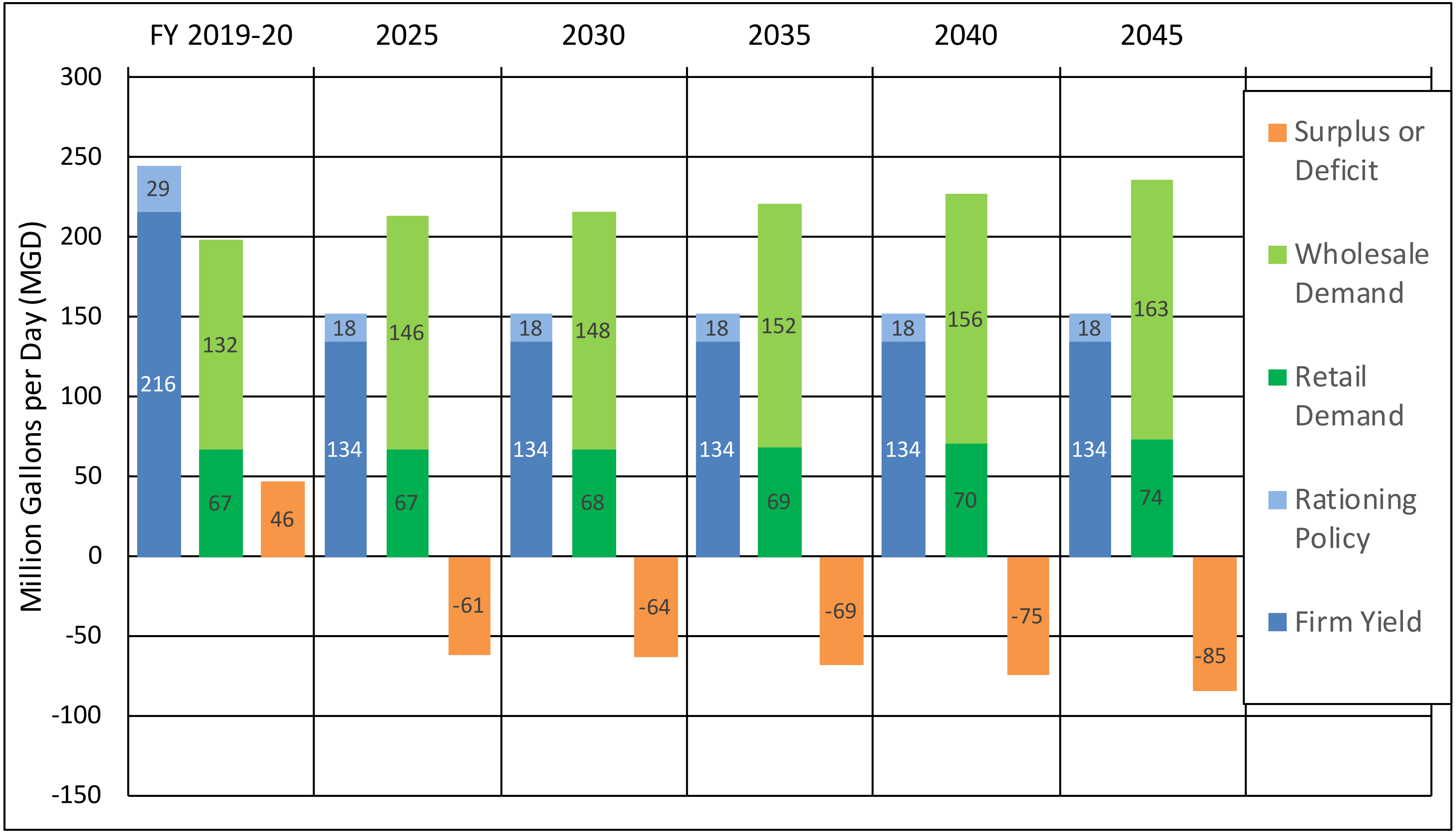
IV. Bay-Delta Plan

- Base Conditions
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy
- Includes SFPUC contribution to the Bay-Delta Plan displayed in the graph as a reduction in Firm Yield, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	245	152	152	152	152	152
RWS Demand:	198	213	215	220	227	236
Lower Tuolumne Contribution:	NA	93	93	93	93	93
Surplus or Deficit:	46	-61	-64	-69	-75	-85

IV. Bay-Delta Plan



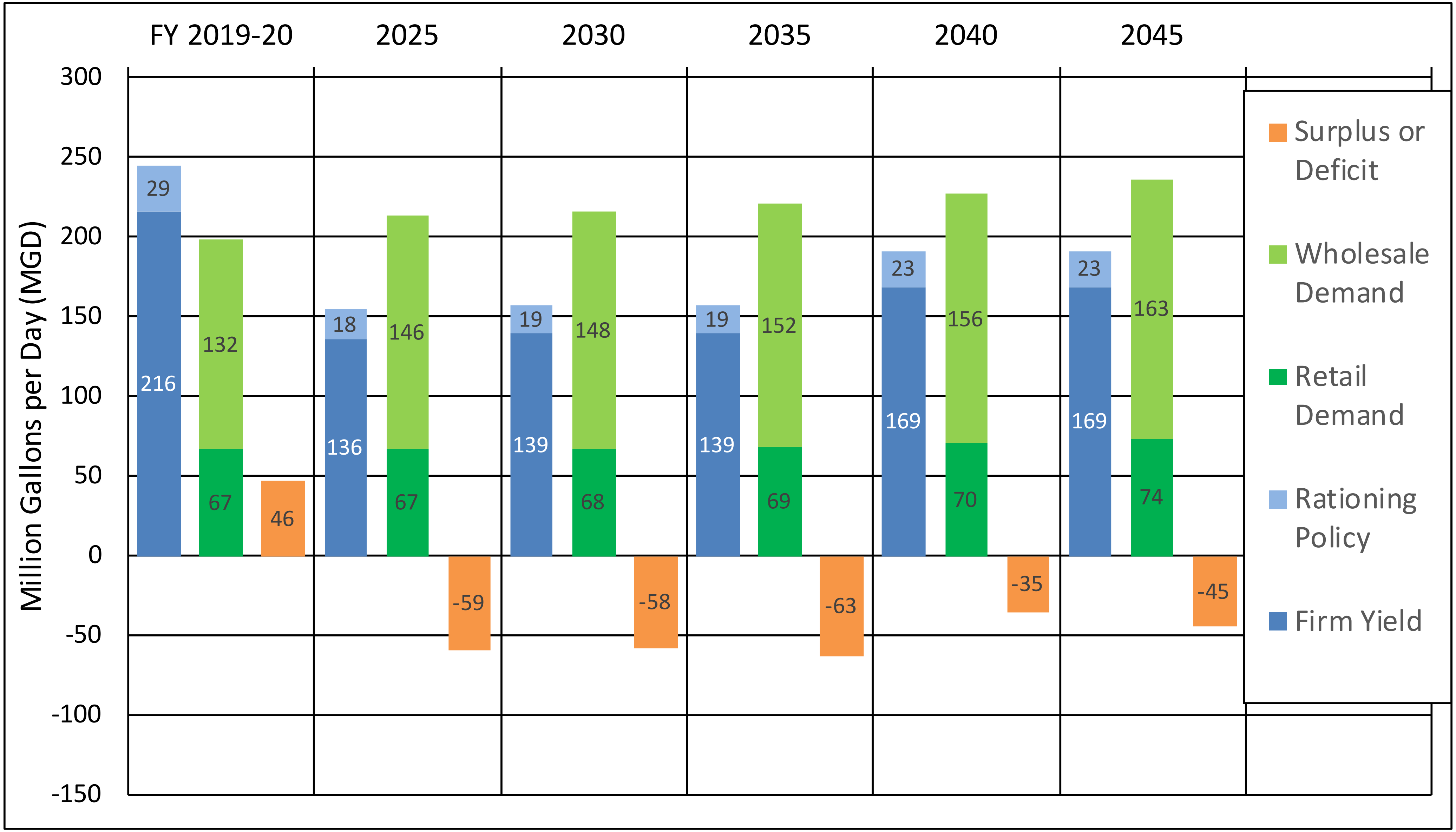
V. Bay-Delta Plan with Alternative Water Supply Projects

- Base Conditions
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy
- Includes SFPUC contribution to the Bay-Delta Plan displayed in the graph as a reduction in Firm Yield, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year.
- SFPUC contributions are calculated according to the 4th Agreement and continuation of the 1995 side agreement.
- Includes a total of 35 MGD of new water supply projects, which are assumed to be added between 2025 and 2040. The firm yield from the new projects is shown separately in the table to demonstrate the estimated development of the projects over time. The new project yield is also included in the Total Yield shown in the table.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	245	154	158	158	192	192
RWS Demand:	198	213	215	220	227	236
Lower Tuolumne Contribution:	NA	93	93	93	93	93
Alternative Water Supply Projects:	NA	2	5	5	35	35
Surplus or Deficit:	46	-59	-58	-63	-35	-45

V. Bay-Delta Plan with Alternative Water Supply Projects



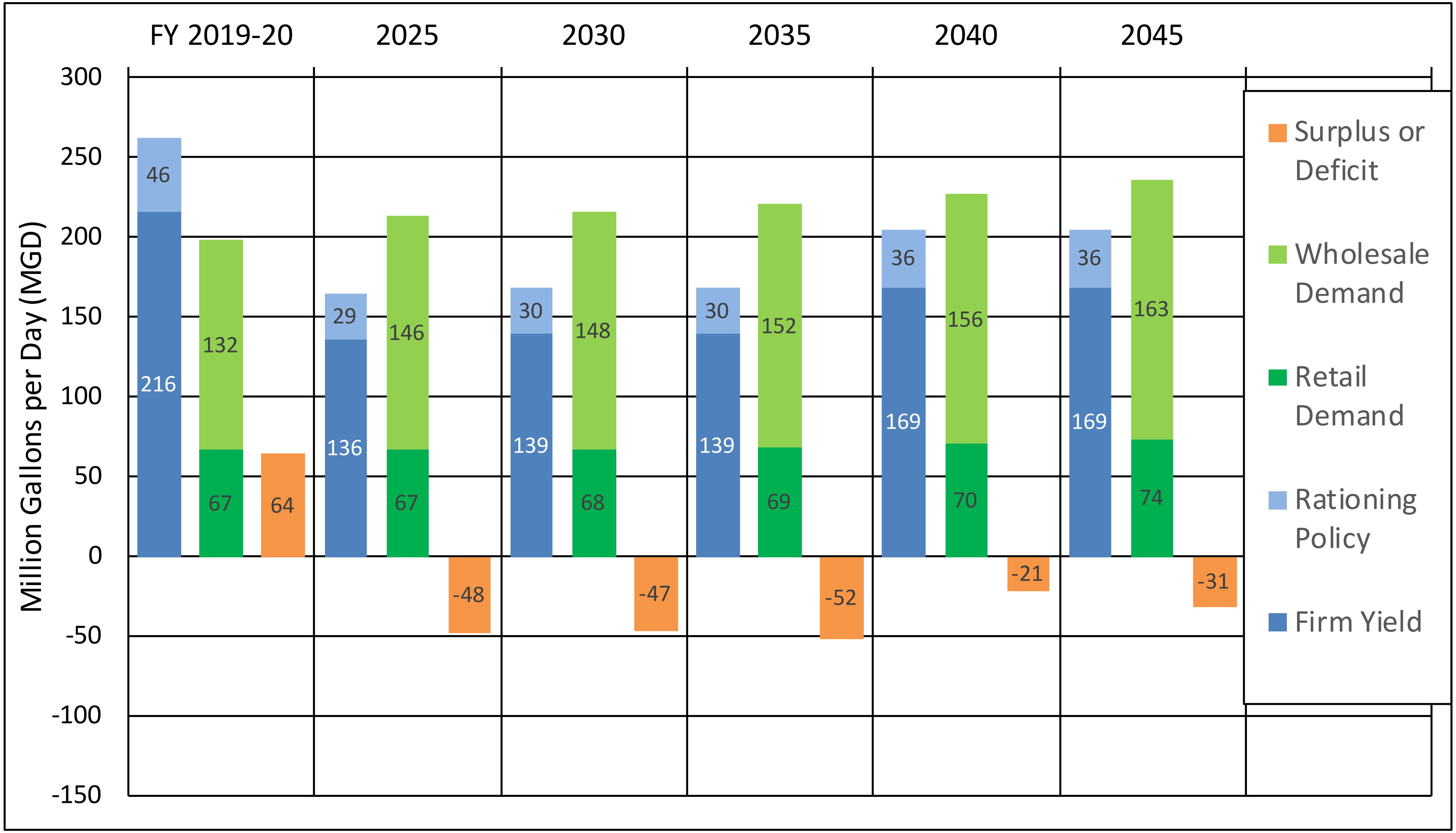
VI. Bay-Delta Plan with Alternative Water Supply Projects and Modified Rationing Policy

- Base Conditions
- Yield values are based on the 8.5-year design drought
- Includes SFPUC contribution to the Bay-Delta Plan displayed in the graph as a reduction in Firm Yield, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.
- Includes a total of 35 MGD of new water supply projects, as described on slide 12 for scenario V
- Includes 7.5 years of rationing at 20% in the 8.5-year design drought sequence

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	262	165	169	169	205	205
RWS Demand:	198	213	215	220	227	236
Lower Tuolumne Contribution:	NA	93	93	93	93	93
Surplus or Deficit:	64	-48	-47	-52	-21	-31

VI. Bay-Delta Plan with Alternative Water Supply Projects and Modified Rationing Policy



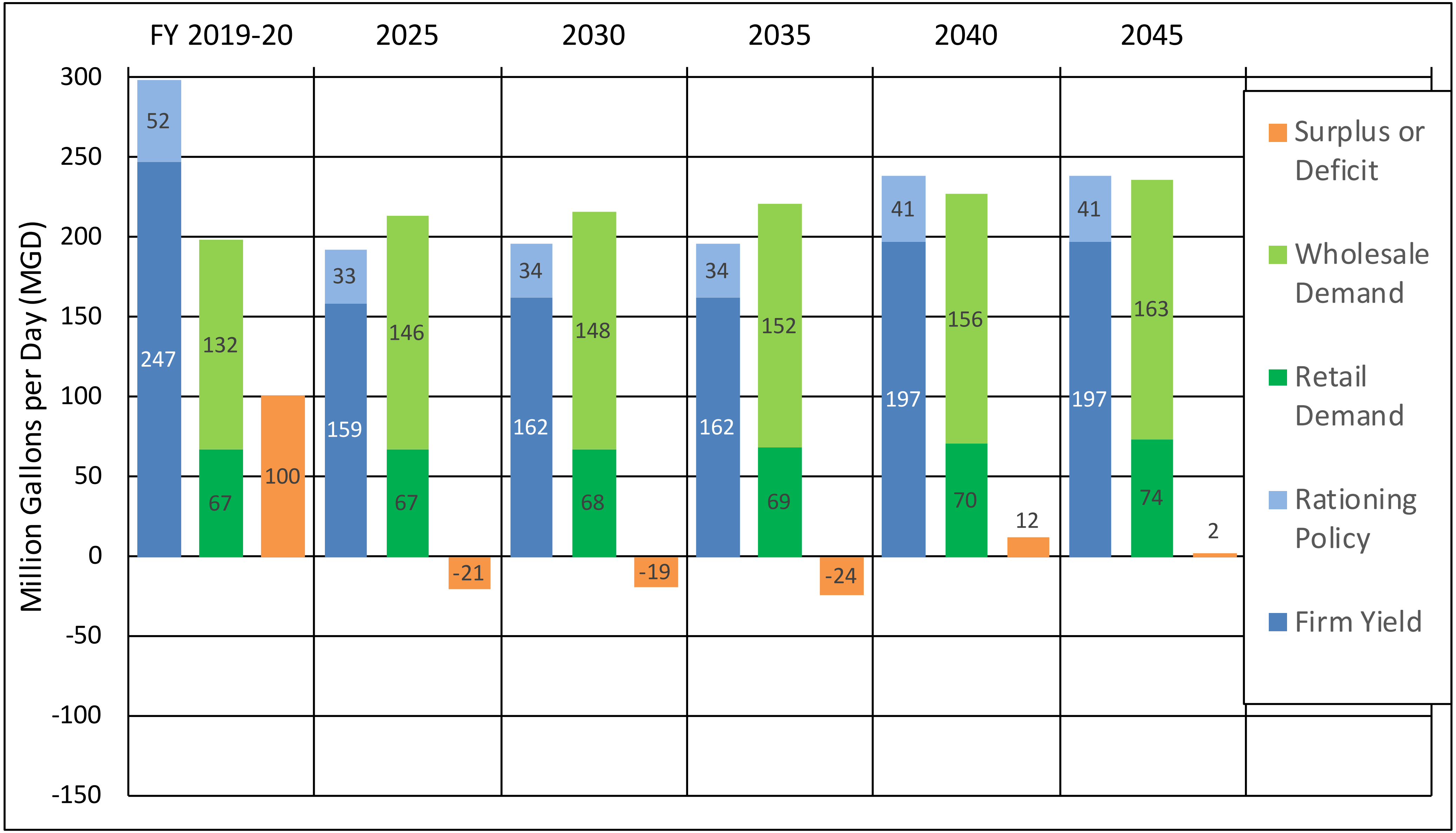
VII. Bay-Delta Plan with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought

- Base Conditions
- Includes SFPUC contribution to the Bay-Delta Plan displayed in the graph as a reduction in Firm Yield, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.
- Includes a total of 35 MGD of new water supply projects, as described on slide 12 for scenario V
- Yield values are estimated using a 7.5-year design drought
- Includes 6.5 years of rationing at 20% in the 7.5-year design drought sequence.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	299	192	196	196	238	238
RWS Demand:	198	213	215	220	227	236
Lower Tuolumne Contribution:	NA	101	101	101	101	101
Surplus or Deficit:	100	-21	-19	-24	12	2

VII. Bay-Delta Plan with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought



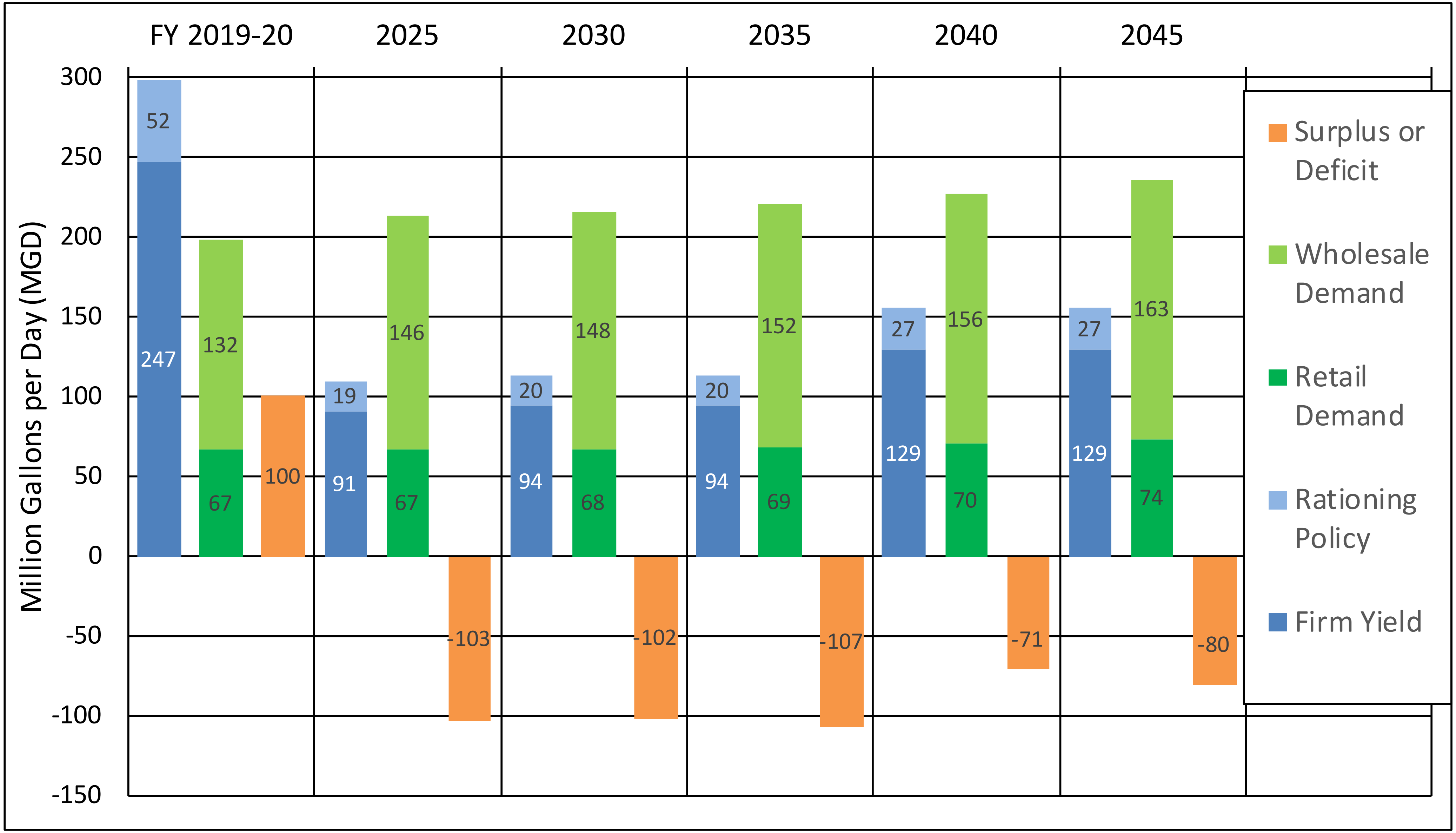
VIII. Water Quality Certification (401) with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought

- Base Conditions
- Includes SFPUC contribution to the Section 401 water quality certification on the FERC license displayed in the graph as a reduction in Firm Yield.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.
- Includes a total of 35 MGD of new water supply projects, as described on slide 12 for scenario V
- Yield values are estimated using a 7.5-year design drought
- Includes 6.5 years of rationing at 20% in the 7.5-year design drought sequence.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	299	110	114	114	156	156
RWS Demand:	198	213	215	220	227	236
Lower Tuolumne Contribution:	NA	169	169	169	169	169
Surplus or Deficit:	100	-103	-102	-107	-71	-80

VIII. Water Quality Certification (401) with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought



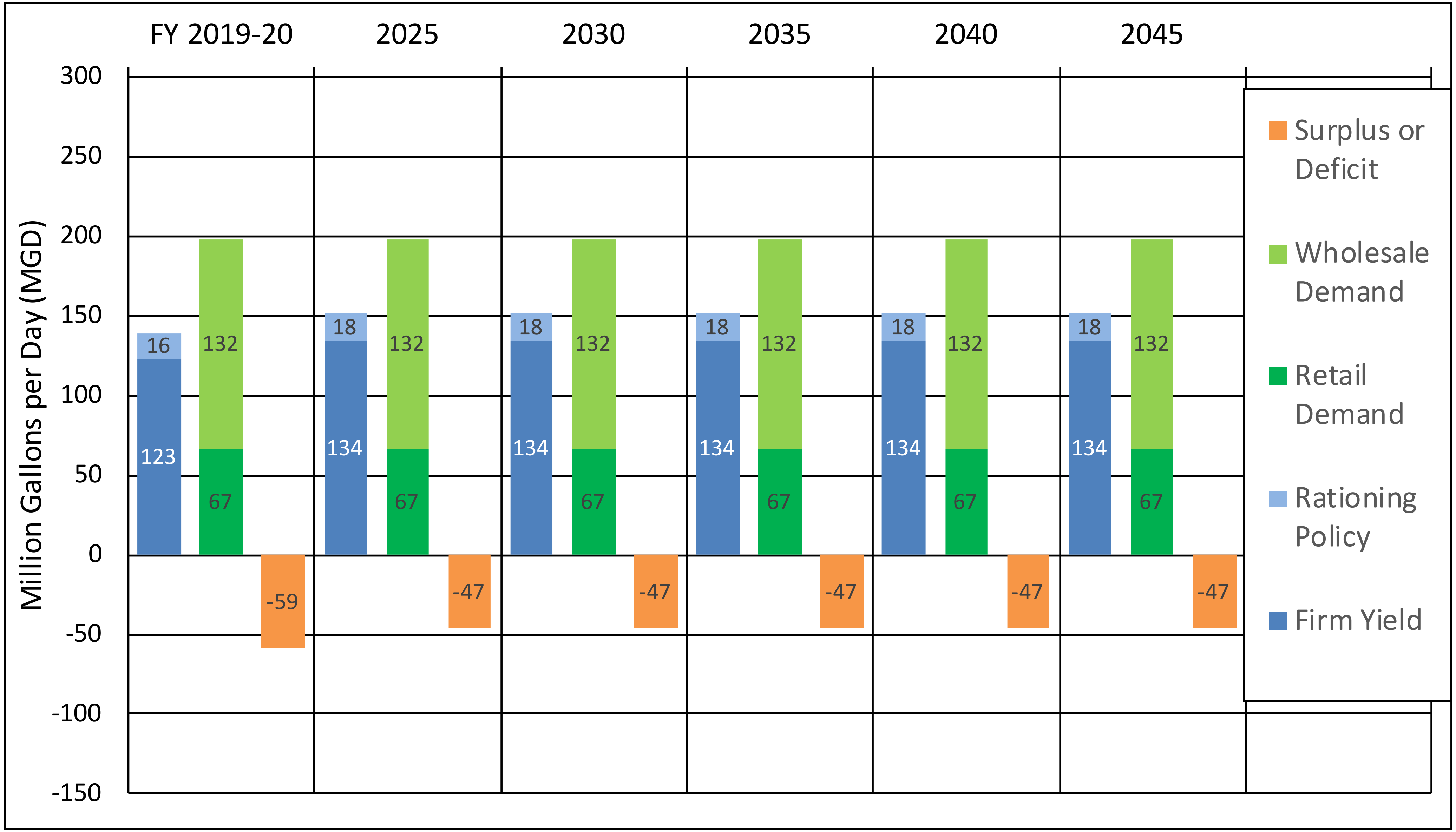
IX. NGO scenario 1: Current system, 198 mgd constant demand, Bay-Delta Plan flows

- Assumes that retail and wholesale demand on the RWS remain at the current level of approximately 198 MGD, and that SFPUC contributions to the Bay-Delta Plan are being made now
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy
- Includes SFPUC contribution to the Bay-Delta Plan, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	139	152	152	152	152	152
RWS Demand:	198	198	198	198	198	198
Lower Tuolumne Contribution:	93	93	93	93	93	93
Surplus or Deficit:	-59	-47	-47	-47	-47	-47

IX. NGO scenario 1: Current system, 198 mgd constant demand, Bay-Delta Plan flows



X. NGO scenario 2: Current system, 223 mgd constant demand, 7½ year design drought, Bay-Delta Plan flows

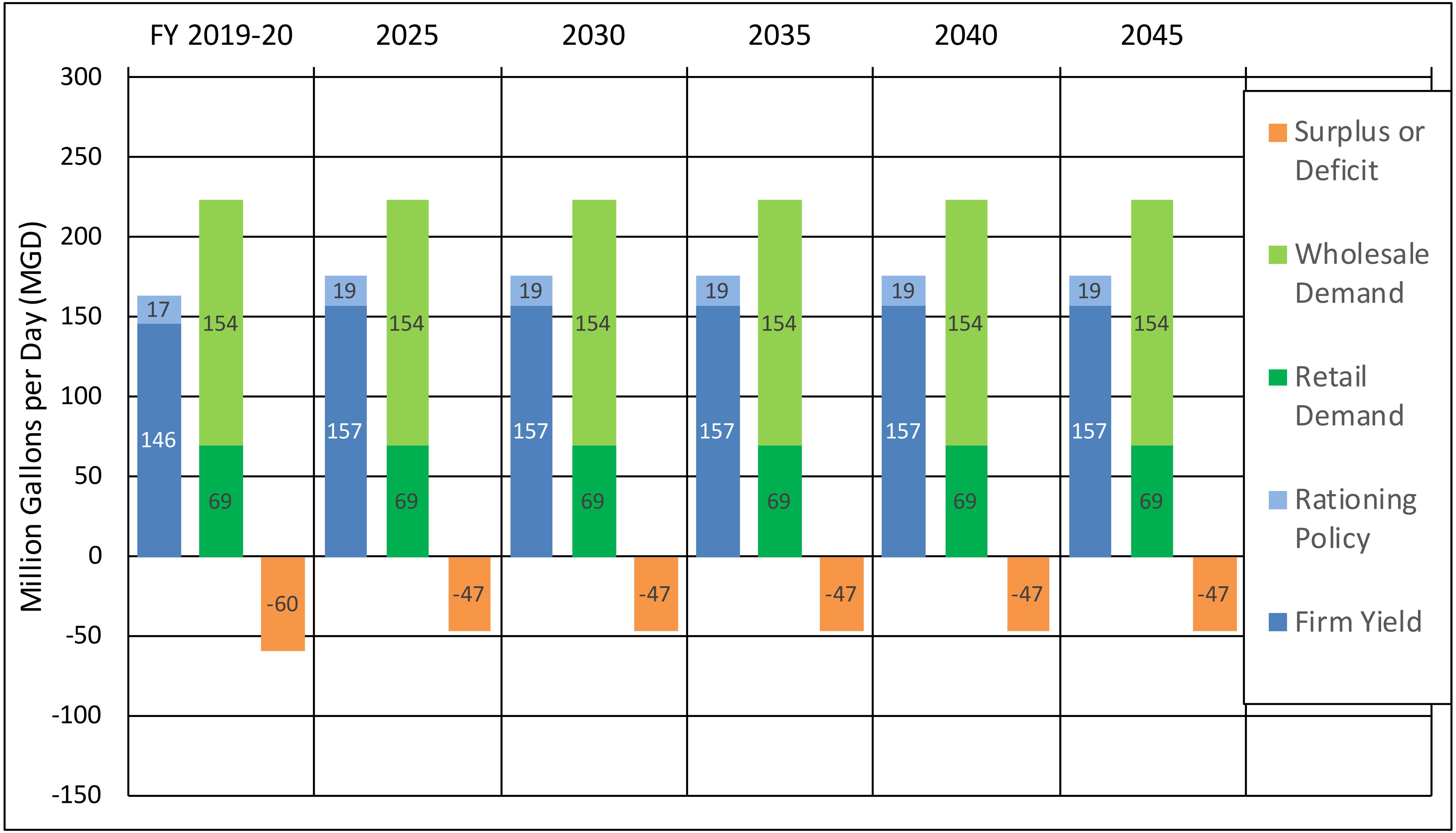
Hetch Hetchy Regional Water System

- Includes an assumed demand of 223 MGD for the SFPUC service area in all years
- Includes a total of 9 MGD for San Jose and Santa Clara
- Includes SFPUC contribution to the Bay-Delta Plan, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year. Assumes this contribution begins now.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.
- Yield values are estimated using a 7.5-year design drought and a truncated version of the adopted WSIP rationing policy

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	163	176	176	176	176	176
RWS Demand:	223	223	223	223	223	223
Lower Tuolumne Contribution:	101	101	101	101	101	101
Surplus or Deficit:	-59	-47	-47	-47	-47	-47

X. NGO scenario 2: Current system, 223 mgd constant demand, 7½ year design drought, Bay-Delta Plan flows



SCENARIO SURPLUSES OR DEFICITS						
SCENARIOS	**FY19-20**	**2025**	**2030**	**2035**	**2040**	**2045**
I. Previous Demand Estimates	15	21	17	10	3	NA
II. Current Conditions	46	44	42	37	31	21
III. Tuolumne River Voluntary Agreement	46	28	26	21	15	5
IV. Bay-Delta Plan	46	-61	-64	-69	-75	-85
V. Bay-Delta Plan with Alternative Water Supply Projects	46	-59	-58	-63	-35	-45
VI. Bay-Delta Plan with Alternative Water Supply Projects and Modified Rationing Policy	64	-48	-47	-52	-21	-31
VII. Bay-Delta Plan with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design	100	-21	-19	-24	12	2
VIII. Water Quality Certification (401) with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought	100	-103	-102	-107	-71	-80
IX. NGO scenario 1: Current system and 198 mgd constant demand and Bay-Delta Plan flows	-59	-47	-47	-47	-47	-47
X. NGO Scenario 2: Current system, 223 mgd constant demand, 7 ½ year design drought and Bay-Delta Plan	-60	-47	-47	-47	-47	-47

Appendix K: Bay-Delta Plan Correspondence

- Tier 2 Shortage Allocation Methodology, dated June 7, 2021
- Comments on the 2018 Final Draft of the Proposed Amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary and Final Substitute Environmental Document, dated July 27, 2018
- Comments on the Substitute Environmental Document Concerning the Sacramento-San Joaquin Bay Delta Water Quality Control Plan, dated March 17, 2017

CALIFORNIA WATER SERVICE
Water Resource Sustainability Department 1720 North First Street
San Jose, CA 95112

June 7, 2021

Nicole Sandkulla, Chief Executive Officer
Bay Area Water Supply Conservation Agency
155 Bovet Road, Suite 650
San Mateo, CA 94402

Re: Tier 2 Shortage Allocation Methodology

Dear Ms. Sandkulla:

As you know, the State Water Resources Control Board's (SWRCB) 2018 adoption of amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan Amendment) could significantly affect the future reliability of the SFPUC's water supplies to its wholesale customers. This action, together with the subsequent failure to achieve a Voluntary Agreement between the SWRCB and the impacted parties, has certainly complicated the process of preparing our 2020 updates to the urban water management plans (UWMP) for our three districts receiving supplies from the SFPUC's Regional Water System.

Cal Water appreciates the assistance that the Bay Area Water Supply and Conservation Agency (BAWSCA) has provided to its member agencies by coordinating with the SFPUC on the development and communication of the projected impacts of these potential cutbacks. Given the lack of time to develop an alternative shortage allocation method for distributing limited SFPUC supplies among the wholesale customers, Cal Water plans to adopt supply projections for its 2020 UWMPs based on the equal allocation cutback methodology discussed during the recent UWMP workshops and provided by BAWSCA. However, this letter serves as a formal notice that Cal Water does not agree to the methodology and our actions should not be considered as acceptance of this approach should an actual allocation of limited supplies be necessary in the future.

As you will recall, Cal Water shared an allocation methodology and accompanying tool that we feel could be easily transferable to the BAWSCA service area to create a more equitable allocation of available SFPUC supplies. This methodology is a "needs based" approach that considers factors such as basic health and safety needs, a wholesale customers reliance on SFPUC supplies, and overall efficiency to avoid drastic differences in retail level reliability. This seeks to minimize economic impacts on individual communities and the region.

We believe BAWSCA understands the problematic inequities that would occur if the equal allocation cutback methodology were employed, and we look forward to the discussion of alternative shortage allocation approaches among the Member Agencies to ensure that cutbacks are allocated equitably in the event of a severe drought.

CALIFORNIA WATER SERVICE

Sincerely,

Michael Hurley
Water Resources Manager

CALIFORNIA WATER SERVICE

July 27, 2018

The Honorable Felicia Marcus, Chair
The Honorable Tam Doduc, Hearing Officer
Ms. Jeanine Townsend, Clerk of the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, CA 95814

Re: Comments on the 2018 Final Draft of the Proposed Amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta Estuary and Final Substitute Environmental Document

Dear Chair Marcus & Board Member Doduc:

California Water Service (Cal Water) is the largest water utility regulated by the California Public Utilities Commission and a proud steward of the environment that strongly supports sustainability efforts to ensure a safe and adequate supply of drinking water. Since 1926, we have provided millions of Californians with safe, reliable, and high-quality water utility service. Today, we serve about two million residents in service areas across the state that covers a vast array of California's footprint from Chico in the north to the Palos Verdes Peninsula in the south.

Our comments today are in addition to the comments Cal Water submitted on March 17, 2017. Cal Water sincerely appreciates the time and effort the State Water Resources Control Board (Board) has put into not only preparing the Supplemental Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the Bay-Delta (SED), but also undertaking an extensive public outreach effort related to the SED. Further, Cal Water understands the need to protect the water quality of the Sacramento-San Joaquin Bay Delta, and we recognize the importance of reliable, high-quality water to our state's health and continued economic growth.

Cal Water is proud to be at the forefront of a number of the state's efforts to ensure that all Californians continue to have safe and dependable potable water supplies. For example, during California's historic drought, Cal Water built upon its industry-leading water conservation program, and developed a customer first drought response effort that provided customers with the information and tools they needed to meet the aggressive water use targets established by the Governor and State Water Resources Control Board.

Additionally, Cal Water is one of the only water utilities in California that has supported the establishment of a Safe and Affordable Drinking Water Fund, as championed by Senator Bill Monning in his Senate Bill 623. In our view, efforts like these will do much to protect the health and safety of millions of Californians and to help those who have been under-served or without access to safe drinking water.

We take our responsibility for providing reliable, affordable water supply to our customers and communities very seriously. In light of this responsibility, we must communicate our concerns with the SED. Across our service areas, we rely on a combination of surface water and groundwater. As both a purchaser of wholesale water from various suppliers and a water rights holder, Cal Water has interests in "areas of origin," exports from the Delta, and locally derived supplies. For example, Cal Water relies on locally derived supplies to provide water to approximately 257,000 people in our Bayshore and Bear Gulch service areas, which are in the San Francisco Bay Area. Because of certain restrictions under federal law, a reduction in water supply to the Hetch Hetchy Regional Water System could significantly impact our ability to serve these customers.

As is the case with many water utilities, Cal Water is reliant in many of our service areas on the supplies made available by local wholesale agencies. For example, we utilize significant imported water from our wholesale partners to serve approximately 171,000 people who live in and around the City of Stockton. In those areas where we are unable to rely on groundwater to supplement the water we receive from local wholesalers, any water supply shortages will directly impact us and our ability to serve our customers. This is also true in service areas where the future use of local groundwater supplies may be limited by rules and regulations established pursuant to the Sustainable Groundwater Management Act. Further, as a retail agency within the service area of the Metropolitan Water District of Southern California, we are well aware of the needs for maintaining drinking water quality and reliability that sources from the Bay-Delta system.

We respectfully ask that the Board give due consideration to the very limited flexibility of urban water suppliers to meet their responsibilities in providing safe and reliable service at a reasonable cost. The Board appears to attribute more flexibility and opportunity for enhancing water supplies from other sources and arrangements than are realistically achievable.

We would like to commend the Board's flexibility through its allowance for a range of potential flows rather than rigid, real-time adherence to a specific percent of unimpaired flow. We urge the Board to consider proposals that focus on functional flows combined with habitat improvements that meet clearly defined objectives regarding timing, temperature and other specified criteria to improve fish production and the overall environment.

Finally, Cal Water believes that a negotiated solution is in the best interests of all parties. Water agencies have proven on many occasions that they are capable of reaching agreement with regulators and other interested parties concerning far-reaching regulatory programs, including the Bay-Delta. We urge the Water Board to continue to provide the water users the opportunity to work with the regulatory agencies to develop long lasting plans to improve the sustainability of our water system ecosystem and address the needs of all interests.

Cal Water stands committed and ready to work with the Board, parties to the negotiations, and others to reach such a solution that meets the long-term needs of our state. If there is anything we can do to assist you or if you have any questions, please do not hesitate to call on us for support.

Sincerely,

Robert Kuta

Vice President, Engineering

Cc: Marty Kropelnicki, President and Chief Executive Officer, Cal Water

Tim Treloar, VP Water Quality & Chief Utility Operations Officer, Cal Water

Michael Hurley, Water Resource Manager, Cal Water

Nicole Sandkulla, Chief Executive Officer/General Manager, BAWSCA

Scott Moody, District Manager, Stockton East Water District

CALIFORNIA WATER SERVICE
1720 North First Street
San Jose, CA 95112-4598 Tel: (408) 367-8200

March 17, 2017

The Honorable Felicia Marcus, Chair
The Honorable Tam Doduc, Hearing Officer
Ms. Jeanine Townsend, Clerk of the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, CA 95814

Re: Comments on the Substitute Environmental Document Concerning the Sacramento-San Joaquin Bay Delta Water Quality Control Plan

Dear Chair Marcus & Board Member Doduc:

As you know, California Water Service (Cal Water) is the largest water utility regulated by the California Public Utilities Commission (Commission). We serve approximately 2 million Californians through 500,000 individual service connections. Our service areas span the state, from Chico in the north to the Palos Verdes Peninsula in the south.

Cal Water sincerely appreciates the time and effort the State Water Resources Control Board (Board) has put into not only preparing the Substitute Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the Bay-Delta (SED), but also undertaking an extensive public outreach effort related to the SED. Further, Cal Water understands the need to protect the water quality of the Sacramento-San Joaquin Bay Delta, and we recognize the importance of reliable, high-quality water to the state's health and economy.

Across our service areas, we rely on a combination of surface water and groundwater to provide safe, reliable, and high-quality service to our customers. As both a purchaser of wholesale water from various suppliers and a water rights holder, Cal Water has interests in areas of origin, exports from the Delta, and locally derived supplies. For example, Cal Water relies on locally derived supplies to provide water to about 250,000 residents of the San Francisco Bay area, and because of certain restrictions under federal law, a reduction in water supply to the Hetch Hetchy water system could significantly impact our ability to serve our customers.

As is the case with many water utilities, Cal Water is reliant, in many of its service areas, on the supplies made available by local wholesale agencies. For example, we utilize significant amounts of what from our wholesale partners to serve approximately 170,500 people who live

CALIFORNIA WATER SERVICE

in or around the City of Stockton. In those areas where we are unable to rely on groundwater to supplement the water we receive from local wholesalers, any water supply shortages will directly impact our customers. This is also true in those service areas where the future use of local groundwater supplies may be limited by rules and regulations established pursuant to the Sustainable Groundwater Management Act.

You are aware of the concerns addressed by many wholesalers that the proposed changes to the Bay-Delta Water Quality Control Plan would have devastating effects on their ability to meet customer demands and that the SED has some scientific infirmities. Our wholesale partners share these concerns. Given our reliance on wholesale supplies, we urge you to continue to work toward a solution that will not ultimately harm the customers we are committed to serving.

We truly appreciate the Board making the decision to provide a two-month extension to the 120-day public comment period on the SED. With negotiations regarding a potential solution ongoing and in light of the seriousness of the potential negative consequences of the proposal laid out in the SED, Cal Water respectfully requests that the Board consider further extending the comment period. It is our hope that this additional time will increase the likelihood of negotiating parties reaching a sustainable and equitable solution.

Cal Water stands ready to work with the Board, parties to the negotiations, and others to reach such a solution. If there is anything we can do to assist you or if you have any questions, please do not hesitate to get in touch with us.

Sincerely,

Robert Kuta
Vice President, Engineering

Cc: Mr. Scott Moody, General Manager, Stockton East Water District
Mr. Harlan Kelly, General Manager, San Francisco Public Utilities District
Ms. Nicole Sandkulla, CEO, Bay Area Water Supply & Conservation Agency
Mr. Rami Kahlon, Director, Water Division, California Public Utilities Commission

Appendix L: Water Shortage Contingency Plan

Water Shortage Contingency Plan 2020 Update

Bear Gulch District

June 2021

Chapter 1
Introduction

☑ ***CWC § 10640***

(a) Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630). The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

(b) Every urban water supplier required to prepare a water shortage contingency plan shall prepare a water shortage contingency plan pursuant to Section 10632. The supplier shall likewise periodically review the water shortage contingency plan as required by paragraph (10) of subdivision (a) of Section 10632 and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

☑ ***CWC § 10632.3***

It is the intent of the Legislature that, upon proclamation by the Governor of a state of emergency under the California Emergency Services Act (Chapter 7 (commencing with Section 8550) of Division 1 of Title 2 of the Government Code) based on drought conditions, the board defer to implementation of locally adopted water shortage contingency plans to the extent practicable.

This document describes the water shortage contingency plan (WSCP) for the Bear Gulch District (also referred to herein as the "District"). The WSCP includes the stages of response to a water shortage caused by drought or by supply interruptions caused by infrastructure failure, regulatory mandate, or catastrophic human-caused or natural events. The primary objective of the WSCP is to ensure that the District has in place the necessary resources and management responses needed to protect health and human safety, minimize economic disruption, and preserve environmental and community assets during water supply shortages and interruptions.

Specifically, this Plan includes the following chapters:

Chapter 1 - Introduction

Chapter 2 - Water Supply Reliability Analysis

Chapter 3 - Annual Water Supply and Demand Assessment Procedures

Chapter 4 - Water Shortage Levels

Chapter 5 - Shortage Response Actions

Chapter 6 - Communication Protocols

Chapter 7 - Compliance and Enforcement

Chapter 2
Water Supply Reliability Analysis

☑ ***CWC § 10632 (a) (1)*** *The analysis of water supply reliability conducted pursuant to Section 10635.*

As described in Chapter 6 of the District Urban Water Management Plan (UWMP), the District relies on purchases from the San Francisco Public Utilities Commission (SFPUC) and surface water from Bear Gulch Reservoir.

Chapter 7 of the District UWMP indicates the potential of future water supply shortages in single-dry and multiple-dry years. This WSCP addresses potential water shortage conditions resulting from such future droughts as well as other causes (e.g., impacted distribution system infrastructure, regulatory-imposed shortage restrictions, catastrophic events, etc.).

Chapter 3
Annual Water Supply and Demand Assessment Procedures

☑ ***CWC § 10632 (a) (2)***

The procedures used in conducting an annual water supply and demand assessment that include, at a minimum, both of the following:

(A) The written decision-making process that an urban water supplier will use each year to determine its water supply reliability.

(B) The key data inputs and assessment methodology used to evaluate the urban water supplier's water supply reliability for the current year and one dry year, including all of the following:

(i) Current year unconstrained demand, considering weather, growth, and other influencing factors, such as policies to manage current supplies to meet demand objectives in future years, as applicable.

(ii) Current year available supply, considering hydrological and regulatory conditions in the current year and one dry year. The annual supply and demand assessment may consider more than one dry year solely at the discretion of the urban water supplier.

(iii) Existing infrastructure capabilities and plausible constraints.

(iv) A defined set of locally applicable evaluation criteria that are consistently relied upon for each annual water supply and demand assessment.

(v) A description and quantification of each source of water supply.

☑ ***CWC § 10632.1***

An urban water supplier shall conduct an annual water supply and demand assessment pursuant to subdivision (a) of Section 10632 and, on or before July 1 of each year, submit an annual water shortage assessment report to the department with information for anticipated shortage, triggered shortage response actions, compliance and enforcement actions, and communication actions consistent with the supplier's water shortage contingency plan. An urban water supplier that relies on imported water from the State Water Project or the Bureau of Reclamation shall submit its annual water supply and demand assessment within 14 days of receiving its final allocations, or by July 1 of each year, whichever is later.

☑ ***CWC § 10632.2***

An urban water supplier shall follow, where feasible and appropriate, the prescribed procedures and implement determined shortage response actions in its water shortage contingency plan, as identified in subdivision (a) of Section 10632, or reasonable alternative actions, provided that descriptions of the alternative actions are submitted with the annual water shortage assessment report pursuant to Section 10632.1. Nothing in this section prohibits an urban water supplier from taking actions not specified in its water shortage contingency plan, if needed, without having to formally amend its urban water management plan or water shortage contingency plan.

On an annual basis, the District will conduct a Supply-Demand Assessment (SDA) to identify whether there is likely to be a water shortage condition in the coming year. This assessment will be based largely on the water supply assessment provided by the SFPUC. Each element of the annual SDA is described below.

1. Evaluation Criteria

   The evaluation criteria that will be used to identify whether the District is likely to experience a water shortage in the coming year include:

   a. **Purchased Water Availability -** Because the District's primary source of potable water supply is from the SFPUC, the evaluation of District supplies for a particular year will be based largely on information provided by the SFPUC or the Bay Area Water Supply and Conservation Agency (BAWSCA). Cal Water will conduct its Annual Assessment as part of a coordinated effort led by BAWSCA. The SFPUC Annual Water Supply and Demand Assessment Procedures are included as Attachment A of this WSCP.

   b. **Treatment and Distribution System Constraints -** An assessment of the probabilities of facility and infrastructure outages and the degree to which they could limit Cal Water's ability to access, convey, or treat adequate supplies, including any planned maintenance or capital improvements over the next year that could affect its ability to provide sufficient supply to meet demands.

   c. **State Regulatory Conditions -** Evaluation of any state-mandated drought or water use restrictions.

   These criteria will be assessed by Cal Water staff, including District staff with detailed knowledge of District operations. The data used to support these assessments may include, but is not limited to, supply capacity, supply and pump capacity, firm capacities, tank storage capacity, system demand, and zone demand.

2. Water Supply

   As described above, the District obtains its potable supplies from the SFPUC and local surface water. As noted in Chapter 2, the supplies purchased from the SFPUC may be constrained in single-dry year or multiple-dry-year hydrologic conditions. The potential constraints on water supply therefore include these purchased supply limitations and the operational limitations and potential local regulatory conditions identified as evaluation criteria above.

3. Unconstrained Customer Demand

   The demand forecast described in Chapter 4 of the District UWMP yields the anticipated unconstrained water demand, i.e. the expected water use in the absence of shortage-caused reductions in water use. During a drought cycle, unconstrained demand typically increases due to higher than normal air temperatures and lower than normal precipitation. The supply reliability analysis and Drought Risk Assessment presented in

Chapter 7 of the District UWMP accounts for this anticipated shift in unconstrained water demand.

The model underlying the demand forecast described in Chapter 4 of the District UWMP has an annual time step. Cal Water has begun developing a short-term demand model with a monthly time step that will be more appropriate for the annual supply-demand assessments.

4. Planned Water Use for Current Year Considering Dry Subsequent Year

   Cal Water will evaluate the anticipated supplies for the current year, based in large part on SFPUC's assessment of available supplies. Cal Water will evaluate local surface water supplies assuming that the following year will be dry, as defined above, using the Evaluation Criteria identified above.

5. Infrastructure Considerations

   As part of its triennial General Rate Case applications to the California Public Utilities Commission (CPUC), Cal Water prepares a Supply-Demand Analysis (CPUC SD Analysis) for each of its Districts. The CPUC SD Analysis is an inventory of water production and pump assets that provide direct and indirect sources of supply to meet customer demands in accordance with CPUC General Order 103-A and California Code of Regulations (CCR) Title 22 Waterworks Standards. This CPUC SD Analysis is based on a combination of regulatory requirements, professional consultant recommendations, and industry standard practices, including those from the American Water Works Association (AWWA) and American Society of Civil Engineers (ASCE). It identifies specific vulnerabilities in different pressure zones within the system and evaluates the system against performance criteria that meet regulatory requirements and ensure operationally adequate levels of service.

   Cal Water plans to extend the District CPUC SD Analysis to perform this analysis on an annual basis. This analysis will guide Cal Water's annual evaluation of operational treatment/distribution constraints that could potentially limit the availability of supplies. This evaluation of supply well operational constraints and treatment and distribution constraints will be completed by March 31 of each year and will assess potential impacts on supply availability. If such constraints are identified, Cal Water will develop a plan to address these constraints, mitigate potential effects, and implement the appropriate water shortage stage of action per Chapter 5, below.

6. Other Factors

As identified under the Evaluation Criteria above, local regulatory conditions could potentially limit the availability of supplies. Therefore, Cal Water will evaluate the development of new regulatory constraints by March 31 of each year and assess their potential impacts on supply availability. If such constraints are identified, Cal Water will develop a plan to address these constraints and mitigate potential effects and implement the appropriate water shortage stage of action per Chapter 5 below.

Consistent with California Water Code (CWC) § 10632.1, Cal Water will perform and submit an SDA to DWR by July 1st of each year beginning in 2022.

Chapter 4
Water Shortage Levels

☑ ***CWC § 10632 (a) (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 subparagraph (A) by developing and including a cross-reference relating its existing categories to the six standard water shortage levels.

Consistent with the requirements of CWC § 10632(a)(3), this WSCP is based on the six water shortage levels (also referred to as "stages") shown in Table 4-1. These shortage stages are intended to address shortage caused by any condition, including the catastrophic interruption of water supplies.

Table 4-1. Water Shortage Contingency Plan Levels (DWR Table 8-1)

Shortage Level	Percent Shortage Range	Shortage Response Actions
1	Up to 10%	Demand reduction (See Table 5-1)
2	Up to 20%	Demand reduction (See Table 5-1)
3	Up to 30%	Demand reduction (See Table 5-1)
4	Up to 40%	Demand reduction (See Table 5-1)
5	Up to 50%	Demand reduction (See Table 5-1)
6	>50%	Demand reduction (See Table 5-1)
NOTES:		

Shortage response actions for each of these stages are identified and discussed in Chapter 5.

Chapter 5
Shortage Response Actions

☑ ***CWC § 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.

(B) Locally appropriate demand reduction actions to adequately respond to shortages.

(C) Locally appropriate operational changes.

(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.

☑ ***CWC § 10632 (b)***

For purposes of developing the water shortage contingency plan pursuant to subdivision (a), an urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

This chapter describes the response actions Cal Water will take to deal with the shortages associated with each of the six stages enumerated in Chapter 4.

5.1 Demand Reduction

The combinations of demand-reduction actions required to resolve the shortages associated with each of the six drought stages are based on Cal Water's experiences in dealing with past drought-related shortages and also include other actions deemed appropriate to achieve the required demand reductions. In order to evaluate and ensure that the right actions would be implemented with the proper level of intensity, Cal Water employed the Drought Response Tool (DRT), an Excel spreadsheet model developed by EKI Environment and Water, Inc.

The DRT provides a quantitative framework that allows Cal Water to systematically estimate the monthly and cumulative annual demand reductions expected to result from particular combinations of drought response actions and associated implementation rates. Data inputs to the DRT include total production, class-specific water use, population, and assumptions regarding the split between indoor and outdoor water use for each customer class.

For each drought response action, the user specifies:

- The customer class(es) and end use(s) that are affected;

- The percent savings for those end use(s) for each account that implements the action. These are based on evaluations reported in the literature, or where such studies are not available, on best estimates based on Cal Water experience; and
- The percentage of accounts assumed to implement the action, which is presumed to be the result of the intensity level of Cal Water program implementation, including but not limited to marketing and enforcement activities.

Based on the foregoing inputs, the DRT model calculates the resulting monthly savings. Cal Water adjusted the combination of actions and implementation levels to achieve the targeted savings levels at each of the six shortage stages.

In order to evaluate the robustness of the DRT model, Cal Water modeled the actions implemented during the height of the last drought for a subset of its Districts, and found that the modeled water shortage reductions were generally consistent with the responses observed in its Districts. In short, the DRT is a robust, transparent tool to tie a particular set of shortage-response actions to an expected reduction in demand.

For each of the six water shortage stages, the modeling targeted the mid-range of the required demand reduction range, ergo:

- 5% for Stage 1,
- 15% for Stage 2,
- 25% for Stage 3,
- 35% for Stage 4,
- 45% for Stage 5, and
- 55% for Stage 6

The key DRT inputs and outputs for each of the six water shortage stages are reproduced in Attachment B.

Table 5-1 shows the water shortage reduction actions, savings assumptions, and implementation rates that are required for the District to achieve the targeted annual demand reductions for each of the six shortage stages. At each stage, there are two types of demand-reduction actions identified:

- Restrictions on customer water usage; and
- Consumption reduction actions by Cal Water to encourage decreased water usage.

The total demand reductions are governed by a set of user-specified constraints to ensure that usage levels do not endanger health and safety or result in unacceptable economic impacts. The DRT will not permit estimated usage reductions to violate these constraints, regardless of the demand reduction actions selected. For most Cal Water districts, including Bear Gulch, the following default constraints are used:

- A minimum residential indoor per capita daily usage of 25 gallons,
- A maximum residential outdoor usage reduction of 100%,

- A maximum Commercial, industrial, and institutional (CII) indoor usage reduction of 30%, and
- A maximum CII outdoor usage reduction of 100%.

Many actions are implemented across a number of stages, some at increasing implementation levels. Therefore the actions are listed as a row under the first stage at which they are implemented, and the implementation rate is shown under each stage column heading at the right. The unit savings represent a percentage savings of the end uses indicated in the table.

Because of the DRT logic described above, the format of Table 5-1 differs from that of the default DWR table.

Table 5-1. Demand Reduction Actions to Achieve Required Savings (DWR Table 8-2)

Water Shortage Response Action	End Use(s)	End Use Savings	IMPLEMENTATION RATES BY STAGE						Penalty, Charge, or Other Enforcement?
			1	2	3	4	5	6	
Stage 1: Minimal Shortage									
Restrictions									
Landscape - Limit landscape irrigation to specific times	Irrigation	**10%**	50%	N/A	N/A	N/A	N/A	N/A	Yes
Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Leaks	**100%**	10%	20%	25%	50%	50%	75%	Yes
Landscape - Restrict or prohibit runoff from landscape irrigation	Irrigation	**3%**	15%	40%	50%	50%	50%	50%	Yes
Landscape - Prohibit application of potable water to outdoor landscapes within 48 hours of measurable rainfall	Irrigation	**20%**	15%	40%	50%	50%	50%	N/A	Yes
Other - Prohibit use of potable water for washing hard surfaces	Misc. Outdoor	**17%**	15%	40%	50%	50%	50%	50%	Yes
Other - Require shut-off nozzles on hoses for vehicle washing with potable water	Misc. Outdoor	**17%**	50%	50%	50%	50%	50%	50%	
CII - Lodging establishments must offer opt out of linen service	Fixtures & Appliances	**1%**	50%	50%	50%	50%	50%	50%	Yes
CII - Restaurants may only serve water upon request	Fixtures & Appliances	**1%**	50%	50%	50%	50%	50%	50%	Yes

Water Shortage Response Action	End Use(s)	End Use Savings	IMPLEMENTATION RATES BY STAGE						Penalty, Charge, or Other Enforcement?
			1	2	3	4	5	6	
No watering of landscape of newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission, the Department of Housing and Community Development, or other state agency	Irrigation	**50%**	0.07%	0.07%	0.07%	0.07%	0.07%	N/A	Yes
Prohibit Potable Water Use for Decorative Water Features that do not Recirculate Water	Misc. Outdoor	**50%**	50%	50%	50%	50%	50%	50%	Yes
Consumption Reduction									
Expand Public Information/Media Campaign	All	**0.5%**	50%	50%	50%	50%	50%	75%	No
Water Bill Inserts	All	**1%**	100%	100%	100%	100%	100%	100%	No
Promote online water waste reporting	All	**10%**	0.1%	0.2%	0.2%	0.3%	0.5%	0.5%	No
Expand Rebates or Giveaways of Plumbing Fixtures and Devices	All	**10%**	1%	1%	2%	4%	5%	5%	No
Expand Rebates for Landscape Irrigation Efficiency	All	**10%**	1%	1%	2%	4%	5%	5%	No
Expand CII Water Use Surveys	All CII uses	**5%**	1%	1%	1%	2%	2%	3%	No
Expand Res Water Use Surveys	All Residential Uses	**5%**	1%	1%	1%	2%	2%	3%	No
Stage 2: Moderate Shortage									
Restrictions									

Water Shortage Response Action	End Use(s)	End Use Savings	IMPLEMENTATION RATES BY STAGE						Penalty, Charge, or Other Enforcement?
			1	2	3	4	5	6	
Landscape - Limit landscape irrigation to 1-3 days/week	Irrigation	**15%-79%** [1]		75%	25%	25%	75%	N/A	Yes
Prohibit the use of non-recirculating systems in all new conveyer car wash and commercial laundry systems	Fixtures & Appliances	**50%**		0%	0%	0%	0%	0%	Yes
Prohibit the use of single pass cooling systems in new connections	Cooling	**50%**		0%	0%	0%	20%	20%	Yes
Consumption Reduction									
Water Efficiency Workshops, Public Events	All Residential Uses	**5%**		25%	25%	25%	50%	75%	No
Offer Water Use Surveys	All	**1%**		1%	1%	2%	2%	3%	No
Provide Rebates or Giveaways of Plumbing Fixtures and Devices	All	**10%**		1%	2%	4%	5%	5%	No
Provide Rebates for Landscape Irrigation Efficiency	All	**10%**		1%	2%	4%	5%	5%	No
Stage 3: Severe Shortage									
Restrictions									
Other - Prohibit use of potable water for construction and dust control	Misc. Outdoor	**100%**			100%	1%	1%	1%	Yes
Prohibit use of potable water for street washing	Misc. Outdoor	**100%**			1%	1%	1%	1%	Yes

Water Shortage Response Action	End Use(s)	End Use Savings	IMPLEMENTATION RATES BY STAGE						Penalty, Charge, or Other Enforcement?
			1	2	3	4	5	6	
Landscape - Prohibit irrigation of ornamental turf on public street medians with potable water	Irrigation	**100%**			10%	20%	25%	N/A	Yes
Prohibit Filling Ornamental Lakes or Ponds	Misc. Outdoor	**100%**			1%	1%	1%	1%	Yes
Consumption Reduction									
Home or Mobile Water Use Reports	All	**5%**			10%	25%	25%	50%	No
Decrease Frequency and Length of Line Flushing	Non Revenue Water	**25%**			50%	50%	50%	50%	No
Reduce System Water Loss	Non Revenue Water	**100%**			10%	10%	10%	10%	No
Increase Water Waste Patrols/Enforcement	All	**10%**			1%	3%	5%	5%	No
Implement Drought Rate Structure and Customer Water Budgets (Res)	All Residential Uses	**30%-60%** [2]			40%	30%	30%	30%	Yes
Implement Drought Rate Structure and Customer Water Budgets (CII)	All CII uses	**10%-30%** [3]			40%	30%	30%	50%	Yes
Stage 4: Critical Shortage									
Water Use Restrictions									
Prohibit vehicle washing except with recirculated water or low-volume systems	Misc. Outdoor	**10%**				50%	50%	50%	Yes
Prohibit use of water for recreational purposes such as water parks and the filling of pools	Misc. Outdoor	**100%**				1%	1%	1%	Yes
Consumption Reduction Actions									
Promote / Expand Use of Recycled Water	Irrigation	**100%**				0%	0%	0%	No

Water Shortage Response Action	End Use(s)	End Use Savings	IMPLEMENTATION RATES BY STAGE						Penalty, Charge, or Other Enforcement?
			1	2	3	4	5	6	
Stage 5: Emergency Shortage									
Water Use Restrictions									
Require net zero demand Increase on new water service connections	All	**100%**					0.07%	0.07%	Yes
Prohibit single-pass cooling systems	Cooling	**50%**					20%	20%	Yes
Consumption Reduction Actions									
Require Pool Covers	Misc. Outdoor	**28%**					10%	10%	Yes
Stage 6: Extreme Shortage									
Water Use Restrictions									
Moratorium on new water service connections	All	**100%**						0.07%	Yes
Landscape - Prohibit all landscape irrigation	Irrigation	**100%**						50%	Yes
		Cumulative Annual Savings	**8%**	**16%**	**26%**	**35%**	**43%**	**57%**	

NOTES:
1. Watering restricted to no more than 3 days/wk in Stage 2 and Stage 3; no more than 2 days/wk in Stage 4; no more than 1 day/wk in Stage 5.
2. Residential water budgets of up to 30% for Stage 3, up to 40% for Stage 4; 50% for Stage 5, up to 60% for Stage 6.
3. CII water budgets of up to 10% for Stage 3, up to 20% for Stage 4, up to 30% for Stages 5 and 6.

5.2 Supply Augmentation

As indicated in Table 5-2, Cal Water has not identified any supply augmentation actions to assist in resolving future District water shortages.

Table 5-2. Supply Augmentation and Other Actions (DWR Table 8-3)

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier	How much is this going to reduce the shortage gap?	Additional Explanation or Reference *(optional)*
NOTES:			

5.3 Operational Changes

As identified in Table 5-1, the District will decrease the frequency and length of line flushing under Stage 3 and beyond. The District will also evaluate the potential benefits of altering other maintenance cycles and expediting infrastructure repairs to improve system efficiency, to the extent feasible.

5.4 Mandatory Restrictions

The water shortage response actions included in Table 5-1 include a variety of mandatory customer water use restrictions that will be necessary to achieve the targeted demand reductions for the different shortage stages. The types of restrictions and the manner and degree of enforcement for these restrictions vary by stage, and are discussed in Chapter 7.

5.5 Emergency Response Plan

Cal Water has an Emergency Response Plan (ERP) in place that coordinates the overall response to a disaster.

The ERP addresses the Company's responsibilities in emergencies associated with natural disaster, human-caused emergencies, and technological incidents. It provides a framework for coordination of response and recovery efforts within the Company in cooperation with local, State, and Federal agencies, as well as other public and private organizations. The ERP establishes an emergency organization to direct and control operations during a period of emergency by assigning responsibilities to specific personnel.

The ERP does the following:

- It conforms to the State mandated Standardized Emergency Management System (SEMS) and the National Incident Management System (NIMS), and it effectively structures emergency response at all levels in compliance with the Incident Command System (ICS).
- It establishes response policies and procedures, while providing the Company clear guidance related to emergency planning.
- It describes and details procedural steps necessary to protect lives and property.
- It outlines coordination requirements.
- It provides a basis for unified training and response exercises to ensure compliance.

The Bear Gulch District has installed backup power generators at some of its well sites, booster sites, and pump storage sites that can be operated in the event of a system wide power outage. A complete loss of power has never been experienced, but the generators have been used in the past to overcome localized outages.

The District has emergency interties with the City of Redwood City and the City of Menlo Park.

5.6 Seismic Risk Assessment and Mitigation Plan

☑ ***CWC § 10632.5***

(a) In addition to the requirements of paragraph (3) of subdivision (a) of Section 10632, beginning January 1, 2020, the plan shall include a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities.

(b) An urban water supplier shall update the seismic risk assessment and mitigation plan when updating its urban water management plan as required by Section 10621.

(c) An urban water supplier may comply with this section by submitting, pursuant to Section 10644, a copy of the most recent adopted local hazard mitigation plan or multihazard mitigation plan under the federal Disaster Mitigation Act of 2000 (Public Law 106-390) if the local hazard mitigation plan or multihazard mitigation plan addresses seismic risk.

Cal Water's ERP includes information on various hazards and a related fault map overlying the District. The San Mateo County Multi-Jurisdictional Local Hazard Mitigation Plan, which includes additional discussion of area earthquake risk and mitigation, can be found at https://cmo.smcgov.org/multijurisdictional-local-hazard-mitigation-plan.

5.7 Shortage Response Action Effectiveness

Table 5-1 above shows the effectiveness of the specific demand-reduction actions and implementation levels necessary for the District to achieve the targeted savings for each water shortage stage. The bottom row indicates the total annual cumulative savings expected to be reached at each water shortage stage level. Additional details, including anticipated savings on a month-by-month basis are provided in the DRT model inputs and outputs included in Attachment B.

Chapter 6
Communication Protocols

☑ ***CWC § 10632 (a) (5)***

Communication protocols and procedures to inform customers, the public, interested parties, and local, regional, and state governments, regarding, at a minimum, all of the following:

(A) Any current or predicted shortages as determined by the annual water supply and demand assessment described pursuant to Section 10632.1.

(B) Any shortage response actions triggered or anticipated to be triggered by the annual water supply and demand assessment described pursuant to Section 10632.1.

(C) Any other relevant communications.

Cal Water intends to escalate communication to customers and stakeholders, as needed, throughout any water shortage situation to help ensure they are aware of current conditions, any water use restrictions that are in effect, and the many ways Cal Water can help them reduce their water use. Cal Water's outreach efforts include multiple channels, including bill messages, bill inserts, direct mail, email, letters, social media, print, radio, music streaming services, TV, over-the-top media, movie theatre advertising, and group presentations.

These efforts will expand on current Cal Water outreach efforts and will be customized to the needs at the time of the shortage to ensure a proper channel mix so that the maximum audience is reached as efficiently as possible.

Chapter 7
Compliance and Enforcement

☑ ***CWC § 10632 (a) (6)*** *For an urban retail water supplier, customer compliance, enforcement, appeal, and exemption procedures for triggered shortage response actions as determined pursuant to Section 10632.2.*

7.1 Water Use Restrictions

In accordance with Rule 14.1, Cal Water is currently authorized to take the following actions to enforce the water use restrictions:

First Violation: Cal Water shall provide the customer with a written notice of violation.

Second Violation: If Cal Water verifies that the customer has used potable water for non- essential, wasteful uses after having been notified of the first violation, Cal Water shall provide the customer with a second written notice of violation and is authorized to install a flow-restricting device on the customer's service line.

Cal Water has submitted to the California Public Utilities Commission (CPUC) an update to Rule 14.1 and Schedule 14.1, for approval, to align with the restrictions identified in this WSCP. Rule14.1 and Schedule 14.1 are discussed in more detail in Chapter 8. The current versions of Rule 14.1 and Schedule 14.1 can be found on the Cal Water website.

7.2 Non-Essential, Wasteful Uses

In the event that more stringent measures are needed, implementation of Schedule 14.1 would be requested from the CPUC. If implemented, Cal Water is currently authorized to take the following actions when its personnel verify a customer is using potable water for non-essential, wasteful uses.

First Violation: Cal Water shall provide the customer with a written notice of violation. In addition, Cal Water is authorized to take the following actions:

A. If the customer currently receives service through a metered connection, install a real- time water measurement device on the customer's service line and provide the customer with access to information from the device. The cost of the device, including installation and ongoing operating costs, may be billed to the customer, and nonpayment may result in discontinuance of service.

B. If the customer does not currently receive service through a metered connection, install a water meter on the customer's service line, charge the customer for water use pursuant to Cal Water's metered service tariffs and rules, and install a real-time water measurement device on the customer's service line and provide the customer with access to information from the device. The cost of the device, including installation and ongoing operating costs, may be billed to the customer, and nonpayment may result in discontinuance of service.

Second Violation: If Cal Water verifies that the customer has used potable water for non- essential, wasteful uses after having been notified of the first violation, Cal Water shall provide the customer with a second written notice of violation. In addition to the actions prescribed under the first violation above, Cal Water is authorized to take the following actions:

A. Apply the following waste of water penalties, which are in addition to any other charges authorized by this Schedule or other Cal Water tariffs.

   i. If Stage 1 is in effect, $25

   ii. If Stage 2 is in effect, $50

   iii. If Stage 3 is in effect, $100

   iv. If Stage 4 is in effect, $200

B. At its sole discretion, waive the waste of water penalty if the customer participates in a water use evaluation provided by Cal Water and/or provides documentation to Cal Water proving that a drip irrigation system, micro spray irrigation system, high-efficiency sprinkler system, or properly programmed smart irrigation controller has been installed, after a notice of violation was delivered, and is in use at the customer's service address.

Third Violation: If Cal Water verifies that the customer has used potable water for non-essential, wasteful uses after having been notified of the second violation, Cal Water shall provide the first and second violations above, Cal Water is authorized to take the following actions:

A. A. Apply the following waste of water penalties, which are in addition to any other charges authorized by this Schedule or other Cal Water tariffs.

   i. If Stage 1 is in effect, $50

   ii. If Stage 2 is in effect, $100

   iii. If Stage 3 is in effect, $200

   iv. If Stage 4 is in effect, $400

B. At its sole discretion, waive the waste of water surcharge if the customer participates in a water use evaluation provided by Cal Water and/or provides documentation to Cal Water proving that a drip irrigation system, micro spray irrigation system, high- efficiency sprinkler system, or properly programmed smart irrigation controller has been installed, after notice of violations have been delivered, and is in use at the customer's service address.

Fourth Violation: If Cal Water verifies that the customer has used potable water for non- essential, wasteful uses after having been notified of the third violation, Cal Water shall provide the customer with a fourth written notice of violation. In addition to actions set forth in previous violations prescribed above, Cal Water is authorized to install a flow- restricting device on the customer's service line.

Egregious Violations: Notwithstanding the foregoing framework for penalties, customers who Cal Water has verified are egregiously using potable water for non-essential, wasteful uses are subject to having a flow- restricting device installed on their service line. After providing the customer with one notice of egregious violation, either by direct mail or door hanger, which documents the egregious use of potable water for non-essential, wasteful uses and explains that failure to correct the violation may result in the installation of a flow-restricting device on the customer's service line, Cal Water is authorized to install a flow-restricting device on the customer's service line.

Cal Water plans to submit to the CPUC an update to Schedule 14.1 to align with this WSCP including, but not limited to, consistency with the new six stage shortage level structure.

7.3 Drought Surcharges

Water budgets and associated drought surcharges are included as actions in Table 5-1. Cal Water will implement such actions through the implementation of Schedule 14.1.

Chapter 8
Legal Authorities

☑ ***CWC § 10632 (a) (7)***

(A) A description of the legal authorities that empower the urban water supplier to implement and enforce its shortage response actions specified in paragraph (4) that may include, but are not limited to, statutory authorities, ordinances, resolutions, and contract provisions.

(B) A statement that an urban water supplier shall declare a water shortage emergency in accordance with Chapter 3 (commencing with Section 350) of Division 1.

(C) A statement that an urban water supplier shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code.

Cal Water is an investor-owned water utility that is regulated by the CPUC. As such, it does not have the authority to adopt resolutions or ordinances. Rule 14.1, as filed with the CPUC, serves as Cal Water's restrictions on non-essential, wasteful uses of potable water. In the event that more stringent measures are required, Cal Water may request the addition of Schedule 14.1 which serves as Cal Water's WSCP and includes staged mandatory reductions and drought surcharges. Cal Water shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency as defined in Section 8558 of the Government Code and to ensure consistency with local resolutions and ordinances.

On April 1, 2016, Cal Water filed its current Schedule 14.1 with the CPUC.[1] The Schedule lays out the staged mandatory reductions and drought surcharges associated with Cal Water's WSCP. This filing is consistent with Resolution W-5034, adopted by the Commission on April 9, 2015, ordering compliance with requirements of the State Water Resources Control Board (SWRCB).

Schedule 14.1 is an extension of Rule 14.1. The compliance and enforcement information presented in Chapter 7 is based on the current versions of both Rule 14.1 and Schedule 14.1, which are based, in part, on the specific SWRCB requirements associated with the Governor's Executive Order B-29-15, which required statewide cutbacks to address the unprecedented 2011-2017 drought, as well as the additional information required pursuant to the CWC.

Cal Water has submitted an update to Rule 14.1 and Schedule 14.1 to the CPUC, for approval, to align with this WSCP.

[1] For reference, the current versions of Rule 14.1 and Schedule 14.1 are included as Attachment C.

In the event of a determination of a water shortage Cal Water shall declare a water shortage emergency in accordance with the Water Code Chapter 3 (commencing with Section 350) of Division 1 and implement the Water Shortage Contingency Plan at the appropriate Stage.

Chapter 9
Financial Consequences of WSCP

☑ ***CWC § 10632 (a) (8)***

A description of the financial consequences of, and responses for, drought conditions, including, but not limited to, all of the following:

(A) A description of potential revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4).

(B) A description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4).

(C) A description of the cost of compliance with Chapter 3.3 (commencing with Section 365) of Division 1.

In 2008, the CPUC approved the creation of a Water Revenue Adjustment Mechanism (WRAM) and Modified Cost Balancing Accounts (MCBA). The goals of the WRAM and MCBA are to sever the relationship between sales and revenue to remove the disincentive to reduce water use. The WRAM and MCBA are designed to be revenue neutral in order to ensure that both the utility and ratepayers are neither harmed nor benefitted.

In 2020, the CPUC ordered that regulated water utilities may not include the continuation of the WRAM and MCBA in their next general rate case filing but may propose the use of a Monterey-Style Revenue Adjustment Mechanism and Incremental Cost Balancing Account. As such, the WRAM and MCBA will no longer be in place for Cal Water beginning in 2023.

During a water shortage, Cal Water will file for a Drought Memorandum Account, or similar, to track incremental shortage-related expenses to be reviewed by the CPUC for future recovery in rates. Cal Water will also file for a Drought Lost Revenue Memorandum Account, or similar, to track reduced sales to be reviewed by the CPUC for future recovery in rates.

Both the Drought Memorandum Account and Drought Lost Revenue Memorandum Account are mechanisms that have been approved by the CPUC in previous droughts.

Chapter 10
Monitoring and Reporting

☑ ***CWC § 10632 (a) (9)*** *For an urban retail water supplier, monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance and to meet state reporting requirements.*

During the period 2014-16, in order to effectively respond to the drought, Cal Water realigned its organizational structure to ensure sufficient resources were available to implement its WSCP. The day-to-day implementation was overseen by the Director of Drought Management & Conservation, with the assistance of the Drought Response Project Manager. The Director of Drought Management & Conservation reported to a team of Cal Water's Officers (Steering Committee), including the President & CEO, the Vice President of Corporate Communications & Community Affairs, the Vice President of Customer Service & Information Technology, the Vice President of Operations, and the Vice President of Continuous Improvement.

Reporting to the Director of Drought Management & Conservation was a team of functional leads, each responsible for managing individual portions of Cal Water's Plan. This team included the Director of Customer Service, the Water Conservation Manager, the Manager of Corporate Communications, the Water Supply Manager, and the Government & Community Relations Manager.

Cal Water would implement a similar structure to effectively manage future water shortages.

This structure includes regular meetings with reporting on items such as:

- Aggregate customer demands,
- Customer compliance with water use restrictions,
- Current and projected water supply conditions,
- Customer outreach activities,
- Customer service inquiries, and
- Operations activities (e.g., water flushing activities, leak repairs, etc.).

Chapter 11
WSCP Refinement Procedures

☑ ***CWC § 10632 (a) (10)*** *Reevaluation and improvement procedures for systematically monitoring and evaluating the functionality of the water shortage contingency plan in order to ensure shortage risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented as needed.*

Cal Water's Drought Steering Committee utilizes an adaptive management process to regularly assess and determine adjustments and changes to the implementation of the WSCP. These refinements are implemented by the Director of Drought Management & Conservation (or equivalent) through the team of functional leads.

Chapter 12
Plan Adoption, Submittal, and Availability

☑ ***CWC § 10632 (c)*** *The urban water supplier shall make available the water shortage contingency plan prepared pursuant to this article to its customers and any city or county within which it provides water supplies no later than 30 days after adoption of the water shortage contingency plan.*

The deadline for public comments on the WSCP was June 11, 2021. The final WSCP was formally adopted by Cal Water's Vice President of Customer Service & Chief Citizenship Officer on June 20, 2021. The District UWMP includes a copy of the signed Resolution of Plan Adoption and contains the following:

- Letters sent to and received from various agencies regarding the UWMP and WSCP, and
- Correspondence between Cal Water and participating agencies.

This UWMP and WSCP were submitted to DWR within 30 days of adoption and by the July 1, 2021 deadline. The submittal was done electronically through Water Use Efficiency Data Portal, an online submittal tool. The adopted WSCP was also sent to the California State Library and to the cities and counties listed in Table 10-1 of the District UWMP.

On or about May 10, 2021, an electronic version of the draft 2020 UWMP and WSCP was made available for review on Cal Water's website:
https://www.calwater.com/conservation/uwmp.

Attachment A

SFPUC Annual Water Supply and Demand Assessment Procedures

ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES

Each year the SFPUC evaluates the amount of total water storage expected to occur throughout the RWS and compares it to expected demands. This annual Water Supply and Demand Assessment (WSDA) is described in the subsections below, which are organized by the sequential steps the SFPUC takes to conduct the assessment each year and reference the relevant California Water Code requirements for a WSDA.[1]

The SFPUC's annual WSDA is a robust planning system that considers a range of input factors unique to the SFPUC's water supplies and system configuration while also providing the flexibility to consider new factors. Traditional surface water supplies from the SFPUC's up country, East Bay, and Peninsula reservoirs are the backbone of the water supply, but the SFPUC extends and protects those supplies in many additional ways by: (1) partnering with the community to help save water through robust conservation programs; (2) minimizing the need for additional water to serve new developments through an onsite water reuse program; (3) recycling wastewater resources to deliver water for large non-potable uses; (4) utilizing local groundwater supplies to supplement surface water supplies; (5) investigating new, alternative water supply options such as purified water and desalination; 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 likelihood of a water shortage condition.

1.1 DEMAND ASSESSMENT [WATER CODE SECTION 10632(A)(2)(B)(I)]

To calculate unconstrained customer demand for the purpose of an annual WSDA, the SFPUC collects information on both the retail and wholesale system demands. Retail customer demand is estimated based on the best available information to date, and typically includes the previous year's demands as well as consideration of current demand use patterns or other conditions impacting demands, such as weather and growth. Each year, in February, the SFPUC receives from BAWSCA a report of estimated Wholesale Customer demand for the upcoming year. BAWSCA typically estimates unconstrained demands for the Wholesale Customers by using total water purchased by those customers in the prior year along with other relevant information. Relatively small demands from the two additional wholesale customers not part of the WSA are estimated based on the best available information to date, and typically includes the previous year's demands as well as consideration of current demand use patterns or other conditions impacting demands, such as weather and growth.

1.2 SUPPLY ASSESSMENT [WATER CODE SECTIONS 10632(A)(2)(B)(II) AND 10632(A)(2)(B)(V)]

The RWS collects water from the Tuolumne River watershed in the Sierra Nevada and from local reservoirs in the Alameda and Peninsula watersheds. The RWS draws an average of 85 percent 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 RWS supply is drawn from local surface waters in the Alameda and Peninsula watersheds. The split between these resources varies from year to year depending on the water year hydrology and operational circumstances.

To project and evaluate water supply conditions, the SFPUC uses measurements of precipitation and snowpack in the watersheds above Hetch Hetchy, Cherry, and Eleanor Reservoirs. Snowpack conditions are evaluated regularly by the Cooperative Snow Survey (conducted by the SFPUC in partnership with state and federal agencies) beginning in late January of each year. The SFPUC also estimates snowpack conditions using information from airborne snow observatory (ASO) and other sources. The SFPUC maintains a hydrologic model

[1] California Water Code section 10632(a)(1) requires "*the analysis of water supply reliability conducted pursuant to Section 10635.*" Additional information about the SFPUC's water supply reliability analysis can be found in Chapter 7 of the SFPUC's 2020 UWMP.

of the watersheds that uses this information to project expected 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 takes into account stored water throughout the RWS, water acquired by the SFPUC from non-SFPUC sources, inactive storage, 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, such that water stored in previous years is relied upon to meet demands. Because of the importance of carry-over storage, the SFPUC constantly monitors and evaluates water supply conditions in the RWS. Look-ahead forecasts are updated 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 condition. 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 1.3 describes the system modeling SFPUC conducts

Table 0-1 shows the availability of RWS supplies for retail customers and Wholesale Customers in normal years. Table 0-2 shows the current and projected RWS supply needs to meet retail and wholesale demands based on information and projections presented in the SFPUC's 2020 UWMP.

The SFPUC sells water to 26 of its 28 wholesale customers under the terms of the 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. The WSA carries forward 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. The WSA also describes the temporary limitation on water sales established by the Phased Water System Improvement Plan (WSIP) in 2008. This "Interim Supply Limitation" (ISL) limits water sales from the RWS to an average annual amount of 265 mgd. The WSA allocations the ISL between the SFPUC's retail customers and Wholesale Customers as follows:

- Wholesale supply allocation: 184 mgd
- Retail supply allocation: 81 mgd[2]

Table 0-1. Regional Water System Supply Availability in Normal Years (mgd)

RWS Supply Allocation	Actual	Projected				
	2020	2025	2030	2035	2040	2045
Retail Customers[a, b]	81	81	81	81	81	81
Wholesale Customers[c, d]	184	184	184	184	184	184

[2] Groveland CSD is considered a retail customer of the SFPUC. Thus, RWS supplies to Groveland CSD are accounted for in the retail supply allocation of 81 mgd.

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 Groveland CSD is reported as a wholesale customer for the purposes of this 2020 UWMP, but it is considered a retail customer of the SFPUC solely for purposes of allocating RWS supplies between retail and Wholesale Customers. Its demands would be met by 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, with their total supply not exceeding 9 mgd assuming supply is available (decision to be made by end of 2028).

d Cordilleras MWC is not a party to the WSA, and it is not included in the wholesale 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 2045.

Table 0-2. Regional Water System Supply Utilized in Normal Years (mgd)

RWS Supply Allocation	Actual	Projected				
	2020	2025	2030	2035	2040	2045
Retail Customers[a, b]	66.5	67.2	67.5	68.6	70.5	73.7
Wholesale Customers[c, d]	132.1	146.0	147.9	151.9	156.3	162.8
Total RWS Supplies	198.6	213.2	215.4	220.5	226.8	236.5

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 Groveland CSD is reported as a wholesale customer for the purposes of this 2020 UWMP, but it is considered a retail customer of the SFPUC solely for purposes of allocating RWS supplies between retail and Wholesale Customers. Its demands would be met by 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, with their total supply not exceeding 9 mgd assuming supply is available (decision to be made by end of 2028).

d Cordilleras MWC is not a party to the WSA, and it is not included in the wholesale 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 2045.

1.3 INFRASTRUCTURE CONSIDERATIONS [WATER CODE SECTION 10632(A)(2)(B)(III)]

On an ongoing basis, the SFPUC's Hetch Hetchy Water and Power, Water Supply and Treatment Division, and Hydrology and Water Systems group conduct analyses of the RWS that incorporate planned facility outages and multiple levels of projected system demands to evaluate and plan for potential water delivery constraints. These 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 system are evaluated extensively prior to initiation of any changes. Results from these modeling efforts are considered in the annual WSDA.

1.4 SYSTEM MODELING [WATER CODE SECTION 10632(A)(2)(B)(IV)]

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 supply rationing is added 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 rationing, is maintained through the design drought sequence.

Estimated rationing levels and corresponding storage threshold values 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 rationing 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 comparison for 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 water supply rationing 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.

1.5 DECISION-MAKING PROCESS [WATER CODE SECTION 10632(A)(2)(A)]

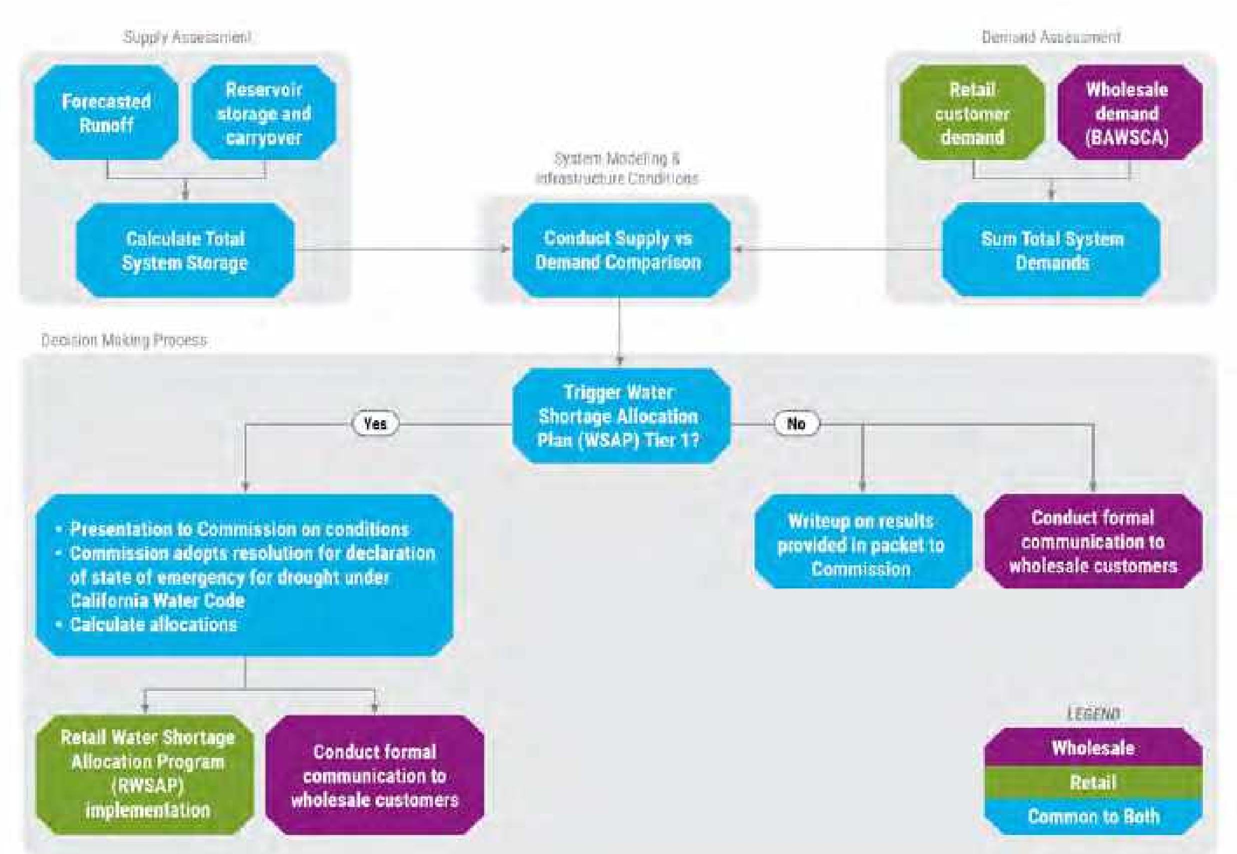
Regardless of the expectation of shortage conditions, as part of the normal course of business, the SFPUC provides a water supply condition update to its executive team every two weeks throughout the year. The SFPUC also provides water supply estimates to its Wholesale Customers on a monthly basis beginning February 1. A Wholesale Customer Annual Meeting is held in the last week of February at which the SFPUC makes a presentation on current water supply conditions and forecasts. The last snow survey of the season typically occurs within the first week of April, followed by a runoff forecast to determine total system storage expected as of July 1. By the middle of April, the SFPUC sends a formal letter to the Wholesale Customers summarizing the water supply availability for the coming year.

If the RWS appears incapable of meeting system-wide demand due to drought, the SFPUC is expected to declare a water shortage by March 31 of that drought year. The General Manager, or designee, is responsible for declaring such a shortage. A presentation would be made to the Commission as part of the General Manager's report, showing 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 Commission may adopt a resolution declaring a water shortage emergency under the California Water Code, or lesser actions such as a call for voluntary conservation efforts.

Prior to the initiation of 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 drought response plan to address the following: the water supply situation; proposed water use reduction objectives; alternatives to water use 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 4.1. This drought response plan will be presented at a regularly scheduled SFPUC Commission meeting and advertised in accordance with the requirements of Section 6066 of the California Government Code.

The overall WSDA process is described visually in the flowchart presented in Figure 0-1.

Figure 0-1: Water Supply and Demand Assessment Process



Attachment B
Key Drought Response Tool Tables and Charts

Drought Response Tool

Home | Input Baseline Year Water Use | Baseline Year Water Use Profile | Drought Response Actions | Estimated Water Savings | Drought Response Tracking

1 - Home

Bear Gulch

Enter Agency Information	
Agency Name	Bear Gulch
Total Population Served	61,480
Conservation Goal (%)	5%
Drought Stage	Stage 1
Number of Residential Accounts	17,134
Number of Commercial, Industrial, and Institutional (CII) Accounts	1,429
Number of Dedicated Irrigation Accounts	0
Baseline Year(s)	2020
Percentage of Residential Indoor Use During Minimum Month (%)	100%
Percentage of Comm-Gov Indoor Use During Minimum Month (%)	81%
Comments	BG

1 - Home
Bear Gulch

Navigation	
USER'S GUIDE	Download and read the guide before using this Tool
1 - HOME	Enter agency information
2 - INPUT BASELINE YEAR WATER USE	Enter Baseline Year production and use
3 - BASELINE YEAR WATER USE PROFILE	Review and confirm entered information
4 - DROUGHT RESPONSE ACTIONS	Select Drought Response Actions and input estimated water savings and implementation rates.
5 - ESTIMATED WATER SAVINGS	Review estimated water production and compare estimated savings to conservation target.
6 - DROUGHT RESPONSE TRACKING	Track production and water savings against the conservation target.

Drought Response Tool

Home | Input Baseline Year Water Use | Baseline Year Water Use Profile | Drought Response Actions | Estimated Water Savings | Drought Response Tracking

1 - Home

Bear Gulch

For questions about this tool or for additional information, contact:

Anona Dutton, P.G., C.Hg.
adutton@ekiconsult.com
(650) 292-9100

Drought Response Tool

Home | Input Baseline Year Water Use | Baseline Year Water Use Profile | Drought Response Actions | Estimated Water Savings | Drought Response Tracking

2 - Input Baseline Year (2020) Water Use

Bear Gulch

Input Baseline Year (2020) Production and Water Use

Units: (mg)

Select the units to input monthly production and use data. Enter the total monthly potable water production for the Baseline Year. Next, enter monthly water use data by sector for the Baseline Year. If you bill on a bi-monthly basis, divide your billing data between the months that the billing cycle includes. If your single-family and multi-family accounts are tracked separately, enter the combined water use for both sectors in the Residential Water Use column. If your commercial, industrial, and institutional (CII) accounts are tracked separately, enter the combined water use for each sector in the CII Water Use column. Your non-revenue water use is calculated by subtracting your monthly residential, CII, and dedicated irrigation water uses from your monthly production. Your monthly residential gallons per capita per day (R-GPCD) is calculated by dividing your monthly residential water use by your population entered in Worksheet 1 - Home.

Date	Total Production (mg)	Residential Water Use (mg)	COM-GOV Water Use (mg)	Industrial Water Use (mg)	Non-Revenue Water Use (mg)	Total R-GPCD	Comments
October	433	381	47	1	4	200	
November	339	311	42	1	-15	168	
December	189	240	37	1	-89	126	
January	150	114	28	0	9	60	
February	182	115	30	0	37	67	
March	259	198	35	0	26	104	
April	260	194	28	0	38	105	
May	425	246	29	0	149	129	
June	468	376	41	1	51	204	
July	494	457	50	1	-13	240	
August	549	460	48	1	40	242	
September	468	414	43	1	10	225	

Drought Response Tool

Home | Input Baseline Year Water Use | Baseline Year Water Use Profile | Drought Response Actions | Estimated Water Savings | Drought Response Tracking

3 - Baseline Year (2020) Water Use Profile

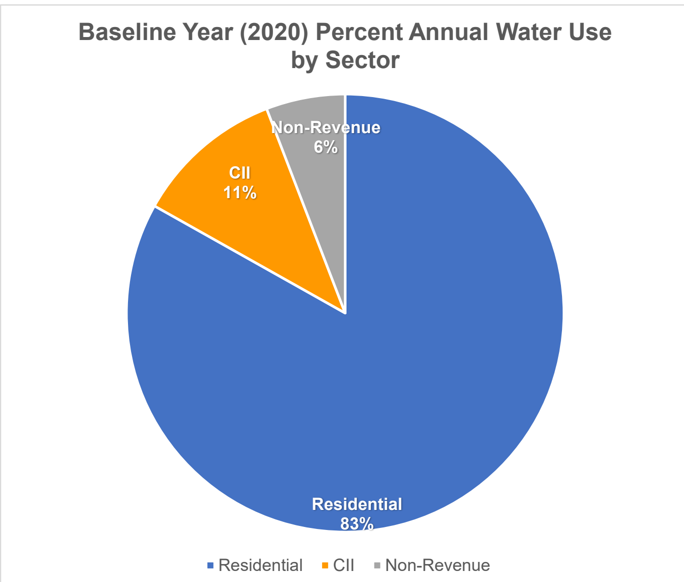
Bear Gulch

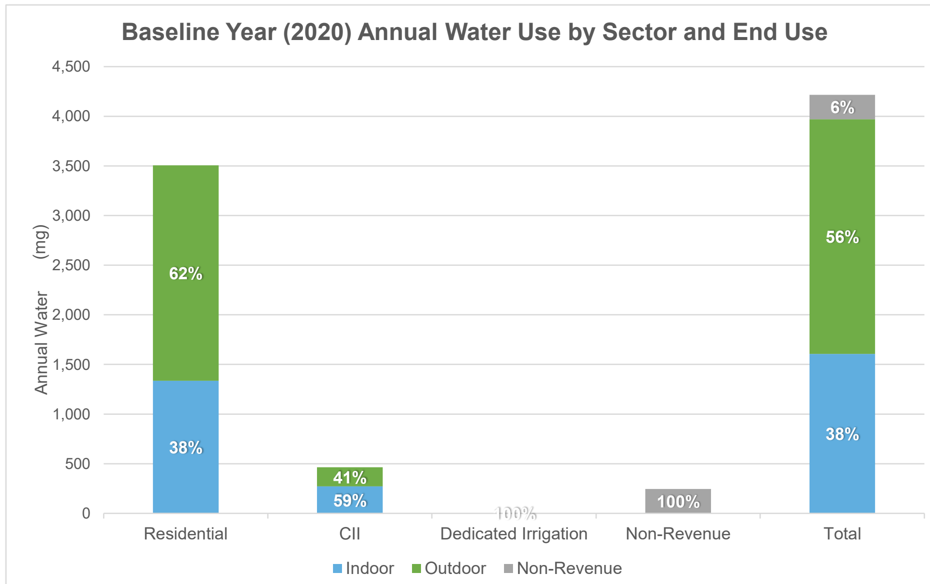
Baseline Year (2020) Annual Water Use Summary

Units: (mg)

A summary of your Baseline Year water use by sector and major end use category is shown below. Select the units in which your production and use data are displayed.

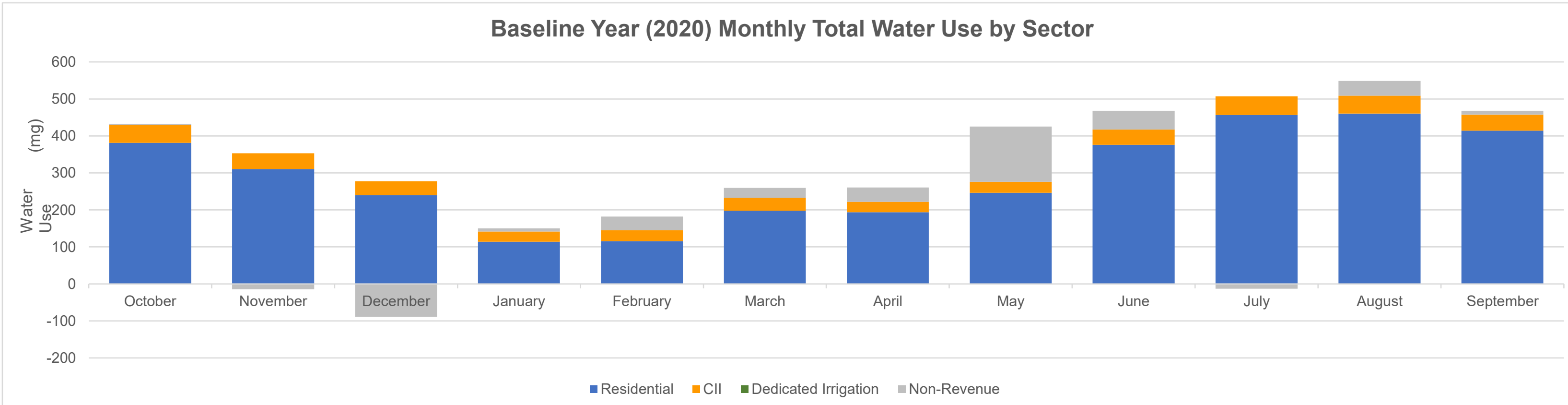
Water Use	Total Production (mg)	Water Use (mg)				Comments
		Residential	CII	Dedicated Irrigation	Non-Revenue	
Total	4,217	3,506	464	0	247	
Total Indoor	1,607	1,335	272	--	--	
Total Outdoor	2,363	2,171	193	0	--	
Total Non-Revenue	247	--	--	--	247	
Total Indoor %	38%	38%	59%	0%	--	
Total Outdoor %	56%	62%	41%	100%	--	
Total Non-Revenue %	6%	--	--	--	100%	

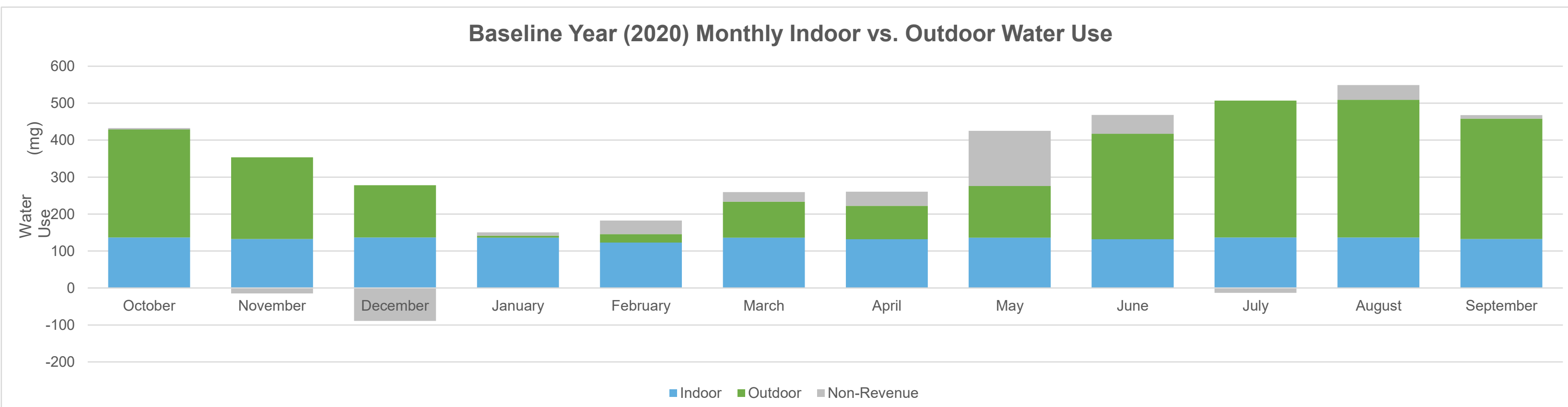




3 - Baseline Year (2020) Water Use Profile

Bear Gulch





5 - Estimated Water Savings - Stage 1

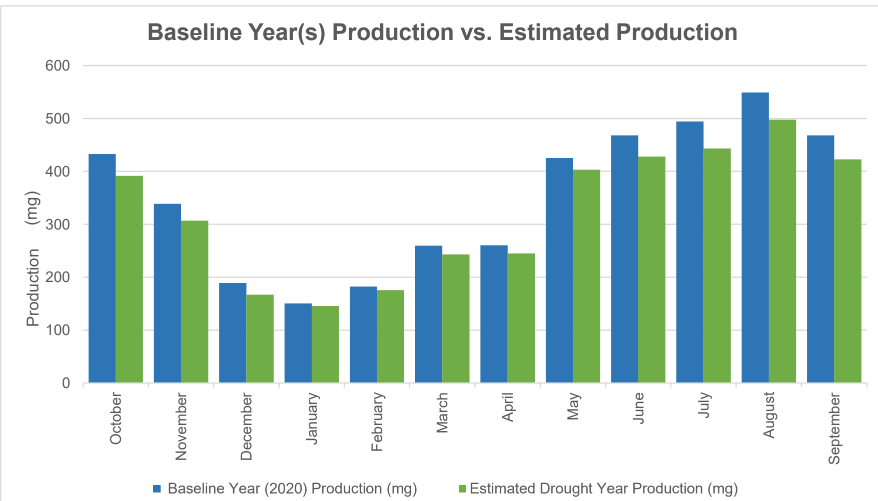
Bear Gulch

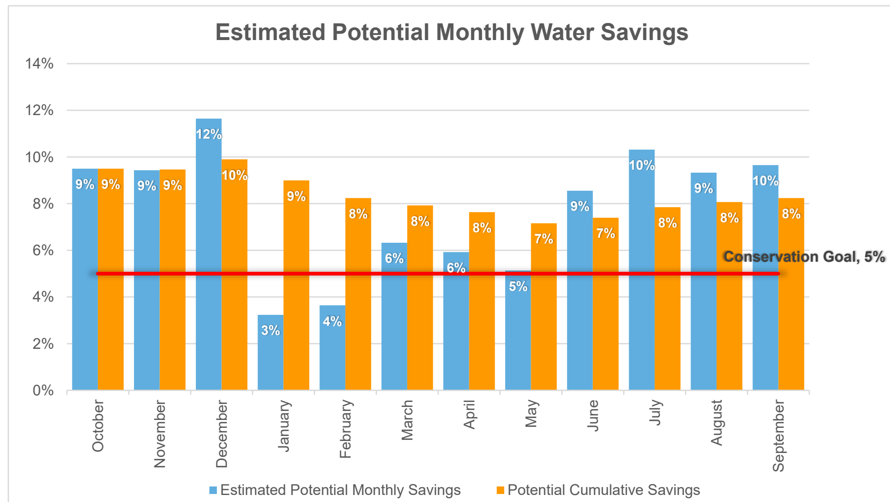
Estimated Monthly Water Use and Savings Summary

Units: (mg)

This provides a summary of the estimated production relative to Baseline Year production and potential water savings, assuming implementation of selected actions at the water savings and implementation rates indicated in the Drought Response Actions worksheet. Select the units that your production data are displayed in.

Month	Baseline Year (2020) Production (mg)	Estimated Drought Year Production (mg)	Estimated Potential Monthly Savings	Potential Cumulative Savings	Conservation Goal	Comments
October	433	391	9%	9%	5%	
November	339	307	9%	9%	5%	
December	189	167	12%	10%	5%	
January	150	145	3%	9%	5%	
February	182	176	4%	8%	5%	
March	259	243	6%	8%	5%	
April	260	245	6%	8%	5%	
May	425	403	5%	7%	5%	
June	468	428	9%	7%	5%	
July	494	443	10%	8%	5%	
August	549	498	9%	8%	5%	
September	468	423	10%	8%	5%	





Drought Response Tool

Home | Input Baseline Year Water Use | Baseline Year Water Use Profile | Drought Response Actions | Estimated Water Savings | Drought Response Tracking

1 - Home

Bear Gulch

Enter Agency Information	
Agency Name	Bear Gulch
Total Population Served	61,480
Conservation Goal (%)	15%
Drought Stage	Stage 2
Number of Residential Accounts	17,134
Number of Commercial, Industrial, and Institutional (CII) Accounts	1,429
Number of Dedicated Irrigation Accounts	0
Baseline Year(s)	2020
Percentage of Residential Indoor Use During Minimum Month (%)	100%
Percentage of Comm-Gov Indoor Use During Minimum Month (%)	81%
Comments	BG

5 - Estimated Water Savings - Stage 2

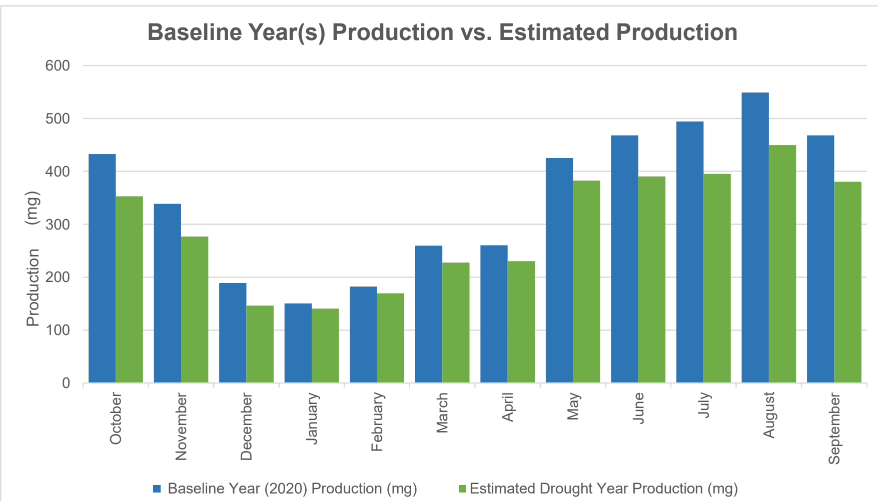
Bear Gulch

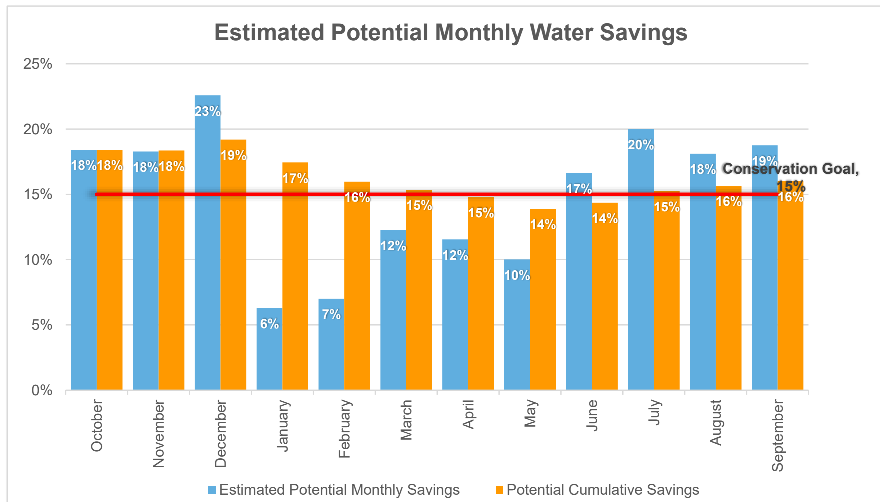
Estimated Monthly Water Use and Savings Summary

Units: (mg)

This provides a summary of the estimated production relative to Baseline Year production and potential water savings, assuming implementation of selected actions at the water savings and implementation rates indicated in the Drought Response Actions worksheet. Select the units that your production data are displayed in.

Month	Baseline Year (2020) Production (mg)	Estimated Drought Year Production (mg)	Estimated Potential Monthly Savings	Potential Cumulative Savings	Conservation Goal	Comments
October	433	353	18%	18%	15%	
November	339	277	18%	18%	15%	
December	189	146	23%	19%	15%	
January	150	141	6%	17%	15%	
February	182	169	7%	16%	15%	
March	259	228	12%	15%	15%	
April	260	230	12%	15%	15%	
May	425	383	10%	14%	15%	
June	468	390	17%	14%	15%	
July	494	395	20%	15%	15%	
August	549	449	18%	16%	15%	
September	468	380	19%	16%	15%	





Drought Response Tool

Home | Input Baseline Year Water Use | Baseline Year Water Use Profile | Drought Response Actions | Estimated Water Savings | Drought Response Tracking

1 - Home

Bear Gulch

Enter Agency Information	
Agency Name	Bear Gulch
Total Population Served	61,480
Conservation Goal (%)	25%
Drought Stage	Stage 3
Number of Residential Accounts	17,134
Number of Commercial, Industrial, and Institutional (CII) Accounts	1,429
Number of Dedicated Irrigation Accounts	0
Baseline Year(s)	2020
Percentage of Residential Indoor Use During Minimum Month (%)	100%
Percentage of Comm-Gov Indoor Use During Minimum Month (%)	81%
Comments	BG

5 - Estimated Water Savings - Stage 3

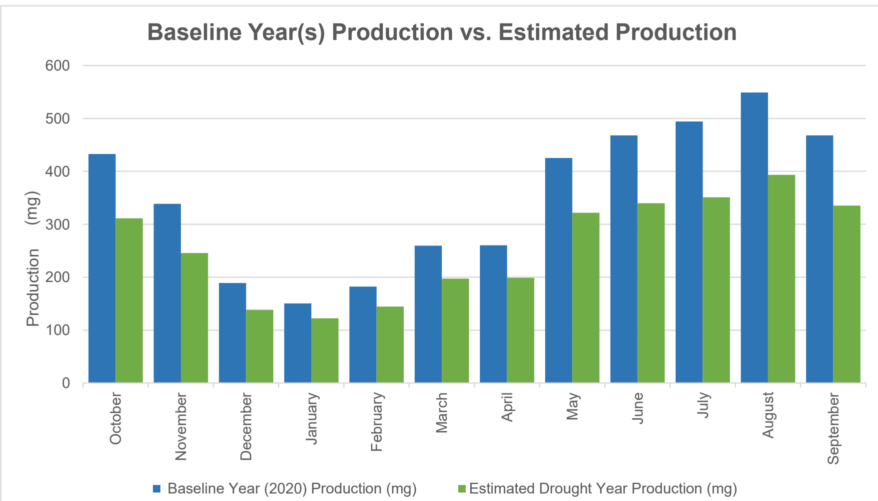
Bear Gulch

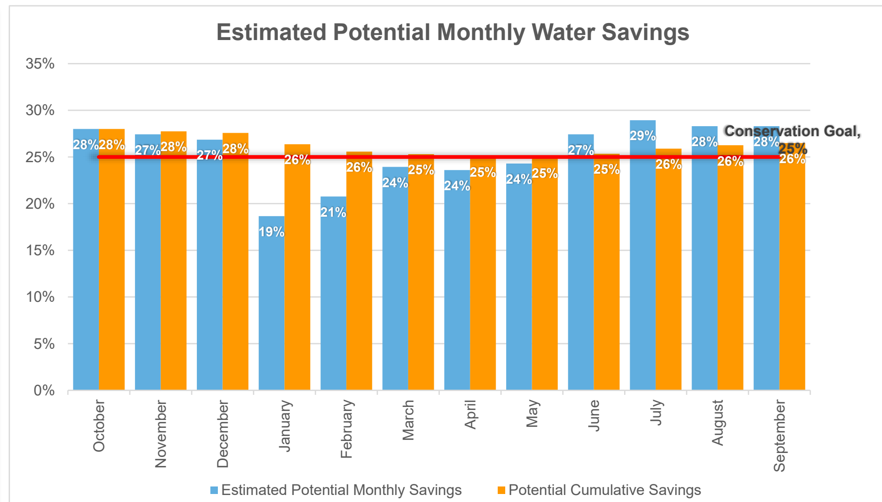
Estimated Monthly Water Use and Savings Summary

Units: (mg)

This provides a summary of the estimated production relative to Baseline Year production and potential water savings, assuming implementation of selected actions at the water savings and implementation rates indicated in the Drought Response Actions worksheet. Select the units that your production data are displayed in.

Month	Baseline Year (2020) Production (mg)	Estimated Drought Year Production (mg)	Estimated Potential Monthly Savings	Potential Cumulative Savings	Conservation Goal	Comments
October	433	311	28%	28%	25%	
November	339	246	27%	28%	25%	
December	189	138	27%	28%	25%	
January	150	122	19%	26%	25%	
February	182	144	21%	26%	25%	
March	259	197	24%	25%	25%	
April	260	199	24%	25%	25%	
May	425	322	24%	25%	25%	
June	468	340	27%	25%	25%	
July	494	351	29%	26%	25%	
August	549	393	28%	26%	25%	
September	468	335	28%	26%	25%	





Drought Response Tool

Home | Input Baseline Year Water Use | Baseline Year Water Use Profile | Drought Response Actions | Estimated Water Savings | Drought Response Tracking

1 - Home

Bear Gulch

Enter Agency Information	
Agency Name	Bear Gulch
Total Population Served	61,480
Conservation Goal (%)	35%
Drought Stage	Stage 4
Number of Residential Accounts	17,134
Number of Commercial, Industrial, and Institutional (CII) Accounts	1,429
Number of Dedicated Irrigation Accounts	0
Baseline Year(s)	2020
Percentage of Residential Indoor Use During Minimum Month (%)	100%
Percentage of Comm-Gov Indoor Use During Minimum Month (%)	81%
Comments	BG

5 - Estimated Water Savings - Stage 4

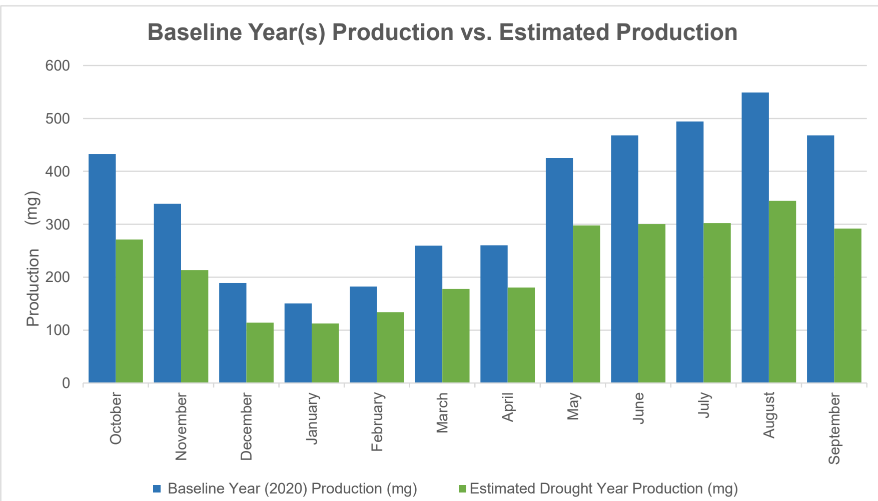
Bear Gulch

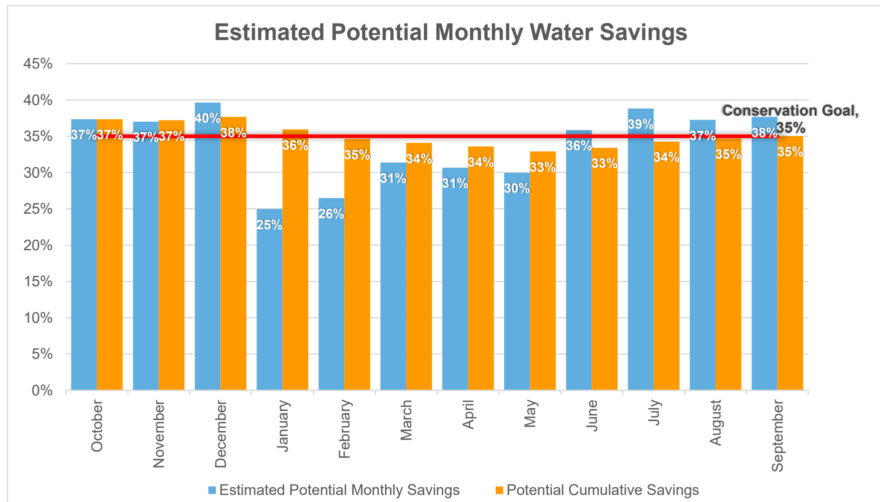
Estimated Monthly Water Use and Savings Summary

Units: (mg)

This provides a summary of the estimated production relative to Baseline Year production and potential water savings, assuming implementation of selected actions at the water savings and implementation rates indicated in the Drought Response Actions worksheet. Select the units that your production data are displayed in.

Month	Baseline Year (2020) Production (mg)	Estimated Drought Year Production (mg)	Estimated Potential Monthly Savings	Potential Cumulative Savings	Conservation Goal	Comments
October	433	271	37%	37%	35%	
November	339	213	37%	37%	35%	
December	189	114	40%	38%	35%	
January	150	113	25%	36%	35%	
February	182	134	26%	35%	35%	
March	259	178	31%	34%	35%	
April	260	181	31%	34%	35%	
May	425	298	30%	33%	35%	
June	468	300	36%	33%	35%	
July	494	302	39%	34%	35%	
August	549	344	37%	35%	35%	
September	468	292	38%	35%	35%	





Drought Response Tool

Home | Input Baseline Year Water Use | Baseline Year Water Use Profile | Drought Response Actions | Estimated Water Savings | Drought Response Tracking

1 - Home
Bear Gulch

Enter Agency Information	
Agency Name	Bear Gulch
Total Population Served	61,480
Conservation Goal (%)	45%
Drought Stage	Stage 5
Number of Residential Accounts	17,134
Number of Commercial, Industrial, and Institutional (CII) Accounts	1,429
Number of Dedicated Irrigation Accounts	0
Baseline Year(s)	2020
Percentage of Residential Indoor Use During Minimum Month (%)	100%
Percentage of Comm-Gov Indoor Use During Minimum Month (%)	81%
Comments	BG

5 - Estimated Water Savings - Stage 5

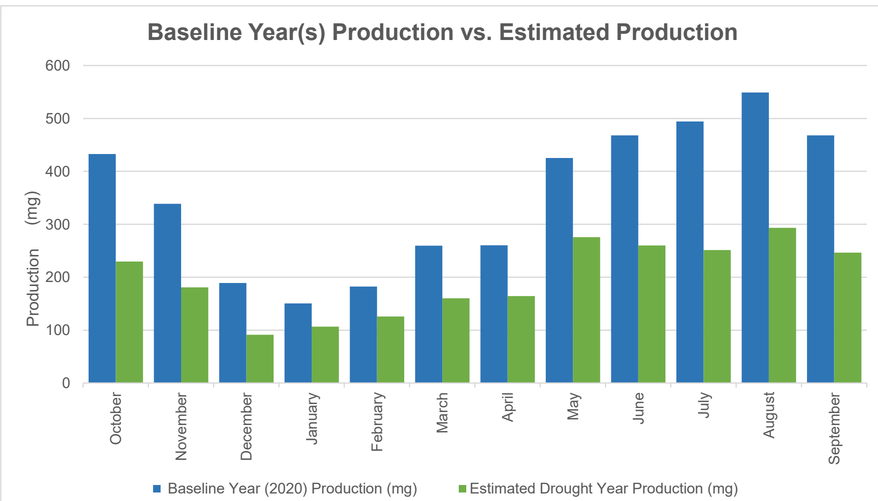
Bear Gulch

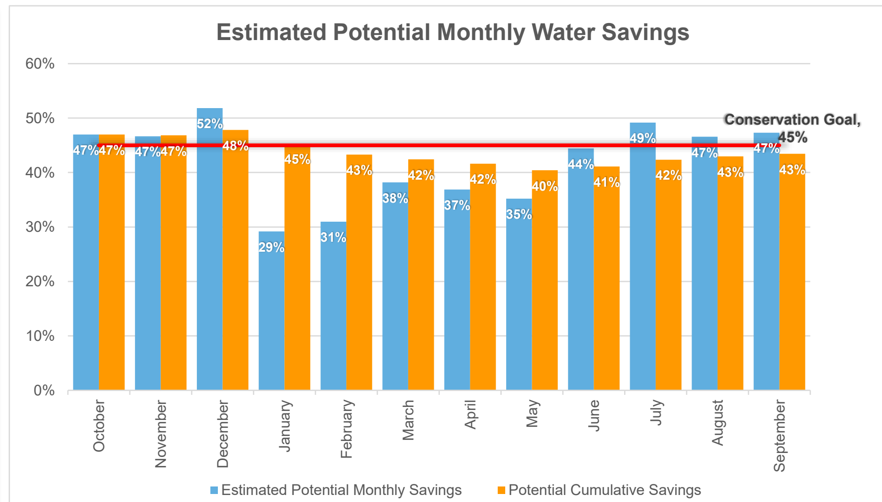
Estimated Monthly Water Use and Savings Summary

Units: (mg)

This provides a summary of the estimated production relative to Baseline Year production and potential water savings, assuming implementation of selected actions at the water savings and implementation rates indicated in the Drought Response Actions worksheet. Select the units that your production data are displayed in.

Month	Baseline Year (2020) Production (mg)	Estimated Drought Year Production (mg)	Estimated Potential Monthly Savings	Potential Cumulative Savings	Conservation Goal	Comments
October	433	229	47%	47%	45%	
November	339	181	47%	47%	45%	
December	189	91	52%	48%	45%	
January	150	106	29%	45%	45%	
February	182	126	31%	43%	45%	
March	259	160	38%	42%	45%	
April	260	164	37%	42%	45%	
May	425	275	35%	40%	45%	
June	468	260	44%	41%	45%	
July	494	251	49%	42%	45%	
August	549	293	47%	43%	45%	
September	468	247	47%	43%	45%	





1 - Home

Bear Gulch

Enter Agency Information	
Agency Name	Bear Gulch
Total Population Served	61,480
Conservation Goal (%)	55%
Drought Stage	Stage 6
Number of Residential Accounts	17,134
Number of Commercial, Industrial, and Institutional (CII) Accounts	1,429
Number of Dedicated Irrigation Accounts	0
Baseline Year(s)	2020
Percentage of Residential Indoor Use During Minimum Month (%)	100%
Percentage of Comm-Gov Indoor Use During Minimum Month (%)	81%
Comments	BG

5 - Estimated Water Savings - Stage 6

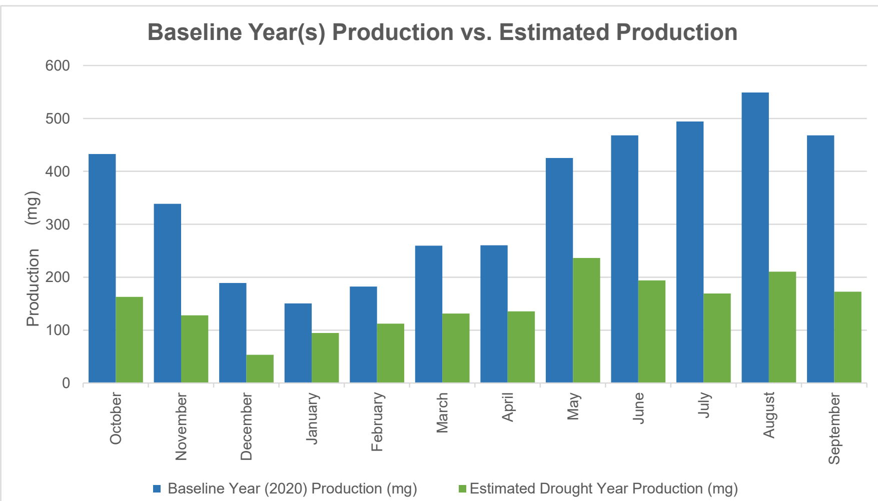
Bear Gulch

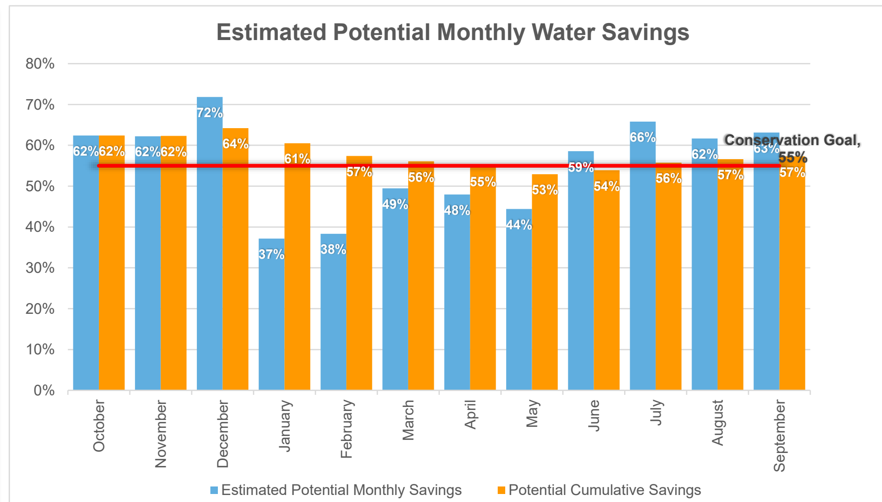
Estimated Monthly Water Use and Savings Summary

Units: (mg)

This provides a summary of the estimated production relative to Baseline Year production and potential water savings, assuming implementation of selected actions at the water savings and implementation rates indicated in the Drought Response Actions worksheet. Select the units that your production data are displayed in.

Month	Baseline Year (2020) Production (mg)	Estimated Drought Year Production (mg)	Estimated Potential Monthly Savings	Potential Cumulative Savings	Conservation Goal	Comments
October	433	163	62%	62%	55%	
November	339	128	62%	62%	55%	
December	189	53	72%	64%	55%	
January	150	94	37%	61%	55%	
February	182	112	38%	57%	55%	
March	259	131	49%	56%	55%	
April	260	136	48%	55%	55%	
May	425	236	44%	53%	55%	
June	468	194	59%	54%	55%	
July	494	169	66%	56%	55%	
August	549	210	62%	57%	55%	
September	468	173	63%	57%	55%	





Attachment C

CPUC Rule and Schedule 14.1

Rule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN (continued)

(Page 1) (T)

A. APPLICABILITY (N)

1. This schedule applies to all of California Water Service's regulated ratemaking areas in California, as well as Grand Oaks Water.

B. GENERAL INFORMATION

1. All expenses incurred by utility to implement Rule 14.1, and Schedule 14.1, and requirements of the California State Water Resources Control Board ("Water Board") that have not been considered in a General Rate Case or other proceeding shall be accumulated by Cal Water in a separate memorandum account, authorized in Resolution W-4976, for disposition as directed or authorized from time to time by the Commission.
2. To the extent that a Stage of Mandatory Water Use Restrictions in Schedule 14.1 has been activated, and a provision in this Rule is inconsistent with the activated Stage in Schedule 14.1, the provisions of Schedule 14.1 apply.

C. DEFINITIONS

For the purposes of this Rule, the following terms have the meanings set forth in this section.

1. "Commercial nursery" means the use of land, buildings or structures for the growing and/or storing of flowers, fruit trees, ornamental trees, vegetable plants, shrubs, trees and similar vegetation for the purpose of transplanting, for use as stock or grafting, and includes the retail sale or wholesale distribution of such items directly from the premises/lot.
2. "Drip irrigation system" means a non-spray, low-pressure, and low volume irrigation system utilizing emission devices with a precipitation or flow rate measured in gallons per hour (GPH), designed to slowly apply small volumes of water at or near the root zone of plants or other landscaping.
3. "Flow rate" means the rate at which water flows through pipes, valves, and emission devices, measured in gallons per minute (GPM), gallons per hour (GPH), inches per hour (IPH), hundred cubic feet (Ccf), or cubic feet per second (CFS).
4. "Flow-restricting device" means valves, orifices, or other devices that reduce the flow of potable water through a service line, which are capable of passing a minimum of 3 Ccf per person, per month, based upon the U.S. Census calculation of the average number of people in a household in the area.
5. "High-efficiency sprinkler systems" means an irrigation system with emission devices, such as sprinkler heads or nozzles, with a precipitation or flow rate no greater than one IPH.
6. "Irrigation" means the application of potable water by artificial means to landscape.
7. "Irrigation system" means the components of a system meant to apply water to an area for the purpose of irrigation, including, but not limited to, piping, fittings, sprinkler heads or nozzles, drip tubing, valves, and control wiring.
8. "Landscape" means all of the outdoor planting areas, turf areas, and water features at a particular location.
9. "Measureable rainfall" means any amount of precipitation of more than one-tenth of an inch (0.1").
10. "Micro spray irrigation system" means a low-pressure, low-volume irrigation system utilizing emission devices that spray, mist, sprinkle, or drip with a precipitation or flow rate measured in GPH, designed to slowly apply small volumes of water to a specific area. (N)

(continued)

Rule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN (continued)

(Page 2) (T)

C. DEFINITIONS (Continued) (N)

11. "Ornamental landscape" means shrubs, bushes, flowers, ground cover, turf, lawns, and grass planted for the purpose of improving the aesthetic appearance of property, but does not include crops or other agricultural products or special landscape areas.

12. "Ornamental turf" means a ground cover surface of grass that can be mowed and is planted for the purpose of improving the aesthetic appearance of the property, but does not include crops or other agricultural products or special landscape areas.

13. "Plumbing fixture" means a receptacle or device that is connected to a water supply system, including, but not limited to, pipes, toilets, urinals, showerheads, faucets, washing machines, water heaters, tubs, and dishwashers.

14. "Potable water" means water supplied by Cal Water which conforms to the federal and state standards for human consumption.

15. "Properly programmed" means a smart irrigation controller that has been programmed according to the manufacturer's instructions and site-specific conditions.

16. "Real-time water measurement device" means a device or system that provides regularly updated electronic information regarding the customer's water use.

17. "Runoff" means water which is not absorbed by the soil or landscape to which it is applied and flows from the landscape onto other areas.

18. "Smart irrigation controller" means an automatic device used to remotely control valves that operate an irrigation system that has been tested by an American National Standards Institute accredited third-party certifying body or laboratory in accordance with the Environmental Protection Agency's WaterSense program (or an analogous successor program), and certified by such body or laboratory as meeting the performance and efficiency requirements of such program, or the more stringent performance and efficiency requirements of another similar program.

19. "Special landscape area" means an area of the landscape dedicated solely to edible plants and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface.

20. "Turf" means a ground cover surface of grass that can be mowed.

21. "Water feature" means a design element where open, artificially supplied water performs an aesthetic or recreation feature, including, but not limited to, ponds, lakes, waterfalls, fountains, and streams.

22. "Water use evaluation" means an evaluation of the efficiency of indoor water-using devices, including, but not limited to, measurement of flow rates for all existing showerheads, faucets, and toilets, inspection for leaks, and providing written recommendations to improve the efficiency of the indoor water-using fixtures and devices and/or an evaluation of the performance of an irrigation system, including, but not limited to, inspection for leaks, reporting of overspray or runoff, and providing written recommendations to improve the performance of the irrigation system. (N)

(continued)

Rule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN (continued)

(Page 3) (T)

D. ENFORCEMENT (N)

Each Stage of this Rule establishes certain restrictions on the use of potable water. Violating the restrictions set forth in a particular Stage while it is in effect is declared a non-essential, wasteful use of potable water. Subject to the schedule and conditions outlined below, Cal Water is authorized to install a flow-restricting device on the service line of any customer when its personnel verify a customer is using potable water for non-essential, wasteful uses. No person shall have any right or claim in law or in equity, against Cal Water because of, or as a result of, any matter or thing done or threatened to be done pursuant to the restrictions on using potable water for non-essential, wasteful uses.

1. FIRST VIOLATION: Cal Water shall provide the customer with a written notice of violation.
2. SECOND VIOLATION: If Cal Water verifies that the customer has used potable water for non-essential, wasteful uses after having been notified of the first violation, Cal Water shall provide the customer with a second written notice of violation and is authorized to install a flow-restricting device on the customer's service line. Cal Water shall not be held liable for any injuries, damages, and/or consequences arising from the installation of a flow restricting device.
3. NOTICES OF VIOLATION:
   A. Written notices of violation provided to customers pursuant to this Rule shall document the verified violation and alert the customer to the fact that future violations of the restricted uses of potable water may result in the installation of a flow-restricting device on the customer's service line or the discontinuation of the customer's service.
   B. If Cal Water elects to install a flow-restricting device on a customer's service line, the written notice of violation shall explain that a flow-restricting device has or will be installed on the customer's service line, document the steps the customer must take in order for the flow-restricting device to be removed, and explain that after the flow-restricting device is removed, it may be reinstalled, without further notice, if the customer is again verified by Cal Water's personnel to be using potable water for non-essential, wasteful uses.
4. FLOW RESTRICTING DEVICE CONDITIONS: The installation of a flow-restricting devide on a customer's service line is subject to the following conditions:
   a. The device shall be capable of providing the premise with a minimum of 3 Ccf per person, per month, based upon the U.S. Census calculation of the average number of people in a household in the area.
   b. The device may only be removed by Cal Water, and only after a minimum three-day period has elapsed.
   c. Any tampering with the device may result in the discontinuation of the customer's water service and the customer being charged for any damage to Cal Water's equipment or facilities and any required service visits. (N)

(continued)

Rule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN (continued)

(Page 4) (T)

D. ENFORCEMENT (Continued) (N)

d. After the removal of the device, if Cal Water verifies that the customer is using potable water for non-essential, wasteful uses, Cal Water may install another flow-restricting device without prior notice. This device may remain in place until water supply conditions warrant its removal. If, despite the installation of the device, Cal Water verifies that the customer is using potable water for non-essential and, unauthorized wasteful uses, then Cal Water may discontinue the customer's water service, as provided in its Rule No. 11.

5. FLOW-RESTRICTING DEVICE REMOVAL CHARGES: The charge to customers for removal of a flow-restricting device installed pursuant to this Rule is $100 during normal business hours, and $150 for the device to be removed outside of normal business hours.

E. WASTEFUL USES OF WATER

Except where necessary to address an immediate health or safety need or to comply with a term or condition in a permit issued by a state or federal agency, customers are prohibited, at all times, from using potable water for the following actions, as each is declared a non-essential, wasteful use of water:

1. Use of potable water through a broken or defective plumbing fixture or irrigation system when Cal Water has notified the customer in writing to repair the broken or defective plumbing fixture or irrigation system, and the customer has failed to effect such repairs within seven (7) business days of receipt of such notice;
2. The application of potable water to 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;
3. The use of a hose that dispenses potable water to wash vehicles, including cars, trucks, buses, boats, aircraft, and trailers, whether motorized or not, except where the hose is fitted with a shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use.

F. MANDATORY STAGED RESTRICTIONS OF WATER USE

1. ADOPTION OF STAGED MANDATORY RESTRICTIONS: Cal Water may implement the following staged mandatory restrictions of water use, after notifying the Director of the Commission's Division of Water and Audits (DWA), by a Tier 1 advice letter in both hard-copy and emailed formats, of Cal Water's intent to implement a particular stage, if:
   a. Water supplies are projected to be insufficient to meet normal customer demand by Cal Water; or
   b. A water supply shortage or threatened shortage exists; or
   c. Water supplies are curtailed by a wholesale water supplier; or
   d. Directed to do so under a duly adopted emergency regulation by the Commission or other authorized government agencies. (N)

(continued)

Rule No. 14.1 (N)

WATER SHORTAGE CONTINGENCY PLAN (continued)

(Page 5)

F. MANDATORY STAGED RESTRICTIONS OF WATER USE (Continued)

2. PUBLIC NOTICE: Thirty (30) days prior to implementing a mandatory staged reduction in water use in this Rule, Cal Water shall notify its customer of the requirements of the particular stage implemented by Cal Water by bill insert, direct mailing, email, or bill message directing the customer to additional information on Cal Water's website.

3. STAGE 1 WATER SHORTAGE: A Stage 1 Water Shortage occurs when Cal Water, the Commission, a wholesale water supplier, or other authorized government agency determines that measures are needed to reduce water consumption by customers served by public water suppliers. In addition to the prohibitions outlined in **Section E**, the following restrictions may be imposed by Cal Water, except where necessary to address an immediate health or safety need or to comply with a term or condition in a permit issued by a state or federal agency:

   a. Outdoor Irrigation Restrictions (Stage 1)

      i. Irrigating ornamental landscapes with potable water is limited to no more than **three (3) days** per week, on a schedule established and posted by Cal Water on its website or otherwise provided to customers by bill message, bill insert, direct mail, or email, or as follows:

         1. Customers with even-numbered addresses may irrigate on Saturdays, Tuesdays, and Thursdays.

         2. Customers with odd-numbered addresses may irrigate on Sundays, Wednesdays, and Fridays.

         3. Customers without a street address may irrigate on Saturdays, Tuesdays, and Thursdays.

         4. Notwithstanding the foregoing restrictions, irrigation of special landscape areas or commercial nurseries may occur as needed, provided that the customer who wishes to irrigate a special landscape area or commercial nursery presents Cal Water with a plan to achieve water use reductions commensurate with those that would be achieved by complying with foregoing restrictions.

         5. Notwithstanding the foregoing restrictions, when a city, county, or other local public agency in one of Cal Water's service areas duly adopts restrictions on the number of days or hours of the day that customers may irrigate which are different than those adopted by Cal Water, Cal Water may enforce the city, county, or other local public agency's restrictions.

      ii. Irrigating ornamental landscape with potable water is prohibited during the hours between **8:00 a.m. and 6:00 p.m**.

      iii. The foregoing restrictions do **not** apply to:

         1. Landscape irrigation zones that exclusively use drip irrigation systems and/or micro spray irrigation system; (N)

(continued)

Rule No. 14.1 (N)

WATER SHORTAGE CONTINGENCY PLAN (continued)

(Page 6)

F. MANDATORY STAGED RESTRICTIONS OF WATER USE (Continued)

[Stage 1 (cont.)]

2. Irrigating ornamental landscapes with the use of a hand-held bucket or similar container, with a continuously monitored hose which is fitted with an automatic shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use or monitored, or for the express purpose of adjusting or repairing an irrigation system.

b. Obligation to Fix Leaks, Breaks or Malfunctions: All leaks, breaks, or other malfunctions in the customer's plumbing fixture(s) or irrigation system(s) must be repaired within **five (5) business days** of written notification by Cal Water, unless other arrangements are made with Cal Water.

c. **Prohibited** Uses of Water: Customers are prohibited from using potable water for the following actions:

i. The application of potable water to driveways and sidewalks;

ii. The use of potable water in a water feature, except where the water is part of a recirculating system;

iii. The application of potable water to outdoor landscapes during and within forty-eight (48) hours after measurable rainfall.

d. Other duly adopted restrictions on the use potable water as prescribed from time to time by the Commission or other authorized government agencies are incorporated herein by reference.

4. STAGE 2 WATER SHORTAGE: A Stage 2 Water Shortage occurs when the Stage 1 Water Shortage restrictions are deemed insufficient to achieve identified water use goals established by Cal Water, the Commission, a wholesale water supplier, or other authorized government agency. In addition to the prohibited wasteful water use practices listed in Section D, the following restrictions may be imposed by Cal Water, except where necessary to address an immediate health or safety need or to comply with a term or condition in a permit issued by a state or federal agency. Differences from or additions to the previous Stage are underlined.

a. Outdoor Irrigation Restrictions (Stage 2)

i. Irrigating ornamental landscapes with potable water is limited to no more than **three (3) days** per week, on a schedule established and posted by Cal Water on its website or otherwise provided to customers by bill message, bill insert, direct mail, or email, or as follows:

1. Customers with even-numbered addresses may irrigate on Saturdays, Tuesdays, and Thursdays.

2. Customers with odd-numbered addresses may irrigate on Sundays, Wednesdays, and Fridays. (N)

(continued)

Rule No. 14.1 (N)

WATER SHORTAGE CONTINGENCY PLAN (continued)

(Page 7)

F. MANDATORY STAGED RESTRICTIONS OF WATER USE (Continued)

[Stage 2 (cont.)]

3. Customers without a street address may irrigate on Saturdays, Tuesdays, and Thursdays.
4. Notwithstanding the foregoing restrictions, irrigation of special landscape areas or commercial nurseries may occur as needed, provided that the customer who wishes to irrigate a special landscape area or commercial nursery presents Cal Water with a plan to achieve water use reductions commensurate with those that would be achieved by complying with foregoing restrictions.
5. Notwithstanding the foregoing restrictions, when a city, county, or other public agency in one of Cal Water's service areas duly adopts restrictions on the number of days or hours of the day that customers may irrigate which are different than those adopted by Cal Water, Cal Water may enforce the city, county, or other local public agency's restrictions.

ii. Irrigating ornamental landscape with potable water is prohibited during the hours between **8:00 a.m. and 6:00 p.m**.

iii. The foregoing restrictions do **not** apply to:

1. Landscape irrigation zones that exclusively use drip irrigation systems and/or micro spray irrigation system;
2. Irrigating ornamental landscapes with the use of a hand-held bucket or similar container, a continuously monitored hose which is fitted with an automatic shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use or monitored, or for the express purpose of adjusting or repairing an irrigation system.

b. Obligation to Fix Leaks, Breaks or Malfunctions: All leaks, breaks, or other malfunctions in the customer's plumbing fixture(s) or irrigation system(s) must be repaired within **three (3) business days** of written notification by Cal Water, unless other arrangements are made with Cal Water.

c. **Prohibited** Uses of Water: Customers are prohibited from using potable water for the following actions:

i. The application of potable water to driveways and sidewalks;

ii. The use of potable water in a water feature, except where the water is part of a recirculating system;

iii. The application of potable water to outdoor landscapes during and within forty-eight (48) hours after measurable rainfall;

iv. The serving of drinking water other than upon request in eating or drinking establishments, including but not limited to restaurants, hotels, cafes, cafeterias, bars, or other public places where food or drink are served and/or purchased; (N)

(continued)

Rule No. 14.1 (N)

WATER SHORTAGE CONTINGENCY PLAN (continued)

(Page 8)

F. MANDATORY STAGED RESTRICTIONS OF WATER USE (Continued)

[Stage 2 (cont.)]

v. Irrigation of ornamental landscape on public street medians;

vi. Irrigation outside of newly constructed homes and buildings with potable water in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission and the Department of Housing and Community Development.

d. Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. The hotel or motel shall prominently display notice of this option in each guest room using clear and easily understood language.

e. Limits on Filling Ornamental Lakes or Ponds: Filling or re-filling ornamental lakes or ponds with potable water is prohibited, except to the extent needed to sustain aquatic life, provided that such animals are of significant value and have been actively managed within the water feature prior to the implementation of any staged mandatory restrictions of water use as described in this Rule.

f. Other duly adopted restrictions on the use of potable water as prescribed from time to time by the Commission or other authorized government agencies are incorporated herein by reference.

5. STAGE 3 WATER SHORTAGE: A Stage 3 Water Shortage occurs when the Stage 2 Water Shortage restrictions are deemed insufficient to achieve identified water use goals established by Cal Water, the Commission, a wholesale water supplier, or other authorized government agency. In addition to the prohibited wasteful water use practices listed in Section D, the following restrictions may be imposed by Cal Water, except where necessary to address an immediate health or safety need or to comply with a term or condition in a permit issued by a state or federal agency. Differences from or additions to the previous Stages are underlined.

a. Outdoor Irrigation Restrictions

i. Irrigating ornamental landscapes with potable water is limited to no more than **two (2) days** per week, on a schedule established and posted by Cal Water on its website or otherwise provided to customers by bill message, bill insert, direct mail, or email, or as follows:

1. Customers with even-numbered addresses may irrigate on Saturdays and Tuesdays (previous Stages allowed Thursdays as well).

2. Customers with odd-numbered addresses may irrigate on Sundays and Wednesdays (previous Stages allowed Fridays as well).

3. Customers without a street address may irrigate on Saturdays and Tuesdays (previous Stages allowed Thursdays as well). (N)

(continued)

Rule No. 14.1 (N)

WATER SHORTAGE CONTINGENCY PLAN (continued)

(Page 9)

F. MANDATORY STAGED RESTRICTIONS OF WATER USE (Continued)

[Stage 3 (cont.)]

4. Notwithstanding the foregoing restrictions, irrigation of special landscape areas or commercial nurseries may occur as needed, provided that the customer who wishes to irrigate a special landscape area or commercial nursery presents Cal Water with a plan to achieve water use reductions commensurate with those that would be achieved by complying with foregoing restrictions.

5. Notwithstanding the foregoing restrictions, when a city, county, or other local public agency in one of Cal Water's service areas duly adopts restrictions on the number of days or hours of the day that customers may irrigate which are different than those adopted by Cal Water, Cal Water may enforce the city, county, or other local public agency's restrictions.

ii. Irrigating ornamental landscape with potable water is prohibited during the hours between **8:00 a.m. and 6:00 p.m.**

iii. The foregoing restrictions do **not** apply to:

1. Landscape irrigation zones that exclusively use drip irrigation systems and/or micro spray irrigation system;

2. Irrigating ornamental landscapes with the use of a hand-held bucket or similar container, a continuously monitored hose which is fitted with an automatic shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use or monitored, or for the express purpose of adjusting or repairing an irrigation system.

b. Obligation to Fix Leaks, Breaks or Malfunctions: All leaks, breaks, or other malfunctions in the customer's plumbing fixtures and/or irrigation system must be repaired within **two (2) business days** of written notification by Cal Water, unless other arrangements are made with Cal Water.

c. **Prohibited** Uses of Water: Customers are prohibited from using potable water for the following actions:

i. The application of potable water to driveways and sidewalks;

ii. The use of potable water in a water feature, except where the water is part of a recirculating system;

iii. The application of potable water to outdoor landscapes during and within forty-eight (48) hours after measurable rainfall;

iv. The serving of drinking water other than upon request in eating or drinking establishments, including but not limited to restaurants, hotels, cafes, cafeterias, bars, or other public places where food or drink are served and/or purchased;

v. Irrigation of ornamental turf on public street medians;

vi. Irrigation outside of newly constructed homes and buildings with potable water in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission and the Department of Housing and Community Development.

vii. Use of potable water for street cleaning with trucks, except for initial wash-down for construction purposes (if street sweeping is not feasible); (N)

(continued)

Rule No. 14.1 (N)

WATER SHORTAGE CONTINGENCY PLAN (continued)

(Page 10)

F. MANDATORY STAGED RESTRICTIONS OF WATER USE (Continued)

[Stage 3 (cont.)]

viii. Use of potable water for construction purposes, such as consolidation of backfill, dust control, or other uses unless no other source of water or other method can be used.

d. Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. The hotel or motel shall prominently display notice of this option in each guest room using clear and easily understood language.

e. Limits on Filling Ornamental Lakes or Ponds: Filling or re-filling ornamental lakes or ponds with potable water is prohibited, except to the extent needed to sustain aquatic life, provided that such animals are of significant value and have been actively managed within the water feature prior to the implementation of any staged mandatory restrictions of water use as described in this Rule.

f. Other duly adopted restrictions on the use of potable water as prescribed from time to time by the Commission or other authorized government agencies are incorporated herein by reference.

6. STAGE 4 WATER SHORTAGE: A Stage 4 Water Shortage occurs when the Stage 3 Water Shortage restrictions are deemed insufficient to achieve identified water use goals established by Cal Water, the Commission, a wholesale water supplier, or other authorized government agency. In addition to the prohibited wasteful water use practices listed in Section D, the following restrictions may be imposed by Cal Water, except where necessary to address an immediate health or safety need or to comply with a term or condition in a permit issued by a state or federal agency. Differences from or additions to the previous Stage are underlined.

a. Irrigating ornamental landscape with potable water is prohibited, except when a hand-held bucket or a similar container, or a continuously monitored hose which is fitted with an automatic shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use or monitored is used to maintain vegetation, including trees and shrubs.

b. Obligation to Fix Leaks, Breaks or Malfunctions: All leaks, breaks, or other malfunctions in the customer's plumbing fixtures or irrigation system must be repaired within **one (1) business day** of written notification by Cal Water, unless other arrangements are made with Cal Water.

Prohibited Uses of Water: Customers are prohibited from using potable water for the following actions:

i. The application of potable water to driveways and sidewalks;

ii. The use of potable water in a water feature, except where the water is part of a recirculating system;

iii. The application of potable water to outdoor landscapes during and within forty-eight (48) hours after measurable rainfall; (N)

(continued)

Rule No. 14.1 (N)

WATER SHORTAGE CONTINGENCY PLAN (continued)

(Page 11)

F. MANDATORY STAGED RESTRICTIONS OF WATER USE (Continued)

[Stage 4 (cont.)]

iv. The serving of drinking water other than upon request in eating or drinking establishments, including but not limited to restaurants, hotels, cafes, cafeterias, bars, or other public places where food or drink are served and/or purchased;

[Note that items previously identified as (v) and (vi) in Stage 3 have been eliminated.]

v. Use of potable water for street cleaning with trucks (the previous Stage allowed certain exceptions);

vi. Use of potable water for construction purposes, such as consolidation of backfill, dust control, or other uses (the previous Stage allowed certain exceptions).

c. Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. The hotel or motel shall prominently display notice of this option in each guest room using clear and easily understood language.

d. Limits on Filling Ornamental Lakes or Ponds: Filling or re-filling ornamental lakes or ponds with potable water is prohibited, except to the extent needed to sustain aquatic life, provided that such animals are of significant value and have been actively managed within the water feature prior to the implementation of any staged mandatory restrictions of water use as described in this Rule.

f. Other duly adopted restrictions on the use of utility-supplied potable water as prescribed from time to time by the Commission or other authorized government agencies, commissions, or officials are incorporated herein by reference.

G. ADOPTION OF STAGED MANDATORY WATER USE REDUCTIONS (for Schedule 14.1)

1. ADDITION OF SCHEDULE 14.1: If, in the opinion of Cal Water, more stringent water conservation measures are required due to supply conditions or government directive, Cal Water may request the addition of a Schedule No. 14.1 – Staged Mandatory Water Use Reductions, via a Tier 2 advice letter.

   A. Cal Water may not activate Schedule No. 14.1 until it has been authorized to do so by the California Public Utilities Commission, as delegated to its Division of Water and Audits.

   B. A Schedule No. 14.1 that has been authorized by the California Public Utilities Commission shall remain dormant until triggered by specific conditions detailed in the Schedule 14.1 tariff and Cal Water has requested and received authorization for activating a stage by the California Public Utilities Commission. (N)

(continued)

Rule No. 14.1 (N)

WATER SHORTAGE CONTINGENCY PLAN (continued)

(Page 12)

G. **ADOPTION OF STAGED MANDATORY WATER USE REDUCTIONS (for Schedule 14.1) (continued)**

c. Notice of the Tier 2 advice letter and associated public participation hearing, if required, shall be provided to customers through a bill insert or a direct mailing, as set forth in Subsection 5 (Public Notice) below.

d. Cal Water shall comply with all requirements of Sections 350-358 of the California Water Code.

e. The Tier 2 advice letter requesting the addition of a Schedule No. 14.1 shall include, but not be limited to:

i. A proposed Schedule No. 14.1 tariff, which shall include but not be limited to:

1. Applicability,
2. Territory applicable to,
3. A detailed description of each stage of water budgets (the number of stages requested for a ratemaking area may vary depending on the specifics of the water shortage event),
4. A detailed description of the trigger(s) that activates each stage of water budgets,
5. A detailed description of each water use restriction for each stage of water budgets,
6. Water use violation levels, written warning levels, associated fines, if applicable, and exception procedures,
7. Conditions for installation of a flow restrictor,
8. Charges for removal of flow restrictors, and
9. Special conditions

ii. Justification for, and documentation and calculations in support of the water budgets.

2. Conditions for Activating Schedule No. 14.1: Cal Water may file a Tier 1 advice letter to request activation of a particular stage of its Schedule No. 14.1 tariff if:

a. Cal Water, the California Public Utilities Commission, wholesale water supplier, or other government agency declares an emergency requiring mandatory water budgets, mandatory water rationing, or mandatory water allocations; or

b. A government agency declares a state of emergency in response to severe drought conditions, earthquake or other catastrophic event that severely reduces Cal Water's water supply; or

c. Cal Water is unable to achieve water conservation targets set by itself; or

d. Water conservation targets set by itself or a governing agency are insufficient; or

e. Cal Water chooses to subsequently activate a different stage of its Schedule No. 14.1 tariff.

(continued)

Rule No. 14.1 (N)

WATER SHORTAGE CONTINGENCY PLAN (continued)

(Page 13)

G. ADOPTION OF STAGED MANDATORY WATER USE REDUCTIONS (for Schedule 14.1) (continued)

a. Include, but not be limited to, a justification for activating the particular stage of mandatory water use reductions, as well as the period during which the particular stage will be in effect.

b. Be accompanied by the customer notification measures detailed in sub-section 5 (Public Notice) below.

4. De-Activating Schedule No. 14.1: When Schedule No. 14.1 is activated and Cal Water determines that water supplies are again sufficient to meet normal demands, and mandatory water use reductions are no longer necessary, Cal Water shall seek the approval of the California Public Utilities Commission, via a Tier 1 advice letter, to de-activate the particular stage of mandatory water use reductions that had been authorized.

5. Public Notice

a. When Cal Water requests the addition of a Schedule 14.1 – Staged Mandatory Water Use Reductions Tariff, via a Tier 2 advice letter, it shall provide notice of the Tier 2 advice letter and associated public hearing provided to customers through bill inserts or direct mailing, and it shall comply with all requirements of Sections 350-358 of the California Water Code (CWC), including but not limited to the following:

i. In order to be in compliance with both the General Order 96-B and CWC, notice shall be provided via both newspaper and bill insert/direct mailing.

ii. One notice shall be provided for each advice letter filed, that includes both notice of the filing of the Tier 2 advice letter as well as the details of the public hearing (date, time, place, etc.).

iii. The public meeting shall be held after the Tier 2 advice letter is filed, and before the Commission authorizes the addition of Schedule 14.1 to the tariff except in cases of emergency water shortages approved by DWA.

iv. Cal Water shall consult with Division of Water and Audits staff prior to filing advice letter, in order to determine details of public meeting.

b. In the event that Schedule No. 14.1- Staged Mandatory Water Use Reductions Tariff is triggered, and Cal Water requests activation through the filing of a Tier 1 advice letter, Cal Water shall notify its customers and provide each customer with a summary of Schedule No. 14.1 by means of bill insert or direct mailing. Notification shall take place prior to imposing any penalties associated with this plan. If activation of Schedule No. 14.1 occurs one year or more since the public hearing associated with adding Schedule 14.1 to its tariffs, then Cal Water shall conduct a public hearing pursuant to California Water Code Section 351 prior to activating a stage of its Mandatory Water Use Reduction Tariff.

c. During the period that a stage of Schedule No. 14.1 is activated, Cal Water shall provide customers with updates in at least every other bill, regarding its water supply status and the results of customers' conservation efforts. (N)

[end]

Schedule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES

A. APPLICABILITY

1. This schedule applies to all of California Water Service's regulated ratemaking areas in California, as well as Grand Oaks Water.

B. GENERAL INFORMATION

1. All expenses incurred by California Water Service to implement Rule 14.1, and Schedule 14.1, and requirements of the California State Water Resources Control Board ("Water Board") that have not been considered in a General Rate Case or other proceeding shall be accumulated by Cal Water in a separate memorandum account, authorized in Resolution W-4976, for disposition as directed or authorized from time to time by the Commission.
2. All monies collected by Cal Water through waste of water penalties established in this schedule shall be recorded in the appropriate memorandum account and used to offset the expenses described in Section 1 above.
3. Except in the case of Grand Oaks, all monies collected by Cal Water through drought surcharges, as established by the Mandatory Water Budgets found in Schedule 14.1, shall be recorded in the appropriate Water Revenue Adjustment Mechanism ("WRAM") account and used to offset under-collected revenues.
4. To the extent that any provision in this Schedule is inconsistent with Rule 14.1, the provisions of this Schedule apply. (D)
5. On April 1, 2015, the Governor of the State of California issued Executive Order B-29-15 due to severe drought conditions. The Executive Order, among other requirements, directs the State Water Resources Control Board ("Water Board") to impose restrictions on urban water suppliers like Cal Water to achieve a statewide 25% reduction in potable urban usage, as compared with the amount used in 2013, through February 2016. (L) (D)

   Urban water suppliers must develop rate structures and other pricing mechanisms, such as surcharges and penalties, to achieve 25% water conservation. (L)
6. On May 5, 2015, the Water Board issued an Emergency Regulation by Resolution No. 2015-0032 due to continuing drought conditions with specific water use reductions, by service area, and prohibitions on how end-use customers can use potable water. On May 7, 2015, the California Public Utilities Commission ("Commission") issued Resolution W-5041 ordering compliance with the mandates of the Governor and the Water Board. (L)
7. On November 13, 2015, the Governor of the State of California issued Executive Order B-36-15 that directed the Water Board to, if drought conditions persist through January 2016, extend until October 31, 2016 restrictions to achieve a statewide reduction in potable usage. (N)
8. On February 2, 2016, the Water Board adopted an extended and revised Emergency Regulation due to continuing drought conditions. On February 11, 2016, the Commission issued Resolution W-5082 ordering compliance with the mandates of the Governor and the Water Board. (N)

C. DEFINITIONS

For the purposes of this Schedule, the following terms have the meanings set forth in this section. (These are the same as in Rule 14.1, unless otherwise specified.)

1. "Commercial nursery" means the use of land, buildings or structures for the growing and/or storing of flowers, fruit trees, ornamental trees, vegetable plants, shrubs, trees and similar vegetation for the purpose of transplanting, for use as stock or grafting, and includes the retail sale or wholesale distribution of such items directly from the premises/lot.

(continued)

Schedule No. 14.1 (N)

WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES

C. DEFINITIONS (Continued)

2. "Drip irrigation system" means a non-spray, low-pressure, and low volume irrigation system utilizing emission devices with a precipitation or flow rate measured in gallons per hour (GPH), designed to slowly apply small volumes of water at or near the root zone of plants or other landscaping.
3. "Flow rate" means the rate at which water flows through pipes, valves, and emission devices, measured in gallons per minute (GPM), gallons per hour (GPH), inches per hour (IPH), hundred cubic feet (Ccf), or cubic feet per second (CFS).
4. "Flow-restricting device" means valves, orifices, or other devices that reduce the flow of potable water through a service line, which are capable of passing a minimum of 3 Ccf per person, per month, based upon the U.S. Census calculation of the average number of people in a household in the area.
5. "High-efficiency sprinkler systems" means an irrigation system with emission devices, such as sprinkler heads or nozzles, with a precipitation or flow rate no greater than one IPH.
6. "Irrigation" means the application of potable water by artificial means to landscape.
7. "Irrigation system" means the components of a system meant to apply water to an area for the purpose of irrigation, including, but not limited to, piping, fittings, sprinkler heads or nozzles, drip tubing, valves, and control wiring.
8. "Landscape" means all of the outdoor planting areas, turf areas, and water features at a particular location.
9. "Measureable rainfall" means any amount of precipitation of more than one-tenth of an inch (0.1").
10. "Micro spray irrigation system" means a low-pressure, low-volume irrigation system utilizing emission devices that spray, mist, sprinkle, or drip with a precipitation or flow rate measured in GPH, designed to slowly apply small volumes of water to a specific area.
11. "Ornamental landscape" means shrubs, bushes, flowers, ground cover, turf, lawns, and grass planted for the purpose of improving the aesthetic appearance of property, but does not include crops or other agricultural products or special landscape areas.
12. "Ornamental turf" means a ground cover surface of grass that can be mowed and is planted for the purpose of improving the aesthetic appearance of the property, but does not include crops or other agricultural products or special landscape areas.
13. "Plumbing fixture" means a receptacle or device that is connected to a water supply system, including, but not limited to, pipes, toilets, urinals, showerheads, faucets, washing machines, water heaters, tubs, and dishwashers.
14. "Potable water" means water supplied by Cal Water which conforms to the federal and state standards for human consumption.
15. "Properly programmed" means a smart irrigation controller that has been programmed according to the manufacturer's instructions and site-specific conditions.
16. "Real-time water measurement device" means a device or system that provides regularly updated electronic information regarding the customer's water use.
17. "Runoff" means water which is not absorbed by the soil or landscape to which it is applied and flows from the landscape onto other areas.
18. "Smart irrigation controller" means an automatic device used to remotely control valves that operate an irrigation system that has been tested by an American National Standards Institute accredited third-party certifying body or (N)

(continued)

Schedule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES (continued)

C. DEFINITIONS (Continued)

laboratory in accordance with the Environmental Protection Agency's WaterSense program (or an analogous successor program), and certified by such body or laboratory as meeting the performance and efficiency requirements of such program, or the more stringent performance and efficiency requirements of another similar program.

19. "Special landscape area" means an area of the landscape dedicated solely to edible plants and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface.
20. "Turf" means a ground cover surface of grass that can be mowed.
21. "Water feature" means a design element where open, artificially supplied water performs an aesthetic or recreation feature, including, but not limited to, ponds, lakes, waterfalls, fountains, and streams.
22. "Water use evaluation" means an evaluation of the efficiency of indoor water-using devices, including, but not limited to, measurement of flow rates for all existing showerheads, faucets, and toilets, inspection for leaks, and providing written recommendations to improve the efficiency of the indoor water-using fixtures and devices and/or an evaluation of the performance of an irrigation system, including, but not limited to, inspection for leaks, reporting of overspray or runoff, and providing written recommendations to improve the performance of the irrigation system.

D. WASTE OF WATER PENALTIES

Each Stage of this Schedule establishes certain restrictions on the use of potable water. Violating the restrictions set forth in a particular Stage while it is in effect is declared a non-essential, wasteful use of potable water. Cal Water is authorized to take the following actions when its personnel verify a customer is using potable water for non-essential, wasteful uses. No person shall have any right or claim in law or in equity, against Cal Water because of, or as a result of, any matter or thing done or threatened to be done pursuant to the restrictions on using potable water for non-essential, wasteful uses.

Note: When a Stage in this Schedule has been activated, Section D in this Schedule supersedes Section D (Enforcement) in Rule 14.1.

1. **FIRST VIOLATION:** Cal Water shall provide the customer with a written notice of violation. In addition, Cal Water is authorized to take the following actions:
   a. If the customer currently receives service through a metered connection, install a real-time water measurement device on the customer's service line and provide the customer with access to information from the device. The cost of the device, including installation and ongoing operating costs, may be billed to the customer, and nonpayment may result in discontinuance of service. (C)
   b. If the customer does not currently receive service through a metered connection, install a water meter on the customer's service line, charge the customer for water use pursuant to Cal Water's metered service tariffs and rules, and install a real-time water measurement device on the customer's service line and provide the customer with access to information from the device. The cost of the device, including installation and ongoing operating costs, may be billed to the customer, and nonpayment may result in discontinuance of service. (C)
2. **SECOND VIOLATION:** If Cal Water verifies that the customer has used potable water for non-essential, wasteful uses after having been notified of the first violation, Cal Water shall provide the customer with a second written notice of violation. In addition to the actions prescribed under the first violation above, Cal Water is authorized to take the following actions:
   a. Apply the following waste of water penalties, which are in addition to any other charges authorized by this Schedule or other Cal Water tariffs.
      i. If Stage 1 is in effect, $25 (Stage 1 is detailed below in Section E).
      ii. If Stage 2 is in effect, $50 (Stage 2 is detailed below in Section F).

(continued)

Schedule No. 14.1 (N)

WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES (continued)

Page 4

D. WASTE OF WATER PENALTIES (Continued)

iii. If Stage 3 is in effect, $100 (Stage 3 is detailed below in Section G).

iv. If Stage 4 is in effect, $200 (Stage 4 is detailed below in Section H).

b. At its sole discretion, waive the waste of water penalty if the customer participates in a water use evaluation provided by Cal Water and/or provides documentation to Cal Water proving that a drip irrigation system, micro spray irrigation system, high-efficiency sprinkler system, or properly programmed smart irrigation controller has been installed, after a notice of violation was delivered, and is in use at the customer's service address.

3. **THIRD VIOLATION:** If Cal Water verifies that the customer has used potable water for non-essential, wasteful uses after having been notified of the second violation, Cal Water shall provide the customer with a third written notice of violation. In addition to the actions prescribed under the first and second violation above, Cal Water is authorized to take the following actions:

   a. Apply the following waste of water penalties, which are in addition to any other charges authorized by this Schedule or other Cal Water tariffs.
      i. If Stage 1 is in effect, $50 (Stage 1 is detailed below in Section E).
      ii. If Stage 2 is in effect, $100 (Stage 2 is detailed below in Section F).
      iii. If Stage 3 is in effect, $200 (Stage 3 is detailed below in Section G).
      iv. If Stage 4 is in effect, $400 (Stage 4 is detailed below in Section H).

   b. At its sole discretion, waive the waste of water surcharge if the customer participates in a water use evaluation provided by Cal Water and/or provides documentation to Cal Water proving that a drip irrigation system, micro spray irrigation system, high-efficiency sprinkler system, or properly programmed smart irrigation controller has been installed, after notice of violations have been delivered, and is in use at the customer's service address.

4. **FOURTH VIOLATION:** If Cal Water verifies that the customer has used potable water for non-essential, wasteful uses after having been notified of the third violation, Cal Water shall provide the customer with a fourth written notice of violation. In addition to actions set forth in previous violations prescribed above, Cal Water is authorized to install a flow-restricting device on the customer's service line. Cal Water shall not be held liable for any injuries, damages, and/or consequences arising from the installation of a flow restricting device.

5. **EGREGIOUS VIOLATIONS:** Notwithstanding the foregoing framework for penalties, customers who Cal Water has verified are egregiously using potable water for non-essential, wasteful uses are subject to having a flow-restricting device installed on their service line. After providing the customer with one notice of egregious violation, either by direct mail or door hanger, which documents the egregious use of potable water for non-essential, wasteful uses and explains that failure to correct the violation may result in the installation of a flow-restricting device on the customer's service line, Cal Water is authorized to install a flow-restricting device on the customer's service line. Cal Water shall not be held liable for any injuries, damages, and/or consequences arising from the installation of a flow restricting device.

6. **NOTICES OF VIOLATION:**

   a. Unless otherwise specified, written notices of violation provided to customers pursuant to this Schedule shall document the verified violation and alert the customer to the fact that future violations of the restricted uses of potable water may result in a real-time water measurement device being installed on the customer's service line at the customers expense, waste of water surcharges being applied to the customer's bill, the installation of a flow-restricting device on the customer's service line, or the discontinuation of the customer's service. (N)

(continued)

Schedule No. 14.1 (N)

WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES (continued)

D. WASTE OF WATER PENALTIES (Continued)

b. If Cal Water elects to install a flow-restricting device on a customer's service line, the written notice shall document the steps the customer must take in order for the flow-restricting device to be removed, and shall explain that after the flow-restricting device is removed, it may be reinstalled, without further notice, if the customer is again verified by Cal Water to be using potable water for non-essential, wasteful uses.

7. **FLOW RESTRICTING DEVICE CONDITIONS:** The installation of a flow-restricting device on a customer's service line is subject to the following conditions:

a. The device shall be capable of providing the premise with a minimum of 3 Ccf per person, per month, based upon the U.S. Census calculation of the average number of people in a household in the area.

b. The device may only be removed by Cal Water, and only after a minimum three-day period has elapsed.

c. Any tampering with the device may result in the discontinuation of the customer's water service and the customer being charged for any damage to Cal Water's equipment or facilities and any required service visits.

d. After the removal of the device, if Cal Water's personnel verify that the customer is using potable water for non-essential, wasteful uses, Cal Water may install another flow-restricting device without prior notice. This device shall remain in place until water supply conditions warrant its removal. If, despite the installation of the device, Cal Water's personnel verifies that the customer is using potable water for non-essential, wasteful uses, then Cal Water may discontinue the customer's water service, as provided in its Rule No. 11.

8. **FLOW-RESTRICTING DEVICE REMOVAL CHARGES:** The charge to customers for removal of a flow-restricting device installed pursuant to this Schedule is $100 during normal business hours, and $150 for the device to be removed outside of normal business hours.

E. STAGE ONE WATER USE RESTRICTIONS

1. WASTEFUL USES OF WATER (STAGE 1)

The following restrictions may be imposed by Cal Water, except where necessary to address an immediate health or safety need, or to comply with a term or condition in a permit issued by a state or federal agency:

a. Outdoor Irrigation Restrictions (Stage 1)

i. Irrigating ornamental landscapes with potable water is limited to no more than **three (3) days per week,** on a schedule established and posted by Cal Water on its website or otherwise provided to customers by bill message, bill insert, direct mail, or email, or as follows:

1. Customers with even-numbered addresses may irrigate on Saturdays, Tuesdays, and Thursdays.
2. Customers with odd-numbered addresses may irrigate on Sundays, Wednesdays, and Fridays.
3. Customers without a street address may irrigate on Saturdays, Tuesdays, and Thursdays. (N)

(continued)

Schedule No. 14.1 (N)

WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES (continued)

Page 6

E. STAGE ONE WATER USE RESTRICTIONS (Continued)

4. Notwithstanding the foregoing restrictions, irrigation of special landscape areas or commercial nurseries may occur as needed, provided that the customer who wishes to irrigate a special landscape area or commercial nursery presents Cal Water with a plan to achieve water use reductions commensurate with those that would be achieved by complying with foregoing restrictions.
5. Notwithstanding the foregoing restrictions, when a city, county, or other local public agency in one of Cal Water's service areas duly adopts restrictions on the number of days or hours of the day that customers may irrigate that are different than those adopted by Cal Water, Cal Water may enforce the city, county, or other local public agency's restrictions.

ii. Irrigating ornamental landscape with potable water is prohibited during the hours between **8:00 a.m. and 6:00 p.m.**

iii. The foregoing restrictions do **not** apply to:
1. Landscape irrigation zones that exclusively use drip irrigation systems and/or micro spray irrigation system;
2. Irrigating ornamental landscapes with the use of a hand-held bucket or similar container, with a continuously monitored hose which is fitted with an automatic shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use or monitored, or for the express purpose of adjusting or repairing an irrigation system.

b. Obligation to Fix Leaks, Breaks or Malfunctions: All leaks, breaks, or other malfunctions in the customer's plumbing fixtures and/or irrigation system must be repaired within **five (5) business days** of written notification by Cal Water, unless other arrangements are made with Cal Water.

c. Prohibited Uses of Water: Customers are prohibited from using potable water for the following actions:
i. The application of potable water to 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;
ii. The use of a hose that dispenses potable water to wash vehicles, including cars, trucks, buses, boats, aircraft, and trailers, whether motorized or not, except where the hose is fitted with a shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use.
iii. The application of potable water to driveways and sidewalks;
iv. The use of potable water in a water feature, except where the water is part of a recirculating system;
v. The application of potable water to outdoor landscapes during and within forty-eight (48) hours after measurable rainfall (see Definitions);
vi. The serving of drinking water other than upon request in eating or drinking establishments, including but not limited to restaurants, hotels, cafes, cafeterias, bars, or other public places where food or drink are served and/or purchased;
vii. Irrigation of ornamental turf on public street medians with potable water;
viii. Irrigation outside of newly constructed homes and buildings with potable water in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission and the Department of Housing and Community Development.

d. Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. The hotel or motel shall prominently display notice of this option in each guest room using clear and easily understood language. (N)

(continued)

Schedule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES (continued)

E. STAGE ONE WATER USE RESTRICTIONS (Continued)

[Stage 1 (cont.)]

e. Limits on Filling Ornamental Lakes or Ponds: Filling or re-filling ornamental lakes or ponds with potable water is prohibited, except to the extent needed to sustain aquatic life, provided that such animals are of significant value and have been actively managed within the water feature prior to the implementation of any staged mandatory restrictions of water use as described in this Schedule.

f. Other duly adopted restrictions on the use of potable water as prescribed from time to time by the Commission or other authorized government agencies are incorporated herein by reference.

F. STAGE TWO WATER USE RESTRICTIONS

1. MANDATORY WATER BUDGETS AND BANKING (STAGE 2)

As described in greater detail below, the Water Board has mandated reductions in potable urban usage, as compared with the amount used in 2013, in each of Cal Water's service areas. Water suppliers must develop rate structures and other pricing mechanisms, such as surcharges and penalties, to achieve these mandated reductions (T)

a. **Mandatory Reduction Percentages**: The Water Board has established increasing levels of required water reduction for each service areas based upon the residential per capita per day use (R-GPCD) in that service area for the three summer months of July through September 2014. The Water Board's approach considers the relative per capita water usage in each service area and requires that those areas with high per-capita use achieve proportionally greater reductions than those with low use. The Water Board has also allowed for adjustments to these required water reductions based on specific criteria.

Each month, the Water Board determines whether a service area has met its mandatory reduction percentage by calculating cumulative savings in the service area since June 2015, and comparing those with the amount of water used during the same months in 2013. (T)

b. **Customer Water Budgets:** Each customer with metered potable water service (residential and non-residential customers) will receive an individualized "Water Budget" for each billing period. (T)

i. The Water Budget will be based on the units of water (CCF) that customer used in the same billing period in 2013, minus the Mandatory Reduction Percentage established by the Water Board for that customer's service (T) area. A customer's Water Budget will vary according to their monthly water usage in 2013. Cal Water shall (C) notify its customers of any changes to the Mandatory Reduction Percentage by the Water Board through bill inserts or direct mailings prior to applying the changed percentage in the requirements in this Schedule, consistent with the "Update" process described in Section F.1.d.(iv) of this Schedule. Cal Water shall also include the current Mandatory Reduction Percentage in effect for each service area on its website. (C)

ii. If a customer was not in his or her current location in 2013, the average monthly consumption will be used as a starting budget. If customers have a unique situation and the average budget is not appropriate, they can file an appeal to have their Water Budget increased. Cal Water may also modify the starting budget to reflect (T) suitable use.

iii. The Water Budget for the following billing period will appear on each customer's water bill. Customers will (T) also be able to find their Water Budgets, and their individual water use history dating back to 2013, by going (T) to usage.calwater.com (do not include "www"), and entering their account number, street (or house) number, and ZIP code.

(D)

(continued)

Schedule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES (continued)

F. STAGE TWO WATER USE RESTRICTIONS (continued) (T)

1. MANDATORY WATER BUDGETS AND BANKING (STAGE 2) (continued) (T)

c. **Minimum Water Budgets**: A minimum monthly amount of water that protects the health and safety of customers will be established for each service area as a Minimum Water Budget for single-family residential customers.

i. No single-family residential customer will have a water budget that is below the threshold of the monthly Minimum Water Budget, even if applying the Mandatory Reduction Percentage to that customer's 2013 usage would result in a lower amount.

ii. The Minimum Water Budget for each service area is identified in **Appendix A**. (For areas with bi-monthly billing and bi-monthly water budgets, the Minimum Water Budget in Appendix A should be doubled for the billing period.)

d. **Drought Surcharges**: If a customer uses more units of potable water (CCF) than their Water Budget in a billing period, that customer's water bill may reflect an additional "Drought Surcharge" for each unit of water over the Water Budget, depending on the amount of excess usage (according to usage tiers described below). (T) (C)

i. **Tier A and Tier B Excess Water Usage:** Excess water usage above a customer's Water Budget may fall into one or both of two tiers – Tier A and Tier B. The amount of usage in Tiers A and B varies by service area, and depends upon whether an area has met its Mandatory Reduction Percentage on a cumulative basis.

For the purposes of Drought Surcharges, each service area will fall into one of two categories – those in compliance with the Mandatory Reduction Percentage, and those not in compliance. There are two sample tables in the last section of this Schedule (**Section I**). The first sample table identifies the Tier A and B usage amounts for those service areas that are in compliance with their Mandatory Reduction Percentage, as of the date specified in **Appendix A**. The second sample table identifies the Tier A and B usage amounts for those service areas that are not in compliance with their Mandatory Reduction Percentage, as of the date specified in **Appendix A**. (C)

ii. **Current Surcharges and Tiers: Appendix A** to this schedule provides the Drought Surcharge rate per unit of water and the excess water usage in Tiers A and B that are currently in effect for each service area. (T) (C)

At this time, Drought Surcharges only apply to excess water usage that falls within "Tier B." Excess water usage in Tier A constitutes a "courtesy" tier to which Drought Surcharges are not applied. As stated below under Water Banking, however, all excess water usage will be applied against a customer's "banked" water amounts, regardless of whether the usage falls within Tier A or Tier B. (C)

Customers will continue to pay the normal tariffed rates for potable water, in addition to any applicable Drought Surcharges. Cal Water retains the right to increase the surcharges if there are changes to the rates in the future. (T) (T)

iii. **Current Compliance Status of Service Area**: **Appendix B** to this schedule provides the Mandatory Reduction Percentage adopted by the Water Board for each area, and the actual cumulative savings for each area, **as of the date specified in Appendix A.** ***Drought Surcharges will be applied based on Tier A and B excess water usage beginning with the first day of each billing period that starts on or after March 31, 2016.*** (C)

iv. **Updates**: An increase in the excess usage designated in Tier A, an increase in Customer Water Budgets, or a decrease in Drought Surcharge rates, are "less restrictive" tariff changes that may be implemented via a Tier 1 advice letter.

A decrease in the excess usage designated in Tier A, a decrease in Customer Water Budgets, or an increase in Drought Surcharge rates are "more restrictive" tariff changes that shall be implemented by filing a Tier 2 advice letter. Cal Water shall notify its customers, and provide each customer with a summary of the changes by means of a bill insert or direct mailing, prior to the effective date of a more restrictive tariff change.

A service area's compliance status, which determines the amount of excess usage designated for Tiers A and B, shall be updated no more than once every 90 days, or to implement different requirements of the Water Board as needed. (C)

(continued)

Schedule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES (continued)

 (T)

F. STAGE TWO WATER USE RESTRICTIONS (continued)

1. MANDATORY WATER BUDGETS AND BANKING (STAGE 2) (continued) (T)

e. **Water Banking**: Customers will be able to "bank" unused units of water from their water budget for use in future billing periods. (L)

i. Should a customer exceed his or her monthly budget, any banked units of water will be applied to the overage before drought surcharges are imposed.

ii. Banked water units can only offset future usage that exceeds a water budget.

f. **Water Budget Appeals:** If specified criteria are met, a customer can file an appeal to have his or her water budget increased.

i. The reasons appeals may be considered include: water use necessary for health and safety; business or economic needs, including process-water requirements; significant long-term savings achieved since 2011; average monthly water use in 2014 that is at least 50% lower than district average; and large animal care (e.g. horse).

ii. All appeals must be submitted online at **www.calwater.com/appeal** or via a written application form (available at **www.calwater.com/appeal** or from our local Customer Center).

iii. Surcharges incurred during the appeal review period may be waived if the review takes an extended period of time.

2. WASTEFUL USES OF WATER (STAGE 2)

Cal Water may continue to impose the restrictions on the wasteful use of water as outlined in Stage One, except where necessary to address an immediate health or safety need or to comply with a term or condition in a permit issued by a state or federal agency.

G. STAGE THREE WATER USE RESTRICTIONS

1. MANDATORY WATER BUDGETS AND BANKING (STAGE 3)

Water budgets will be based on a customer's consumption during a historical base period and will include a percentage reduction designed to meet necessary water-use reductions. Cal Water may include provisions such as minimum water budgets to protect the health and safety of customers, and water banking allowing customers additional flexibility with regard to their required reductions.

In addition to the normal rate paid for the unit of water, a drought surcharge will be charged to a customer for each unit of water used over the established water budget for the billing period. Cal Water may implement surcharges up to three (3) times those charged in Stage 2. Cal Water will establish an appeals process for customers that will allow for requests for increased water budgets. (L)

(continued)

Schedule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES (continued)

(T)

G. STAGE THREE WATER USE RESTRICTIONS (Continued)

[Stage 3 (cont.)]

2. WASTEFUL USES OF WATER (STAGE 3)

The following restrictions may be imposed by Cal Water, except where necessary to address an immediate health or safety need or to comply with a term or condition in a permit issued by a state or federal agency. Differences from or additions to previous Stages are underlined. (The following restrictions are the same as those provided in Stage 3 of Rule 14.1.)

a. Outdoor Irrigation Restrictions (Stage 3)

i. Irrigating ornamental landscapes with potable water is limited to no more than **two (2) days per week,** on a schedule established and posted by Cal Water on its website or otherwise provided to customers by bill message, bill insert, direct mail, or email, or as follows:

1. Customers with even-numbered addresses may irrigate on Saturdays and Tuesdays (previous Stages allowed Thursdays as well).
2. Customers with odd-numbered addresses may irrigate on Sundays and Wednesdays (previous Stages allowed Fridays as well).
3. Customers without a street address may irrigate on Saturdays and Tuesdays (previous Stages allowed Thursdays as well).
4. Notwithstanding the foregoing restrictions, irrigation of special landscape areas or commercial nurseries may occur as needed, provided that the customer who wishes to irrigate a special landscape area or commercial nursery presents Cal Water with a plan to achieve water use reductions commensurate with those that would be achieved by complying with foregoing restrictions.
5. Notwithstanding the foregoing restrictions, when a city, county, or other local public agency in one of Cal Water's service areas duly adopts restrictions on the number of days or hours of the day that customers may irrigate which are different than those adopted by Cal Water, Cal Water may enforce the city, county, or other local public agency's restrictions.

ii. Irrigating ornamental landscape with potable water is prohibited during the hours between **8:00 a.m. and 6:00 p.m.**

iii. The foregoing restrictions do **not** apply to:

1. Landscape irrigation zones that exclusively use drip irrigation systems and/or micro spray irrigation system;
2. Irrigating ornamental landscapes with the use of a hand-held bucket or similar container, a continuously monitored hose which is fitted with an automatic shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use or monitored, or for the express purpose of adjusting or repairing an irrigation system.

b. Obligation to Fix Leaks, Breaks or Malfunctions: All leaks, breaks, or other malfunctions in the customer's plumbing fixtures and/or irrigation system must be repaired within **two (2) business days** of written notification by Cal Water, unless other arrangements are made with Cal Water.

c. **Prohibited** Uses of Water: Customers are prohibited from using potable water for the following actions:

i. The application of potable water to 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 (note: this provision appears under Section E in Rule 14.1);

(continued)

Schedule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES (continued)

 (T)

G. STAGE THREE WATER USE RESTRICTIONS (Continued)

[Stage 3 (cont.)]

ii. The use of a hose that dispenses potable water to wash vehicles, including cars, trucks, buses, boats, aircraft, and trailers, whether motorized or not, except where the hose is fitted with a shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use (note: this provision appears under Section E in Rule 14.1).

iii. The application of potable water to driveways and sidewalks;

iv. The use of potable water in a water feature, except where the water is part of a recirculating system;

v. The application of potable water to outdoor landscapes during and within forty-eight (48) hours after measurable rainfall;

vi. The serving of drinking water other than upon request in eating or drinking establishments, including but not limited to restaurants, hotels, cafes, cafeterias, bars, or other public places where food or drink are served and/or purchased;

vii. Irrigation of ornamental turf on public street medians with potable water;

viii. Irrigation outside of newly constructed homes and buildings with potable water in a manner inconsistent with regulations or other requirements established by the California Building Standards Commission and the Department of Housing and Community Development.

ix. Use of potable water for street cleaning with trucks, except for initial wash-down for construction purposes (if street sweeping is not feasible);

x. Use of potable water for construction purposes, such as consolidation of backfill, dust control, or other uses unless no other source of water or other method can be used.

d. Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. The hotel or motel shall prominently display notice of this option in each guest room using clear and easily understood language.

e. Limits on Filling Ornamental Lakes or Ponds: Filling or re-filling ornamental lakes or ponds with potable water is prohibited, except to the extent needed to sustain aquatic life, provided that such animals are of significant value and have been actively managed within the water feature prior to the implementation of any staged mandatory restrictions of water use as described in this Schedule.

f. Other duly adopted restrictions on the use of potable water as prescribed from time to time by the Commission or other authorized government agencies are incorporated herein by reference.

H. STAGE FOUR WATER USE RESTRICTIONS

1. MANDATORY WATER BUDGETS AND BANKING (STAGE 4)

Water budgets will be based on a customer's consumption during a historical base period and will include a percentage reduction designed to meet necessary water-use reductions. Cal Water may include provisions such as minimum water budgets to protect the health and safety of customers, and water banking allowing customers additional flexibility with regard to their required reductions.

In addition to the normal rate paid for the unit of water, a drought surcharge will be charged to a customer for each unit of water used over the established water budget for the billing period. For Stage 4, Cal Water may implement surcharges up to three (3) times those charged in Stage 2. Cal Water may require customer consumption reductions of up to 50%.

Cal Water will establish an appeals process for customers that will allow for requests for increased water budgets.

(continued)

Schedule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES (continued)

 (T)

H. STAGE FOUR WATER USE RESTRICTIONS (Continued)

[Stage 4 (cont.)]

2. WASTEFUL USES OF WATER (STAGE 4)

The following restrictions may be imposed by Cal Water, except where necessary to address an immediate health or safety need or to comply with a term or condition in a permit issued by a state or federal agency. Differences from or additions to previous Stages are underlined. (The following restrictions are the same as those provided in Stage 4 of Rule 14.1.)

a. Irrigating ornamental landscape with potable water is prohibited, except when a hand-held bucket or a similar container, or a continuously monitored hose which is fitted with an automatic shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use or monitored is used to maintain vegetation, including trees and shrubs.

b. Obligation to Fix Leaks, Breaks or Malfunctions: All leaks, breaks, or other malfunctions in the customer's plumbing fixtures or irrigation system must be repaired within **one (1) business day** of written notification by Cal Water, unless other arrangements are made with Cal Water.

c. Prohibited Uses of Water: Customers are prohibited from using potable water for the following actions:

i. The application of potable water to 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;

ii. The use of a hose that dispenses potable water to wash vehicles, including cars, trucks, buses, boats, aircraft, and trailers, whether motorized or not, except where the hose is fitted with a shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use.

iii. The application of potable water to driveways and sidewalks;

iv. The use of potable water in a water feature, except where the water is part of a recirculating system;

v. The application of potable water to outdoor landscapes during and within forty-eight (48) hours after measurable rainfall;

vi. The serving of drinking water other than upon request in eating or drinking establishments, including but not limited to restaurants, hotels, cafes, cafeterias, bars, or other public places where food or drink are served and/or purchased;

[Note that items previously identified as (ix) and (x) in Stage 3 have been eliminated.]

vii. Use of potable water for street cleaning with trucks (previous Stage allowed certain exceptions);

viii. Use of potable water for construction purposes, such as consolidation of backfill, dust control, or other uses (previous Stages allowed certain exceptions).

d. Operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. The hotel or motel shall prominently display notice of this option in each guest room using clear and easily understood language.

e. Limits on Filling Ornamental Lakes or Ponds: Filling or re-filling ornamental lakes or ponds with potable water is prohibited, except to the extent needed to sustain aquatic life, provided that such animals are of significant value and have been actively managed within the water feature prior to the implementation of any staged mandatory restrictions of water use as described in this Schedule.

f. Other duly adopted restrictions on the use of potable water as prescribed from time to time by the Commission or other authorized government agencies are incorporated herein by reference.

(continued)

Schedule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES (continued)

 (T)

I. SAMPLE TABLES WITH TIER A AND TIER B EXCESS USAGE AMOUNTS (N)

1. FOR DISTRICTS IN COMPLIANCE WITH MANDATORY REDUCTIONS

For the purposes of applying Drought Surcharges, the sample table below identifies the number of units over a customer's Water Budget (the excess usage) that falls within Tiers A and B in a district whose cumulative savings meet the Water Board's Mandatory Reduction Percentage as of the date identified in **Appendix A**.

For Districts in Compliance with Mandatory Water Reduction Targets

District	Service Area	Tier A - No Surcharges	Tier B - Drought Surcharges Applied			Minimum Water Budget	Rate Support Fund Area
		Units Over Water Budget	Units Over Water Budget	Surcharge per unit (Non-LIRA Customers)	Surcharge per unit (LIRA Customers)	(Ccf per month)	(RSF)
Antelope Valley	Fremont Valley & Lake Hughes	1-6	7+	$4.5200	$2.2600	5	RSF Area
	Lancaster	1-5	6+	$7.1180	$3.5590	5	
	Leona Valley	1-4	5+	$4.5200	$2.2600	5	RSF Area
Bakersfield		1-6	7+	$4.1868	$2.0934	7	
Bayshore	Mid-Peninsula	1-3	4+	$10.0000	$5.0000	6	
	South San Francisco	1-3	4+	$5.6492	$2.8246	6	
Bear Gulch		1-5	6+	$10.0000	$5.0000	6	
Chico		1-6	7+	$3.1314	$1.5657	6	
Dixon		1-3	4+	$7.9402	$3.9701	7	
Dominguez		1-3	4+	$6.9934	$3.4967	7	
East Los Angeles		1-4	5+	$3.7605	$1.8803	9	
Grand Oaks		1-6	7+	$2.1236	$1.0618	5	
Hermosa Redondo		1-3	4+	$9.1586	$4.5793	5	
Kern River Valley		1-3	4+	$4.5200	$2.2600	4	RSF Area
King City		1-4	5+	$6.7536	$3.3768	9	
Livermore		1-4	5+	$7.6194	$3.8097	6	
Los Altos		1-5	6+	$8.1608	$4.0804	6	
Marysville		1-4	5+	$5.1470	$2.5735	6	
Oroville		1-5	6+	$6.1840	$3.0920	6	
Palos Verdes		1-6	7+	$9.5358	$4.7679	6	
Redwood Valley		1-4	5+	$4.5200	$2.2600	4	RSF Area
Salinas		1-3	4+	$5.7776	$2.8888	7	
Selma		1-5	6+	$3.0122	$1.5061	8	
Stockton		1-4	5+	$5.5506	$2.7753	7	
Visalia		1-5	6+	$2.9796	$1.4898	7	
Westlake		1-6	7+	$9.2378	$4.6189	6	
Willows		1-5	6+	$4.1356	$2.0678	6	

(N)

(continued)

Schedule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES (continued)

 (T)

I. SAMPLE TABLES WITH TIER A AND TIER B EXCESS USAGE AMOUNTS (N)

2. FOR DISTRICTS NOT IN COMPLIANCE WITH MANDATORY REDUCTIONS

For the purposes of applying Drought Surcharges, the sample table below identifies the number of units over a customer's Water Budget (the excess usage) that falls within Tiers A and B in a district whose cumulative savings do NOT meet the Water Board's Mandatory Reduction Percentage as of the date identified in **Appendix A**.

For Districts not in Compliance with Mandatory Water Reduction Targets

District	Service Area	Tier A - No Surcharges: Units Over Water Budget	Tier B - Drought Surcharges Applied: Units Over Water Budget	Surcharge per unit (Non-LIRA Customers)	Surcharge per unit (LIRA Customers)	Minimum Water Budget (CCF per month)	Rate Support Fund Area (RSF)
Antelope Valley	Fremont Valley & Lake Hughes	1	2+	$4.5200	$2.2600	5	RSF Area
	Lancaster	1	2+	$7.1180	$3.5590	5	
	Leona Valley	1	2+	$4.5200	$2.2600	5	RSF Area
Bakersfield		1	2+	$4.1868	$2.0934	7	
Bayshore	Mid-Peninsula	1	2+	$10.0000	$5.0000	6	
	South San Francisco	1	2+	$5.6492	$2.8246	6	
Bear Gulch		1	2+	$10.0000	$5.0000	6	
Chico		1	2+	$3.1314	$1.5657	6	
Dixon		1	2+	$7.9402	$3.9701	7	
Dominguez		1	2+	$6.9934	$3.4967	7	
East Los Angeles		1	2+	$3.7605	$1.8803	9	
Grand Oaks		1	2+	$2.1236	$1.0618	5	
Hermosa Redondo		1	2+	$9.1586	$4.5793	5	
Kern River Valley		1	2+	$4.5200	$2.2600	4	RSF Area
King City		1	2+	$6.7536	$3.3768	9	
Livermore		1	2+	$7.6194	$3.8097	6	
Los Altos		1	2+	$8.1608	$4.0804	6	
Marysville		1	2+	$5.1470	$2.5735	6	
Oroville		1	2+	$6.1840	$3.0920	6	
Palos Verdes		1	2+	$9.5358	$4.7679	6	
Redwood Valley		1	2+	$4.5200	$2.2600	4	RSF Area
Salinas		1	2+	$5.7776	$2.8888	7	
Selma		1	2+	$3.0122	$1.5061	8	
Stockton		1	2+	$5.5506	$2.7753	7	
Visalia		1	2+	$2.9796	$1.4898	7	
Westlake		1	2+	$9.2378	$4.6189	6	
Willows		1	2+	$4.1356	$2.0678	6	

(N)

(continued)

Schedule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES (continued)

Page 15

APPENDIX A to Schedule 14.1 - *NOT IN EFFECT* (C)

Drought Surcharge Tiers (applies to all metered customers of potable water) (C)

District	Service Area	In Compliance with Mandatory Reduction? As of 2/1/16	Tier A - No Surcharges: Units Over Water Budget	Tier B - Drought Surcharges Applied: Units Over Water Budget	Tier B: Surcharge per unit (Non-LIRA Customers)	Tier B: Surcharge per unit (LIRA Customers)	Minimum Water Budget (CCF per month)	Rate Support Fund Area (RSF)
Antelope Valley	Fremont Val. /Lake Hughes		1-6	7+	$4.5200	$2.2600	5	RSF Area
	Lancaster		1-5	6+	$7.1180	$3.5590	5	
	Leona Valley		1-4	5+	$4.5200	$2.2600	5	RSF Area
Bakersfield			1-6	7+	$4.1868	$2.0934	7	
Bayshore	Mid-Peninsula		1-3	4+	$10.0000	$5.0000	6	
	South San Francisco		1-3	4+	$5.6492	$2.8246	6	
Bear Gulch			1-5	6+	$10.0000	$5.0000	6	
Chico			1-6	7+	$3.1314	$1.5657	6	
Dixon			1-3	4+	$7.9402	$3.9701	7	
Dominguez			1-3	4+	$6.9934	$3.4967	7	
East Los Angeles			1-4	5+	$3.7605	$1.8803	9	
Grand Oaks			1-6	7+	$2.1236	$1.0618	5	
Hermosa Redondo		**No**	1	2+	$9.1586	$4.5793	5	
Kern River Valley		**No**	1	2+	$4.5200	$2.2600	4	RSF Area
King City			1-4	5+	$6.7536	$3.3768	9	
Livermore			1-4	5+	$7.6194	$3.8097	6	
Los Altos			1-5	6+	$8.1608	$4.0804	6	
Marysville			1-4	5+	$5.1470	$2.5735	6	
Oroville			1-5	6+	$6.1840	$3.0920	6	
Palos Verdes		**No**	1	2+	$9.5358	$4.7679	6	
Redwood Valley (all)			1-4	5+	$4.5200	$2.2600	4	RSF Area
Salinas			1-3	4+	$5.7776	$2.8888	7	
Selma			1-5	6+	$3.0122	$1.5061	8	
Stockton			1-4	5+	$5.5506	$2.7753	7	
Visalia		**No**	1	2+	$2.9796	$1.4898	7	
Westlake		**No**	1	2+	$9.2378	$4.6189	6	
Willows			1-5	6+	$4.1356	$2.0678	6	

(a) The Drought Surcharge is equal to two (2) times the highest residential tier rate with a $10.00 maximum EXCEPT:
The Drought Surcharge in Rate Support Fund (RSF) areas is equal to $4.52.
The Drought Surcharge for districts with a 10% or less water reduction requirement is equal to the highest residential tier rate.

(b) The Drought Surcharge for LIRA customers is 50% of the Drought Surcharge for Non-LIRA customers.

(c) The Minimum Water Budget is set at 55 gpcd (gallons per capita per day) multiplied by the number of people per household for the area according to the U.S. Census.

(d) A district is determined to be in compliance if it has met or is within one percent of its Mandatory Reduction requirement.

(continued)

Schedule No. 14.1

WATER SHORTAGE CONTINGENCY PLAN
WITH STAGED MANDATORY REDUCTIONS AND DROUGHT SURCHARGES (continued)

Page 16 (T)

APPENDIX B to Schedule 14.1 (T)

CUMULATIVE WATER SAVED COMPARED TO MANDATORY REDUCTIONS (C)

Urban Water Supplier	Cumulative Percentage Saved	Water Board's Target Percentage	In Compliance?
	Jun. 2015 to Jan. 2016 (as compared to 2013) *	Mandatory Reduction *	As of Feb. 1, 2016 **
California Water Service Company Antelope Valley	47.8%	36%	
California Water Service Company Bakersfield	31.1%	32%	
California Water Service Company Bear Gulch	35.0%	36%	
California Water Service Company Chico District	38.3%	32%	
California Water Service Company Dixon, City of	30.2%	28%	
California Water Service Company Dominguez	16.8%	16%	
California Water Service Company East Los Angeles	15.5%	8%	
California Water Service Company Hermosa Redondo	18.3%	20%	No
California Water Service Company Kern River Valley	20.1%	28%	No
California Water Service Company King City	21.8%	12%	
California Water Service Company Livermore	39.9%	24%	
California Water Service Company Los Altos/Suburban	38.1%	32%	
California Water Service Company Marysville	26.2%	24%	
California Water Service Company Mid Penninsula	26.6%	16%	
California Water Service Company Oroville	28.5%	28%	
California Water Service Company Palos Verdes	28.9%	36%	No
California Water Service Company Redwood Valley	31.7%	16%	
California Water Service Company Salinas District	24.9%	16%	
California Water Service Company Selma	39.0%	32%	
California Water Service Company South San Francisco	20.8%	8%	
California Water Service Company Stockton	22.6%	20%	
California Water Service Company Visalia	25.6%	32%	No
California Water Service Company Westlake	33.5%	36%	No
California Water Service Company Willows	30.1%	28%	

(C)

* The figures in Appendix B are from the State Water Resources Control Board's website at:
http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/docs/2016feb/suppliercompliance_022516.pdf (C)

(D)
** A district is determined to be in compliance if it has met or is within one percent of its Mandatory Reduction requirement. (N)

[end]

Appendix M: Conservation Master Plan

CONSERVATION MASTER PLAN 2021 – 2025

April 2021

Bear Gulch District

California Water Service

Prepared by M.Cubed

Table of Contents

List of Acronyms

AB	Assembly Bill
AF	Acre-feet (one AF equals 325,851 gallons)
AMI	Advanced metering infrastructure
AMR	Automatic meter reading
AWE	Alliance for Water Efficiency
BCR	Benefit Cost Ratio
BMP	Best Management Practice
CalWEP	California Water Efficiency Partnership
CII	Commercial, industrial, and institutional
CPUC	California Public Utilities Commission
CUWCC	California Urban Water Conservation Council
EO	Executive Order
GPCD	Gallons per capita per day
GPF	Gallons per flush
GPM	Gallons per minute
GRC	General Rate Case
HET	High efficiency toilet
HEU	High efficiency urinal
HEW	High efficiency clothes washer
IOU	Investor-owned utility
MaP	Maximum performance toilet testing program
MGD	Million gallons per day
MOU	Memorandum of Understanding Regarding Urban Water Conservation in California
SB	Senate Bill
SB X7-7	Senate Bill X7-7 Water Conservation Act of 2009
ULFT	Ultra low flow toilet
UWMP	Urban Water Management Plan
WF	Water Factor
WSCP	Water Shortage Contingency Plan

1 Introduction

1.1 Master Plan Scope and Objectives

Cal Water is committed to helping its customers use water efficiently and has developed a range of water conservation programs to support this goal. To ensure that it is providing the right mix of programs in a cost-effective manner, Cal Water routinely conducts comprehensive conservation program analysis and planning. This is done on a five-year cycle in tandem with the Urban Water Management Plan (UWMP). The results of this planning for the Bear Gulch District are summarized in this report, which covers the period 2021 to 2025.

The main purposes of this Conservation Master Plan are to:

- Serve as a broad guidance document that helps inform annual conservation activities, such as program levels, staffing, and budget needs both internally and for stakeholders.

- Summarize the mix of conservation measures that Cal Water plans to implement going forward, including the estimated water savings, costs, and effects on water demand.

- Explain the evaluation process and factors considered in selecting conservation measures.

- Provide an update to the 2016-20 Conservation Master Plan as part of a five-year review cycle to assess program performance and identify the need for any adjustments; and

- Ensure Cal Water districts are positioned to comply with the state's Making Water Conservation a California Way of Life regulations.

1.2 Relationship to GRC and UWMP

Cal Water's operations are regulated by the California Public Utilities Commission (CPUC), which approves the budgets and rates for each Cal Water district every three years in a General Rate Case (GRC) proceeding. The district's conservation programs and expenditures are part of the GRC proceeding. The last GRC covered the three-year period 2020-22 and a new GRC covering the period 2023-25 is presently underway. The conservation programs and budgets for 2021 in this plan reflect those authorized in the last GRC while those recommended for 2023-25 reflect programs and budgets being proposed by Cal Water in the current GRC.

This plan is an update to the Conservation Master Plan Cal Water completed in 2016 covering the period 2016-20. It constitutes the primary source of information on historical and proposed implementation of conservation programs reported in the Bear Gulch District's 2020 UWMP. A copy of this plan is provided as an appendix to the UWMP.

1.3 Relationship to Water Shortage Contingency Plan

The Water Conservation Master Plan is distinct from Cal Water's Water Shortage Contingency Plan (WSCP), which is also part of each district's UWMP. While the main purpose of the WSCP is to provide a blue-print for responding to water shortage emergencies caused by drought or other events resulting in temporary disruption to water supplies, the goal of the Water Conservation Master Plan is to provide a blue-print for providing education, assistance, and incentives to help customers use water efficiently all the time. Regardless of drought, water in California is an increasingly scarce resource. Investing in water use efficiency has repeatedly been shown to be a cost-effective way to ensure adequate supply of water for the future. While the conservation programs Cal Water implements are critically important during periods of water shortage, their primary purpose is to help make sure Cal Water can reliably serve customer water needs far into the future.

1.4 Report Organization

The remainder of this report is organized as follows:

- Section 2 provides a brief overview of the District, including the communities it serves, its sources of water supply, and its customer water demands.
- Section 3 discusses Cal Water's conservation goals and accomplishments, in particular with respect to the Water Conservation Act of 2009, CPUC conservation requirements, and the state's pending Making Water Conservation a California Way of Life regulations.
- Section 4 describes the conservation programs Cal Water currently offers to its customers and discusses new programs Cal Water intends to offer.
- Section 5 presents the water savings, costs, and benefits expected from the recommended conservation programs.
- Section 6 discusses metrics used to assess program performance.
- Section 7 addresses program monitoring and future updates to the Conservation Master Plan.

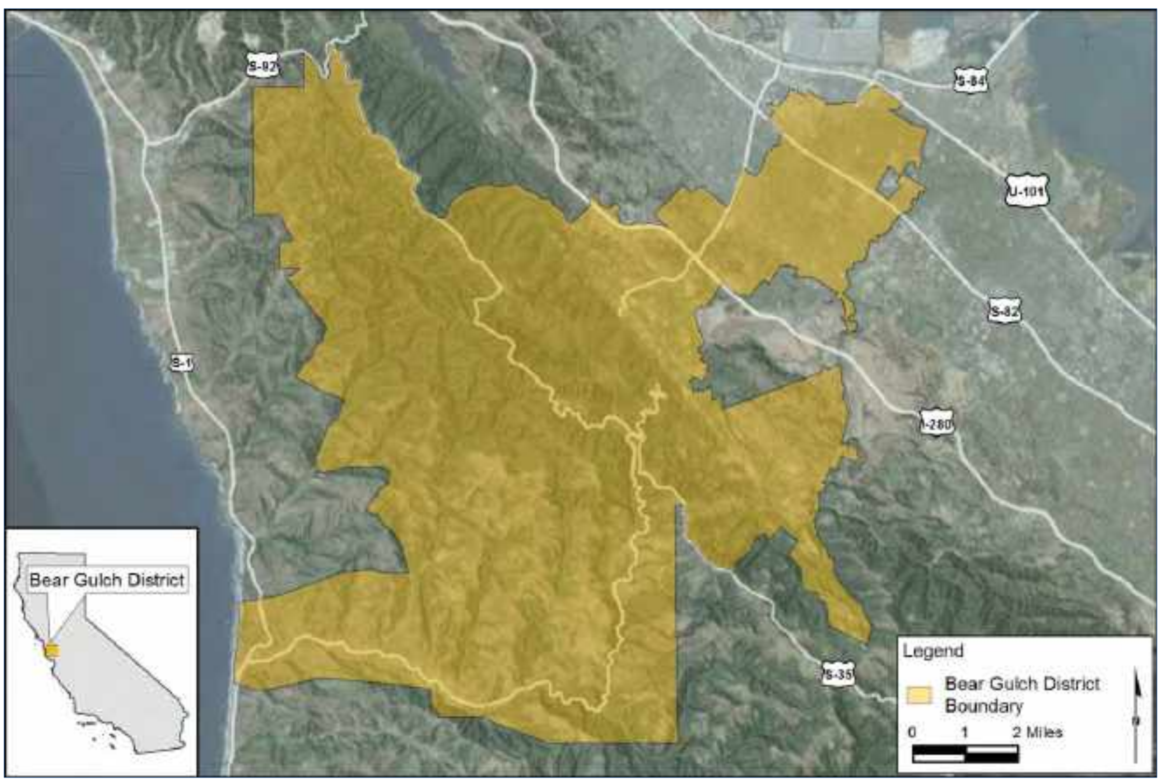
2 District Overview

District Quick Facts:

- Communities Served: Atherton, Portola Valley, Woodside, parts of Menlo Park, unincorporated portions of San Mateo County
- Population served in 2020: 60,814
- Residential Customers: 92% of total services and 89% of total use
- Sources of Supply: 95% imported, 5% local surface water
- Average Annual Water Deliveries Last Five Years: 12,000 AF
- Average Per Capita Water Use Last Five Years: 171 GPCD

The Bear Gulch District serves the communities of Atherton, Portola Valley, Woodside, portions of Menlo Park, and adjacent unincorporated portions of San Mateo County including: West Menlo Park, Ladera, North Fair Oaks, and Menlo Oaks. The system is bordered on the north by Redwood City; on the east by Palo Alto, Stanford University, and unincorporated Santa Clara County; and on the south and west by unincorporated San Mateo County. A map of the service area boundaries is shown in Figure 1.

Figure 1. Bear Gulch District Service Area Boundaries



Cal Water estimates the service area population was 60,814 in 2020. Service area population has been growing at an annual rate of less than one percent for the past 15 years. Between 2016 and 2020, the District's population increased at an average rate of 0.3 percent per year.

The District delivers a combination of local surface water and imported water purchased from the City and County of San Francisco (SFPUC). Approximately 95 percent is purchased from SFPUC and 5 percent is produced from the District's reservoir and treatment plant in Atherton.

The District delivers water to residential, commercial, industrial, and governmental customers. Residential customers account for 92 percent of water services in the District. The share of services in 2020 by customer category is shown in Figure 2. The share of total water sales by customer category over the period 2016-2020 is shown in Figure 3. Residential customers accounted for 87 percent of water use over this period.

Annual demand has averaged 12,000 acre-feet (AF) over the five-year period 2016-2020. Total annual demands and sources of water supply since 1980 are shown in Figure 4.

Figure 2. Share of Services in 2020 by Customer Category

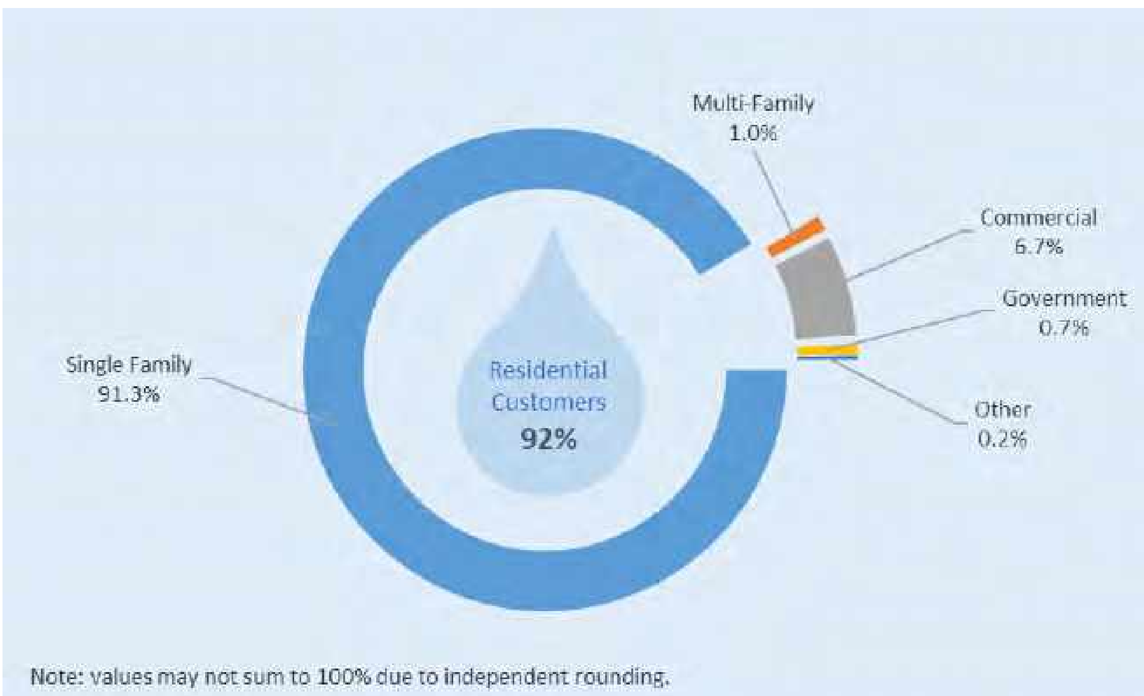


Figure 3. Share of Water Sales by Customer Category: 2016-2020

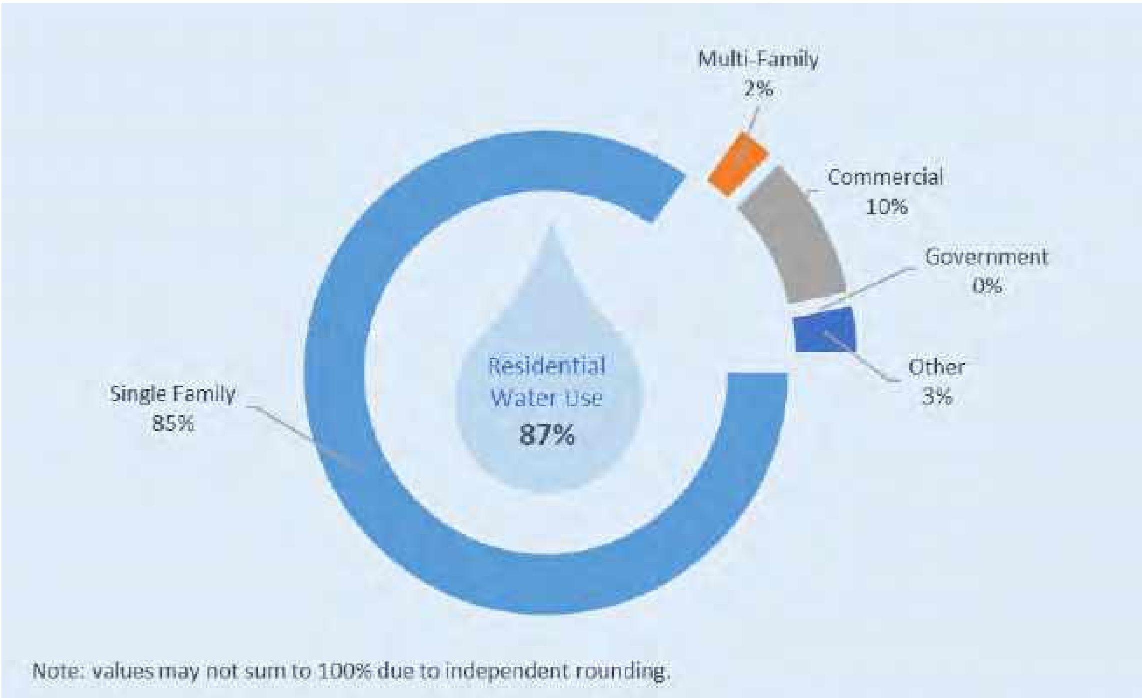
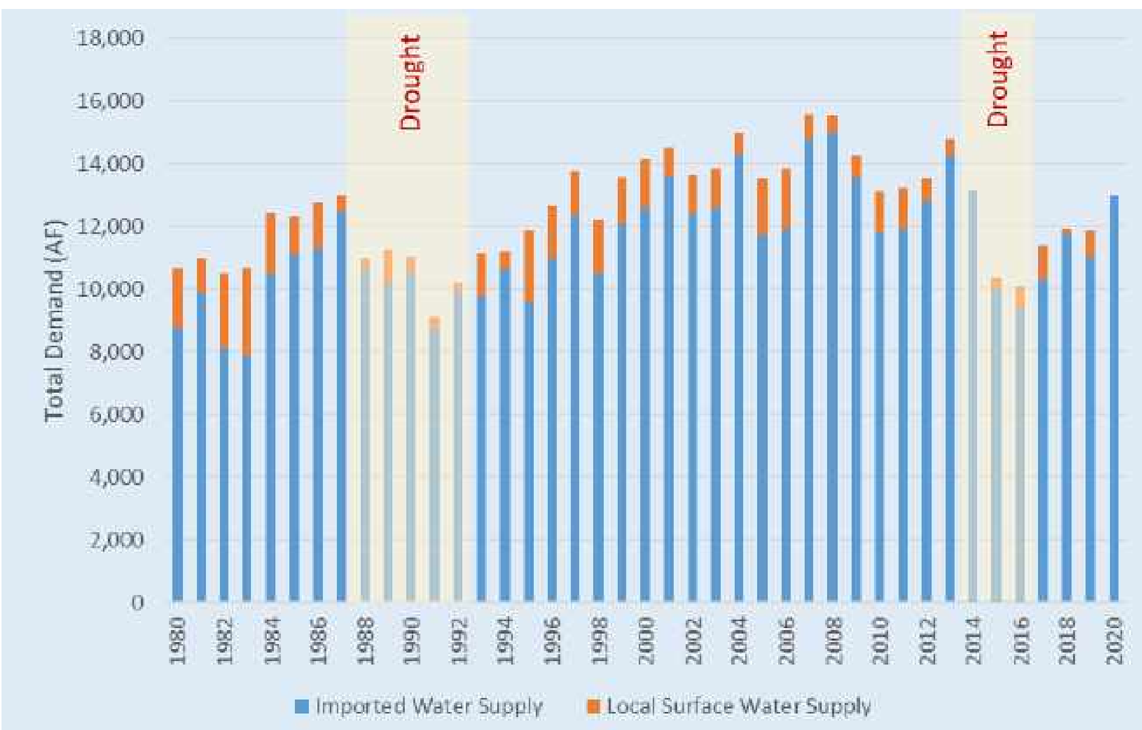


Figure 4. Total Demand and Sources of Supply: 1980 - 2020



3 Conservation Goals and Progress

In this section, conservation goals and progress for the Bear Gulch District are presented.

3.1 Conservation Program Activity and Water Savings

Cal Water uses the Alliance for Water Efficiency's Water Conservation Tracking Tool to track program activity and estimate water savings. Conservation program activity for 2016-20 is shown in Table 1. This activity is expected to generate water savings of 96 AF/year and cumulative lifetime savings of 1,440 AF.

Table 1. Conservation Program Activity and Water Savings: 2016-20

1. Plumbing Fixture Replacement	2016 – 2020 Total Activity
Toilets & Urinals (number distributed)	1,933
Clothes Washers (number distributed)	325
Consv. Kits (number distributed)	238
2. Irrigation Equip./Landscape Upgrades	
Smart Controllers (number distributed)	422
Nozzles & Spray Bodies (number distributed)	1,206
Turf Replacement (sq ft removed)	52,850
3. Residential Customer Assistance	
Surveys/Audits (homes receiving)	60
4. Non-Residential Customer Assistance	
Surveys/Audits (sites receiving)	5
Large Landscape Reports (sites receiving)	78
Average Annual Water Savings (AF)	**96**
Cumulative Lifetime Water Savings (AF)	**1,440**

3.2 Plumbing Codes and Water Use Efficiency Standards

Cal Water's conservation programs are operated within the context of existing plumbing codes and water use efficiency standards that are designed to improve the future water use efficiency of major water using appliances and fixtures, such as toilets and clothes washers, as well as water used outdoor for landscaping. Cal Water estimates that plumbing codes and water use efficiency standards will cumulatively save more than 7,800 AF in the District over the next 25 years. The primary drivers for the expected water savings are as follows:

- AB 715, enacted in 2007, requires that any toilet or urinal sold or installed in California on or after January 1, 2014 cannot have a flush rating exceeding 1.28 and 0.5 gallons per flush, respectively. AB 715 superseded the state's previous standards for toilet and urinal water use set in 1991 of 1.6 and 1.0 gallons per flush, respectively. On April 8, 2015, in response to the Governor's Emergency Drought Response Executive Order (EO B-29-15), the California Energy Commission approved new standards for urinals requiring that they not use more than 0.125 gallons per flush, 75% less than the standard set by AB 715.

- Water use standards for residential and commercial clothes washers and dishwashers are established by the U.S. Department of Energy through its authority under the federal Energy Policy and Conservation Act. Water use efficiency is summarized by the water factor for the appliance which measures the gallons of water used per cycle per cubic foot of capacity. A typical top-loading residential clothes washer manufactured in the 1990s had a water factor of around 12. In 2015, the allowable water factor for top- and front-loading residential clothes was reduced to 8.4 and 4.7, respectively. In 2018, the water factor standard for top-loading residential clothes washers was reduced to 6.5. In 2010 the allowable water factor for top- and front-loading commercial clothes washers was reduced to 8.5 and 5.5, respectively. The maximum water factor for Energy Star compliant top- and front-loading washers is 3.7 and 4.3, respectively. An Energy Star compliant washer uses about two-thirds less water per cycle than washers manufactured in the 1990s. There also are federal dishwasher efficiency standards. The maximum water use for standard and compact sized dishwashers is 5.0 and 3.5 gallons per cycle, respectively.

- New construction and renovations in California are subject to CalGreen Code requirements. CalGreen includes prescriptive indoor provisions for maximum water consumption of plumbing fixtures and fittings in new and renovated properties. CalGreen also allows for an optional performance path to compliance, which requires an overall aggregate 20% reduction in indoor water use from a calculated baseline using a set of worksheets provided with the CalGreen guidelines.

- SB 407, enacted in 2009, mandates that existing buildings in California come up to current state plumbing fixture standards. This law establishes requirements that residential and commercial property built and available for use on or before January 1, 1994 replace plumbing fixtures that are not water conserving, defined as "noncompliant plumbing fixtures" as follows:

  - any toilet manufactured to use more than 1.6 gallons of water per flush;

  - any urinal manufactured to use more than one gallon of water per flush;

  - any showerhead manufactured to have a flow capacity of more than 2.5 gallons of water per minute; and
  - any interior faucet that emits more than 2.2 gallons of water per minute.

- For single-family residential property, the SB 407 compliance date was January 1, 2017. For multi-family and commercial property, it was January 1, 2019.

- The law does not include enforcement mechanisms ensuring conversion by these dates. However, it does require retrofit upon resale of property. SB 837, passed in 2011, reinforced this requirement by requiring the transfer disclosure statement include disclosure of compliance with SB 407.

California also has adopted regulations governing future use of water for landscape.

- The California Water Commission approved the State's updated Model Water Efficient Landscape Ordinance (MWELO) in 2015. MWELO or a locally adopted equivalent ordinance limits how much water new and rehabilitated residential and commercial landscapes can use. For residential landscapes, the maximum allowed water allowance (MAWA) is 55% of the amount of water that healthy cool season turf grass would require given the local climate. For commercial landscapes, it is 45%. Variances are allowed for special landscaping, such as play fields and parks, or landscaping irrigated with recycled water.

- CalGreen requires that automatic irrigation controllers for new landscaping installed by a builder be weather- or soil moisture-based controllers that automatically adjust irrigation in response to changes in plant water needs as weather or soil conditions change.

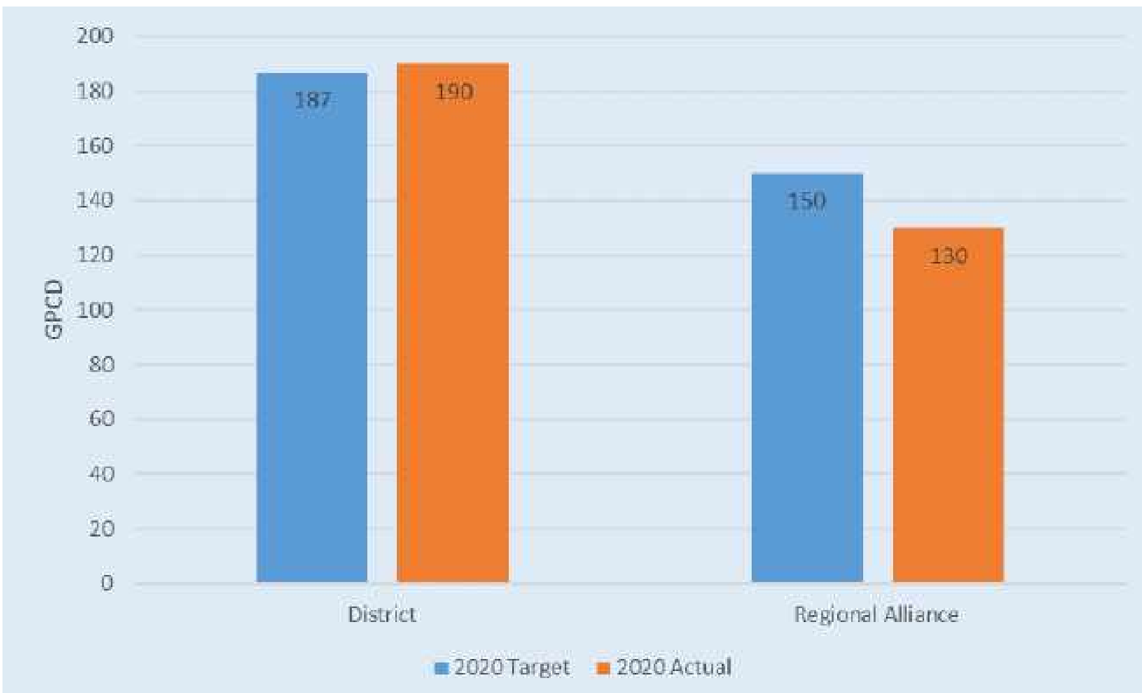
- Starting October 1, 2020, spray sprinkler bodies sold or offered for sale in California are required to use the WaterSense test procedure (Version 1.0, September 21, 2017) and must meet state standards (California Code of Regulations, Title 20, section 1605.3(x)(1)(A)). The new standards establish limits on maximum and average flow rate and minimum outlet pressure. Statewide, the new standards are estimated to save 15 billion gallons of water in the first year the standard is in effect and 152 billion gallons per year at full stock turnover. Consumers are expected to save about $22 per spray sprinkler body over the life of the device through reduced water use.

3.3 Compliance with State Urban Water Use Target

The Water Conservation Act of 2009, also known as SB X7-7, mandated a 20% reduction in per capita water use by 2020. Every urban retail water supplier was required to establish a 2020 per capita water use target based on their historical water use. Water suppliers could also form a Regional Alliance with other retail water suppliers and meet the requirement jointly. The District formed a Regional Alliance with other Cal Water districts in the San Francisco Bay Hydrologic Region. As long as either the District's or the Regional Alliance's 2020 per capita water use is below target, the District will have met the act's requirements.

Figure 5 demonstrates the District's compliance with the Water Conservation Act of 2009. Although 2020 per capita water use was slightly above the District target, water use by the Regional Alliance was well below it. Through the concerted efforts of Cal Water and its customers, District per capita water use is now 24% below its peak reached in the mid-2000s (see Figure 6).

Figure 5. 2020 Target and Actual Per Capita Water Use



3.4 Compliance with CPUC Conservation Goals

In 2008, the California Public Utilities Commission (CPUC) established water conservation goals of 1-2% per year for Class A utilities, which includes California Water Service Company.[1] As shown in Figure 6, the District has met or exceeded these goals every year since they were adopted.

[1] CPUC Decision 08-02-036, dated February 29, 2008.

Figure 6. District Per Capita Water Use Relative to CPUC Conservation Goals

3.5 Making Water Conservation a California Way of Life

The state adopted legislation in 2018 establishing a new framework for setting urban water conservation standards and objectives.[2] This legislation built upon the April 2017 report entitled *Making Water Conservation a California Way of Life, Implementing Executive Order B-37-16*, prepared by state agencies, including the CPUC. The legislation directs the state to establish water use efficiency standards for:

- Residential Indoor Water Use
- Residential Outdoor Water Use
- Dedicated Landscape Meter Water Use
- Utility Distribution System Water Losses

Once adopted, these standards will provide the basis for a new urban water use target, or in the vernacular of the legislation, an aggregate urban water use objective. In one way, the Making Water Conservation a California Way of Life legislation carries on where the Water Conservation Act of 2009 left off – it will establish a new set of water use objectives for retail urban water suppliers. However, there are important

[2] Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman).

differences. First, whereas the 2009 legislation established a long-term reduction target, under the new regulations, urban water suppliers will report water use relative to the new target annually starting in 2023 and will need to achieve the new target by January 1, 2027. Second, while the 2009 legislation applied to all urban water uses, the new legislation excludes non-residential uses other than water served by dedicated landscape meters from the target setting process. Instead, it requires DWR and the State Water Board to propose best management practices, including water audits and water management plans for non-residential customers above a certain size or volume of use, by October 1, 2021. Third, whereas the 2009 legislation set the same objective for all urban water suppliers (reduce water use by 20%), the new legislation varies the objective based on local conditions and existing levels of water use.[3]

Figure 7 shows the components of an urban water supplier's water use objective. The first four components will be based on the efficiency standards the state sets for indoor and outdoor residential water use, dedicated landscape meter water use, and utility distribution system losses. The fifth component allows for special circumstances, such as a large seasonal population or significant water use for fire protection, while the sixth component provides credit for water recycling. Added together, the six components establish the water suppliers water use objective.

For water suppliers failing to meet their water use objective, the legislation specifies progressive enforcement, as follows:

- Starting November 1, 2023, the State Water Board may issue information orders to obtain information to determine technical assistance needs for compliance (CWC 10609.26(a))

- Starting November 1, 2024, the State Water Board may issue written notices to warn suppliers of violation and request corrective actions by the next annual reporting (CWC 10609.26(b))

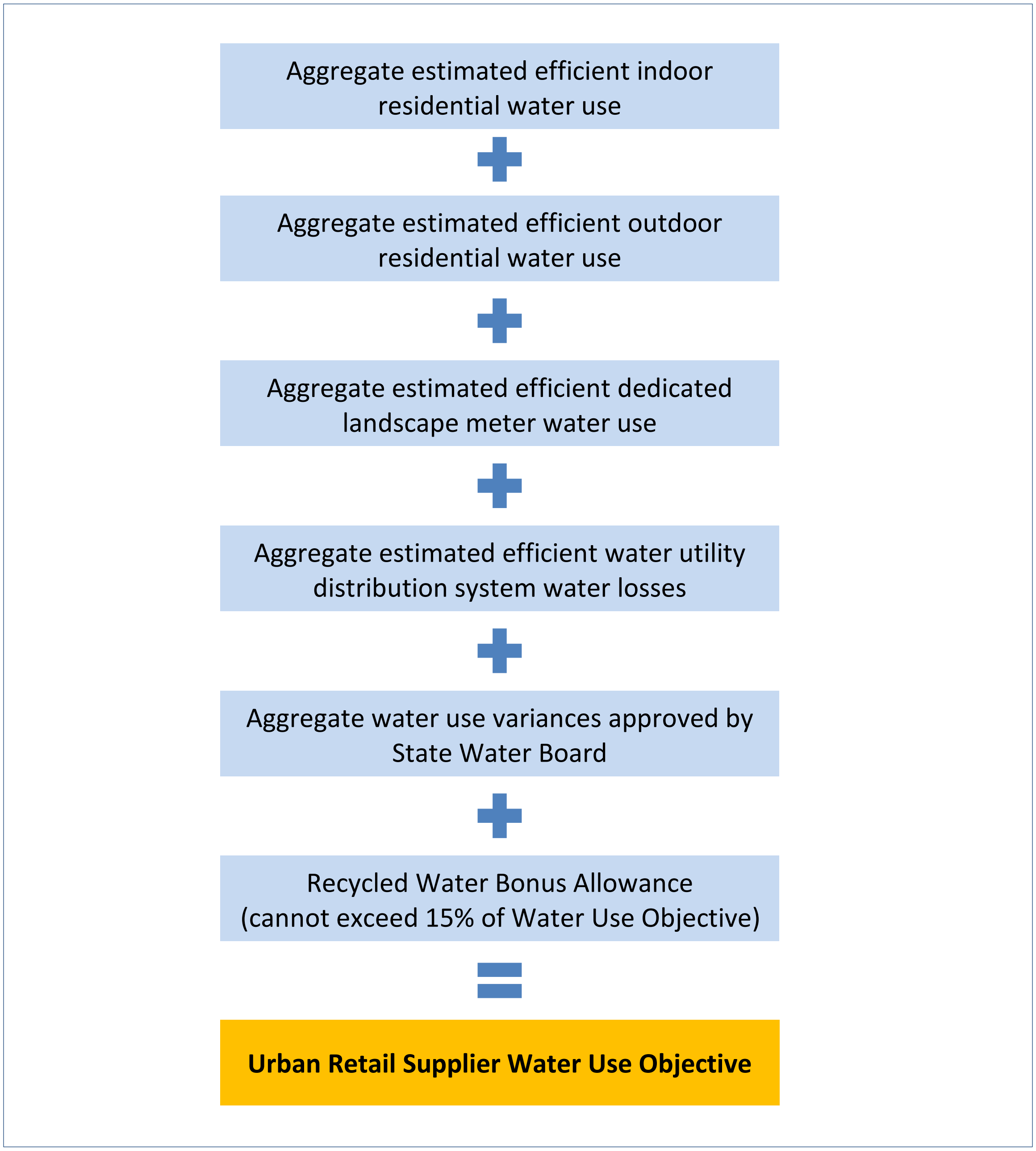
- Starting November 1, 2025, the State Water Board may issue conservation orders that may include referral to DWR for technical assistance and other local enforcement actions, including imposition of civil liability (CWC 10609.26(c)

Cal Water conducted a risk assessment to determine which of its districts may require additional resources to meet the new conservation regulations. The risk assessment considered current and projected level of overall water use, level of indoor residential water use, extent of residential and non-residential landscape area and water use, and

[3] For additional information, see Making Water Conservation a California Way of Life: Primer of 2018 Legislation on Water Conservation and Drought Planning Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman).

condition of distribution system and level of water loss. Using a scoring system, the assessment ranked each district in terms of its risk of non-compliance with the individual components of the water use objective as well as the aggregate objective. The results of this assessment provided the basis for the conservation program budgets put forward in Cal Water's 2018 and 2021 general rate cases.

Figure 7. Making Water Conservation a California Way of Life Water Use Objective



4 Water Conservation Program

Cal Water centrally administers the conservation programs for its service districts. This creates both constraints and opportunities in terms of program design and implementation. The key constraint is the need to have consistent program offerings across districts. Except under unique circumstances, it is generally not logistically feasible or cost-effective to customize programs for individual districts. Also, if Cal Water offers a program in one district, customers in other districts generally expect it to also be available in their district. This puts a premium on offering a relatively small set of programs that can benefit all Cal Water customers. The advantage of central administration, however, is that it gives Cal Water scale economies and purchasing power that helps it keep program costs down, thereby improving cost-effectiveness.

4.1 Conservation Program Drivers

While Cal Water strives to develop programs that can be deployed in any of its districts, it tailors marketing, customer targeting, and implementation focus based on the needs of each district. In the Bear Gulch District, the main drivers shaping the conservation program are summarized in Table 2.

Table 2. Main Conservation Program Drivers in Bear Gulch District

Driver	Explanation
Supply Reliability	The District depends primarily on imported surface water which may be substantially curtailed during drought periods. Conservation is an important option available to the District for reducing dependence on imported water supply.
Water Supply Cost	The District's dependence on imported surface water results in high water supply cost. Acquiring additional water through conservation in most cases is less costly than purchasing additional imported water.
Residential Water Use	The state's Making Conservation a California Way of Life water use regulations are focused on reducing indoor and outdoor residential water use.
Landscape Water Use	The state's Making Conservation a California Way of Life water use efficiency regulations may require the District to start serving some non-residential landscapes through dedicated landscape meters and annually report water use relative to new landscape water use efficiency standards.

4.2 Customer Conservation Programs

Cal Water's conservation programs are grouped into four categories:

- Plumbing Fixture Replacement
- Irrigation Equipment/Landscape Upgrades
- Residential Customer Assistance
- Non-Residential Customer Assistance

A description of current programs in each of these categories follows. Where rebate amounts are listed, these are current rebate levels. Readers should note that rebate amounts may be adjusted in the future in response to CPUC requirements or changes to program design.

4.2.1 Plumbing Fixture Replacement

High-Efficiency Toilet Replacement – This program replaces old toilets with MaP certified high-efficiency toilets via financial rebates, direct installation, or direct distribution.[4] Current rebate amounts are up to $50/toilet for residential toilet replacement and up to $100/toilet for commercial toilet replacement.

High-Efficiency Urinal Replacement – This program replaces old urinals with high-efficiency urinals meeting the state's 0.125 gallon per flush water use standard via financial rebates and direct installation. While available to all non-residential customers, the program targets sites with higher-than-average bathroom utilization, such as restaurants and office buildings. The current rebate amount is up to $150/urinal.

Clothes Washer Replacement – This program provides a financial rebate to replace an old inefficient clothes washer with a new high-efficiency washer. The program is available to all residential and multi-family customers. The current rebate amount is up to $150/washer.

Residential Conservation Kit Distribution – This program offers residential customers conservation kits featuring a range of water-saving plumbing retrofit devices. The kits are available at no charge and include two high-efficiency showerheads (1.5 gpm), two bathroom faucet aerators (1.0 gpm), one kitchen faucet aerator (1.5 gpd), toilet leak tablets, and an outside multi-function, full-stop hose nozzle.

[4] For information on MaP certified toilets, see: https://www.map-testing.com/

4.2.2 Irrigation Equipment/Landscape Upgrades

Smart Irrigation Controller Installation – This program provides a financial rebate for the installation of a smart irrigation controller that automatically adjusts watering schedule in response to changing weather conditions. The current rebate amount is $125/controller for residential customers and $25/station for commercial customers.

High-Efficiency Sprinkler Nozzle Rebate – This program provides a financial rebate for the installation of high-efficiency sprinkler nozzles. This program is available to all Cal Water customers. The current rebate amount is $5/nozzle.

Large Rotary Nozzle Rebate – This program provides a financial rebate for the installation of high-efficiency large rotary nozzles. This program is available to all Cal Water customers. The current rebate amount is up to $30/nozzle toward the nozzle purchase cost and up to $8/spray body toward installation cost, if installed by a C-27 licensed landscape contractor.

Spray Body with Integrated Pressure Regulation and Check Valve Rebate – This program provides a financial rebate for the installation of high-efficiency spray bodies with integrated pressure regulation. This program is available to all Cal Water customers. The current rebate amount is up to $10/body toward the spray body purchase cost and up to $8/spray body toward installation cost, if installed by a C-27 licensed landscape contractor.

Turf Replacement Rebate – This program provides a financial rebate for replacement of turf with approved drought-tolerant landscaping. Cal Water operated this program in 2015/16 as a drought response measure. The program will be re-started as part of Cal Water's irrigation equipment/landscape upgrade program offerings.

4.2.3 Customer Assistance

Smart Landscape Tune-Up Program – This program provides customers with an irrigation system evaluation and installation of approved efficient irrigation system equipment, such as a smart irrigation controller and high-efficiency sprinkler nozzles. The program also includes irrigation system adjustments and detection and repair of irrigation system leaks. This program is available to all Cal Water customers at no charge.

Residential Customer Portal – Through its residential customer portal, Cal Water provides tailored assistance to each residential customer via customized water-efficiency targets, water savings calculators, and customer-specific recommendations for programs and water-saving tips.

Non-Residential Customer Assistance – Cal Water provides tailored assistance to commercial customers through customized incentives, commercial water surveys, and large landscape water use surveys. The non-residential assistance program helps commercial customers efficiently use water for sanitation/cleaning, heating/cooling, process, and landscape purposes.

4.2.4 Summary of Customer Programs

The customer conservation programs offered to customers in Bear Gulch District are summarized in Table 3 by customer class.

Table 3. Cal Water Conservation Programs Available to Bear Gulch District Customers

Programs (Rebate, Direct Install, and Free Distribution Programs)	Customer Eligibility		
	Single-Family	Multi-Family	Commercial
Plumbing Fixture Replacement			
High-Efficiency Toilet Replacement	✓	✓	✓
High-Efficiency Urinal Replacement			✓
High-Efficiency Clothes Washer Rebate	✓	✓	
Conservation Kits	✓	✓	
Irrigation Equipment/Landscape Upgrades			
Smart Irrigation Controller Rebate	✓	✓	✓
High-Efficiency Sprinkler Nozzle Rebate	✓	✓	✓
Large Rotary Nozzle Rebate		✓	✓
Spray Body Rebate		✓	✓
Turf Replacement Rebate	✓	✓	✓
Customer Assistance			
Smart Landscape Tune-Up Program	✓	✓	✓
Residential Customer Portal	✓		
Non-Residential Customer Assistance		✓	✓

4.3 School Education and Public Information Programs

Public Information Program – Cal Water operates an extensive public information program to provide information to customers on ways to use water efficiently and to market its conservation programs through multiple media outlets, including the Cal Water website, direct mail and bills, digital media, social media, and email.

School Education Program - Cal Water's school education program includes the Cal Water H2O Challenge, a project-based learning competition for grades 4-6, individual student competitions for grades K-12 and general information and learning materials for students and teachers. Cal Water deploys its school education program in all its districts. Cal Water H2O Challenge is a project-based competition for classrooms, grades 4-6. The program is offered in partnership with DoGoodery, the California Association of Science Educators (CASE), and the WestEd K-12 Alliance. The program aligns with the Common Core State Standards and the Next Generation Science Standards. The Cal Water H2O Challenge offers a unique opportunity for upper elementary teachers to facilitate their students' learning of standards-based content, while developing the core understanding of environmental principles necessary to becoming science-literate citizens.

4.4 Water System Efficiency

4.4.1 System Water Loss Management

As discussed above, reducing distribution system losses is one of the main focuses of the new Making Water Conservation a California Way of Life regulations. In preparation for these new requirements, Cal Water took part in the California Water Loss Technical Assistance Program (TAP) in both 2016 and 2017. Cal Water annually conducts distribution system audits using the American Water Works Association (AWWA) Free Water Audit Software. It has also developed a Water Loss Control Plan and Water Loss Control Policy to guide future water loss management with respect to:

- Meeting CPUC and state water loss standards and regulations
- Improving audit data and validity scores
- Implementing cost-effective water loss control actions

To coordinate and oversee water loss management actions across its multiple districts, Cal Water has added a Water Loss Program Analyst position to its conservation staff.

4.4.2 Metering and Pricing

Cal Water has deployed conservation-oriented rate designs in all its districts since 2008. The CPUC reviews these rate designs every three years as part of a general rate case. Cal Water is continuously seeking ways to improve the efficiency and equity of the rates and charges paid by customers. One example is Cal Water's Customer Assistance Program (CAP), which provides bill discounts to qualifying lower income households.

All service connections in the District are metered. In addition to its use for billing, Cal Water uses meter data in the management of its conservation programs, including using it to analyze water use trends and identify customers that may benefit from Cal Water conservation programs. Cal Water is also piloting automatic meter reading

(AMR) and advanced metering infrastructure (AMI) in several of its districts. Broad adoption of AMI would allow Cal Water in the future to detect and alert households of leaks and other possible problems as well as provide customers with tailored water use information to help them use water more efficiently.

4.5 Conservation Partnerships

Cal Water collaborates with organizations at the local, state, and national level to promote and advance water use efficiency, including as a member of the following organizations and initiatives.

California Water Efficiency Partnership (CalWEP) – CalWEP's mission is to maximize urban water efficiency and conservation throughout California by supporting and integrating innovative technologies and practices; encouraging effective public policies; advancing research, training, and public education; and building collaborative approaches and partnerships. In addition to being a CalWEP member, Cal Water serves on the organization's board of directors.

Alliance for Water Efficiency - The Alliance for Water Efficiency (AWE) is a national non-profit organization dedicated to efficient and sustainable use of water. In addition to being an AWE member, Cal Water uses the AWE Water Conservation Tracking Tool to evaluate conservation programs and track water savings.

EPA WaterSense - As an EPA WaterSense partner, Cal Water has committed to educating its customers about the value of water, water efficiency, and the WaterSense brand. Products and services earning the WaterSense label have been certified to be at least 20 percent more efficient without sacrificing performance.

5 Conservation Budget

The District's recommended conservation budget for the period 2021-2025 is presented in Figure 8.[5] Cal Water used the three-step process shown in Figure 9 to develop the conservation budget. In the first step, a wide range of possible conservation programs are qualitatively screened in terms of their potential savings, implementation feasibility, customer receptivity, and cost. The program screening filters used in this step are listed in Table 4. In the second step, the programs passing through the screen are quantitatively analyzed using the AWE's Water Conservation Tracking Tool. In the third step, a portfolio of programs is developed based on the

[5] This is a composite of the conservation budget the CPUC approved in Cal Water's 2018 general rate case, which covers the period 2020-2022, and the budget Cal Water is proposing in its 2021 general rate case, which covers the period 2023-2025. Depending on the outcome of the general rate case, the adopted 2023-2025 budget may differ from Cal Water's recommended budget.

results of the second step. As discussed earlier, in its two most recent general rate cases Cal Water has further refined the conservation budget based on the results of a risk assessment used to determine which districts may require additional resources to meet the state's new conservation regulations.

Figure 8. Recommend Conservation Budget and Allocation: 2021-2025

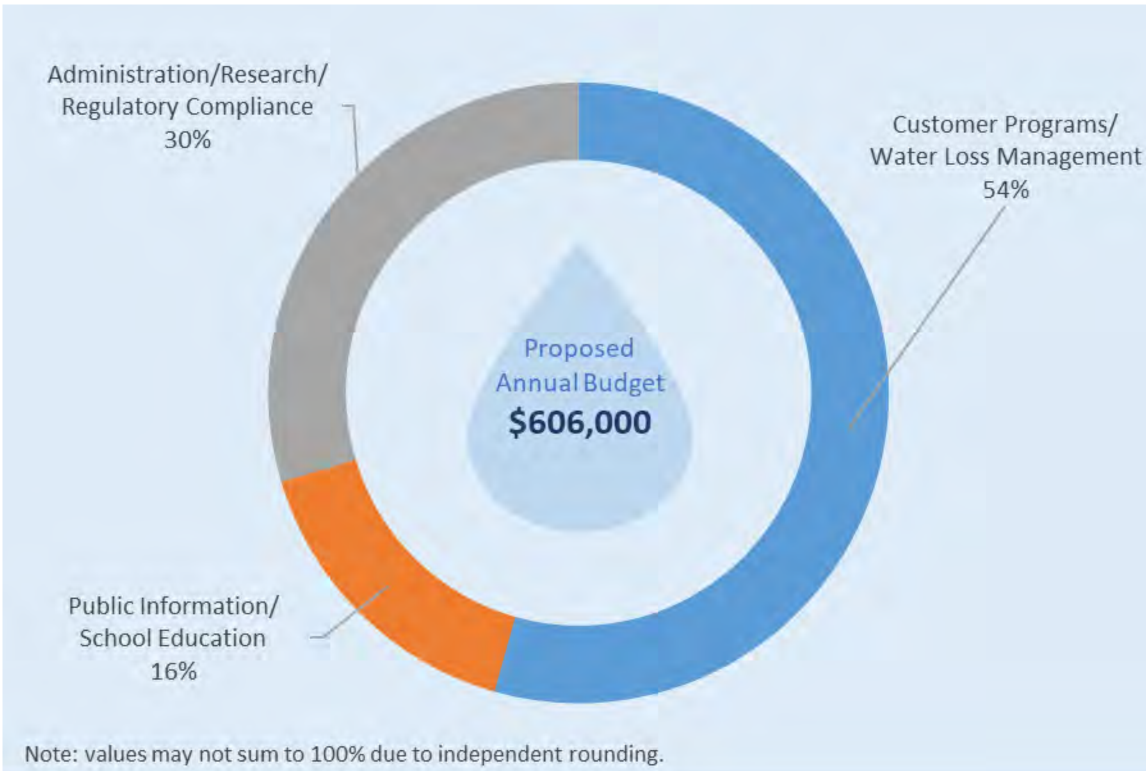


Figure 9. Conservation Program Assessment Method

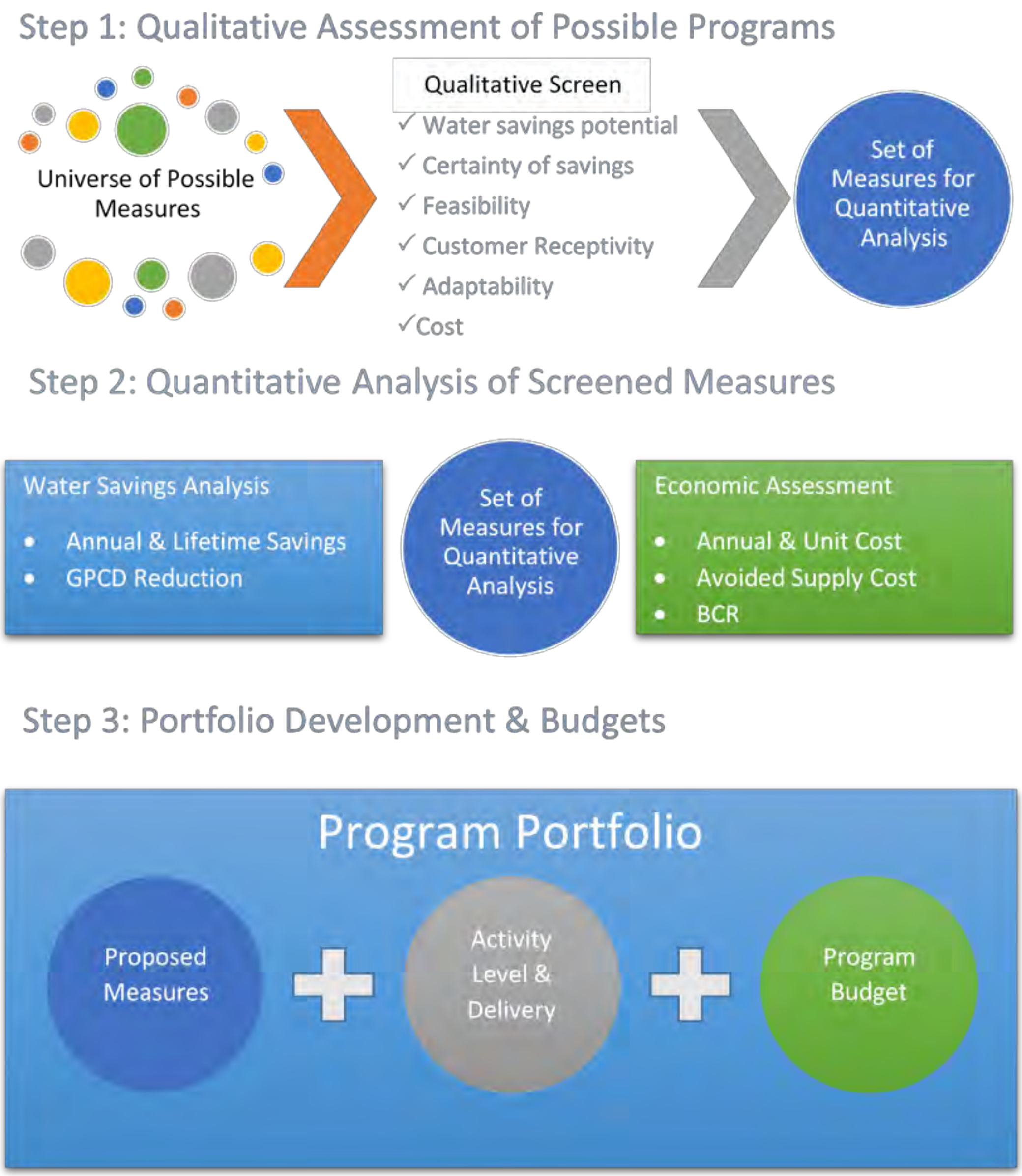


Table 4. Conservation Measure Qualitative Screening Filters

Filter	Description
Water Savings Potential	The amount of water a measure can potentially save over its lifespan or over a certain period after an action that encourages behavioral change (such as receipt of a home water survey). This filter screens out measures where potential savings are too low to make it worthwhile.
Certainty of Water Savings	The certainty of the water savings estimated in Water Savings Potential. Some measures have high potential but low certainty because they are new and untested or because they rely on uncertain behavioral actions of participants. Other measures have low potential but high certainty. This filter screens out measures that have low expected savings (i.e., measures with high certainty but low potential or measures with high potential but low certainty) or flags these measures as candidates for pilot programs.
Implementation Feasibility	The ease with which a measure can be implemented, such as adequate budget and staff resources to handle outreach and ongoing administrative needs. This filter screens out measures than are considered infeasible to implement.
Customer Receptivity	The degree to which customers are receptive to a measure, such as how easy or difficult it is for a customer to apply for a certain rebate or arrange for a water survey. This filter screens out measures that are unlikely to be favored by customers.
Adaptability	The ease with which a measure can be scaled to react to a changing market (e.g., increasing or decreasing a toilet rebate to ramp up/down the participation rate), or adjusted to accommodate a different market sector (e.g., redesigning the incentives or other parameters of a single-family landscape turf replacement program to target the multi-family or commercial sectors). This filter screens out measures that cannot be readily adapted to changing circumstances of the market.
Cost	The expected cost-effectiveness of the measure relative to other measures. This filter screens out measures that are unlikely to be cost-effective or would crowd out other desirable measures because of its expense.

6 Performance Metrics

Cal Water periodically evaluates program savings potential and cost-effectiveness using the AWE Water Conservation Tracking Tool. Based on the most recent evaluation, the expected water savings and cost-effectiveness of Bear Gulch's conservation program are as follows:

- **Water Savings** – Up to 360 AF/year and cumulatively up to 5,600 AF over the useful life of the measures. Program water savings will help the District comply with new state water conservation regulations.

- **Unit Cost** – $700/AF (rounded to nearest $100), which is less than the District's purchased water cost.

- **Benefit-Cost Ratio** -- 2.9. The District's conservation program is expected to pay back $2.90 in avoided purchased water costs for every dollar of program expenditure.

7 Program Monitoring and Reporting

Cal Water regularly reviews its conservation programs to ensure they are performing as expected. This includes the following:

Program Tracking - Cal Water uses the AWE Water Conservation Tracking tool to track program participation, cost, and water savings. This data helps Cal Water monitor program performance, analyze water use trends, and forecast future water demand.

Research and Evaluation – Cal Water regularly evaluates program performance and undertakes pilot projects to assess the effectiveness of its programs. Examples include:

- Comprehensive statistical evaluations of bathroom retrofit programs operated between 2013 and 2018

- Statistical evaluations of water savings associated with high-efficiency irrigation nozzle replacement, smart irrigation controller installation, and turf replacement programs.

- Development of statistical models of customer program participation that help Cal Water target programs based on household and neighborhood attributes.

- AMR and AMI pilot projects.

Annual Conservation Report – Cal Water annually reports on the conservation program's progress and accomplishments, and posts public reports for each of its districts on its public website (https://www.calwater.com/conservation/water-conservation-reports/).

CPUC Reporting – Cal Water reports to the CPUC annually on the implementation, cost, and performance of its conservation programs.

State Reporting – Starting in 2023, Cal Water will annually report District water use relative to its water use objective as part of the new Making Water Conservation a California Way of Life regulations.

Appendix N: Resolution to Adopt UWMP

CALIFORNIA WATER SERVICE
1720 North First Street
San Jose, CA 95112-4598 *Tel:* (408) 367-8200

June 20, 2021

Julia Ekstrom, PhD
Supervisor, Urban Unit
California Department of Water Resources
Water Use Efficiency Section
P.O. Box 942836
Sacramento, CA 94236-0001

Re: Adoption of the 2020 Urban Water Management Plan and Water Shortage Contingency Plan California Water Service – Bear Gulch District

Ms. Ekstrom:

This letter serves as notice that California Water Service Company (Cal Water) has formally adopted this 2020 Urban Water Management Plan (UWMP) and Water Shortage Contingency Plan (WSCP) for our Bear Gulch District.

The attached resolution from Cal Water's Board of Directors on September 28, 2005 delegated authority for this approval to, among others, any Vice President. I have approved the attached UWMP and WSCP, which was developed by staff under my supervision in accordance with the Urban Water Management Planning Act contained in the California Water Code, Division 6, Part 2.6.

If you have any questions regarding this UWMP or WSCP, please contact Michael Bolzowski at the above mailing address, by telephone at (408) 367-8338, or by email at mbolzowski@calwater.com.

Sincerely,

Shannon Dean
Vice President, Customer Service and Chief Citizenship Officer

Attachments

cc: Ken Jenkins - Director, Water Resource Sustainability
Dawn Smithson - District Manager, Bear Gulch District

CALIFORNIA WATER SERVICE
1720 North First Street
San Jose, CA 95112-4598 *Tel:* (408) 367-8200

CALIFORNIA WATER SERVICE COMPANY

RESOLVED, that this Board of Directors delegates its authority to approve Urban Water Management Plans as required under the Urban Water Management Planning Act contained in California Water Code 6, Part 2.6 to the President and Chief Executive Officer, any Vice President, the Corporate Secretary and any Assistant Secretary of California Water Service Company.

--oOo--

I, DAN L. STOCKTON, Corporate Secretary of California Water Service Company, a California corporation, do hereby certify that the foregoing is a full, true and correct copy of certain resolution adopted by the Board of Directors of said corporation at a regular meeting of said Board duly called and held September 28, 2005, at which a quorum was present, that all Directors present voted in favor of said resolution, and that said resolution has never been annulled or revoked but is still in full force and effect.

IN WITNESS WHEREOF, I have hereunto signed my name this 7th day of September, 2005.

Dan L. Stockton

Dan L. Stockton
Corporate Secretary

Appendix B

Menlo Park Municipal Water, 2020 Urban Water Management Plan

June 2021

2020 Urban Water Management Plan

for Menlo Park Municipal Water

eki environment & water

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

ABBREVIATIONS

AB	Assembly Bill
ACWD	Alameda County Water District
AF	acre-foot
AFY	acre-foot per year
AMI	Advanced Metering Infrastructure
AWSP	Alternative Water Supply Planning Program
AWWA	American Water Works Association
BAIRWMP	Bay Area Integrated Regional Water Management Plan
BARR SWAP	Bay Area Regional Reliability Shared Water Access Program
BAWSCA	Bay Area Water Supply and Conservation Agency
BDPLs	Bay Division Pipelines
BG	billion gallon
CA	California
CASGEM	California Statewide Groundwater Elevation Monitoring
ccf	hundred cubic feet
CCR	California Code of Regulations
CCWD	Contra Costa Water District
CEQA	California Environmental Quality Act
CII	commercial, industrial, and institutional
CIP	Capital Improvement Plan
CUWCC	California Urban Water Conservation Council
CWC	California Water Code
DBP	disinfection by-product
DDW	Division of Drinking Water
DMM	Demand Management Measures
DOF	Department of Finance
DRA	Drought Risk Assessment
DSOD	Division of Safety of Dams
DSS	Decision Support System
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utilities District
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ETo	reference evapotranspiration
ft	foot
FTE	full-time equivalent
FY	fiscal year

GIS	geographic information system
GPCD	gallons per capita per day
gpf	gallons per flush
gpm	gallons per minute
GRP	Groundwater Reliability Partnership
GSP	Groundwater Sustainability Plan
GSR	Groundwater Storage and Recovery
GWMP	groundwater management plan
HET	High-Efficiency Toilet
HOA	homeowner's association
HTWTP	Harry Tracy Water Treatment Plant
IPCC	International Panel on Climate Change
ISG	Individual Supply Guarantee
JPA	Joint Powers Authority
kWh	kilowatt hours
LCSD	Lower Crystal Springs Dam
LOS	level of service
LVE	Los Vaqueros Reservoir Expansion
MCL	Maximum Contaminant Level
MG	million gallons
MGD	million gallons per day
MID	Modesto Irrigation District
MMWD	Marin Municipal Water District
MPMW	Menlo Park Municipal Water
MWELO	Model Water Efficient Landscape Ordinance
PAPMWC	Palo Alto Park Mutual Water Company
R-GPCD	residential gallons per capita per day
RUWMP	Regional Urban Water Management Plan
RWF	Recycled Water Facility
RWQCB	Regional Water Quality Control Board
RWS	Regional Water System
SB	Senate Bill
SCVWD	Santa Clara Valley Water District
SFPUC	San Francisco Public Utilities Commission
SGMA	Sustainable Groundwater Management Act
SHGCC	Sharon Heights Golf and Country Club
SLAC	SLAC National Accelerator Laboratory
SMP	Surface Mining Permit
SVCW	Silicon Valley Clean Water
SVWTP	Sunol Valley Water Treatment Plant
SWAP	Shared Water Access Program

SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solids
TID	Turlock Irrigation District
TRT	Tuolumne River Trust
U.S.	United States
USD	Union Sanitary District
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UV	ultraviolet
UWMP	Urban Water Management Plan
WBSD	West Bay Sanitary District
WCIP	Water Conservation Implementation Plan
WQD	Water Quality Division
WSA	Water Supply Assessment
WSAP	Water Shortage Allocation Plan
WSCP	Water Shortage Contingency Plan
WSIP	Water System Improvement Program
WWTP	Wastewater Treatment Plant

1 INTRODUCTION AND OVERVIEW

This chapter discusses the importance and uses of this Urban Water Management Plan (UWMP or Plan), the relationship of this Plan to the California Water Code (CWC), the relationship of this Plan to other local and regional planning efforts, and how this Plan is organized and developed in general accordance with the UWMP Guidebook 2020 (Guidebook; DWR, 2021).

1.1 Background and Purpose

Menlo Park Municipal Water (MPMW) serves water to approximately half of the City of Menlo Park (City), which is located along San Francisco Bay in San Mateo County. MPMW delivers water to residential, commercial, industrial, and governmental customers and purchases all of its potable water supplies from the San Francisco Public Utilities Commission (SFPUC). As of December 2020, MPMW serves 4,296 connections within its service area.

This UWMP is a foundational document and source of information about MPMW's historical and projected water demands, water supplies, supply reliability and potential vulnerabilities, water shortage contingency planning, and demand management programs. Among other things, it is used as:

- A long-range planning document for water supply and system planning; and
- A source for data on population, housing, water demands, water supplies, and capital improvement projects used in:
    - Regional water resource management plans prepared by wholesale water suppliers and other regional planning authorities (as applicable),
    - General Plans prepared by cities and counties, and
    - Statewide and broad regional water resource plans prepared by the California Department of Water Resources (DWR), the State Water Resources Control Board (State Board), or other state agencies.

MPMW's last UWMP was completed in 2016, referred to herein as the "2015 UWMP" (City of Menlo Park, 2016a). This Plan is an update to the 2015 UWMP and carries forward information that remains current and is relevant to this Plan, and provides additional information as required by amendments to the UWMP Act (CWC §10610 – 10657). Although this Plan is an update to the 2015 UWMP, it was developed to be a self-contained, stand-alone document and does not require readers to reference information contained in previous updates.

1.2 Urban Water Management Planning and the California Water Code

The UWMP Act requires urban water suppliers to prepare an UWMP every five years and to submit this plan to the DWR, the California State Library, and any city or county within which the supplier provides water supplies. All urban water suppliers, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet annually are required to prepare an UWMP (CWC §10617).

The UWMP Act was enacted in 1983. Over the years it has been amended in response to water resource challenges and planning imperatives confronting California. A significant amendment was made in 2009 as a result of the governor's call for a statewide 20 percent reduction in urban water use by 2020, referred to as "20x2020," the Water Conservation Act of 2009, and "SB X7-7." This amendment required urban retail water suppliers to establish water use targets for 2015 and 2020 that would result in statewide water savings of 20 percent by 2020. Beginning in 2016, urban retail water suppliers were required to comply with the water conservation requirements in SB X7-7 in order to be eligible for state water grants or loans. Chapter 5 of this plan contains the data and calculations used to determine compliance with these requirements.

A subsequent substantial revision to the UWMP Act was made in 2018 through a pair of bills (i.e., Assembly Bill 1668 and Senate Bill 606), referred to as "Making Water Conservation a California Way of Life" or the "2018 Water Conservation Legislation." These changes include, among other things, additional requirements for Water Shortage Contingency Plans (WSCPs), expansion of dry year supply reliability assessments to a five-year drought period, establishment of annual drought risk assessment procedures and reporting, and new conservation targets referred to as "annual water use objectives," which will require retailers to continue to reduce water use beyond the 2020 SB X7-7 targets.

As applicable, MPMW's 2020 UWMP reflects the following significant revisions to the UWMP Act that have been made since 2015.

- ***Five Consecutive Dry-Year Water Reliability Assessment***. The Legislature modified the dry-year water reliability planning from a "multiyear" time period to a "drought lasting five consecutive water years" designation.
- ***Drought Risk Assessment***. The Drought Risk Assessment (DRA) requires a supplier to assess water supply reliability over a five-year period from 2021 to 2025 that examines water supplies, water uses, and the resulting water supply reliability under a reasonable prediction for five consecutive dry years.
- ***Energy Analysis.*** UWMPs are now required to include water system energy usage information that can be readily obtained.
- ***Seismic Risk***. The Water Code now requires suppliers to specifically address seismic risk to various water system facilities and to have a mitigation plan.
- ***Water Shortage Contingency Plan***. In 2018, the Legislature modified the UWMP laws to require a WSCP with specific elements as explained in Appendix K.
- ***Lay Description***. The Legislature included a new statutory requirement for suppliers to include a lay description of the fundamental determinations of the UWMP, especially regarding water service reliability, challenges ahead, and strategies for managing reliability risks.

The UWMP Act contains numerous other requirements that an UWMP must satisfy. Appendix A to this Plan lists each of these requirements and where in the Plan they are addressed.

1.3 Relationship to Other Planning Efforts

This Plan provides information specific to water management and planning by MPMW. However, water management does not happen in isolation; there are other planning processes that integrate with the UWMP to accomplish urban planning. Some of these relevant planning documents include relevant city and county General Plans, Water Master Plans, Recycled Water Master Plans, integrated resource plans, Integrated Regional Water Management Plans, and others.

This Plan is informed by and helps to inform these other planning efforts. In particular, this Plan was prepared in close coordination with the City of Menlo Park's Community Development Department (Planning) and the Public Works Department (Engineering). Primary coordination was achieved through City staff's participation in two UWMP workshops (held on 1 December 2020 and 16 February 2021). At these workshops, key information regarding the 2020 UWMP content was presented and City representatives were provided the opportunity to review, comment, and present additional information.

1.4 Plan Organization

The organization of this Plan follows the same sequence as outlined in the Guidebook (DWR, 2021).

Chapter 1 - Introduction and Overview

Chapter 2 - Plan Preparation

Chapter 3 - System Description

Chapter 4 - Water Use Characterization

Chapter 5 - SBx7-7 Baselines, Targets, and 2020 Compliance

Chapter 6 - Water Supply Characterization

Chapter 7 - Water Service Reliability and Drought Risk Assessment

Chapter 8 - Water Shortage Contingency Plan

Chapter 9 - Demand Management Measures

Chapter 10 - Plan Adoption, Submittal, and Implementation

In addition to these ten chapters, this Plan includes a number of appendices providing supporting documentation and supplemental information. Pursuant to CWC §10644(a)(2), this Plan utilizes the standardized forms, tables, and displays developed by DWR for the reporting of water use and supply information required by the UWMP Act. This Plan also includes additional tables, figures, and maps to augment the set developed by DWR, as appropriate. The table headers indicate if the table is part of DWR's standardized set of submittal tables.

1.5 Demonstration of Consistency with the Delta Plan for Participants in Covered Actions

The Sacramento-San Joaquin Delta Reform Act of 2009 (Delta Reform Act) (Water Code § 85000 et seq), established the coequal goals for the Sacramento-San Joaquin Delta (Delta) of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem." The Delta Reform Act also includes a state policy to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency.

In addition to establishing the coequal goals, the Delta Reform Act created the Delta Stewardship Council, which is tasked with furthering the state's coequal goals for the Delta through development of a Delta

Plan. Delta Stewardship Council released the Delta Plan in 2013, which adopted 14 recommendations to achieve the coequal goals of water supply and reliability.

Although not required by the UWMP Act, in the Guidebook (DWR, 2021), DWR recommends that all suppliers that are participating in, or may participate in, receiving water from a proposed project that is considered a "covered action" under the Delta Plan—such as a (1) multiyear water transfer; (2) conveyance facility; or (3) new diversion that involves transferring water through, exporting water from, or using water in the Delta —provide information in their UWMP to demonstrate consistency with the Delta Plan policy WR P1, Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance (California Code of Regulations, Title 23, Section 5003). The SFPUC, MPMW's wholesale agency, has made a legal determination that this requirement does not apply to their water sources.[1]

1.6 Lay Description

☑ ***CWC § 10630.5***

Each plan shall include a simple lay description of how much water the agency has on a reliable basis, how much it needs for the foreseeable future, what the agency's strategy is for meeting its water needs, the challenges facing the agency, and any other information necessary to provide a general understanding of the agency's plan.

This Urban Water Management Plan (UWMP or Plan) is prepared for Menlo Park Municipal Water (MPMW), which serves drinking water to approximately 4,296 accounts within the City of Menlo Park. This UWMP serves as a foundational planning document and includes descriptions of historical and projected water demands and water supplies and reliability over a 20-year planning horizon. This document also describes the actions MPMW is taking to promote water conservation, both by the agency itself and by its customers (referred to as "demand management measures") and includes a plan to address potential water supply shortages such as drought or other impacts to supply availability (the "Water Shortage Contingency Plan"). This UWMP is updated every five years in accordance with state requirements under the Urban Water Management Planning Act and amendments (Division 6 Part 2.6 of the California Water Code [CWC] §10610 – 10656). Past plans developed for MPMW are available on the California Department of Water Resources (DWR) Water Use Efficiency Data Portal website: https://wuedata.water.ca.gov/. This document includes ten chapters, which are summarized below.

Chapter 1 – Introduction and Overview

This chapter presents the background and purpose of the UWMP, identifies the Plan organization, and provides this lay description overview of the document. For suppliers that receives water from a "covered action" under the Delta Plan, this section also discusses and demonstrates consistency with Delta Plan Policy WR P1. MPMW, however, does not receive water from a "covered action" under the Delta Plan, and thus this discussion is not applicable.

[1] Email from BAWSCA, dated 9 February 2021.

Chapter 2 - Plan Preparation

This chapter discusses key structural aspects related to the preparation of the UWMP, and describes the coordination and outreach conducted as part of the preparation of the Plan, including coordination with local agencies (i.e., the San Francisco Public Utilities Commission [SFPUC], members of the Bay Area Water Supply and Conservation Agency [BAWSCA], the West Bay Sanitary District [WBSD]) and the public.

Chapter 3 - System Description

This chapter provides a description of MPMW's water system and service area, including information related to the climate, demographics, and the water distribution system. The MPMW service area is located within a region characterized by a Mediterranean climate with cool, wet winters and warm, dry summers. The majority of precipitation falls during winter and spring, averaging 15 inches of rainfall annually. MPMW currently serves a population of approximately 18,276. Population is projected to increase steadily through 2040. Significant new development is envisioned in the General Plan within MPMW's service area. MPMW distributes water purchased from the SFPUC to its three pressure zones via five SFPUC service connections (turnouts). MPMW operates one emergency supply well as well as 13 interties with adjacent water systems.

Chapter 4 - Water Use Characterization

This chapter provides a description and quantifies MPMW's current and projected demands through the year 2040. MPMW provides drinking water (also referred to as "potable water") to customers. Water demands refer not only to the water used by customers, but also includes the water used as part of the system maintenance and operation, as well as unavoidable losses inherent in the operation of a water distribution system. MPMW water demand was 1,021 million gallons (MG) on average between 2016 and 2020. Taking into account historical water use, expected population increase and other growth, climatic variability, and other assumptions, water demand within MPMW is projected to increase to 1,483 MG by 2040, a change of 41% compared to the 2016-2020 average.

Chapter 5 - SBx7-7 Baselines, Targets, and 2020 Compliance

In this chapter, MPMW demonstrates compliance with its per capita water use target for the year 2020. The Water Conservation Act of 2009 (Senate Bill X7-7) was enacted in November 2009 and requires the state of California to achieve a 20 percent reduction in urban per capita water use by December 31, 2020. In order to achieve this, each urban retail water supplier was required to establish water use targets for 2015 and 2020 using methodologies established by DWR. MPMW is in compliance with its 2020 water use target of 204 gallons per capita per day (GPCD), having reduced its water use in 2020 to 160 GPCD.

Chapter 6 - Water Supply Characterization

This chapter presents an analysis of MPMW's water supplies, as well as an estimate of water-related energy consumption. The intent of this chapter is to present a comprehensive overview of MPMW's water supplies, estimate the volume of available supplies over the 20-year planning horizon, and assess the sufficiency of supplies to meet projected demands under "normal" hydrologic conditions.

The sole source of potable water supply for MPMW is purchased water from the SFPUC. MPMW has a contractual supply of 4.456 million gallons per day (MGD), or approximately 1,630 MG per year. Water supply for MPMW is expected to be sufficient during normal years to meet the projected water demand through 2040. MPMW has been working with West Bay Sanitary District (WBSD), the recycled water purveyor for MPMW's service area, to develop recycled water. Recycled water is currently used for irrigation at the Sharon Heights Golf and Country Club. Another similar recycled water project in the Bayfront area is undergoing planning.

Calculation and reporting of water system energy intensity is a new requirement for the 2020 UWMPs. Energy intensity is defined as the net energy used for water treatment, conveyance, and distribution for all water entering the distribution system, less the amount of energy produced within the water system itself. The energy intensity for MPMW is estimated to be 349 kilowatt hours per MG of water (kWh/MG).

Chapter 7 - Water Service Reliability and Drought Risk Assessment

This chapter assesses the reliability of MPMW's water supplies, with a specific focus on potential constraints such as water supply availability, water quality, and climate change. The intent of this chapter is to identify any potential constraints that could affect the reliability of MPMW's supply (such as drought conditions) to support MPMW's planning efforts to ensure that it can meet projected demands. Water service reliability is assessed during normal, single dry-year, and multiple dry-year hydrologic conditions.

Based on this analysis, MPMW's supply is expected to be sufficient to meet demands in normal year conditions. However, MPMW is expected to experience significant shortfalls during single dry and multiple dry year conditions as a result of amendments to the Water Quality Control Plan for the San Francisco/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan Amendment) implementation. Yet, numerous uncertainties remain in the implementation of the Bay-Delta Plan Amendment and the resultant allocation of the available supply between the Wholesale Customers.

Chapter 8 - Water Shortage Contingency Plan

This chapter describes the Water Shortage Contingency Plan (WSCP) for MPMW. The WSCP serves as a standalone document to be engaged in the case of a water shortage event, such as a drought or supply interruption, and defines specific policies and actions that will be implemented at various shortage level scenarios. For example, implementing customer water budgets and surcharges, or restricting landscape irrigation to specific days and/or times. Consistent with DWR requirements, the WSCP includes six levels to address shortage conditions ranging from up to 10% to greater than 50% shortage.

Chapter 9 - Demand Management Measures

This chapter includes descriptions of past and planned conservation programs that MPMW operates within each demand management measure (DMM) category outlined in the UWMP Act, specifically: (1) water waste prevention ordinances, (2) metering, (3) conservation pricing, (4) public education and outreach, (5) distribution system water loss management, (6) water conservation program coordination and staffing support, and (7) "other" DMMs. MPMW has developed a suite of conservation programs and policies, which address each DMM category. Additionally, MPMW participates in water conservation programs offered by BAWSCA. It is estimated that between the years 2016 and 2020, MPMW conserved over 6 MG through implementation of DMMs.

Chapter 10 - Plan Adoption, Submittal, and Implementation

This chapter provides information on a public hearing, the adoption process for the UWMP and the associated WSCP, the adopted UWMP and WSCP submittal process, plan implementation, and the process for amending the adopted UWMP and WSCP. MPMW adopted the UWMP and WSCP during a City Council meeting on 25 May 2021. This UWMP and the WSCP was submitted to DWR within 30 days of adoption and by the 1 July 2021 deadline.

2 PLAN PREPARATION

This chapter discusses the type of Urban Water Management Plan (UWMP or Plan) Menlo Park Municipal Water (MPMW) has prepared and includes information that will apply throughout the Plan. Coordination and outreach during the development of the Plan is also discussed.

2.1 Compliance with the UWMP Act

☑ ***CWC § 10620 (b)***

Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

The 2020 UWMP has been prepared in accordance with the Urban Water Plan Act (UWMP Act), which is defined by the California Water Code (CWC) §10610 - §10657. The UWMP Act requires every urban water supplier that provides water for municipal purposes to more than 3,000 connections, or supplies more than 3,000 acre-feet (AF) of water annually, to adopt and submit a plan every five years to the California Department of Water Resources (DWR). Table 2-1 provides information on MPMW's public water system which services 4,296 connections within its service area and is therefore subject to the requirements of the UWMP Act.

Table 2-1 Public Water Systems (DWR Table 2-1)

Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020 (MG)
CA4110017	City of Menlo Park	4,296	1,069
	TOTAL	4,296	1,069
NOTES: (a) Data provided by MPMW.			

As indicated in Table 2-2, MPMW's 2020 UWMP is an individual Plan. It has been prepared in general accordance with the format suggested in DWR's UWMP Guidebook (Guidebook; DWR, 2021). Text from the UWMP Act has been included in grey boxes at the beginning of relevant sections of this UWMP. The information presented in the respective UWMP sections and the associated text, figures, tables and charts are collectively intended to fulfill the requirements of that sub-section of the UWMP Act. To the extent practicable, supporting documentation has also been provided in Appendices A through N. Other sources for the information contained herein are provided in the references section of the document.

Per CWC §10644(a)(2), selected information for the 2020 UWMP updates must be presented in standardized tables for electronic submittal to DWR. To the extent applicable, text and tables in the main body of the UWMP document have been cross-referenced to the companion DWR tables. The DWR tables include an optional column for 2045. However, MPMW's data are only reported up through 2040 to be consistent with the General Plan's planning horizon.

Table 2-2 Plan Identification (DWR Table 2-2)

<table>
<tr><th>Select Only One</th><th colspan="2">Type of Plan</th><th>Name of RUWMP or Regional Alliance
if applicable</th></tr>
<tr><td>X</td><td colspan="3">Individual UWMP</td></tr>
<tr><td rowspan="2"></td><td></td><td>Water Supplier is also a member of a RUWMP</td><td></td></tr>
<tr><td></td><td>Water Supplier is also a member of a Regional Alliance</td><td></td></tr>
<tr><td></td><td colspan="2">Regional Urban Water Management Plan (RUWMP)</td><td></td></tr>
<tr><td colspan="4">NOTES:</td></tr>
</table>

2.2 Coordination and Outreach

As described below and in Section 10, this UWMP has been prepared in coordination with the Bay Area Water Supply and Conservation Agency (BAWSCA), the BAWSCA member agencies, the San Francisco Public Utilities Commission (SFPUC), the West Bay Sanitary District (WBSD), the public, and other appropriate entities.

2.2.1 Role of BAWSCA and the UWMP Common Language

Among its other functions, BAWSCA represents MPMW and the 25 other water districts, cities, and utilities, collectively referred to as the "Wholesale Customers", in negotiations and other coordination efforts with the SFPUC. Together with the SFPUC, BAWSCA developed common language for inclusion in each Wholesale Customers' 2020 UWMP regarding the following common issues:

- Description of BAWSCA;
- Regional Water Demand and Conservation Projections;
- Long Term Reliable Water Supply Strategy;
- Making Conservation a Way of California Life Strategic Plan
- Tier One Drought Allocations;
- Tier Two Drought Allocations;
- SFPUC Regional Water System
- Individual Supply Guarantees (ISGs);
- 2028 SFPUC Decisions (formerly 2018 SFPUC Decisions);

- Reliability of the Regional Water System;
- Climate Change;
- SFPUC's Efforts to Develop Alternative Water Supplies
- SFPUC's Decision to use Bay-Delta Plan Scenario in UWMP Submittal Tables;
- Bay Delta Plan Implementation Starting Year;
- SFPUC's Decision to Present Both Modeling Results in its UWMP;
- Rate Impacts of Water Shortages; and
- BAWSCA Conservation Programs.

For clarification purposes, and as shown below, the common language provided by BAWSCA is shown in grey font and has been indented for emphasis; it is otherwise presented unchanged from the original text provide by BAWSCA. As a result, there may be some redundancy in the information presented and the number of times that certain terms are abbreviated or defined. A description of BAWSCA's role generally and related to the 2020 UWMP development process is provided below.

> BAWSCA provides regional water reliability planning and conservation programming for the benefit of its 26 member agencies that purchase wholesale water supplies from the San Francisco Public Utilities Commission (SFPUC). Collectively, the BAWSCA member agencies deliver water to over 1.8 million residents and nearly 40,000 commercial, industrial and institutional accounts in Alameda, San Mateo and Santa Clara Counties.
>
> BAWSCA also represents the collective interests of these wholesale water customers on all significant technical, financial, and policy matters related to the operation and improvement of the SFPUC's Regional Water System (RWS).
>
> BAWSCA's role in the development of the 2020 Urban Water Management Plan (UWMP) updates is to work with its member agencies and the SFPUC to seek consistency among UWMP documents.

2.2.2 Wholesale Coordination

☑ ***CWC § 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. 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). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (f).

The SFPUC is a wholesale water supplier to all of the BAWSCA member agencies, and is the only wholesale water supplier to MPMW. As part of the coordination efforts for the 2020 UWMP, and in compliance with CWC §10631(h), BAWSCA prepared water demand projections through 2040 on behalf of MPMW and transmitted MPMW's water demand projections to the SFPUC.

Additionally, as described in more detail in Section 6.11, MPMW has relied upon the water supply reliability projections provided by the SFPUC for the purposes of analyzing the reliability of its SFPUC supplies during normal and dry years through 2040 (see Table 2-3).[2]

Table 2-3 Water Supplier Information Exchange (DWR Table 2-4)

The retail Supplier has informed the following wholesale supplier(s) of projected water use in accordance with Water Code Section 10631.
Wholesale Water Supplier Name
San Francisco Public Utilities Commission
NOTES:

2.2.3 Agency Coordination

☑ ***CWC § 10620 (d) (2)***

Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

As a member of BAWSCA and the BAWSCA Water Management Representative Committee, MPMW has coordinated closely with BAWSCA and its 25 other member agencies throughout the update of MPMW's UWMP. Between 12 February 2021 and 9 April 2021, MPMW attended a series of five webinars on supply reliability hosted by BAWSCA. During the webinar, BAWSCA and the member agencies reviewed the water supply reliability projections provided by the SFPUC, as well as the updated dry year supply allocations described in Section 7. MPMW also attends monthly water management meetings with BAWSCA and its member agencies that, among other topics, include discussion of items pertinent to the preparation of the 2020 UWMPs.

MPMW has also been supporting West Bay Sanitary District (WBSD), the wastewater agency serving MPMW's service area, to provide recycled water and assess potential recycled water supplies for the MPMW service area. The ongoing recycled water projects led by WBSD in coordination with MPMW are discussed in Section 6.

In addition, MPMW notified local and regional water retailers and public agencies of MPMW's intent to prepare the 2020 UWMP and Water Shortage Contingency Plan (WSCP), as well as the associated public hearing. A total of 68 recipients from 33 agencies and groups received notices as listed in Table 2-4 and

[2] Information provided by the SFPUC and BAWSCA are included in Appendix G.

Appendix B, including the SFPUC, BAWSCA, each BAWSCA member agency, and San Mateo County. Sample copies of the notices are provided in Appendix B.

Table 2-4 Notification to Cities and Counties (DWR Table 10-1)

City Name	60 Day Notice	Notice of Public Hearing
City of Menlo Park	X	X
County Name	**60 Day Notice**	**Notice of Public Hearing**
San Mateo County	X	X
Other Agency Name	**60 Day Notice**	**Notice of Public Hearing**
Note (a)	X	X
NOTES: (a) See Appendix B for the full list of cities and agencies that MPMW provided notification to.		

2.2.4 Public Participation

☑ ***CWC § 10642***

Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of both the plan and the water shortage contingency plan. Prior to adopting either, the urban water supplier shall make both the plan and the water shortage contingency plan available for public inspection and shall hold a public hearing or hearings thereon. Prior to any of these hearings, notice of the time and place of the hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of a hearing to any city or county within which the supplier provides water supplies. Notices by a local public agency pursuant to this section shall be provided pursuant to Chapter 17.5 (commencing with Section 7290) of Division 7 of Title 1 of the Government Code. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing or hearings, the plan or water shortage contingency plan shall be adopted as prepared or as modified after the hearing or hearings.

The City established and maintains a website in support of the 2020 UWMP update process[3]. The website provides background information regarding UWMPs and includes information on key 2020 UWMP preparation activities, including the 13 April 2021 City Council Study Session, availability of the Public Review Draft 2020 UWMP and WSCP, and the 25 May 2021 Public Hearing to adopt the 2020 UWMP and WSCP. A copy of the Public Review Draft 2020 UWMP and WSCP was posted on this website for public review on 26 April 2021. Notices were also sent to MPMW customers via water bills.

On 7 May 2021 and 14 May 2021, MPMW published a notice in the *Redwood City Tribune* informing the public that the 2020 UWMP and WSCP would be available for public review on the City's website, consistent with requirements of California Government Code 6066[4]. The notice also informed the public that the 2020 UWMP and WSCP public hearing would be held via teleconference on 25 May 2021. Copies of the newspaper announcements are included in Appendix C.

2.3 UWMP Structure, Standard Units, and Basis for Reporting

Per CWC §10644(a)(2), selected information for the 2020 UWMP updates must be presented in standardized tables for electronic submittal to DWR. As such, tables in the UWMP document follows DWR required format and have been cross-referenced to DWR table numbers.

[3] Menlo Park Municipal Water 2020 UWMP Website: https://www.menlopark.org/150/Urban-Water-Management-Plan.

[4] Government Code section 6066. Publication of notice pursuant to this section shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. The period of notice commences upon the first day of publication and terminates at the end of the fourteenth day, including therein the first day.

Per the Guidebook, the UWMP preparer is requested to complete a checklist of specific UWMP requirements to assist DWR's review of the submitted UWMP. The completed checklist is included in Appendix A.

Information presented in this UWMP is reported on a calendar year basis. The unit of measure for reporting water volumes is million gallons (MG) and is maintained consistently throughout the UWMP, unless otherwise noted (see Table 2-5).

Further, consistent with the Guidebook, the terms "water use", "water consumption", and "water demand" are used interchangeably in this UWMP.

Table 2-5 Supplier Identification (DWR Table 2-3)

Type of Supplier	
	Supplier is a wholesaler
X	Supplier is a retailer
Fiscal or Calendar Year	
X	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)	
Units of measure used in UWMP	
Unit	MG
NOTES:	

3 SYSTEM DESCRIPTION

☑ ***CWC § 10631 (a)*** *A plan shall be adopted in accordance with this chapter that shall do all of the following:*

Describe the service area of the supplier, including current and projected population, climate, and other social, economic, and demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available. The description shall include the current and projected land uses within the existing or anticipated service area affecting the supplier's water management planning. Urban water suppliers shall coordinate with local or regional land use authorities to determine the most appropriate land use information, including, where appropriate, land use information obtained from local or regional land use authorities, as developed pursuant to Article 5 (commencing with Section 65300) of Chapter 3 of Division 1 of Title 7 of the Government Code.

Menlo Park Municipal Water (MPMW) serves approximately half of the City of Menlo Park (City), which is located along San Francisco Bay in San Mateo County, between the cities of Redwood City, Palo Alto, and East Palo Alto (Figure 3-1). Other purveyors within City limits include the California Water Service Company (Cal Water), which serves the Bear Gulch District; the O'Connor Tract Co-operative Water Company, which serves a small area of the City using groundwater production wells; and the Palo Alto Park Mutual Water Company, which serves fewer than ten homes using groundwater production wells within the eastern portion of the City. Figure 3-2 shows MPMW's service area and the approximate service area extents of the other water purveyors within the City.

MPMW is a member of Bay Area Water Supply and Conservation Agency (BAWSCA) and purchases all of its potable water from the San Francisco Public Utilities Commission (SFPUC). MPMW is governed by the City Council and run by the City's Public Works Department. Water distribution, water conservation and maintenance of water quality are MPMW's main water resource functions, as water purchased from the SFPUC does not require further treatment.

As required by the Urban Water Management Planning Act (UWMP Act), specific information about MPMW's service area, population, and climate is provided below. A brief description of MPMW's potable water distribution system is also included herein.

3.1 Service Area Population and Demographics

MPMW's water distribution system provides water retail service to approximately half of the City's population through approximately 4,296 connections. The current and projected population and employment data from 2020 through 2040 within the MPMW service area are shown in Table 3-1 and, Table 3-2 and the associated charts.

3.1.1 Future Population Growth

MPMW's service area is largely built-out and population growth is attributed primarily to redevelopment projects within the existing urban footprint. The City's General Plan sets the framework for development. As with the 2015 UWMP, this Plan estimates future population based on the expected growth associated with the buildout of the previous General Plan and the additional growth created through the 2016

General Plan update (i.e., ConnectMenlo) (City of Menlo Park, 1994 and 2016). The projections have been updated by the City's Planning Division to account for frontloading of development between 2020 and 2025, as indicated by their review of the approved and pending projects[5].

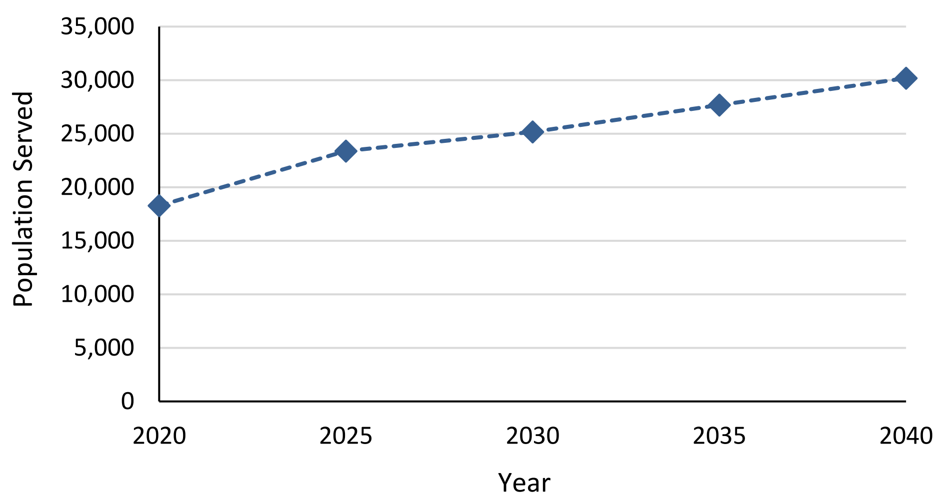
The total population within the MPMW service area is projected to be 30,184 by 2040. More than 40% of the increase is expected to take place within the next five years (2020 to 2025).

Table 3-1 Population - Current and Projected (DWR Table 3-1)

Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	18,276	23,383	25,166	27,675	30,184	--

NOTES:
(a) Historical and current population data are further documented in Table 4-2.
(b) Data provided by the City (see Appendix D).

Chart 3-1 Current and Projected Population



3.1.2 Future Employment Growth

MPMW also supplies water to its commercial, industrial, and institutional (CII) customers, which were collectively estimated to provide 23,574 jobs within the MPMW service area in 2020 (see Table 3-2). Based

[5] Population and employment projections were estimated by the City's Planning Division, as documented in Appendix D.

on the previous General Plan, the ConnectMenlo update, and the City's approved and pending projects, the number of jobs within the MPMW service area is anticipated to grow to 37,311 in 2040[5], an increase of 58% relative to 2020.

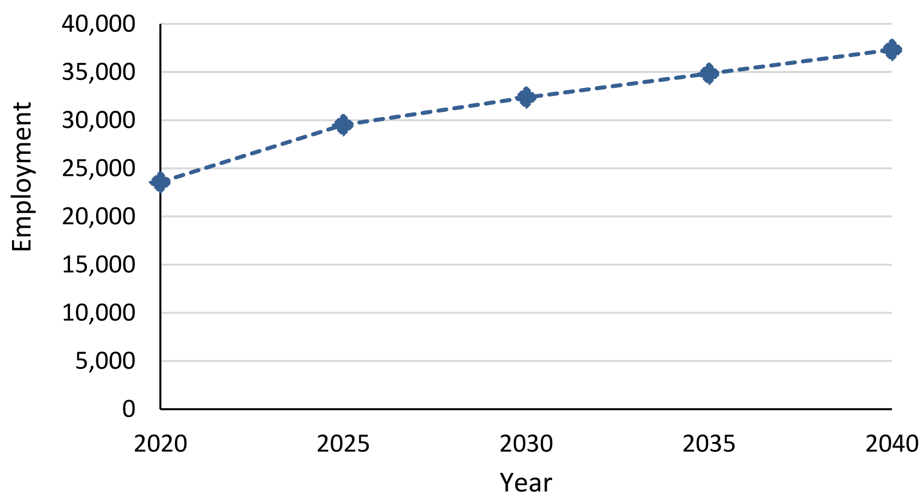
The anticipated job growth through 2040 is a combined effect of growth in the commercial sector and a decline in the industrial sector. Specifically, commercial jobs are expected to increase by 14,529 while industrial jobs are expected to decrease by 792 between 2020 and 2040. Additional details are provided in Appendix D.

Table 3-2 Employment - Current and Projected

Service Area Employment	2020	2025	2030	2035	2040	2045*(opt)*
	23,574	29,511	32,356	34,834	37,311	--

NOTES:
(a) Projected employment growth was provided by the City's Planning Division in October 2020 (see Appendix D).

Chart 3-2 Current and Projected Employment



3.1.3 Other Social, Economic, and Demographic Factors

Demographics for the City are summarized in Table 3-3 as they may affect water management and planning. The same data are also provided for the whole State of California as comparison. The City has a similar age and race structure to the State as a whole. Educational attainment and median household income in the City are much higher than for the State, and percent of population below the poverty level is comparatively lower.

Table 3-3 Demographic and Housing Characteristics

Demographics (a)	City of Menlo Park	California
Age and Sex		
Persons under 5 years	7.6%	6.0%
Persons under 18 years	24.9%	22.5%
Persons 65 years and older	14.0%	14.8%
Female persons	50.3%	50.3%
Race and Hispanic Origin		
White alone	67.2%	71.9%
Black or African American alone	4.5%	6.5%
American Indian and Alaska Native alone	0.7%	1.6%
Asian alone	15.0%	15.5%
Native Hawaiian and Other Pacific Islander alone	2.0%	0.5%
Two or More Races	5.0%	4.0%
Hispanic or Latino	15.5%	39.4%
White alone, not Hispanic or Latino	58.2%	36.5%
Families & Living Arrangements		
Persons per household	2.78	2.95
Living in same house 1 year ago, percent of persons age 1 year+	82.6%	87.1%
Language other than English spoken at home, age 5 years+	32.8%	44.2%
Education		
High school graduate or higher, persons age 25 years+	94.0%	83.3%
Bachelor's degree or higher, persons age 25 years+	69.6%	33.9%
Income & Poverty		
Median Household Income (2019 dollars)	$160,784	$75,235
Per capita income in past 12 months (2019 dollars)	$85,710	$36,955
Persons in poverty	7.6%	11.8%

NOTES:
(a) Demographic data per the U.S. Census Bureau QuickFacts website, https://www.census.gov/quickfacts/fact/table/menloparkcitycalifornia,CA/PST045219, accessed March 2021.

3.2 Land Uses within Service Area

General Plans are required by State law to guide land use and development within cities (California Government Code Section 65030.1). The Land Use and Circulation Elements are the central components of the General Plan as they frame the type and scale of potential development that may occur over a 20-year time horizon and informs associated transportation and water demand issues. Beginning in 2014, the

City initiated an effort to update the Land Use and Circulation Elements. This process, which is also known as ConnectMenlo, culminated in the adoption of the updated General Plan in 2016.

As reflected in the General Plan Land Use Element (City of Menlo Park, 2016b), the majority of the City's land use is residential (55%), while the remaining 45% is split among other uses, notably Bayfront Innovation Area (15%), Parks and Recreation (10%), and Commercial (7%). MPMW's service area is in the northeastern and southwestern portions of the City, covering approximately half of the City's area. Land uses within the MPMW service area generally consists of a mix of residential, commercial, light industrial uses (Figure 3-3).

The major land use changes included in the updated General Plan is the new development north of Highway 101 in the Bayfront Area (former M-2 Zoning Area), which is served by MPMW.[6] The maximum potential net increase from the Bayfront Area development includes approximately:

- 2.3 million non-residential square feet, including offices, life-sciences buildings, and other commercial uses;
- 400 hotel rooms;
- 4,500 multi-family residential units;
- Two transit centers; and
- Up to 61 acres of landscaped open space.

The future population, employment, and water demand projections presented in Sections 3 and 4 reflect buildout of the General Plan, including the additional allowable development associated with ConnectMenlo and other major development projects within the MPMW service area.

3.3 Climate

The MPMW service area is located within a region characterized by a Mediterranean climate with cool, wet winters and warm, dry summers. As shown in Table 3-4, rainfall in the area averages 15.2 inches per year and is generally confined to the wet season from late October to early May. The average reference evapotranspiration (ETo) for the region is 44 inches per year. The ETo is a standard measurement related to the water demand by plants in a specific region. Because the average annual ETo is approximately 30 inches more than the average annual precipitation, and because 90% of the annual precipitation occurs between the months of November and April, growing turf or other plantings in this region requires a significant amount of irrigation during the dry season. This irrigation demand contributes to the overall and observed seasonal variation in water demand throughout the MPMW service area.

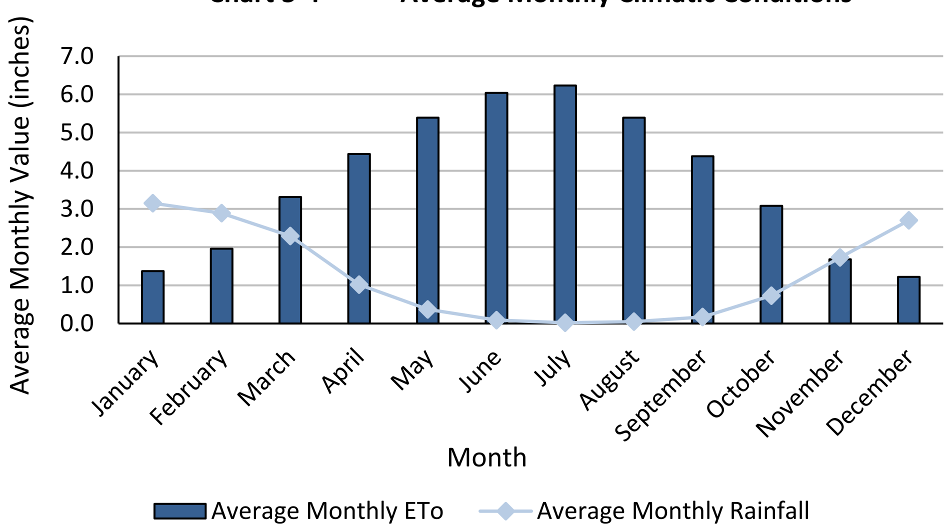
[6] A portion of the M-2 Area bounded by Highway 101, Marsh Road, and the Dumbarton Rail is served by California Water Service Company. The land use changes associated with ConnectMenlo in this area would generally reflect the same uses and intensity that is permitted under the current regulations.

Table 3-4 Average Monthly Climate Characteristics

Month	Average Temperature		Standard Average ETo (inches)	Average Rainfall (inches)
	Min (°F)	Max (°F)		
January	38.5	57.4	1.4	3.15
February	41.3	61.1	2.0	2.89
March	43.1	64.2	3.3	2.29
April	44.7	68.4	4.4	1.02
May	48.5	72.9	5.4	0.37
June	52.5	77.4	6.0	0.09
July	54.9	78.4	6.2	0.02
August	54.8	78.4	5.4	0.05
September	52.6	78.3	4.4	0.17
October	48.0	73.0	3.1	0.73
November	42.6	64.3	1.7	1.73
December	38.2	57.8	1.2	2.70
Annual	**46.6**	**69.3**	**44**	**15.2**

NOTES:
(a) Temperature and precipitation data are from the Western Regional Climate Center for Station #046646 PALO ALTO from 1 September 1953 to 4 June 2016.
(b) Reference evapotranspiration data for Union City station #171 are from the Department of Water Resources, California Irrigation Management Information System.

Chart 3-4 Average Monthly Climatic Conditions



3.4 Water Distribution System

As illustrated in Figure 3-4, MPMW's potable water distribution system is split into three different pressure zones, which are described below.

- The Lower Zone is generally located north and east of El Camino Real and serves residential, small commercial, and light industrial land uses. The lower zone includes the Belle Haven neighborhood, commercial and light industrial in the Bayfront Area, as well as portions of the Bay Road and Willows neighborhoods. It also includes the business parks between Willow Road and University Avenue north of O'Brien Drive.
- The High Pressure Zone is located in northern Menlo Park between Highway 101 and Bayfront Expressway, north of Chilco Street, and serves multi-family residential, commercial and light industrial, and a mobile home park outside the City's northern-most boundary. The High Pressure Zone is hydraulically disconnected from the other zones.
- The Upper Zone is located in the southwest portion of Menlo Park near Interstate 280 and is geographically and hydraulically disconnected from the other pressure zones. It primarily serves the residential Sharon Heights neighborhood and business parks along Sand Hill Road.

There are 31 MPMW customers located along Euclid Avenue (25 connections) and O'Brien Drive (six connections) that receive water from the City of East Palo Alto's water distribution system that are billed by MPMW. MPMW compensates City of East Palo Alto for water used by these customers and their water use is not included as part of MPMW's demand.

Water from the SFPUC's Regional Water System (RWS) enters MPMW's distribution system through five service connections (turnouts). The High Pressure Zone and the Upper Zone each have one turnout, and the Lower Zone has three turnouts. MPMW has two water storage tanks, which have capacities of 2 million gallons (MG) and 3.5 MG[7], and act together to serve the Upper Zone. A MPMW pump station conveys water from the upper zone turnout to supplement demands and to fill the storage tanks.

MPMW has 13 emergency interties with four adjacent water suppliers. Three connections (one metered) are with the Cal Water's Bear Gulch system; a metered connection with the O'Connor Tract Co-operative Water Company; a connection with the City of Redwood City; and eight interties with the City of East Palo Alto.

MPMW has one emergency groundwater well at the City's Corporation Yard located at 333 Burgess Drive. MPMW is in the midst of working with the State Water Resources Control Board (SWRCB) to permit the "Corp Yard Well" which can provide up to 1,500 gallons per minute (gpm) of back-up supply to the Lower Zone. MPMW plans to design and construct an additional one or two emergency wells in order to achieve another 1,500 gpm (for a total supply capacity of 3,000 gpm) as part of the Emergency Water

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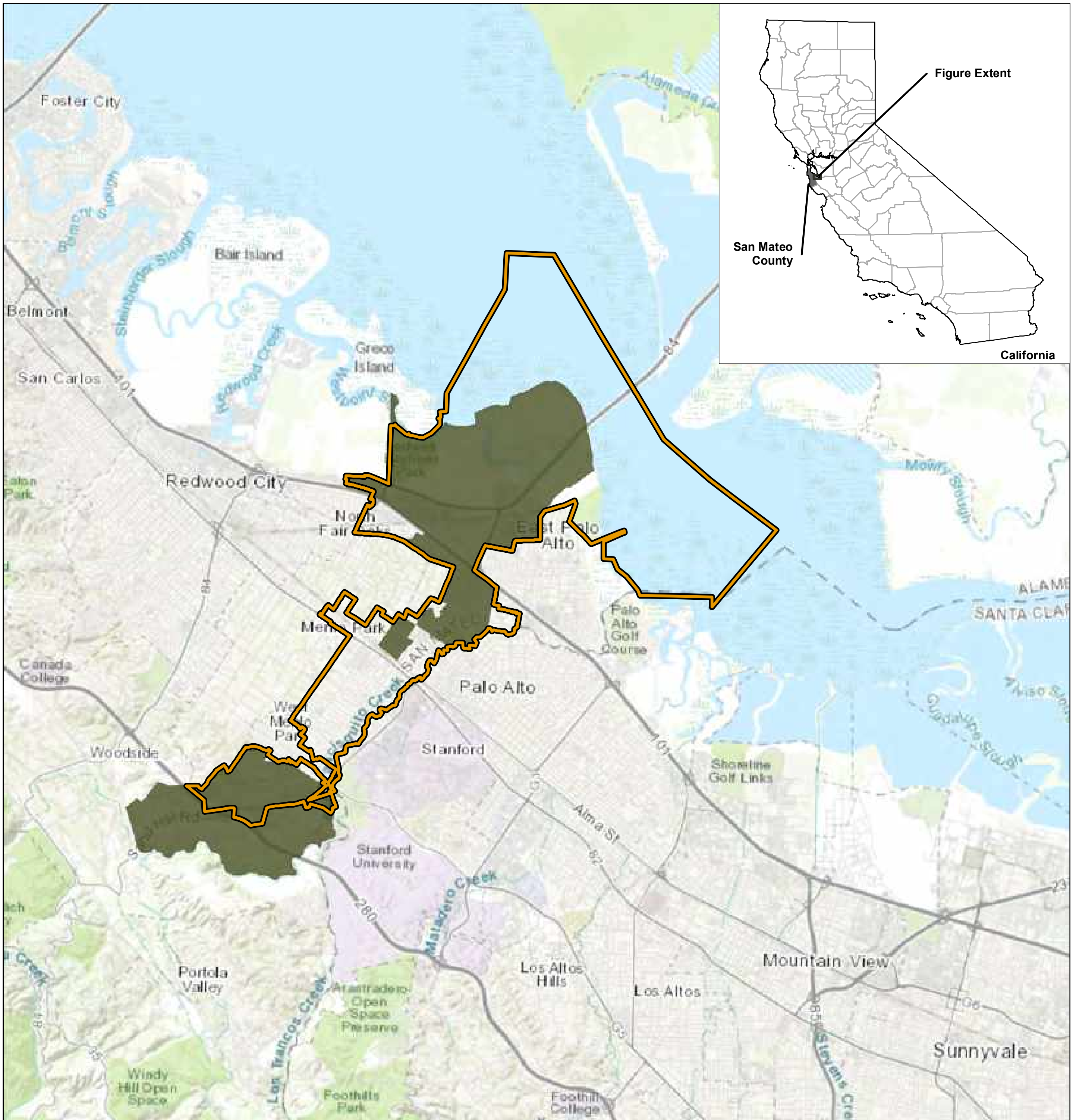
[7] An evaluation of MPMW's water system was documented in a Water System Evaluation Report (Metcalf and Eddy, 2000). Hydraulic modeling was performed to evaluate alternative projects to improve distribution system performance. The addition of a tank and pump station in the Upper Zone was evaluated to meet fire protection and emergency storage requirements. Construction of a 3.5 MG of storage and separate inlet and outlet structures for the storage tanks was implemented in 1997.

Storage/Supply Project. MPMW is also investigating locations for a future underground reservoir to serve the Lower and Higher Pressure Zones.

MPMW updated its Water System Master Plan in 2018. The Water System Master Plan identifies strategies for cost-effectively meeting MPMW's distribution system infrastructure needs for the next 25 years through year 2040; recommends capital expenditures for the system totaling $90.31 million; furnishes important guidance to enhance renewal and replacement strategies, operational and water quality practices; and provides a framework for diversifying MPMW's water supply. The 2018 Water System Master Plan can be viewed at menlopark.org/watersystemmasterplan.



Legend

Menlo Park City Limit

MPMW Service Area

Abbreviations

MPMW = Menlo Park Municipal Water

Notes

1. All locations are approximate.

Sources

1. Service area data were provided by MPMW on 6 July 2020.
2. World Topographic base map provided by ArcGIS Online.

N

0 2 4

Miles

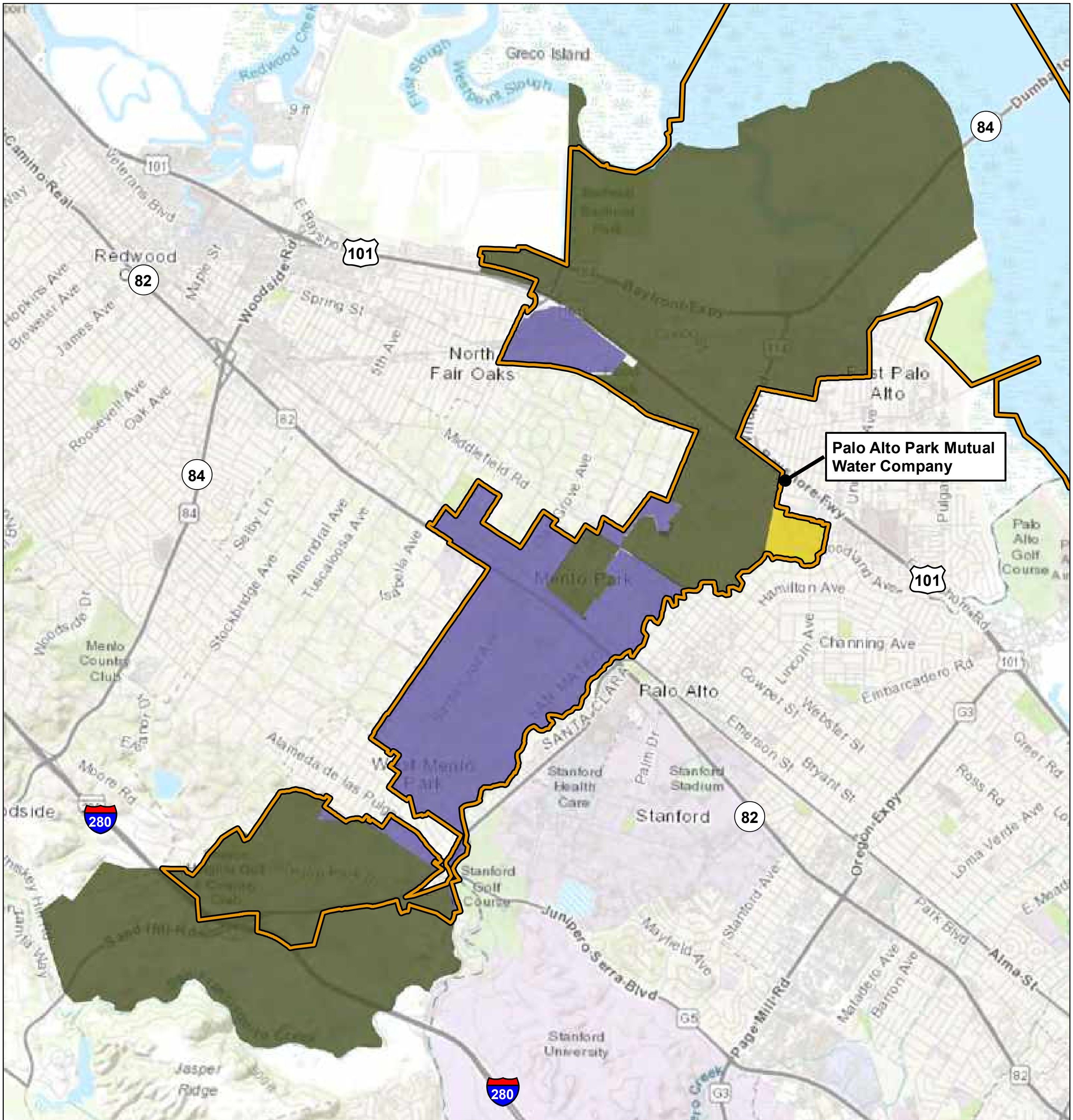
Regional Vicinity Map

Menlo Park Municipal Water
2020 Urban Water Management Plan
Menlo Park, CA
June 2021
EKI C00050.00

eki environment & water

Figure 3-1

Path: X:\C00050\Maps\2021\06\Fig3-1_VicinityMap.mxd



Legend

Service Areas

- MPMW
- California Water Service Company
- O'Connor Tract Co-operative Water Company
- Menlo Park City Limit

N

0 1 2

Miles

Abbreviations

MPMW = Menlo Park Municipal Water

Notes

1. All locations are approximate.

Sources

1. Service area data were provided by MPMW on 6 July 2020.
2. Basemap provided by ArcGIS.

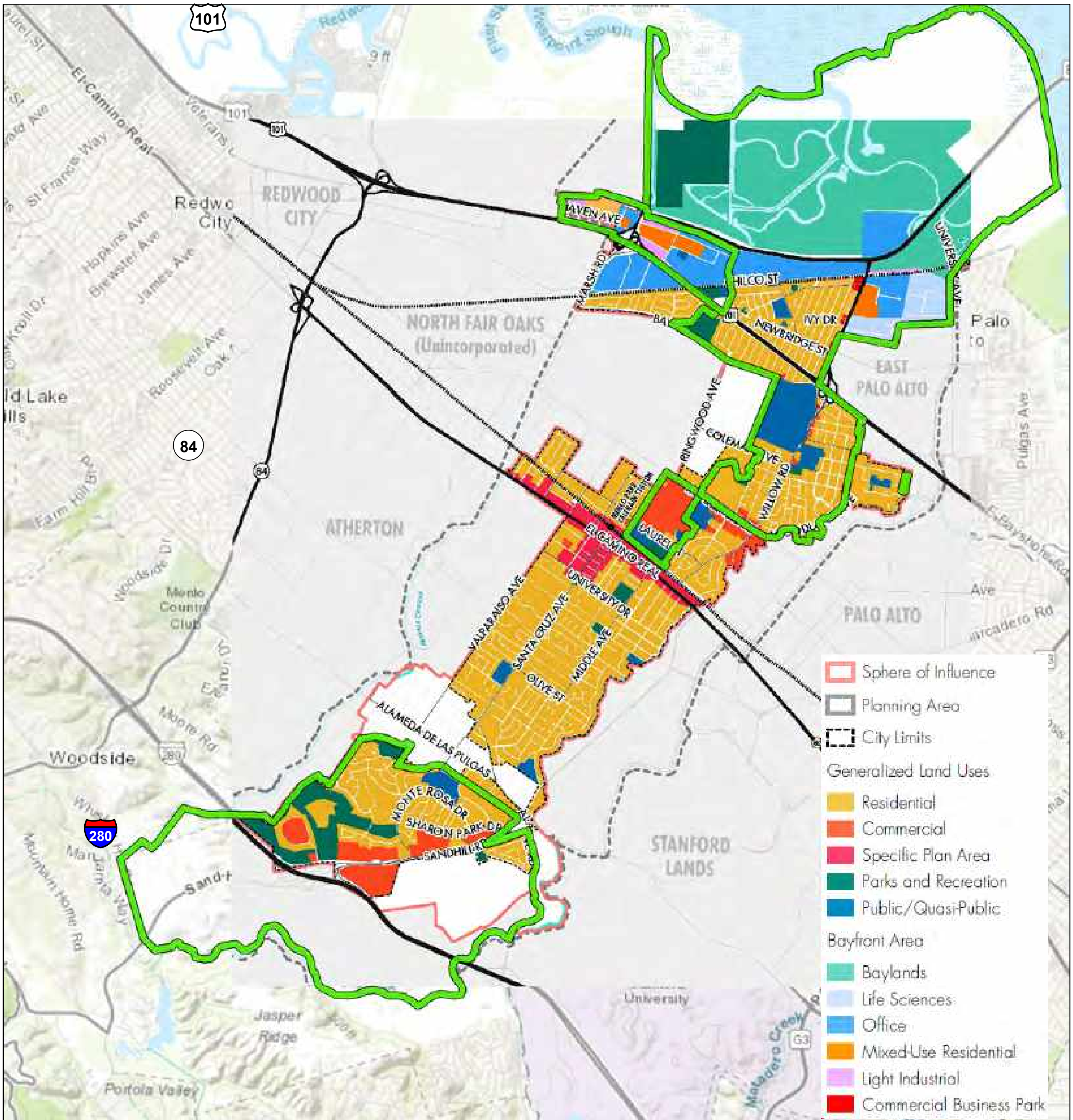
Path: X:\C00050\Maps\2021\06\Fig3-2_WaterPurveyors.mxd

Water Purveyors within the City of Menlo Park

Menlo Park Municipal Water
2020 Urban Water Management Plan
Menlo Park, CA
June 2021
EKI C00050.00

eki environment & water

Figure 3-2



Legend

MPMW Service Areas

N

0 1 2

Miles

Abbreviations

MPMW = Menlo Park Municipal Water

Notes

1. All locations are approximate.

Sources

1. Service area data were provided by MPMW on 6 July 2020.
2. Land use obtained from City's General Plan.
3. Basemap provided by ArcGIS.

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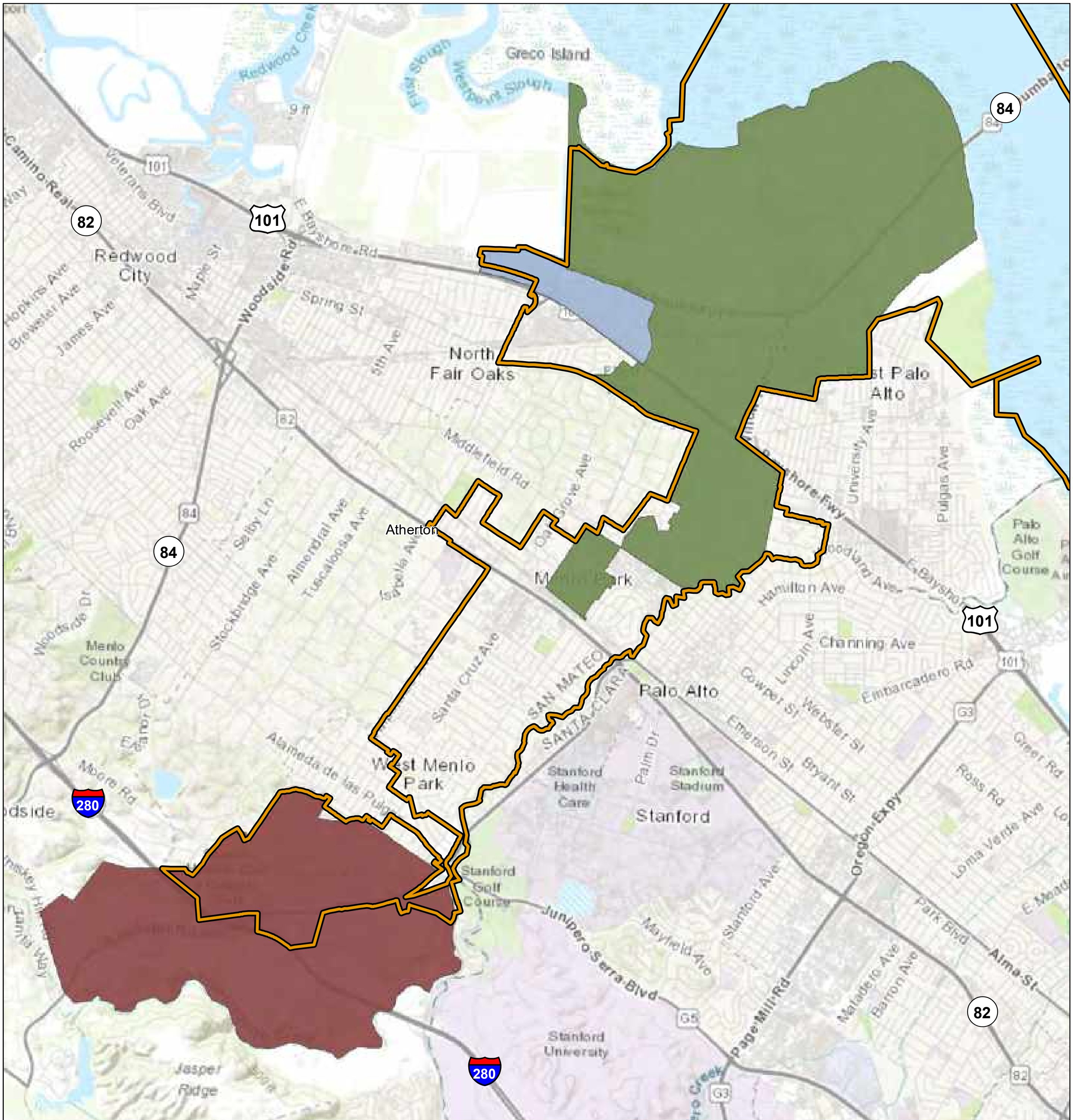
Land Use Designations within the MPMW Service Area

Menlo Park Municipal Water
2020 Urban Water Management Plan
Menlo Park, CA
June 2021
EKI C00050.00

eki environment & water

Figure 3-3



Legend

MPMW Service Areas

- Upper Zone
- Lower Zone
- High Pressure Zone

Menlo Park City Limit

N

0 1 2

Miles

Abbreviations

MPMW = Menlo Park Municipal Water

Notes

1. All locations are approximate.

Sources

1. Service area data were provided by MPMW on 6 July 2020.
2. Basemap provided by ArcGIS Online.

Path: X:\C00050\Maps\2021\06\Fig3-4_ServiceAreaMap.mxd

MPMW Service Area Map

Menlo Park Municipal Water
2020 Urban Water Management Plan
Menlo Park, CA
June 2021
EKI C00050.00

Figure 3-4

eki environment & water

4 WATER USE CHARACTERIZATION

☑ ***CWC § 10631 (d) (1)*** *A plan shall be adopted in accordance with this chapter that shall do all of the following:*

For an urban retail water supplier, quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, based upon information developed pursuant to subdivision (a), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following:

(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.

(2) *The water use projections shall be in the same five-year increments described in subdivision (a).*

For the purposes of this Urban Water Management Plan (UWMP or Plan), potable water demand is defined as the volume of potable water that Menlo Park Municipal Water (MPMW) purchases from the San Francisco Public Utilities Commission (SFPUC) Regional Water System (RWS). Non-potable water demand is defined as the demand for recycled water provided by the West Bay Sanitary District (WBSD) to the MPMW service area, that would otherwise be served by MPMW. Among other things, water demand is dependent on climate, population, industry, and the types of development present in a community. Sections 4.1 and 4.2 describe the historical and projected water demands for the residential, commercial, industrial, institutional, and landscape irrigation sectors within the MPMW service area (water use sectors A through F and J, as described per California Water Code [CWC] §10631(d)(1)(A) though (F) and (J)). As described in Section 4.3, this discussion does not include demands for water use sectors per CWC §10631(d)(1)(G) through (I) as they are not applicable or present within the MPMW service area.

4.1 Historical and Current Total Water Demand

Prior to 2020, all potable water demands within the MPMW service area were met with water purchased from the SFPUC RWS. Starting in July 2020, recycled water became available and was used to meet a portion of the irrigation demand. The historical and current total water demands within the MPMW service area include the water consumed by metered accounts in the service area (“metered water consumption”), unmetered water used for fire services and flushing (“unmetered water consumption”), and the water that is lost within the distribution system (“losses”).

4.1.1 Historical and Current Potable Water Demand

Potable water demand within the MPMW service area is measured using water meters that are installed at each customer account. Records of historical and current water use at each account are maintained by the City of Menlo Park's (City's) Public Works Department. Water demand within the MPMW service area is tracked and reported on a monthly basis for the following sectors:

- Single Family Residential;
- Multi-Family Residential;
- Commercial;
- Industrial;
- Institutional/Governmental;
- Landscape; and
- Other.

Total water demand within the MPMW service area was approximately 1,069 million gallons (MG) in 2020. As can be seen in Table 4-1 and the associated charts, the residential sector accounted for an average of approximately 41% of the total water demand between 2016 and 2020 (i.e., single family residential demands were approximately 31% of the total demand, while multi-family residential demands accounted for the remaining 10%). MPMW has a relatively large commercial, industrial, and institutional (CII) base, which together accounted for approximately 44% of potable water demand for the 2016-2020 period. The one remaining major use type is irrigation, which accounted for 12% of the total water demand on average[8].

There is a slightly increasing trend in potable water demand between 2016 and 2020, which likely reflects commercial development as well as a rebound from the historic drought. Commercial water use increased 56% from 2016 to 2019. Although commercial water use decreased slightly in 2020, it was likely due to temporary impacts from the shelter-in-place orders that were issued during COVID-19. Industrial water use, however, decreased by 37%, which reflects the shift in the City's development focus as discussed in Section 3.2.

[8] Irrigation services include irrigation water use at accounts that have a separate irrigation meter and does not represent all of the outdoor irrigation water use within the MPMW service area.

Table 4-1 Demands for Potable and Non-Potable Water - Actual (DWR Table 4-1)

Use Type	Additional Description *(as needed)*	Level of Treatment When Delivered	Volume				
			2016	2017	2018	2019	2020
Single Family		Drinking Water	277	306	315	309	361
Multi-Family		Drinking Water	95	106	101	97	113
Commercial		Drinking Water	157	179	245	244	203
Industrial		Drinking Water	222	240	140	143	140
Institutional/ Governmental		Drinking Water	42	58	58	67	98
Landscape	Note (b)	Drinking Water	97	116	125	122	139
Losses	Note (c)	Drinking Water	4	-4	120	42	12
Other	Note (d)	Drinking Water	5	2	4	2	3
		TOTAL	898	1,003	1,108	1,028	1,069

NOTES:
(a) Volumes are in units of MG.
(b) Irrigation water use includes water use recorded at dedicated irrigation meters and does not represent all of the outdoor irrigation water use within MPMW.
(c) Losses are further documented in Table 4-3. 2016 to 2019 losses were obtained from the AWWA Water Audit Reports. 2020 water loss was estimated as the difference between production and consumption.
(d) Other water uses include other billed metered consumption (e.g., temporary meters and hydrant), billed unmetered consumption and unbilled consumption which are obtained from the AWWA Water Audit Reports.
(e) Demand data provided by MPMW. Demands did not include accounts that received water from East Palo Alto but were billed by MPMW.
(f) Total water uses may not match the total water supplies reported in Table 6-8. This is because the water losses calculated in AWWA Water Audit Reports and presented here are based on invoices which usually do not start from the first day of the month. However, the supply data in Table 6-8 are based on real-time AMI meter reads and summed by natural month.
(g) Totals may not sum due to rounding.

Chart 4-1A Annual Water Demand by Sector: 2016-2020

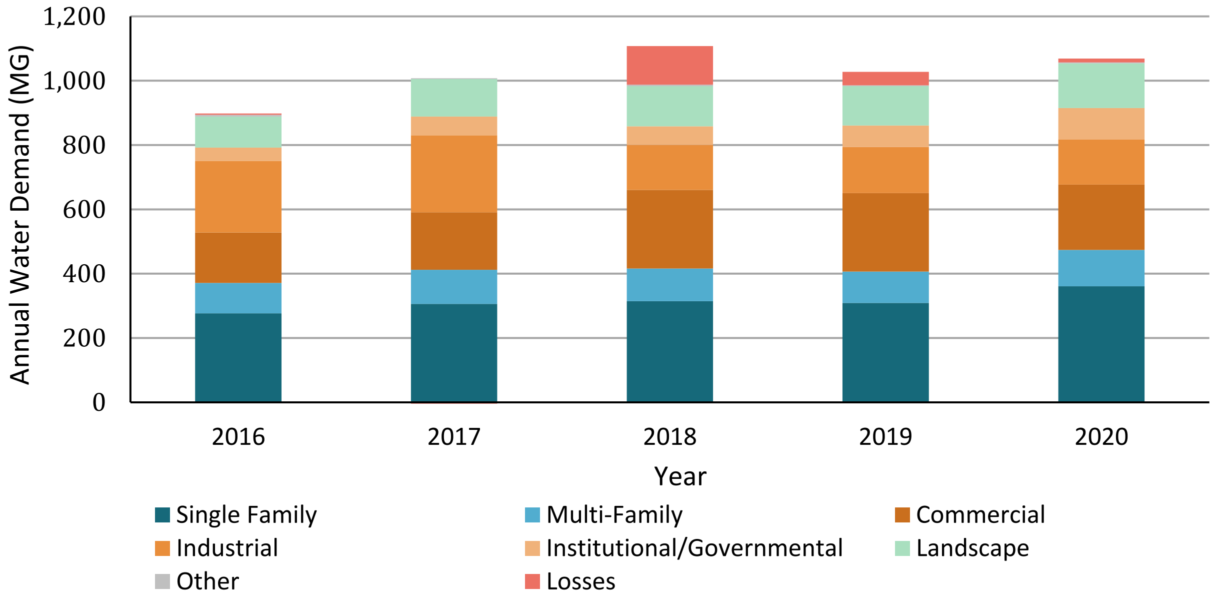


Chart 4-1B Percentage of Total Water Demand by Sector: 2016-2020

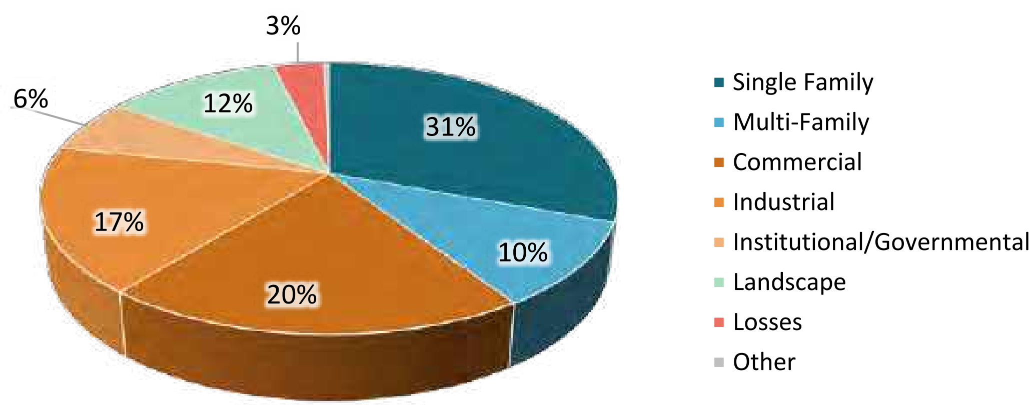


Table 4-2 and the associated charts present historic potable water use on a per capita basis. Per capita water use has shown a decreasing trend during the drought period of 2014 and 2017 as a result of the local water use cutbacks and the mandatory state-wide restrictions. The lowest per capita water use was observed in 2016 at 154 gallons per capita per day (GPCD). Per capita water use since then has shown a rebound to approximately 160 GPCD in 2020.

Table 4-2 Historical and Current Potable Water Demand and Population

Year	Potable Water Demand	Service Area Population	Per Capita Potable Water Use (GPCD)
2010	1,052	14,749	195
2011	1,033	14,829	191
2012	1,079	14,973	197
2013	1,189	15,129	215
2014	1,030	15,157	186
2015	883	15,342	158
2016	898	15,929	154
2017	1,003	16,516	166
2018	1,108	17,102	177
2019	1,028	17,689	159
2020	1,069	18,276	160

NOTES:
(a) Unless otherwise noted, volumes are in units of MG.
(b) 2010 to 2015 data are from the 2015 UWMP.
(c) 2016 to 2020 water demand data are from Table 4-1. 2016 to 2019 population is estimated based on interpolation between 2015 and 2020.
(d) Per capita water use is calculated by dividing the total annual water use by service area population and the number of days in a year.

Chart 4-2A Historical and Current Potable Water Demand and Population

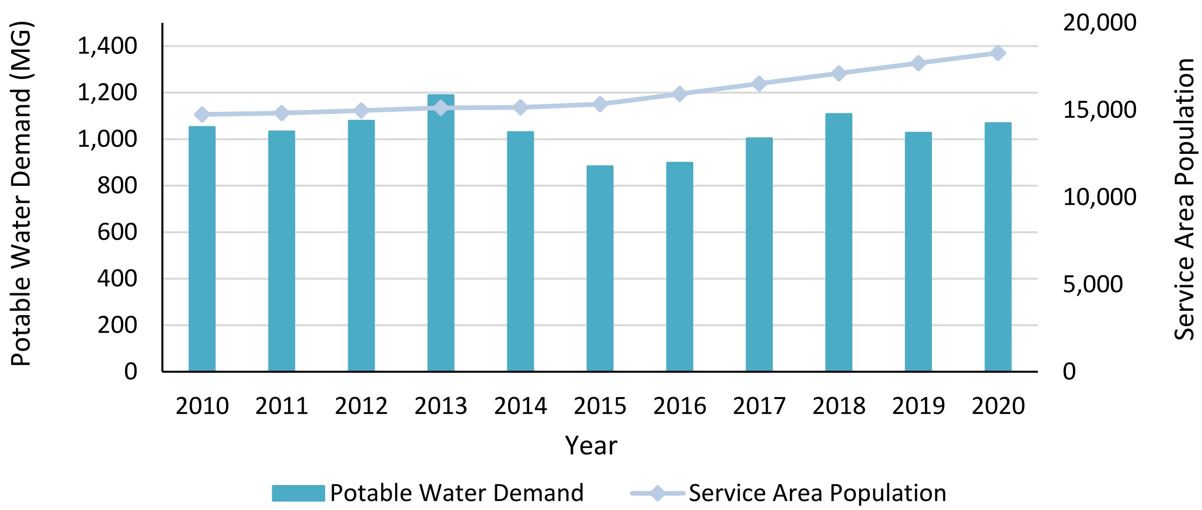
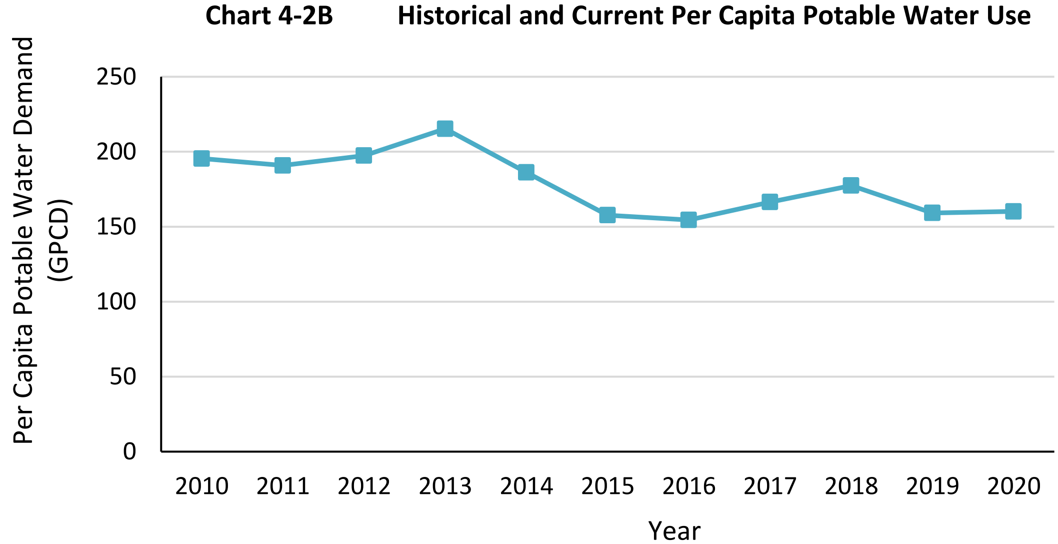


Chart 4-2B Historical and Current Per Capita Potable Water Use



4.1.2 Historical and Current Recycled Water Demand

Historically, no MPMW water demands were met with recycled water supplies. With the completion of the West Bay Sanitation Sanitary District's (WBSD's) Sharon Heights Recycled Water Facility in July 2020, approximately 20 MG of recycled water was used for irrigation at the Sharon Heights Golf and Country Club in 2020. Detailed discussion of recycled water use within the MPMW service area is provided in Section 6.5.

4.1.3 Distribution System Water Loss

☑ ***CWC § 10631 (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.

(B) The distribution system water loss quantification shall be reported in accordance with a worksheet approved or developed by the department through a public process. The water loss quantification worksheet shall be based on the water system balance methodology developed by the American Water Works Association.

(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.

Since 2016, urban retail water suppliers have been required under CWC §10608.34 and California Code of Regulations (CCR) § 638.1 et seq to quantify distribution system water losses using the American Water Works Association (AWWA) Water Audit Software (referred to as the "AWWA Water Loss Worksheet"). Water losses within MPMW's potable water distribution system over the last five years were estimated using the AWWA Water Loss Worksheet summarized in Table 4-3. Furthermore, CWC §10631 (3)(c) requires that this UWMP demonstrate whether the distribution loss standards enacted by the State Water Resources Control Board (SWRCB) pursuant to §10608.34 have been met. However, the SWRCB has yet to establish these standards, and thus consistency with these standards cannot be demonstrated herein.

The "Losses" are the sum of "apparent" and "real" losses estimated by the AWWA Water Loss Worksheet analysis. Apparent losses include metering inaccuracies, systematic data handling errors, and unauthorized consumption. Real losses represent water loss attributable to the distribution system and include physical water losses from the pressurized system and storage tanks up to the point of customer consumption.

The "Losses" are a portion of the total differential between water supply and metered water use, and the remaining portion is the "Other-Unbilled Consumption" which includes unbilled water uses such as system flushing and leak repair flushing.

As shown in Table 4-3, the water losses within MPMW were calculated to be variable between 2016 and 2020, ranging from negative 4 MG to a high of 120 MG. The five-year average of water losses was approximately 35 MG, or 3% of the average total water demand. The high variability of water losses during this period and the negative value of water losses in 2017 were likely due to the quality of the billing data and differences in meter reading cycles between the SFPUC supply meters and MPMW's meters. MPMW is anticipating that installation of Advanced Metering Infrastructure will improve billing data quality going forward. Metering of the MPMW distribution system is further discussed in Section 9.2.2.

Table 4-3 Last Five Years of Water Loss Audit Reporting (DWR Table 4-4)

Reporting Period Start Date	Volume of Water Loss
01/2016	4
01/2017	-4
01/2018	120
01/2019	42
01/2020	12

NOTES:
(a) Volumes are in units of MG.
(b) Water losses are reported on a calendar year basis. 2016 to 2019 losses were obtained from the AWWA Water Audit Reports. 2020 water loss was estimated as the difference between production and consumption.

4.2 Projected Total Water Demand

Per CWC §10631(d)(1), potable and non-potable water demand projections are discussed in the following sections.

4.2.1 Projected Total Water Demand

In 2020, future water demands for MPMW's service area were projected by Bay Area Water Supply and Conservation Agency (BAWSCA) on behalf of MPMW. Future water demands were projected using the Demand Management Decision Support System Model (DSS Model) and were based on population and employment projections within MPMW's service area. The DSS Model and the associated water demand and conservation projection methodology is documented in detail in the *Regional Water Demand and Conservation Projections Report* (BAWSCA, 2020b). A brief description of BAWSCA's 2020 demand projections is provided below.

> In June 2020, BAWSCA completed the Regional Water Demand and Conservation Projections Report (Demand Study). The goal of the Demand Study was to develop transparent, defensible, and uniform demand and conservation savings projections for each wholesale customer using a common methodology to support both regional and individual agency planning efforts and compliance with the new statewide water efficiency targets required by Assembly Bill (AB) 1668 and Senate Bill (SB) 606.
>
> Through the Demand Study process, BAWSCA and the wholesale customers (1) quantified the total average-year water demand for each BAWSCA member agency through 2045, (2) quantified passive and active conservation water savings potential for each individual wholesale customer through 2045, and (3) identified 24 conservation programs with high water savings potential and/or member agency interest. Implementation of these conservation measures, along with passive conservation, is anticipated to yield an additional 37.3 MGD of water savings by 2045. Based on the revised water demand projections, the identified water conservation savings, increased development and use of other local supplies by the wholesale

> customers, and other actions, the collective purchases of the BAWSCA member agencies from the SFPUC are projected to stay below 184 MGD through 2045.
>
> As part of the Demand Study, each wholesale customer was provided with a demand model that can be used to support ongoing demand and conservation planning efforts, including UWMP preparation.

In 2021, as part of the 2020 UWMP update, MPMW's DSS Model was revised to account for several changes since the demand projections were estimated by BAWSCA. The baseline year for projections was updated to 2019, which was the most recent year with full data. Population and employment inputs were revised by the City's Planning Division based on information related to the City's recently approved projects and the current General Plan, as discussed in Section 3.1. Furthermore, assumptions associated with the partial rebound in demands to pre-drought conditions were adjusted to better reflect the observed demand patterns within MPMW in recent years.[9]

Demands are projected through 2040 to be consistent with the General Plan's planning horizon. It is estimated that the total water demand will be approximately 1,483 MG in 2040, inclusive of passive and active conservation savings (Table 4-5). There is a significant increase in demand projected over the next five years (i.e., a 19% increase between 2020 and 2025) which reflects conservative assumptions regarding: (1) a potential rebound from the drought-suppressed water demands, and (2) the accelerated growth between 2020 and 2025 attributable to the City's approved and planned projects, as described in Section 3.1.

As described further in Section 4.2.2, passive and active water conservation savings associated with existing water uses in MPMW's service area have been subtracted from the total water demand projections. The 2021 DSS Model update included conservation measure assumptions consistent with MPMW's planned Demand Management Measures (DMMs) that are described in Chapter 9.

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[9] The DSS Model uses a Partial Rebound Scenario which assumes temporary behavioral changes to return to pre-drought norms, but water savings from historical water rate increases and active conservation programs are to be permanent. This scenario is further explained in BAWSCA's report (BAWSCA, 2020a). For MPMW, it is assumed that there will be a 1% rebound in single-family, multi-family, industrial, and irrigation sectors, and a 3% rebound in other sectors between 2019 and 2023.

4.2.2 Water Savings from Codes, Standards, Ordinances, or Transportation and Land Use Plans

☑ ***CWC § 10631 (d) (4)***

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

(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.

"Passive conservation" refers to water savings resulting from actions and activities that do not depend on direct financial assistance or educational programs implemented by water suppliers. These savings result primarily from: (1) the natural replacement of existing plumbing fixtures with water-efficient models required under current plumbing code standards,[10] (2) the installation of water-efficient fixtures and equipment in new buildings and retrofits as required under CALGreen Building Code Standards,[11] and (3) inclusion of low-water use landscaping and high-efficiency irrigation systems to minimize outdoor water use in new connections and projects in accordance with the State's Model Water Efficient Landscape Ordinance (MWELO).

"Active conservation" refers to water savings resulting from MPMW's implementation of water conservation programs, education programs, and the offering of financial incentives (e.g., rebates). MPMW's current and planned active conservation programs are discussed in Section 9.

The water demand projections presented herein take into account both passive and active conservation savings, as shown in Table 4-4 and Table 4-5 and associated charts. Passive and active savings within the MPMW service area were estimated in the 2021 DSS Model (BAWSCA, 2020b). By 2040, it is estimated that the total annual water demand would be 1,634 MG, including potable and recycled water, without passive or active conservation savings. Passive conservation is projected to reduce this water demand by 124 MG and active conservation is projected to further reduce the demand by 27 MG. As such, it is estimated that the total annual water demands within MPMW's service area will be approximately 1,483 MG in 2040.

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[10] Including the California Energy Commission Title 20 appliance standards for toilets, urinals, faucets, and showerheads – The appliance standards determine what can be sold in California and therefore will impact both new construction and replacement fixtures in existing homes.

[11] Adopted in the City's Municipal Code Chapter 12. All new residential and non-residential construction are required to comply with the mandatory CALGreen Requirements.

Table 4-4 Inclusion in Water Use Projections (DWR Table 4-5)

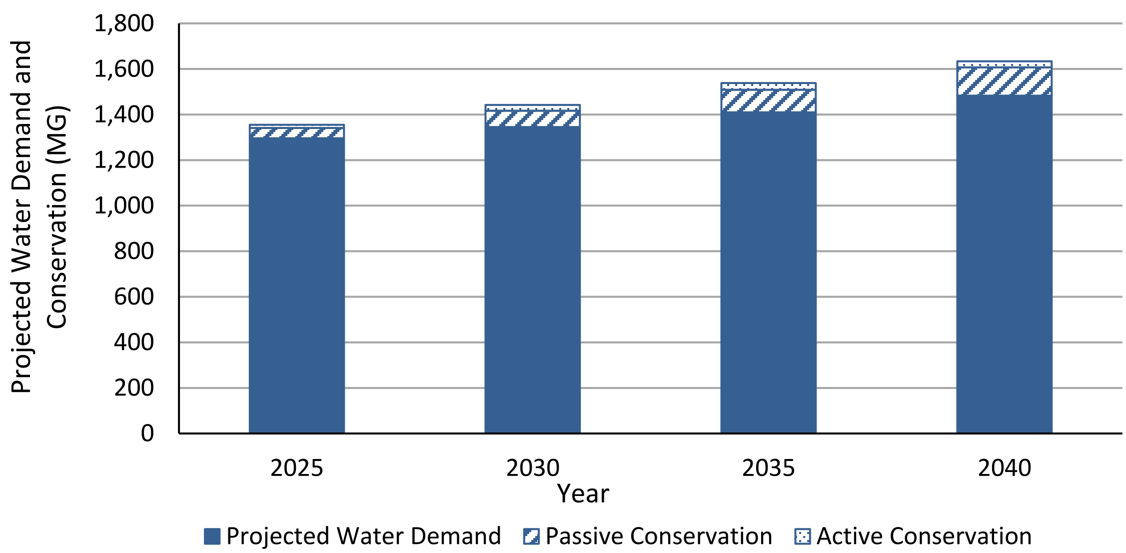
Are Future Water Savings Included in Projections?	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, or otherwise are utilized in demand projections are found.	UWMP Section 4.2.2
Are Lower Income Residential Demands Included In Projections?	Yes
NOTES:	

Table 4-5 Projected Total Water Demand and Projected Passive and Active Water Conservation

Water Conservation Type	Projected Total Water Demand				
	2025	2030	2035	2040	2045
Projected Water Demand	1,355	1,442	1,538	1,634	--
Projected Water Conservation					
Passive Conservation	45	72	99	124	--
Active Conservation	14	25	29	27	--
Projected Water Demand after Passive Conservation Savings	1,310	1,370	1,439	1,510	--
Projected Water Demand after Passive and Active Conservation Savings	1,296	1,345	1,410	1,483	--

NOTES:
(a) Volumes are in units of MG.
(b) Data from the DSS Model.

Chart 4-5 Projected Water Demand and Conservation



4.2.3 Projected Recycled Water Demand

The Sharon Heights Golf and Country Club is projected to continue receiving approximately 48 MG of recycled water for irrigation from WBSD's Sharon Heights Recycled Water Facility. In addition, it is estimated that the WBSD's Bayfront Project will start supplying approximately 72 MG of recycled water to the City's Bayfront Area starting in 2030. MPMW's recycled water programs are further discussed in Section 6.5. MPMW does not supply other types of non-potable water.

4.2.4 Projected Potable Water Demand

After accounting for the recycled water use, the remaining demand is anticipated to be supplied by potable water from the SFPUC RWS. Projected potable water demand for each water use sector within MPMW's service area is shown in five-year increments through 2040 in Table 4-6. Potable water demand is anticipated to be approximately 1,363 MG in 2040, an increase of 28% compared to 2020. The sectors with the largest growth are multi-family and commercial, demands of which are projected to double by 2040.

MPMW's projected potable and recycled water demands (i.e., "total water use") in five-year increments are summarized in Table 4-7 and associated chart.

Table 4-6 Use for Potable and Non-Potable - Projected (DWR Table 4-2)

Use Type	Additional Description *(as needed)*	Projected Water Use				
		2025	2030	2035	2040	2045 *(opt)*
Single Family		306	299	293	288	--
Multi-Family		158	176	203	230	--
Commercial		346	345	373	401	--
Industrial		134	122	112	102	--
Institutional/ Governmental		98	105	115	126	--
Landscape	Note (b)	95	61	71	85	--
Losses		110	116	122	128	--
Other Potable	Note (c)	1	1	1	2	--
TOTAL		1,248	1,225	1,290	1,363	--

NOTES:
(a) Volumes are in units of MG.
(b) Irrigation water use includes water use recorded at dedicated irrigation meters and does not represent all of the outdoor irrigation water use within MPMW.
(c) Other potable water use includes water used for temporary meters.
(d) The projected water demands include savings from plumbing codes and active conservation efforts that MPMW plans to undertake.

Chart 4-6 Current and Projected Potable Water Demand by Sector

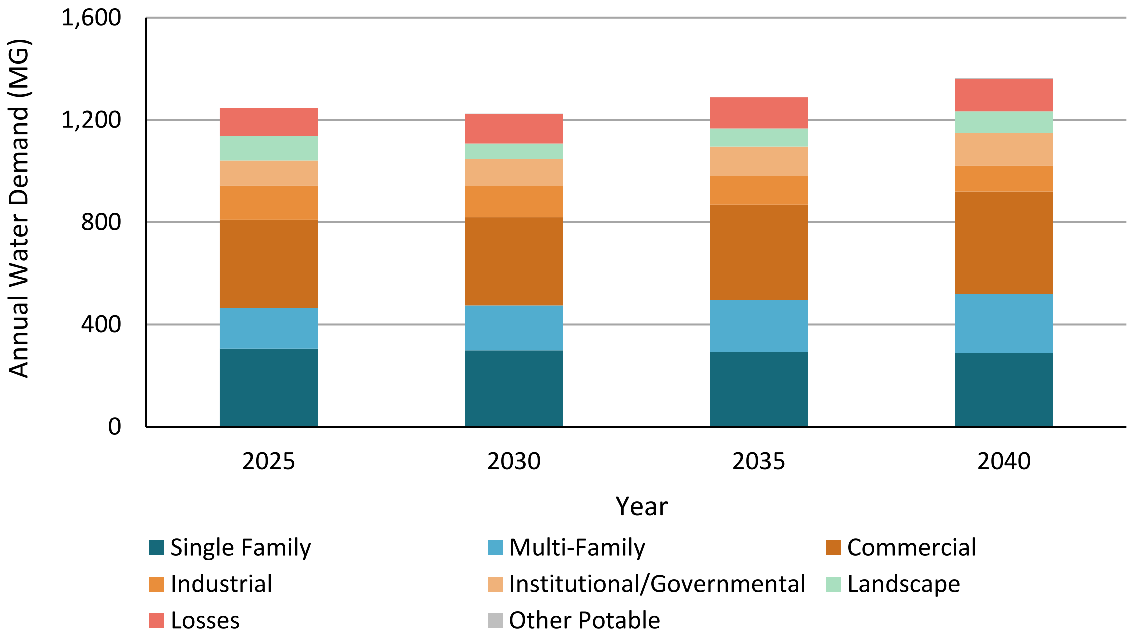
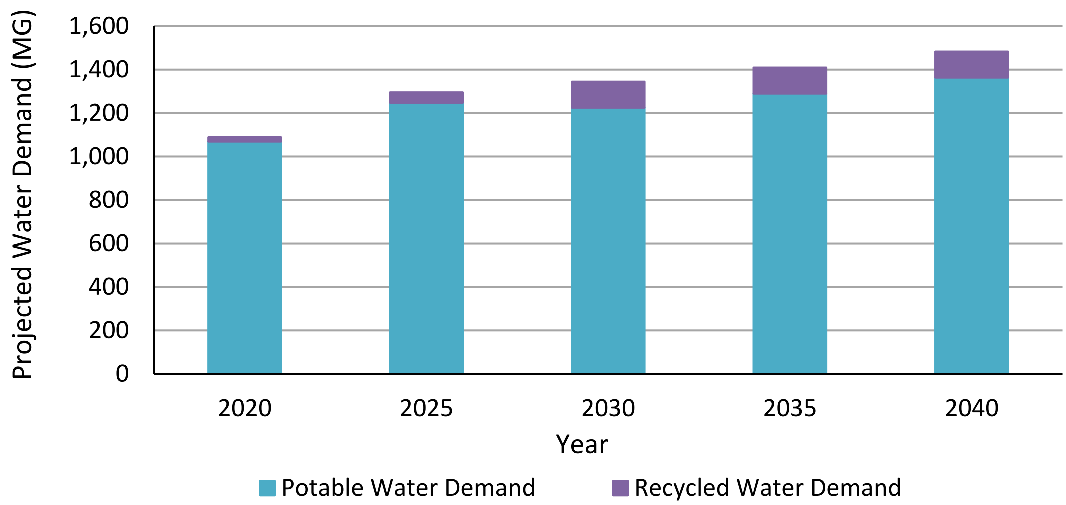


Table 4-7 Total Water Use (Potable and Non-Potable) (DWR Table 4-3)

	2020	2025	2030	2035	2040	2045*(opt)*
Potable Water, Raw, Other Non-potable *From DWR Tables 4-1 and 4-2*	1,069	1,248	1,225	1,290	1,363	--
Recycled Water Demand *From DWR Table 6-4*	20	48	120	120	120	--
Optional Deduction of Recycled Water Put Into Long-Term Storage	--	--	--	--	--	--
TOTAL WATER USE	1,089	1,296	1,345	1,410	1,483	--
NOTES: (a) Volumes are in units of MG.						

Chart 4-7 Current and Projected Total Water Use



4.2.5 Water Use for Lower Income Households

☑ ***CWC § 10631.1***

(a) The 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 defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.

(b) It is the intent of the Legislature that the identification of projected water use for single-family and multifamily residential housing for lower income households will assist a supplier in complying with the requirements under Section 65589.7 of the Government Code to grant a priority for the provision of service to housing units affordable to lower income households.

The water demands presented above include projected future water use by lower income households (Table 4-4). Per Health and Safety Code 50079.5, a lower income household is defined as a household with lower than 80% of the City's median income. The 2015-2023 Housing Element (City of Menlo Park, 2015) indicates that in 2012 there were 12,388 housing units within the City and that 41% of these units served residents with less than 80% of the median income adjusted for family size. Water demands associated with these households were included in the total water demand projections described above and shown in Table 4-7.

4.2.6 Characteristic Five-Year Water Use

☑ ***CWC § 10635(b)(3)***

(b) Every urban water supplier shall include, as part of its urban water management plan, a drought risk assessment for its water service to its customers as part of information considered in developing the demand management measures and water supply projects and programs to be included in the urban water management plan. The urban water supplier may conduct an interim update or updates to this drought risk assessment within the five-year cycle of its urban water management plan update. The drought risk assessment shall include each of the following…

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

A critical component of the new statutory language in Water Code §10635(b) is the requirement to prepare the five-year Drought Risk Assessment (DRA), which is included in Chapter 7. The five-year DRA can also be used to provide the water service reliability assessment for a drought lasting five years.

As a first step, DWR recommends that the expected gross water use for the next five years without drought conditions (also known as *unconstrained demand*) be estimated. These numbers can then be adjusted to estimate the five-years' cumulative drought effects. MPMW's unconstrained demand is based on the demand projections from the 2021 DSS Model over the next five years, as shown in Table 4-8.

Table 4-8 Characteristic Five-Year Water Use

2021	2022	2023	2024	2025
1,095	1,143	1,192	1,243	1,296
NOTES: (a) Volumes are in units of MG.				

4.3 Water Use Sectors Not Included in the Demand Projections

Historical and projected water demands for the water use sectors described in CWC §10631(d)(1)(G) through (I) and listed below were not included in the water demand calculations because they are not applicable to MPMW:

- Sales to other agencies;
- Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; and
- Agricultural.

4.3.1 Sales to Other Agencies

MPMW does not sell water to other agencies and does not expect to in the future.

4.3.2 Saline Water Intrusion Barriers, Groundwater Recharge, and Conjunctive Use

MPMW does not use water for saline water intrusion barriers and does not currently participate in active groundwater recharge activities or conjunctive use programs.

4.3.3 Agricultural

MPMW does not sell water to agricultural customers and does not expect to in the future.

4.4 Climate Change Impacts to Demand

☑ ***CWC § 10635(b)***

(4) 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.

Hotter and drier weather may lead to an increased demand in landscape irrigation. The DSS Model assesses the sensitivity of MPMW's water demand to weather and then incorporates predicted weather and climate change data into demand projections. Therefore, the demand projections presented above include considerations of climate change.

A description of the weather and climate change data incorporated into the DSS Model is provided in Section 3.6 of the BAWSCA Demand Study (BAWSCA, 2020b). Based on data published by the International Panel on Climate Change (IPCC) and the California's Fourth Climate Change Assessment San Francisco Bay Area Summary Report (Ackerly et al., 2018), a predicted annual mean temperature increase of 1.7°F was incorporated into the DSS Model demand forecast.

4.5 Coordinating Water Use Projections

☑ ***CWC § 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.

MPMW provides SFPUC with water use projections annually as part of reporting to the BAWSCA Annual Surveys and other BAWSCA-led water demand and supply coordination efforts as dictated by the 2009 Water Supply Agreement. As part of the coordination effort for the 2020 UWMP, and in compliance with CWC §10631(h), MPMW supplied BAWSCA with its water demand projections through 2040 for transmittal to the SFPUC[12].

[12] Email from MPMW to BAWSCA dated 5 January 2021.

4.6 Urban Water Use Objectives

☑ ***CWC § 10609.20***

(a) Each urban retail water supplier shall calculate its urban water use objective no later than January 1, 2024, and by January 1 every year thereafter.

(b) The calculation shall be based on the urban retail water supplier's water use conditions for the previous calendar or fiscal year.

☑ ***CWC § 10609.22***

(a) An urban retail water supplier shall calculate its actual urban water use no later than January 1, 2024, and by January 1 every year thereafter.

(b) The calculation shall be based on the urban retail water supplier's water use for the previous calendar or fiscal year.

☑ ***CWC § 10609.24***

(a) An urban retail water supplier shall submit a report to the department no later than January 1, 2024, and by January 1 every year thereafter. The report shall include all of the following:

(1) The urban water use objective calculated pursuant to Section 10609.20 along with relevant supporting data.

(2) The actual urban water use calculated pursuant to Section 10609.22 along with relevant supporting data.

(3) Documentation of the implementation of the performance measures for CII water use.

(4) A description of the progress made towards meeting the urban water use objective.

(5) The validated water loss audit report conducted pursuant to Section 10608.34.

(b) The department shall post the reports and information on its internet website.

(c) The board may issue an information order or conservation order to, or impose civil liability on, an entity or individual for failure to submit a report required by this section.

Beginning in 2023, urban water retailers will be required to report on "annual water use objectives" by 1 January of each year and to achieve these objectives by 1 January 2027. The annual water use objectives will be calculated based on standards for indoor residential water use, outdoor residential water use, and distribution system water loss. Additionally, it is anticipated that performance-based standards for the commercial, industrial, and institutional sectors, separate from the annual water use objectives, will also be developed by Department of Water Resources (DWR) and be implemented in the future. However, the specific standards that will be used to determine a retailer's annual urban water use objectives are currently under development by DWR, and thus the annual urban water use objectives for MPMW cannot be calculated or estimated. Once the urban water use objectives are released, MPMW will evaluate its historical and current water use compared to the new objectives, and will evaluate the need to adjust its conservation and water loss management measures to meet the new objectives.

The indoor residential water use component of calculating future water use objectives is described in CWC §10609.4.(a), which states "(1) Until January 1, 2025, the standard for indoor residential water use shall be 55 gallons per capita daily. (2) Beginning January 1, 2025, and until January 1, 2030, the standard for indoor residential water use shall be the greater of 52.5 gallons per capita daily or a standard recommended pursuant to subdivision (b). (3) Beginning January 1, 2030, the standard for indoor residential water use shall be the greater of 50 gallons per capita daily or a standard recommended pursuant to subdivision (b).” Table 4-9 and the associated chart shows an estimate of future per capita residential water use, broken out by estimated indoor and outdoor water use. Based on these estimates, per capita indoor residential potable water use within MPMW is expected to be below the indoor use standards presented in the legislation. However, it should be noted that because standards have not yet been developed for the outdoor water use or water loss components of the future water use objectives, it cannot be known whether projected demands for MPMW will be in compliance with the pending requirements.

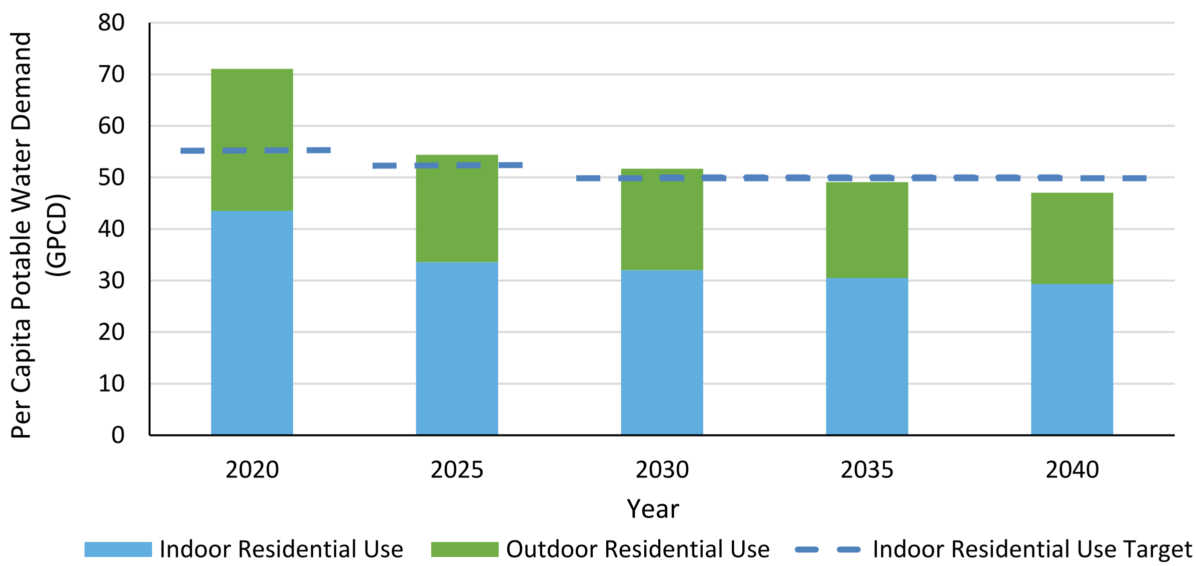
In the past decade, MPMW has made significant strides in reducing its per capita water demand to meet the targets delineated by the Water Conservation Act (see Chapter 5). MPMW plans to continue to implement conservation efforts to meet new legislative requirements. Potable water demand reductions will be achieved through the recycled water projects and implementation of DMMs as discussed in Chapters 6 and 9, respectively. MPMW will continue to monitor per capita water demand to ensure that its compliance targets are being met.

Table 4-9 Current and Projected Residential Per Capita Water Use

Year	Residential Potable Water Demand (MG)	Service Area Population	Per Capita Residential Potable Water Use (GPCD)	Approximate Per Capita Outdoor Residential Potable Water Use (GPCD)	Approximate Per Capita Indoor Residential Potable Water Use (GPCD)	Indoor Residential Water Use Target (GPCD)
2020	474	18,276	71	28	43	55
2025	464	23,383	54	21	34	52.5
2030	475	25,166	52	20	32	50
2035	496	27,675	49	19	30	50
2040	518	30,184	47	18	29	50

NOTES:
(a) Residential demand includes single family and multi-family residential.
(b) Per capita potable water demand is calculated by dividing the annual residential potable water demand by the service area population and the number of days in a year.
(c) Indoor and outdoor residential water use is estimated by the DSS Model.
(d) Urban water retailers will be required to report on "annual water use objectives" starting from 2023. Specific standards are currently under development by DWR.

Chart 4-8 Current and Projected Indoor and Outdoor Residential Per Capita Potable Water Use



5 SBX7-7 BASELINES, TARGETS, AND 2020 COMPLIANCE

☑ ***CWC § 10608.24 (b)***

Each urban retail water supplier shall meet its urban water use target by December 31, 2020.

☑ ***CWC § 10608.28***

(a) An urban retail water supplier may meet its urban water use target within its retail service area, or through mutual agreement, by any of the following:

(1) Through an urban wholesale water supplier.

(2) Through a regional agency authorized to plan and implement water conservation, including, but not limited to, an agency established under the Bay Area Water Supply and Conservation Agency Act (Division 31 (commencing with Section 81300)).

(3) Through a regional water management group as defined in Section 10537.

(4) By an integrated regional water management funding area.

(5) By hydrologic region.

(6) Through other appropriate geographic scales for which computation methods have been developed by the department.

(b) A regional water management group, with the written consent of its member agencies, may undertake any or all planning, reporting, and implementation functions under this chapter for the member agencies that consent to those activities. Any data or reports shall provide information both for the regional water management group and separately for each consenting urban retail water supplier and urban wholesale water supplier.

With the adoption of the Water Conservation Act of 2009, also known as Senate Bill (SB) X7-7, the state is required to reduce urban water use by 20% by the year 2020. Each urban retail water supplier was required to develop a baseline daily per capita water use ("baseline water use") in their 2010 Urban Water Management Plan (UWMP or Plan) and establish per capita water use targets for 2015 and 2020 in order to help the state achieve the 20% reduction.

In support of implementing the requirements of SB X7-7, the California Department of Water Resources (DWR) produced a set of methodologies for developing baseline and compliance water use and targets, which are included in Methodologies for Calculating Baseline and Compliance Urban Per Capita Water, California Department of Water Resources Division of Statewide Integrated Water Management Water Use and Efficiency Branch (Methodologies; DWR, 2016).

Baselines and water use targets for Menlo Park Municipal Water (MPMW) were initially calculated in the 2010 UWMP in response to the Water Conservation Act. Per requirements of the DWR, the 2015 UWMP updated the baseline and water use target calculations using 2010 United States Census (Census) data.

This chapter discusses MPMW's compliance with its 2020 water use target. As part of the compliance reporting for SB X7-7, water suppliers are required to complete and submit a set of standardized verification tables in their 2020 UWMPs. The information in these tables is discussed and summarized in the following subsections, and the complete set of SB X7-7 standardized tables is included in Appendix E.

5.1 Service Area Population

☑ ***CWC § 10608.20 (e)***

An urban retail water supplier shall include in its urban water management plan due in 2010 pursuant to Part 2.6 (commencing with Section 10610) the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.

☑ ***CWC § 10608.20 (g)***

An urban retail water supplier may update its 2020 urban water use target in its 2015 urban water management plan required pursuant to Part 2.6 (commencing with Section 10610).

☑ ***Methodology 2 Service Area Population.***

DWR will examine discrepancy between the actual population estimate and DOF's projections for 2010; if significant discrepancies are discovered, DWR may require some or all suppliers to update their baseline population estimates. (DWR, 2016)

As reported in the 2015 UWMP, MPMW updated its service area population for baseline periods spanning from 1996 through 2010 to meet DWR's requirement of using 2010 Census data. The revised 2010 service area population was 14,749. The population of 14,749 was approximately 46% of the total population of City of Menlo Park (City), according to data published by the Department of Finance (DOF) for 2010 (DOF, 2012). The service area population during the baseline period was estimated based on the assumption that MPMW served the same percentage of City-wide population from 1996 through 2010.

The 2020 population was estimated by the City using the GIS-based method recommended in the Methodologies (DWR, 2016), as documented in Appendix F. Based on MPMW's service area map and the Census data, the 2020 population for the MPMW service area is estimated to be 18,276.

5.2 Baseline Water Use

Water suppliers were required to define a 10- or 15-year base (or baseline) period for water use that was then used to develop their future target per capita water use. Water suppliers were also required to calculate water use over a 5-year baseline period and use that value to determine a minimum required reduction in water use by 2020. Utilizing a 15-year baseline period was only allowed for water suppliers that meet at least 10% of their 2008 measured retail water demand through recycled water; MPMW did not meet this criterion and thus selected a 10-year baseline.

The 10-year baseline water use was calculated using gross per capita water usage data (calculated as total water entering the MPMW water distribution system, including uses by commercial, industrial, and other users, as well as water loses, divided by total population) for the 10-year period between 1 January 1996 and 31 December 2005. The 5-year baseline water use was calculated using per capita water usage data for the 5-year period between 1 January 2006 and 31 December 2010. The 5- and 10-year baseline water uses are shown in Table 5-1 and in Appendix E.

5.3 Water Use Targets

☑ ***CWC § 10608.20 (b)***

An urban retail water supplier shall adopt one of the following methods for determining its urban water use target pursuant to subdivision (a):

(1) Eighty percent of the urban retail water supplier's baseline per capita daily water use.

(2) The per capita daily water use that is estimated using the sum of the following performance standards:

(A) For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of the department's 2016 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute.

(B) For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Chapter 2.7 (commencing with Section 490) of Division 2 of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992. An urban retail water supplier using the approach specified in this subparagraph shall use satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas.

(C) For commercial, industrial, and institutional uses, a 10-percent reduction in water use from the baseline commercial, industrial, and institutional water use by 2020.

(3) Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30, 2009). If the service area of an urban water supplier includes more than one hydrologic region, the supplier shall apportion its service area to each region based on population or area.

(4) A method that shall be identified and developed by the department, through a public process, and reported to the Legislature no later than December 31, 2010. The method developed by the department shall identify per capita targets that cumulatively result in a statewide 20-percent reduction in urban daily per capita water use by December 31, 2020. In developing urban daily per capita water use targets, the department shall do all of the following:

(A) Consider climatic differences within the state.

(B) Consider population density differences within the state.

(C) Provide flexibility to communities and regions in meeting the targets.

(D) Consider different levels of per capita water use according to plant water needs in different regions.

(E) Consider different levels of commercial, industrial, and institutional water use in different regions of the state.

(F) Avoid placing an undue hardship on communities that have implemented conservation measures or taken actions to keep per capita water use low.

☑ ***CWC § 10608.22***

Notwithstanding the method adopted by an urban retail water supplier pursuant to Section 10608.20, an urban retail water supplier's per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use as defined in paragraph (3) of subdivision (b) of Section 10608.12. This section does not apply to an urban retail water supplier with a base daily per capita water use at or below 100 gallons per capita per day.

Water suppliers were required to calculate their 2020 water use targets (Targets) and compare their actual water use in 2020 with the calculated Targets to assess compliance. The Water Conservation Act requires that water suppliers calculate their Targets using one of the following four methods:

- Method 1: Eighty percent of the water supplier's baseline per capita water use;
- Method 2: Per capita daily water use estimated using the sum of performance standards applied to indoor residential use, landscaped area water use, and commercial, industrial, and institutional uses;
- Method 3: Ninety-five percent of the applicable state hydrologic region target as stated in the State's 20x2020 Water Conservation Plan, dated February 2010; or
- Method 4: Total savings subtracted from baseline water use. Savings include metering savings, residential savings, commercial, industrial, and institutional savings, and landscape and water loss savings.

MPMW's 2020 Target was first calculated in its 2010 UWMP using Method 1 and was then recalculated in its 2015 UWMP using updated service area population. The updated 2020 Target was 204 gallons per capita per day (GPCD). Table 5-1 shows MPMW's 5- and 10-year baseline periods, the associated baseline water use in GPCD, and its 2020 target.

Table 5-1 Baselines and Targets Summary (DWR Table 5-1)

Baseline Period	Start Year	End Year	Average Baseline GPCD	Confirmed 2020 Target GPCD
10-15 year	1996	2005	255	204
5 Year	2006	2010	236	
NOTES:				

5.4 2020 Target Compliance

☑ ***CWC § 10608.24 (b)***

Each urban retail water supplier shall meet its urban water use target by December 31, 2020.

☑ ***CWC § 10608.24 (d)***

(1) When determining compliance daily per capita water use, an urban retail water supplier may consider the following factors:

(A) Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period.

(B) Substantial changes to commercial or industrial water use resulting from increased business output and economic development that have occurred during the reporting period.

(C) Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period.

(2) If the urban retail water supplier elects to adjust its estimate of compliance daily per capita water use due to one or more of the factors described in paragraph (1), it shall provide the basis for, and data supporting, the adjustment in the report required by Section 10608.40.

☑ ***CWC § 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. The data shall be reported using a standardized form developed pursuant to Section 10608.52.

As shown in Table 3-1 and Table 4-1, MPMW's 2020 service area population was 18,276 and the 2020 water demand was 1,069 million gallons (MG). The per capita water use in 2020 was calculated to be 160 GPCD, approximately 78% of the 2020 Target of 204 GPCD. Per the Methodologies (DWR, 2016), there are several allowable adjustments that can be made to a supplier's 2020 per capita water use calculations as part of evaluating target compliance. However, no adjustments were made to MPMW's 2020 per capita water use calculations. As demonstrated in Table 5-2, MPMW is in compliance with SB X7-7 requirements.

Table 5-2 2020 Compliance (DWR Table 5-2)

2020 GPCD			2020 Confirmed Target GPCD	Did Supplier Achieve Targeted Reduction for 2020?
Actual 2020 GPCD	2020 TOTAL Adjustments	Adjusted 2020 GPCD *(Adjusted if applicable)*		
160	0	160	204	Yes
NOTES:				

6 WATER SUPPLY CHARACTERIZATION

☑ ***CWC § 10631 (b)*** *A plan shall be adopted in accordance with this chapter that shall do all of the following:*

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).

Menlo Park Municipal Water (MPMW) purchases all of its potable water from the San Francisco Public Utilities Commission (SFPUC) Regional Water System (RWS) in accordance with the Water Supply Agreement (WSA) between the City and County of San Francisco and Wholesale Customers in Alameda, San Mateo and Santa Clara Counties, that was approved by the SFPUC on 28 April 2009 and amended on 12 February 2019.

To maintain consistency with the Urban Water Management Plans (UWMPs) prepared by the SFPUC and the other Bay Area Water Supply and Conservation Agency (BAWSCA) member agencies, much of the language describing the SFPUC wholesale water supply in the following sections is common language provided by BAWSCA, in coordination with the SFPUC.

6.1 Purchased or Imported Water

This section describes the sources of wholesale water provided by SFPUC, and the process for allocating water between SFPUC, BAWSCA, and wholesale customers.

6.1.1 Description of SFPUC RWS

Approximately 85% of the water supply to the SFPUC RWS originates in the Hetch Hetchy watershed, located in Yosemite National Park, and flows down the Tuolumne River into the Hetch Hetchy Reservoir. Water from the Hetch Hetchy watershed is managed through the Hetch Hetchy Water and Power Project. The remaining 15% of the water supply to the SFPUC RWS originates locally in the Alameda and Peninsula watersheds and is stored in six different reservoirs in Alameda and San Mateo Counties. Details of the various components of the SFPUC RWS are provided below and are shown on Figure 6-1. Information regarding the Hetch Hetchy, Alameda, and Peninsula water systems is sourced from the SFPUC's 2020 UWMP and is provided verbatim below.

6.1.1.1 *Water Distribution*

> The RWS, shown on Figure 6-1, consists of more than 280 miles of pipelines, 60 miles of tunnels, 11 reservoirs, five pump stations, and two water treatment plants. It includes the Hetch Hetchy Project and the Bay Area water system facilities. The Hetch Hetchy Project is generally composed of the reservoirs, hydroelectric generation and transmission facilities, and water transmission facilities from the Hetch Hetchy Valley west to the Alameda East Portal of the Coast Range Tunnel in Sunol Valley. Water system components of the Hetch Hetchy Project are also referred to as the Hetch Hetchy System. The local 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 treatment 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.

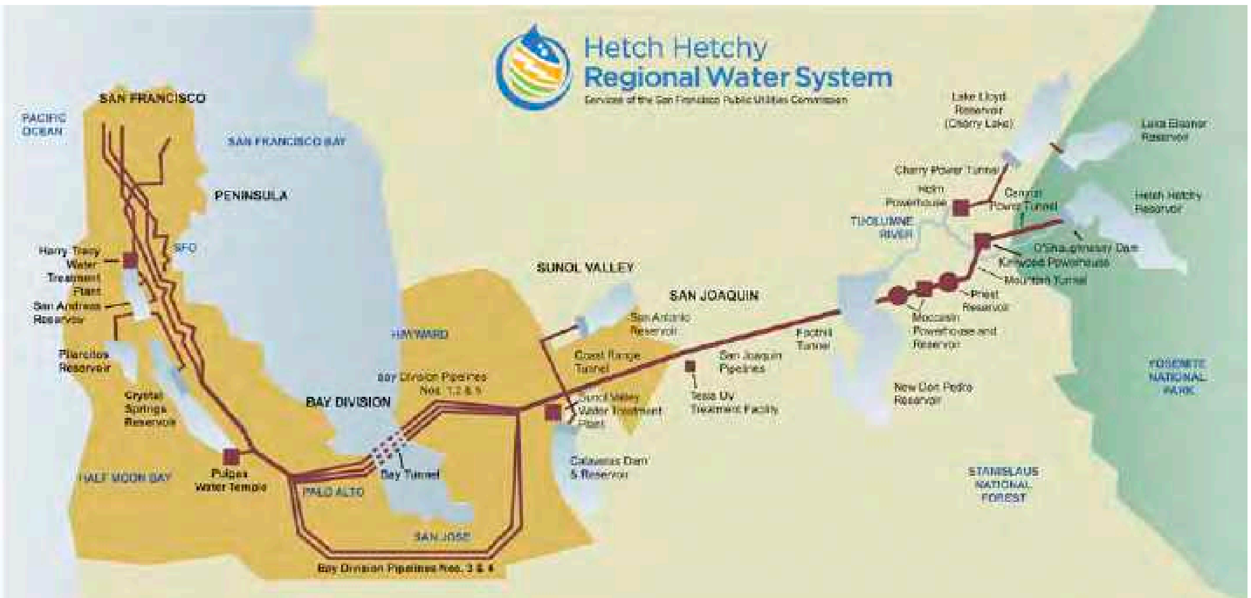


Figure 6-1 Regional Water System

Hetch Hetchy System

In the Hetch Hetchy System, water is diverted from Hetch Hetchy Reservoir into 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 the 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 connect the Hetch Hetchy System and Alameda water sources to the Peninsula System. The BDPLs [Bay Division Pipelines] cross the South Bay to the Peninsula System delivering water to customers along the pipeline route. The Sunol Valley Water Treatment Plant (SVWTP) filters and disinfects water supplied from San Antonio Reservoir and Calaveras Reservoir.

Peninsula System

The Peninsula System includes conveyance facilities connecting the BDPLs to the in-City distribution system 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 the Wholesale Customers, the Coastside County Water District (which includes the City of Half Moon Bay), along with 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 the in-City distribution system.

6.1.1.2 *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, which flows down the Tuolumne River to Hetch Hetchy Reservoir. This water meets or exceeds all federal and State criteria for watershed protection. Water from Hetch Hetchy Reservoir is protected in pipes and tunnels as it is conveyed to the Bay Area, and requires pH adjustment to control pipeline corrosion and disinfection for bacteria control. Based on the SFPUC's disinfection treatment practice, extensive bacteriological quality monitoring, and high operational standards, the U.S. Environmental Protection Agency (USEPA) and the 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.

A new USEPA regulation took effect in 2012 requiring secondary disinfection for all unfiltered drinking water systems to control the waterborne parasite cryptosporidium. To comply with this regulation, the SFPUC completed construction of a new ultraviolet (UV) treatment facility in 2011. The Tesla Treatment Facility is a key component of the Water System Improvement Program (WSIP) and enhances the high-quality water from the RWS. The facility has a capacity of 315 mgd, making it the third largest UV drinking water disinfection facility in the U.S.

All water derived from sources other than Hetch Hetchy Reservoir is treated at one of two treatment plants: the SVWTP or the HTWTP. The SVWTP primarily treats water from the Alameda System reservoirs and has both a peak capacity and sustainable capacity of 160 mgd. Treatment processes include coagulation, flocculation, sedimentation, filtration, fluoridation, corrosion control treatment, and chloramination. Fluoridation, chloramination, and corrosion control treatment can also be provided for the combined Hetch Hetchy System and SVWTP water at the Sunol Valley Chloramination Facility. The HTWTP treats water from the Peninsula System reservoirs and has a peak capacity of 180 mgd and a sustainable capacity of 140 mgd. Treatment processes include ozonation, coagulation, flocculation, filtration, disinfection, fluoridation, corrosion control treatment, and chloramination. Major upgrades to the SVWTP were completed in 2013 and to the HTWTP in 2015.

6.1.1.3 *Water Storage*

The majority 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 Reservoir, Lake Lloyd (a.k.a., Cherry

Lake), and Lake Eleanor. A "water bank" in Don Pedro Reservoir is also integrated into system operations.[13] 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.

As a by-product of water delivery and water supply management, hydroelectric power is generated by the Hetch Hetchy Water and Power System. Water stored in Hetch Hetchy Reservoir is used for hydroelectric generation and also satisfies instream flow requirements when released downstream. Normally, only Hetch Hetchy Reservoir water supplies are exported to the Bay Area, while releases from Lake Eleanor and Lake Lloyd are used to satisfy instream flow requirements, satisfy Raker Act entitlements to the Districts downstream, and produce hydroelectric power. The Hetch Hetchy Water and Power System includes three major hydroelectric powerhouses along the Tuolumne River—Holm, Kirkwood, and Moccasin—that have a collective generating capacity of nearly 400 megawatts.

Downstream of the Hetchy Hetchy System, the SFPUC utilizes local watersheds in the Bay Area. 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 Country, capture local runoff in the Alameda watershed. In addition to capturing local runoff, San Andreas, San Antonio, and Crystal Springs Reservoirs also provide storage for water from the Hetch Hetchy System and, along with Calaveras Reservoir, are an important water supply in the event of an interruption to Hetch Hetchy System deliveries.

Calaveras Reservoir had been operating in recent years 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 existing dam. The SFPUC began impounding water behind the new dam in the winter of 2018/2019 and continued the initial fill of the reservoir during the 2019/2020 winter season.

[13] Turlock and Modesto Irrigation Districts have senior water rights to the SFPUC for the Tuolumne River water and are entitled to the first increment of flow in the basin. Water bank provides a credit and debit system which allows the SFPUC to divert water upstream while meeting its obligations to Modesto and Turlock Irrigation 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 water bank.

Regional Water System Storage Capacity

Reservoir	Storage	
	Acre-Feet (AF)	Billions of Gallons (BG)
Up-Country[a]		
Hetch Hetchy	360,360	117.4
Lake Lloyd[b]	273,300	89.1
Lake Eleanor	27,100	8.8
Subtotal Up-Country	**660,760**	**215.3**
Local		
Calaveras (East Bay)[c]	96,800	31.5
San Antonio (East Bay)	50,500	16.5
Crystal Springs (Peninsula)[d]	69,300	22.6
San Andreas (Peninsula)	19,000	6.2
Pilarcitos (Peninsula)	3,100	1.0
Subtotal Local	**238,700**	**77.8**
Total Regional Water System[e]	**899,460**	**293.1**

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

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

c Calaveras Reservoir was constructed with a storage capacity of 96,800 AF. Since December 2001, in response to safety concerns about the seismic stability of the dam and a directive from the Division of Safety of Dams (DSOD), the SFPUC held the maximum water level at approximately 37,800 AF (roughly 40% of its maximum capacity). The construction of a new replacement dam downstream was completed in 2019 to restore the dam's full storage capacity and the dam was continuing to be filled over the 2019/2020 winter season.

d Crystal Springs Reservoir has a maximum storage capacity of 22.6 BG (at 291.8 feet). Based on permit conditions, the reservoir is currently operated at 287.8 feet (4 feet below capacity).

e This includes 63,700 AF in dead storage (i.e., the volume in a reservoir below the lowest controllable level). In addition, the SFPUC may draw against a credit of up to 570,000 AF in storage in a water bank account in Don Pedro Reservoir, for total storage for planning purposes of 1,469,460 AF.

6.1.2 Individual Supply Guarantees

> San Francisco has a perpetual commitment (Supply Assurance) to deliver 184 mgd to the 24 permanent Wholesale Customers collectively. San Jose and Santa Clara are not included in the Supply Assurance commitment and each has temporary and interruptible water supply contracts with San Francisco. The Supply Assurance is allocated among the 24 permanent Wholesale Customers through Individual Supply Guarantees (ISG), which represent each Wholesale Customer's allocation of the 184 mgd Supply Assurance.

MPMW's Individual Supply Guarantee (ISG) is 4.456 million gallons per day (MGD), or approximately 1,630 million gallons (MG) per year. Between 2016 and 2020, MPMW purchased between 52% and 66% of its ISG (see Table 6-8).

6.1.3 2028 SFPUC Decisions (formerly 2018 SFPUC Decisions)

Information regarding the 2028 SFPUC Decisions (formerly 2018 SFPUC Decision) was provided by BAWSCA in coordination with SFPUC and is provided verbatim below.

> In the 2009 WSA, the SFPUC committed to make three decisions before 2018 that affect water supply development:
>
> - Whether or not to make the cities of San Jose and Santa Clara permanent customers,
> - Whether or not to supply the additional unmet supply needs of the Wholesale Customers beyond 2018, and
> - Whether or not to increase the wholesale customer Supply Assurance above 184 mgd.
>
> Events since 2009 made it difficult for the SFPUC to conduct the necessary water supply planning and CEQA analysis required to make these three decisions before 2018. Therefore, in the 2018 Amended and Restated WSA, the decisions were deferred for 10 years to 2028.
>
> Additionally, there have been recent changes to instream flow requirements and customer demand projections that have affected water supply planning beyond 2018. As a result, the SFPUC has established an Alternative Water Supply Planning program to evaluate several regional and local water supply options. Through this program, the SFPUC will conduct feasibility studies and develop an Alternative Water Supply Plan by July 2023 to support the continued development of water supplies to meet future needs.

6.2 Groundwater

☑ ***CWC § 10631***

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

(A) The current version of any groundwater sustainability plan or alternative adopted pursuant to Part 2.74 (commencing with Section 10720), any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management for basins underlying the urban water supplier's service area.

(B) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For basins that a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For a basin that has not been adjudicated, information as to whether the department has identified the basin as a high- or medium-priority basin in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to coordinate with groundwater sustainability agencies or groundwater management agencies listed in subdivision (c) of Section 10723 to maintain or achieve sustainable groundwater conditions in accordance with a groundwater sustainability plan or alternative adopted pursuant to Part 2.74 (commencing with Section 10720).

(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.

To date, MPMW has not utilized groundwater as a potable water source (i.e., as described above, the sole source of MPMW's potable water has been wholesale water supplied by the SFPUC RWS) and does not expect to utilize groundwater as a regular source in the future. However, because the Lower Zone and the High Pressure Zone of its distribution system lack emergency storage (see Section 3.4), MPMW anticipates bringing one groundwater well online in spring 2021 and is planning to construct an additional one or two wells to provide up to 3,000 gallons per minute (gpm) of potable and fire supply in these zones. Potential future use of the groundwater supply wells and information related to the local groundwater basin is described in more detail below.

6.2.1 Groundwater Basin Description

MPMW overlies the southern end of the San Mateo Plain Groundwater Subbasin (groundwater basin number 2-009.03; DWR, 2004; or "subbasin") of the Santa Clara Valley Groundwater Basin. The subbasin is not adjudicated, nor has it been found by Department of Water Resources (DWR) to be in a condition of overdraft. As part of the implementation of the Sustainable Groundwater Management Act (SGMA), the subbasin was ranked as a "very low priority" basin under the 2014 California Statewide Groundwater Elevation Monitoring (CASGEM) basin prioritization process and maintained this ranking in DWR's latest basin prioritization effort in 2019. The subbasin is therefore not subject to the requirements of SGMA.

6.2.1.1 Physical Setting

The subbasin is approximately 38,000 acres[14] and is bounded by the Santa Cruz Mountains on the west, San Francisco Bay and the Niles Cone subbasin on the east, the Westside Basin on the north near Burlingame Avenue and Coyote Point, and the San Francisquito Creek and the Santa Clara subbasin to the south. Figure 6-2 shows the subbasin boundary, the surrounding subbasins of the Santa Clara Valley Groundwater Basin, and the location of the MPMW service area within the subbasin.

The subbasin is filled with alluvial fan deposits formed by tributaries to San Francisco Bay that drained across the basin and toward the center of the Bay (RWQCB, 2003; EKI et al., 2018). These alluvial fan deposits are interbedded with thick clay aquitards or confining layers and comprise the main water bearing formations within the subbasin. The major water bearing formation of the subbasin is the Quaternary alluvium, from which all larger yielding wells acquire their water. The Santa Clara Formation underlies the Quaternary alluvium and is the other water bearing formation of the subbasin. In general, the groundwater system is unconfined in the higher elevations, and confined or semiconfined at lower elevations closer to San Francisco Bay.

Groundwater flow in the subbasin is generally from west-southwest to east-northeast, from the edge of the Santa Cruz Mountains to San Francisco Bay. Both the southern and eastern edges of the subbasin are political boundaries that are roughly coincident with County lines, rather than physical hydrogeologic barriers to groundwater flow (Fio and Leighton, 1995; RWQCB 2003; EKI et al., 2018). Depending upon temporally varying streamflow, recharge, and pumping conditions, groundwater flow likely occurs in variable directions across each boundary.

Natural recharge occurs by infiltration of water from streams that enter the valley from the upland areas within the drainage basin, including San Francisquito Creek, San Mateo Creek, and other smaller creeks, and by percolation of precipitation that falls directly on the land surface. Additional recharge occurs as a result of infiltration of applied irrigation water. Subbasin outflows include limited municipal and private well pumping and groundwater outflows across subbasin boundaries.

It is further noted that the United States Geological Survey (USGS) has defined the "San Francisquito Cone" as a unique groundwater subbasin that is roughly coincident with the known lateral extent of the San Francisquito Creek alluvial fan deposits. The San Francisquito Cone subbasin underlies portions of MPMW and East Palo Alto, and overlaps with the southern end of the subbasin (see Figure 6-2). The San Francisquito Cone subbasin has been the subject of several hydrologic and water balance studies. As described in the Final Feasibility of Supplemental Groundwater Resources Development in Menlo Park and East Palo Alto (Todd Engineers, 2005), the San Francisquito Cone subbasin encompasses mountainous bedrock terrain and relatively flat alluvial fan deposits. The geology is composed of the coarse- and fine-grained alluvial deposits of San Francisquito Creek. The groundwater system includes a shallow aquifer, a laterally extensive confining clay layer, and a multi-layered deep aquifer that extends to depths of up to 1,000 feet below ground surface. Storativity values indicate the shallow aquifer is unconfined and the deeper aquifer system is semi-confined. Pumping test and empirical transmissivity and well yield data

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[14] Basin area is based on the SGMA 2019 Basin Prioritization results.

indicate that development of a municipal supply wells within the San Francisquito Cone portion of the subbasin is feasible.

6.2.1.2 *Groundwater Conditions*

Groundwater use in the subbasin has been relatively limited for the last several decades, as the primary water supply source for the overlying population has been imported water from the SFPUC RWS. The only municipal water suppliers within the subbasin that utilize groundwater as a potable supply source are Palo Alto Park Mutual Water Company (PAPMWC), O'Connor Tract Co-operative Water Company (O'Connor Tract CWC), and the City of East Palo Alto. Groundwater is also used for landscape or domestic irrigation purposes. Total groundwater production for water supply within the subbasin is approximately 2,300 acre-feet per year (AFY) as of 2018 (EKI et al., 2018)[15].

Based on limited available groundwater level information, the subbasin is currently in a relatively full and stable condition. However, historical information indicates that during past periods of high groundwater production in the 1850s to 1960s, groundwater levels in the subbasin were significantly lower and negative impacts including seawater intrusion and land subsidence were observed (EKI et al., 2018). A recent renewed interest in groundwater development in the subbasin has increased the need and interest in gaining a better understanding of the subbasin and evaluating the extent to which increased groundwater development can be pursued, while mitigating potential negative impacts. Details on the subbasin groundwater management efforts are described in the section below.

6.2.2 Groundwater Management

As stated above, the subbasin is currently designated by the DWR as a "very low priority" basin and is exempt from complying with SGMA. However, multiple entities overlying the subbasin have expressed interests in maintaining groundwater sustainability and/or established a formal role in the subbasin management.

The San Mateo County conducted a comprehensive groundwater basin assessment in 2018 (EKI et al., 2018). The study provided a more complete understanding of the subbasin hydrogeologic framework and groundwater flow and quality conditions. It also identified potential groundwater management strategies for the subbasin.

Informed by this study, San Mateo County has begun to participate in the CASGEM program. CASGEM is a groundwater elevation monitoring program that was developed by DWR per the requirements of SBx7-6. The objective of CASGEM is to establish a permanent, locally managed program of regular groundwater monitoring to track seasonal and long-term trends in groundwater elevations. The County provided initial notification to DWR of its intent to become the CASGEM Monitoring Entity for the subbasin in 2019. A CASGEM Monitoring Plan including a monitoring network of approximately ten wells throughout the

[15] The groundwater production value stated above excludes East Palo Alto which did not start pumping from its re-activated Gloria Way Well in 2018.

subbasin was developed and submitted for DWR review in 2020. Compliance with CASGEM is an important first step in setting the subbasin up for long-term sustainable management and funding.

There has also been widespread agreement among the overlying cities, water suppliers and other interested parties that cooperative, sustainable groundwater management of the entire subbasin is needed. Several entities have passed resolutions in support of sustainable groundwater management. In particular, the City of Menlo Park (City) adopted Resolution 6239 in 2014. As per this Resolution, the City is committed to: (1) working with other agencies and organizations to better understand the hydrology and geology of the San Francisquito Creek area; and (2) the sustainable management of local groundwater, including conjunctive water management and aggressive conservation, to protect its quality and ensure its availability during droughts and emergency situations.

The subbasin is currently not managed pursuant to any groundwater management plan (GWMP). However, Santa Clara Valley Water District (SCVWD) and the City of East Palo Alto adopted their own GWMPs in 2012 and 2015, respectively. The SCVWD GWMP covers the small far southern portion of the subbasin within Santa Clara County, and was updated in 2016 (SCVWD, 2016) and submitted to DWR as an Alternative to a Groundwater Sustainability Plan (GSP). The East Palo Alto GWMP addresses groundwater conditions within the jurisdictional boundary of the City of East Palo Alto in the southeastern portion of the subbasin (Todd Engineers, 2015). The East Palo Alto GWMP was prepared in accordance with Assembly Bill (AB) 3030 and the amendments to AB 3030 provided by Senate Bill (SB) 1938 and AB 359.

In addition, BAWSCA initiated work with San Mateo County and its member agencies to form the Groundwater Reliability Partnership (GRP) in 2015. The main focus of the GRP was to provide information regarding SGMA and other locally relevant groundwater management efforts to the BAWSCA member agencies and other interested parties. The GRP has not been active since 2018.

6.2.3 Historical Groundwater Use

As discussed above, MPMW has not historically used groundwater as a potable water source (see Table 6-1).

Table 6-1 Groundwater Volume Pumped (DWR Table 6-1)

X	Supplier does not pump groundwater. The supplier will not complete the table below.					
	All or part of the groundwater described below is desalinated.					
Groundwater Type	Location or Basin Name	2016	2017	2018	2019	2020
	TOTAL					
NOTES:						

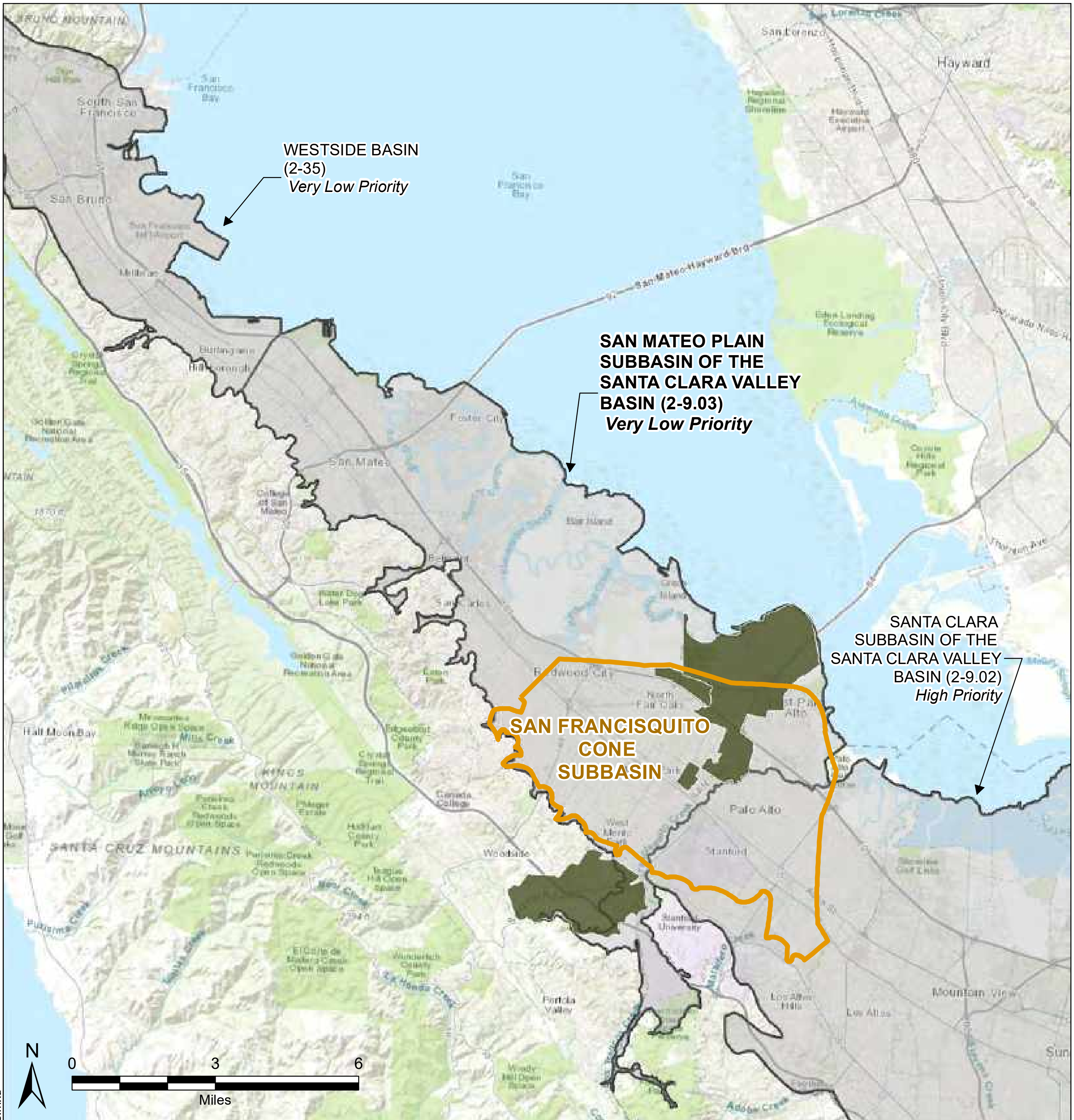
6.2.4 Projected Future Groundwater Use

MPMW purchases all of its potable water from the SFPUC RWS. Groundwater is currently not part of its potable water supply. However, as described previously, MPMW has long recognized the need for emergency storage and/or supply in the distribution system and has been pursuing the Emergency Water Storage/Supply Project for a number of years. After extensive planning, siting, and exploratory drilling efforts, in 2017, the first groundwater well was drilled in the City's Corporation Yard at 333 Burgess Drive. Based on aquifer testing data, the Corporation Yard Well can produce up to 1,500 gpm of emergency/backup supply to the Lower Zone. Construction of the above-grade facilities for the Corporation Yard well was completed in late 2020, and MPMW is in the midst of working with the State Water Resources Control Board (SWRCB) to permit the well.

MPMW plans to construct an additional one or two emergency wells in order to achieve another 1,500 gpm (for a total supply capacity of 3,000 gpm) as part of the Emergency Water Storage/Supply Project. Groundwater is currently not considered as a regular normal or dry year supply for MPMW. The wells are envisioned to serve as a supplemental supply as needed during significant water shortages due to an emergency or drought conditions (see MPMW's Water Shortage Contingency Plan in Appendix K).

MPMW is also investigating locations for a future underground reservoir for the Lower Zone and High Pressure Zone. Extensive information regarding the Emergency Water Storage/Supply Project can be found on the City's website:

https://www.menlopark.org/141/Emergency-water-supply-wellshttps://www.menlopark.org/141/Emergency-water-supply-wells



Legend

- San Francisquito Cone Subbasin
- MPMW Service Area
- DWR Bulletin 118 Groundwater Basin

Abbreviations

CASGEM = California Statewide Groundwater Elevation Monitoring Program
DWR = Department of Water Resources
MPMW = Menlo Park Municipal Water

Notes

1. All locations are approximate.
2. Priority rankings from CASGEM groundwater basin prioritization, May 2020.
3. DWR Bulletin 118 Groundwater Basin Boundaries, Feb 2019.

Sources

1. World Topographic base map provided by ArcGIS Online
2. San Francisquito Cone data provided by Metzger, L. F. 2002. Streamflow gains and losses along San Francisquito Creek and characterization of surface-water and ground-water quality, Southern San Mateo and Northern Santa Clara counties, California, 1996-97. U.S. Geological Survey, Water-Resources Investigations. Report 02-4078.

Groundwater Basins in the Vicinity of the MPMW Service Area

Menlo Park Municipal Water
2020 Urban Water Management Plan
Menlo Park, CA
June 2021
EKI C00050.00

Figure 6-2

Path: X:\C00050\Maps\2021\06\Fig 6-2_MPMW_GroundwaterBasins.mxd

6.3 Surface Water

Water that is self-supplied to agencies from streams, lakes and reservoirs is considered a surface water supply. Although MPMW's potable water supply is originally derived from surface water, it is categorized as "purchased" water since the water is obtained from the SFPUC RWS. MPMW does not currently, nor does it plan to in the future, use self-supplied surface water as part of its water supply portfolio.

6.4 Stormwater

MPMW does not currently, nor does it plan to in the future, use diverted stormwater as part of its water supply portfolio.

6.5 Wastewater and Recycled Water

☑ ***CWC § 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.

Recycling water involves treating wastewater to an acceptable level such that it can be reused for irrigation, cooling, and other non-potable applications. A key benefit of water recycling is its potential to offset the use of potable supplies. The regulatory requirements for recycled water are defined in the California Code of Regulations, Title 22, Article 3 (Title 22) and differ for different uses (e.g. irrigation for food crops, landscape, and recreation). The sections below describe wastewater collection and treatment for the MPMW service area and summarize MPMW's efforts with respect to recycled water planning and use.

6.5.1 Recycled Water Coordination

West Bay Sanitary District (WBSD) provides wastewater collection services to the MPMW service area. WBSD also acts as the recycled water purveyor. As described in Section 2.2.3, MPMW relies on and coordinates with WBSD on the relevant wastewater and recycled water issues.

6.5.2 Wastewater Collection, Treatment, and Disposal

☑ ***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.

☑ ***CWC § 10633 (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.

Wastewater in the MPMW service area is collected by WBSD, which also serves other customers within the remainder of Menlo Park, Atherton, sections of East Palo Alto, Portola Valley, Woodside, and unincorporated San Mateo and Santa Clara Counties. The WBSD collection system conveys wastewater through the Menlo Park Pumping Station located at the entrance to Bedwell Bayfront Park to the Silicon Valley Clean Water (SVCW) facilities in Redwood City for treatment and discharge to the San Francisco Bay. The volume of wastewater collected from the MPMW service area in 2020 was approximately 873 MG (Table 6-2).

The SVCW wastewater treatment plant (WWTP) is jointly owned and operated by WBSD and the Cities of Redwood City, Belmont, and San Carlos as a joint powers authority. The SVCW WWTP is located at the northeastern end of Redwood Shores, approximately nine miles from the northeastern boundary of the MPMW service area. The treatment processes at the SVCW WWTP involve the following: primary sedimentation, dual secondary treatment with fixed film reactors and activated sludge, filtration, disinfection using sodium hypochlorite, and dechlorination with sodium bisulfide. Discharge of the advanced secondarily-treated effluent is permitted by the San Francisco Regional Water Quality Control Board (RWQCB).

A limited volume of wastewater is treated within the MPMW service area at the Sharon Heights Recycled Water Facility (RWF; see Table 6-3). The Sharon Heights RWF, located at the Sharon Heights Golf and Country Club (SHGCC), was constructed and managed by WBSD in coordination with MPMW. It is a 0.5 MGD satellite WWTP which produces tertiary-treated recycled water under Title 22 for reuse within MPMW's service area. Wastewater is diverted from WBSD's collection system and pumped into the RWF. The treatment process includes screening, membrane bioreactor, and UV disinfection. In 2020, approximately 63 MG of wastewater was treated at the Sharon Heights RWF, among which 20 MG was recycled and the remaining 43 MG was conveyed to SVCW WWTP for discharge. Recycled water uses are further described in the section below.

Table 6-2 Wastewater Collected Within Area in 2020 (DWR Table 6-2)

	There is no wastewater collection system. The supplier will not complete the table below.					
	Percentage of 2020 service area covered by wastewater collection system *(optional)*					
	Percentage of 2020 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			Recipient of Collected Wastewater			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected from UWMP Service Area 2020	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area?	Is WWTP Operation Contracted to a Third Party? *(optional)*
West Bay Sanitary District	Estimated	873	Silicon Valley Clean Water	Silicon Valley Clean Water Wastewater Treatment Plant	No	
Total Wastewater Collected from Service Area in 2020:		873				

NOTES:
(a) Volumes are in units of MG.
(b) The volume of wastewater collected within the MPMW service area is estimated using information provided by WBSD. These estimates assume that sewer flow from residential units is 200 gallons per day and that sewer flow from non-residential accounts equals the volume of water consumed.
(c) The SVCW WWTP is jointly owned and operated by WBSD and the Cities of Redwood City, Belmont, and San Carlos as a joint powers authority.

Table 6-3 Wastewater Treatment and Discharge Within Service Area in 2020 (DWR Table 6-3)

	No wastewater is treated or disposed of within the UWMP service area. The supplier will not complete the table below.										
							2020 volumes				
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
Recycled Water Facility - Sharon Heights	WBSD wastewater collection system	WBSD wastewater collection system		Other	No	Tertiary	63	43	20	0	0
						Total	63	43	20	0	0

NOTES:
(a) Volumes are in units of MG.
(b) Data provide by WBSD.
(c) Tertiary treated recycled water produced by the Sharon Heights Recycled Water Facility is either delivered to SHGCC for beneficial use or returned to the WBSD wastewater collection system

6.5.3 Recycled Water System Description

☑ ***CWC § 10633 (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.

MPMW has been working with WBSD, which is the recycled water purveyor, to develop the recycled water system within MPMW's service area. WBSD is responsible for recycled water system operation and maintenance.

Currently, recycled water is only used at the SHGCC which is a 170-acre property located in the Upper Zone of MPMW's service area. The recycled water system consists of the Sharon Heights RWF, a pump station, recycled water distribution pipelines to the golf course irrigation system, and a solids disposal pipeline. In 2020, the satellite WWTP provided 20 MG recycled water to the SHGCC, offsetting demand in potable water purchased from SFPUC. A second phase of the project that could supply approximately 28 MG of recycled water over seven months a year to Stanford Linear Accelerator Center (SLAC) for irrigation and industrial uses such as for cooling towers is in very early planning stages.

Planning for a similar recycled water facility in the Bayfront Area is ongoing. WBSD completed a Bayfront Recycled Water Facilities Plan in May 2019 (Woodard and Curran, 2019). The study included additional market assessment, evaluated potential project alternatives, and identified a recommended project. The recommended project involves construction of a 0.4 MGD treatment facility along with the associated pump stations and distribution systems. WBSD anticipates that the project could deliver up to 72 MG of recycled water for irrigation, cooling towers, and other uses within the Bayfront Area starting around 2030.

6.5.4 Potential, Current, and Projected Recycled Water Uses

☑ ***CWC § 10633 (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.

☑ ***CWC § 10633 (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.

☑ ***CWC § 10633 (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.

Historically there was no recycled water use within MPMW's service area. Starting in July 2020, with the completion of the Sharon Heights Recycled Water Project, recycled water provided by WBSD became available to certain MPMW's customers. The SHGCC used 20 MG of recycled water for irrigation in 2020.

Recycled water use projections for the MPMW service area are shown in Table 6-4, which include projected demands from SHGCC and demands associated with the planned Bayfront Recycled Water Facility. SHGCC's future demand was assumed to remain constant at approximately 48 MG per year. The Bayfront Recycled Water Facility was projected to come online by 2030 and provide approximately 39 MG per year of recycled water for irrigation and 33 MG per year for indoor non-potable uses (Woodard and Curran, 2019). As the SLAC recycled water project is still in its early planning phases, it was not included in Table 6-4.

No recycled water use projections were made in previous UWMPs. As described above, the SHGCC started to use recycled water for irrigation in late 2020. Table 6-5 lists the 2020 actual recycled water use, as reported in Table 6-4.

Table 6-4 Recycled Water Direct Beneficial Uses Within Service Area (DWR Table 6-4)

	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.									
Name of Supplier Producing (Treating) the Recycled Water:		West Bay Sanitary District								
Name of Supplier Operating the Recycled Water Distribution System:		West Bay Sanitary District								
Supplemental Water Added in 2020 (volume)		0								
Source of 2020 Supplemental Water		--								
Beneficial Use Type	**Potential** Beneficial Uses of Recycled Water (Describe)	Amount of **Potential** Uses of Recycled Water (Quantity)	General Description of 2020 Uses	Level of Treatment	2020	2025	2030	2035	2040	2045 *(opt)*
Landscape irrigation (excludes golf courses)	Irrigation in Bayfront area	39 MG/year	--	Tertiary	0	0	39	39	39	--
Golf course irrigation	Irrigation of 170 acres of golf course at the SHGCC	48 MG/year	Irrigation of 170 acres of golf course at the SHGCC	Tertiary	20	48	48	48	48	--
Commercial use	Indoor non-potable use in Bayfront area	33 MG/year	--	Tertiary	0	0	33	33	33	--
				Total:	20	48	120	120	120	--
				2020 Internal Reuse	0					

NOTES:
(a) Volumes are in units of MG.
(b) The projected demands at Sharon Heights are estimated based on the average of historical demands in 2017 to 2019.
(c) Bayfront recycled water demands are estimated based on information provided by WBSD and in Bayfront Recycled Water Facilities Plan.

Table 6-5 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual (DWR Table 6-5)

	Recycled water was not used in 2015 nor projected for use in 2020. The supplier will not complete the table below.	
Beneficial Use Type	2015 Projection for 2020	2020 Actual Use
Golf course irrigation	0	20
Total	0	20
NOTES: (a) Volumes are in units of MG.		

6.5.5 Actions to Encourage and Optimize Future Recycled Water Use

☑ ***CWC § 10633 (f-g)***

(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.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

As part of the 2016 General Plan Update (i.e., ConnectMenlo), several new zoning district categories, including Office (or "O"), Life Science (or "LS"), and Mixed Use Residential (or "R-MU"), were adopted for consistency with the new Bayfront Area land use designations. The green and sustainable building requirements of these zoning districts include policies that promote recycled water use (see Table 6-6). Specifically, new development in the Bayfront Area is required to be dual plumbed for the internal use of recycled water. In addition, all new buildings 250,000 square feet or more in gross floor area should identify and use an alternate water source for all City approved non-potable applications such as on-site and offsite recycled water, or if recycled water is not feasible, incorporate conservation measures equivalent to the building's non-potable demand. As described in Section 6.5.3, the recycled water use within the MPMW service area is projected to increase by 72 MG per year in 2030, assuming development of the Bayfront Recycled Water Facility.

Table 6-6 Methods to Expand Future Recycled Water Use (DWR Table 6-6)

	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 6.5.5	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Zoning Ordinance	Require new construction in the Bayfront area to incorporate recycled water measures	Ongoing	72
		Total	72
NOTES: (a) Volumes are in units of MG. (b) The expected increase in recycled water use is estimated based on the Bayfront Recycled Water Facilities Plan (Woodard & Curran, 2019).			

6.6 Desalinated Water Opportunities

☑ *CWC § 10631 (g) A plan shall be adopted in accordance with this chapter and shall do all of the following:*

Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

Opportunities to develop desalinated water supplies from ocean water, brackish surface, and brackish groundwater were investigated by BAWSCA as part of Phase II of its Long-Term Reliable Water Supply Strategy (Strategy, see Section 7.1.1.1). According to BAWSCA, there are high costs and intensive permitting requirements associated with desalination. However, it does potentially provide a substantial yield given the limited options for generating significant new water supplies for the region. SFPUC is also exploring desalination as part of its Alternative Water Supply Planning Program (see Section 7.1.1.1).

MPMW does not anticipate opportunities for development of desalinated water supplies within the planning horizon of this UWMP and this water supply is not being considered.

6.7 Water Exchanges and Transfers

☑ ***CWC § 10631 (c)*** *A plan shall be adopted in accordance with this chapter and shall do all of the following:*

Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

6.7.1 Exchanges and Transfers

There are potential transfer and exchange opportunities within and outside of the SFPUC RWS. MPMW does not presently anticipate the need for water right transfers during normal year conditions. However, should that condition change in the future, it is possible that MPMW could purchase water from another agency or entity either within or outside of the SFPUC RWS.

Within the SFPUC RWS, it is possible to transfer water entitlements and/or banked water among agencies. The Water Shortage Allocation Plan (WSAP) adopted by all BAWSCA agencies and the SFPUC provides the basis for voluntary transfers of water among BAWSCA agencies during periods when mandatory rationing is in effect on the SFPUC RWS (see Section 7.1.1.1). Some BAWSCA agencies have the capacity to rely on groundwater or other sources during dry years and thus may be willing to transfer a portion of their wholesale water entitlement to other BAWSCA agencies in need of supply above their allocations. Securing water from willing sellers outside the SFPUC RWS is a more complex process than transfers within the RWS, which requires both a contract with the seller agency and approval by the SFPUC. BAWSCA has the authority to plan for and acquire supplemental water supplies, and continues to evaluate the feasibility of water transfers as part of its implementation of the Strategy (see Section 7.1.1.1).

6.7.2 Emergency Interties

As discussed in Section 3.4, MPMW has 13 emergency interties with four adjacent water suppliers. Three connections (one metered) are with the Cal Water’s system; a metered connection with the O'Connor Tract Co-operative Water Company; a connection with the City of Redwood City; and eight interties with the City of East Palo Alto.

6.8 Future Water Projects

☑ *CWC § 10631 A plan shall be adopted in accordance with this chapter and shall do all of the following:*

(b) (3) For any planned sources of water supply, a description of the measures that are being undertaken to acquire and develop those water supplies.

(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.

This section lists the water supply projects that may be undertaken by both the wholesaler SFPUC and MPMW (in coordination with WBSD). The effects of these projects on MPMW's long-term water supply are not all quantifiable at this point in time, therefore not all of them are included as future supplies in Table 6-9. The local projects are also documented in the City's five-year Capital Improvement Plan (CIP), which is an annually-updated, planning document that provides a long-term approach for prioritizing and implementing new projects within the City. The most recent update to the City's CIP is the FY 2020-2025 CIP (City of Menlo Park, 2020).

6.8.1 SFPUC Water Supply Projects

MPMW's wholesaler SFPUC has been implementing its Water System Improvement Plan (WSIP) since it was adopted in 2008. The WSIP includes several water supply projects to address the level of service (LOS) Goals and Objective established in the WSIP and updated in February 2020. SFPUC has also developed an Alternative Water Supply Planning Program to explore other projects that would increase overall water supply resiliency. These programs and future water supply projects are described in Section 7.1.1.1.

6.8.2 Emergency Water Supply Wells

As described in Section 6.2.4, MPMW completed construction of its first emergency groundwater well and anticipates bringing the well online in 2021. An additional one or two emergency wells are being considered as part of the Emergency Water Storage/Supply Project. The total supply capacity is targeted at 3,000 gpm. In addition, MPMW is also investigating locations for a future underground reservoir for the Lower Zone and the High Pressure Zone. Extensive information regarding the Emergency Water Storage/Supply Project can be found on the City's website: www.menlopark.org/emergencywatersupply.

6.8.3 Recycled Water

As described in Section 6.5.3, the Sharon Heights Recycled Water Project will potentially be expanded to connect SLAC. In addition, WBSD has been evaluating the project alternatives of constructing another recycled water facility in the Bayfront Area. A recommended project has been identified, which would deliver an estimated total of 72 MG of recycled water for irrigation, cooling towers, and other uses. The facility is anticipated to come online by 2030. WBSD is continuing coordination with the City to determine next steps in recycled water planning.

Table 6-7 Expected Future Water Supply Projects or Programs (DWR Table 6-7)

<table>
<tr><td></td><td colspan="6">No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.</td></tr>
<tr><td>X</td><td colspan="6">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.</td></tr>
<tr><td>Section 6.8</td><td colspan="6">Provide page location of narrative in the UWMP</td></tr>
<tr><td rowspan="2">Name of Future Projects or Programs</td><td colspan="2">Joint Project with other suppliers?</td><td rowspan="2">Description (if needed)</td><td rowspan="2">Planned Implementation Year</td><td rowspan="2">Planned for Use in Year Type</td><td rowspan="2">Expected Increase in Water Supply to Supplier</td></tr>
<tr><td>Y/N</td><td>Supplier Name</td></tr>
<tr><td>Sharon Heights Recycled Water Project - Delivery to SLAC</td><td>Y</td><td>WBSD</td><td>--</td><td>Unknown</td><td>All Year Types</td><td>28</td></tr>
<tr><td>Bayfront Recycled Water Project</td><td>Y</td><td>WBSD</td><td>--</td><td>2030</td><td>All Year Types</td><td>72</td></tr>
<tr><td colspan="7">NOTES:
(a) Volumes are in units of MG.
(b) The recycled water purveyorship for both projects listed above have been delegated to WBSD. WBSD is responsible for the project development.
(c) Expected increase in water supply is estimated based on information presented in the Recycled Water Project - Sharon Heights Mitigated Negative Declaration report (RMC, 2015) and the Bayfront Recycled Water Facilities Plan (Woodard & Curran, 2019).
(d) Projects to be constructed by SFPUC are documented in the narrative of this UWMP and in the SFPUC's 2020 UWMP.</td></tr>
</table>

6.9 Summary of Existing and Planned Sources of Water

☑ ***CWC § 10631 (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).*

☑ ***CWC § 10631 (b) (4) (D)*** *A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.*

MPMW purchases potable water from the SFPUC RWS to meet all of the potable water demands within the service area. In 2020, MPMW received approximately 1,069 MG from the SFPUC. An additional 20 MG of recycled water was supplied to SHGCC to meet its irrigation demand. MPMW's historical and current supply is presented in Table 6-8.

MPMW plans to continue purchasing wholesale water from the SFPUC RWS. Water supplies from the SFPUC through 2040 are projected to be equivalent to MPMW's ISG of 1,630 MG, which is MPMW's contractual entitlement to SFPUC wholesale water, and which survives in perpetuity. Although MPMW currently owns one groundwater well, groundwater will not normally be distributed to customers unless there is a significant water shortage and normal water supplies are low or unavailable (see the City's Water Shortage Contingency Plan in Appendix K). Therefore, groundwater is not included in the supply projections. MPMW does not anticipate developing additional long-term potable water supplies from other sources in the near future.

In addition to the potable water supply from SFPUC RWS, approximately 48 MG and 72 MG of recycled water are projected to be supplied by the Sharon Heights and Bayfront Recycled Water Facilities per year, respectively. The recycled water supply is reported to the extent that it is needed to meet the recycled water demand identified in Table 6-4. Excess available supplies are not included.

MPMW's total water supply projections are shown in Table 6-9 in five-year increments through 2040.

Table 6-8 Water Supplies - Actual (DWR Table 6-8)

Water Supply	Additional Detail on Water Supply	Actual Volume					Water Quality	Total Right or Safe Yield *(optional)*
		2016	2017	2018	2019	2020		
Potable								
Purchased or Imported Water	SFPUC RWS	847	965	1,069	1,031	1,069	Drinking Water	1,630
Total Potable		847	965	1,069	1,031	1,069		1,630
Non-Potable								
Recycled Water	Sharon Heights Recycled Water Facility	0	0	0	0	20	Recycled Water	--
Total Non-Potable		0	0	0	0	20		--

NOTES:
(a) Volumes are in units of MG.
(b) The annual water supplies are based on SFPUC Eye On Water AMI data. 2018 and 2019 data are adjusted for meter and supply errors based on the AWWA Water Audit Reports.
(c) Total supplies may not match the total water demands reported in Table 4-1. This is because the water losses calculated in AWWA Water Audit Reports and presented in Table 4-1 are based on invoices which usually do not start from the first day of the month. However, the supply data in the above table are based on real-time AMI meter reads and summed by natural month.
(d) MPMW has an ISG of 4.456 MGD, which is approximately 1,630 MG per year.

Chart 6-8 Current and Historical Water Supply

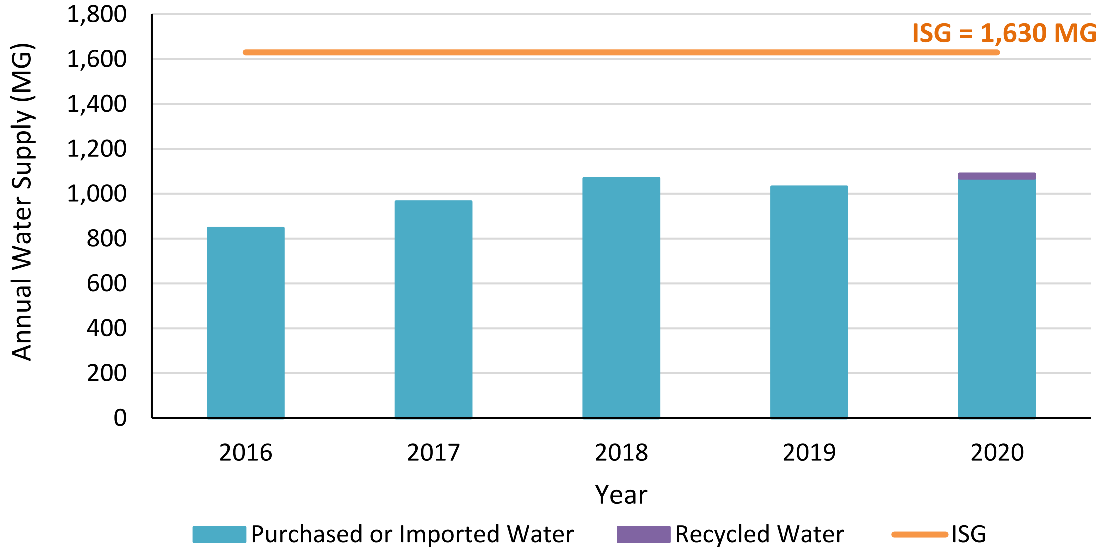
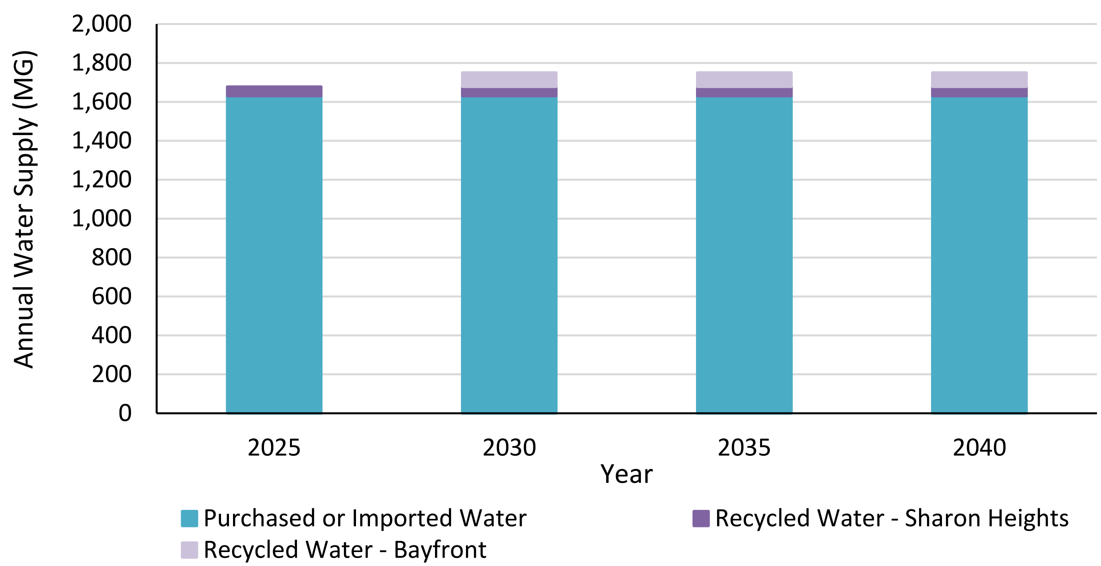


Table 6-9 Water Supplies - Projected (DWR Table 6-9)

Water Supply	Additional Detail on Water Supply	Projected Water Supply									
		2025		2030		2035		2040		2045 *(opt)*	
		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Projected Potable											
Purchased or Imported Water	SFPUC RWS	1,630	--	1,630	--	1,630	--	1,630	--	--	--
	Total Potable	1,630	--	1,630	--	1,630	--	1,630	--	--	--
Projected Non-Potable											
Recycled Water	Sharon Heights Recycled Water Facility	48	--	48	--	48	--	48	--	--	--
Recycled Water	Bayfront Recycled Water Facility	0	--	72	--	72	--	72	--	--	--
	Total Non-Potable	48	--	120	--	120	--	120	--	--	--

NOTES:
(a) Volumes are in units of MG.
(b) MPMW has an ISG of 4.456 MGD, which is approximately 1,630 MG per year.
(c) The recycled water supply reported herein are reported to the extent that they are needed to meet the recycled water demand in Table 6-4. Excess available supplies are not reported.

Chart 6-9 Projected Water Supply



6.10 Special Conditions

☑ ***CWC § 10635(b)***

(4) 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.

6.10.1 Climate Change Effects

Information regarding the impacts of climate change to the SFPUC RWS supply was provided by BAWSCA in coordination with SFPUC and is provided verbatim below:

> The issue of climate change has become an important factor in water resources planning in California, and is frequently considered in urban water management planning processes, though the extent and precise effects of climate change remain uncertain. There is convincing evidence that increasing concentrations of greenhouse gasses have caused and will 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 and virtually all projections indicate this will continue through the 21st century. These changes will have a direct effect on water resources in California, and numerous studies have been conducted to determine the potential impacts to water resources. Based on these studies, climate change could result in the following types of water resource impacts, including impacts on the watersheds in the Bay Area:
>
> - Reductions in the average annual snowpack due to a rise in the snowline and a shallower snowpack in the low and medium elevation zones, such as in the Tuolumne River basin, 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 rather than 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;
> - Increased water temperatures with accompanying potential adverse effects on some fisheries and water quality;
> - Increases in evaporation and concomitant increased irrigation need; and
> - Changes in urban and agricultural water demand.
>
> Both the SFPUC and BAWSCA participated in the 2020 update of the Bay Area Integrated Regional Water Management Plan (BAIRWMP), which includes an assessment of the potential climate change vulnerabilities of the region’s water resources and identifies climate change adaptation strategies. In addition, the SFPUC continues to study the effect of climate change on the RWS. These works are summarized below.

6.10.1.1 Bay Area Integrated Regional Water Management Plan

Climate change adaptation continues to be an overarching theme for the 2019 BAIRWMP update. As stated in the BAIRWMP, identification of watershed characteristics that could potentially be vulnerable to future climate change is the first step in assessing vulnerabilities of water resources in the Bay Area Region (Region). Vulnerability is defined as the degree to which a system is exposed to, susceptible to, and able to cope with or adjust to, the adverse effects of climate change. A vulnerability assessment was conducted in accordance with the DWR's Climate Change Handbook for Regional Water Planning and using the most current science available for the Region. The vulnerability assessment, summarized in the table below, provides the main water planning categories applicable to the Region and a general overview of the qualitative assessment of each category with respect to anticipated climate change impacts.

Summary of BAIRWMP Climate Change Vulnerability Assessment

Vulnerability Areas	General Overview of Vulnerabilities
Water Demand	**Urban and Agricultural Water Demand** – Changes to hydrology in the Region as a result of climate change could lead to changes in total water demand and use patterns. Increased irrigation (outdoor landscape or agricultural) is anticipated to occur with temperature rise, increased evaporative losses due to warmer temperature, and a longer growing season. Water treatment and distribution systems are most vulnerable to increases in maximum day demand.
Water Supply	**Imported Water** – Imported water derived from the Sierra Nevada sources and Delta diversions provide 66 percent of the water resources available to the Region. Potential impacts on the availability of these sources resulting from climate change directly affect the amount of imported water supply delivered to the Region. **Regional Surface Water** – Although future projections suggest that small changes in total annual precipitation over the Region will not change much, there may be changes to when precipitation occurs with reductions in the spring and more intense rainfall in the winter. **Regional Groundwater** – Changes in local hydrology could affect natural recharge to the local groundwater aquifers and the quantity of groundwater that could be pumped sustainably over the long-term in some areas. Decreased inflow from more flashy or more intense runoff, increased evaporative losses and warmer and shorter winter seasons can alter natural recharge of groundwater. Salinity intrusion into coastal groundwater aquifers due to sea-level rise could interfere

Vulnerability Areas	General Overview of Vulnerabilities
	with local groundwater uses. Furthermore, additional reductions in imported water supplies would lead to less imported water available for managed recharge of local groundwater basins and potentially more groundwater pumping in lieu of imported water availability.
Water Quality	**Imported Water** – For sources derived from the Delta, sea-level rise could result in increases in chloride and bromide (a disinfection by-product (DBP) precursor that is also a component of sea water), potentially requiring changes in treatment for drinking water. Increased temperature could result in an increase in algal blooms, taste and odor events, and a general increase in DBP formation **Regional Surface Water** – Increased temperature could result in lower dissolved oxygen in streams and prolong thermocline stratification in lakes and reservoirs forming anoxic bottom conditions and algal blooms. Decrease in annual precipitation could result in higher concentrations of contaminants in streams during droughts or in association with flushing rain events. Increased wildfire risk and flashier or more intense storms could increase turbidity loads for water treatment. **Regional Groundwater** – Sea-level rise could result in increases in chlorides and bromide for some coastal groundwater basins in the Region. Water quality changes in imported water used for recharge could also impact groundwater quality.
Sea-Level Rise	Sea-level rise is additive to tidal range, storm surges, stream flows, and wind waves, which together will increase the potential for higher total water levels, overtopping, and erosion. Much of the bay shoreline is comprised of low-lying diked baylands which are already vulnerable to flooding. In addition to rising mean sea level, continued subsidence due to tectonic activity will increase the rate of relative sea-level rise. As sea-level rise increases, both the frequency and consequences of coastal storm events, and the cost of damage to the built and natural environment, will increase. Existing coastal armoring (including levees, breakwaters, and other structures) is likely to be insufficient to protect against projected sea-level rise. Crest elevations of structures will have to be raised or structures relocated to reduce hazards from higher total water levels and larger waves.

Vulnerability Areas	General Overview of Vulnerabilities
Flooding	Climate change projections are not sensitive enough to assess localized flooding, but the general expectation is that more intense storms would occur thereby leading to more frequent, longer and deeper flooding. Changes to precipitation regimes may increase flooding. Elevated Bay elevations due to sea-level rise will increase backwater effects exacerbating the effect of fluvial floods and storm drain backwater flooding.
Ecosystem and Habitat	Changes in the seasonal patterns of temperature, precipitation, and fire due to climate change can dramatically alter ecosystems that provide habitats for California's native species. These impacts can result in species loss, increased invasive species ranges, loss of ecosystem functions, and changes in vegetation growing ranges. Reduced rain and changes in the seasonal distribution of rainfall may alter timing of low flows in streams and rivers, which in turn would have consequences for aquatic ecosystems. Changes in rainfall patterns and air temperature may affect water temperatures, potentially affecting coldwater aquatic species. Bay Area ecosystems and habitat provide important ecosystem services, such as: carbon storage, enhanced water supply and quality, flood protection, food and fiber production. Climate change is expected to substantially change several of these services. The region provides substantial aquatic and habitat-related recreational opportunities, including: fishing, wildlife viewing, and wine industry tourism (a significant asset to the region) that may be at risk due to climate change effects.
Hydropower	Currently, several agencies in the Region produce or rely on hydropower produced outside of the Region for a portion of their power needs. As the hydropower is produced in the Sierra, there may be changes in the future in the timing and amount of energy produced due to changes in the timing and amount of runoff as a result of climate change. Some hydropower is also produced within the region and could also be affected by changes in the timing and amount of runoff.

Source: 2019 Bay Area Integrated Regional Water Management Plan (BAIRWMP), Table 16-3.

6.10.1.2 SFPUC Climate Change Studies

The SFPUC views assessment of the effects of climate change as an ongoing project requiring regular updating to reflect improvements in climate science, atmospheric/ocean modeling, and human response to the threat of greenhouse gas emissions. Climate change research by the SFPUC began in 2009 and continues to be refined. In its 2012 report "Sensitivity of Upper Tuolumne River Flow to Climate Change Scenarios," the SFPUC assessed the sensitivity of runoff into Hetch Hetchy Reservoir to a range of changes in temperature and precipitation due to climate change. Key conclusions from the report include the following:

- With differing increases in temperature alone, the median annual runoff at Hetch Hetchy would decrease by 0.7-2.1 percent from present-day conditions by 2040 and by 2.6-10.2 percent from present-day by 2100. Adding differing decreases in precipitation on top of temperature increases, the median annual runoff at Hetch Hetchy would decrease by 7.6-8.6 percent from present-day conditions by 2040 and by 24.7-29.4 percent from present-day conditions by 2100.
- In critically dry years, these reductions in annual runoff at Hetch Hetchy would be significantly greater, with runoff decreasing up to 46.5 percent from present day conditions by 2100 utilizing the same climate change scenarios.
- In addition to the total change in runoff, there will be a shift in the annual distribution of runoff. Winter and early spring runoff would increase and late spring and summer runoff would decrease.
- Under all scenarios, snow accumulation would be reduced and snow would melt earlier in the spring, with significant reductions in maximum peak snow water equivalent under most scenarios.

Currently, the SFPUC is conducting a comprehensive assessment of the potential effects of climate change on 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 2020 to 2070. There are many uncertain factors such as climate change, changing regulations, water quality, growth and economic cycles that may create vulnerabilities for the Regional Water System'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 is difficult to predict, but nonetheless they need to be considered in SFPUC planning. To address this planning challenge, the project uses a vulnerability-based planning approach to explore a range of future conditions to identify vulnerabilities, 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.

6.10.2 Regulatory Conditions and Project Development

Emerging regulatory conditions (e.g., issues surrounding the amendments to the Water Quality Control Plan for the San Francisco/Sacramento-San Joaquin Delta Estuary [Bay-Delta Plan Amendment]) may affect planned future projects and the characterization of future water supply availability and analysis. A detailed description of the potential impacts of Bay-Delta Plan Amendment implementation on RWS supply reliability is included in Section 7.1.1.1. MPMW currently does not have any plans to develop new supply sources. If MPMW does move forward with any plans to develop supply projects, emerging regulatory conditions will be considered, and the associated water supply reliability impacts will be assessed in future UWMP updates.

6.10.3 Other Locally Applicable Criteria

Other locally applicable criteria may affect characterization and availability of an identified water supply (e.g., changes in regional water transfer rules may alter the availability of a water supply that had historically been readily available). Reliability of the RWS supply is further discussed in Section 7.1.1.1. MPMW does not have any current plans to develop new supply sources. If MPMW does move forward with any plans to develop supply projects, locally applicable criteria will be considered, and the associated water supply reliability impacts will be assessed in future UWMP updates.

6.11 Energy Intensity

☑ ***CWC § 10631.2***

(a) In addition to the requirements of Section 10631, an urban water management plan shall include any of the following information that the urban water supplier can readily obtain:
(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 through 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.
(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. The department may consider studies and calculations conducted by the Public Utilities Commission in developing the methodology.
(c) The Legislature finds and declares that energy use is only one factor in water supply planning and shall not be considered independently of other factors.

MPMW used the "Total Utility Approach" defined by DWR in the UWMP Guidebook 2020 to report water-related energy consumption. Calendar year 2019 is selected as the one-year reporting period, and utility bills for the whole year are used as the source for energy consumption data. It is estimated that a total of approximately 359,907 kilowatt hours (kWh) of energy was consumed for operation of water facilities in MPMW's water system in 2019. As the total volume of water entering the system was 1,031 MG, the energy intensity was calculated to be 349 kWh/MG (Table 6-10).

Table 6-10 Recommended Energy Intensity - Total Utility Approach (DWR Table O-1B)

Urban Water Supplier: *MPMW*

Water Delivery Product
Retail Potable Deliveries

Enter Start Date for Reporting Period	1/1/2019	Urban Water Supplier Operational Control		
End Date	12/31/2019			
Is upstream embedded in the values reported?	N	Sum of All Water Management Processes	Non-Consequential Hydropower	
Water Volume Units Used	MG	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process (MG)		*1,031*	*0*	*1,031*
Energy Consumed (kWh)		*359,907*	*0*	*359,907*
Energy Intensity (kWh/MG)		*349.2*	*0.0*	*349.2*

Quantity of Self-Generated Renewable Energy
0 kWh

Data Quality
Metered Data

Data Quality Narrative:
Volume of water data is from the SFPUC AMI meters. Energy usage is for water facilities and is from the City's energy bills.

Narrative:
MPMW utilizes the pump station to convey water from the Upper Zone turnout to supplement demands and to fill the storage tanks.

7 WATER SERVICE RELIABILITY AND DROUGHT RISK ASSESSMENT

☑ ***CWC § 10620 (f)***

An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

☑ ***CWC § 10630.5***

Each plan shall include a simple lay description of how much water the agency has on a reliable basis, how much it needs for the foreseeable future, what the agency's strategy is for meeting its water needs, the challenges facing the agency, and any other information necessary to provide a general understanding of the agency's plan.

This chapter assesses the reliability of Menlo Park Municipal Water's (MPMW's) water supplies, with a specific focus on potential constraints, including purchased water supply availability, water quality, and climate change. The intent of this chapter is to identify any potential constraints that could affect the reliability of MPMW's supply during normal, single dry-year, and multiple dry-year hydrologic conditions.

As described in Section 6, all of MPMW's potable water supply is purchased from the San Francisco Public Utilities Commission (SFPUC) Regional Water System (RWS) and a portion of the irrigation use is served by recycled water. The reliability of the SFPUC RWS is anticipated to vary greatly in different year types. MPMW has relied on SFPUC's RWS supply reliability estimates and the drought allocation structure provided by SFPUC and the Bay Area Water Supply and Conservation Agency (BAWSCA) to estimate available RWS supplies in all year types through 2040. In addition to the long-term water service reliability assessment, this chapter also presents a Drought Risk Assessment (DRA) to evaluate MPMW's supply risks under a severe drought period lasting for the next five consecutive years (i.e., through 2025).

7.1 Water Service Reliability Assessment

The following sections describe MPMW's water service reliability assessment, which presents MPMW's expected water service reliability for a normal year, single dry year, and five consecutive dry years projections in five-year increments between 2025 and 2040.

7.1.1 Service Reliability – Constraints on Water Sources

Several potential constraints have been identified on future supply availability, water quality, and climate change. These constraints are summarized in the following sections.

7.1.1.1 Regional Water System Supply Constraints

☑ ***CWC § 10631 (h)*** *A plan shall be adopted in accordance with this chapter and shall do all of the following:*

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. 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). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (f).

Detailed information is provided below regarding factors that impact the SFPUC RWS supply reliability. The source for this information is the common language provided by the SFPUC and BAWSCA (see Appendix G).

Level of Service Goals

The SFPUC historically has met demand in its service area in all year types from its watersheds, which consist of:

- Tuolumne River watershed
- Alameda Creek watershed
- San Mateo County watersheds

In general, 85 percent of the supply comes from the Tuolumne River through Hetch Hetchy Reservoir and the remaining 15 percent comes from the local watersheds through the San Antonio, Calaveras, Crystal Springs, Pilarcitos and San Andreas Reservoirs. The adopted Water Supply Improvement Program (WSIP) retains this mix of water supply for all year types.

In 2008, the SFPUC adopted Level of Service (LOS) Goals and Objectives in conjunction with the adoption of WSIP. The SFPUC updated the LOS Goals and Objectives in February 2020. The SFPUC's LOS Goals and Objectives related to water supply are:

Program Goal	System Performance Objective
Water Supply – *meet customer water needs in non-drought and drought periods*	• Meet all state and federal regulations to support the proper operation of the water system and related power facilities. • Meet average annual water demand of 265 mgd from the SFPUC watersheds for retail and Wholesale Customers during non–drought years for system demands consistent with the 2009 Water Supply Agreement. • Meet dry-year delivery needs while limiting rationing to a maximum 20 percent system-wide reduction in water service during extended droughts. • Diversify water supply options during non-drought and drought periods. • Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers.

Bay-Delta Plan Amendment Impacts

Based on information provided by SFPUC and BAWSCA (Appendix G and Appendix I) the adoption of the 2018 Bay-Delta Plan Amendment is anticipated to impact the reliability of the RWS supplies in the future.

> 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) to establish water quality objectives to maintain the health of the Bay-Delta ecosystem. 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 salmon populations in three San Joaquin River tributaries (the Stanislaus, Merced, and Tuolumne Rivers) and the Bay-Delta. The Bay-Delta Plan Amendment requires the release of 30-50% of the "unimpaired flow"[16] 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 Urban Water Management Plan (UWMP) in normal years but would experience supply shortages in single dry years or multiple

[16] "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.)

dry years. Implementation of the Bay-Delta Plan Amendment will require rationing in all single dry years and multiple dry years. The SFPUC has initiated an Alternative Water Supply Planning Program (AWSP) to ensure that San Francisco can meet its Retail and Wholesale Customer water needs, address projected dry years shortages, and limit rationing to a maximum 20 percent system-wide in accordance with adopted SFPUC policies. This program is in early planning stages and is intended to meet future water supply challenges and vulnerabilities such as environmental flow needs and other regulatory changes; earthquakes, disasters, and emergencies; increases in population and employment; and climate change. As the region faces future challenges – both known and unknown – the SFPUC is considering this suite of diverse non-traditional supplies and leveraging regional partnerships to meet Retail and Wholesale Customer needs through 2045.

The SWRCB has stated that it intends to implement the Bay-Delta Plan Amendment on the Tuolumne River by the year 2022, assuming all required approvals are obtained by that time. But implementation of the Plan Amendment is uncertain for multiple reasons.

First, since adoption of the Bay-Delta Plan Amendment, 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 in the early stages and there have been no dispositive court rulings as of this date.

Second, the Bay-Delta Plan Amendment is not self-implementing and does not automatically allocate responsibility for meeting its new flow requirements to the SFPUC or any other water rights holders. Rather, the Bay-Delta Plan Amendment merely provides a regulatory framework for flow allocation, which must be accomplished by other regulatory and/or adjudicatory proceedings, such as a comprehensive water rights adjudication or, in the case of the Tuolumne River, may be implemented 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 the other regulatory and/or adjudicatory proceedings would likely 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 SFPUC).

Third, in recognition of the obstacles to implementation of the Bay-Delta Plan Amendment, the SWRCB 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" by March 1, 2019, 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." In accordance with the SWRCB's instruction, on March 1, 2019, SFPUC, in partnership with other key stakeholders, submitted a proposed project description for the Tuolumne River that could be the basis for a voluntary substitute agreement with the SWRCB ("March 1st Proposed Voluntary Agreement"). On March 26, 2019, the Commission adopted Resolution No. 19-0057 to support the SFPUC's participation in the Voluntary Agreement negotiation process. To date, those negotiations are ongoing under the California Natural Resources Agency and the leadership of the Newsom administration.[17]

Drought Allocation Methodology

Given the constraints described above, the SFPUC has provided all of the Wholesale Customers with estimates of the RWS reliability in all year types though 2045, as shown in Appendix I. The Tier One Plan describes the method for allocating RWS water between Retail and Wholesale Customers during system-wide shortages of 20% or less. The Tier Two Plan allocates the collective Wholesale Customer share from the Tier One Plan among each of SFPUC's 26 Wholesale Customers.

For the purposes of 2020 UWMP development only, SFPUC and BAWSCA have provided revised methodologies to allocate RWS supplies during projected future single dry and multiple dry years in instances where the projects supply shortfalls are greater than 20%. SFPUC and BAWSCA assumed that Tier One allocations for system-wide shortfalls of 16% to 20% would apply for all shortfalls greater than 20%. BAWSCA provided a revised methodology to allocate RWS supplies to Wholesale Agencies. The inclusion of these revised methodologies, which serve as the preliminary basis for UWMP supply reliability analyses, does not in any way imply an agreement by BAWSCA member agencies as to the exact allocation methodologies.

The Tier One and Tier Two Plans and the drought allocation methodologies used in the 2020 UWMP for shortfalls of greater than 20% are further described below.

Tier One Drought Allocations

In July 2009, San Francisco and its Wholesale Customers in Alameda County, Santa Clara County, and San Mateo County (Wholesale Customers) adopted the Water Supply Agreement (WSA), which includes a Water Shortage Allocation Plan (WSAP) that describes the method for allocating water from the RWS between Retail and Wholesale Customers during system-wide shortages of 20 percent or less. The WSAP, also known as the Tier One Plan, was amended in the 2018 Amended and Restated WSA.

The SFPUC allocates water under the Tier One Plan when it determines that the projected available water supply is up to 20 percent less than projected system-wide water purchases. The following table shows the SFPUC (i.e, Retail Customers) share and the Wholesale Customers' share of the annual water supply available during shortages depending on the level of system-wide reduction in water use that is required. The Wholesale Customers' share will be apportioned among the individual Wholesale Customers based on a separate methodology adopted by the Wholesale Customers, known as the Tier Two Plan, discussed further below.

[17] California Natural Resources Agency, "Voluntary Agreements to Improve Habitat and Flow in the Delta and its Watersheds," available at https://files.resources.ca.gov/voluntary-agreements/.

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%

> The Tier One Plan allows for voluntary transfers of shortage allocations between the SFPUC and any Wholesale Customer as well as between Wholesale Customers themselves. In addition, water "banked" by a Wholesale Customer, through reductions in usage greater than required, may also be transferred.
>
> As amended in 2018, the Tier One Plan requires Retail Customers to conserve a minimum of 5 percent during droughts. If Retail Customer demands are lower than the Retail Customer allocation (resulting in a "positive allocation" to Retail[18]) then the excess percentage would be re-allocated to the Wholesale Customers' share. The additional water conserved by Retail Customers up to the minimum 5 percent level is deemed to remain in storage for allocation in future successive dry years.
>
> The Tier One Plan will expire at the end of the term of the WSA in 2034, unless mutually extended by San Francisco and the Wholesale Customers.
>
> The Tier One Plan applies only when the SFPUC determines that a system-wide water shortage exists and issues a declaration of a water shortage emergency under California Water Code Section 350. Separate from a declaration of a water shortage emergency, the SFPUC may opt to request voluntary cutbacks from its Retail and Wholesale Customers to achieve necessary water use reductions during drought periods.

As discussed above, the Tier One Plan only applies to system-wide shortages of 20% or less, and there is currently no methodology for sharing available water between SFPUC and Wholesale Customers for system-wide shortages of greater than 20%. SFPUC and BAWSCA assumed that Tier One allocations for System-Wide shortfalls of 16% to 20% would apply for all shortfalls greater than 20% for purposes of the UWMP supply reliability analyses. The analysis included herein does not in any way imply an agreement by BAWSCA member agencies with the assumed application of the Tier One allocations by SFPUC and BAWSCA for shortages of greater than 20%.

Tier Two Drought Allocations

> The Wholesale Customers have negotiated and adopted the Tier Two Plan, referenced above, which allocates the collective Wholesale Customer share from the Tier One Plan

[18] See Water Supply Agreement, Water Shortage Allocation Plan (Attachment H), Section 2.1.

among each of the 26 Wholesale Customers. These Tier Two allocations are based on a formula that takes into account multiple factors for each Wholesale Customer including:

- Individual Supply Guarantee;
- Seasonal use of all available water supplies; and
- Residential per capita use.

The water made available to the Wholesale Customers collectively will be allocated among them in proportion to each Wholesale Customer's Allocation Basis, expressed in millions of gallons per day (MGD), which in turn is the weighted average of two components. The first component is the Wholesale Customer's Individual Supply Guarantee, as stated in the WSA, and is fixed. The second component, the Base/Seasonal Component, is variable and is calculated using the monthly water use for three consecutive years prior to the onset of the drought for each of the Wholesale Customers for all available water supplies. The second component is accorded twice the weight of the first, fixed component in calculating the Allocation Basis. Minor adjustments to the Allocation Basis are then made to ensure a minimum cutback level, a maximum cutback level, and a sufficient supply for certain Wholesale Customers.

The Allocation Basis is used in a fraction, as numerator, over the sum of all Wholesale Customers' Allocation Bases to determine each wholesale customer's Allocation Factor. The final shortage allocation for each Wholesale Customer is determined by multiplying the amount of water available to the Wholesale Customers' collectively under the Tier One Plan, by the Wholesale Customer's Allocation Factor.

The Tier Two Plan requires that the Allocation Factors be calculated by BAWSCA each year in preparation for a potential water shortage emergency. As the Wholesale Customers change their water use characteristics (e.g., increases or decreases in SFPUC purchases and use of other water sources, changes in monthly water use patterns, or changes in residential per capita water use), the Allocation Factor for each Wholesale Customer will also change. However, for long-term planning purposes, each Wholesale Customer shall use as its Allocation Factor, the value identified in the Tier Two Plan when adopted.

Per WSA Section 3.11, the Tier One and Tier Two Plans will be used to allocate water from the Regional Water System between Retail and Wholesale Customers during system-wide shortages of 20% or less. For Regional Water System shortages in excess of 20%, San Francisco shall (a) follow the Tier 1 Shortage Plan allocations up to the 20% reduction, (b) meet and discuss how to implement incremental reductions above 20% with the Wholesale Customers, and (c) make a final determination of allocations above the 20% reduction. After the SFPUC has made the final allocation decision, the Wholesale Customers shall be free to challenge the allocation on any applicable legal or equitable basis. For purposes of the 2020 UWMPs, for San Francisco Regional Water System (RWS) shortages in excess of 20%, the allocations among the Wholesale Customers is assumed to be equivalent among them and to equal the drought cutback to Wholesale Customer by the SFPUC.

The Tier Two Plan, which initially expired in 2018, has been extended by the BAWSCA Board of Directors every year since for one additional calendar year. In November 2020, the BAWSCA Board voted to extend the Tier Two Plan through the end of 2021.

Revised Drought Allocation Plan

As detailed by BAWSCA in multiple memos and workshops (Appendix I), the Tier Two Plan was not designed for RWS shortages greater than 20%.[19] In a memorandum dated 1 March 2021, BAWSCA provided a refined methodology to allocate RWS supplies during projected future single dry and multiple dry years in the instance where the supply shortfalls are greater than 20%. The revised methodology developed by BAWSCA allocates the wholesale RWS supplies as follows:

1. When the average Wholesale Customers' RWS shortages are 10 percent or less, an equal percent reduction will be applied across all agencies. This is consistent with the existing Tier Two requirement of a minimum 10 percent cutback in any Tier Two application scenario.
2. When average Wholesale Customers' shortages are between 10 and 20 percent, the Tier Two Plan will be applied.
3. When the average Wholesale Customers' RWS shortages are greater than 20 percent, an equal percent reduction will be applied across all agencies.

The associated allocations based on the updated BAWSCA methodology are included as Appendix I. While this allocation methodology has been used herein, MPMW notes per BAWSCA's memoranda dated 18 February 2021 (Appendix I)

> "BAWSCA recognizes that this is not an ideal situation or method for allocation of available drought supplies. In the event of actual RWS shortages greater than 20 percent, the Member Agencies would have the opportunity to negotiate and agree upon a more nuanced and equitable approach. Such an approach would likely consider basic health and safety needs, the water needs to support critical institutions such as hospitals, and minimizing economic impacts on individual communities and the region."

As such, this allocation method is only intended to serve as the preliminary basis for the 2020 UWMP supply reliability analysis. The analysis provided herein does not in any way imply an agreement by BAWSCA member agencies as to the exact allocation methodology. BAWSCA member agencies are in discussions about jointly developing an allocation method that would consider additional equity factors in the event that SFPUC is not able to deliver its contractual supply volume, and its cutbacks to the RWS supply exceed 20%.

7.1.1.2 *Recycled Water Supply Constraints*

Recycled water currently supplies 2% of MPMW's total demand and is anticipated to supply 8% of MPMW's total demand by 2040 (see Chapters 4 and 6). Recycled water is assumed to be a reliable and stable water supply source and is estimated to be available during all hydrologic years at a volume that meets MPMW's projected recycled water demands.

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[19] Note that the Tier One Drought Allocations were also not designed for shortages greater than 20%. SFPUC and BAWSCA have assumed for UWMP planning purposes that the Wholesale Share will remain 62.5% for all shortfalls greater than 16%.

7.1.1.3 Water Quality

☑ ***CWC § 10634***

The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

Impaired water quality also has the potential to affect water supply reliability. As discussed in Section 6, the majority of the water supply to the SFPUC RWS is from the Hetch Hetchy Reservoir in the Sierra Nevada Mountains. The Hetch Hetchy Reservoir is considered a very high-quality water source due to low total dissolved solid (TDS) concentrations and other factors. Additional water supplies from the Alameda and Peninsula sources come from areas with restricted access to protect the source water quality.

The SFPUC's Water Quality Division (WQD) regularly collects and tests water samples from reservoirs and designated sampling points throughout the RWS to ensure that the SFPUC's water meets or exceeds federal and state drinking water standards. In 2019, the WQD conducted more than 53,650 drinking water tests in the sources and transmission systems. This is in addition to the extensive treatment process control monitoring performed by the SFPUC's certified operators and online instruments. The SFPUC also has online instruments providing continuous water quality monitoring at numerous locations.

Additionally, MPMW routinely collects water quality samples and monitors water quality within its own distribution system. The results of the testing are summarized annually in Water Quality Reports (also known as "Consumer Confidence Reports"), which are available on the City's website: https://www.menlopark.org/waterquality. As can be seen therein, all of the analyzed constituents were detected at concentrations below the Maximum Contaminant Level (MCL) in 2019.

The results of MPMW's and SFPUC's water quality assessments show that SFPUC RWS watersheds have very low levels of contaminants, and that those contaminants that are found at low levels are associated with wildlife and, to a limited extent, human recreation. For the purposes of this UWMP, it is anticipated that this high-quality potable water source will continue to be available to MPMW through the planning horizon ending in the year 2040. Water quality is not expected to impact the reliability of MPMW's supplies.

7.1.1.4 Climate Change

☑ ***CWC § 10631 (b) (1)***

...For each source of water supply, consider any information pertinent to the reliability analysis conducted pursuant to Section 10635, including changes in supply due to climate change.

Section 6.10.1 provides a summary of the assessments of the applicable climate change on supplies that SFPUC has previously performed and those planned for the near term. The anticipated effects of climate change have been directly factored into MPMW's assessment of its supply reliability. MPMW is actively working with SFPUC and BAWSCA to further quantify and consider future climate change impacts as part of its ongoing supply and operations planning.

7.1.2 Service Reliability - Year Type Characterization

☑ ***CWC § 10631 (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, including all of the following:

☑ ***CWC § 10631 (b)(1)***

A detailed discussion of anticipated supply availability under a normal water year, single dry year, and droughts lasting at least five years, as well as more frequent and severe periods of drought, as described in the drought risk assessment. For each source of water supply, consider any information pertinent to the reliability analysis conducted pursuant to Section 10635, including changes in supply due to climate change.

☑ ***CWC § 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. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

Per the UWMP Guidebook 2020, the water service reliability assessment includes three unique year types:

- A normal hydrologic year represents the water supplies available under normal conditions, this could be an averaged range of years or a single representative year,
- A single dry year represents the lowest available water supply, and
- A five-consecutive year drought represents the driest five-year period in the historical record.

The available SFPUC RWS supplies by year type is provided by BAWSCA and SFPUC in Appendix G and Appendix I and are presented in Table 7-1 and Table 7-3. Data and methods used to develop these dry year supply availabilities are consistent with the UWMP Guidebook 2020 methodology and are described in the sections below.

Table 7-1 Basis of SFPUC RWS Water Year Data (Reliability Assessment) (DWR Table 7-1)

<table>
<tr><th rowspan="4">Year Type</th><th rowspan="4">Base Year</th><th colspan="3">Available Supplies if Year Type Repeats</th></tr>
<tr><td>X</td><td colspan="2">Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP.
Location: Table 7-3</td></tr>
<tr><td></td><td colspan="2">Quantification of available supplies is provided in this table as either volume only, percent only, or both.</td></tr>
<tr><th colspan="2">Volume Available</th><th>% of Average Supply</th></tr>
<tr><td>Average Year</td><td></td><td colspan="2"></td><td>100%</td></tr>
<tr><td>Single-Dry Year</td><td></td><td colspan="2"></td><td></td></tr>
<tr><td>Consecutive Dry Years 1st Year</td><td></td><td colspan="2"></td><td></td></tr>
<tr><td>Consecutive Dry Years 2nd Year</td><td></td><td colspan="2"></td><td></td></tr>
<tr><td>Consecutive Dry Years 3rd Year</td><td></td><td colspan="2"></td><td></td></tr>
<tr><td>Consecutive Dry Years 4th Year</td><td></td><td colspan="2"></td><td></td></tr>
<tr><td>Consecutive Dry Years 5th Year</td><td></td><td colspan="2"></td><td></td></tr>
<tr><td colspan="5">NOTES:</td></tr>
</table>

In addition, a portion of MPMW's irrigation use is served by recycled water. As discussed in Section 7.1.1.2, MPMW anticipates that 100% of its recycled water supply will be available during all year types (Table 7-2).

Table 7-2 Basis of Recycled Water Year Data (Reliability Assessment) (DWR Table 7-1)

Year Type	Base Year	Available Supplies if Year Type Repeats	
			Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location ___________________________
		X	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available	% of Average Supply
Average Year			100%
Single-Dry Year			100%
Consecutive Dry Years 1st Year			100%
Consecutive Dry Years 2nd Year			100%
Consecutive Dry Years 3rd Year			100%
Consecutive Dry Years 4th Year			100%
Consecutive Dry Years 5th Year			100%
NOTES:			

7.1.2.1 SFPUC Supply Modeled RWS Dry Year Supply Availability

As described in SFPUC's 2020 UWMP, SFPUC used the Hetch Hetchy and Local Simulation Model (HHLSM) to estimate SFPUC RWS supply availability for water service reliability assessment and the DRA (Section 7.2). HHLSM simulates supplies over a historical record of hydrology from 1920 through 2017 with a representation of current and planned SFPUC RWS infrastructure and operations.

Water supply shortfalls presented by SFPUC in Appendix I were estimated using SFPUC's design drought methodology. The SFPUC uses a hypothetical 8.5-year design drought that is more severe than what the RWS has historically experienced 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. The five-consecutive-year dry sequence used for the UWMP represents years 2 through 6 of the design drought. However, the modeling approach assumes water supply rationing each year that is designed to provide sufficient carry-over water in SFPUC reservoirs to continue delivering water, although at reduced levels, during each year of the five-consecutive year drought and the remaining years of the design drought (SFPUC, 2021).

SFPUC provided results for two modeled scenarios, which show significantly different supply reliability projections for the RWS:

1. With full implementation of the Bay-Delta Plan Amendment in 2023
2. Without implementation of the Bay-Delta Plan Amendment

The SFPUC decided to present the water reliability analysis with full implementation of the Bay-Delta Plan Amendment in the SFPUC 2020 UWMP Submittal Tables and provided the following rationale for that decision:

> The adoption of the Bay-Delta Plan Amendment may significantly impact the supply available from the RWS. SFPUC recognizes that the Bay-Delta Plan Amendment has been adopted and that, given that it is now state law, we must plan for a future in which it is fully implemented. SFPUC also acknowledges that the plan is not self-implementing and therefore does not automatically go into effect. SFPUC is currently pursuing a voluntary agreement as well as a lawsuit which would limit implementation of the Plan. With both of these processes occurring on an unknown timeline, SFPUC does not know at this time when the Bay-Delta Plan Amendment is likely to go into effect. As a result, it makes sense to conduct future supply modeling for a scenario that doesn't include implementation of the Bay-Delta Plan Amendment, as that represents a potential supply reliability scenario.
>
> Because of the uncertainty surrounding implementation of the Bay-Delta Plan Amendment, the SFPUC conducted water service reliability assessment that includes: (1) a scenario in which the Bay-Delta Plan Amendment is fully implemented in 2023, and (2) a scenario that considers the SFPUC system's current situation without the Bay-Delta Plan Amendment. The two scenarios provide a bookend for the possible future scenarios regarding RWS supplies. The standardized tables associated with the SFPUC's UWMP contain the future scenario that assumes implementation of the Bay-Delta Plan Amendment starting in 2023.
>
> Although the SWRCB has stated it intends to implement the Bay-Delta Plan Amendment on the Tuolumne River by the year 2022, given the current level of uncertainty, it is assumed for the purposes of the SFPUC's draft UWMP that the Bay-Delta Plan Amendment will be fully implemented starting in 2023.

As shown in Appendix I, SFPUC also provided results for each of the modeling scenarios described above assuming demands on the RWS equal to both: (1) the total of projected retail demands and projected Wholesale Customer purchases and (2) a constant water demand of 265 million gallons per day (MGD) from the SFPUC watersheds for retail and Wholesale Customers, consistent with SFPUC's contractual obligation. According to the SFPUC, the modeling based on a demand of 265 MGD was used to "facilitate planning that supports meeting this Level of Service goal and their contractual obligations." Supply modeling results presented in the text of the SFPUC's 2020 UWMP reflect an input of projected retail and Wholesale demands on the RWS.

Consistent with SFPUC's approach and guidance from SFPUC and BAWSCA, MPMW's UWMP presents results for the water service reliability assessment and the DRA (Section 7.2) based on the modeling scenario that assumes full implementation of the Bay Delta Plan Amendment in 2023 and uses projected demands on the RWS. SFPUC modeling results for this scenario showing the total RWS supply available to Wholesale Customers during the characteristic year types can be found in Tables 3a-3g of the SFPUC letter dated March 30, 2021. These results show total Wholesale RWS supply shortfalls ranging from 36% to 54% of projected purchases during dry years after 2023.

For comparison purposes, results for the scenario without the Bay-Delta Plan Amendment can be found in Tables 4a-4g of the same SFPUC letter. These results indicated that the SFPUC would be able to meet 100% of Wholesale projected purchases during all year types except during the fourth and fifth consecutive dry years for base year 2045 when 15% Wholesale supply shortages are projected.

7.1.2.2 *MPMW's Year-Type Characterization*

As discussed in Section 6.1.2, in accordance with the SFPUC's perpetual obligation to MPMW's Supply Assurance, MPMW has an Individual Supply Guarantee (ISG) of 4.456 MGD, or 1,630 million gallons (MG) per year. SFPUC is obligated to provide MPMW with up to 100% of MPMW's ISG during normal years.

Using the SFPUC modeling results presented in the SFPUC letter dated March 30, 2021, BAWSCA provided single and five-consecutive dry-year allocations for each agency based on the methodology described in Section 7.1.1.1. As discussed in therein, for the purposes for the 2020 UWMP supply reliability analysis only, Wholesale Agency drought allocations assume an equal percent reduction across all agencies when the average Wholesale Customers' RWS shortages are greater than 20%. These percent reductions for the scenario that assumes the implementation of the Bay-Delta Plan Amendment in 2023 are included in Table E of the BAWSCA updated drought allocation memorandum dated 1 April 2021 (Appendix I). BAWSCA then applied these percent reductions to each agency's projected demands to calculate the drought allocation volumes for base year 2025 through 2045, which are included in Table G2 to K2 of the same memorandum. Results for MPMW are reproduced in Table 7-3 below and are used to calculate the total supplies presented in Table 7-5 and Table 7-6.

Table 7-3 RWS Wholesale Supply Availability During Normal and Dry Years for Based Years 2025 through 2040 (Responds to DWR Table 7-1)

Year Type		2025	2030	2035	2040
Normal Year		1,630	1,630	1,630	1,630
Single Dry Year		829	858	898	942
Multiple Dry Years	First year	829	858	898	942
	Second year	712	734	767	807
	Third year	712	734	767	807
	Fourth year	712	734	767	712
	Fifth year	712	734	704	712

NOTES:
(a) Volumes are in units of MG.
(b) Normal-year water supply is presented as MPMW's ISG (4.456 MGD or approximately 1,630 MG).
(c) Dry-year water supplies are MPMW's drought allocations provided by BAWSCA based on the revised BAWSCA Drought Methodology that assumes equal percent cutbacks across all Wholesale Agencies.
(c) Results reflect scenario with Bay-Delta Plan Amendment implemented in 2023.

7.1.3 Service Reliability - Supply and Demand Assessment

☑ ***CWC § 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. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

The following sections compare MPMW's projected water demands with projected water supply availability during normal years, single dry years, and multiple dry year periods.

7.1.3.1 Water Service Reliability - Normal Year

Table 7-4 shows the projected supply and demand totals for a normal year. The supply and demand totals are consistent with those in Table 6-9 and Table 4-7, respectively. MPMW is expected to have adequate water supplies during normal years to meet its projected demands through 2040.

Table 7-4 Normal Year Supply and Demand Comparison (DWR Table 7-2)

	2025	2030	2035	2040	2045*(opt)*
Supply totals *From DWR Table 6-9*	1,678	1,750	1,750	1,750	--
Demand totals *From DWR Table 4-3*	1,296	1,345	1,410	1,483	--
Difference	382	405	340	267	--
NOTES: (a) Volumes are in units of MG. (b) Supply and demand include both potable water and recycled water.					

7.1.3.2 *Water Service Reliability – Single Dry Year*

The reliability of the SFPUC RWS supply is anticipated to vary greatly in different year types. As described above and detailed in Appendix I, MPMW has relied on SFPUC's RWS supply reliability estimates and the drought allocation structure provided by SFPUC and BAWSCA to estimate available RWS supplies in dry year types through 2040. Recycled water supply is expected to be 100% reliable in all year types.

Table 7-5 shows the projected supply and demand totals for the single dry year.

Table 7-5 Single Dry Year Supply and Demand Comparison (DWR Table 7-3)

	2025	2030	2035	2040	2045*(opt)*
Supply totals	877	978	1,018	1,062	--
Demand totals	1,296	1,345	1,410	1,483	--
Difference	(419)	(367)	(392)	(422)	--
NOTES: (a) Volumes are in units of MG. (b) Supply and demand include both potable water and recycled water.					

7.1.3.3 *Water Service Reliability – Five Consecutive Dry Years*

Based on the supply reliability estimates and allocation structure provided by SFPUC and BAWSCA and the assumed 100% reliability for recycled water supply, Table 7-6 shows the projected supply and demand totals for multiple dry year periods extending five years.

Table 7-6 Multiple Dry Years Supply and Demand Comparison (DWR Table 7-4)

		2025	2030	2035	2040	2045*(opt)*
First year	Supply totals	877	978	1,018	1,062	--
	Demand totals	1,296	1,345	1,410	1,483	--
	Difference	(419)	(367)	(392)	(422)	--
Second year	Supply totals	760	854	887	927	--
	Demand totals	1,296	1,345	1,410	1,483	--
	Difference	(536)	(491)	(523)	(557)	--
Third year	Supply totals	760	854	887	927	--
	Demand totals	1,296	1,345	1,410	1,483	--
	Difference	(536)	(491)	(523)	(557)	--
Fourth year	Supply totals	760	854	887	832	--
	Demand totals	1,296	1,345	1,410	1,483	--
	Difference	(536)	(491)	(523)	(652)	--
Fifth year	Supply totals	760	854	824	832	--
	Demand totals	1,296	1,345	1,410	1,483	--
	Difference	(536)	(491)	(585)	(652)	--

NOTES:
(a) Volumes are in units of MG.
(b) Supply and demand include both potable water and recycled water.

7.1.3.4 Uncertainties in Dry Year Water Supply Projections

As shown in the above tables, significant water supply shortfalls are currently projected in future single and multiple dry years, directly because of the Bay-Delta Plan Amendment implementation. However, numerous uncertainties remain in the implementation of the Bay-Delta Plan Amendment. The water supply projections presented above likely represent a worst-case scenario in which the Bay-Delta Plan Amendment is implemented without the SFPUC and the State Water Resources Control Board (SWRCB) reaching a Voluntary Agreement and do not account for implementation of SFPUC's Alternative Water Supply Program (AWSP), described in more detail below. Under this supply scenario, SFPUC appears not to be able to meet its contractual obligations (i.e., Level of Service goals) and MPMW's forecasted demands during droughts.

As discussed in Section 7.1.2.1, SFPUC also provided water supply reliability projections without the Bay-Delta Plan Amendment (see Appendix I), which likely represents a highly optimistic water supply reliability outcome. These projections indicated that without the Bay-Delta Plan Amendment SFPUC would be able to supply 100% of projected RWS demands in all year types through 2045, except for the 4th and 5th consecutive dry year in 2045, during which 90% of projected RWS demands (85% of the Wholesale demands) would be met. The large disparity in projected water supply reliability between these two scenarios demonstrate the current level uncertainty.

In addition to these two UWMP scenarios, in a March 26, 2021 Special Commission Meeting, SFPUC staff presented HHLSM modeling results for 10 different scenarios, including scenarios with the implementation of the Tuolumne River Voluntary Agreement (TRVA), with the implementation of the Bay-Delta Plan Amendment and the AWSP, and with the use of a modified rationing policy and a modified design drought (Appendix J). Results for the scenarios with the TRVA and with the AWSP (particularly with a modified rationing policy and design drought) showed significantly improved RWS supply availability compared to the Bay-Delta Plan Amendment scenario shown herein.

The current sources of uncertainty in the dry year water supply projections are summarized below:

- *Implementation of the Bay-Delta Plan Amendment is under negotiation.* The SFPUC is continuing negotiations with the SWRCB on implementation of the Bay-Delta Plan Amendment for water supply cutbacks, particularly during droughts. The SFPUC, in partnership with other key stakeholders, has proposed a voluntary substitute agreement to the Bay-Delta Plan Amendment, the TRVA, that provides a collaborative approach to protect the environment and plan for a reliable and high-quality future potable water supply. This is a dynamic situation and the projected drought cutback allocations may need to be revised before the next (i.e., 2025) UWMP depending on the outcome of ongoing negotiations.

- *Benefits of the AWSP are not accounted for in current supply projections.* As discussed in Section 7.1.3.5 and Appendix I, SFPUC is exploring options to increase its supplies through the AWSP. Implementation of feasible projects developed under the AWSP is not yet reflected in the supply reliability scenarios presented herein and is anticipated to reduce the projected RWS supply shortfalls (Appendix J).

- *SFPUC is considering modifications to its design drought methodology and rationing policy.* Shortening the 8.5-year design drought or modifying the rationing policy to increase rationing in the early years of a drought are anticipated to reduce projected RWS supply shortfalls (Appendix J). On 7 June 2021, MPMW sent a letter to the SFPUC requesting the inclusion of a reduced duration drought scenario, if and when SFPUC's current climate change study merits doing so, as in appendix to SFPUC 2020 UWMP (Appendix H).

- *Methodology for Tier One and Tier Two Wholesale drought allocations have not been established for wholesale shortages greater than 20%.* As discussed in Section 7.1.1.1, the current Tier One and Tier Two Plans are not designed for RWS supply shortages of greater than 20%. For UWMP planning purposes per BAWSCA guidance, the Tier One Wholesale share for a 16% to 20% supply reduction (62.5%) has been applied for reductions greater than 20% and an equal percent reduction has been applied across all Wholesale agencies. BAWSCA member agencies have not formally agreed to adopt this shortage allocation methodology and are in discussions about jointly developing an alternative allocation method that would consider additional equity factors if SFPUC is unable to deliver its contractual supply volume and cutbacks to the RWS supply exceed 20%.

- *RWS demands are subject to change.* The RWS supply availability is dependent upon the system demands. As discussed in Section 7.1.2, the supply scenarios are based on the total projected Wholesale Customer purchases provided by BAWSCA to SFPUC in January 2021. Many BASCWA agencies have refined their projected demands during the UWMP process after these estimates were provided to SFPUC. Furthermore, the RWS demand projections are subject to change in the future based upon future housing needs, increased conservation, and development of additional local supplies.

- *Frequency and duration of cutbacks are also uncertain.* While the projected shortfalls presented in the UWMP appear severe, the actual frequency and duration of such shortfalls are uncertain. Based on the HHLSM simulations provided by BAWSCA for the with Bay-Delta Plan Amendment scenario (Appendix I), rationing is anticipated to be required 20% of years for base year 2025 through 2035, 23% of all years for base year 2040, and 25% of years for base year 2045. In addition to the supply volumes, the above listed uncertainties would also impact the projected frequency and duration of shortfalls.

As such, in addition to evaluating local options to increase supply reliability, MPMW has placed high priority on working with BAWSCA and SFPUC in the upcoming years to better refine the estimates of RWS supply reliability and may amend this UWMP when new information becomes available.

The above uncertainties notwithstanding, BAWSCA's current drought allocation cutbacks will require MPMW to apply its Water Shortage Contingency Plan (WSCP) Stage 5, for water use restrictions up to 50% (see Appendix K) and will affect MPMW's short- and long-term water management decisions. As described further below (Section 7.1.3.5), MPMW is working independently and with the other BAWSCA agencies to identify regional mitigation measures to improve reliability for regional and local water supplies and meet its customers' water needs. If conditions for large drought cutbacks to the RWS persist, MPMW will need to implement additional demand management practices to invoke strict restrictions on potable water use and accelerate efforts to develop alternative supplies of water.

MPMW recommends that users of its 2020 UWMP contact MPMW staff for potential updates about its water supply reliability before using the 2020 UWMP drought cutback projections for their planning projects and referencing the drought.

7.1.3.5 Strategies and Actions to Address Dry Year Supply Shortfalls

Although there remains significant uncertainty in future supply availability, as discussed above, MPMW, SFPUC, and BAWSCA have developed strategies and actions to address the projected dry year supply shortfalls. These efforts are discussed in the following sections.

SFPUC and Other Regional Strategies and Actions

Dry Year Water Supply Projects

The WSIP authorized the SFPUC to undertake a number of water supply projects to meet dry-year demands with no greater than 20% system-wide rationing in any one year. Implementation of these projects is also expected to mitigate impacts of the implementation of the Bay-Delta Plan Amendment. Those projects include the following:

- *Calaveras Dam Replacement Project*. Calaveras Dam is located near a seismically active fault zone and was determined to be seismically vulnerable. To address this vulnerability, the SFPUC constructed a new dam of equal height downstream of the existing dam. Construction on the project occurred between 2011 and July 2019. The SFPUC began impounding water behind the new dam in accordance with California Division of Safety of Dams (DSOD) guidance in the winter of 2018/2019.
- *Alameda Creek Recapture Project*. As a part of the regulatory requirements for future operations of Calaveras Reservoir, the SFPUC must implement bypass

and instream flow schedules for Alameda Creek. The Alameda Creek Recapture Project will recapture a portion of the water system yield lost due to the instream flow releases at Calaveras Reservoir or bypassed around the Alameda Creek Diversion Dam and return this yield to the RWS through facilities in the Sunol Valley. Water that naturally infiltrates from Alameda Creek will be recaptured into an existing quarry pond known as SMP (Surface Mining Permit)-24 Pond F2. The project will be designed to allow the recaptured water to be pumped to the Sunol Valley Water Treatment Plant or to San Antonio Reservoir. Construction of this project will occur from spring 2021 to fall 2022.

- *Lower Crystal Springs Dam Improvements*. The Lower Crystal Springs Dam (LCSD) Improvements were substantially completed in November 2011. The joint San Mateo County/SFPUC Bridge Replacement Project to replace the bridge across the dam was completed in January 2019. A WSIP follow up project to modify the LCSD Stilling Basin for fish habitat and upgrade the fish water release and other valves started in April 2019. While the main improvements to the dam have been completed, environmental permitting issues for reservoir operation remain significant. While the reservoir elevation was lowered due to DSOD restrictions, the habitat for the Fountain Thistle, an endangered plant, followed the lowered reservoir elevation. Raising the reservoir elevation now requires that new plant populations be restored incrementally before the reservoir elevation is raised. The result is that it may be several years before pre-project water storage volumes can be restored.
- *Regional Groundwater Storage and Recovery Project*. The Groundwater Storage and Recovery Project (GSRP) is a strategic partnership between SFPUC and three San Mateo County agencies – Cal Water, the City of Daly City, and the City of San Bruno – to conjunctively operate the south Westside Groundwater Basin. The project sustainably manages groundwater and surface water resources in a way that provides supplies during times of drought. During years of normal or heavy rainfall, the project would provide additional surface water to the partner agencies in San Mateo County in lieu of groundwater pumping. Over time, reduced pumping creates water storage through natural recharge of up to 20 billion gallons of new water supply available during dry years.

  The project's Final Environmental Impact Report was certified in August 2014, and the project also received Commission approval that month. Phase 1 of this project consists of construction of thirteen well sites and is over 99 percent complete. Phase 2 of this project consists of completing construction of the well station at the South San Francisco Main site and some carryover work that has not been completed from Phase 1. Phase 2 design work began in December 2019.
- *2 MGD Dry-year Water Transfer*. In 2012, the dry-year transfer was proposed between the Modesto Irrigation District and the SFPUC. Negotiations were terminated because an agreement could not be reached. Subsequently, the SFPUC had discussions with the Oakdale Irrigation District for a one-year transfer agreement with the SFPUC for 2 MGD (2,240 acre-feet). No progress towards agreement on a transfer was made in 2019, but the irrigation districts recognize SFPUC's continued interest and SFPUC will continue to pursue transfers.

> In order to achieve its target of meeting at least 80 percent of its customer demand during droughts with a system demand of 265 MGD, and to mitigate the impacts of the Bay-Delta Plan, the SFPUC must successfully implement the dry-year water supply projects included in the WSIP.
>
> Furthermore, the permitting obligations for the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements include a combined commitment of 12.8 MGD for instream flows on average. When this is reduced for an assumed Alameda Creek Recapture Project recovery of 9.3 MGD, the net loss of water supply is 3.5 MGD.

Alternative Water Supply Program

As discussed below, BAWSCA has taken steps to ensure that SFPUC develops alternative water supplies:

> With the adoption of the Bay-Delta Plan Phase 1 (Bay-Delta Plan) by the State Water Resources Control Board in December of 2018, coupled with the uncertainties associated with litigation and the development of Voluntary Agreements that, if successful, would provide an alternative to the 40% unimpaired flow requirement that is required by the Bay-Delta Plan, BAWSCA redoubled its efforts to ensure that the SFPUC took necessary action to develop alternative water supplies such that they would be in place to fill any potential gap in supply by implementation of the Bay-Delta Plan and that the SFPUC would be able to meet its legal and contractual obligations to its Wholesale Customers.
>
> In 2019, BAWSCA held numerous meetings with the SFPUC encouraging them to develop a division within their organization whose chief mission was to spearhead alternative water supply development. On June 25, 2019, BAWSCA provided a written and oral statement to the Commissioners urging the SFPUC to focus on developing new sources of supply in a manner similar to how it addressed the implementation of the Water System Improvement Program (WSIP). BAWSCA urged that a new water supply program was called for, with clear objectives, persistent focus, a dedicated team, adequate funding, and a plan for successful execution. The SFPUC Commission supported BAWSCA's recommendation and directed staff to undertake such an approach.
>
> In early 2020, the SFPUC began implementation of the Alternative Water Supply Planning Program (AWSP), a program designed to investigate and plan for new water supplies to address future long-term water supply reliability challenges and vulnerabilities on the RWS.
>
> Included in the AWSP is a suite of diverse, non-traditional supply projects that, to a great degree, leverage regional partnerships and are designed to meet the water supply needs of the SFPUC Retail and Wholesale Customers through 2045. As of the most recent Alternative Water Supply Planning Quarterly Update, SFPUC has budgeted $264 million over the next ten years to fund water supply projects. BAWSCA is heavily engaged with the SFPUC on its AWSP efforts.

SFPUC's AWSP is described in more detail below:

> The SFPUC is increasing and accelerating its efforts to acquire additional water supplies and explore other projects that would increase overall water supply resilience through the AWSP. The drivers for the program include: (1) the adoption of the Bay-Delta Plan Amendment and the resulting potential limitations to RWS supply during dry years,

(2) the net supply shortfall following the implementation of WSIP, (3) San Francisco's perpetual obligation to supply 184 MGD to the Wholesale Customers, (4) adopted LOS Goals to limit rationing to no more than 20 percent system-wide during droughts, and (5) the potential need to identify water supplies that would be required to offer permanent status to interruptible customers. Developing additional supplies through this program would reduce water supply shortfalls and reduce rationing associated with such shortfalls. The planning priorities guiding the framework of the AWSP are as follows:

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

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

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

Together, the planning priorities and LOS Goals and Objectives provide a lens through which the SFPUC considers water supply options and opportunities to meet all foreseeable water supply needs.

In addition to the Daly City Recycled Water Expansion project[20], which was a potential project identified in the SFPUC's 2015 UWMP and had committed funding at that time, the SFPUC has taken action to fund the study of potential additional water supply projects. Capital projects under consideration to develop additional water supplies include surface water storage expansion, recycled water expansion, water transfers, desalination, and potable reuse. A more detailed list and descriptions of these efforts are provided below.

The capital projects that are under consideration would be costly and are still in the early feasibility or conceptual planning stages. Because these water supply projects

[20] While this potential project was identified in the 2015 UWMP, it has since been approved by Daly City following environmental review and has a higher likelihood of being implemented.

would take 10 to 30 years to implement, and because required environmental permitting negotiations may reduce the amount of water that can be developed, the yield from these projects are not currently incorporated into SFPUC's supply projections. State and federal grants and other financing opportunities would be pursued for eligible projects, to the extent feasible, to offset costs borne by ratepayers.

- *Daly City Recycled Water Expansion (Regional, Normal- and Dry-Year Supply)*. This project can produce up to 3 MGD of tertiary recycled water during the irrigation season (~7 months). On an average annual basis, this is equivalent to 1.25 MGD or 1,400 AFY. The project is envisioned to provide recycled water to 13 cemeteries and other smaller irrigation customers, offsetting existing groundwater pumping from the South Westside Groundwater Basin; this will free up groundwater, enhancing the reliability of the Basin. The project is a regional partnership between the SFPUC and Daly City. The irrigation customers are located largely within California Water Service's (Cal Water's) service area. RWS customers will benefit from the increased reliability of the South Westside Basin for additional drinking water supply during droughts. In this way, this project supports the GSR Project, which is under construction.
- *ACWD-USD Purified Water Partnership (Regional, Normal- and Dry-Year Supply)*. This project could provide a new purified water supply utilizing Union Sanitary District's (USD) treated wastewater. Purified water produced by advanced water treatment at USD could be transmitted to the Quarry Lakes Groundwater Recharge Area to supplement recharge into the Niles Cone Groundwater Basin or put to other uses in Alameda County Water District's (ACWD) service area. With the additional water supply to ACWD, an in-lieu exchange with the SFPUC would result in more water left in the RWS. Additional water supply could also be directly transmitted to the SFPUC through a new intertie between ACWD and the SFPUC.
- *Crystal Springs Purified Water (Regional, Normal- and Dry-Year Supply)*. The Crystal Springs Purified Water (PREP) Project is a purified water project that could provide 6-12 MGD of water supply through reservoir water augmentation at Crystal Springs Reservoir, which is a facility of the RWS. Treated wastewater from Silicon Valley Clean Water (SVCW) and/or the City of San Mateo would go through an advanced water treatment plant to produce purified water that meets state and federal drinking water quality standards. The purified water would then be transmitted 10 to 20 miles (depending on the alignment) to Crystal Springs Reservoir, blended with regional surface water supplies and treated again at Harry Tracy Water Treatment Plant. Project partners include the SFPUC, Bay Area Water Supply and Conservation Agency (BAWSCA), SVCW, CalWater, Redwood City, Foster City, and the City of San Mateo. Partner agencies are contributing financial and staff resources towards the work effort.
- *Los Vaqueros Reservoir Expansion (Regional, Dry Year Supply)*. The Los Vaqueros Reservoir Expansion (LVE) Project is a storage project that will enlarge the existing reservoir located in northeastern Contra Costa County from 160,000 acre-feet to 275,000 acre-feet. While the existing reservoir is owned and operated by the Contra Costa Water District (CCWD), the expansion will have regional benefits and will be managed by a Joint Powers Authority (JPA) that will be set up prior to construction. Meanwhile, CCWD is leading the planning, design and environmental review efforts. CCWD's Board certified the

EIS/EIR and approved the LVE Project on May 13, 2020. The additional storage capacity from the LVE Project would provide a dry year water supply benefit to the SFPUC. BAWSCA is working in concert with the SFPUC to support their work effort on the LVE project.

- Conveyance Alternatives: The SFPUC is considering two main pathways to move water from storage in a prospective LVE Project to the SFPUC's service area, either directly to RWS facilities or indirectly via an exchange with partner agencies. The SFPUC is evaluating potential alignments for conveyance.
- Bay Area Regional Reliability Shared Water Access Program (BARR SWAP): As part of the BARR Partnership, a consortium of 8 Bay Area water utilities (including ACWD, BAWSCA, CCWD, EBMUD, Marin Municipal Water District (MMWD), SFPUC, Valley Water, and Zone 7 Water Agency) are exploring opportunities to move water across the region as efficiently as possible, particularly during times of drought and emergencies. The BARR agencies are proposing two separate pilot projects in 2020-2021 through the Shared Water Access Program (SWAP) to test conveyance pathways and identify potential hurdles to better prepare for sharing water during a future drought or emergency. A strategy report identifying opportunities and considerations will accompany these pilot transfers and will be completed in 2021.

- *Bay Area Brackish Water Desalination (Regional, Normal- and Dry-Year Supply)*. The Bay Area Brackish Water Desalination (Regional Desalination) Project is a partnership between CCWD, the SFPUC, Valley Water, and Zone 7 Water Agency. The East Bay Municipal Utilities District (EBMUD) and ACWD may also participate in the project. The project could provide a new drinking water supply to the region by treating brackish water from CCWD's existing Mallard Slough intake in Contra Costa County. While this project has independent utility as a water supply project, for the current planning effort the SFPUC is considering it as a source of supply for storage in LVE. While the allocations remain to be determined among partners, the SFPUC is considering a water supply benefit of between 5 and 15 MGD during drought conditions when combined with storage at LVE.
- *Calaveras Reservoir Expansion (Regional, Dry Year Supply)*. Calaveras Reservoir would be expanded to create 289,000 acre-feet (AF) additional capacity to store excess Regional Water System supplies or other source water in wet and normal years. In addition to reservoir enlargement, the project would involve infrastructure to pump water to the reservoir, such as pump stations and transmission facilities.
- *Groundwater Banking*. Groundwater banking in the Modesto Irrigation District (MID) and Turlock Irrigation District (TID) service areas could be used to provide some additional water supply to meet instream releases in dry years reducing water supply impacts to the SFPUC service area. For example, additional surface water could be provided to irrigators in wet years, which would offset the use of groundwater, thereby allowing the groundwater to remain in the basin rather than be consumptively used. The groundwater that remains in the basin can then be used in a subsequent dry year for irrigation,

freeing up surface water that would have otherwise been delivered to irrigators to meet instream flow requirements.

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

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

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

If all the projects identified through the current planning process can be implemented, there would still be a supply shortfall to meet projected needs. Furthermore, each of the supply options being considered has its own inherent challenges and uncertainties that may affect the SFPUC's ability to implement it.

Given the limited availability of water supply alternatives - unless the supply risks are significantly reduced or our needs change significantly - the SFPUC will continue to plan, develop and implement all project opportunities that can help bridge the anticipated water supply gaps during droughts. In 2019, the SFPUC completed a survey among water and wastewater agencies within the service area to identify additional opportunities for purified water. Such opportunities remain limited, but the SFPUC continues to pursue all possibilities.

BAWSCA's Long Term Reliability Water Supply Strategy

BAWSCA's Long-Term Reliable Water Supply Strategy (Strategy), completed in February 2015, quantified the water supply reliability needs of the BAWSCA member agencies through 2040, identified the water supply management projects and/or programs (projects) that could be developed to meet those needs, and prepared an implementation plan for the Strategy's recommendations.

When the 2015 Demand Study concluded it was determined that while there is no longer a regional normal year supply shortfall, there was a regional drought year supply shortfall of up to 43 MGD. In addition, key findings from the Strategy's project evaluation analysis included:

- Water transfers represent a high priority element of the Strategy.
- Desalination potentially provides substantial yield, but its high effective costs and intensive permitting requirements make it a less attractive drought year supply alternative.
- Other potential regional projects provide tangible, though limited, benefit in reducing dry-year shortfalls given the small average yields in drought years.

Since 2015, BAWSCA has completed a comprehensive update of demand projections and engaged in significant efforts to improve regional reliability and reduce the dry-year water supply shortfall.

- *Water Transfers*. BAWSCA successfully facilitated two transfers of portions of Individual Supply Guarantee (ISG) between BAWSCA agencies in 2017 and 2018. Such transfers benefit all BAWSCA agencies by maximizing use of existing supplies. BAWSCA is currently working on an amendment to the Water Supply Agreement between the SFPUC and BAWSCA agencies to establish a mechanism by which member agencies that have an ISG may participate in expedited transfers of a portion of ISG and a portion of a Minimum Annual Purchase Requirement. In 2019, BAWSCA participated in a pilot water transfer that, while ultimately unsuccessful, surfaced important lessons learned and produced interagency agreements that will serve as a foundation for future transfers. BAWSCA is currently engaged in the Bay Area Regional Reliability Partnership (BARR)[21], a partnership among eight Bay Area water utilities (including the SFPUC, Alameda County Water District, BAWSCA, Contra Costa Water District, Santa Clara Valley Water District) to identify opportunities to move water across the region as efficiently as possible, particularly during times of drought and emergencies.
- *Regional Projects*. Since 2015, BAWSCA has coordinated with local and State agencies on regional projects with potential dry-year water supply benefits for BAWSCA's agencies. These efforts include storage projects, indirect/direct water reuse projects, and studies to evaluate the capacity and potential for various conveyance systems to bring new supplies to the region.

BAWSCA continues to implement the Strategy recommendations in coordination with BAWSCA member agencies. Strategy implementation will be adaptively managed to account for changing conditions and to ensure that the goals of the Strategy are met in an efficient and cost-effective manner. On an annual basis, BAWSCA will reevaluate Strategy recommendations and results in conjunction with development of the BAWSCA's FY 2021-22 Work Plan. In this way, actions can be modified to accommodate changing conditions and new developments.

MPMW Strategies and Actions

In addition to the management tools and options discussed below, MPMW has been involved directly and through BAWSCA to advocate for an alternative to the Bay-Delta Plan Amendment, including submitting letters and testimony (see Appendix H) that identify, among other things, the significant impact to local water supply reliability.

Further, as part of this UWMP process, MPMW submitted letters to both BAWSCA and SFPUC (see Appendix H) enumerating concerns regarding the fact that the SFPUC RWS supply allocations do not meet the Level of Service Goals included in the WSA (see Section 7.1.1.1) and, therefore, SFPUC is not meeting its contractual obligations to the Wholesale Customers.

MPMW's letter to BAWSCA further states that while it is applying BAWSCA's revised Tier Two allocation methodology for RWS shortages greater than 20% for preliminary planning purposes, MPMW is not

[21] https://www.bayareareliability.com/

agreeing to, or adopting, the revised Tier Two methodology. Among other issues, MPMW notes that the revised Tier Two methodology does not take minimum health and safety standards into account.

As described in Sections 6 and 9, MPMW is committed to improving its supply reliability, including development of recycled water and groundwater supply sources and continued commitment to its water conservation program.

7.2 Drought Risk Assessment

☑ ***CWC § 10635(b)***

Every urban water supplier shall include, as part of its urban water management plan, a drought risk assessment for its water service to its customers as part of information considered in developing the demand management measures and water supply projects and programs to be included in the urban water management plan. The urban water supplier may conduct an interim update or updates to this drought risk assessment within the five-year cycle of its urban water management plan update. 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, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.

In addition to the long-term water service reliability assessment presented above, the DRA evaluates MPMW's supply risks under a severe drought period lasting for the next five consecutive years after the assessment is completed, i.e., from 2021 through 2025. The DRA is intended to inform the demand management measures and water supply projects and programs to be included in the UWMP (see Chapters 8 and 9). Suppliers may conduct an interim update or updates to this DRA within the five-year cycle of its UWMP update, i.e., before the 2025 UWMP.

7.2.1 Data, Methods, and Basis for Water Shortage Condition

As a first step to the DRA, MPMW has estimated unconstrained water demand for the next five years (2021-2025). Unconstrained water demand is the expected water use in the absence of drought water use restrictions. The characteristic five-year water demand is described in Section 4.2.6 and is from the Decision Support System (DSS) Water Demand and Conservation Model.

The available potable water supplies assumed in the DRA are based upon the same methodology and assumptions used for the long-term water service reliability assessment (Section 7.1) and relies on information provided by SFPUC and BAWSCA (Appendix G and Appendix I). The available RWS water supplies are estimated based on the following assumptions: (1) The RWS demands are held constant at

132.1 MGD (i.e., 2020 demand levels), (2) implementation of the Bay-Delta Plan Amendment occurs in 2023, and (3) the 2020 infrastructure conditions are maintained (see Table 1 of the January 22, 2021 SFPUC letter in Appendix I). Details of how MPMW's available supplies are then estimated as part of the DRA are provided below.

7.2.2 DRA Individual Water Source Reliability

As described in Chapter 6, MPMW relies on imported surface water supply purchased from the SFPUC RWS for potable uses and utilizes recycled water for non-potable uses.

MPMW's available potable water supplies during the five-consecutive-year drought are based upon information provided by SFPUC and BAWSCA included in Appendix I, as indicated in Section 7.2.1. Specifically, based on the modeling results presented in the 30 March 2021 SFPUC letter, BAWSCA provided percent reductions in RWS supply for 2021 to 2025 in Table E of the 1 April 2021 BAWSCA updated drought allocation memorandum, which are reproduced for MPMW in Table 7-7 below.

Prior to the assumed implementation of the Bay-Delta Plan Amendment in 2023, sufficient RWS supplies will be available to meet the Wholesale Customers' purchase requests during the first two consecutive dry years (i.e., 2021 and 2022). Shortages are projected to begin in 2023 with the implementation of the Bay-Delta Plan Amendment. In the event of a shortage, the current Tier 2 Drought Allocation Plan (Section 7.1.1.1) specifies that each agencies' Allocation Factor would be calculated once at the onset of a shortage based on the previous year's use and remain the same until the shortage condition is over. Therefore, for the purpose of drought allocations for the DRA, the available RWS supply is assumed to remain static in 2023-2025 and is calculated based on MPMW's projected potable demands in 2022 and the percent reductions provided by BAWSCA, as shown in Table 7-7.[22]

[22] BAWSCA also provided drought allocation volumes for each agency, as mentioned in Section 7.1.2. However, MPMW's 2021-2025 demands that were used for the calculations were outdated. Therefore, the DRA performed here used percent cutbacks provided by BAWSCA and re-calculated the supply volumes based on corrected 2021-2025 demands.

Table 7-7 MPMW Supply Availability During Multiple Dry Years for Base Year 2020

Year	2021	2022	2023	2024	2025
Potable Supply (c)					
Allocation Basis (d)	*1,047*	*1,095*	*1,095*	*1,095*	*1,095*
Percent Cutback (e)	*0%*	*0%*	*47%*	*47%*	*47%*
Total Potable Supply	1,047	1,095	580	580	580
Recycled Water Supply	48	48	48	48	48
Total Supplies	**1,095**	**1,143**	**628**	**628**	**628**

NOTES:
(a) Volumes are in units of MG.
(b) Five consecutive year drought assumed to start in 2021.
(c) Scenario reflects implementation of the Bay-Delta Plan Amendment in 2023. Sufficient RWS supplies will be available to meet the Wholesale Customers' purchase requests during the first two consecutive dry years, prior to implementation of the Bay-Delta Plan Amendment. System-wide shortages are projected to start in 2023. Wholesale RWS demand is assumed to be static for the remainder of the drought sequence per the Water Supply Agreement. As such, the percent cutbacks in 2023 to 2025 are applied to 2022 demand to calculate each year's projected supply.
(d) MPMW's potable water demand projected for years 2021 and 2022.
(e) Source: Table E from the BAWSCA drought allocation tables dated April 1, 2021.

MPMW considers recycled water to be a reliable and stable water supply source and its recycled water supply is estimated to be available during all hydrologic years at a volume that meets its projected recycled water demands (see Chapters 4 and 6).

As shown in Table 7-7, prior to the assumed implementation of the Bay-Delta Plan Amendment in 2023, sufficient RWS supplies will be available to meet the Wholesale Customers' purchase requests during the first two consecutive years (i.e., 2021 and 2022).

Shortages are projected to begin in 2023 with the implementation of the Bay-Delta Plan Amendment. In the event of a shortage, the current Tier 2 Drought Allocation Plan (Section 7.1.1.1) specifies that each agencies' Allocation Factor would be calculated once at the onset of a shortage based on the previous year's use and remain the same until the shortage condition is over. Therefore, for the purpose of drought allocations for the DRA, the available RWS supply is assumed to remain static in 2023-2025 as shown in Table 7-7.

7.2.3 Management Tools and Options

☑ ***CWC § 10620 (f)***

An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

At a regional level, MPMW maintains active involvement in the work that SFPUC and BAWSCA are doing with respect to optimizing the use of regional water supplies and pursuing additional supplies. These efforts are detailed above in Section 7.1.3.5.

In addition to supporting SFPUC and BAWSCA, MPMW has been working with West Bay Sanitary District (WBSD) to develop recycled water supplies. If additional recycled water is made available, the potable water demands will be less than the current projections and therefore the resultant supply shortage will likely to be smaller.

MPMW has also been implementing, and plans to continue to implement, the demand management measures described in Section 9. Further, in response to the anticipated future dry-year shortfalls, MPMW has developed a robust WSCP that systematically identifies ways in which MPMW can reduce water demands. The WSCP is included in Appendix K.

MPMW has also been exploring groundwater resources as a supplemental supply. As part of the WSCP, MPMW plans to operate its emergency groundwater well as a supplemental supply during significant water shortages during a water supply emergency or drought conditions. An additional one or two emergency wells are being considered as part of the Emergency Water Storage/Supply Project.

7.2.4 Drought Risk Assessment Total Water Supply and Use Comparison

Table 7-8 provides a comparison of the water supply sources available to MPMW with the total projected water use for an assumed drought period from 2021 through 2025. MPMW is expected to experience significant shortfalls in years 2023-2025 of the DRA with unconstrained demands because of the assumed implementation of the Bay-Delta Plan Amendment in 2023.

MPMW has developed a WSCP (Appendix K) to address water shortage conditions resulting from any cause (e.g., droughts, impacted distribution system infrastructure, regulatory-imposed shortage restrictions, etc.). The WSCP identifies a variety of actions that MPMW will implement to reduce demands and further ensure supply reliability at various levels of water shortage. MPMW intends to implement its WSCP to reduce water use and address the projected supply shortfalls.

Given the current uncertainty discussed in Section 7.1.3.4, MPMW could update its DRA prior to the 2025 UWMP update if significant new information becomes available. CWC §10635(b) permits urban water suppliers to conduct an interim update or updates to their DRA within the five-year cycle of its UWMP update. MPMW anticipates that by the 2025 UWMP update, SFPUC will provide more specific information about the AWSP, with estimated water supply contributions from such projects. Additionally, MPMW expects that SFPUC will provide more specific information and a refined estimate of the Bay-Delta Plan Amendment impacts to the SFPUC supply. MPMW will also have more information regarding the available uses of recycled water by the 2025 UWMP update. Further, it is anticipated that the Wholesale Customers will negotiate a revised Tier 2 allocation formula that could affect each agency's share of available supplies in drought years relative to what has been presented herein.

MPMW recommends that users of its 2020 UWMP contact MPMW staff for potential updates to the DRA presented in the 2020 UWMP for their planning projects.

Table 7-8 Five-Year Drought Risk Assessment Tables to Address Water Code 10635(b) (DWR Table 7-5)

2021	Total
Total Water Use	1,095
Total Supplies	1,095
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	--
WSCP - use reduction savings benefit	--
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use	1,143
Total Supplies	1,143
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	--
WSCP - use reduction savings benefit	--
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use	1,192
Total Supplies	628
Surplus/Shortfall w/o WSCP Action	(564)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	564
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	47%

Table 7-8 Five-Year Drought Risk Assessment Tables to Address Water Code 10635(b) (DWR Table 7-5)

2024	Total
Total Water Use	1,243
Total Supplies	628
Surplus/Shortfall w/o WSCP Action	(615)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	615
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	49%

2025	Total
Total Water Use	1,296
Total Supplies	628
Surplus/Shortfall w/o WSCP Action	(668)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	0
WSCP - use reduction savings benefit	668
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	52%

NOTES:
(a) Volumes are in units of MG.
(b) Supply and demand include both potable water and recycled water.

8 WATER SHORTAGE CONTINGENCY PLAN

Menlo Park Municipal Water's (MPMW's) Water Shortage Contingency Plan (WSCP) is included as Appendix K. The WSCP serves as a standalone document to be engaged in the case of a water shortage event, such as a drought or supply interruption, and defines specific policies and actions that will be implemented at various shortage level scenarios. The primary objective of the WSCP is to ensure that MPMW has in place the necessary resources and management responses needed to protect health and human safety, minimize economic disruption, and preserve environmental and community assets during water supply shortages and interruptions. Consistent with California Water Code (CWC) §10632, the WSCP includes six levels to address shortage conditions ranging from up to 10% to greater than 50% shortage, identifies a suite of demand mitigation measures for MPMW to implement at each level, and identifies procedures for MPMW to annually assess whether or not a water shortage is likely to occur in the coming year, among other things.

A summary of the key elements of the WSCP including water shortage levels and demand-reduction actions is shown in Table 8-1, Table 8-2, and Table 8-3. Additional details are provided in Appendix K.

Table 8-1 Water Shortage Contingency Plan Levels (DWR Table 8-1)

Shortage Level	Percent Shortage Range	Shortage Response Actions
No-Drought	N/A	• Includes water waste prohibitions effective at all times.
1	Up to 10%	• Declaration by the City Council upon the determination that the SFPUC or another governing authority (e.g., the SWRCB) has required a voluntary or mandatory reduction in water use of up to 10% due to water supply shortages or an emergency. • Includes implementation of mandatory restrictions on end uses (see Table 8-2) as well as agency actions (see Table 8-3).
2	Up to 20%	• Declaration by the City Council upon the determination that the SFPUC or another governing authority (e.g., the SWRCB) has required a voluntary or mandatory reduction in water use from 10% to 20% due to water supply shortages or emergency. • Includes implementation of mandatory restrictions on end uses (see Table 8-2) as well as agency actions (see Table 8-3).
3	Up to 30%	• Declaration by the City Council upon the determination that the SFPUC or another governing

Shortage Level	Percent Shortage Range	Shortage Response Actions
		authority (e.g., the SWRCB) has required a voluntary or mandatory reduction in water use from 20% to 30% due to water supply shortages or emergency. • Includes implementation of mandatory restrictions on end uses (see Table 8-2) as well as agency actions (see Table 8-3).
4	Up to 40%	• Declaration by the City Council upon the determination that the SFPUC or another governing authority (e.g., the SWRCB) has required a voluntary or mandatory reduction in water use from 30% to 40% due to water supply shortages or emergency. • Includes implementation of mandatory restrictions on end uses (see Table 8-2) as well as agency actions (see Table 8-3).
5	Up to 50%	• Declaration by the City Council upon the determination that the SFPUC or another governing authority (e.g., the SWRCB) has required a voluntary or mandatory reduction in water use from 40% to 50% due to water supply shortages or emergency. • Includes implementation of mandatory restrictions on end uses and water use budgets for customers (see Table 8-2), as well as agency actions and groundwater supply augmentation (see Table 8-3).
6	>50%	• Declaration by the City Council upon the determination that the SFPUC or another governing authority (e.g., the SWRCB) has required a voluntary or mandatory reduction in water use greater than 50% due to water supply shortages or emergency. • Includes implementation of mandatory restrictions on end uses and water use budgets for customers (see Table 8-2), as well as agency actions and groundwater supply augmentation (see Table 8-3).

Table 8-2 Demand Reduction Actions (DWR Table 8-2)

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? (a)	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
No Drought	Other	--	1. Hoses must be equipped with a shut-off valve for washing vehicles, sidewalks, walkways, or buildings. 2. Ornamental fountains shall use only re-circulated or recycled water. 3. Potable water shall not be applied in any manner to any driveway, sidewalk, or other hard surface except when necessary to address immediate health or safety concerns. 4. Potable water shall not be used to water outdoor landscapes in a manner that causes more than incidental runoff onto non-irrigated areas, walkways, roadways, parking lots, or other hard surfaces. 5. Potable water cannot be applied to outdoor landscapes during and up to 48 hours after measurable rainfall. 6. Potable water shall not be used to irrigate ornamental turf on public street medians. 7. Hotels and motels shall provide guests an option whether to launder towels and linens daily. Hotels and motels shall prominently display notice of this option in each bathroom using clear and easily understood language. 8. Restaurants and other food service operations shall serve water to customers only upon request during a period for which the Governor has issued a proclamation of a state of emergency. 9. Broken or defective plumbing and irrigation systems must be repaired or replaced within a reasonable period. 10. Recreational water features shall be covered when not in use. 11. Single-pass cooling systems on new construction shall not be allowed. 12. Other measures as may be approved by the State Water Resources Control Board or City Council Resolution.	Yes

Table 8-2 Demand Reduction Actions (DWR Table 8-2)

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? (a)	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1	Other	5%	1. Continue with "no drought" restrictions and prohibitions except where superseded by more stringent requirements. 2. Newly constructed homes and buildings must irrigate with drip or microspray only. 3. Other measures as may be approved by City Council Resolution.	Yes
2	Other	15%	1. Continue with Stage 1 restrictions and prohibitions except where superseded by more stringent requirements. 2. Irrigating outdoor ornamental landscapes or turf with potable water is limited to no more than two (2) days per week on a schedule established by the Director and posted on the City's website, except for hand watering. Water customers may be granted an exception upon review and approval of a Drought Response Plan by the Public Works Director pursuant to such policies and procedures as may be established by the Public Works Director provided that such plan results in an equivalent or greater reduction in water use. 3. Hand watering must be with a continuously monitored hose fitted with an automatic shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use or monitored. 4. Other measures as may be approved by City Council Resolution.	Yes
3	Other	25%	1. Continue with Stage 2 restrictions and prohibitions except where superseded by more stringent requirements. 2. Permits for construction of new pools shall include a requirement that MPMW water shall not be used to fill new pools. 3. Vehicles may only be washed at vehicle washing facilities using recycled or recirculating water. 4. Other measures as may be approved by City Council Resolution.	Yes

Table 8-2 Demand Reduction Actions (DWR Table 8-2)

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? (a)	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
4	Other	35%	1. Continue with Stage 3 restrictions and prohibitions except where superseded by more stringent requirements. 2. Irrigating outdoor ornamental landscapes or turf with potable water is limited to no more than one (1) day per week on a schedule established by the Director and posted on the City's website, except for hand watering. Water customers may be granted an exception upon review and approval of a Drought Response Plan by the Public Works Director pursuant to such policies and procedures as may be established by the Public Works Director provided that such plan results in an equivalent or greater reduction in water use. 3. Potable water shall not be used for construction or dust control. 4. Potable water shall not be used for commercial vehicles that provide street washing, sweeping, or cleaning. 5. Other measures as may be approved by City Council Resolution.	Yes
5	Other	45%	1. Continue with Stage 4 restrictions and prohibitions except where superseded by more stringent requirements. 2. Water use shall not exceed water budgets established for each customer. 3. Hand watering outdoor ornamental landscapes is only allowed between designated hours, as determined by the Public Works Director. 4. Turf irrigation is prohibited at all times, including artificial turf. 5. Existing irrigation systems shall not be expanded. 6. Other measures as may be approved by City Council Resolution.	Yes
6	Other	55%	1. Continue with Stage 5 restrictions and prohibitions except where superseded by more stringent requirements. 2. Hand watering outdoor ornamental landscapes is prohibited at all times. 3. Other measures as may be approved by City Council Resolution.	Yes

Table 8-2 Demand Reduction Actions (DWR Table 8-2)

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? (a)	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
NOTES: (a) The percentages listed in this table are the cumulative savings for each shortage level with implementation of corresponding supply augmentation and other agency actions in Table 8-3. Detailed saving estimates based on end use, response action, and implementation rates can be found in Appendix K.				

Table 8-3 Supply Augmentation and Other Actions (DWR Table 8-3)

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier	How much is this going to reduce the shortage gap? (a)	Additional Explanation or Reference
1	Other	5%	1. Initiate public outreach to inform customers that there is a water shortage emergency. 2. Implement Stage 1 drought surcharge.
2	Other	15%	1. Continue with actions and measures from Stage 1. 2. Increase public outreach for added restrictions and prohibitions, and to provide information regarding fines or penalties for non-compliance. 3. Coordinate with BAWSCA, SFPUC, and other Menlo Park water agencies (California Water Service, O'Connor Cooperative Water Tract, East Palo Alto, Palo Alto Park Mutual Water Company). 4. Evaluate if participation in BAWSCA's subscription water conservation programs can be increased. 5. Train City staff and billing contractor customer service representatives how to respond to customer calls, reports and complaints. 6. Evaluate options to capture water during routine flushing of water mains. 7. Implement Stage 2 drought surcharge.
3	Other	25%	1. Continue with actions and measures from Stage 2. 2. Increase public outreach for added restrictions and prohibitions, and to provide information how to report water waste to the City. 3. Increase public outreach to the top 10% water users in each customer category. 4. Coordinate with Police code enforcement to investigate water waste reports. 5. Request cooperation from Menlo Park Fire District to reduce fire training water use. 6. Implement Stage 3 drought surcharge.

Table 8-3 Supply Augmentation and Other Actions (DWR Table 8-3)

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier	How much is this going to reduce the shortage gap? (a)	Additional Explanation or Reference
4	Other	35%	1. Continue with actions and measures from Stage 3. 2. Increase public outreach for added restrictions and prohibitions. 3. Increase public outreach to the top 20% water users in each customer category. 4. Evaluate staff resources. May include hiring temporary staff or training additional City staff to assist with customer service and enforcement. 5. Reevaluate routine flushing of water mains except when necessary to address immediate health or safety concerns. 6. Consider increasing fines for multiple violations. 7. Implement Stage 4 drought surcharge.
5	Other	45%	1. Continue with actions and measures from Stage 4. 2. Increase public outreach for added restrictions and prohibitions. 3. Increase public outreach to the top 30% water users in each customer category. 4. Implement water waste patrols and increase enforcement. 5. Halt installations of new potable water meters (temporary or permanent) or meter upgrades except if a valid, unexpired building permit has been issued for the project; or the project is necessary to protect the public's health, safety, and welfare. 6. Halt issuing statements of immediate ability to serve or provide potable water service. 7. Consider increasing fines for multiple violations. 8. Develop water budgets for all accounts. 9. Use emergency groundwater well(s). 10. Implement Stage 5 drought surcharge.

Table 8-3 Supply Augmentation and Other Actions (DWR Table 8-3)

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier	How much is this going to reduce the shortage gap? (a)	Additional Explanation or Reference
6	Other	55%	1. Continue with actions and measures from Stage 5. 2. Increase public outreach for added restrictions and prohibitions. 3. Increase public outreach to the top 40% water users in each customer category. 4. Halt installations of new potable water meters (temporary or permanent) even if a valid, unexpired building permit has been issued for the project. 5. Consider increasing fines for multiple violations. 6. Increase water budget reduction requirements. 7. Implement other short-term emergency actions from the Emergency Response Plan. 8. Implement Stage 6 drought surcharge.

NOTES:
(a) The percentages listed in this table are the cumulative savings for each shortage level with implementation of corresponding demand reduction actions in Table 8-2. Detailed saving estimates based on end use, response action, and implementation rates can be found in Appendix K.

9 DEMAND MANAGEMENT MEASURES

☑ ***CWC § 10631 (e)***

Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) (A) For an urban retail water supplier, as defined in Section 10608.12, a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years. The narrative shall describe the water demand management measures that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.20.

(B) The narrative pursuant to this paragraph shall include descriptions of the following water demand management measures:

(i) Water waste prevention ordinances.

(ii) Metering.

(iii) Conservation pricing.

(iv) Public education and outreach.

(v) Programs to assess and manage distribution system real loss.

(vi) Water conservation program coordination and staffing support.

(vii) Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovative measures, if implemented.

This section provides an overview of Menlo Park Municipal Water's (MPMW's) current and planned demand management measures (DMMs), which include specific types and groupings of water conservation measures typically implemented by water suppliers; the DMMs are closely aligned with the California Urban Water Conservation Council (CUWCC) Best Management Practices. MPMW administers several of its DMMs through participation in Bay Area Water Supply and Conservation Agency's (BAWSCA's) Regional Water Conservation Program. The following sections describe BAWSCA's Regional Water Conservation Program and the nature and extent of the specific DMMs implemented by MPMW.

9.1 Regional Water Conservation

MPMW participates in BAWSCA's Regional Water Conservation Program, as a part of its overall water conservation program.

> BAWSCA manages a Regional Water Conservation Program comprised of several programs and initiatives that support and augment member agencies' and customers' efforts to use water more efficiently. These efforts extend limited water supplies that are available to meet both current and future water needs; increase drought reliability of the existing water system; and save money for both the member agencies and their customers.

> The implementation of the Regional Water Conservation Program builds upon both the Water Conservation Implementation Plan (WCIP, completed in September 2009) and the Regional Demand and Conservation Projections Project (Demand Study, completed in June of 2020). These efforts include both Core Programs (implemented regionally throughout the BAWSCA service area) and Subscription Programs (funded by individual member agencies that elect to participate and implement them within their respective service areas).
>
> BAWSCA's Core Conservation Programs include organizing classes open to the public on topics such as water efficient landscape education and water-wise gardening, assistance related to automated metering infrastructure, and other associated programs that work to promote smart water use and practices. BAWSCA's Subscription Programs include numerous rebate programs, educational programs that can be offered to area schools, technical assistance to member agencies in evaluating water loss, and programs to train and certify contractors employed to install water efficient landscape. In total, BAWSCA offers 22 programs to its member agencies and that number continues to grow over time.
>
> Each fiscal year, BAWSCA prepares an Annual Water Conservation Report that documents how all of BAWSCA's 26 member agencies have benefitted from the Core Conservation Programs. Additionally, the report highlights how all 26 member agencies participate in one or more of the Subscription Programs offered by BAWSCA, such as rebates, water loss management and large landscape audits. The Demand Study indicates that through a combination of active and passive conservation, 37.3 MGD will be conserved by BAWSCA's member agencies by 2045.
>
> Following the 2014-2016 drought, the State of California (State) developed the "Making Water Conservation a California Way of Life" framework to address the long-term water use efficiency requirements called for in executive orders issued by Governor Brown. In May of 2018, AB 1668 and SB 606 (collectively referred to as the efficiency legislation) went into effect, which built upon the executive orders implementing new urban water use objectives for urban retail water suppliers.

Although the BAWSCA Regional Water Conservation Program was designed and available at a regional level, most of the implementation of the individual programs within the MPMW service area is done by MPMW staff.

The Core Programs provided as a part of the Regional Water Conservation Program include conservation measures that benefit from regional implementation and provide overall regional benefit, and are funded through the annual BAWSCA budget. The Subscription Programs are conservation measures that individual agencies must elect to participate in, and whose benefits are primarily realized within individual water agency service areas. As such, the Subscription Programs are funded by individual member agencies, based on their participation level. MPMW is actively participating in the following Subscription Programs.

- Water Conservation School Education Program
- EarthCapades School Assembly Program
- Large Landscape Program
- Lawn Be Gone! Rebate Program

- Lawn Be Gone! Inspection Services Program
- Rain Barrel Program
- Smart Irrigation Controller Program
- Water Loss Management Program
- Decision Support System (DSS) Model Technical Support

MPMW's implementation, and participation in, the Core and Subscription Programs are described in detail below, as they relate to MPMW's implementation of the DMMs.

9.2 Agency Water Conservation

☑ ***CWC § 10631 (e)***

Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) (A) For an urban retail water supplier, as defined in Section 10608.12, a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years.

MPMW implements all of the DMMs, as described below.

9.2.1 DMM 1 – Water Waste Prevention Ordinances

As discussed in the Water Shortage Contingency Plan (WSCP; Appendix K), MPMW has the authority within Section 7.35 of the City's Municipal Code to require water rationing and conservation and to enforce penalties. The City's current WSCP stage and water waste prohibitions in effect were adopted in 2017 in Resolution 6383. An adopted water shortage contingency resolution corresponding to this 2020 WSCP update is included in Appendix K.

Prohibitions to prevent water waste are included as the Non-Drought Stage of MPMW's 2020 WSCP, and remain in place at all times, irrespective of water supply conditions. The Non-Drought Stage includes the following water waste prohibitions:

- Hoses must be equipped with a shut-off valve for washing vehicles, sidewalks, walkways, or buildings.
- Ornamental fountains shall use only re-circulated or recycled water.
- Potable water shall not be applied in any manner to any driveway, sidewalk, or other hard surface except when necessary to address immediate health or safety concerns.
- Potable water shall not be used to water outdoor landscapes in a manner that causes more than incidental runoff onto non-irrigated areas, walkways, roadways, parking lots, or other hard surfaces.
- Potable water cannot be applied to outdoor landscapes during and up to 48 hours after measurable rainfall.
- Potable water shall not be used to irrigate ornamental turf on public street medians.

- Hotels and motels shall provide guests an option whether to launder towels and linens daily. Hotels and motels shall prominently display notice of this option in each bathroom using clear and easily understood language.
- Restaurants and other food service operations shall serve water to customers only upon request during a period for which the Governor has issued a proclamation of a state of emergency.
- Broken or defective plumbing and irrigation systems must be repaired or replaced within a reasonable period.
- Recreational water features shall be covered when not in use.
- Single-pass cooling systems on new construction shall not be allowed.

In subsequent stages of the WSCP, the water waste prohibitions become increasingly restrictive to respond to water shortages.

9.2.2 DMM 2 – Metering

☑ ***CWC § 526 (a)***

Notwithstanding any other provision of law, an urban water supplier that, on or after January 1, 2004, receives water from the federal Central Valley Project under a water service contract or subcontract … shall do both of the following:

(1) On or before January 1, 2013, install water meters on all service connections to residential and nonagricultural commercial buildings constructed prior to January 1, 1992, located within its service area.

(2) On and after March 1, 2013, or according to the terms of the Central Valley Project water contract in operation, charge customers for water based on the actual volume of deliveries, as measured by a water meter.

☑ ***CWC § 527 (a)***

(a) An urban water supplier that is not subject to Section 526 shall do both of the following:

(1) Install water meters on all municipal and industrial service connections located within its service area on or before January 1, 2025.

MPMW has water meters on each water service connection, with the exception of fire services. All of the meters within the MPMW service area are read on a monthly basis. Some non-residential and multi-family customers also have separate irrigation meters to monitor water use for landscape irrigation separately from indoor uses. The City's updated Water Efficient Landscaping Ordinance (effective February 2016) requires non-residential projects to install a separate irrigation meter if landscaped areas meet specific size thresholds, as discussed in Section 4.

The 2018 Water System Master Plan included a meter replacement/enhancement program as a high priority. In addition, per the City's 2020-2025 five-year Capital Improvement Plan, MPMW plans to install Advanced Metering Infrastructure (AMI) within the next three years (i.e., by Fiscal Year [FY] 2022-23). Implementation of AMI will allow MPMW to automate meter reading and provide real-time water use data to MPMW staff and customers that can be used to aggressively target leaks and atypically high water use during normal years and periods of water shortage. MPMW may also consider a customer portal for accounts with AMI meters. The system can better identify water theft and improve customer service.

9.2.3 DMM 3 – Conservation Pricing

MPMW's current water rate structure for all customers includes a monthly fixed meter charge based on meter size, plus a capital surcharge and a tiered water consumption charge based on water usage.[23] The water consumption charge is tiered such that customers are billed at a lower rate for efficient water use and a higher rate for high water use. The current rate structure for the water consumption charge includes two tiers of monthly water use: (1) 0 to 6 hundred cubic feet (ccf), and (2) greater than 6 ccf. MPMW recently completed a water rate study and is proposing new rates for the next five years. The proposed rate structure for the water consumption charge includes three tiers of monthly water use: (1) 0 to 6 ccf, (2) 7 to 12 ccf, and (3) greater than 12 ccf. MPMW has scheduled a water rate public hearing for 11 May 2021. If the proposed rates are adopted, they will go into effect on 1 July 2021.

In addition, as discussed in Section 8, MPMW's water rate structure also includes drought surcharge rates, which are applied temporarily upon implementation of the WSCP and are designed to recover drought-related expenditures and lost revenue. The drought surcharge rates increase according to each stage of the WSCP as declared by the City Council.

9.2.4 DMM 4 – Public Education and Outreach

MPMW implements a number of public education and outreach initiatives with support from the BAWSCA Regional Water Conservation Program. Specific initiatives include:

- EarthCapades School Assembly Program: MPMW facilitates the school assemblies performed by EarthCapades at schools within its service area. The EarthCapades' performances combine age-appropriate state science standards with circus skills, juggling, music, storytelling, comedy, and audience participation to teach environmental awareness, water science, and conservation. EarthCapades' assemblies are designed to include local water source and watershed education and specific information pertaining to the MPMW service area. MPMW and BAWSCA provide specific information to EarthCapades regarding the San Francisco Public Utilities Commission (SFPUC) Regional Water System (RWS) and other topics (e.g., recycled water). EarthCapades integrates this information into the specific scripts used for assemblies conducted within the MPMW service area.
- Water Conservation School Education Program: The water conservation school education program, formerly known as the Water-Wise school education program, is provided by Resource Action Programs (a contractor to BAWSCA) to 5th grade students within the MPMW service area. Resource Action Programs works directly with teachers and schools to provide them with turn-key, in-classroom water conservation curriculum and indoor and outdoor water conservation kits

[23] Current City of Menlo Park five-year water rate structure including drought surcharge rates are located online at http://www.menlopark.org/135/Water-rates..

(i.e., the Water-Wise Kits). The Water-Wise curriculum has been designed to be easily implemented by teachers, and easily understood and taken back into the home by the students. The Water-Wise Kits include water saving devices that can be installed at the student's homes (e.g., low-flow showerheads and faucet aerators) and a water audit that the students can perform with their parents.

The students are provided with the motivation, information, and tools they need to perform an in-home water audit. The information and material provided to the teachers and students also includes methods that can be used to quantify the water savings as a result of installing the equipment contained in the kit and performing the recommended, water-conserving actions. After the student performs the audit and installs the water and energy saving devices, affidavits signed by the parents are returned to the school, collected by the teacher, and forwarded to Resource Action Programs for documentation of measure implementation and the estimated water savings. Resource Action Programs then prepares a final report for distribution to MPMW.

- Water efficient landscape education classes: MPMW hosts a series of Water-Efficient Landscape Education Classes developed by BAWSCA that are free to the public and are designed to introduce homeowners and landscape professionals to the concepts of sustainable landscape design. The classes focus on creating beautiful, water-efficient gardens as an alternative to lawns. Examples of specific class topics include "Lawn Replacement 101", "Drought Tolerant Plants", and "From Graywater to Green Garden", among others. This program was implemented through 2018.
- Hosting information booths at fairs and public events: The City sets up information booths at large City public events to distribute information regarding MPMW's water conservation programs including rebate programs, landscape analysis programs, and fixture give-aways.
- Informative website, online tools, or social media: The City maintains pages on its website (www.menlopark.org) that are dedicated to its water conservation program. The website provides information regarding its rebate programs, water-saving fixture give-aways, water regulations, and conservation tips and links to interactive tools such as *Water-Wise Gardening in the Bay Area* and a consumption calculator. MPMW also posts outreach materials on its Twitter, Instagram and Facebook accounts.
- Media campaigns and other outreach: MPMW encourages water conservation and markets its rebate programs and water-saving fixture give-aways through direct mail, newsletters, local newspapers, and water billing inserts.

The full extent of public outreach that MPMW has conducted between 2015 and 2020 is discussed in Section 9.3.

9.2.5 DMM 5 – Programs to Assess and Manage Distribution System Real Loss

As discussed in Section 4.1.3, distribution system water loss was estimated to be approximately 3% of total water demand between 2015 and 2020. MPMW does not currently implement a program to assess and manage distribution system losses, however, the 2018 Water System Master Plan (City of Menlo Park, 2018) included a meter replacement/enhancement program as a high priority. In addition, per the City's 2020-2025 five-year Capital Improvement Plan, MPMW plans to install Advanced Metering Infrastructure

(AMI) by FY 2022-23. The future AMI system will help evaluate water use and be instrumental in detecting leaks to prevent distribution system losses.

9.2.6 DMM 6 – Water Conservation Program Coordination and Staffing Support

For FY 2015-16 through FY 2018-19, Sustainability Division staff, equating to one full-time equivalent (FTE), administered MPMW water conservation programs. In FY 2019-20, managing water conservation transitioned to Engineering staff with reduced staff resources equating to 0.08 FTE. Contact information for water conservation staff is listed below:

Phone: 650-330-6750

Email: water@menlopark.org

MPMW's water conservation program is funded through its water fund. The total water conservation program budget for FY 2020-21 is $120,000, including the cost for participation in the Subscription Programs through BAWSCA's Regional Water Conservation Program.

9.2.7 DMM 7 – Other DMMs

Other DMMs provided by MPMW, in addition to those discussed above, include the following:

- Water-Saving Fixtures Give-away: MPMW offers its residential customers free water-saving fixtures. MPMW encourages its customers to pick up and install the following free water saving fixtures from City Hall:
  - Bathroom aerator - uses 1 gallons per minute (gpm)
  - Kitchen aerator - uses 1.5 gpm
  - Low-flow shower head - uses 1.5 gpm
  - Toilet leak detection tablets (2 tablets per packet)
  - Water conserving hose nozzles (with shut-off valve)
- HET Rebates: MPMW administered a High Efficiency Toilet (HET) Rebate Program for its residential and commercial customers from 2008 through 2018. The HET program was one of the Subscription Programs available to BAWSCA member agencies. MPMW offered customers the following rebates for customers replacing a high-volume toilet (i.e., 3.5 gallons per flush, gpf, or more):
  - Up to a $125 Rebate for replacing an existing toilet with a qualifying MaP® Premium model toilet (1.06 gallons or less per flush); or
  - Up to a $75 Rebate per standard HET (i.e., between 1.06 gallons and 1.28 gallons per flush).

  Up to three rebates were allowed per residential account and up to ten rebates were allowed per commercial customer account.

- Large Landscape Audits: MPMW administers the BAWSCA Large Landscape Audits program to commercial and multi-family residential accounts, as described below. Waterfluence, BAWSCA's contractor, implements the program:
  - Landscape Analysis Program: MPMW currently offers a Large Landscape Analysis (a $1,400 value) for free to multi-family and commercial accounts. An irrigation expert evaluates landscapes and provides customers with a personalized report on how they can improve water efficiency and save on water costs.
  - Large Landscape Water Budgets: MPMW distributes water budgets to select accounts and has recently targeted irrigation accounts, which include a mix of churches, parks, schools, home owner associations, and office complexes. However, the program can be applied to any account MPMW chooses. Currently, MPMW provides and tracks water budgets for approximately the top 100 irrigation accounts.
- Lawn Be Gone! Turf Replacement Rebates and Lawn Be Gone! Inspection Services Program: MPMW administers the BAWSCA Lawn Be Gone! turf replacement rebate program for its residential and commercial customers. MPMW offers its customers $2 per square foot of turf removed. MPMW previously capped the rebate at $1,400 per account, but the cap was removed in June 2014. In order to qualify for participation in the Lawn Be Gone! Program, the new landscape must include at least 80% live plant coverage, with the difference completed in permeable hardscape, and all plants must be low water use plants from the BAWSCA-approved plant list. Global Sun Landscape, BAWSCA's contractor, performs the inspection services for this program. A pre and post inspection is required. This program offers MPMW's customers a financial incentive to reduce their outdoor water use and create permanent and lasting water savings. Also, because eligible landscapes must include front yards and areas visible to the public, this program has an educational and public-outreach element (i.e., demonstrating to the wider public that low water use landscaping can be an attractive alternative to lawns and encouraging conversations about responsible water use among neighbors).
- Rain Barrel Program: MPMW administers the BAWSCA Rain Barrel program in partnership with the San Mateo Countywide Water Pollution Prevention Program (a program of the City/County Association of Governments of San Mateo County). MPMW offers rebates of up to $200 per barrel for the purchase and installation of qualifying rain barrels and cisterns. This program is only offered to residential customers. BAWSCA and MPMW review installation images and approve applications. Rain barrels are a low-cost system that allow residents to supplement their water supply with a sustainable source and help preserve local watersheds by detaining rainfall.
- Smart Irrigation Controller Program: This program works with Rachio, BAWSCA's contractor, to offer residential customers a Rachio 3 Smart Sprinkler Controller at a discounted price. The Rachio 3 Smart Sprinkler Controller allows users to save up to 20% or more on their outdoor water use. The controller allows residents to check and manage watering from anywhere with their smartphone by creating tailored schedules and make automatic weather adjustments.

The full extent of the DMMs that MPMW has implemented between 2015 and 2020 is discussed in Section 9.3.

9.3 Implementation over the Past Five Years

Table 9-1 and the associated chart summarizes the DMMs implemented by MPMW and the extent of implementation (e.g., number of kits, number of rebates) for each of the programs each year between 2015 and 2020.

Water savings from the HET rebates and the Lawn Be Gone! Turf Replacement Program are conservatively estimated to be over 6 million gallons (MG) over the past five years.[24] Through implementation of the DMMs, MPMW has been able to significantly reduce water demands in its service area and help its customers to achieve water and cost savings.

9.4 Planned Implementation to Achieve Water Use Targets

☑ ***CWC § 10631 (e)***

Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) (A) … The narrative shall describe the water demand management measures that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.20.

MPMW implemented all of the DMMs described in Section 9.2 to achieve its Senate Bill (SB) X7-7 water use targets. As shown in Chapter 5, MPMW's water use in 2020 was 160 gallons per capital per day (GPCD), which is substantially lower than its SB X7-7 water use target of 204 GPCD.

9.5 Urban Water Use Objectives (Future Requirement)

CWC §10609 requires that urban retail water suppliers develop new water use objectives that are based on specific standards for certain water use sectors. These water use objectives will not be developed until 2023. Suppliers are encouraged in this UWMP cycle to consider how they will align their conservation management actions in order to meet these future obligations.

MPMW intends to continue and expand implementation of the DMMs discussed above and will continue to participate in BAWSCA's Regional Water Conservation Program.

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[24] Expected annual water savings per each HET change out would be approximately 4,862 gallons per year, using the following calculation (BAWSCA, n.d.): (3.5 gpf - 1.28 gpf) x 5 flushes/day/person x 2.64 persons/house / 2.2 toilets/house x 365 days = 4,862 gal. This calculation assumes that a toilet rated at 3.5 gpf actually operates at 3.5 gpf.

Expected annual water savings per lawn replacement, assuming average area converted per rebate between FY 2015-2017, would be approximately 19,730 gallons per year, using the following calculation (BAWSCA, n.d.): (3.5 acre-feet/acre - 1.0 acre-feet/acre) /43,560 square feet/acre x 1,055 square feet x 325,851 gallons/acre-foot = 19,730 gallons.

BAWSCA led its member agencies in a multi-year effort to develop and implement a strategy to meet these new legislative requirements. BAWSCA's Making Conservation a Way of Life Strategic Plan (Strategic Plan) provided a detailed roadmap for member agencies to improve water efficiency. BAWSCA implementing the following elements of the Strategic Plan:

- Conducted an assessment of the agencies' current practices and water industry best practices for three components of the efficiency legislation that, based on a preliminary review, present the greatest level of uncertainty and potential risk to the BAWSCA agencies. The three components were:
    1. Development of outdoor water use budgets in a manner that incorporates landscape area, local climate, and new satellite imagery data.
    2. Commercial, Industrial, and Institutional water use performance measures.
    3. Water loss requirements.
- Organized an Advanced Metering Infrastructure symposium to enable information exchange, including case studies, implementation strategies, and data analysis techniques.
- Initiated a regional CII audit pilot program, which BAWSCA aims to complete in 2021.[25]
- Implemented a regional program for water loss control to help BAWSCA agencies comply with regulatory requirements and implement cost-effective water loss interventions.
- Engaged with the SFPUC to audit meter testing and calibration practices for SFPUC's meters at BAWSCA agency turnouts.

Finally, BAWSCA's Demand Study developed water demand and conservation projections through 2045 for each BAWSCA agency. These projects are designed to provide valuable insights on long-term water demand patterns and conservation savings potential to support regional efforts, such as implementation of BAWSCA's Long-Term Reliable Water Supply Strategy.

As described in Section 4.2, MPMW's 2021 Demand Management Decision Support System Model (DSS Model) estimates projected water demands and quantifies passive and active conservation water savings potential. As discussed in Section 4.6, the DSS Model projections demonstrate that per capita indoor residential potable water use within MPMW is expected to be below the indoor use standards presented in the legislation.

[25] Efforts on the CII audit pilot program stalled in March 2020 due to the COVID 19 pandemic and related shelter-in-place orders.

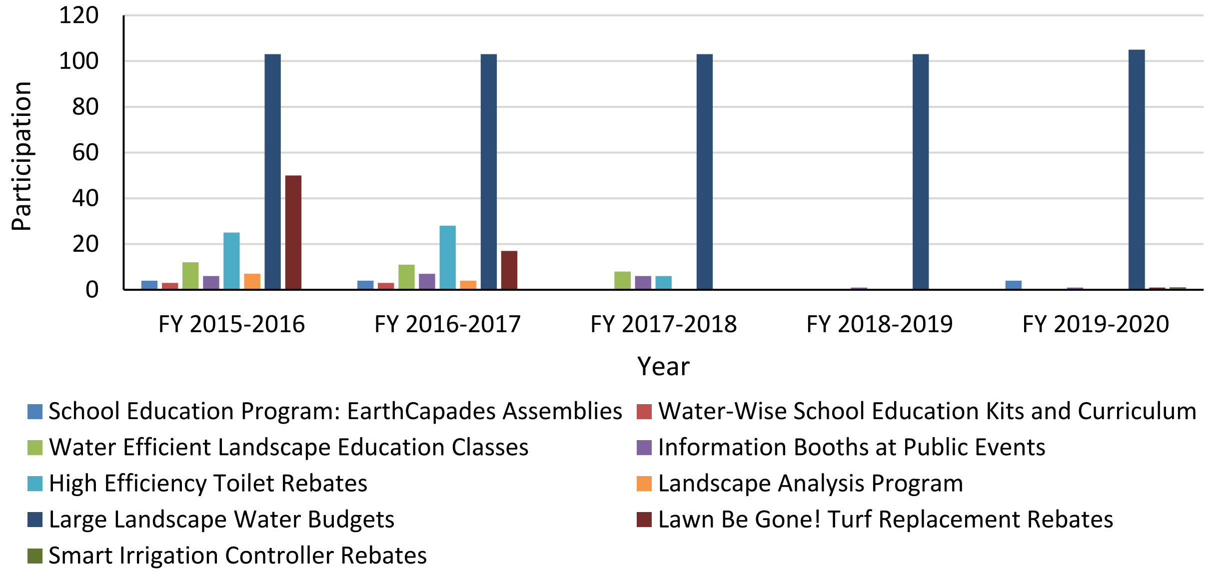
Table 9-1 Summary of DMMs and Implementation over the Past Five Years (2015-2020)

DMM Category	Program or Activity	Target Sector	Nature of Implementation	Extent of Implementation
1	Water Waste Prevention Ordinances	SF, MF, CII And IRR	Prohibition of water uses to prevent water waste included under Stage 1 of the WSCP are in place at all times, irrespective of water supply condition.	Stage 1 water waste prohibitions have been in place since adoption of the 2014 WSCP. The 2016 WSCP adds additional prohibitions.
2	Metering	SF, MF, CII And IRR	All water service connections are metered, with the exception of fire services. Per the City's 2020-2025 five-year CIP, MPMW plans to install AMI within the next three years.	All accounts are metered and read on a monthly basis.
3	Conservation Pricing	SF, MF, CII And IRR	The current water rate structure includes a tiered water consumption charge based on water usage and additional drought surcharge rates: http://www.menlopark.org/waterrates	Tiered rate structure in place during 2015-2020. Drought surcharge rates were established in 2015.
4	School Education Program: EarthCapades Assemblies	SF, MF	School assemblies that teach water science and conservation to students, including local water source and watershed education and specific information pertaining to the MPMW service area. MPMW participates through the BAWSCA Regional Water Conservation Program.	FY 2015-16: 4 assemblies FY 2016-17: 4 assemblies FY 2017-18: Not implemented FY 2018-19: Not implemented FY 2019-20: 4 assemblies
4	Water-Wise School Education Kits and Curriculum	SF, MF	Fifth grade teachers are provided with a water conservation curriculum. Kits are distributed to 5th grade students that enable them to install water saving devices and perform a water audit in their home. MPMW participates through the BAWSCA Regional Water Conservation Program.	FY 2015-16: 3 events FY 2016-17: 3 events FY 2017-18: Not implemented FY 2018-19: Not implemented FY 2019-20: Not implemented
4	Water Efficient Landscape Education Classes	SF, MF	Free classes developed by BAWSCA and hosted by MPMW provide information regarding water efficient landscaping and MPMW's water conservation programs. The classes focus on creating beautiful, water-efficient gardens as an alternative to lawns, and include "Lawn Replacement 101," "Drought Tolerant Plants," and "From Graywater to Green Garden," among others. MPMW participates through the BAWSCA Regional Water Conservation Program.	FY 2015-16: 12 classes FY 2016-17: 11 classes FY 2017-18: 8 classes FY 2018-19: Not implemented FY 2019-20: Not implemented

DMM Category	Program or Activity	Target Sector	Nature of Implementation	Extent of Implementation
4	Information Booths at Public Events	SF, MF, CII And IRR	At public events, MPMW distributes information and materials to participants regarding its water conservation programs.	FY 2015-16: 6 event FY 2016-17: 7 events FY 2017-18: 6 events FY 2018-19: 1 event FY 2019-20: 1 event
4	Other Public Outreach	SF, MF, CII And IRR	MPMW encourages water conservation and markets its rebate programs and water-saving fixture give-aways through newsletters, local newspapers, and water bill inserts. MPMW also maintains water conservation program pages on its website and posts outreach materials on its social media accounts: .http://www.menlopark.org/waterconservation.	FY 2015-16: Not tracked FY 2016-17: Not tracked FY 2017-18: Not tracked FY 2018-19: Not implemented FY 2019-20: Not implemented
5	Programs to Assess and Manage Distribution System Real Loss	Non-revenue	The 2018 Water System Master Plan includes a meter replacement/enhancement program as a high priority. In addition, per the City's 2020-2025 five-year Capital Improvement Plan, MPMW plans to install AMI within the next three years. The future AMI system will help evaluate water use and be instrumental in detecting leaks to prevent distribution system losses.	
6	Conservation Program Coordination and Staff	SF, MF, CII And IRR	City employs coordination staff and funds the water conservation program.	For FY 2015-16 through FY 2018-19, Environmental Services staff, equating to one FTE, administered MPMW water conservation programs. In FY 2019-20, managing water conservation transitioned to Engineering staff with reduced staff resources equating to 0.08 FTE.
7	Free Water-Saving Fixtures	SF, MF	Water-saving fixture kits are available to residential customers at City Hall, and include a bathroom aerator, a kitchen aerator, a low-flow shower head, two (2) toilet leak detection tablets, and water conserving hose nozzles (with shut-off valve).	FY 2015-26: Not tracked FY 2016-17: Not tracked FY 2017-18: Not tracked FY 2018-19: Not tracked FY 2019-20: Not tracked
7	High Efficiency Toilet Rebate	SF, MF, CII	Up to $125 rebate for qualifying toilets less than 1.06 gpf; up to $75 rebate per HET (between 1.06 and 1.28 gpf). Up to three rebates are allowed per residential units and up to ten rebates are allowed per commercial customer account. MPMW participated through the BAWSCA Regional Water Conservation Program.	FY 2015-16: 25 rebates FY 2016-17: 28 rebates FY 2017-18: 6 rebates FY 2018-19: Not implemented FY 2019-20: Not implemented

DMM Category	Program or Activity	Target Sector	Nature of Implementation	Extent of Implementation
7	Landscape Analysis Program	MF, CII	Free landscape analyses (value of $1,400) are offered to commercial and multi-family residential accounts, and provide customers with reports on how to improve landscape water efficiency. MPMW participates through the BAWSCA Regional Water Conservation Program.	FY 2015-16: 7 participants FY 2016-17: 4 participants FY 2017-18: Not implemented FY 2018-19: Not implemented FY 2019-20: Not implemented
7	Large Landscape Water Budgets	IRR, SF	MPMW provides and track water budgets for approximately the top 100 irrigation accounts, including churches, parks, schools, HOA's and office complexes.	FY 2015-16: 103 participants FY 2016-17: 103 participants FY 2017-18: 103 participants FY 2018-19: 103 participants FY 2019-20: 105 participants
7	Lawn Be Gone! Turf Replacement Rebates	SF, MF, CII	Customers are offered $2 per square foot of turf removed and replaced with water-efficient landscaping. The new landscape must include at least 80% live plant coverage, permeable hardscape, and all plants must be low water use plants from the BAWSCA-approved plant list. The rebate was previously capped at $1,400, but as of 17 June 2014, the rebate cap was removed. MPMW participates through the BAWSCA Regional Water Conservation Program.	FY 2015-16: 50 accounts FY 2016-17: 17 accounts FY 2017-18: Not implemented FY 2018-19: Not implemented FY 2019-20: 1 account
7	Rain Barrel Program	SF, MF	MPMW administers this program in partnership with the San Mateo Countywide Water Pollution Prevention Program (a program of the City/County Association of Governments of San Mateo County). MPMW offers rebates of up to $200 per barrel for the purchase and installation of qualifying rain barrels and cisterns.	As this is a new program, no participation data for previous years.
7	Smart Irrigation Controller Rebates	SF	Customers are offered a Rachio 3 Smart Sprinkler Controller at a discounted price which allows users to save 20% or more on their outdoor water use. The controller allows customers to check and manage watering from anywhere with their smartphone, create tailored schedules, and make automatic weather adjustments.	FY 2015-16: Not implemented FY 2016-17: Not implemented FY 2017-18: Not implemented FY 2018-19: Not implemented FY 2019-20: 1 participant

Chart 9-1 DMM Participation (2015-2020)



10 PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

Preparation of the Urban Water Management Plan (UWMP) and the Water Shortage Contingency Plan (WSCP) began in April 2020 for completion in July 2021, with notifications and interactions between stakeholders as discussed further below.

10.1 Notification of UWMP and WSCP Preparation

☑ ***CWC § 10621 (b)***

Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days before the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

On 16 February 2021, Menlo Park Municipal Water (MPMW) sent a letter to 68 recipients from 33 entities, including the San Francisco Public Utilities Commission (SFPUC), Bay Area Water Supply and Conservation Agency (BAWSCA), each BAWSCA member agency, San Mateo County, and other local agencies informing them that MPMW was in the process of updating its UWMP and WSCP and soliciting their input in the update process. A listing of the entities contacted is provided in Table 2-4 and Appendix B. The letter was sent more than 60 days before the public hearing as required by code. A sample outreach letter is included in Appendix B.

10.2 Notification of Public Hearing

☑ ***CWC § 10642***

Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of both the plan and the water shortage contingency plan. Prior to adopting either, the urban water supplier shall make both the plan and the water shortage contingency plan available for public inspection and shall hold a public hearing or hearings thereon. Prior to any of these hearings, notice of the time and place of the hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of a hearing to any city or county within which the supplier provides water supplies. Notices by a local public agency pursuant to this section shall be provided pursuant to Chapter 17.5 (commencing with Section 7290) of Division 7 of Title 1 of the Government Code. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing or hearings, the plan or water shortage contingency plan shall be adopted as prepared or as modified after the hearing or hearings.

10.2.1 <u>Notice to Cities and Counties</u>

On 6 May 2021, MPMW sent a letter to each of the above-mentioned entities informing them the Public Review Draft 2020 UWMP and the updated WSCP were available for review on the City's website and welcoming their input and comments on the documents. The letter also informed the agencies that the UWMP and WSCP public hearing would be occurring via teleconference on 25 May 2021. A sample copy of the notification letters is included in Appendix B.

10.2.2 Notice to the Public

MPMW issued public notifications soliciting public input during the preparation of 2020 UWMP and WSCP.

The City Council held a Study Session on 13 April 2021 regarding the 2020 UWMP and WSCP development. The City Council meeting agenda and copy of the Staff Report and accompanying presentation were made available to the public on the City's website. As directed by MPMW staff, comments received from the City Council during the Study Session were incorporated into the UWMP and the WSCP.

On 7 May 2021 and 14 May 2021, MPMW published a notice in the *Redwood City Tribune* informing the public that the 2020 UWMP and WSCP would be available for public review on the City's website, consistent with requirements of California Government Code 6066. The notice also informed the public that the 2020 UWMP and WSCP public hearing would be held via teleconference on 25 May 2021. Copies of the newspaper announcements are included in Appendix C.

10.3 Public Hearing and Adoption

☑ ***CWC § 10608.26***

(a) In complying with this part, an urban retail water supplier shall conduct at least one public hearing to accomplish all of the following:

(1) Allow community input regarding the urban retail water supplier's implementation plan for complying with this part.

(2) Consider the economic impacts of the urban retail water supplier's implementation plan for complying with this part.

(3) Adopt a method, pursuant to subdivision (b) of Section 10608.20, for determining its urban water use target.

As described above, MPMW informed the public and the appropriate agencies of (1) its intent to prepare a UWMP and the associated WSCP, (2) where the UWMP and WSCP were available for public review, and (3) when the public hearing regarding the UWMP and WSCP would be held. All notifications were completed in compliance with the stipulations of Section 6066 of the Government Code.

As part of the public hearing, MPMW provided the audience with information on compliance with the Senate Bill (SB) X7-7, including its baseline daily per capita water use, water use targets, implementation plan, and 2020 compliance.

This UWMP was adopted by Resolution No. 6630 by the City Council during its 25 May 2021 City Council meeting. The WSCP included as Appendix K was adopted by Resolution No. 6630 during the same meeting. A copy of the resolutions is included in Appendix L.

10.4 Plan Submittal

☑ ***CWC § 10621***

(f) (1) Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.

☑ ***CWC § 10635 (c)***

The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

☑ ***CWC § 10644***

(a) (1) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

(2) The plan, or amendments to the plan, submitted to the department pursuant to paragraph (1) shall be submitted electronically and shall include any standardized forms, tables, or displays specified by the department.

(b) If an urban water supplier revises its water shortage contingency plan, the supplier shall submit to the department a copy of its water shortage contingency plan prepared pursuant to subdivision (a) of Section 10632 no later than 30 days after adoption, in accordance with protocols for submission and using electronic reporting tools developed by the department.

A copy of the adopted 2020 UWMP and associated WSCP will be provided to the Department of Water Resources (DWR), the California State Library, San Mateo County, and SFPUC within 30 days of the adoption. An electronic copy of the adopted 2020 UWMP will be submitted to the DWR using the DWR online submittal tool.

10.5 Public Availability

☑ ***CWC § 10645***

(a) Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

(b) Not later than 30 days after filing a copy of its water shortage contingency plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

A copy of the adopted 2020 UWMP and associated WSCP will be available for public review in City Hall during normal business hours and on the City's website within 30 days of filing the plan with DWR.

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APPENDIX A
COMPLETED UWMP CHECKLIST

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x	x	Chapter 1	10615	A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities.	Introduction and Overview	Section 1 Section 1.6
x	x	Chapter 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.	Summary	Section 1.6
x	x	Section 2.2	10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.1
x	x	Section 2.6	10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 2.2.3

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x	x	Section 2.6.2	10642	Provide supporting documentation that the water supplier has encouraged 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.	Plan Preparation	Section 1.3 Section 2.2.4
x		Section 2.6, Section 6.1	10631(h)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) - if any - with water use projections from that source.	System Supplies	Section 2.2.2
	x	Section 2.6	10631(h)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	N/A
x	x	Section 3.1	10631(a)	Describe the water supplier service area.	System Description	Section 3
x	x	Section 3.3	10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3
x	x	Section 3.4	10631(a)	Provide population projections for 2025, 2030, 2035, 2040 and optionally 2045.	System Description	Section 3.1.1
x	x	Section 3.4.2	10631(a)	Describe other social, economic, and demographic factors affecting the supplier's water management planning.	System Description	Section 3.1.2 Section 3.1.3

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x	x	Sections 3.4 and 5.4	10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Section 3.1 Section 5.1
x	x	Section 3.5	10631(a)	Describe the land uses within the service area.	System Description	Section 3.2
x	x	Section 4.2	10631(d)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4
x	x	Section 4.2.4	10631(d)(3)(C)	Retail suppliers shall provide data to show the distribution loss standards were met.	System Water Use	Section 4.1.3
x	x	Section 4.2.6	10631(d)(4)(A)	In projected water use, include estimates of water savings from adopted codes, plans, and other policies or laws.	System Water Use	Section 4.2.2
x	x	Section 4.2.6	10631(d)(4)(B)	Provide citations of codes, standards, ordinances, or plans used to make water use projections.	System Water Use	Section 4.2.2
x	optional	Section 4.3.2.4	10631(d)(3)(A)	Report the distribution system water loss for each of the 5 years preceding the plan update.	System Water Use	Section 4.1.3
x	optional	Section 4.4	10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.2.5
x	x	Section 4.5	10635(b)	Demands under climate change considerations must be included as part of the drought risk assessment.	System Water Use	Section 4.4

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x		Chapter 5	10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	Section 5
x		Chapter 5	10608.24(a)	Retail suppliers shall meet their water use target by December 31, 2020.	Baselines and Targets	Section 5.4
	x	Section 5.1	10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	N/A
x		Section 5.2	10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Section 5.4
x		Section 5.5	10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5-year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.3

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x		Section 5.5 and Appendix E	10608.4	Retail suppliers shall report on their compliance in meeting their water use targets. The data shall be reported using a standardized form in the SBX7-7 2020 Compliance Form.	Baselines and Targets	Appendix E
x	x	Sections 6.1 and 6.2	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.	System Supplies	Section 7.1.1 Section 7.1.2
x	x	Sections 6.1	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.*	System Supplies	Section 6.10.1 Section 7.1.1.4
x	x	Section 6.1	10631(b)(2)	When multiple sources of water supply are identified, describe the management of each supply in relationship to other identified supplies.	System Supplies	Section 6
x	x	Section 6.1.1	10631(b)(3)	Describe measures taken to acquire and develop planned sources of water.	System Supplies	Section 6.8
x	x	Section 6.2.8	10631(b)	Identify and quantify the existing and planned sources of water available for 2020, 2025, 2030, 2035, 2040 and optionally 2045.	System Supplies	Section 6.9

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x	x	Section 6.2	10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2
x	x	Section 6.2.2	10631(b)(4)(A)	Indicate whether a groundwater sustainability plan or groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	Section 6.2.2
x	x	Section 6.2.2	10631(b)(4)(B)	Describe the groundwater basin.	System Supplies	Section 6.2.1
x	x	Section 6.2.2	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.	System Supplies	Section 6.2.1
x	x	Section 6.2.2.1	10631(b)(4)(B)	For unadjudicated basins, indicate whether or not the department has identified the basin as a high or medium priority. Describe efforts by the supplier to coordinate with sustainability or groundwater agencies to achieve sustainable groundwater conditions.	System Supplies	Section 6.2.1

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x	x	Section 6.2.2.4	10631(b)(4)(C)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	System Supplies	Section 6.2.3
x	x	Section 6.2.2	10631(b)(4)(D)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Section 6.2.4
x	x	Section 6.2.7	10631(c)	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	System Supplies	Section 6.7
x	x	Section 6.2.5	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.	System Supplies (Recycled Water)	Section 6.5.2
x	x	Section 6.2.5	10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.4
x	x	Section 6.2.5	10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.5.4

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x	x	Section 6.2.5	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 a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	Section 6.5.4
x	x	Section 6.2.5	10633(f)	Describe the actions 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.	System Supplies (Recycled Water)	Section 6.5.5
x	x	Section 6.2.5	10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.5
x	x	Section 6.2.6	10631(g)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6
x	x	Section 6.2.5	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.	System Supplies (Recycled Water)	Section 6.5.2
x	x	Section 6.2.8, Section 6.3.7	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 5 consecutive water years.	System Supplies	Section 6.8

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x	x	Section 6.4 and Appendix O	10631.2(a)	The UWMP must include energy information, as stated in the code, that a supplier can readily obtain.	System Suppliers, Energy Intensity	Section 6.11
x	x	Section 7.2	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	Water Supply Reliability Assessment	Section 7.1.1.3
x	x	Section 7.2.4	10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.1.4
x	x	Section 7.3	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 water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.1.3
x	x	Section 7.3	10635(b)	Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects.	Water Supply Reliability Assessment	Section 7.2

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x	x	Section 7.3	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 5 consecutive years.	Water Supply Reliability Assessment	Section 7.2.1
x	x	Section 7.3	10635(b)(2)	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Water Supply Reliability Assessment	Section 7.2.2
x	x	Section 7.3	10635(b)(3)	Include a comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.	Water Supply Reliability Assessment	Section 7.2.3
x	x	Section 7.3	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.	Water Supply Reliability Assessment	Section 7.2.1
x	x	Chapter 8	10632(a)	Provide a water shortage contingency plan (WSCP) with specified elements below.	Water Shortage Contingency Planning	Section 8 Appendix K
x	x	Chapter 8	10632(a)(1)	Provide the analysis of water supply reliability (from Chapter 7 of Guidebook) in the WSCP	Water Shortage Contingency Planning	Appendix K Section 2

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x	x	Section 8.10	10632(a)(10)	Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Water Shortage Contingency Planning	Appendix K Section 12
x	x	Section 8.2	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.	Water Shortage Contingency Planning	Appendix K Section 4
x	x	Section 8.2	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.	Water Shortage Contingency Planning	Appendix K Section 4
x	x	Section 8.3	10632(a)(3)(A)	Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and greater than 50 percent 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.	Water Shortage Contingency Planning	Appendix K Section 5
x	x	Section 8.3	10632(a)(3)(B)	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Water Shortage Contingency Planning	N/A

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x	x	Section 8.4	10632(a)(4)(A)	Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation actions.	Water Shortage Contingency Planning	Appendix K Section 6.2
x	x	Section 8.4	10632(a)(4)(B)	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Water Shortage Contingency Planning	Appendix K Section 6.1
x	x	Section 8.4	10632(a)(4)(C)	Specify locally appropriate operational changes.	Water Shortage Contingency Planning	Appendix K Section 6.3
x	x	Section 8.4	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.	Water Shortage Contingency Planning	Appendix K Section 6.4
x	x	Section 8.4	10632(a)(4)(E)	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Water Shortage Contingency Planning	Appendix K Section 6.6
x	x	Section 8.4.6	10632.5	The plan shall include a seismic risk assessment and mitigation plan.	Water Shortage Contingency Plan	Appendix K Section 7
x	x	Section 8.5	10632(a)(5)(A)	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Water Shortage Contingency Planning	Appendix K Section 8

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x	x	Section 8.5 and 8.6	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.	Water Shortage Contingency Planning	Appendix K Section 8
x		Section 8.6	10632(a)(6)	Retail supplier must describe how it will ensure compliance with and enforce provisions of the WSCP.	Water Shortage Contingency Planning	Appendix K Section 9
x	x	Section 8.7	10632(a)(7)(A)	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Water Shortage Contingency Planning	Appendix K Section 10
x	x	Section 8.7	10632(a)(7)(B)	Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3.	Water Shortage Contingency Planning	Appendix K Section 10
x	x	Section 8.7	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.	Water Shortage Contingency Planning	Appendix K Section 10
x	x	Section 8.8	10632(a)(8)(A)	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Appendix K Section 11
x	x	Section 8.8	10632(a)(8)(B)	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Appendix K Section 11

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x		Section 8.8	10632(a)(8)(C)	Retail suppliers must describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought	Water Shortage Contingency Planning	Appendix K Section 11
x		Section 8.9	10632(a)(9)	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Water Shortage Contingency Planning	Appendix K Section 12
x		Section 8.11	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.	Water Shortage Contingency Planning	Appendix K Section 6.5
x	x	Sections 8.12 and 10.4	10635(c)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 30 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	Appendix K Section 14
x	x	Section 8.14	10632(c)	Make available the Water Shortage Contingency Plan to customers and any city or county where it provides water within 30 after adopted the plan.	Water Shortage Contingency Planning	Appendix K Section 14

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
	x	Sections 9.1 and 9.3	10631(e)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	N/A
x		Sections 9.2 and 9.3	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.	Demand Management Measures	Section 9.1 Section 9.2 Section 9.3
x		Chapter 10	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).	Plan Adoption, Submittal, and Implementation	Section 10.3
x	x	Section 10.2.1	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. Reported in Table 10-1.	Plan Adoption, Submittal, and Implementation	Section 10.1
x	x	Section 10.4	10621(f)	Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.	Plan Adoption, Submittal, and Implementation	Section 10.4

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x	x	Sections 10.2.2, 10.3, and 10.5	10642	Provide supporting documentation that the urban water supplier made the plan and contingency plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan and contingency plan.	Plan Adoption, Submittal, and Implementation	Section 10.5
x	x	Section 10.2.2	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.	Plan Adoption, Submittal, and Implementation	Section 10.2.1
x	x	Section 10.3.2	10642	Provide supporting documentation that the plan and contingency plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3
x	x	Section 10.4	10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4
x	x	Section 10.4	10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4
x	x	Sections 10.4.1 and 10.4.2	10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Section 10.4

Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location
x	x	Section 10.5	10645(a)	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5
x	x	Section 10.5	10645(b)	Provide supporting documentation that, not later than 30 days after filing a copy of its water shortage contingency plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5
x	x	Section 10.6	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.	Plan Adoption, Submittal, and Implementation	N/A
x	x	Section 10.7.2	10644(b)	If revised, submit a copy of the water shortage contingency plan to DWR within 30 days of adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4

APPENDIX B
UWMP AGENCY NOTIFICATION LETTERS

Notification Distribution List

Alameda County Water District

BAWSCA

California Water Service

City of Brisbane

City of Burlingame

City of Daly City

City of Hayward

City of Millbrae

City of Milpitas

City of Mountain View

City of Palo Alto

City of Redwood City

City of San Bruno

City of Santa Clara

City of Sunnyvale

Coastside County Water District

EKI Environment & Water, Inc.

Estero Municipal Improvement District

Menlo Park Chamber of Commerce

Menlo Park Fire District

Mid-Peninsula Water District

North Coast County Water Dist.

O'Connor Tract Co-Operative Water Company

Palo Alto Park Mutual Water Company

Purissima Hills Water District

Ravenswood School District

San Francisco Public Utilities Commission

San Jose Municipal Water System

San Mateo County Environmental Health

Stanford University

Town of Hillsborough

West Bay Sanitary District

Westborough Water District

Jaw, Scott

From: Jaw, Scott
Sent: Tuesday, February 16, 2021 2:01 PM
To: 'Leonard.Ash@acwd.com'; 'kelsi.oshiro@acwd.com'; 'NSandkulla@bawsca.org'; 'dmcpherson@bawsca.org'; 'nashoori@bawsca.org'; 'Acarrasco@calwater.com'; 'dsmithson@calwater.com'; 'mbolzowski@calwater.com'; 'jflanagan@ci.brisbane.ca.us'; 'rbreault@ci.brisbane.ca.us'; 'jlee@burlingame.org'; 'amorimoto@burlingame.org'; 'gkrauss@dalycity.org'; 'wdonnelly@dalycity.org'; 'richard.perez@veolia.com'; 'alex.ameri@hayward-ca.gov'; 'Michelle.Tran@hayward-ca.gov'; 'klim@ci.millbrae.ca.us'; 'Bgiang@ci.millbrae.ca.us'; 'tndah@ci.milpitas.ca.gov'; 'hsiddiqui@ci.milpitas.ca.gov'; 'lisa.au@mountainview.gov'; 'Elizabeth.Flegel@mountainview.gov'; 'karla.dailey@cityofpaloalto.org'; 'Lisa.Bilir@CityofPaloAlto.org'; 'tkyaw@redwoodcity.org'; 'jchapel@redwoodcity.org'; 'jtan@sanbruno.ca.gov'; 'MReinhardt@sanbruno.ca.gov'; 'gwelling@santaclaraca.gov'; 'DAsuncion@SantaClaraCA.gov'; 'mnasser@ci.sunnyvale.ca.us'; 'RChinnakotla@sunnyvale.ca.gov'; 'mrogren@coastsidewater.org'; 'cbrennan@coastsidewater.org'; 'twang@ekiconsult.com'; 'ndorais@fostercity.org'; 'asmith@fostercity.org'; 'harolds@menlofire.org'; 'tammyr@midpeninsulawater.org'; 'jeanettek@midpeninsulawater.org'; 'acarr@nccwd.com'; 'stephaniedalton@nccwd.com'; 'philw@purissimawater.org'; 'samv@purissimawater.org'; 'aakastama@sfwater.org'; 'sritchie@sfwater.org'; 'henry.louie@sanjoseca.gov'; 'nicole.harvie@sanjoseca.gov'; 'hforshey@smcgov.org'; 'ekudyba@stanford.edu'; 'juliann@stanford.edu'; 'ecooney@hillsborough.net'; 'pwillis@hillsborough.net'; 'SRamirez@westbaysanitary.org'; 'dbarrow@westboroughwater.com'; 'pmairena@westboroughwater.com'; 'davidlawjones@gmail.com'; 'oconnorwater@gmail.com'; 'papmwc@yahoo.com'; 'info@papmwc.org'; 'gsudaria@ravenswoodschools.org'; 'weger@ravenswoodschools.org'; 'mpfd@menlofire.org'; 'info@westbaysanitary.org'; 'info@menloparkchamber.com'; Dehn Fran
Cc: Lowe, Pam H; Lamm, Christopher T
Subject: City of Menlo Park - Notice of Preparation of the 2020 Urban Water Management Plan

Re: Notice of Preparation of the City of Menlo Park's 2020 Urban Water Management Plan and Water Shortage Contingency Plan

The Urban Water Management Planning Act (California Water Code §10608–10656) requires the City's Menlo Park Municipal Water to update its Urban Water Management Plan (UWMP) and associated Water Shortage Contingency Plan (WSCP) every 5 years. The City is currently reviewing its existing UWMP and WSCP, which were updated in 2016, and considering revisions to the documents. The UWMP integrates land use, water needs and supply, and demand management measures to document the City's ability to provide a reliable supply of water to its customers. The associated WSCP considers dry-year water supply planning, including strategies to address six levels of water supply shortage conditions, and a drought risk assessment.

The City coordinates with its wholesale water supplier, nearby water agencies, relevant public entities, and other interested parties in preparing the UWMP and WSCP. A draft of the 2020 UWMP and WSCP will be made available for public review, and a public hearing is tentatively scheduled for late-spring. If you would like more information regarding the 2020 UWMP and WSCP, and the schedule for updating these documents, please visit menlopark.org/urbanwatermanagementplan or contact us at:

City of Menlo Park, Menlo Park Municipal Water
701 Laurel Street,
Menlo Park, CA 94025
Phone: (650) 330-6694
Email: scjaw@menlopark.org

Sincerely,
Scott

Jaw, Scott

From: Jaw, Scott
Sent: Thursday, May 6, 2021 12:16 PM
To: 'Leonard.Ash@acwd.com'; 'kelsi.oshiro@acwd.com'; 'NSandkulla@bawsca.org'; 'dmcpherson@bawsca.org'; 'nashoori@bawsca.org'; 'Acarrasco@calwater.com'; 'dsmithson@calwater.com'; 'mbolzowski@calwater.com'; 'jflanagan@ci.brisbane.ca.us'; 'rbreault@ci.brisbane.ca.us'; 'jlee@burlingame.org'; 'amorimoto@burlingame.org'; 'gkrauss@dalycity.org'; 'wdonnelly@dalycity.org'; 'richard.perez@veolia.com'; 'alex.ameri@hayward-ca.gov'; 'Michelle.Tran@hayward-ca.gov'; 'klim@ci.millbrae.ca.us'; 'Bgiang@ci.millbrae.ca.us'; 'tndah@ci.milpitas.ca.gov'; 'hsiddiqui@ci.milpitas.ca.gov'; 'lisa.au@mountainview.gov'; 'Elizabeth.Flegel@mountainview.gov'; 'karla.dailey@cityofpaloalto.org'; 'Lisa.Bilir@CityofPaloAlto.org'; 'tkyaw@redwoodcity.org'; 'jchapel@redwoodcity.org'; 'jtan@sanbruno.ca.gov'; 'MReinhardt@sanbruno.ca.gov'; 'gwelling@santaclaraca.gov'; 'DAsuncion@SantaClaraCA.gov'; 'mnasser@ci.sunnyvale.ca.us'; 'RChinnakotla@sunnyvale.ca.gov'; 'mrogren@coastsidewater.org'; 'cbrennan@coastsidewater.org'; 'twang@ekiconsult.com'; 'ndorais@fostercity.org'; 'asmith@fostercity.org'; 'harolds@menlofire.org'; 'tammyr@midpeninsulawater.org'; 'jeanettek@midpeninsulawater.org'; 'acarr@nccwd.com'; 'stephaniedalton@nccwd.com'; 'philw@purissimawater.org'; 'samv@purissimawater.org'; 'aakastama@sfwater.org'; 'sritchie@sfwater.org'; 'henry.louie@sanjoseca.gov'; 'nicole.harvie@sanjoseca.gov'; 'hforshey@smcgov.org'; 'ekudyba@stanford.edu'; 'juliann@stanford.edu'; 'ecooney@hillsborough.net'; 'pwillis@hillsborough.net'; 'SRamirez@westbaysanitary.org'; 'dbarrow@westboroughwater.com'; 'pmairena@westboroughwater.com'; 'davidlawjones@gmail.com'; 'oconnorwater@gmail.com'; 'papmwc@yahoo.com'; 'info@papmwc.org'; 'gsudaria@ravenswoodschools.org'; 'weger@ravenswoodschools.org'; 'mpfd@menlofire.org'; 'info@westbaysanitary.org'; 'info@menloparkchamber.com'; Dehn Fran
Cc: Lowe, Pam H; Lamm, Christopher T
Subject: City of Menlo Park - Draft 2020 Urban Water Management Plan Available for Public Review

Re: City of Menlo Park’s Draft 2020 Urban Water Management Plan and Water Shortage Contingency Plan available for public review

The Urban Water Management Planning Act (California Water Code §10608–10656) requires the City’s Menlo Park Municipal Water to update its Urban Water Management Plan (UWMP) and associated Water Shortage Contingency Plan (WSCP) every 5 years. The City is currently reviewing its existing UWMP and WSCP, which were updated in 2016, and considering revisions to the documents. The UWMP integrates land use, water needs and supply, and demand management measures to document the City’s ability to provide a reliable supply of water to its customers. The associated WSCP considers dry-year water supply planning, including strategies to address six levels of water supply shortage conditions, and a drought risk assessment.

The City coordinates with its wholesale water supplier, nearby water agencies, relevant public entities, and other interested parties in preparing the UWMP and WSCP. A draft of the 2020 Urban Water Management Plan and Water Shortage Contingency Plan is now available for public review. A public hearing to adopt the

UWMP and WSCP is scheduled for May 25, 2021. If you would like more information, please visit menlopark.org/watermanagementplan or contact us at:

City of Menlo Park, Menlo Park Municipal Water
701 Laurel Street,
Menlo Park, CA 94025
Phone: (650) 330-6694
Email: scjaw@menlopark.org

Sincerely,
Scott

APPENDIX C
UWMP PUBLIC NOTIFICATION

From: City of Menlo Park <water@menlopark.org>
Sent: Wednesday, February 24, 2021 8:59 AM
To: Lowe, Pam H
Subject: Draft 2020 Urban Water Management Plan coming soon for public review

Draft 2020 Urban Water Management Plan coming soon for public review

Menlo Park Municipal Water customers:

The Urban Water Management Plan, and associated Water Shortage Contingency Plan, are a critical part of meeting the long-range water supply needs of Menlo Park Municipal Water customers for both normal and dry year weather conditions. As we face increasingly unpredictable climate patterns, the new state planning requirements ensure we will be prepared for various scenarios and continue to be a reliable and dependable water supplier.

An update to the plan for meeting its long-term water needs is under development. Once completed, the 2020 Urban Water Management Plan will serve as the long-term guide to ensure a reliable water supply for the next 20 years.

- Read the previous update, the 2015 Urban Water Management Plan

- Read the latest staff report on the progress of the 2020 planning process

The City Council approved an agreement with EKI Environment & Water, Inc. to develop the 2020 Urban Water Management Plan. A draft of the 2020 Urban Water Management Plan and Water Shortage Contingency Plan is expected to be released for public review in March or April 2021 for a 60-day public comment period. The City Council is then expected to consider adoption of the final plan in May or June 2021. The adopted plans must be submitted to the state by July 1, 2021.

For additional information, please visit the Urban Water Management Plan webpage or contact Senior Civil Engineer Pam Lowe.

Email SUBSCRIBE

Menlo Park Municipal Water customers,

The Urban Water Management Plan and Water Shortage Contingency Plan are a critical part of meeting the long-range water supply needs of Menlo Park Municipal Water customers for both normal and dry year weather conditions.

The Urban Water Management Plan serves as the long-term guide to ensure a reliable water supply for the next 20 years, and the Water Shortage Contingency Plan outlines the actions and demand management measures that may be implemented based on various future drought conditions.

The City contracted with EKI Environment & Water, Inc. to develop both plans, and presented a study session at the April 13, 2021, City Council meeting.

A draft of the 2020 Urban Water Management Plan and Water Shortage Contingency Plan is available for public review. The City Council is scheduled to hold a public hearing to adopt both plans May 25, 2021.

- Draft 2020 Urban Water Management Plan and Water Shortage Contingency Plan and Appendices
- April 13 City Council study session – Staff Report

The City must submit the plans to the California Department of Water Resources by June 30.

For additional information, please visit the Urban Water Management Plan webpage or contact Senior Civil Engineer Pam Lowe.

Share

Menlo Park Updates

May (May 10) 10

Draft urban water management and water shortage contingency plan available for review

Posted on May 10, 2021 at 6:18 pm by Clay Curtin

The Urban Water Management Plan and Water Shortage Contingency Plan are a critical part of meeting the long-range water supply needs of Menlo Park Municipal Water customers for both normal and dry year weather conditions.

The Urban Water Management Plan serves as the long-term guide to ensure a reliable water supply for the next 20 years, and the Water Shortage Contingency Plan outlines the actions and demand management measures that may be implemented based on various future drought conditions.

The City contracted with EKI Environment & Water, Inc. to develop both plans, and presented a study session at the April 13, 2021, City Council meeting.

The Draft 2020 Urban Water Management Plan and Water Shortage Contingency Plan is available for public review. The City Council is scheduled to hold a public hearing to adopt both plans May 25, 2021. The City must submit the plans to the California Department of Water Resources by June 30.

For additional information, please visit the Urban Water Management Plan webpage or contact Senior Civil Engineer Pam Lowe.

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JUDI HERREN
MENLO PARK/CITY MANAGER, CITY CLERK'S OFFICE
701 LAUREL ST/ CITY HALL 2ND FL.
MENLO PARK, CA 94025

COPY OF NOTICE

Notice Type: HRG NOTICE OF HEARING

Ad Description

Public hearing on the 2020 urban water management plan and the water shortage contingency plan

To the right is a copy of the notice you sent to us for publication in the REDWOOD CITY TRIBUNE. Please read this notice carefully and call us with any corrections. The Proof of Publication will be filed with the County Clerk, if required, and mailed to you after the last date below. Publication date(s) for this notice is (are):

05/07/2021 , 05/14/2021

The charge(s) for this order is as follows. An invoice will be sent after the last date of publication. If you prepaid this order in full, you will not receive an invoice.

Publication	$127.60
Total	$127.60

SPEN# 3466088

Public hearing on the 2020 urban water management plan and the water shortage contingency plan

NOTICE IS HEREBY GIVEN that the City Council of the City of Menlo Park will hold a public hearing to consider proposed revisions and updates to the 2020 urban water management plan (UWMP) and the water shortage contingency plan (WSCP). In conjunction with the update to the UWMP and WSCP, the community must be given an opportunity to give input on the City's urban water use target in the UWMP, any impacts to the local economy, and the City's method of determining its urban water use target. A draft of the 2020 UWMP and WSCP is available for public review on the City's webpage at menlo-park.org/watermanagementplan.

NOTICE IS HEREBY FURTHER GIVEN that the City Council of the City of Menlo Park will hold this public hearing on Tuesday, May 25, 2021 at 5 p.m. or as near as possible thereafter, by virtual meeting, at which time and place interested persons may participate and be heard on the matter. If you challenge this item in court, you may be limited to raising only those issues you or someone else raised at the public hearing described in this notice, or in written correspondence delivered to the City of Menlo Park at, or prior to, the public hearing.

Please call Menlo Park Municipal Water, at 650-330-6750 or email water@menlopark.org if you have any questions or comments.

Visit the City's website at menlopark.org/agenda for the City Council meeting agenda and for links to the public hearing staff report which will be available one week before the public hearing.

DATED: May 3, 2021
BY: Judi A. Herren, City Clerk
5/7, 5/14/21
SPEN-3466088#
EXAMINER - REDWOOD CITY TRIBUNE

A000005705541

APPENDIX D
POPULATION AND EMPLOYMENT PROJECTIONS

CITY OF MENLO PARK

MEMORANDUM

Date: **10/5/2020**
To: **Menlo Park Water Department**
From: **Kyle Perata, Principal Planner**
Re: **ConnectMenlo Population and Employment Projections for 2020 Urban Water Management Plan**

The City of Menlo Park Water Department (Water Department) asked the Planning Division to review the 2015 Urban Water Management Plan (2015 UWMP) projections for employment and population within the Water Department's service area and update the projections for population and employment growth from the City's 2016 General Plan Update (ConnectMenlo) for the period from 2020 through 2045. The General Plan sets the framework for development, with growth focused on the Bayfront Area of the Water Department's service area, through 2040, so the Planning Division has updated residential and employment projections from ConnectMenlo through 2040, not 2045. Projections beyond 2040 would be speculative.

This memo outlines the Planning Division's approach to the updated residential population and commercial employment projections. Outside of ConnectMenlo and the Facebook Campus Expansion Project, Planning Division staff did not adjust the population and employment growth in the remainder of the Water Department's service area.

Residential population within service area

Table 2-1 of the 2015 UWMP identifies the population growth expected through 2040 from the previous general plan and the population expected through 2040 with full buildout of the additional housing units created through ConnectMenlo. ConnectMenlo created the potential for up to 4,500 new housing units and a population of 11,570 new residents[1]. All of these new housing units would be located within the Water Department's service area. Planning Division staff did not modify the total residential population in the projections as the number of housing units is capped in ConnectMenlo; however, Planning Staff reviewed the City's approved and pending projects under ConnectMenlo to reallocate residential population increases within the five year planning increments based on when the currently proposed projects would likely be completed and occupied. The Planning Division is currently reviewing projects for a total of 3,049 housing units and all except Willow Village are anticipated to be complete and occupied by 2025. This shifts much of the residential population growth to 2025, including approximately half of the total proposed housing units in the Willow Village project. For 2030, the second half of the Willow Village project would be expected to be completed. No projects currently on file would be anticipated to be completed after 2030; for those years Planning staff split the additional expected population growth equally between 2035 and 2040. As stated previously, no population growth from ConnectMenlo is projected beyond 2040.

[1] The residential population projection is based on an average household size of 2.57 persons multiplied by the total (4,500) housing units available under ConnectMenlo.

Housing element
The Planning Division will be embarking on the next Housing Element update in 2021, which will require that the City plan for additional housing units. The Regional Housing Needs Assessment (RHNA) allocation from Association of Bay Area Governments (ABAG) has not occurred yet. However, the Planning Division anticipates that the City will be required to plan for approximately 3,000 housing units to accommodate population growth in the City, approximately half of which could be located in the Menlo Park Water Department service area. Since approximately slightly fewer than 1,500 housing units are still available under ConnectMenlo, those units would be able to be applied toward the RHNA allocation. The remaining anticipated approximately 1,500 housing units would likely be planned for outside of the Water Department's service area. Planning staff believe that the Housing Element update can be accommodated in the 2020 UWMP based on the available units under ConnectMenlo.

Employment projections within service area
Commercial square footage within the office, life sciences, and commercial (non-office retail/services) are capped but employees were not limited. Further, hotel rooms are capped at 400 rooms, also without an employment cap. While housing units are capped by ConnectMenlo, employment was not capped and the projections provided in the 2015 UWMP were based on the Planning Division's estimates at the time.

Table 2-2 of the 2015 UWMP identified an increase in approximately 5,500 employees within the Water Department's service area through ConnectMenlo. In addition to the 5,500 employees anticipated by ConnectMenlo, buildout of the previous general plan could accommodate approximately 3,400 employees within the Bayfront Area[2]. The total projected employment by 2040 in the Bayfront Area would be 8,900 employees (ConnectMenlo plus growth available under previous general plan). These are two distinct calculations; however, with 5,500 employees directly related to the net increase in growth under ConnectMenlo and 3,400 employees under the previous general plan and identified in general plan build out within the Water Department's service area. The total estimated employment based on the additional development potential (office, life sciences, commercial-retail, and hotels) created by ConnectMenlo, and accounting for the growth under the existing general plan, would be up to approximately 10,218 employees. This total employment could occur if ConnectMenlo was completely built out. The ConnectMenlo employment projection in Table 3-2 of the Draft EIR did not account for the Facebook office density at the Commonwealth Corporate Center Building 3 project proposal, nor did it accommodate the proposed Willow Village master plan project.

The majority of the proposed projects with commercial components require environmental review under the California Environmental Quality Act (CEQA) to determine if the proposed projects would result in impacts not identified through the ConnectMenlo certified EIR. Therefore, population increases above the estimated projections would be reviewed for potential environmental impacts through the CEQA

[2] Employment projection of previous general plan in Bayfront Area identified in Table 3-2 of the ConnectMenlo Draft Environmental Impact Report.

environmental analysis process for individual projects.

Planning Staff updated the ConnectMenlo employment projections based on approved and built projects, pending projects, and the net available development potential after accounting for all approved/built and pending projects. Reviewing these projects results in some employment growth by 2020 and moves all pending projects, with the exception of Willow Village into 2025. As with the residential population half of Willow Village is assumed to be constructed by 2025 with the second half built out by 2030. For the remaining development potential within ConnectMenlo, Planning staff allocated the employee growth, based on square footage, equally between 2035 and 2040. These projections account for the total available square footage in the Bayfront Area. The growth associated with the previous general plan would be accounted for in the Projected GP Build Out column. To ensure that the employment associated with the previous general plan was not double counted, Planning staff removed the 3,400 employees from the ConnectMenlo column after accounting for full build out since those employees would already have been accounted for in the general plan buildout without ConnectMenlo.

Conclusions and updated projections

The total residential population is static and the Planning Division limited modifications to the allocation of growth over the time period from 2020 to 2040 and did not modify the total expected population. Planning staff believe that ConnectMenlo can accommodate the forthcoming RHNA numbers for housing units that would need to be served by the Menlo Park Water Department. The remaining units would likely be located within the Cal Water service area.

With regard to employment growth, the estimate in ConnectMenlo was lower than the employment that could be accommodated within the square footage within the development cap because it did not account for the proposed Willow Village project or the employment density at the Commonwealth Building 3 project. Those projects are being reviewed through the CEQA process to determine if the proposed projects would result in any environmental effects.

The attached updated projections identify the ConnectMenlo growth in population and employment in five year increments. While the tables in the UWMP showed population and employment cumulatively, the Planning Division has shown the projections by year to help show the actual numbers per planning year for discussion purposes. The Water Department may wish to convert to a cumulative/running total for the projections to be consistent with the 2015 UWMP tables after reviewing the Planning Division’s updates.

	Population						Jobs					
Date	2015 UWMP	Actual (CM)	HE	Projected (CM) - net new	Projected (GP Buildout - net new + growth) (former UWMP #)	Total Projected (GP buildout + CM)	2015 UWMP	Actual (CM)	Projected (CM)	Other (FB West Campus)	Projected (GP Buildout) (numbers from UWMP #)	Total Projected (GP buildout + CM + FB)
2010	14,749						11,637					
2011	14,829						11,798					
2012	14,973						11,959					
2013	15,129						12,121					
2014	15,157						12,282					
2015	15,342						12,443					
2016	15,918						14,693					
2017	16,495						16,943					
2018	17,071						19,193					
2019	17,648											
2020	18,224	0		0	18,224	18,224	23,693	31	0	6,400	17,143	23,574
2025	21,214	5,062		2,893	18,321	23,383	25,918	4,937	1,375	150	17,993	29,511
2030	24,204	1,685		5,785	18,419	25,166	28,143	1,995	2,750	0	18,843	32,356
2035	27,194	2,412		8,678	18,516	27,675	30,368	1,628	4,125	0	19,693	34,834
2040	30,184	2,411		11,570	18,614	30,184	32,593	1,628	5,500	0	20,543	37,311
2045												

APPENDIX E
SBX7-7 COMPLIANCE TABLES

SB X7-7 Table 0: Units of Measure Used in 2020 UWMP* *(select one from the drop down list)*
Million Gallons
**The unit of measure must be consistent throughout the UWMP, as reported in Submittal Table 2-3.*
NOTES:

SB X7-7 Table 2: Method for 2020 Population Estimate	
Method Used to Determine 2020 Population (may check more than one)	
☐	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☑	**4. Other** DWR recommends pre-review
NOTES: (a) The 2020 population was estimated by the City using the GIS-based method recommended by DWR and is described in Section 5.1.	

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	18,276
NOTES:	

SB X7-7 Table 4: 2020 Gross Water Use							
Compliance Year 2020	2020 Volume Into Distribution System *This column will remain blank until SB X7-7 Table 4-A is completed.*	2020 Deductions					2020 Gross Water Use
		Exported Water *	Change in Dist. System Storage* (+/-)	Indirect Recycled Water *This column will remain blank until SB X7-7 Table 4-B is completed.*	Water Delivered for Agricultural Use*	Process Water *This column will remain blank until SB X7-7 Table 4-D is completed.*	
	1,069	-	-	-	-	-	**1,069**

* **Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.

NOTES:

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water ***Fm SB X7-7 Table 4***	**2020 Population** ***Fm SB X7-7 Table 3***	**2020 GPCD**
1,069	18,276	**160**
NOTES:		

SB X7-7 Table 9: 2020 Compliance

Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD Enter "0" if Adjustment Not Used: Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]	TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
160	-	-	-	-	160	204	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

SB X7-7 Table 7: 2020 Target Method *Select Only One*		
Target Method		Supporting Documentation
☑	Method 1	SB X7-7 Table 7A
☐	Method 2	SB X7-7 Tables 7B, 7C, and 7D *Contact DWR for these tables*
☐	Method 3	SB X7-7 Table 7-E
☐	Method 4	Method 4 Calculator
NOTES:		

SB X7-7 Table 7-A: Target Method 1
20% Reduction

10-15 Year Baseline GPCD	**2020 Target GPCD**
255	**204**

NOTES:

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target

5 Year Baseline GPCD *From SB X7-7 Table 5*	Maximum 2020 Target[1]	Calculated 2020 Target[2]	**Confirmed 2020 Target**
236	224	204	**204**

[1] Maximum 2020 Target is 95% of the 5 Year Baseline GPCD *[2] 2020 Target is calculated based on the selected Target Method, see SB X7-7 Table 7 and corresponding tables for agency's calculated target.*

NOTES:

APPENDIX F
2020 CURRENT POPULATION ESTIMATE

MP Water Demographic and Income Profile

Burgess SRI Census Blocks-Combined
Area: 0.02 square miles

Prepared by Menlo Park GIS

Summary	Census 2010		2020		2025
Population	90		94		94
Households	31		31		31
Families	17		17		17
Average Household Size	2.90		3.03		3.03
Owner Occupied Housing Units	14		15		15
Renter Occupied Housing Units	17		16		16
Median Age	37.8		37.8		38.0
Trends: 2020-2025 Annual Rate	**Area**		**State**		**National**
Population	0.00%		0.55%		0.72%
Households	0.00%		0.50%		0.72%
Families	0.00%		0.50%		0.64%
Owner HHs	0.00%		0.65%		0.72%
Median Household Income	0.00%		1.81%		1.60%
			2020		**2025**
Households by Income		Number	Percent	Number	Percent
<$15,000		0	0.0%	0	0.0%
$15,000 - $24,999		1	3.2%	0	0.0%
$25,000 - $34,999		0	0.0%	0	0.0%
$35,000 - $49,999		0	0.0%	0	0.0%
$50,000 - $74,999		2	6.5%	1	3.2%
$75,000 - $99,999		2	6.5%	2	6.5%
$100,000 - $149,999		4	12.9%	4	12.9%
$150,000 - $199,999		5	16.1%	5	16.1%
$200,000+		16	51.6%	17	54.8%
Median Household Income		$200,001		$200,001	
Average Household Income		$269,643		$291,603	
Per Capita Income		$118,544		$128,199	

Source: Esri, U.S. Census

February 04, 2021

MP Water Demographic and Income Profile

Burgess SRI Census Blocks-Combined
Area: 0.02 square miles

Prepared by Menlo Park GIS

	Census 2010		2020		2025	
Population by Age	Number	Percent	Number	Percent	Number	Percent
0 - 4	7	7.7%	7	7.5%	7	7.4%
5 - 9	6	6.6%	6	6.5%	6	6.4%
10 - 14	5	5.5%	5	5.4%	5	5.3%
15 - 19	2	2.2%	2	2.2%	2	2.1%
20 - 24	3	3.3%	3	3.2%	3	3.2%
25 - 34	17	18.7%	18	19.4%	18	19.1%
35 - 44	18	19.8%	18	19.4%	18	19.1%
45 - 54	13	14.3%	12	12.9%	11	11.7%
55 - 64	9	9.9%	9	9.7%	9	9.6%
65 - 74	6	6.6%	8	8.6%	8	8.5%
75 - 84	3	3.3%	3	3.2%	5	5.3%
85+	2	2.2%	2	2.2%	2	2.1%

	Census 2010		2020		2025	
Race and Ethnicity	Number	Percent	Number	Percent	Number	Percent
White Alone	72	80.0%	69	74.2%	67	70.5%
Black Alone	1	1.1%	1	1.1%	1	1.1%
American Indian Alone	0	0.0%	0	0.0%	0	0.0%
Asian Alone	10	11.1%	15	16.1%	18	18.9%
Pacific Islander Alone	0	0.0%	0	0.0%	0	0.0%
Some Other Race Alone	1	1.1%	1	1.1%	1	1.1%
Two or More Races	6	6.7%	7	7.5%	8	8.4%
Hispanic Origin (Any Race)	5	5.6%	5	5.3%	5	5.3%

Data Note: Income is expressed in current dollars.

Source: Esri, U.S. Census

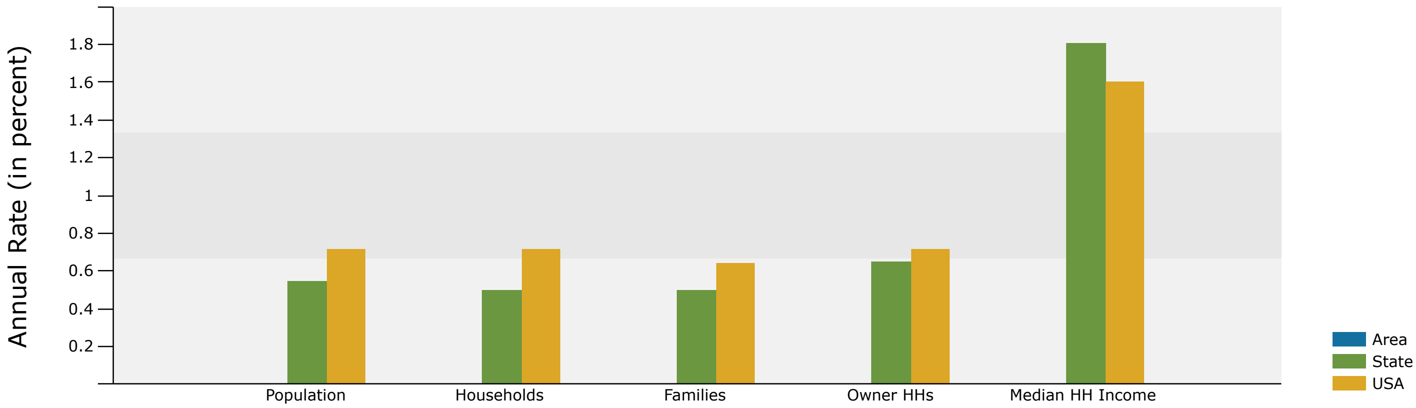
February 04, 2021

MP Water Demographic and Income Profile

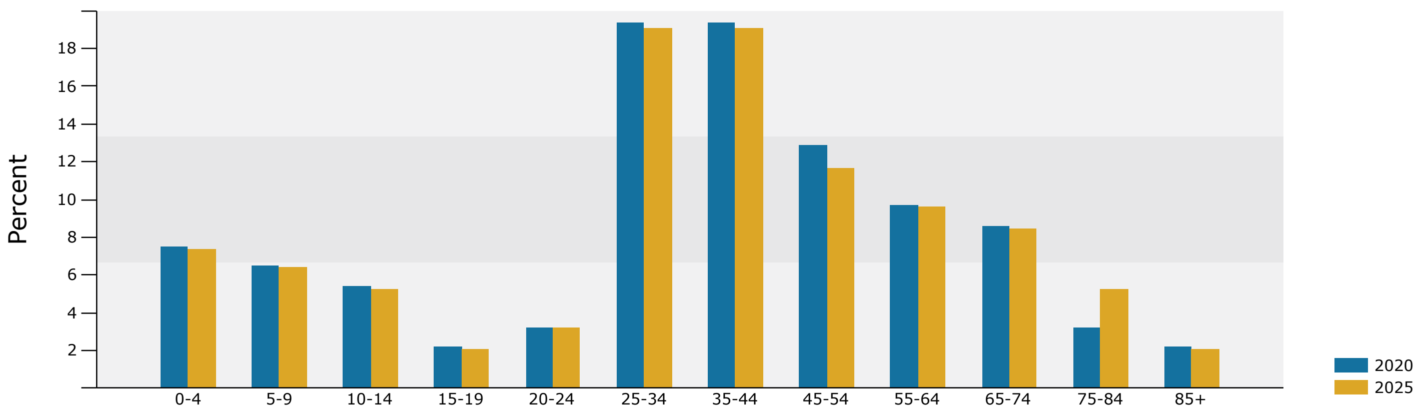
Burgess SRI Census Blocks-Combined
Area: 0.02 square miles

Prepared by Menlo Park GIS

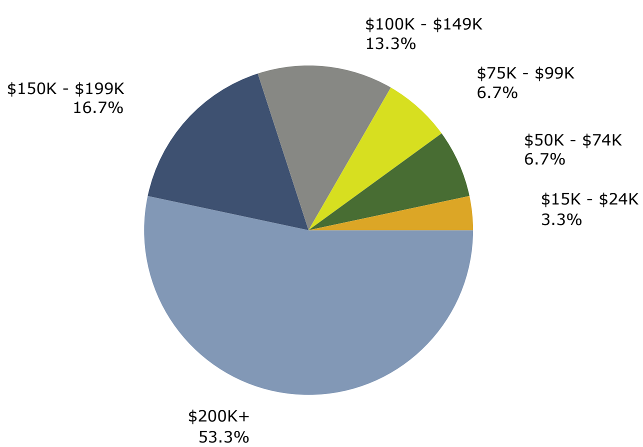
Trends 2020-2025



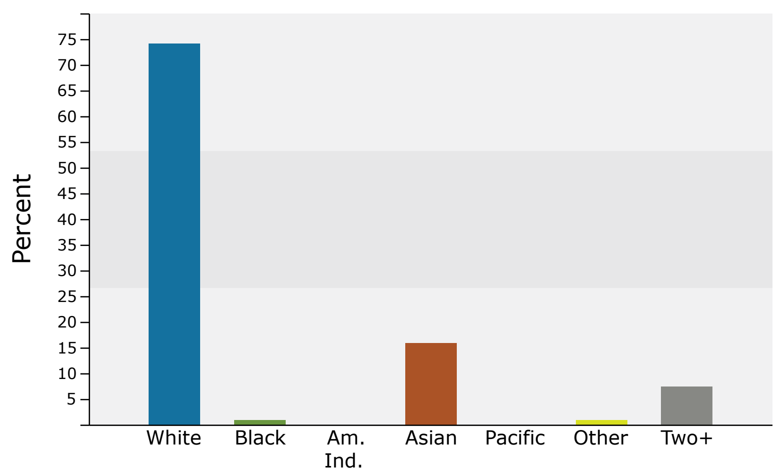
Population by Age



2020 Household Income



2020 Population by Race



2020 Percent Hispanic Origin:5.3%

Source: Esri, U.S. Census

February 04, 2021

MP Water Demographic and Income Profile

Block 1005

Prepared by Menlo Park GIS

Summary	Census 2010	2020	2025
Population	113	114	114
Households	52	52	52
Families	30	30	30
Average Household Size	2.13	2.15	2.15
Owner Occupied Housing Units	33	34	35
Renter Occupied Housing Units	19	18	18
Median Age	38.4	40.9	41.4
Trends: 2020-2025 Annual Rate	**Area**	**State**	**National**
Population	0.00%	0.55%	0.72%
Households	0.00%	0.50%	0.72%
Families	0.00%	0.50%	0.64%
Owner HHs	0.58%	0.65%	0.72%
Median Household Income	0.00%	1.81%	1.60%

	2020		2025	
Households by Income	Number	Percent	Number	Percent
<$15,000	2	3.8%	2	3.8%
$15,000 - $24,999	1	1.9%	1	1.9%
$25,000 - $34,999	1	1.9%	1	1.9%
$35,000 - $49,999	0	0.0%	0	0.0%
$50,000 - $74,999	3	5.8%	3	5.8%
$75,000 - $99,999	3	5.8%	3	5.8%
$100,000 - $149,999	5	9.6%	5	9.6%
$150,000 - $199,999	7	13.5%	7	13.5%
$200,000+	29	55.8%	32	61.5%
Median Household Income	$200,001		$200,001	
Average Household Income	$259,604		$283,748	
Per Capita Income	$105,255		$115,041	

Source: Esri, U.S. Census

February 04, 2021

CITY OF MENLO PARK

MP Water Demographic and Income Profile

Block 1005

Prepared by Menlo Park GIS

	Census 2010		2020		2025	
Population by Age	Number	Percent	Number	Percent	Number	Percent
0 - 4	10	8.8%	7	6.2%	7	6.1%
5 - 9	10	8.8%	8	7.1%	8	7.0%
10 - 14	5	4.4%	9	8.0%	8	7.0%
15 - 19	3	2.7%	9	8.0%	8	7.0%
20 - 24	5	4.4%	4	3.5%	7	6.1%
25 - 34	16	14.2%	11	9.7%	10	8.8%
35 - 44	22	19.5%	15	13.3%	14	12.3%
45 - 54	16	14.2%	20	17.7%	18	15.8%
55 - 64	16	14.2%	14	12.4%	16	14.0%
65 - 74	6	5.3%	11	9.7%	11	9.6%
75 - 84	3	2.7%	4	3.5%	6	5.3%
85+	1	0.9%	1	0.9%	1	0.9%
	Census 2010		**2020**		**2025**	
Race and Ethnicity	Number	Percent	Number	Percent	Number	Percent
White Alone	88	77.9%	83	72.8%	79	69.3%
Black Alone	3	2.7%	2	1.8%	2	1.8%
American Indian Alone	0	0.0%	0	0.0%	0	0.0%
Asian Alone	11	9.7%	16	14.0%	19	16.7%
Pacific Islander Alone	0	0.0%	0	0.0%	0	0.0%
Some Other Race Alone	4	3.5%	4	3.5%	4	3.5%
Two or More Races	7	6.2%	9	7.9%	10	8.8%
Hispanic Origin (Any Race)	11	9.7%	10	8.8%	10	8.8%

Data Note: Income is expressed in current dollars.

Source: Esri, U.S. Census

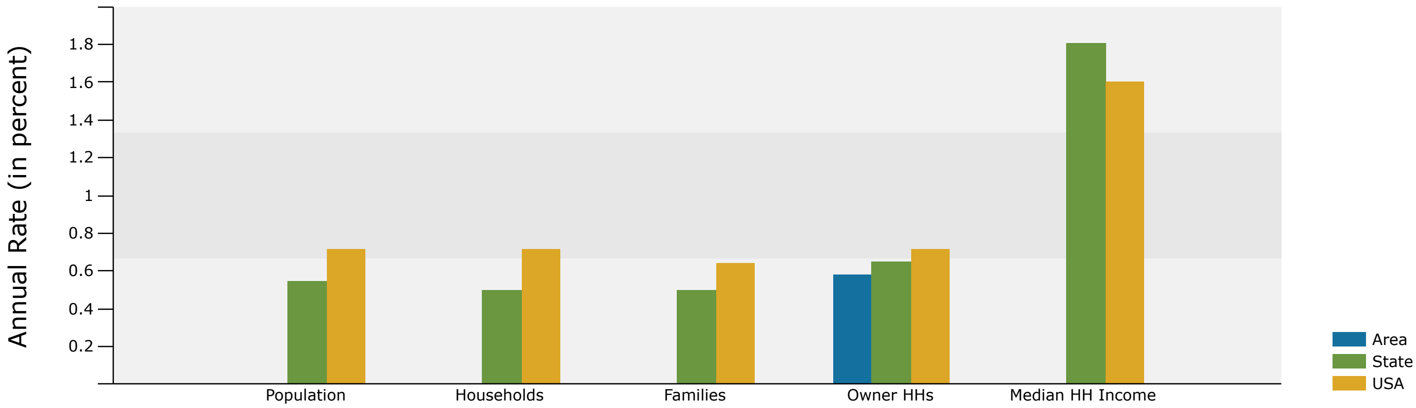
February 04, 2021

MP Water Demographic and Income Profile

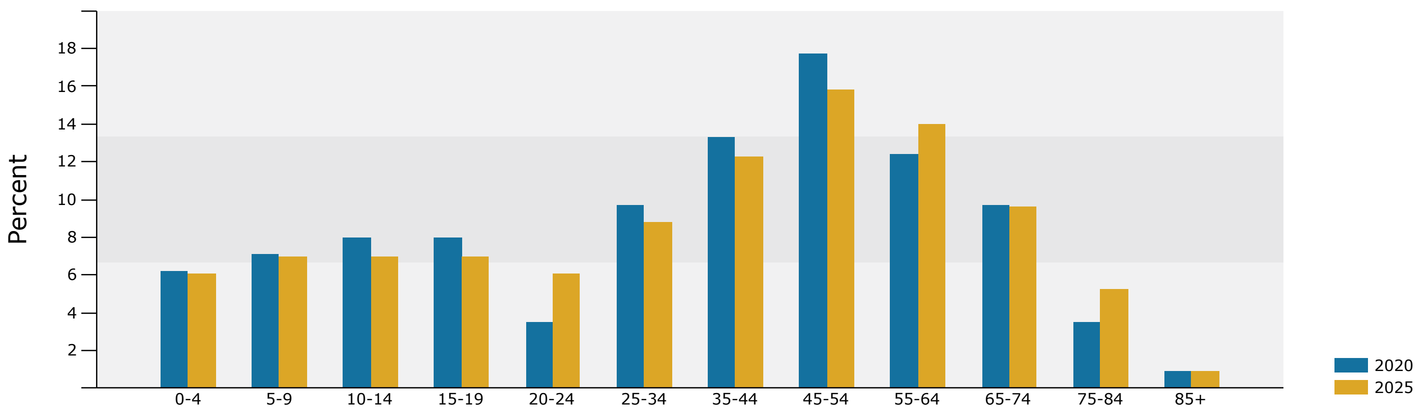
Block 1005

Prepared by Menlo Park GIS

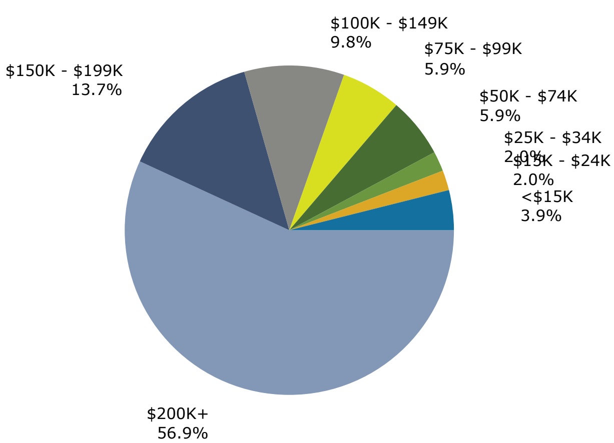
Trends 2020-2025



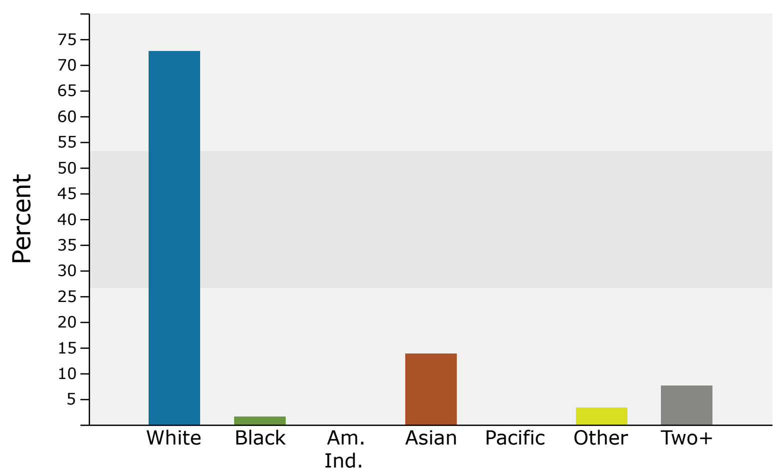
Population by Age



2020 Household Income



2020 Population by Race



2020 Percent Hispanic Origin:8.8%

Source: Esri, U.S. Census

February 04, 2021

MP Water Demographic and Income Profile

Menlo Park Municipal Water-Lower Zone
Area: 5.78 square miles

Prepared by Menlo Park GIS

Summary	Census 2010	2020	2025
Population	11,931	14,235	14,748
Households	3,556	4,335	4,451
Families	2,536	3,167	3,262
Average Household Size	3.27	3.22	3.25
Owner Occupied Housing Units	2,173	2,281	2,368
Renter Occupied Housing Units	1,383	2,054	2,083
Median Age	34.5	34.6	35.3

Trends: 2020-2025 Annual Rate	Area	State	National
Population	0.71%	0.55%	0.72%
Households	0.53%	0.50%	0.72%
Families	0.59%	0.50%	0.64%
Owner HHs	0.75%	0.65%	0.72%
Median Household Income	1.88%	1.81%	1.60%

	2020		2025	
Households by Income	Number	Percent	Number	Percent
<$15,000	356	8.2%	302	6.8%
$15,000 - $24,999	134	3.1%	117	2.6%
$25,000 - $34,999	147	3.4%	125	2.8%
$35,000 - $49,999	257	5.9%	247	5.5%
$50,000 - $74,999	504	11.6%	481	10.8%
$75,000 - $99,999	382	8.8%	399	9.0%
$100,000 - $149,999	659	15.2%	688	15.5%
$150,000 - $199,999	450	10.4%	490	11.0%
$200,000+	1,448	33.4%	1,603	36.0%
Median Household Income	$125,133		$137,379	
Average Household Income	$185,593		$203,256	
Per Capita Income	$58,093		$62,929	

Source: Esri, U.S. Census

February 04, 2021

MP Water Demographic and Income Profile

Menlo Park Municipal Water-Lower Zone
Area: 5.78 square miles

Prepared by Menlo Park GIS

	Census 2010		2020		2025	
Population by Age	Number	Percent	Number	Percent	Number	Percent
0 - 4	1,072	9.0%	1,120	7.9%	1,168	7.9%
5 - 9	981	8.2%	1,112	7.8%	1,109	7.5%
10 - 14	843	7.1%	1,111	7.8%	1,066	7.2%
15 - 19	757	6.3%	912	6.4%	932	6.3%
20 - 24	699	5.9%	848	6.0%	856	5.8%
25 - 34	1,695	14.2%	2,096	14.7%	2,183	14.8%
35 - 44	1,919	16.1%	2,008	14.1%	2,131	14.5%
45 - 54	1,724	14.4%	1,868	13.1%	1,818	12.3%
55 - 64	1,143	9.6%	1,583	11.1%	1,652	11.2%
65 - 74	573	4.8%	947	6.7%	1,056	7.2%
75 - 84	357	3.0%	424	3.0%	560	3.8%
85+	168	1.4%	204	1.4%	215	1.5%
	Census 2010		**2020**		**2025**	
Race and Ethnicity	Number	Percent	Number	Percent	Number	Percent
White Alone	6,335	53.1%	6,919	48.6%	6,850	46.4%
Black Alone	1,288	10.8%	1,355	9.5%	1,343	9.1%
American Indian Alone	111	0.9%	127	0.9%	134	0.9%
Asian Alone	792	6.6%	1,515	10.6%	1,781	12.1%
Pacific Islander Alone	376	3.2%	442	3.1%	461	3.1%
Some Other Race Alone	2,466	20.7%	3,078	21.6%	3,291	22.3%
Two or More Races	563	4.7%	799	5.6%	888	6.0%
Hispanic Origin (Any Race)	4,689	39.3%	5,784	40.6%	6,116	41.5%

Data Note: Income is expressed in current dollars.

Source: Esri, U.S. Census

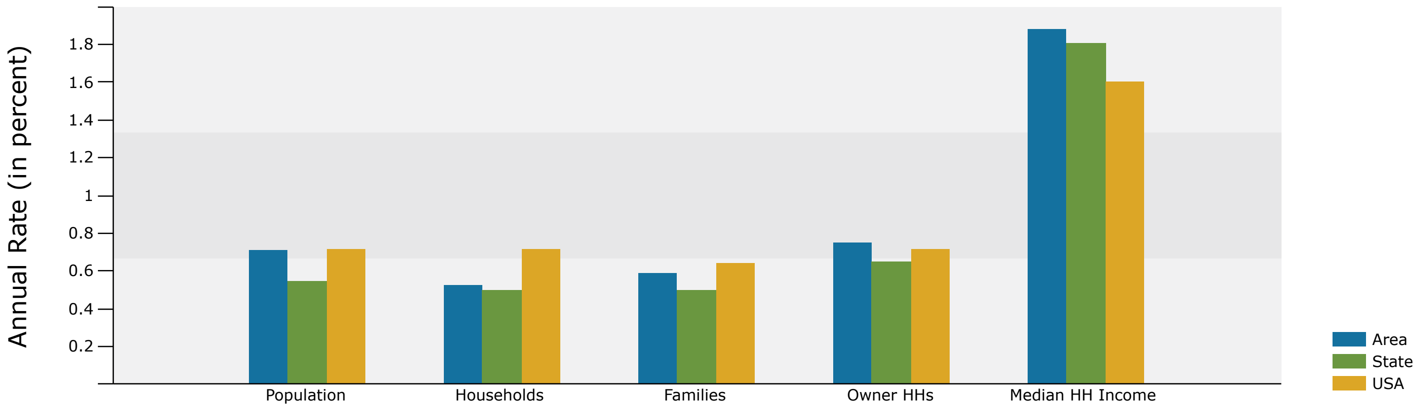
February 04, 2021

MP Water Demographic and Income Profile

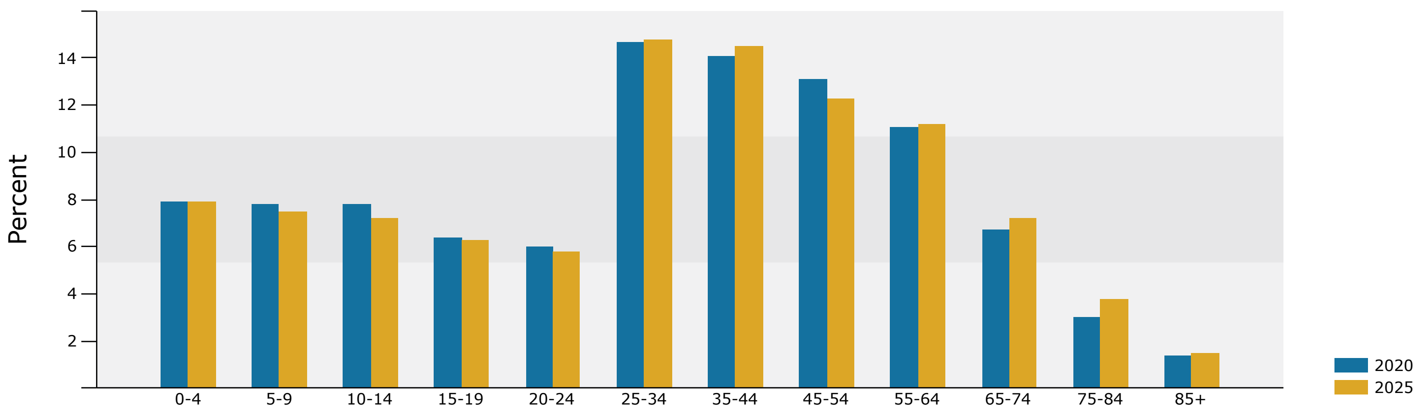
Menlo Park Municipal Water-Lower Zone
Area: 5.78 square miles

Prepared by Menlo Park GIS

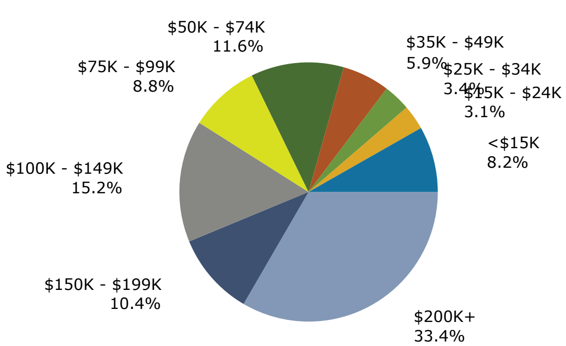
Trends 2020-2025



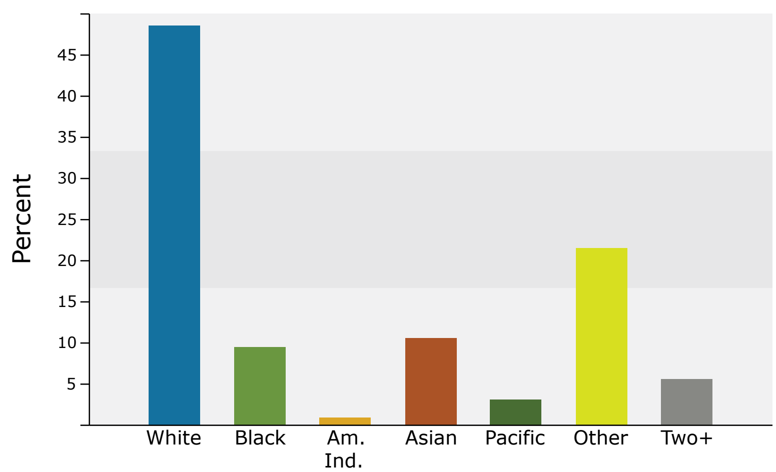
Population by Age



2020 Household Income



2020 Population by Race



2020 Percent Hispanic Origin:40.6%

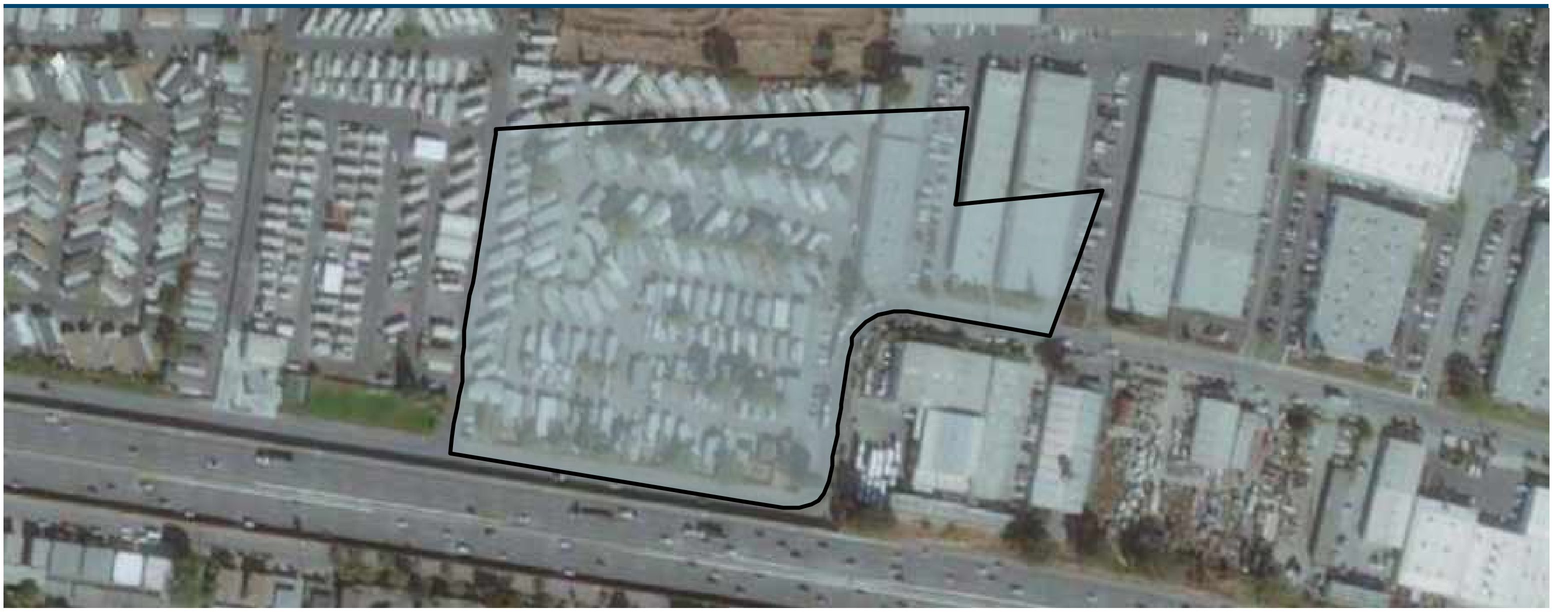
Source: Esri, U.S. Census

February 04, 2021

MP Water Demographic and Income Profile

Uninc Area
Area: 0.02 square miles

Prepared by Menlo Park GIS



Summary	Census 2010		2020		2025
Population	305		609		706
Households	111		184		214
Families	59		99		115
Average Household Size	2.48		3.12		3.14
Owner Occupied Housing Units	67		97		115
Renter Occupied Housing Units	44		87		99
Median Age	40.3		40.1		40.6
Trends: 2020-2025 Annual Rate	**Area**		**State**		**National**
Population	3.00%		0.55%		0.72%
Households	3.07%		0.50%		0.72%
Families	3.04%		0.50%		0.64%
Owner HHs	3.46%		0.65%		0.72%
Median Household Income	0.71%		1.81%		1.60%
			2020		**2025**
Households by Income		Number	Percent	Number	Percent
<$15,000		13	7.1%	14	6.5%
$15,000 - $24,999		13	7.1%	14	6.5%
$25,000 - $34,999		13	7.1%	14	6.5%
$35,000 - $49,999		19	10.3%	21	9.8%
$50,000 - $74,999		31	16.8%	38	17.8%
$75,000 - $99,999		8	4.3%	10	4.7%
$100,000 - $149,999		18	9.8%	27	12.6%
$150,000 - $199,999		24	13.0%	30	14.0%
$200,000+		45	24.5%	44	20.6%
Median Household Income		$83,298		$86,309	
Average Household Income		$132,620		$132,127	
Per Capita Income		$53,121		$53,085	

Source: Esri, U.S. Census

February 04, 2021

MP Water Demographic and Income Profile

Uninc Area
Area: 0.02 square miles

Prepared by Menlo Park GIS

	Census 2010		2020		2025	
Population by Age	Number	Percent	Number	Percent	Number	Percent
0 - 4	19	6.2%	35	5.7%	41	5.8%
5 - 9	12	3.9%	36	5.9%	42	5.9%
10 - 14	14	4.6%	36	5.9%	43	6.1%
15 - 19	17	5.6%	29	4.8%	42	5.9%
20 - 24	21	6.9%	36	5.9%	37	5.2%
25 - 34	45	14.8%	89	14.6%	91	12.9%
35 - 44	47	15.4%	84	13.8%	98	13.9%
45 - 54	55	18.0%	85	13.9%	94	13.3%
55 - 64	44	14.4%	88	14.4%	97	13.7%
65 - 74	19	6.2%	61	10.0%	76	10.8%
75 - 84	10	3.3%	23	3.8%	36	5.1%
85+	2	0.7%	8	1.3%	9	1.3%

	Census 2010		2020		2025	
Race and Ethnicity	Number	Percent	Number	Percent	Number	Percent
White Alone	176	57.7%	330	54.2%	366	51.8%
Black Alone	9	3.0%	16	2.6%	17	2.4%
American Indian Alone	5	1.6%	9	1.5%	11	1.6%
Asian Alone	26	8.5%	73	12.0%	99	14.0%
Pacific Islander Alone	4	1.3%	8	1.3%	9	1.3%
Some Other Race Alone	64	21.0%	127	20.9%	148	21.0%
Two or More Races	21	6.9%	46	7.6%	56	7.9%
Hispanic Origin (Any Race)	123	40.3%	242	39.7%	279	39.5%

Data Note: Income is expressed in current dollars.

Source: Esri, U.S. Census

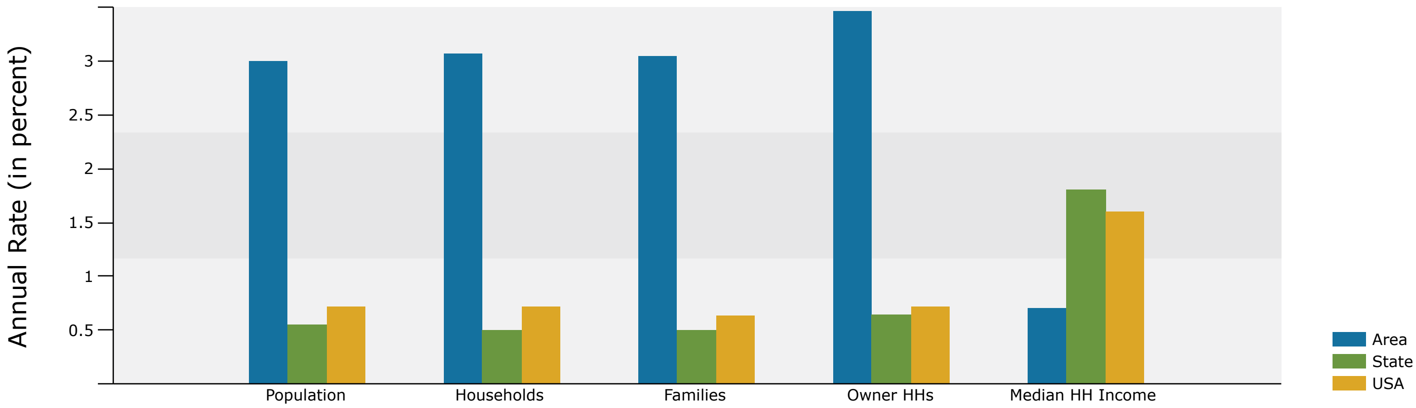
MENLO PARK

MP Water Demographic and Income Profile

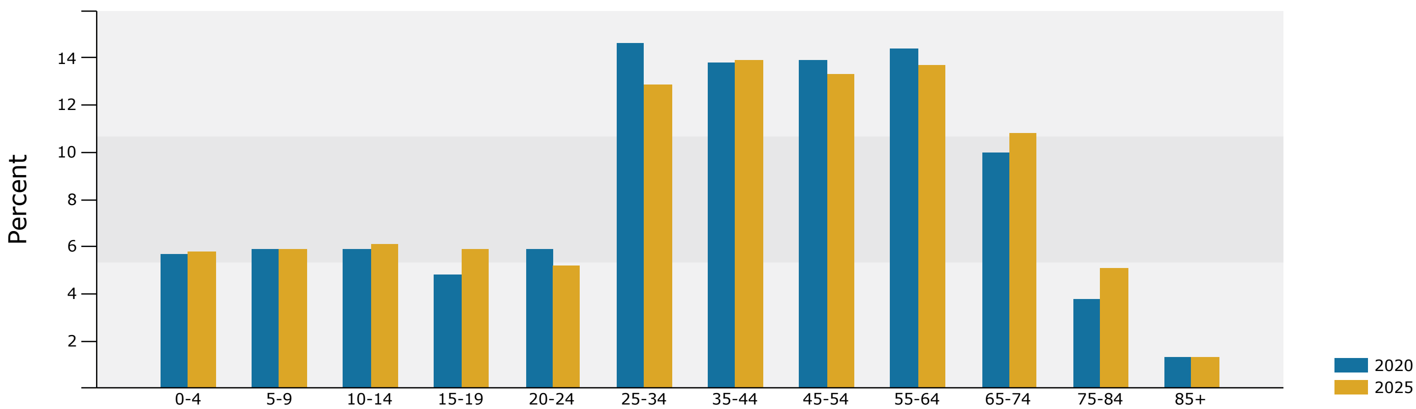
Uninc Area
Area: 0.02 square miles

Prepared by Menlo Park GIS

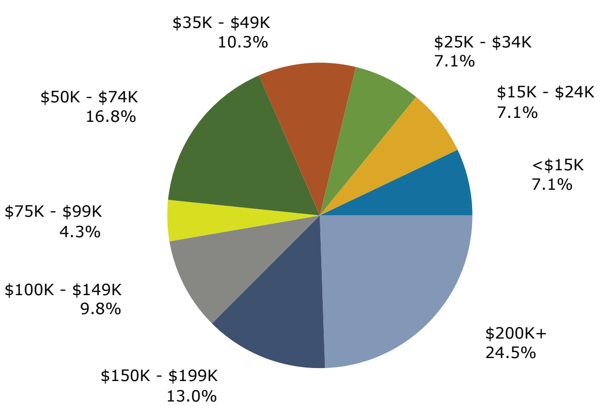
Trends 2020-2025



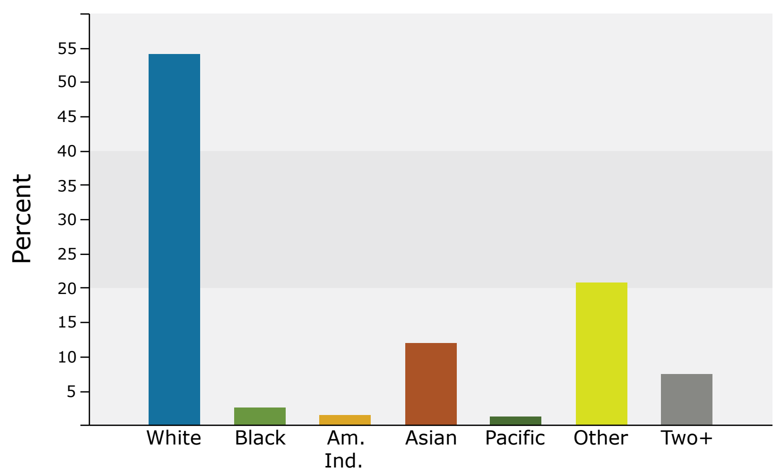
Population by Age



2020 Household Income



2020 Population by Race



2020 Percent Hispanic Origin:39.7%

Source: Esri, U.S. Census

February 04, 2021

APPENDIX G
SFPUC AND BAWSCA COMMON LANGUAGE FOR 2020 UWMPS

Draft Common Language for BAWSCA Member Agencies' 2020 UWMPs

Tier One Drought Allocations

In July 2009, San Francisco and its Wholesale Customers in Alameda County, Santa Clara County, and San Mateo County (Wholesale Customers) adopted the Water Supply Agreement (WSA), which includes a Water Shortage Allocation Plan (WSAP) that describes the method for allocating water from the Regional Water System (RWS) between Retail and Wholesale Customers during system-wide shortages of 20 percent or less. The WSAP, also known as the Tier One Plan, was amended in the 2018 Amended and Restated WSA.

The SFPUC allocates water under the Tier One Plan when it determines that the projected available water supply is up to 20 percent less than projected system-wide water purchases. The following table shows the SFPUC (i.e, Retail Customers) share and the Wholesale Customers' share of the annual water supply available during shortages depending on the level of system-wide reduction in water use that is required. The Wholesale Customers' share will be apportioned among the individual Wholesale Customers based on a separate methodology adopted by the Wholesale Customers, known as the Tier Two Plan, discussed further below.

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%

The Tier One Plan allows for voluntary transfers of shortage allocations between the SFPUC and any Wholesale Customer as well as between Wholesale Customers themselves. In addition, water "banked" by a Wholesale Customer, through reductions in usage greater than required, may also be transferred.

As amended in 2018, the Tier One Plan requires Retail Customers to conserve a minimum of 5% during droughts. If Retail Customer demands are lower than the Retail Customer allocation (resulting in a "positive allocation" to Retail[1]) then the excess percentage would be re-allocated to the Wholesale Customers' share. The additional water conserved by Retail Customers up to the minimum 5% level is deemed to remain in storage for allocation in future successive dry years.

The Tier One Plan will expire at the end of the term of the WSA in 2034, unless mutually extended by San Francisco and the Wholesale Customers.

The Tier One Plan applies only when the SFPUC determines that a system-wide water shortage exists and issues a declaration of a water shortage emergency under California Water Code

[1] See Water Supply Agreement, Water Shortage Allocation Plan (Attachment H), Section 2.1.

Section 350. Separate from a declaration of a water shortage emergency, the SFPUC may opt to request voluntary cutbacks from its Retail and Wholesale Customers to achieve necessary water use reductions during drought periods.

Tier Two Drought Allocations

The Wholesale Customers have negotiated and adopted the Tier Two Plan, referenced above, which allocates the collective Wholesale Customer share from the Tier One Plan among each of the 26 Wholesale Customers. These Tier Two allocations are based on a formula that takes into account multiple factors for each Wholesale Customer including:

- Individual Supply Guarantee;
- Seasonal use of all available water supplies; and
- Residential per capita use.

The water made available to the Wholesale Customers collectively will be allocated among them in proportion to each Wholesale Customer's Allocation Basis, expressed in millions of gallons per day (mgd), which in turn is the weighted average of two components. The first component is the Wholesale Customer's Individual Supply Guarantee, as stated in the WSA, and is fixed. The second component, the Base/Seasonal Component, is variable and is calculated using the monthly water use for three consecutive years prior to the onset of the drought for each of the Wholesale Customers for all available water supplies. The second component is accorded twice the weight of the first, fixed component in calculating the Allocation Basis. Minor adjustments to the Allocation Basis are then made to ensure a minimum cutback level, a maximum cutback level, and a sufficient supply for certain Wholesale Customers.

The Allocation Basis is used in a fraction, as numerator, over the sum of all Wholesale Customers' Allocation Bases to determine each wholesale customer's Allocation Factor. The final shortage allocation for each Wholesale Customer is determined by multiplying the amount of water available to the Wholesale Customers' collectively under the Tier One Plan, by the Wholesale Customer's Allocation Factor.

The Tier Two Plan requires that the Allocation Factors be calculated by BAWSCA each year in preparation for a potential water shortage emergency. As the Wholesale Customers change their water use characteristics (e.g., increases or decreases in SFPUC purchases and use of other water sources, changes in monthly water use patterns, or changes in residential per capita water use), the Allocation Factor for each Wholesale Customer will also change. However, for long-term planning purposes, each Wholesale Customer shall use as its Allocation Factor, the value identified in the Tier Two Plan when adopted.

The Tier Two Plan, which initially expired in 2018, has been extended by the BAWSCA Board of Directors every year since for one additional calendar year. In November 2020, the BAWSCA Board voted to extend the Tier Two Plan through the end of 2021.

Individual Supply Guarantee

San Francisco has a perpetual commitment (Supply Assurance) to deliver 184 mgd to the 24 permanent Wholesale Customers collectively. San Jose and Santa Clara are not included in the Supply Assurance commitment and each has temporary and interruptible water supply contracts with San Francisco. The Supply Assurance is allocated among the 24 permanent Wholesale Customers through Individual Supply Guarantees (ISG), which represent each Wholesale Customer's allocation of the 184 mgd Supply Assurance.

[Name of Agency's] ISG is _______ mgd.

2028 SFPUC Decisions (formerly 2018 SFPUC Decisions)
[Note: This section is intended to be optional language that individual BAWSCA member agencies may use.]

In the 2009 WSA, the SFPUC committed to make three decisions before 2018 that affect water supply development:

- Whether or not to make the cities of San Jose and Santa Clara permanent customers,
- Whether or not to supply the additional unmet supply needs of the Wholesale Customers beyond 2018, and
- Whether or not to increase the wholesale customer Supply Assurance above 184 mgd.

Events since 2009 made it difficult for the SFPUC to conduct the necessary water supply planning and CEQA analysis required to make these three decisions before 2018. Therefore, in the 2018 Amended and Restated WSA, the decisions were deferred for 10 years to 2028.

Additionally, there have been recent changes to instream flow requirements and customer demand projections that have affected water supply planning beyond 2018. As a result, the SFPUC has established an Alternative Water Supply Planning program to evaluate several regional and local water supply options. Through this program, the SFPUC will conduct feasibility studies and develop an Alternative Water Supply Plan by July 2023 to support the continued development of water supplies to meet future needs.

Reliability of the Regional Water System

In 2008, the SFPUC adopted Level of Service (LOS) Goals and Objectives in conjunction with the adoption of WSIP. The SFPUC updated the LOS Goals and Objectives in February 2020.

The SFPUC's LOS Goals and Objectives related to water supply are:

Program Goal	System Performance Objective
Water Supply – *meet customer water needs in non-drought and drought periods*	• Meet all state and federal regulations to support the proper operation of the water system and related power facilities. • Meet average annual water demand of 265 mgd from the SFPUC watersheds for retail and Wholesale Customers during non–drought years for system demands consistent with the 2009 Water Supply Agreement. • Meet dry-year delivery needs while limiting rationing to a maximum 20 percent system-wide reduction in water service during extended droughts. • Diversify water supply options during non-drought and drought periods. • Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers.

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Factors Impacting Supply Reliability

<u>Adoption of the 2018 Bay-Delta Plan Amendment</u>

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) to establish water quality objectives to maintain the health of the Bay-Delta ecosystem. 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 Bay-Delta. The Bay-Delta Plan Amendment requires the release of 30-50% of the "unimpaired flow"[2] 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 UWMP in normal years but would experience supply shortages in single dry years or multiple dry years. Implementation of the Bay-Delta Plan Amendment will require rationing in all single dry years and multiple dry years. The SFPUC has initiated an Alternative Water Supply Planning Program to ensure that San Francisco can meet its Retail and Wholesale Customer water needs, address projected dry years shortages, and limit rationing to a maximum 20 percent system-wide in accordance with adopted SFPUC policies. This program is in early planning stages and is intended to meet future water supply challenges and vulnerabilities such as environmental flow needs and other regulatory changes; earthquakes, disasters, and emergencies; increases in population and employment; and climate

[2] "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.)

change. As the region faces future challenges – both known and unknown – the SFPUC is considering this suite of diverse non-traditional supplies and leveraging regional partnerships to meet Retail and Wholesale Customer needs through 2045.

The SWRCB has stated that it intends to implement the Bay-Delta Plan Amendment on the Tuolumne River by the year 2022, assuming all required approvals are obtained by that time. But implementation of the Plan Amendment is uncertain for multiple reasons.

First, since adoption of the Bay-Delta Plan Amendment, 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 in the early stages and there have been no dispositive court rulings as of this date.

Second, the Bay-Delta Plan Amendment is not self-implementing and does not automatically allocate responsibility for meeting its new flow requirements to the SFPUC or any other water rights holders. Rather, the Bay-Delta Plan Amendment merely provides a regulatory framework for flow allocation, which must be accomplished by other regulatory and/or adjudicatory proceedings, such as a comprehensive water rights adjudication or, in the case of the Tuolumne River, may be implemented 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 the other regulatory and/or adjudicatory proceedings would likely 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 SFPUC).

Third, in recognition of the obstacles to implementation of the Bay-Delta Plan Amendment, the SWRCB 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" by March 1, 2019, 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." In accordance with the SWRCB's instruction, on March 1, 2019, SFPUC, in partnership with other key stakeholders, submitted a proposed project description for the Tuolumne River that could be the basis for a voluntary substitute agreement with the SWRCB ("March 1st Proposed Voluntary Agreement"). On March 26, 2019, the Commission adopted Resolution No. 19-0057 to support the SFPUC's participation in the Voluntary Agreement negotiation process. To date, those negotiations are ongoing under the California Natural Resources Agency and the leadership of the Newsom administration.[3]

Water Supply – All Year Types

The SFPUC historically has met demand in its service area in all year types from its watersheds, which consist of:

- Tuolumne River watershed
- Alameda Creek watershed

[3] California Natural Resources Agency, "Voluntary Agreements to Improve Habitat and Flow in the Delta and its Watersheds," available at https://files.resources.ca.gov/voluntary-agreements/.

- San Mateo County watersheds

In general, 85 percent of the supply comes from the Tuolumne River through Hetch Hetchy Reservoir and the remaining 15 percent comes from the local watersheds through the San Antonio, Calaveras, Crystal Springs, Pilarcitos and San Andreas Reservoirs. The adopted WSIP retains this mix of water supply for all year types.

WSIP Dry Year Water Supply Projects

The WSIP authorized the SFPUC to undertake a number of water supply projects to meet dry-year demands with no greater than 20 percent system-wide rationing in any one year. Those projects include the following:

- **Calaveras Dam Replacement Project**

  Calaveras Dam is located near a seismically active fault zone and was determined to be seismically vulnerable. To address this vulnerability, the SFPUC constructed a new dam of equal height downstream of the existing dam. Construction on the project occurred between 2011 and July 2019. The SFPUC began impounding water behind the new dam in accordance with California Division of Safety of Dams (DSOD) guidance in the winter of 2018/2019.

- **Alameda Creek Recapture Project**

  As a part of the regulatory requirements for future operations of Calaveras Reservoir, the SFPUC must implement bypass and instream flow schedules for Alameda Creek. The Alameda Creek Recapture Project will recapture a portion of the water system yield lost due to the instream flow releases at Calaveras Reservoir or bypassed around the Alameda Creek Diversion Dam and return this yield to the RWS through facilities in the Sunol Valley. Water that naturally infiltrates from Alameda Creek will be recaptured into an existing quarry pond known as SMP (Surface Mining Permit)-24 Pond F2. The project will be designed to allow the recaptured water to be pumped to the Sunol Valley Water Treatment Plant or to San Antonio Reservoir. Construction of this project will occur from spring 2021 to fall 2022.

- **Lower Crystal Springs Dam Improvements**

  The Lower Crystal Springs Dam (LCSD) Improvements were substantially completed in November 2011. The joint San Mateo County/SFPUC Bridge Replacement Project to replace the bridge across the dam was completed in January 2019. A WSIP follow up project to modify the LCSD Stilling Basin for fish habitat and upgrade the fish water release and other valves started in April 2019. While the main improvements to the dam have been completed, environmental permitting issues for reservoir operation remain significant. While the reservoir elevation was lowered due to DSOD restrictions, the habitat for the Fountain Thistle, an endangered plant, followed the lowered reservoir elevation. Raising the reservoir elevation now requires that new plant populations be restored incrementally before the reservoir elevation is raised. The result is that it may be several years before pre-project water storage volumes can be restored.

- **Regional Groundwater Storage and Recovery Project**

  The Groundwater Storage and Recovery (GSR) Project is a strategic partnership between SFPUC and three San Mateo County agencies – the California Water Service Company (serving South San Francisco and Colma), the City of Daly City, and the City of San Bruno – to conjunctively operate the south Westside Groundwater Basin. The project sustainably manages groundwater and surface water resources in a way that provides supplies during times of drought. During years of normal or heavy rainfall, the project would provide additional surface water to the partner agencies in San Mateo County in lieu of groundwater pumping. Over time, reduced pumping creates water storage through natural recharge of up to 20 billion gallons of new water supply available during dry years.

The project's Final Environmental Impact Report was certified in August 2014, and the project also received Commission approval that month. Phase 1 of this project consists of construction of thirteen well sites and is over 99 percent complete. Phase 2 of this project consists of completing construction of the well station at the South San Francisco Main site and some carryover work that has not been completed from Phase 1. Phase 2 design work began in December 2019.

- **2 mgd Dry-year Water Transfer**

  In 2012, the dry-year transfer was proposed between the Modesto Irrigation District and the SFPUC. Negotiations were terminated because an agreement could not be reached. Subsequently, the SFPUC had discussions with the Oakdale Irrigation District for a one-year transfer agreement with the SFPUC for 2 mgd (2,240 acre-feet). No progress towards agreement on a transfer was made in 2019, but the irrigation districts recognize SFPUC's continued interest and SFPUC will continue to pursue transfers.

In order to achieve its target of meeting at least 80 percent of its customer demand during droughts with a system demand of 265 mgd, the SFPUC must successfully implement the dry-year water supply projects included in the WSIP.

Furthermore, the permitting obligations for the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements include a combined commitment of 12.8 mgd for instream flows on average. When this is reduced for an assumed Alameda Creek Recapture Project recovery of 9.3 mgd, the net loss of water supply is 3.5 mgd.

Alternative Water Supply Planning Program

The SFPUC is increasing and accelerating its efforts to acquire additional water supplies and explore other projects that would increase overall water supply resilience through the Alternative Water Supply Planning Program. The drivers for the program include: (1) the adoption of the Bay-Delta Plan Amendment and the resulting potential limitations to RWS supply during dry years, (2) the net supply shortfall following the implementation of WSIP, (3) San Francisco's perpetual obligation to supply 184 MGD to the Wholesale Customers, (4) adopted Level of Service Goals to limit rationing to no more than 20 percent system-wide during droughts, and (5) the potential need to identify water supplies that would be required to offer permanent status to interruptible customers. Developing additional supplies through this program would reduce water supply shortfalls and reduce rationing associated with such shortfalls. The planning priorities guiding the framework of the Alternative Water Supply Planning Program are as follows:

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

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

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

Together, the planning priorities and LOS Goals and Objectives provide a lens through which the SFPUC considers water supply options and opportunities to meet all foreseeable water supply needs.

In addition to the Daly City Recycled Water Expansion project[4], which was a potential project identified in the 2015 UWMP and had committed funding at that time, the SFPUC has taken action to fund the study of potential additional water supply projects. Capital projects under consideration to develop additional water supplies include surface water storage expansion, recycled water expansion, water transfers, desalination, and potable reuse. A more detailed list and descriptions of these efforts are provided below.

The capital projects that are under consideration would be costly and are still in the early feasibility or conceptual planning stages. Because these water supply projects would take 10 to 30 years to implement, and because required environmental permitting negotiations may reduce the amount of water that can be developed, the yield from these projects are not currently incorporated into SFPUC's supply projections. State and federal grants and other financing opportunities would be pursued for eligible projects, to the extent feasible, to offset costs borne by ratepayers.

- **Daly City Recycled Water Expansion** (Regional, Normal- and Dry-Year Supply)

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

[4] While this potential project was identified in the 2015 UWMP, it has since been approved by Daly City following environmental review and has a higher likelihood of being implemented.

- **ACWD-USD Purified Water Partnership** (Regional, Normal- and Dry-Year Supply)

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

- **Crystal Springs Purified Water** (Regional, Normal- and Dry-Year Supply)

  The Crystal Springs Purified Water (PREP) Project is a purified water project that could provide 6-12 mgd of water supply through reservoir water augmentation at Crystal Springs Reservoir, which is a facility of the RWS. Treated wastewater from Silicon Valley Clean Water (SVCW) and/or the City of San Mateo would go through an advanced water treatment plant to produce purified water that meets state and federal drinking water quality standards. The purified water would then be transmitted 10-20 miles (depending on the alignment) to Crystal Springs Reservoir, blended with regional surface water supplies and treated again at Harry Tracy Water Treatment Plant. Project partners include the SFPUC, BAWSCA, SVCW, CalWater, Redwood City, Foster City, and the City of San Mateo. Partner agencies are contributing financial and staff resources towards the work effort.

- **Los Vaqueros Reservoir Expansion** (Regional, Dry Year Supply)

  The Los Vaqueros Reservoir Expansion (LVE) Project is a storage project that will enlarge the existing reservoir located in northeastern Contra Costa County from 160,000 acre-feet to 275,000 acre-feet. While the existing reservoir is owned and operated by the Contra Costa Water District (CCWD), the expansion will have regional benefits and will be managed by a Joint Powers Authority (JPA) that will be set up prior to construction. Meanwhile, CCWD is leading the planning, design and environmental review efforts. CCWD's Board certified the EIS/EIR and approved the LVE Project on May 13, 2020. The additional storage capacity from the LVE Project would provide a dry year water supply benefit to the SFPUC. BAWSCA is working in concert with the SFPUC to support their work effort on the LVE project.

  - **Conveyance Alternatives:** The SFPUC is considering two main pathways to move water from storage in a prospective LVE Project to the SFPUC's service area, either directly to RWS facilities or indirectly via an exchange with partner agencies. The SFPUC is evaluating potential alignments for conveyance.
  - **Bay Area Regional Reliability Shared Water Access Program (BARR SWAP):** As part of the BARR Partnership, a consortium of 8 Bay Area water utilities (including ACWD, BAWSCA, CCWD, EBMUD, Marin Municipal Water District (MMWD), SFPUC, Valley Water, and Zone 7 Water Agency) are exploring opportunities to move water across the region as efficiently as possible, particularly during times of drought and emergencies. The BARR agencies are proposing two separate pilot projects in 2020-2021 through the Shared Water Access Program (SWAP) to test conveyance pathways and identify potential hurdles to better prepare for sharing water during a future drought or emergency. A strategy report identifying opportunities and considerations will accompany these pilot transfers and will be completed in 2021.

- **Bay Area Brackish Water Desalination** (Regional, Normal- and Dry-Year Supply)

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

- **Calaveras Reservoir Expansion** (Regional, Dry Year Supply)

  Calaveras Reservoir would be expanded to create 289,000 AF additional capacity to store excess Regional Water System supplies or other source water in wet and normal years. In addition to reservoir enlargement, the project would involve infrastructure to pump water to the reservoir, such as pump stations and transmission facilities.

- **Groundwater Banking**

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

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

- **Inter-Basin Collaborations**

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

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

If all the projects identified through the current planning process can be implemented, there would still be a supply shortfall to meet projected needs. Furthermore, each of the supply options being considered has its own inherent challenges and uncertainties that may affect the SFPUC's ability to implement it.

Given the limited availability of water supply alternatives - unless the supply risks are significantly reduced or our needs change significantly - the SFPUC will continue to plan, develop and implement all project opportunities that can help bridge the anticipated water supply gaps during droughts. In 2019, the SFPUC completed a survey among water and wastewater agencies within the service area to identify additional opportunities for purified water. Such opportunities remain limited, but the SFPUC continues to pursue all possibilities.

Projected SFPUC Regional Water System Supply Reliability

The SFPUC will provide tables presenting the projected RWS supply reliability under normal, single dry year, and multiple dry year scenarios.

Climate Change

The issue of climate change has become an important factor in water resources planning in the State, and is frequently considered in urban water management planning processes, though the extent and precise effects of climate change remain uncertain. There is convincing evidence that increasing concentrations of greenhouse gasses have caused and will 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 and virtually all projections indicate this will continue through the 21st century. These changes will have a direct effect on water resources in California, and numerous studies have been conducted to determine the potential impacts to water resources. Based on these studies, climate change could result in the following types of water resource impacts, including impacts on the watersheds in the Bay Area:

- Reductions in the average annual snowpack due to a rise in the snowline and a shallower snowpack in the low and medium elevation zones, such as in the Tuolumne River basin, 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 rather than 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;
- Increased water temperatures with accompanying potential adverse effects on some fisheries and water quality;
- Increases in evaporation and concomitant increased irrigation need; and
- Changes in urban and agricultural water demand.

Both the SFPUC and BAWSCA participated in the 2020 update of the Bay Area Integrated Regional Water Management Plan (BAIRWMP), which includes an assessment of the potential climate change vulnerabilities of the region's water resources and identifies climate change adaptation strategies. In addition, the SFPUC continues to study the effect of climate change on the Regional Water System (RWS). These works are summarized below.

Bay Area Integrated Regional Water Management Plan

Climate change adaptation continues to be an overarching theme for the 2019 BAIRWMP update. As stated in the BAIRWMP, identification of watershed characteristics that could potentially be vulnerable to future climate change is the first step in assessing vulnerabilities of water resources in the Bay Area Region (Region). Vulnerability is defined as the degree to which a system is exposed to, susceptible to, and able to cope with or adjust to, the adverse effects of climate change. A vulnerability assessment was conducted in accordance with the Department of Water Resources' (DWR's) *Climate Change Handbook for Regional Water Planning* and using the most current science available for the Region. The vulnerability assessment, summarized in the table below, provides the main water planning categories applicable to the Region and a general overview of the qualitative assessment of each category with respect to anticipated climate change impacts.

Summary of BAIRWMP Climate Change Vulnerability Assessment

Vulnerability Areas	General Overview of Vulnerabilities
Water Demand	**Urban and Agricultural Water Demand** – Changes to hydrology in the Region as a result of climate change could lead to changes in total water demand and use patterns. Increased irrigation (outdoor landscape or agricultural) is anticipated to occur with temperature rise, increased evaporative losses due to warmer temperature, and a longer growing season. Water treatment and distribution systems are most vulnerable to increases in maximum day demand.
Water Supply	**Imported Water** – Imported water derived from the Sierra Nevada sources and Delta diversions provide 66 percent of the water resources available to the Region. Potential impacts on the availability of these sources resulting from climate change directly affect the amount of imported water supply delivered to the Region. **Regional Surface Water** – Although future projections suggest that small changes in total annual precipitation over the Region will not change much, there may be changes to when precipitation occurs with reductions in the spring and more intense rainfall in the winter. **Regional Groundwater** – Changes in local hydrology could affect natural recharge to the local groundwater aquifers and the quantity of groundwater that could be pumped sustainably over the long-term in some areas. Decreased inflow from more flashy or more intense runoff, increased evaporative losses and warmer and shorter winter seasons can alter natural recharge of groundwater. Salinity intrusion into coastal groundwater aquifers due to sea-level rise could interfere with local groundwater uses. Furthermore, additional reductions in imported water supplies would lead to less imported water available for managed recharge of local groundwater basins and potentially more groundwater pumping in lieu of imported water availability.
Water Quality	**Imported Water** – For sources derived from the Delta, sea-level rise could result in increases in chloride and bromide (a disinfection by-product (DBP) precursor that is also a component of sea water),

Vulnerability Areas	General Overview of Vulnerabilities
	potentially requiring changes in treatment for drinking water. Increased temperature could result in an increase in algal blooms, taste and odor events, and a general increase in DBP formation **Regional Surface Water** – Increased temperature could result in lower dissolved oxygen in streams and prolong thermocline stratification in lakes and reservoirs forming anoxic bottom conditions and algal blooms. Decrease in annual precipitation could result in higher concentrations of contaminants in streams during droughts or in association with flushing rain events. Increased wildfire risk and flashier or more intense storms could increase turbidity loads for water treatment. **Regional Groundwater** – Sea-level rise could result in increases in chlorides and bromide for some coastal groundwater basins in the Region. Water quality changes in imported water used for recharge could also impact groundwater quality.
Sea-Level Rise	Sea-level rise is additive to tidal range, storm surges, stream flows, and wind waves, which together will increase the potential for higher total water levels, overtopping, and erosion. Much of the bay shoreline is comprised of low-lying diked baylands which are already vulnerable to flooding. In addition to rising mean sea level, continued subsidence due to tectonic activity will increase the rate of relative sea-level rise. As sea-level rise increases, both the frequency and consequences of coastal storm events, and the cost of damage to the built and natural environment, will increase. Existing coastal armoring (including levees, breakwaters, and other structures) is likely to be insufficient to protect against projected sea-level rise. Crest elevations of structures will have to be raised or structures relocated to reduce hazards from higher total water levels and larger waves.
Flooding	Climate change projections are not sensitive enough to assess localized flooding, but the general expectation is that more intense storms would occur thereby leading to more frequent, longer and deeper flooding. Changes to precipitation regimes may increase flooding. Elevated Bay elevations due to sea-level rise will increase backwater effects exacerbating the effect of fluvial floods and storm drain backwater flooding.

Vulnerability Areas	General Overview of Vulnerabilities
Ecosystem and Habitat	Changes in the seasonal patterns of temperature, precipitation, and fire due to climate change can dramatically alter ecosystems that provide habitats for California's native species. These impacts can result in species loss, increased invasive species ranges, loss of ecosystem functions, and changes in vegetation growing ranges. Reduced rain and changes in the seasonal distribution of rainfall may alter timing of low flows in streams and rivers, which in turn would have consequences for aquatic ecosystems. Changes in rainfall patterns and air temperature may affect water temperatures, potentially affecting coldwater aquatic species. Bay Area ecosystems and habitat provide important ecosystem services, such as: carbon storage, enhanced water supply and quality, flood protection, food and fiber production. Climate change is expected to substantially change several of these services. The region provides substantial aquatic and habitat-related recreational opportunities, including: fishing, wildlife viewing, and wine industry tourism (a significant asset to the region) that may be at risk due to climate change effects.
Hydropower	Currently, several agencies in the Region produce or rely on hydropower produced outside of the Region for a portion of their power needs. As the hydropower is produced in the Sierra, there may be changes in the future in the timing and amount of energy produced due to changes in the timing and amount of runoff as a result of climate change. Some hydropower is also produced within the region and could also be affected by changes in the timing and amount of runoff.

Source: 2019 Bay Area Integrated Regional Water Management Plan (BAIRWMP), Table 16-3.

SFPUC Climate Change Studies

The SFPUC views assessment of the effects of climate change as an ongoing project requiring regular updating to reflect improvements in climate science, atmospheric/ocean modeling, and human response to the threat of greenhouse gas emissions. Climate change research by the SFPUC began in 2009 and continues to be refined. In its 2012 report "Sensitivity of Upper Tuolumne River Flow to Climate Change Scenarios," the SFPUC assessed the sensitivity of runoff into Hetch Hetchy Reservoir to a range of changes in temperature and precipitation due to climate change. Key conclusions from the report include the following:

- With differing increases in temperature alone, the median annual runoff at Hetch Hetchy would decrease by 0.7-2.1% from present-day conditions by 2040 and by 2.6-10.2% from present-day by 2100. Adding differing decreases in precipitation on top of temperature increases, the median annual runoff at Hetch Hetchy would decrease by 7.6-8.6% from present-day conditions by 2040 and by 24.7-29.4% from present-day conditions by 2100.

- In critically dry years, these reductions in annual runoff at Hetch Hetchy would be significantly greater, with runoff decreasing up to 46.5% from present day conditions by 2100 utilizing the same climate change scenarios.
- In addition to the total change in runoff, there will be a shift in the annual distribution of runoff. Winter and early spring runoff would increase and late spring and summer runoff would decrease.
- Under all scenarios, snow accumulation would be reduced and snow would melt earlier in the spring, with significant reductions in maximum peak snow water equivalent under most scenarios.

Currently, the SFPUC is conducting a comprehensive assessment of the potential effects of climate change on 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 2020 to 2070. There are many uncertain factors such as climate change, changing regulations, water quality, growth and economic cycles that may create vulnerabilities for the Regional Water System'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 is difficult to predict, but nonetheless they need to be considered in SFPUC planning. To address this planning challenge, the project uses a vulnerability-based planning approach to explore a range of future conditions to identify vulnerabilities, 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.

Common Language for BAWSCA Member Agencies'

2020 UWMP Updates

BAWSCA

Description of BAWSCA

BAWSCA provides regional water reliability planning and conservation programming for the benefit of its 26 member agencies that purchase wholesale water supplies from the San Francisco Public Utilities Commission (SFPUC). Collectively, the BAWSCA member agencies deliver water to over 1.8 million residents and nearly 40,000 commercial, industrial and institutional accounts in Alameda, San Mateo and Santa Clara Counties.

BAWSCA also represents the collective interests of these wholesale water customers on all significant technical, financial, and policy matters related to the operation and improvement of the SFPUC's Regional Water System (RWS).

BAWSCA's role in the development of the 2020 Urban Water Management Plan (UWMP) updates is to work with its member agencies and the SFPUC to seek consistency among UWMP documents.

Regional Water Demand and Conservation Projections

In June 2020, BAWSCA completed the Regional Water Demand and Conservation Projections Report (Demand Study).[1] The goal of the Demand Study was to develop transparent, defensible, and uniform demand and conservation savings projections for each Wholesale Customer using a common methodology to support both regional and individual agency planning efforts and compliance with the new statewide water efficiency targets required by Assembly Bill (AB) 1668 and Senate Bill (SB) 606.

Through the Demand Study process, BAWSCA and the Wholesale Customers (1) quantified the total average-year water demand for each BAWSCA member agency through 2045, (2) quantified passive and active conservation water savings potential for each individual Wholesale Customer through 2045, and (3) identified 24 conservation programs with high water savings potential and/or member agency interest. Implementation of these conservation measures, along with passive conservation, is anticipated to yield an additional 37.3 MGD of water savings by 2045. Based on the revised water demand projections, the identified water conservation savings, increased development and use of other local supplies by the Wholesale Customers, and other actions, the collective purchases of the BAWSCA member agencies from the SFPUC are projected to stay below 184 MGD through 2045.

As part of the Demand Study, each Wholesale Customer was provided with a demand model that can be used to support ongoing demand and conservation planning efforts, including UWMP preparation.

[1] Phase III Final Report: http://bawsca.org/uploads/pdf/BAWSCA_Regional_Water_Demand_and_Conservation%20Projections%20Report_Final.pdf

Long-Term Reliable Water Supply Strategy

BAWSCA's Long-Term Reliable Water Supply Strategy (Strategy), completed in February 2015, quantified the water supply reliability needs of the BAWSCA member agencies through 2040, identified the water supply management projects and/or programs (projects) that could be developed to meet those needs, and prepared an implementation plan for the Strategy's recommendations.

When the 2015 Demand Study concluded it was determined that while there is no longer a regional normal year supply shortfall, there was a regional drought year supply shortfall of up to 43 MGD. In addition, key findings from the Strategy's project evaluation analysis included:

- Water transfers represent a high priority element of the Strategy.
- Desalination potentially provides substantial yield, but its high effective costs and intensive permitting requirements make it a less attractive drought year supply alternative.
- Other potential regional projects provide tangible, though limited, benefit in reducing dry-year shortfalls given the small average yields in drought years.

Since 2015, BAWSCA has completed a comprehensive update of demand projections and engaged in significant efforts to improve regional reliability and reduce the dry-year water supply shortfall.

Water Transfers. BAWSCA successfully facilitated two transfers of portions of Individual Supply Guarantee (ISG) between BAWSCA agencies in 2017 and 2018. Such transfers benefit all BAWSCA agencies by maximizing use of existing supplies. BAWSCA is currently working on an amendment to the Water Supply Agreement between the SFPUC and BAWSCA agencies to establish a mechanism by which member agencies that have an ISG may participate in expedited transfers of a portion of ISG and a portion of a Minimum Annual Purchase Requirement. In 2019, BAWSCA participated in a pilot water transfer that, while ultimately unsuccessful, surfaced important lessons learned and produced interagency agreements that will serve as a foundation for future transfers. BAWSCA is currently engaged in the Bay Area Regional Reliability Partnership[2] (BARR), a partnership among eight Bay Area water utilities (including the SFPUC, Alameda County Water District, BAWSCA, Contra Costa Water District, Santa Clara Valley Water District) to identify opportunities to move water across the region as efficiently as possible, particularly during times of drought and emergencies.

Regional Projects. Since 2015, BAWSCA has coordinated with local and State agencies on regional projects with potential dry-year water supply benefits for BAWSCA's agencies. These efforts include storage projects, indirect/direct water reuse projects, and studies to evaluate the capacity and potential for various conveyance systems to bring new supplies to the region.

BAWSCA continues to implement the Strategy recommendations in coordination with BAWSCA member agencies. Strategy implementation will be adaptively managed to account for changing conditions and to ensure that the goals of the Strategy are met in an efficient and cost-effective manner. On an annual basis, BAWSCA will reevaluate Strategy recommendations and results in conjunction with development of the BAWSCA's FY 2021-22 Work Plan. In this way, actions can be modified to accommodate changing conditions and new developments.

[2] https://www.bayareareliability.com/

Making Conservation a Way of Life Strategic Plan

Following the 2014-2016 drought, the State of California (State) developed the "Making Water Conservation a California Way of Life" framework to address the long-term water use efficiency requirements called for in executive orders issued by Governor Brown. In May of 2018, AB 1668 and SB 606 (collectively referred to as the efficiency legislation) went into effect, which built upon the executive orders implementing new urban water use objectives for urban retail water suppliers.

BAWSCA led its member agencies in a multi-year effort to develop and implement a strategy to meet these new legislative requirements. BAWSCA's Making Conservation a Way of Life Strategic Plan (Strategic Plan) provided a detailed roadmap for member agencies to improve water efficiency. BAWSCA implementing the following elements of the Strategic Plan:

- Conducted an assessment of the agencies' current practices and water industry best practices for three components of the efficiency legislation that, based on a preliminary review, present the greatest level of uncertainty and potential risk to the BAWSCA agencies. The three components were:
    1. Development of outdoor water use budgets in a manner that incorporates landscape area, local climate, and new satellite imagery data.
    2. Commercial, Industrial, and Institutional water use performance measures.
    3. Water loss requirements.
- Organized an Advanced Metering Infrastructure symposium to enable information exchange, including case studies, implementation strategies, and data analysis techniques.
- Initiated a regional CII audit pilot program, which BAWSCA aims to complete in 2021.[3]
- Implemented a regional program for water loss control to help BAWSCA agencies comply with regulatory requirements and implement cost-effective water loss interventions.
- Engaged with the SFPUC to audit meter testing and calibration practices for SFPUC's meters at BAWSCA agency turnouts.

Finally, BAWSCA's Demand Study developed water demand and conservation projections through 2045 for each BAWSCA agency. These projects are designed to provide valuable insights on long-term water demand patterns and conservation savings potential to support regional efforts, such as implementation of BAWSCA's Long-Term Reliable Water Supply Strategy.

[3] Efforts on the CII audit pilot program stalled in March 2020 due to the COVID 19 pandemic and related shelter-in-place orders.

Tier Two Drought Allocations

The Wholesale Customers have negotiated and adopted the Tier Two Plan, referenced above, which allocates the collective Wholesale Customer share from the Tier One Plan among each of the 26 Wholesale Customers. These Tier Two allocations are based on a formula that takes into account multiple factors for each Wholesale Customer including:

- Individual Supply Guarantee;
- Seasonal use of all available water supplies; and
- Residential per capita use.

The water made available to the Wholesale Customers collectively will be allocated among them in proportion to each Wholesale Customer's Allocation Basis, expressed in millions of gallons per day (mgd), which in turn is the weighted average of two components. The first component is the Wholesale Customer's Individual Supply Guarantee, as stated in the WSA, and is fixed. The second component, the Base/Seasonal Component, is variable and is calculated using the monthly water use for three consecutive years prior to the onset of the drought for each of the Wholesale Customers for all available water supplies. The second component is accorded twice the weight of the first, fixed component in calculating the Allocation Basis. Minor adjustments to the Allocation Basis are then made to ensure a minimum cutback level, a maximum cutback level, and a sufficient supply for certain Wholesale Customers.

The Allocation Basis is used in a fraction, as numerator, over the sum of all Wholesale Customers' Allocation Bases to determine each Wholesale Customer's Allocation Factor. The final shortage allocation for each Wholesale Customer is determined by multiplying the amount of water available to the Wholesale Customers' collectively under the Tier One Plan, by the Wholesale Customer's Allocation Factor.

The Tier Two Plan requires that the Allocation Factors be calculated by BAWSCA each year in preparation for a potential water shortage emergency. As the Wholesale Customers change their water use characteristics (e.g., increases or decreases in SFPUC purchases and use of other water sources, changes in monthly water use patterns, or changes in residential per capita water use), the Allocation Factor for each Wholesale Customer will also change. However, for long-term planning purposes, each Wholesale Customer shall use as its Allocation Factor, the value identified in the Tier Two Plan when adopted.

Per WSA Section 3.11, the Tier One and Tier Two Plans will be used to allocate water from the Regional Water System between Retail and Wholesale Customers during system-wide shortages of 20% or less. For Regional Water System shortages in excess of 20%, San Francisco shall (a) follow the Tier 1 Shortage Plan allocations up to the 20% reduction, (b) meet and discuss how to implement incremental reductions above 20% with the Wholesale Customers, and (c) make a final determination of allocations above the 20% reduction. After the SFPUC has made the final allocation decision, the Wholesale Customers shall be free to challenge the allocation on any applicable legal or equitable basis. For purposes of the 2020 UWMPs, for San Francisco Regional Water System (RWS) shortages in excess of 20%, the allocations among the Wholesale Customers is assumed to be equivalent among them and to equal the drought cutback to Wholesale Customer by the SFPUC.

The Tier Two Plan, which initially expired in 2018, has been extended by the BAWSCA Board of Directors every year since for one additional calendar year. In November 2020, the BAWSCA Board voted to extend the Tier Two Plan through the end of 2021.

SFPUC's Efforts to Develop of Alternative Water Supplies

With the adoption of the Bay-Delta Plan Phase 1 (Bay-Delta Plan) by the State Water Resources Control Board in December of 2018, coupled with the uncertainties associated with litigation and the development of Voluntary Agreements that, if successful, would provide an alternative to the 40% unimpaired flow requirement that is required by the Bay-Delta Plan, BAWSCA redoubled its efforts to ensure that the SFPUC took necessary action to develop alternative water supplies such that they would be in place to fill any potential gap in supply by implementation of the Bay-Delta Plan and that the SFPUC would be able to meet its legal and contractual obligations to its Wholesale Customers.

In 2019, BAWSCA held numerous meetings with the SFPUC encouraging them to develop a division within their organization whose chief mission was to spearhead alternative water supply development. On June 25, 2019, BAWSCA provided a written and oral statement to the Commissioners urging the SFPUC to focus on developing new sources of supply in a manner similar to how it addressed the implementation of the Water System Improvement Program (WSIP). BAWSCA urged that a new water supply program was called for, with clear objectives, persistent focus, a dedicated team, adequate funding, and a plan for successful execution. The SFPUC Commission supported BAWSCA's recommendation and directed staff to undertake such an approach.

In early 2020, the SFPUC began implementation of the Alternative Water Supply Planning Program (AWSP), a program designed to investigate and plan for new water supplies to address future long-term water supply reliability challenges and vulnerabilities on the RWS.

Included in the AWSP is a suite of diverse, non-traditional supply projects that, to a great degree, leverage regional partnerships and are designed to meet the water supply needs of the SFPUC Retail and Wholesale Customers through 2045. As of the most recent Alternative Water Supply Planning Quarterly Update, SFPUC has budgeted $264 million over the next ten years to fund water supply projects. BAWSCA is heavily engaged with the SFPUC on its AWSS efforts.

<u>BAWSCA Conservation Programs</u>

BAWSCA manages a Regional Water Conservation Program comprised of several programs and initiatives that support and augment member agencies' and customers' efforts to use water more efficiently. These efforts extend limited water supplies that are available to meet both current and future water needs; increase drought reliability of the existing water system; and save money for both the member agencies and their customers.

The implementation of the Regional Water Conservation Program builds upon both the Water Conservation Implementation Plan (WCIP, completed in September 2009) and the Regional Demand and Conservation Projections Project (Demand Study, completed in June of 2020). These efforts include both Core Programs (implemented regionally throughout the BAWSCA service area) and Subscription Programs (funded by individual member agencies that elect to participate and implement them within their respective service areas).

BAWSCA's Core Conservation Programs include organizing classes open to the public on topics such as water efficient landscape education and water-wise gardening, assistance related to automated metering infrastructure, and other associated programs that work to promote smart water use and practices. BAWSCA's Subscription Programs include numerous rebate programs, educational programs that can be offered to area schools, technical assistance to member agencies in evaluating water loss, and programs to train and certify contractors employed to install water efficient landscape. In total, BAWSCA offers 22 programs to its member agencies and that number continues to grow over time.

Each fiscal year, BAWSCA prepares an Annual Water Conservation Report that documents how all of BAWSCA's 26 member agencies have benefitted from the Core Conservation Programs. Additionally, the report highlights how all 26 member agencies participate in one or more of the Subscription Programs offered by BAWSCA, such as rebates, water loss management and large landscape audits. The Demand Study indicates that through a combination of active and passive conservation, 37.3 MGD will be conserved by BAWSCA's member agencies by 2045.

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7. Additional language requested by the Member Agencies

SFPUC's Decision to use With Bay-Delta Plan Scenario in UWMP Submittal Tables

The adoption of the Bay-Delta Plan Amendment may significantly impact the supply available from the RWS. SFPUC recognizes that the Bay-Delta Plan Amendment has been adopted and that, given that it is now state law, we must plan for a future in which it is fully implemented. SFPUC also acknowledges that the plan is not self-implementing and therefore does not automatically go into effect. SFPUC is currently pursuing a voluntary agreement as well as a lawsuit which would limit implementation of the Plan. With both of these processes occurring on an unknown timeline, SFPUC does not know at this time when the Bay-Delta Plan Amendment is likely to go into effect. As a result, it makes sense to conduct future supply modeling for a scenario that doesn't include implementation of the Bay-Delta Plan Amendment, as that represents a potential supply reliability scenario.

Because of the uncertainty surrounding implementation of the Bay-Delta Plan Amendment, the SFPUC conducted water service reliability assessment that includes: (1) a scenario in which the Bay-Delta Plan Amendment is fully implemented in 2023, and (2) a scenario that considers the SFPUC system's current situation without the Bay-Delta Plan Amendment. The two scenarios provide a bookend for the possible future scenarios regarding RWS supplies. The standardized tables associated with the SFPUC's UWMP contain the future scenario that assumes implementation of the Bay-Delta Plan Amendment starting in 2023.

Bay-Delta Plan Implementation Starting Year

Because of the uncertainty surrounding implementation of the Bay-Delta Plan Amendment, the water service reliability assessment presented in the SFPUC's draft UWMP looks at two future supply scenarios, both with and without implementation of the Bay-Delta Plan Amendment. Although the SWRCB has stated it intends to implement the Bay-Delta Plan Amendment on the Tuolumne River by the year 2022, given the current level of uncertainty, it is assumed for the purposes of the SFPUC's draft UWMP that the Bay-Delta Plan Amendment will be fully implemented starting in 2023.

SFPUC's Decision to Present Both Modeling Results in its UWMP

A key input for the HHLSM model is the anticipated level of demand on the RWS. Supply modeling results presented in the text of the SFPUC's UWMP reflect an input of projected demands on the RWS consisting of (1) projected retail demands on the RWS (total retail demands minus local groundwater and recycled water supplies), and (2) projected Wholesale Customer purchases. 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, as well as a contractual obligation to supply 184 mgd to the Wholesale Customers. Therefore, the SFPUC has also conducted modeling based on a demand of 265 mgd in order to facilitate planning that supports meeting this Level of Service goal and their contractual obligations.

APPENDIX H
LETTERS FROM MPWD TO BAWSCA AND SFPUC

CITY OF MENLO PARK

March 3, 2017

Jeanine Townsend, Clerk to the Board
State Water Resources Control Board
Cal/EPA Headquarters
1001 "I" Street, 24th Floor
Sacramento, CA 95814-0100
commentletters@waterboards.ca.gov

Re: Comment Letter – 2016 Bay-Delta Plan Amendment & SED

Dear Ms. Townsend:

We are submitting the following comments regarding the *Recirculated Draft Substitute Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the San Francisco Bay-Sacramento/San Joaquin Delta Estuary: San Joaquin River Flows and Southern Delta Water Quality* (SED). In addition, we would like to incorporate by reference separate comments submitted by the Bay Area Water Supply and Conservation Agency (BAWSCA) and the San Francisco Public Utilities Commission (SFPUC) that provide more detail of the SED proposal's impact on our Menlo Park Municipal Water District (MPMWD) service area and the region.

Under the SED, the State Water Resources Control Board (SWRCB) proposes substantial changes to flow objectives for the Tuolumne River. These changes are anticipated to result in significantly reduced surface water available for diversions, thereby causing significant, potentially unavoidable impacts to water supply and the environment. Below we provide relevant information that the SWRCB must consider in conducting its analysis of the SED's impacts:

- As a wholesale customer of SFPUC that purchases 100% of its potable water supply from the San Francisco Regional Water System, water supply available to the MPMWD under the SED proposal could be reduced more than 50% under drought conditions for multiple consecutive years.

- MPMWD has made significant strides in water conservation in the past 10 years. Total water use decreased 31.5% from 3.25 million gallons per day (MGD) to 2.23 MGD.

- Based on our 2015 Urban Water Management Plan, a 50% cut to water supply would force MPMWD to take a number of significant actions including developing water budgets for all water accounts and notifying account holders, and not approving new potable water connections, new temporary meters or permanent meters, except under special circumstances.

- MPMWD serves water to 3,600 residential customers and over 250 businesses and other non-residential customers. Potential consequences of the SED proposal include health and safety concerns due to lack of potable supplies, major job losses, slower economic growth and delayed community development in our service area.

- Since outdoor use represents a relatively small proportion of our commercial, industrial, and institutional account water demand, commercial, industrial, and institutional customers generally have fewer opportunities to reduce water use without changing their operations or incurring significant economic impacts.

- MPMWD relies 100% on SFPUC water. MPMWD's only other emergency supply is via interconnections with adjacent water agencies. However, these adjacent water agencies also rely primarily on SFPUC water, so a 50% cut to SFPUC water would be detrimental to our system's ability to provide water to our customers.

In the light of these aforementioned impacts as well as those articulated in the BAWSCA and SFPUC comment letters incorporated here by reference, the MPMWD requests that environmental and economic impacts of any shortage on the San Francisco Regional Water System, and the associated lost jobs and delayed development, be fully and adequately analyzed as part of the SWRCB's proposed flow alternatives. Such full and adequate analysis should be given at least equal weight with all other elements of the SWRCB's subsequent deliberations and decision making.

Last, the Governor has indicated his strong support for negotiated voluntary agreements to resolve these issues. We request that the SWRCB provide adequate time for voluntary agreements to be reached amongst the stakeholders prior to any action on the SED. Please give this settlement process a chance for success instead of expediting implementation of the current proposal. We share BAWSCA's commitment to continue working closely with the diverse interests and stakeholders to develop that shared solution.

If you have any questions about this letter, please do not hesitate to contact me by phone at (650) 330-6725 or by email at jicmurphy@menlopark.org.

Sincerely,

Justin Murphy

Justin Murphy
Public Works Director

Public Works

CITY OF MENLO PARK

May 27, 2021

Bay Area Water Supply and Conservation Agency (BAWSCA)
Nicole Sandkulla, CEO / General Manager
155 Bovet Rd, Suite 650
San Mateo, CA 94402

Subject: BAWSCA Methodology for Cutbacks Greater than 20 Percent for the 2020 Urban Water Management Plan

Dear Ms. Sandkulla,

As we prepare our Urban Water Management Plan, we appreciate BAWSCA's support and assistance in clarifying the San Francisco Public Utility Commission's (SFPUC) Regional Water System (RWS) supply reliability data, obtaining and creating Urban Water Management Plans (UWMP) common language, and developing a methodology that the BAWSCA agencies can use for cutbacks greater than 20 percent.

As stated in your February 18, 2021 memorandum, because there is no method for allocating supplies for cutbacks greater than 20 percent, BAWSCA recommended "*when the average Wholesale Customers' RWS shortages are greater than 20 percent, an equal percent reduction will be applied across all agencies.*" With the close deadline for agencies to adopt and submit their UWMPs to the Department of Water Resources by July 1, we appreciate that BAWSCA could quickly develop a methodology that the Wholesale Customers could use in their respective UWMPs.

We have included BAWSCA's equal percent reductions for cutbacks greater than 20 percent in our 2020 UWMP for planning purposes, however, we must go on record that we are not in agreement with this methodology. We understand that the Wholesale Customers will begin discussing and negotiating new Tier 2 calculations later this year, a process that could take upwards of 18 months, and we look forward to be part of that process.

As you are aware, SFPUC's supply reliability data does not meet their contractual obligation (also known as level of service goals) to supply Wholesale Customers with not more than a 20 percent cutback (WSA Section 3.11C4). We know that BAWSCA, in its role of administering the contract on behalf of the Wholesale Customers, will continue to prioritize SFPUC's need to meet its contractual obligations and urge them to expedite water supply projects in order to meet the total 184 million gallons per day (MGD) supply guarantee to all of the Wholesale customers, including MPMW's individual supply guarantee of 4.456 MGD.

We appreciate BAWSCA's diligence and perseverance in administering the contract on behalf of the Wholesale Customers and ensuring that SFPUC meets its contractual obligations, specifically their level of service goals.

Sincerely,

Nicole Nagaya

Nicole Nagaya
Public Works Director

cc: Nira Doherty, City Attorney
Christopher Lamm, Assistant Public Works Director
Pam Lowe, Senior Civil Engineer

CITY OF
MENLO PARK

May 27, 2021

San Francisco Public Utilities Commission
Paula Kehoe, Director of Water Resources
525 Golden Gate Avenue, 13th Floor
San Francisco, CA 94102

RE: SFPUC Supply Reliability for the 2020 Urban Water Management Plan

Dear Ms. Kehoe,

As we prepare our Urban Water Management Plan, we appreciate the water supply reliability data and common language provided by the San Francisco Public Utilities Commission (SFPUC) to the Bay Area Water Supply and Conservation Agency (BAWSCA) for the Wholesale Customers on memorandums dated January 22, 2021, March 19, 2021, and March 30, 2021.

The supply reliability data with the Bay-Delta Plan does not meet SFPUC's contractual obligation (also known as level of service goals) to supply Wholesale Customers with not more than a 20 percent cutback. Section 3.11C4 of the 2019 Water Supply Agreement states that "*San Francisco will use its best efforts to identify potential sources of dry year water supplies and establish the contractual and other means to access and deliver those supplies in sufficient quantity to meet a goal of not more than 20 percent system-wide shortage in any year of the design drought.*"

SFPUC needs to meet its contractual obligations and we urge you to expedite the Alternative Water Supply Project in order to meet the total 184 million gallons per day (MGD) supply guarantee to all of the Wholesale customers, including MPMW's individual supply guarantee of 4.456 MGD.

Sincerely,

Nicole Nagaya

Nicole Nagaya
Public Works Director

cc: Nira Doherty, City Attorney
Christopher Lamm, Assistant Public Works Director
Pam Lowe, Senior Civil Engineer

City Council

CITY OF
MENLO PARK

June 7, 2021

San Francisco Public Utilities Commission
Paula Kehoe, Director of Water Resources
525 Golden Gate Avenue, 13th Floor
San Francisco, CA 94102

RE: Request to Rerun Water Supply Reliability Model

Dear Ms. Kehoe,

We understand that SFPUC's climate change study, the *Long Term Vulnerability Assessment and Adaptation Plan for the SFPUC Water Enterprise* completed in partnership with the Water Research Foundation, will be released in the summer of 2021 and can be used to help frame the issue of climate change impacts on the water supplies delivered via the San Francisco Regional Water System, including but not limited to the Tuolumne River.

On May 25, our City Council adopted a resolution adopting our 2020 Urban Water Management Plan (UWMP) and Water Shortage Contingency Plan. If the climate change study provides merit to study a shorter Drought Period, we request that SFPUC prepare an appendix with updated supply reliability that we can consider including in our UWMP.

Thank you for considering this request.

Sincerely,

DocuSigned by:
Drew Combs
52C1D491348F4A3...

Drew Combs
Mayor

cc: Vice Mayor Betsy Nash
City Councilmember Jen Wolosin
City Councilmember Ray Mueller
City Councilmember Cecilia Taylor
Starla Jerome-Robinson, City Manager
Nira Doherty, City Attorney

APPENDIX I
SFPUC REGIONAL WATER SYSTEM SUPPLY RELIABILITY AND BAWSCA TIER 2 DROUGHT IMPLEMENTATION SCENARIOS

February 18, 2021

TO: BAWSCA Member Agencies

FROM: Danielle McPherson, Senior Water Resources Specialist
Tom Francis, Water Resources Manager

SUBJECT: San Francisco Regional Water System Supply Reliability for 2020 Urban Water Management Plans

The purpose of this memorandum is to provide updated drought allocations among the Member Agencies under the various scenarios provided in the San Francisco Public Utilities Commission (SFPUC) Regional Water System (RWS) Supply Reliability Letter dated January 22, 2021 and transmitted to the Member Agencies via email on January 25th ("Supply Reliability Letter", Attachment A). As presented and discussed at the February 12th BAWSCA Urban Water Management Plan (UWMP) Workshop, the Tier 2 Drought Allocation Plan was not designed for RWS shortages greater than 20 percent. As a result, the Tier 2 allocation tables shared with the Supply Reliability Letter showed unexpected and wide-ranging results between Member Agencies that should not be used for UWMP purposes.

As provided for in the 2018 Amended and Restated Water Supply Agreement (WSA), the SFPUC will honor new Tier 2 allocations agreed upon by all Member Agencies if an RWS shortage greater than 20 percent is declared. However, at this time, there is no method for allocating supplies under such significant cutbacks. Additionally, the time it would take to negotiate a modified Tier 2 plan to address those significant cutbacks would be extensive and greater than the timeline required for BAWSCA to provide your agency with numbers for input into your 2020 UWMP submittals.

For these reasons, BAWSCA is recommending that for the purpose of the 2020 UWMP updates, allocation of wholesale RWS supplies should be as follows:

1. When the average Wholesale Customers' RWS shortages are 10 percent or less, an equal percent reduction will be applied across all agencies. This is consistent with the existing Tier 2 requirement of a minimum 10 percent cutback in any Tier 2 application scenario.
2. When average Wholesale Customers' shortages are between 10 and 20 percent, the Tier 2 Drought Allocation Plan will be applied.
3. When the average Wholesale Customers' RWS shortages are greater than 20 percent, an equal percent reduction will be applied across all agencies.

Attachment B "Updated 2020 UWMP Drought Cutbacks" provides further detail, including recommended wholesale RWS allocation tables, for use in your agency's 2020 UWMP.

BAWSCA recognizes that this is not an ideal situation or method for allocation of available drought supplies. In the event of actual RWS shortages greater than 20 percent, the Member Agencies would have the opportunity to negotiate and agree upon a more nuanced and equitable approach. Such an approach would likely consider basic health and safety needs, the water needs to support critical institutions such as hospitals, and minimizing economic impacts on individual communities and the region.

Enclosed: Attachment A: Supply Reliability Letter
Attachment B: Updated 2020 UWMP Drought Cutbacks

cc: Nicole Sandkulla
Allison Schutte

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

525 Golden Gate Avenue, 13th Floor
San Francisco, CA 94102
T 415.554.3155
F 415.554.3161
TTY 415.554.3488

January 22, 2021

Danielle McPherson
Senior Water Resources Specialist
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 650
San Mateo, CA 94402

Dear Ms. McPherson,

Attached please find the information you requested on the Regional Water System's supply reliability for use in the Wholesale Customer's 2020 Urban Water Management Plan (UWMP) updates. The SFPUC has assessed the water supply reliability under the following planning scenarios:

- Projected supply reliability for year 2020 through 2045
- Projected single dry year and multiple dry year reliability for base year 2020, both with and without implementation of the Bay-Delta Plan Amendment
- Projected single dry year and multiple dry year reliability for base year 2025, both with and without implementation of the Bay-Delta Plan Amendment

The tables presented below assume full implementation of the Bay-Delta Plan Amendment will begin in 2023. All tables assume that the wholesale customers will purchase 184 mgd from the RWS through 2045. Assumptions about the status of the dry-year water supply projects included in the Water Supply Improvement Program (WSIP) are provided below in the table 'WSIP Project Assumptions'. The tables reflect instream flow requirements at San Mateo and Alameda Creeks, as described in the common language provided to BAWSCA separately.

Concerning allocation of supply during dry years, the Water Shortage Allocation Plan (WSAP) was utilized to allocate shortages between the SFPUC and the Wholesale Customers collectively. The WSAP implements a method for allocating water between the SFPUC retail customers and wholesale customers collectively which has been adopted by the Wholesale Customers per the July 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. The WSAP, also known as the Tier One Plan, was amended in the 2018 Amended and Restated Water Supply Agreement. The wholesale customers have adopted the Tier Two Plan, the second component of the WSAP, which allocates the collective wholesale customer share among each of the 26 wholesale customers.

Compared to the reliability projections that were provided previously for the 2015 UWMP update, the biggest difference in projected future deliveries is caused by the implementation of the Bay-Delta Plan Amendment. Given the uncertainty about the implementation of the Amendment (described further in the common language provided to BAWSCA), tables are included to show future projected supplies both with and without the Bay-Delta Plan Amendment.

It is our understanding that you will pass this information on to the Wholesale Customers. If you have any questions or need additional information, please do not hesitate to contact Sarah Triolo, at striolo@sfwater.org or (628) 230 0802.

Sincerely,

Paula Kehoe

Paula Kehoe
Director of Water Resources

Table 1: WSIP Project Assumptions

	2020	2025 and Beyond
Calaveras Dam Replacement Project	Calaveras Reservoir partially refilled at spring 2020 level of 63,900 AF	Calaveras Reservoir fully refilled
Lower Crystal Springs Dam Improvements	Crystal Springs storage not restored	
Regional Groundwater Storage and Recovery (GSR) Project	GSR account partially filled at spring 2020 level of 23,500 AF; GSR recovery rate of 6.2 mgd	GSR account fully filled; GSR recovery rate of 6.2 mgd
Alameda Creek Recapture Project	Project not built	Project built
Dry-year Transfers	Not in effect	

Table 2: Projected Wholesale Supply from Regional Water System [For Table 6-9]:

Year	2020	2025	2030	2035	2040	2045
RWS Supply (mgd)	265	265	265	265	265	265
Wholesale Supply (mgd)	184	184	184	184	184	184

Table 3: Basis of Water Supply Data [For Table 7-1], 2020 Infrastructure Conditions With Bay Delta Plan

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2020	265	100%	184	
Single dry year		238.5	90%	157.5	• At 10% shortage, wholesale allocation is 64%, or 152.6 mgd • Retail allocation is 36%, or 85.9 mgd • Retail allocations above 81 mgd are re-allocated to Wholesale Customers, per the 2018 WSA • 4.9 mgd added to wholesale allocation, bringing it to 157.5 mgd
Consecutive 1st Dry year		238.5	90%	157.5	• Same as above
Consecutive 2nd Dry year		212	80%	132.5	• At a 20% shortage, wholesale allocation is 62.5%, or 132.5 mgd • Retail allocation is 37.5%, or 79.5 mgd
Consecutive 3rd Dry year[1]		119.25	45%	74.5	• WSA does not define percentage split above a 20% shortage level • Assume same split as for a 20% shortage level, i.e. Wholesale Customers receive 62.5%
Consecutive 4th Dry year		119.25	45%	74.5	• Same as above
Consecutive 5th Dry year		119.25	45%	74.5	• Same as above

[1] Assuming this year represents 2023, when Bay Delta Plan Amendment would come into effect.

Table 4: Basis of Water Supply Data [For Table 7-1], 2020 Infrastructure Conditions Without Bay Delta Plan

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2020	265	100%	184	
Single dry year		238.5	90%	157.5	• At 10% shortage, wholesale allocation is 64%, or 152.6 mgd • Retail allocation is 36%, or 85.9 mgd • Retail allocations above 81 mgd are re-allocated to Wholesale Customers, per the 2018 WSA • 4.9 mgd added to wholesale allocation, bringing it to 157.5 mgd
Consecutive 1st Dry year		238.5	90%	157.5	• Same as above
Consecutive 2nd Dry year		212	80%	132.5	• At a 20% shortage, wholesale allocation is 62.5%, or 132.5 mgd • Retail allocation is 37.5%, or 79.5 mgd
Consecutive 3rd Dry year		212	80%	132.5	• Same as above
Consecutive 4th Dry year		212	80%	132.5	• Same as above
Consecutive 5th Dry year		212	80%	132.5	• Same as above

Table 5: Basis of Water Supply Data [For Table 7-1], 2025 Infrastructure With Bay Delta Plan

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2025	265	100%	184	
Single dry year		132.5	50%	82.8	• WSA does not define percentage split above a 20% shortage level • Assume same split as for a 20% shortage level, i.e. Wholesale Customers receive 62.5%
Consecutive 1st Dry year		132.5	50%	82.8	• Same as above
Consecutive 2nd Dry year		119.25	45%	74.5	• Same as above
Consecutive 3rd Dry year		119.25	45%	74.5	• Same as above
Consecutive 4th Dry year		119.25	45%	74.5	• Same as above
Consecutive 5th Dry year		119.25	45%	74.5	• Same as above

Table 6: Basis of Water Supply Data [For Table 7-1], 2025 Infrastructure Without Bay Delta Plan

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2025	265	100%	184	
Single dry year		238.5	90%	157.5	• At 10% shortage, wholesale allocation is 64% • Retail allocation is 36%, or 85.9 mgd; retail allocations above 81 mgd are re-allocated to Wholesaler Customers, per the 2018 WSA • 4.9 mgd added to wholesale allocation, bringing it to 157.5 mgd
Consecutive 1st Dry year		238.5	90%	157.5	• Same as above
Consecutive 2nd Dry year		238.5	90%	157.5	• Same as above
Consecutive 3rd Dry year		238.5	90%	157.5	• Same as above
Consecutive 4th Dry year		212	80%	132.5	• At a 20% shortage, wholesale allocation is 62.5%, or 132.5 mgd • Retail allocation is 37.5%, or 79.5 mgd
Consecutive 5th Dry year		212	80%	132.5	• Same as above

Table 7: Projected Multiple Dry Years Wholesale Supply from RWS [For Table 7-4], With Bay Delta Plan

	2025	2030	2035	2040	2045
First year	82.8	82.8	82.8	82.8	82.8
Second year	74.5	74.5	74.5	74.5	74.5
Third year	74.5	74.5	74.5	74.5	74.5
Fourth year	74.5	74.5	74.5	74.5	74.5
Fifth year	74.5	74.5	74.5	74.5	74.5

Table 8: Projected Multiple Dry Years Wholesale Supply from RWS [For Table 7-4], Without Bay Delta Plan

	2025	2030	2035	2040	2045
First year	157.5	157.5	157.5	157.5	157.5
Second year	157.5	157.5	157.5	157.5	157.5
Third year	157.5	157.5	157.5	157.5	157.5
Fourth year	132.5	132.5	132.5	132.5	132.5
Fifth year	132.5	132.5	132.5	132.5	132.5

Table 9: Projected Regional Water System Supply for 5-Year Drought Risk Assessment [For Table 7-5], With Bay Delta Plan. This table assumes Bay Delta Plan comes into effect in 2023.

Year	2021	2022	2023	2024	2025
RWS Supply (mgd)	238.5	212	119.25	119.25	119.25
Wholesale Supply (mgd)	157.5	132.5	74.5	74.5	74.5

Table 10: Projected Regional Water System Supply for 5-Year Drought Risk Assessment [For Table 7-5], Without Bay Delta Plan

Year	2021	2022	2023	2024	2025
RWS Supply (mgd)	238.5	212	212	212	212
Wholesale Supply (mgd)	157.5	132.5	132.5	132.5	132.5

Attachment B: Updated 2020 UWMP Drought Cutbacks

The January 22, 2021, SFPUC Regional Water System (RWS) Supply Reliability Letter (Supply Reliability Letter) provides RWS supplies available to the Wholesale Customers under two scenarios: (1) With Bay-Delta Plan, and (2) Without Bay-Delta Plan. Your agency must choose which scenario to use for your agency's 2020 UWMP submittal tables. However, you may discuss both scenarios in the body of your agency's UWMP. The purpose of this attachment is to provide further detail about your agency's allocation of total RWS supplies available to the Wholesale Customers under both scenarios.

Data Sources for Projected RWS Purchases

Supply allocations are based on projected RWS purchases provided to BAWSCA by the Member Agencies. Following the completion of the Demand Study in June 2020, BAWSCA used the results to develop a table for each Member Agency listing possible supplies and total demand for 2025, 2030, 2035, 2040, and 2045. BAWSCA populated the tables with total demand after passive conservation and entered active conservation, as calculated in the agencies' DSS Model, as a source of supply. Multi-source agencies were asked to complete the table with supply projections, including from the RWS, to meet total demand. Single-source agencies were offered the opportunity to review the tables upon request. Because active conservation was treated as a source of supply, projected RWS purchases are after passive and active conservation.[1]

Water Management Representatives (WMRs) received a draft copy of all projected wholesale RWS purchase requests as part of the January 7, 2021 WMR meeting agenda packet and meeting slides. Agencies were asked to notify BAWSCA if changes were necessary regarding their purchase requests prior to BAWSCA sending those purchase requests to the SFPUC. Purchase requests were transmitted to the SFPUC via a letter dated January 15, 2021 for use in their 2020 UWMP efforts.

Note that the projected RWS purchases used by BAWSCA for fiscal years 2020-21 and for 2021-22 were provided to Christina Tang, BAWSCA's Finance Manager, by each Member Agency in January 2021. This annual reporting is part of the SFPUC's wholesale rate setting process. Member Agencies have provided BAWSCA with these projected purchases annually for the past 10 years.

UWMP Tables 7-1 and 7-5

UWMP Table 7-1 requests supply reliability for a normal year, a single dry year, and multiple (five) dry years. Tables 3, 4, 5, and 6 provided in the Supply Reliability Letter will help your agency complete UWMP Table 7-1. The Drought Risk Assessment (DRA) in UWMP Table 7-5 also requests a five-year drought sequence but specifies years 2021 through 2025. Supply Reliability Letter Tables 9 and 10 will help your agency complete UWMP Table 7-5.

The Supply Reliability Letter provides four scenarios to select from for completing UWMP Table 7-1. The Supply Reliability Letter Tables 3 (with Bay-Delta Plan) and 4 (without Bay-Delta Plan) use 2020 as the base year. Depending on which scenario you choose, these will be the basis for your agency's five-year DRA (UWMP Table 7-5). The Supply Reliability Letter Tables 5 (with Bay-Delta Plan) and 6 (without Bay-Delta Plan) use 2025 as the base year. Depending on which scenario you choose, these will be the basis for UWMP Tables 7-2 through 7-4.

[1] Projected RWS purchases are after conservation, except for Mountain View.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Total RWS supplies available to the Wholesale Customers in the first through fifth consecutive dry years in Supply Reliability Letter Table 3 align with those in Table 9 of the same letter. Similarly, Supply Reliability Letter Table 4 aligns with Table 10 of the same letter.

Table A below provides a summary of the Member Agencies' RWS supply drought cutbacks under each of the four supply availability conditions and is intended to help you complete UWMP Tables 7-1and 7-5.

Table A: Wholesale Customer Drought Cutbacks Based on a Single Dry Year and Multiple Dry Years (Base Year 2020)

	(a)	(b)	(c)	(d)	(e)	(f)	(g)
(1)	Projected SF RWS Wholesale Purchases	132.2 MGD	138.6 MGD	140.8 MGD	142.5 MGD	144.3 MGD	146.0 MGD
(2)	Supply Available to the Wholesale Customers	Percent Cutback on Wholesale RWS Purchases					
		2020	**2021**	**2022**	**2023**	**2024**	**2025**
(3)	157.5 MGD	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
(4)	132.5 MGD	0.0%	-4.4%	-5.9%	-7.0%	-8.2%	-9.3%
(5)	82.8 MGD	-37.4%	-40.3%	-41.2%	-41.9%	-42.6%	-43.3%
(6)	74.5 MGD	-43.7%	-46.3%	-47.1%	-47.7%	-48.4%	-49.0%

Table A, column (a), rows 3 through 6 lists total RWS supplies available to the Wholesale Customers as provided in the Supply Reliability Letter tables. Row 1 provides cumulative actual wholesale RWS purchases for 2020 and projected purchases for 2021 through 2025. Projected RWS purchases for years 2021 and 2022 were provided to Christina Tang, BAWSCA's Finance Manager, by the Member Agencies in January. Projected RWS purchases for 2025 were provided to BAWSCA by the Member Agencies as described previously in this memo. Projected wholesale RWS purchases for 2023 and 2024 were derived assuming a linear change between 2022 and 2025.

Table B below provides a summary of the Member Agencies' RWS supply drought cutbacks under each of the four supply availability conditions and is intended to help you complete UWMP Table 7-1.

Table B: Wholesale Customer Drought Cutbacks Based on a Single Dry Year and Multiple Dry Years (Base Year 2025)

	(a)	(b)	(c)	(d)	(e)	(f)	(g)
(1)	Projected SF RWS Wholesale Purchases	146.0 MGD	146.4 MGD	146.8 MGD	147.1 MGD	147.5 MGD	147.9 MGD
(2)	Supply Available to the Wholesale Customers	Percent Cutback on Wholesale RWS Purchases					
		2025	**2026**	**2027**	**2028**	**2029**	**2030**
(3)	157.5 MGD	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
(4)	132.5 MGD	-9.2%	-9.5%	-9.7%	-9.9%	-10.2%	-10.4%
(5)	82.8 MGD	-43.3%	-43.4%	-43.6%	-43.7%	-43.9%	-44.0%
(6)	74.5 MGD	-49.0%	-49.1%	-49.3%	-49.4%	-49.5%	-49.6%

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table B, column (a), rows 3 through 6 lists total RWS supplies available to the Wholesale Customers as provided in the Supply Reliability Letter tables. Row 1 provides cumulative projected wholesale RWS purchases for 2025 through 2030. Projected wholesale RWS purchases for years 2025 and 2030 were provided to BAWSCA by the Member Agencies as described previously in this memo. Projected wholesale RWS purchases for 2026 through 2029 were derived assuming a linear change between 2025 and 2030.

To complete UWMP Tables 7-1 and 7-5, reference tables in the Supply Reliability Letter to identify total RWS supplies available to the Wholesale Customers and apply the percent cutback in the corresponding year of the drought sequence using Tables A and B. For example, in Supply Reliability Letter Table 3, in the 5th consecutive year of a drought, the volume available to the Wholesale Customers is 74.5 MGD. To calculate RWS supplies available to your agency in 2025 using table A, locate the row with 74.5 MGD on the table – row 6 – and the column for 2025 – column (g). Then apply the percent cutback to your agency's RWS demand in 2025.

A list of purchase projections by agency are provided in Tables C, D, E, and F. The table also indicates the percent cutback that should be applied based on total RWS supplies available to the Wholesale Customers. Tables C and E use Scenario 1: With Bay-Delta Plan. Tables D and F use Scenario 2: Without Bay-Delta Plan. Tables C and D use 2020 as the base year and Tables E and F use 2025 as the base year.

BAWSCA understands that agencies are updating projected demands for their 2020 UWMPs and that projected RWS purchases may change from what was previously provided. Additionally, BAWSCA recognizes that not all Member Agencies will choose the same scenario for their UWMP supply reliability tables. For both reasons, projected RWS purchases in each Member Agency's 2020 UWMP may not add up to total Wholesale demands in the SFPUC's 2020 UWMP. This is consistent with direction given by the Department of Water Resources, which encourages suppliers use the UWMP tables to represent what they believe to be the most likely supply reliability scenario and to characterize the five-consecutive year drought in a manner that is best suited for understanding and managing their water service reliability and individual agency level of risk tolerance.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table C: Scenario 1: With Bay-Delta Plan - Projected Wholesale Customer RWS Demand and Percent Cutback for a Single Dry Year and Multiple Dry Years (Base Year 2020)

	2020 (184 MGD)		**2021** (157.5 MGD)		**2022** (132.5 MGD)		**2023** (74.5 MGD)		**2024** (74.5 MGD)		**2025** (74.5 MGD)	
Agency	Actual Purchases	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback
ACWD	7.87	0.0%	9.44	0.0%	9.46	-5.9%	8.87	-47.7%	8.27	-48.4%	7.68	-49.0%
Brisbane/GVMID	0.64	0.0%	0.62	0.0%	0.65	-5.9%	0.73	-47.7%	0.81	-48.4%	0.89	-49.0%
Burlingame	3.48	0.0%	3.34	0.0%	3.35	-5.9%	3.67	-47.7%	4.00	-48.4%	4.33	-49.0%
Coastside	1.02	0.0%	1.54	0.0%	1.23	-5.9%	1.29	-47.7%	1.34	-48.4%	1.40	-49.0%
CalWater Total	29.00	0.0%	29.66	0.0%	29.81	-5.9%	29.87	-47.7%	29.93	-48.4%	29.99	-49.0%
Daly City	3.97	0.0%	4.00	0.0%	4.01	-5.9%	3.86	-47.7%	3.72	-48.4%	3.57	-49.0%
East Palo Alto	1.57	0.0%	1.63	0.0%	1.69	-5.9%	1.75	-47.7%	1.81	-48.4%	1.88	-49.0%
Estero	4.34	0.0%	4.48	0.0%	4.51	-5.9%	4.36	-47.7%	4.22	-48.4%	4.07	-49.0%
Hayward	13.92	0.0%	14.47	0.0%	15.12	-5.9%	16.03	-47.7%	16.94	-48.4%	17.86	-49.0%
Hillsborough	2.62	0.0%	2.95	0.0%	3.05	-5.9%	3.12	-47.7%	3.19	-48.4%	3.26	-49.0%
Menlo Park	2.96	0.0%	2.92	0.0%	2.93	-5.9%	3.14	-47.7%	3.35	-48.4%	3.55	-49.0%
Mid-Peninsula	2.66	0.0%	2.65	0.0%	2.80	-5.9%	2.82	-47.7%	2.84	-48.4%	2.86	-49.0%
Millbrae	1.90	0.0%	1.95	0.0%	2.15	-5.9%	2.19	-47.7%	2.24	-48.4%	2.29	-49.0%
Milpitas	5.92	0.0%	5.88	0.0%	5.34	-5.9%	5.76	-47.7%	6.17	-48.4%	6.59	-49.0%
Mountain View	7.67	0.0%	7.80	0.0%	8.05	-5.9%	8.23	-47.7%	8.42	-48.4%	8.60	-49.0%
North Coast	2.37	0.0%	2.58	0.0%	2.66	-5.9%	2.56	-47.7%	2.45	-48.4%	2.34	-49.0%
Palo Alto	9.75	0.0%	9.44	0.0%	9.66	-5.9%	9.79	-47.7%	9.93	-48.4%	10.06	-49.0%
Purissima Hills	1.75	0.0%	1.97	0.0%	2.02	-5.9%	2.04	-47.7%	2.06	-48.4%	2.09	-49.0%
Redwood City	8.76	0.0%	8.72	0.0%	9.07	-5.9%	8.86	-47.7%	8.66	-48.4%	8.46	-49.0%
San Bruno	0.95	0.0%	3.39	0.0%	3.40	-5.9%	3.35	-47.7%	3.29	-48.4%	3.24	-49.0%
San José	4.26	0.0%	4.31	0.0%	4.51	-5.9%	4.51	-47.7%	4.50	-48.4%	4.50	-49.0%
Santa Clara	3.27	0.0%	3.29	0.0%	3.50	-5.9%	3.83	-47.7%	4.17	-48.4%	4.50	-49.0%
Stanford	1.43	0.0%	1.40	0.0%	1.54	-5.9%	1.70	-47.7%	1.85	-48.4%	2.01	-49.0%
Sunnyvale	9.33	0.0%	9.35	0.0%	9.45	-5.9%	9.35	-47.7%	9.26	-48.4%	9.16	-49.0%
Westborough	0.82	0.0%	0.84	0.0%	0.81	-5.9%	0.83	-47.7%	0.84	-48.4%	0.86	-49.0%
Wholesale Total	**132.2**	**132.2†**	**138.6**	**138.6†**	**140.8**	**132.5†**	**142.5**	**74.5†**	**144.3**	**74.5†**	**146.0**	**74.5†**

† Total supply available to the Wholesale Customers after drought cutback.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table D: Scenario 2: Without Bay-Delta Plan - Projected Wholesale Customer RWS Demand and Percent Cutback for a Single Dry Year and Multiple Dry Years (Base Year 2020)

	2020 (184 MGD)		**2021** (157.5 MGD)		**2022** (132.5 MGD)		**2023** (132.5 MGD)		**2024** (132.5 MGD)		**2025** (132.5 MGD)	
Agency	Actual Purchases	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback
ACWD	7.87	0.0%	9.44	0.0%	9.46	-5.9%	8.87	-7.0%	8.27	-8.2%	7.68	-9.2%
Brisbane/GVMID	0.64	0.0%	0.62	0.0%	0.65	-5.9%	0.73	-7.0%	0.81	-8.2%	0.89	-9.2%
Burlingame	3.48	0.0%	3.34	0.0%	3.35	-5.9%	3.67	-7.0%	4.00	-8.2%	4.33	-9.2%
Coastside	1.02	0.0%	1.54	0.0%	1.23	-5.9%	1.29	-7.0%	1.34	-8.2%	1.40	-9.2%
CalWater Total	29.00	0.0%	29.66	0.0%	29.81	-5.9%	29.87	-7.0%	29.93	-8.2%	29.99	-9.2%
Daly City	3.97	0.0%	4.00	0.0%	4.01	-5.9%	3.86	-7.0%	3.72	-8.2%	3.57	-9.2%
East Palo Alto	1.57	0.0%	1.63	0.0%	1.69	-5.9%	1.75	-7.0%	1.81	-8.2%	1.88	-9.2%
Estero	4.34	0.0%	4.48	0.0%	4.51	-5.9%	4.36	-7.0%	4.22	-8.2%	4.07	-9.2%
Hayward	13.92	0.0%	14.47	0.0%	15.12	-5.9%	16.03	-7.0%	16.94	-8.2%	17.86	-9.2%
Hillsborough	2.62	0.0%	2.95	0.0%	3.05	-5.9%	3.12	-7.0%	3.19	-8.2%	3.26	-9.2%
Menlo Park	2.96	0.0%	2.92	0.0%	2.93	-5.9%	3.14	-7.0%	3.35	-8.2%	3.55	-9.2%
Mid-Peninsula	2.66	0.0%	2.65	0.0%	2.80	-5.9%	2.82	-7.0%	2.84	-8.2%	2.86	-9.2%
Millbrae	1.90	0.0%	1.95	0.0%	2.15	-5.9%	2.19	-7.0%	2.24	-8.2%	2.29	-9.2%
Milpitas	5.92	0.0%	5.88	0.0%	5.34	-5.9%	5.76	-7.0%	6.17	-8.2%	6.59	-9.2%
Mountain View	7.67	0.0%	7.80	0.0%	8.05	-5.9%	8.23	-7.0%	8.42	-8.2%	8.60	-9.2%
North Coast	2.37	0.0%	2.58	0.0%	2.66	-5.9%	2.56	-7.0%	2.45	-8.2%	2.34	-9.2%
Palo Alto	9.75	0.0%	9.44	0.0%	9.66	-5.9%	9.79	-7.0%	9.93	-8.2%	10.06	-9.2%
Purissima Hills	1.75	0.0%	1.97	0.0%	2.02	-5.9%	2.04	-7.0%	2.06	-8.2%	2.09	-9.2%
Redwood City	8.76	0.0%	8.72	0.0%	9.07	-5.9%	8.86	-7.0%	8.66	-8.2%	8.46	-9.2%
San Bruno	0.95	0.0%	3.39	0.0%	3.40	-5.9%	3.35	-7.0%	3.29	-8.2%	3.24	-9.2%
San José	4.26	0.0%	4.31	0.0%	4.51	-5.9%	4.51	-7.0%	4.50	-8.2%	4.50	-9.2%
Santa Clara	3.27	0.0%	3.29	0.0%	3.50	-5.9%	3.83	-7.0%	4.17	-8.2%	4.50	-9.2%
Stanford	1.43	0.0%	1.40	0.0%	1.54	-5.9%	1.70	-7.0%	1.85	-8.2%	2.01	-9.2%
Sunnyvale	9.33	0.0%	9.35	0.0%	9.45	-5.9%	9.35	-7.0%	9.26	-8.2%	9.16	-9.2%
Westborough	0.82	0.0%	0.84	0.0%	0.81	-5.9%	0.83	-7.0%	0.84	-8.2%	0.86	-9.2%
Wholesale Total	**132.2**	**132.2†**	**138.6**	**138.6†**	**140.8**	**132.5†**	**142.5**	**132.5†**	**144.3**	**132.5†**	**146.0**	**132.5†**

† Total supply available to the Wholesale Customers after drought cutback.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table E: Scenario 1: With Bay-Delta Plan - Projected Wholesale Customer RWS Demand and Percent Cutback for a Single Dry Year and Multiple Dry Years (Base Year 2025)

	2025 (184 MGD)		**2026** (82.8 MGD)		**2027** (74.5 MGD)		**2028** (74.5 MGD)		**2029** (74.5 MGD)		**2030** (74.5 MGD)	
Agency	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback
ACWD	7.68	0%	7.68	-43.4%	7.68	-49.3%	7.68	-49.4%	7.68	-49.5%	7.68	-49.6%
Brisbane/GVMID	0.89	0%	0.89	-43.4%	0.89	-49.3%	0.89	-49.4%	0.89	-49.5%	0.89	-49.6%
Burlingame	4.33	0%	4.34	-43.4%	4.35	-49.3%	4.37	-49.4%	4.38	-49.5%	4.40	-49.6%
Coastside	1.40	0%	1.40	-43.4%	1.39	-49.3%	1.39	-49.4%	1.38	-49.5%	1.38	-49.6%
CalWater Total	29.99	0%	29.94	-43.4%	29.89	-49.3%	29.84	-49.4%	29.79	-49.5%	29.74	-49.6%
Daly City	3.57	0%	3.56	-43.4%	3.55	-49.3%	3.54	-49.4%	3.53	-49.5%	3.52	-49.6%
East Palo Alto	1.88	0%	1.89	-43.4%	1.91	-49.3%	1.92	-49.4%	1.93	-49.5%	1.95	-49.6%
Estero	4.07	0%	4.08	-43.4%	4.08	-49.3%	4.09	-49.4%	4.10	-49.5%	4.11	-49.6%
Hayward	17.86	0%	18.02	-43.4%	18.19	-49.3%	18.35	-49.4%	18.52	-49.5%	18.68	-49.6%
Hillsborough	3.26	0%	3.26	-43.4%	3.26	-49.3%	3.26	-49.4%	3.26	-49.5%	3.25	-49.6%
Menlo Park	3.55	0%	3.58	-43.4%	3.60	-49.3%	3.63	-49.4%	3.66	-49.5%	3.68	-49.6%
Mid-Peninsula	2.86	0%	2.85	-43.4%	2.85	-49.3%	2.85	-49.4%	2.84	-49.5%	2.84	-49.6%
Millbrae	2.29	0%	2.33	-43.4%	2.37	-49.3%	2.41	-49.4%	2.46	-49.5%	2.50	-49.6%
Milpitas	6.59	0%	6.62	-43.4%	6.65	-49.3%	6.68	-49.4%	6.72	-49.5%	6.75	-49.6%
Mountain View	8.60	0%	8.66	-43.4%	8.72	-49.3%	8.78	-49.4%	8.84	-49.5%	8.90	-49.6%
North Coast	2.34	0%	2.34	-43.4%	2.33	-49.3%	2.33	-49.4%	2.33	-49.5%	2.33	-49.6%
Palo Alto	10.06	0%	10.08	-43.4%	10.10	-49.3%	10.12	-49.4%	10.13	-49.5%	10.15	-49.6%
Purissima Hills	2.09	0%	2.09	-43.4%	2.09	-49.3%	2.09	-49.4%	2.09	-49.5%	2.09	-49.6%
Redwood City	8.46	0%	8.46	-43.4%	8.47	-49.3%	8.48	-49.4%	8.49	-49.5%	8.49	-49.6%
San Bruno	3.24	0%	3.23	-43.4%	3.23	-49.3%	3.22	-49.4%	3.22	-49.5%	3.22	-49.6%
San José	4.50	0%	4.50	-43.4%	4.50	-49.3%	4.50	-49.4%	4.50	-49.5%	4.50	-49.6%
Santa Clara	4.50	0%	4.50	-43.4%	4.50	-49.3%	4.50	-49.4%	4.50	-49.5%	4.50	-49.6%
Stanford	2.01	0%	2.04	-43.4%	2.08	-49.3%	2.11	-49.4%	2.15	-49.5%	2.18	-49.6%
Sunnyvale	9.16	0%	9.19	-43.4%	9.22	-49.3%	9.24	-49.4%	9.27	-49.5%	9.30	-49.6%
Westborough	0.86	0%	0.86	-43.4%	0.86	-49.3%	0.86	-49.4%	0.85	-49.5%	0.85	-49.6%
Wholesale Total	**146.0**	**146.0†**	**146.4**	**82.8†**	**146.8**	**74.5†**	**147.1**	**74.5†**	**147.5**	**74.5†**	**147.9**	**74.5†**

† Total supply available to the Wholesale Customers after drought cutback.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table F: Scenario 2: Without Bay-Delta Plan - Projected Wholesale Customer RWS Demand and Percent Cutback for a Single Dry Year and Multiple Dry Years (Base Year 2025)

	2025 (184 MGD)		**2026** (157.5 MGD)		**2027** (157.5 MGD)		**2028** (157.5 MGD)		**2029** (132.5 MGD)		**2030** (132.5 MGD)	
Agency	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback
ACWD	7.68	0.0%	7.68	0.0%	7.68	0.0%	7.68	0.0%	7.68	-10.2%	7.68	-10.4%
Brisbane/GVMID	0.89	0.0%	0.89	0.0%	0.89	0.0%	0.89	0.0%	0.89	-10.2%	0.89	-10.4%
Burlingame	4.33	0.0%	4.34	0.0%	4.35	0.0%	4.37	0.0%	4.38	-10.2%	4.40	-10.4%
Coastside	1.40	0.0%	1.40	0.0%	1.39	0.0%	1.39	0.0%	1.38	-10.2%	1.38	-10.4%
CalWater Total	29.99	0.0%	29.94	0.0%	29.89	0.0%	29.84	0.0%	29.79	-10.2%	29.74	-10.4%
Daly City	3.57	0.0%	3.56	0.0%	3.55	0.0%	3.54	0.0%	3.53	-10.2%	3.52	-10.4%
East Palo Alto	1.88	0.0%	1.89	0.0%	1.91	0.0%	1.92	0.0%	1.93	-10.2%	1.95	-10.4%
Estero	4.07	0.0%	4.08	0.0%	4.08	0.0%	4.09	0.0%	4.10	-10.2%	4.11	-10.4%
Hayward	17.86	0.0%	18.02	0.0%	18.19	0.0%	18.35	0.0%	18.52	-10.2%	18.68	-10.4%
Hillsborough	3.26	0.0%	3.26	0.0%	3.26	0.0%	3.26	0.0%	3.26	-10.2%	3.25	-10.4%
Menlo Park	3.55	0.0%	3.58	0.0%	3.60	0.0%	3.63	0.0%	3.66	-10.2%	3.68	-10.4%
Mid-Peninsula	2.86	0.0%	2.85	0.0%	2.85	0.0%	2.85	0.0%	2.84	-10.2%	2.84	-10.4%
Millbrae	2.29	0.0%	2.33	0.0%	2.37	0.0%	2.41	0.0%	2.46	-10.2%	2.50	-10.4%
Milpitas	6.59	0.0%	6.62	0.0%	6.65	0.0%	6.68	0.0%	6.72	-10.2%	6.75	-10.4%
Mountain View	8.60	0.0%	8.66	0.0%	8.72	0.0%	8.78	0.0%	8.84	-10.2%	8.90	-10.4%
North Coast	2.34	0.0%	2.34	0.0%	2.33	0.0%	2.33	0.0%	2.33	-10.2%	2.33	-10.4%
Palo Alto	10.06	0.0%	10.08	0.0%	10.10	0.0%	10.12	0.0%	10.13	-10.2%	10.15	-10.4%
Purissima Hills	2.09	0.0%	2.09	0.0%	2.09	0.0%	2.09	0.0%	2.09	-10.2%	2.09	-10.4%
Redwood City	8.46	0.0%	8.46	0.0%	8.47	0.0%	8.48	0.0%	8.49	-10.2%	8.49	-10.4%
San Bruno	3.24	0.0%	3.23	0.0%	3.23	0.0%	3.22	0.0%	3.22	-10.2%	3.22	-10.4%
San José	4.50	0.0%	4.50	0.0%	4.50	0.0%	4.50	0.0%	4.50	-10.2%	4.50	-10.4%
Santa Clara	4.50	0.0%	4.50	0.0%	4.50	0.0%	4.50	0.0%	4.50	-10.2%	4.50	-10.4%
Stanford	2.01	0.0%	2.04	0.0%	2.08	0.0%	2.11	0.0%	2.15	-10.2%	2.18	-10.4%
Sunnyvale	9.16	0.0%	9.19	0.0%	9.22	0.0%	9.24	0.0%	9.27	-10.2%	9.30	-10.4%
Westborough	0.86	0.0%	0.86	0.0%	0.86	0.0%	0.86	0.0%	0.85	-10.2%	0.85	-10.4%
Wholesale Total	**146.0**	**146.0†**	**146.4**	**146.4†**	**146.8**	**146.8†**	**147.1**	**147.1†**	**147.5**	**132.5†**	**147.9**	**132.5†**

† Total supply available to the Wholesale Customers after drought cutback.

Attachment B: Updated 2020 UWMP Drought Cutbacks

UWMP Table 7-4

Supply Reliability Letter Tables 7 and 8 will help your agency complete UWMP Table 7-4. Table G below provides a summary of the Member Agencies' RWS supply drought cutbacks under each of the four supply availability conditions and is intended to help you complete UWMP Table 7-4. The table assumes (1) the Tier 2 Plan will be used to allocate supplies available to the Wholesale Customers when average Wholesale Customers' RWS shortages are greater than 10 and up to 20 percent, and (2) an equal percent reduction will be shared across all Wholesale Customers when average Wholesale Customers' RWS shortages are 10 percent or less or greater than 20 percent.

Table G: Drought Cutbacks Based on Projected Demands Under All Water Supply Availability Conditions

	(a)	(b)	(c)	(d)	(e)	(f)
(1)	Projected SF RWS Wholesale Purchases	146.0 MGD	147.9 MGD	151.9 MGD	156.3 MGD	162.8 MGD
(2)	Supply Available to the Wholesale Customers	% Cutback on Wholesale RWS Purchases				
		2025	**2030**	**2035**	**2040**	**2045**
(3)	157.5 MGD	0.0%	0.0%	0.0%	0.0%	-3.2%
(4)	132.5 MGD	-9.3%	-10.4%	Tier 2 Avg. -14%*	Tier 2 Avg. -16%*	Tier 2 Avg. -19%*
(5)	82.8 MGD	-43.3%	-44.0%	-45.5%	-47.0%	-49.1%
(6)	74.5 MGD	-49.0%	-49.6%	-51.0%	-52.3%	-54.2%

* Calculated average. Individual agency cutbacks are calculated in Table H.

Table G, column (a) lists total RWS supplies available to the Wholesale Customers as provided in the Supply Reliability Letter tables. Row 1 provides cumulative projected wholesale RWS purchases for 2025, 2030, 2035, 2040, and 2045.

Tables H, I, J and K provide additional detail by agency for each of the four supply availability conditions listed in Table G. To complete UWMP Table 7-4, reference Table 7 or 8 (depending on which Bay-Delta Plan scenario you choose) in the Supply Reliability Letter to identify total RWS supplies available to the Wholesale Customers and apply the percent cutback in the corresponding year using Table G or input the volumetric drought allocation using Tables H, I, J and K below.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table H: Drought Allocations when Total Supplies Available to the Wholesale Customers are Equal to 157.5 MGD

Projected SF RWS Wholesale Purchases	146.0 MGD	147.9 MGD	151.9 MGD	156.3 MGD	162.8 MGD
	Drought Allocation (MGD)				
Agency	**2025**	**2030**	**2030**	**2040**	**2045**
ACWD	7.68	7.68	7.68	7.68	8.82
Burlingame	0.89	0.89	0.88	0.89	0.87
Burlingame	4.33	4.40	4.47	4.58	4.54
Coastside	1.40	1.38	1.36	1.33	1.28
CalWater Total	29.99	29.74	29.81	30.27	29.71
Daly City	3.57	3.52	3.49	3.46	3.32
East Palo Alto	1.88	1.95	2.10	2.49	2.80
Estero	4.07	4.11	4.18	4.23	4.24
Hayward	17.86	18.68	19.75	20.82	21.43
Hillsborough	3.26	3.25	3.26	3.26	3.15
Menlo Park	3.55	3.68	3.87	4.06	4.15
Mid-Peninsula	2.86	2.84	2.88	2.89	2.83
Millbrae	2.29	2.50	2.45	2.82	3.10
Milpitas	6.59	6.75	7.03	7.27	7.29
Mountain View	8.60	8.90	9.20	9.51	9.61
North Coast	2.34	2.33	2.34	2.34	2.27
Palo Alto	10.06	10.15	10.28	10.51	10.44
Purissima Hills	2.09	2.09	2.12	2.13	2.08
Redwood City	8.46	8.49	8.64	8.74	8.62
San Bruno	3.24	3.22	3.20	3.20	3.11
San José	4.50	4.50	4.50	4.50	4.35
Santa Clara	4.50	4.50	4.50	4.50	4.35
Stanford	2.01	2.18	2.35	2.53	2.61
Sunnyvale	9.16	9.30	10.70	11.44	11.71
Westborough	0.86	0.85	0.85	0.84	0.82
Wholesale Total	**146.0**	**147.9**	**151.9**	**156.3**	**157.5**

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table I: Drought Allocations when Total Supplies Available to the Wholesale Customers are Equal to 132.5 MGD

Projected SF RWS Wholesale Purchases	146.0 MGD	147.9 MGD	151.9 MGD	156.3 MGD	162.8 MGD
	Drought Allocation (MGD)				
Agency	**2025**	**2030**	**2030**	**2040**	**2045**
ACWD	6.97	6.88	6.91	6.91	8.20
Burlingame	0.81	0.79	0.73	0.73	0.72
Burlingame	3.93	3.94	3.96	3.89	3.80
Coastside	1.27	1.24	1.22	1.20	1.19
CalWater Total	27.21	26.65	26.46	25.69	24.69
Daly City	3.24	3.15	3.04	3.01	2.98
East Palo Alto	1.70	1.75	1.97	2.30	2.62
Estero	3.69	3.68	3.76	3.87	3.77
Hayward	16.20	16.74	17.32	17.69	18.07
Hillsborough	2.96	2.92	2.90	2.75	2.56
Menlo Park	3.22	3.30	3.37	3.33	3.26
Mid-Peninsula	2.59	2.54	2.59	2.62	2.54
Millbrae	2.07	2.24	2.16	2.32	2.45
Milpitas	5.98	6.05	6.25	6.31	6.35
Mountain View	7.80	7.97	8.28	8.49	8.34
North Coast	2.12	2.09	2.11	2.11	2.11
Palo Alto	9.13	9.09	9.26	9.46	9.71
Purissima Hills	1.89	1.87	1.42	1.38	1.32
Redwood City	7.67	7.61	7.89	7.70	7.49
San Bruno	2.94	2.88	2.56	2.51	2.45
San José	4.08	4.03	3.03	2.91	2.76
Santa Clara	4.08	4.03	3.03	2.91	2.76
Stanford	1.82	1.95	2.06	2.13	2.16
Sunnyvale	8.31	8.33	9.46	9.51	9.43
Westborough	0.78	0.76	0.76	0.76	0.76
Wholesale Total	**132.5**	**132.5**	**132.5**	**132.5**	**132.5**

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table J: Drought Allocations when Total Supplies Available to the Wholesale Customers are Equal to 82.8 MGD

Projected SF RWS Wholesale Purchases	146.0 MGD	147.9 MGD	151.9 MGD	156.3 MGD	162.8 MGD
	Drought Allocation (MGD)				
Agency	**2025**	**2030**	**2030**	**2040**	**2045**
ACWD	4.36	4.30	4.19	4.07	4.64
Burlingame	0.51	0.50	0.48	0.47	0.45
Burlingame	2.45	2.46	2.44	2.43	2.39
Coastside	0.79	0.77	0.74	0.71	0.68
CalWater Total	17.00	16.65	16.25	16.03	15.62
Daly City	2.02	1.97	1.90	1.83	1.75
East Palo Alto	1.06	1.09	1.14	1.32	1.47
Estero	2.31	2.30	2.28	2.24	2.23
Hayward	10.13	10.46	10.77	11.03	11.26
Hillsborough	1.85	1.82	1.78	1.73	1.66
Menlo Park	2.01	2.06	2.11	2.15	2.18
Mid-Peninsula	1.62	1.59	1.57	1.53	1.49
Millbrae	1.30	1.40	1.34	1.49	1.63
Milpitas	3.74	3.78	3.83	3.85	3.83
Mountain View	4.88	4.98	5.01	5.04	5.05
North Coast	1.33	1.30	1.28	1.24	1.19
Palo Alto	5.71	5.68	5.61	5.57	5.49
Purissima Hills	1.18	1.17	1.15	1.13	1.10
Redwood City	4.80	4.76	4.71	4.63	4.53
San Bruno	1.83	1.80	1.75	1.70	1.63
San José	2.55	2.52	2.45	2.38	2.29
Santa Clara	2.55	2.52	2.45	2.38	2.29
Stanford	1.14	1.22	1.28	1.34	1.37
Sunnyvale	5.19	5.21	5.83	6.06	6.16
Westborough	0.49	0.48	0.46	0.45	0.43
Wholesale Total	**82.8**	**82.8**	**82.8**	**82.8**	**82.8**

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table K: Drought Allocations when Total Supplies Available to the Wholesale Customers are Equal to 74.5 MGD

Projected SF RWS Wholesale Purchases	146.0 MGD	147.9 MGD	151.9 MGD	156.3 MGD	162.8 MGD
	Drought Allocation (MGD)				
Agency	**2025**	**2030**	**2030**	**2040**	**2045**
ACWD	3.92	3.87	3.77	3.66	4.17
Burlingame	0.46	0.45	0.43	0.42	0.41
Burlingame	2.21	2.21	2.19	2.18	2.15
Coastside	0.71	0.70	0.67	0.64	0.61
CalWater Total	15.30	14.98	14.62	14.43	14.05
Daly City	1.82	1.77	1.71	1.65	1.57
East Palo Alto	0.96	0.98	1.03	1.19	1.32
Estero	2.08	2.07	2.05	2.02	2.00
Hayward	9.11	9.41	9.69	9.92	10.14
Hillsborough	1.66	1.64	1.60	1.55	1.49
Menlo Park	1.81	1.86	1.90	1.94	1.96
Mid-Peninsula	1.46	1.43	1.41	1.38	1.34
Millbrae	1.17	1.26	1.20	1.34	1.47
Milpitas	3.36	3.40	3.45	3.47	3.45
Mountain View	4.39	4.48	4.51	4.53	4.54
North Coast	1.19	1.17	1.15	1.12	1.07
Palo Alto	5.14	5.11	5.04	5.01	4.94
Purissima Hills	1.06	1.05	1.04	1.02	0.99
Redwood City	4.31	4.28	4.24	4.17	4.08
San Bruno	1.65	1.62	1.57	1.53	1.47
San José	2.30	2.27	2.21	2.14	2.06
Santa Clara	2.30	2.27	2.21	2.14	2.06
Stanford	1.03	1.10	1.15	1.21	1.24
Sunnyvale	4.67	4.69	5.25	5.45	5.54
Westborough	0.44	0.43	0.41	0.40	0.39
Wholesale Total	**74.5**	**74.5**	**74.5**	**74.5**	**74.5**

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

525 Golden Gate Avenue, 13th Floor
San Francisco, CA 94102
T 415.554.3155
F 415.554.3161
TTY 415.554.3488

March 30, 2021

Danielle McPherson
Senior Water Resources Specialist
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 650
San Mateo, CA 94402

Dear Ms. McPherson,

Attached please find additional supply reliability modeling results conducted by the SFPUC. The SFPUC has conducted additional supply reliability modeling under the following planning scenarios:

- Projected supply reliability for years 2020 through 2045, assuming that demand is equivalent to the sum of the projected retail demands on the Regional Water System (RWS) and Wholesale Customer purchase request projections provided to SFPUC by BAWSCA on January 21st (see Table 1 below).
- Under the above demand conditions, projected supply reliability for scenarios both with and without implementation of the Bay-Delta Plan Amendment starting in 2023.

The SFPUC will be using this supply modeling in the text of its draft UWMP and moving the original modeling results into an appendix.

Table 1: Retail and Wholesale RWS Demand Assumptions Used for Additional Supply Reliability Modeling (mgd)

	2020	2025	2030	2035	2040	2045
Retail	66.5	67.2	67.5	68.6	70.5	73.7
Wholesale[1, 2]	132.1	146.0	147.9	151.9	156.3	162.8
Total	**198.6**	**213.2**	**215.4**	**220.5**	**226.8**	**236.5**

[1] Wholesale purchase request projections provided to the SFPUC by BAWSCA on January 21st, 2021
[2] Includes demands for Cities of San Jose and Santa Clara

Please note the following about the information presented in the attached tables:

- Assumptions about infrastructure conditions remain the same as what was provided in our January 22nd letter.
- The Tier 1 allocations were applied to the RWS supplies to determine the wholesale supply, as was also described in the January 22nd letter; for any system-wide shortage above 20%, the Tier 1 split for a 20% shortage was applied.
- The SFPUC water supply planning methodology, including simulation of an 8.5-year design drought, is used to develop these estimates of water supply available from the RWS for five dry years. In each demand scenario for 2020 through 2045, the RWS deliveries are estimated using the standard SFPUC procedure, which includes adding increased levels of rationing as needed to balance the demands on the RWS system with available water supply. Some simulations may have increased levels of rationing in the final years of the design drought sequence, which can influence the comparison of results in the first five years of the sequence.
- Tables 7 and 8 in the attached document provide RWS and wholesale supply availability for the five-year drought risk assessment from 2021 to 2025. SFPUC's modeling approach does not allow for varying demands over the course of a dry year sequence. Therefore, the supply projections for 2021 to 2025 are based on meeting 2020 levels of demand. However, in years when the Bay-Delta Plan Amendment is not in effect, sufficient RWS supplies will be available to meet the Wholesale Customers' purchase requests assuming that they are between the 2020 and 2025 projected levels. This is not reflected in Tables 7 and 8 because SFPUC did not want to make assumptions about the growth of purchase requests between 2020 and 2025.

In our draft UWMP, we acknowledge that we have 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, as well as a contractual obligation to supply 184 mgd to the Wholesale Customers. Therefore, we will still include the results of our modeling based on a demand of 265 mgd in order to facilitate planning that supports meeting this Level of Service objective and our contractual obligations. The results of this modeling will be in an appendix to the draft UWMP. As will be shown in this appendix, in a normal year the SFPUC can provide up to 265 mgd of supply from the RWS. The RWS supply projections shown in the attached tables are more accurately characterized as supplies that will be used to meet projected retail and Wholesale Customer demands.

It is our understanding that you will pass this information on to the Wholesale Customers. If you have any questions or need additional information, please do not hesitate to contact Sarah Triolo, at striolo@sfwater.org or (628) 230 0802.

Sincerely,

Paula Kehoe

Paula Kehoe
Director of Water Resources

Table 2: Projected Total RWS Supply Utilized and Portion of RWS Supply Utilized by Wholesale Customers in Normal Years [For Table 6-9]:

Year	2020	2025	2030	2035	2040	2045
RWS Supply Utilized (mgd)	198.6	213.2	215.4	220.5	226.8	236.5
RWS Supply Utilized by Wholesale Customers[a] (mgd)	132.1	146.0	147.9	151.9	156.3	162.8

[a] RWS supply utilized by Wholesale Customers is equivalent to purchase request projections provided to SFPUC by BAWSCA on January 21, 2021, and includes Cities of San Jose and Santa Clara.

Basis of Water Supply Data: With Bay-Delta Plan Amendment

Table 3a: Basis of Water Supply Data [For Table 7-1], Base Year 2020, With Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2020	198.6	100%	132.1	
Single dry year		198.6	100%	132.1	
Consecutive 1st Dry year		198.6	100%	132.1	
Consecutive 2nd Dry year		198.6	100%	132.1	
Consecutive 3rd Dry year[1]		119.2	60%	74.5	• At shortages 20% or greater, wholesale allocation is assumed to be 62.5%
Consecutive 4th Dry year		119.2	60%	74.5	• Same as above
Consecutive 5th Dry year		119.2	60%	74.5	• Same as above

[1] Assuming this year represents 2023, when Bay Delta Plan Amendment would come into effect.

Table 3b: Basis of Water Supply Data [For Table 7-1], Base Year 2025, With Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2025	213.2	100%	146.0	
Single dry year		149.2	70%	93.3	• At shortages 20% or greater, wholesale allocation is assumed to be 62.5%
Consecutive 1st Dry year		149.2	70%	93.3	• Same as above
Consecutive 2nd Dry year		127.9	60%	80.0	• Same as above
Consecutive 3rd Dry year		127.9	60%	80.0	• Same as above
Consecutive 4th Dry year		127.9	60%	80.0	• Same as above
Consecutive 5th Dry year		127.9	60%	80.0	• Same as above

Table 3c: Basis of Water Supply Data [For Table 7-1], Base Year 2030, With Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2030	215.4	100%	147.9	
Single dry year		150.8	70%	94.2	• At shortages 20% or greater, wholesale allocation is assumed to be 62.5%
Consecutive 1st Dry year		150.8	70%	94.2	• Same as above
Consecutive 2nd Dry year		129.2	60%	80.8	• Same as above
Consecutive 3rd Dry year		129.2	60%	80.8	• Same as above
Consecutive 4th Dry year		129.2	60%	80.8	• Same as above
Consecutive 5th Dry year		129.2	60%	80.8	• Same as above

Table 3d: Basis of Water Supply Data [For Table 7-1], Base Year 2035, With Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2035	220.5	100%	151.9	
Single dry year		154.4	70%	96.5	• At shortages 20% or greater, wholesale allocation is assumed to be 62.5%
Consecutive 1st Dry year		154.4	70%	96.5	• Same as above
Consecutive 2nd Dry year		132.3	60%	82.7	• Same as above
Consecutive 3rd Dry year		132.3	60%	82.7	• Same as above
Consecutive 4th Dry year		132.3	60%	82.7	• Same as above
Consecutive 5th Dry year		121.3	55%	75.8	• Same as above

Table 3e: Basis of Water Supply Data [For Table 7-1], Base Year 2040, With Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2040	226.8	100%	156.3	
Single dry year		158.8	70%	99.2	• At shortages 20% or greater, wholesale allocation is assumed to be 62.5%
Consecutive 1st Dry year		158.8	70%	99.2	• Same as above
Consecutive 2nd Dry year		136.1	60%	85.1	• Same as above
Consecutive 3rd Dry year		136.1	60%	85.1	• Same as above
Consecutive 4th Dry year		120.2	53%	75.1	• Same as above
Consecutive 5th Dry year		120.2	53%	75.1	• Same as above

Table 3f: Basis of Water Supply Data [For Table 7-1], Base Year 2045, With Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2045	236.5	100%	162.8	
Single dry year		141.9	60%	88.7	• At shortages 20% or greater, wholesale allocation is assumed to be 62.5%
Consecutive 1st Dry year		141.9	60%	88.7	• Same as above
Consecutive 2nd Dry year		141.9	60%	88.7	• Same as above
Consecutive 3rd Dry year		141.9	60%	88.7	• Same as above
Consecutive 4th Dry year		120.6	51%	75.4	• Same as above
Consecutive 5th Dry year		120.6	51%	75.4	• Same as above

Table 3g: Projected RWS Supply Availability [Alternative to Table 7-1], Years 2020-2045, With Bay-Delta Plan Amendment

Year	2020	2025	2030	2035	2040	2045
Average year	100%	100%	100%	100%	100%	100%
Single dry year	100%	70%	70%	70%	70%	60%
Consecutive 1st Dry year	100%	70%	70%	70%	70%	60%
Consecutive 2nd Dry year	100%	60%	60%	60%	60%	60%
Consecutive 3rd Dry year[1]	60%	60%	60%	60%	60%	60%
Consecutive 4th Dry year	60%	60%	60%	60%	53%	51%
Consecutive 5th Dry year	60%	60%	60%	55%	53%	51%

[1] Assuming that at base year 2020, this year represents 2023, when Bay Delta Plan Amendment would come into effect.

Basis of Water Supply Data: Without Bay-Delta Plan Amendment

Table 4a: Basis of Water Supply Data [For Table 7-1], Base Year 2020, Without Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2020	198.6	100%	132.1	
Single dry year		198.6	100%	132.1	
Consecutive 1st Dry year		198.6	100%	132.1	
Consecutive 2nd Dry year		198.6	100%	132.1	
Consecutive 3rd Dry year		198.6	100%	132.1	
Consecutive 4th Dry year		198.6	100%	132.1	
Consecutive 5th Dry year		198.6	100%	132.1	

Table 4b: Basis of Water Supply Data [For Table 7-1], Base Year 2025, Without Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2025	213.2	100%	146.0	
Single dry year		213.2	100%	146.0	
Consecutive 1st Dry year		213.2	100%	146.0	
Consecutive 2nd Dry year		213.2	100%	146.0	
Consecutive 3rd Dry year		213.2	100%	146.0	
Consecutive 4th Dry year		213.2	100%	146.0	
Consecutive 5th Dry year		213.2	100%	146.0	

Table 4c: Basis of Water Supply Data [For Table 7-1], Base Year 2030, Without Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2030	215.4	100%	147.9	
Single dry year		215.4	100%	147.9	
Consecutive 1st Dry year		215.4	100%	147.9	
Consecutive 2nd Dry year		215.4	100%	147.9	
Consecutive 3rd Dry year		215.4	100%	147.9	
Consecutive 4th Dry year		215.4	100%	147.9	
Consecutive 5th Dry year		215.4	100%	147.9	

Table 4d: Basis of Water Supply Data [For Table 7-1], Base Year 2035, Without Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2035	220.5	100%	151.9	
Single dry year		220.5	100%	151.9	
Consecutive 1st Dry year		220.5	100%	151.9	
Consecutive 2nd Dry year		220.5	100%	151.9	
Consecutive 3rd Dry year		220.5	100%	151.9	
Consecutive 4th Dry year		220.5	100%	151.9	
Consecutive 5th Dry year		220.5	100%	151.9	

Table 4e: Basis of Water Supply Data [For Table 7-1], Base Year 2040, Without Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2040	226.8	100%	156.3	
Single dry year		226.8	100%	156.3	
Consecutive 1st Dry year		226.8	100%	156.3	
Consecutive 2nd Dry year		226.8	100%	156.3	
Consecutive 3rd Dry year		226.8	100%	156.3	
Consecutive 4th Dry year		226.8	100%	156.3	
Consecutive 5th Dry year		226.8	100%	156.3	

Table 4f: Basis of Water Supply Data [For Table 7-1], Base Year 2045, Without Bay-Delta Plan Amendment

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2045	236.5	100%	162.8	
Single dry year		236.5	100%	162.8	
Consecutive 1st Dry year		236.5	100%	162.8	
Consecutive 2nd Dry year		236.5	100%	162.8	
Consecutive 3rd Dry year		236.5	100%	162.8	
Consecutive 4th Dry year		212.8	90%	139.1	• At a 10% shortage level, the wholesale allocation is 64% of available supply • The retail allocation is 36% of supply, which resulted in a positive allocation to retail of 2.9 mgd, which was re-allocated to the Wholesale Customers
Consecutive 5th Dry year		212.8	90%	139.1	• Same as above

Table 4g: Projected RWS Supply [Alternative to Table 7-1], Years 2020-2045, Without Bay-Delta Plan Amendment

Year	2020	2025	2030	2035	2040	2045
Average year	100%	100%	100%	100%	100%	100%
Single dry year	100%	100%	100%	100%	100%	100%
Consecutive 1st Dry year	100%	100%	100%	100%	100%	100%
Consecutive 2nd Dry year	100%	100%	100%	100%	100%	100%
Consecutive 3rd Dry year	100%	100%	100%	100%	100%	100%
Consecutive 4th Dry year	100%	100%	100%	100%	100%	90%
Consecutive 5th Dry year	100%	100%	100%	100%	100%	90%

Supply Projections for Consecutive Five Dry Year Sequences

Table 5: Projected Multiple Dry Years Wholesale Supply from RWS [For Table 7-4], With Bay-Delta Plan Amendment

	2025	2030	2035	2040	2045
First year	93.3	94.2	96.5	99.2	88.7
Second year	80.0	80.8	82.7	85.1	88.7
Third year	80.0	80.8	82.7	85.1	88.7
Fourth year	80.0	80.8	82.7	75.1	75.4
Fifth year	80.0	80.8	75.8	75.1	75.4

Table 6: Projected Multiple Dry Years Wholesale Supply from RWS [For Table 7-4], Without Bay-Delta Plan Amendment

	2025	2030	2035	2040	2045
First year	146.0	147.9	151.9	156.3	162.8
Second year	146.0	147.9	151.9	156.3	162.8
Third year	146.0	147.9	151.9	156.3	162.8
Fourth year	146.0	147.9	151.9	156.3	139.1
Fifth year	146.0	147.9	151.9	156.3	139.1

Table 7: Projected Regional Water System Supply for 5-Year Drought Risk Assessment [For Table 7-5], With Bay-Delta Plan Amendment. This table assumes Bay Delta Plan comes into effect in 2023.

Year	2021	2022	2023	2024	2025
RWS Supply (mgd)	198.6	198.6	119.2	119.2	119.2
Wholesale Supply (mgd)	132.1	132.1	74.5	74.5	74.5

Table 8: Projected Regional Water System Supply for 5-Year Drought Risk Assessment [For Table 7-5], Without Bay Delta Plan

Year	2021	2022	2023	2024	2025
RWS Supply (mgd)	198.6	198.6	198.6	198.6	198.6
Wholesale Supply (mgd)	132.1	132.1	132.1	132.1	132.1

Section 1: Basis for Calculations. Projected Wholesale RWS Purchases Through 2045

Table A: Wholesale RWS Actual Purchases in 2020 and Projected Purchases for 2025, 2030, 2035, 2040, and 2045 (mgd)[a]

Agency	2020 Actual	Projected Wholesale RWS Purchases 2025	2030	2035	2040	2045
ACWD	7.87	7.68	7.68	7.68	7.68	9.11
Brisbane/GVMID	0.64	0.89	0.89	0.88	0.89	0.89
Burlingame	3.48	4.33	4.40	4.47	4.58	4.69
Coastside	1.02	1.40	1.38	1.36	1.33	1.33
CalWater Total	29.00	29.99	29.74	29.81	30.27	30.70
Daly City	3.97	3.57	3.52	3.49	3.46	3.43
East Palo Alto	1.57	1.88	1.95	2.10	2.49	2.89
Estero	4.34	4.07	4.11	4.18	4.23	4.38
Hayward	13.92	17.86	18.68	19.75	20.82	22.14
Hillsborough	2.62	3.26	3.25	3.26	3.26	3.26
Menlo Park	2.96	3.55	3.68	3.87	4.06	4.29
Mid-Peninsula	2.66	2.86	2.84	2.88	2.89	2.93
Millbrae	1.90	2.29	2.50	2.45	2.82	3.20
Milpitas	5.92	6.59	6.75	7.03	7.27	7.53
Mountain View	7.67	8.60	8.90	9.20	9.51	9.93
North Coast	2.37	2.34	2.33	2.34	2.34	2.34
Palo Alto	9.75	10.06	10.15	10.28	10.51	10.79
Purissima Hills	1.75	2.09	2.09	2.12	2.13	2.15
Redwood City	8.76	8.46	8.49	8.64	8.74	8.90
San Bruno	0.95	3.24	3.22	3.20	3.20	3.21
San Jose	4.26	4.50	4.50	4.50	4.50	4.50
Santa Clara	3.27	4.50	4.50	4.50	4.50	4.50
Stanford	1.43	2.01	2.18	2.35	2.53	2.70
Sunnyvale	9.33	9.16	9.30	10.70	11.44	12.10
Westborough	0.82	0.86	0.85	0.85	0.84	0.84
Total	**132.22**	**146.01**	**147.87**	**151.90**	**156.31**	**162.76**

[a] Wholesale RWS purchase projections for 2025, 2030, 2035, 2040, and 2045 were provided to BAWSCA between July 2020 and January 2021 by the Member Agencies following the completion of the June 2020 Demand Study.

Table B: Basis for the 5-Year Drought Risk Assessment Wholesale RWS Actual Purchases in 2020 and 2021-2025 Projected Purchases (mgd)

Agency	2020 Actual	Projected and Estimated Wholesale RWS Purchases 2021[b]	2022[b]	2023[c]	2024[c]	2025[c]
ACWD	7.87	9.44	9.46	9.46	9.46	9.46
Brisbane/GVMID	0.64	0.62	0.65	0.65	0.65	0.65
Burlingame	3.48	3.34	3.35	3.35	3.35	3.35
Coastside	1.02	1.54	1.23	1.23	1.23	1.23
CalWater Total	29.00	29.66	29.81	29.81	29.81	29.81
Daly City	3.97	4.00	4.01	4.01	4.01	4.01
East Palo Alto	1.57	1.63	1.69	1.69	1.69	1.69
Estero	4.34	4.48	4.51	4.51	4.51	4.51
Hayward	13.92	14.47	15.12	15.12	15.12	15.12
Hillsborough	2.62	2.95	3.05	3.05	3.05	3.05
Menlo Park	2.96	2.92	2.93	2.93	2.93	2.93
Mid-Peninsula	2.66	2.65	2.80	2.80	2.80	2.80
Millbrae	1.90	1.95	2.15	2.15	2.15	2.15
Milpitas	5.92	5.88	5.34	5.34	5.34	5.34
Mountain View	7.67	7.80	8.05	8.05	8.05	8.05
North Coast	2.37	2.58	2.66	2.66	2.66	2.66
Palo Alto	9.75	9.44	9.66	9.66	9.66	9.66
Purissima Hills	1.75	1.97	2.02	2.02	2.02	2.02
Redwood City	8.76	8.72	9.07	9.07	9.07	9.07
San Bruno	0.95	3.39	3.40	3.40	3.40	3.40
San Jose	4.26	4.31	4.51	4.51	4.51	4.51
Santa Clara	3.27	3.29	3.50	3.50	3.50	3.50
Stanford	1.43	1.40	1.54	1.54	1.54	1.54
Sunnyvale	9.33	9.35	9.45	9.45	9.45	9.45
Westborough	0.82	0.84	0.81	0.81	0.81	0.81
Total	**132.22**	**138.61**	**140.77**	**140.77**	**140.77**	**140.77**

[b] Wholesale RWS purchase projections for 2021 and 2022 were provided to Christina Tang, BAWSCA's Finance Manager, by the Member Agencies in January 2021.

[c] The SFPUC's supply reliability tables assume the Bay-Delta Plan takes effect in 2023. In the event of a shortage, the Tier 2 Plan specifies that each agencies' Allocation Factor would be calculated once at the onset of a shortage based on the previous year's use and remains the same until the shortage condition is over. Therefore, for the purpose of drought allocations for the 5-year Drought Risk Assessment, wholesale RWS demand is assumed to remain static from 2022 through the drought sequence.

Section 2: Drought Allocations ***With*** Bay-Delta Plan

Table C: RWS Supply Available to the Wholesale Customers (Combined Tables 3a-3f from the SFPUC's March 30th letter) *With* Bay-Delta Plan (mgd)

	2020[e]	2025	2030	2035	2040	2045
Projected Purchases[d]	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 1st Dry Year	138.6	93.3	94.2	96.5	99.2	88.7
Consecutive 2nd Dry Year	140.8	80.0	80.8	82.7	85.1	88.7
Consecutive 3rd Dry Year	74.5	80.0	80.8	82.7	85.1	88.7
Consecutive 4th Dry Year	74.5	80.0	80.8	82.7	75.1	75.4
Consecutive 5th Dry Year	74.5	80.0	80.8	75.8	75.1	75.4

[d] Values for 2020 are actual purchases. This row aligns with what is labeled as an "Average Year" in Tables 3a-3f in the SFPUC's March 30th letter. However, these values do not represent an average year and instead are actual purchases for 2020 or projected purchases for 2025 through 2045.

[e] In years when the Bay-Delta Plan is not in effect, sufficient RWS supplies will be available to meet the Wholesale Customers' purchase requests assuming that they are between the 2020 and 2025 projected levels. As such, RWS supply available to the Wholesale Customers in the 1st and 2nd consecutive dry years under base year 2020 is equal to the cumulative projected wholesale RWS purchases for 2021 and 2022, respectively.

Table D: Wholesale RWS Demand (Combined Totals from Tables A and B) (mgd)[f]

	2020	2025	2030	2035	2040	2045
Projected Purchases[d]	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 1st Dry Year	138.6	146.0	147.9	151.9	156.3	162.8
Consecutive 2nd Dry Year	140.8	146.0	147.9	151.9	156.3	162.8
Consecutive 3rd Dry Year	140.8	146.0	147.9	151.9	156.3	162.8
Consecutive 4th Dry Year	140.8	146.0	147.9	151.9	156.3	162.8
Consecutive 5th Dry Year	140.8	146.0	147.9	151.9	156.3	162.8

[f] The SFPUC's modeling approach does not allow for varying demands over the course of a dry year sequence. Additionally, the Tier 2 Plan calculates each agencies' Allocation Factor once at the onset of a drought and it remains the same until the shortage condition is over. When system-wide shortages are projected, wholesale RWS demand is assumed to be static for the remainder of the drought sequence.

Table E: Percent Cutback to the Wholesale Customers *With* Bay-Delta Plan[g]

	2020	2025	2030	2035	2040	2045
Projected Purchases[d]	0%	0%	0%	0%	0%	0%
Consecutive 1st Dry Year	0%	36%	36%	36%	37%	46%
Consecutive 2nd Dry Year	0%	45%	45%	46%	46%	46%
Consecutive 3rd Dry Year	47%	45%	45%	46%	46%	46%
Consecutive 4th Dry Year	47%	45%	45%	46%	52%	54%
Consecutive 5th Dry Year	47%	45%	45%	50%	52%	54%

[g] Agencies that wish to use new or different projected RWS purchases may use the percent cutbacks listed in this table to determine their drought allocation.

Table F1: Basis of Water Supply Data [For Tables 7-1 and 7-5], Base Year 2020, *With* Bay-Delta Plan (mgd)

Year Consecutive Dry Year	2020 Actual	2021 1st	2022 2nd	2023 3rd	2024 4th	2025 5th
Wholesale RWS Demand	132.2	138.6	140.8	140.8	140.8	140.8
Wholesale RWS Supply Available	132.2	138.6	140.8	74.5	74.5	74.5
Percent Cutback	0%	0%	0%	47%	47%	47%

Table F2: Individual Agency Drought Allocations [For Tables 7-1 and 7-5], Base Year 2020, *With* Bay-Delta Plan (mgd)

	2020	Wholesale RWS Drought Allocations				
Agency	**Actual**	**2021**	**2022**	**2023**	**2024**	**2025**
ACWD	7.87	9.44	9.46	5.01	5.01	5.01
Brisbane/GVMID	0.64	0.62	0.65	0.34	0.34	0.34
Burlingame	3.48	3.34	3.35	1.77	1.77	1.77
Coastside	1.02	1.54	1.23	0.65	0.65	0.65
CalWater Total	29.00	29.66	29.81	15.78	15.78	15.78
Daly City	3.97	4.00	4.01	2.12	2.12	2.12
East Palo Alto	1.57	1.63	1.69	0.89	0.89	0.89
Estero	4.34	4.48	4.51	2.39	2.39	2.39
Hayward	13.92	14.47	15.12	8.00	8.00	8.00
Hillsborough	2.62	2.95	3.05	1.61	1.61	1.61
Menlo Park	2.96	2.92	2.93	1.55	1.55	1.55
Mid-Peninsula	2.66	2.65	2.80	1.48	1.48	1.48
Millbrae	1.90	1.95	2.15	1.14	1.14	1.14
Milpitas	5.92	5.88	5.34	2.83	2.83	2.83
Mountain View	7.67	7.80	8.05	4.26	4.26	4.26
North Coast	2.37	2.58	2.66	1.41	1.41	1.41
Palo Alto	9.75	9.44	9.66	5.11	5.11	5.11
Purissima Hills	1.75	1.97	2.02	1.07	1.07	1.07
Redwood City	8.76	8.72	9.07	4.80	4.80	4.80
San Bruno	0.95	3.39	3.40	1.80	1.80	1.80
San Jose	4.26	4.31	4.51	2.39	2.39	2.39
Santa Clara	3.27	3.29	3.50	1.85	1.85	1.85
Stanford	1.43	1.40	1.54	0.82	0.82	0.82
Sunnyvale	9.33	9.35	9.45	5.00	5.00	5.00
Westborough	0.82	0.84	0.81	0.43	0.43	0.43
Total	**132.2**	**138.6**	**140.8**	**74.5**	**74.5**	**74.5**

Table G1: Basis of Water Supply Data [For Tables 7-1 and 7-4], Base Year 2025, *With* Bay-Delta Plan (mgd)

Consecutive Dry Year	1st	2nd	3rd	4th	5th
Wholesale RWS Demand	146.0	146.0	146.0	146.0	146.0
Wholesale RWS Supply Available	93.3	80.0	80.0	80.0	80.0
Percent Cutback	36%	45%	45%	45%	45%

Table G2: Individual Agency Drought Allocations [For Tables 7-1 and 7-4], Base Year 2025, *With* Bay-Delta Plan (mgd)

	Wholesale RWS Drought Allocations				
Consecutive Dry Year	1st	2nd	3rd	4th	5th
ACWD	4.91	4.21	4.21	4.21	4.21
Brisbane/GVMID	0.57	0.49	0.49	0.49	0.49
Burlingame	2.76	2.37	2.37	2.37	2.37
Coastside	0.89	0.77	0.77	0.77	0.77
CalWater Total	19.16	16.43	16.43	16.43	16.43
Daly City	2.28	1.96	1.96	1.96	1.96
East Palo Alto	1.20	1.03	1.03	1.03	1.03
Estero	2.60	2.23	2.23	2.23	2.23
Hayward	11.41	9.78	9.78	9.78	9.78
Hillsborough	2.08	1.79	1.79	1.79	1.79
Menlo Park	2.27	1.95	1.95	1.95	1.95
Mid-Peninsula	1.83	1.57	1.57	1.57	1.57
Millbrae	1.46	1.25	1.25	1.25	1.25
Milpitas	4.21	3.61	3.61	3.61	3.61
Mountain View	5.49	4.71	4.71	4.71	4.71
North Coast	1.49	1.28	1.28	1.28	1.28
Palo Alto	6.43	5.51	5.51	5.51	5.51
Purissima Hills	1.33	1.14	1.14	1.14	1.14
Redwood City	5.40	4.63	4.63	4.63	4.63
San Bruno	2.07	1.77	1.77	1.77	1.77
San Jose	2.88	2.47	2.47	2.47	2.47
Santa Clara	2.88	2.47	2.47	2.47	2.47
Stanford	1.28	1.10	1.10	1.10	1.10
Sunnyvale	5.85	5.02	5.02	5.02	5.02
Westborough	0.55	0.47	0.47	0.47	0.47
Total	**93.3**	**80.0**	**80.0**	**80.0**	**80.0**

Table H1: Basis of Water Supply Data [For Tables 7-1 and 7-4], Base Year 2030, *With* Bay-Delta Plan (mgd)

Consecutive Dry Year	1st	2nd	3rd	4th	5th
Wholesale RWS Demand	147.9	147.9	147.9	147.9	147.9
Wholesale RWS Supply Available	94.2	80.8	80.8	80.8	80.8
Percent Cutback	36%	45%	45%	45%	45%

Table H2: Individual Agency Drought Allocations [For Tables 7-1 and 7-4], Base Year 2030, *With* Bay-Delta Plan (mgd)

	Wholesale RWS Drought Allocations				
Consecutive Dry Year	1st	2nd	3rd	4th	5th
ACWD	4.89	4.20	4.20	4.20	4.20
Brisbane/GVMID	0.56	0.48	0.48	0.48	0.48
Burlingame	2.80	2.40	2.40	2.40	2.40
Coastside	0.88	0.75	0.75	0.75	0.75
CalWater Total	18.94	16.25	16.25	16.25	16.25
Daly City	2.24	1.92	1.92	1.92	1.92
East Palo Alto	1.24	1.07	1.07	1.07	1.07
Estero	2.62	2.24	2.24	2.24	2.24
Hayward	11.90	10.21	10.21	10.21	10.21
Hillsborough	2.07	1.78	1.78	1.78	1.78
Menlo Park	2.35	2.01	2.01	2.01	2.01
Mid-Peninsula	1.81	1.55	1.55	1.55	1.55
Millbrae	1.59	1.37	1.37	1.37	1.37
Milpitas	4.30	3.69	3.69	3.69	3.69
Mountain View	5.67	4.86	4.86	4.86	4.86
North Coast	1.48	1.27	1.27	1.27	1.27
Palo Alto	6.47	5.55	5.55	5.55	5.55
Purissima Hills	1.33	1.14	1.14	1.14	1.14
Redwood City	5.41	4.64	4.64	4.64	4.64
San Bruno	2.05	1.76	1.76	1.76	1.76
San Jose	2.87	2.46	2.46	2.46	2.46
Santa Clara	2.87	2.46	2.46	2.46	2.46
Stanford	1.39	1.19	1.19	1.19	1.19
Sunnyvale	5.92	5.08	5.08	5.08	5.08
Westborough	0.54	0.47	0.47	0.47	0.47
Total	**94.2**	**80.8**	**80.8**	**80.8**	**80.8**

Table I1: Basis of Water Supply Data [For Tables 7-1 and 7-4], Base Year <u>2035</u>, *<u>With</u>* Bay-Delta Plan (mgd)

Consecutive Dry Year	1st	2nd	3rd	4th	5th
Wholesale RWS Demand	151.9	151.9	151.9	151.9	151.9
Wholesale RWS Supply Available	96.5	82.7	82.7	82.7	75.8
Percent Cutback	36%	46%	46%	46%	50%

Table I2: Individual Agency Drought Allocations [For Tables 7-1 and 7-4], Base Year <u>2035</u>, *<u>With</u>* Bay-Delta Plan (mgd)

	Wholesale RWS Drought Allocations				
Consecutive Dry Year	1st	2nd	3rd	4th	5th
ACWD	4.88	4.18	4.18	4.18	3.83
Brisbane/GVMID	0.56	0.48	0.48	0.48	0.44
Burlingame	2.84	2.44	2.44	2.44	2.23
Coastside	0.86	0.74	0.74	0.74	0.68
CalWater Total	18.94	16.23	16.23	16.23	14.88
Daly City	2.22	1.90	1.90	1.90	1.74
East Palo Alto	1.33	1.14	1.14	1.14	1.05
Estero	2.66	2.28	2.28	2.28	2.09
Hayward	12.55	10.75	10.75	10.75	9.86
Hillsborough	2.07	1.78	1.78	1.78	1.63
Menlo Park	2.46	2.10	2.10	2.10	1.93
Mid-Peninsula	1.83	1.57	1.57	1.57	1.44
Millbrae	1.56	1.34	1.34	1.34	1.22
Milpitas	4.47	3.83	3.83	3.83	3.51
Mountain View	5.84	5.01	5.01	5.01	4.59
North Coast	1.49	1.27	1.27	1.27	1.17
Palo Alto	6.53	5.60	5.60	5.60	5.13
Purissima Hills	1.34	1.15	1.15	1.15	1.06
Redwood City	5.49	4.70	4.70	4.70	4.31
San Bruno	2.03	1.74	1.74	1.74	1.60
San Jose	2.86	2.45	2.45	2.45	2.25
Santa Clara	2.86	2.45	2.45	2.45	2.25
Stanford	1.49	1.28	1.28	1.28	1.17
Sunnyvale	6.80	5.83	5.83	5.83	5.34
Westborough	0.54	0.46	0.46	0.46	0.42
Total	**96.5**	**82.7**	**82.7**	**82.7**	**75.8**

Table J1: Basis of Water Supply Data [For Table 7-1 and 7-4], Base Year 2040, *With* Bay-Delta Plan (mgd)

Consecutive Dry Year	1st	2nd	3rd	4th	5th
Wholesale RWS Demand	156.3	156.3	156.3	156.3	156.3
Wholesale RWS Supply Available	99.2	85.1	85.1	75.1	75.1
Percent Cutback	37%	46%	46%	52%	52%

Table J2: Individual Agency Drought Allocations [For Tables 7-1 and 7-4], Base Year 2040, *With* Bay-Delta Plan (mgd)

	Wholesale RWS Drought Allocations				
Consecutive Dry Year	**1st**	**2nd**	**3rd**	**4th**	**5th**
ACWD	4.87	4.18	4.18	3.69	3.69
Brisbane/GVMID	0.56	0.48	0.48	0.43	0.43
Burlingame	2.91	2.49	2.49	2.20	2.20
Coastside	0.85	0.73	0.73	0.64	0.64
CalWater Total	19.21	16.48	16.48	14.54	14.54
Daly City	2.20	1.88	1.88	1.66	1.66
East Palo Alto	1.58	1.36	1.36	1.20	1.20
Estero	2.69	2.30	2.30	2.03	2.03
Hayward	13.21	11.34	11.34	10.00	10.00
Hillsborough	2.07	1.78	1.78	1.57	1.57
Menlo Park	2.58	2.21	2.21	1.95	1.95
Mid-Peninsula	1.84	1.58	1.58	1.39	1.39
Millbrae	1.79	1.53	1.53	1.35	1.35
Milpitas	4.62	3.96	3.96	3.49	3.49
Mountain View	6.03	5.18	5.18	4.57	4.57
North Coast	1.49	1.27	1.27	1.12	1.12
Palo Alto	6.67	5.72	5.72	5.05	5.05
Purissima Hills	1.35	1.16	1.16	1.03	1.03
Redwood City	5.55	4.76	4.76	4.20	4.20
San Bruno	2.03	1.74	1.74	1.54	1.54
San Jose	2.86	2.45	2.45	2.16	2.16
Santa Clara	2.86	2.45	2.45	2.16	2.16
Stanford	1.61	1.38	1.38	1.22	1.22
Sunnyvale	7.26	6.23	6.23	5.49	5.49
Westborough	0.54	0.46	0.46	0.41	0.41
Total	**99.2**	**85.1**	**85.1**	**75.1**	**75.1**

Table K1: Basis of Water Supply Data [For Tables 7-1 and 7-4], Base Year 2045, *With* Bay-Delta Plan (mgd)

Consecutive Dry Year	1st	2nd	3rd	4th	5th
Wholesale RWS Demand	162.8	162.8	162.8	162.8	162.8
Wholesale RWS Supply Available	88.7	88.7	88.7	75.4	75.4
Percent Cutback	46%	46%	46%	54%	54%

Table K2: Individual Agency Drought Allocations [For Tables 7-1 and 7-4], Base Year 2045, *With* Bay-Delta Plan (mgd)

	Wholesale RWS Drought Allocations				
Consecutive Dry Year	1st	2nd	3rd	4th	5th
ACWD	4.97	4.97	4.97	4.22	4.22
Brisbane/GVMID	0.49	0.49	0.49	0.41	0.41
Burlingame	2.56	2.56	2.56	2.17	2.17
Coastside	0.72	0.72	0.72	0.61	0.61
CalWater Total	16.73	16.73	16.73	14.22	14.22
Daly City	1.87	1.87	1.87	1.59	1.59
East Palo Alto	1.58	1.58	1.58	1.34	1.34
Estero	2.39	2.39	2.39	2.03	2.03
Hayward	12.07	12.07	12.07	10.26	10.26
Hillsborough	1.78	1.78	1.78	1.51	1.51
Menlo Park	2.34	2.34	2.34	1.99	1.99
Mid-Peninsula	1.59	1.59	1.59	1.36	1.36
Millbrae	1.74	1.74	1.74	1.48	1.48
Milpitas	4.11	4.11	4.11	3.49	3.49
Mountain View	5.41	5.41	5.41	4.60	4.60
North Coast	1.28	1.28	1.28	1.09	1.09
Palo Alto	5.88	5.88	5.88	5.00	5.00
Purissima Hills	1.17	1.17	1.17	1.00	1.00
Redwood City	4.85	4.85	4.85	4.12	4.12
San Bruno	1.75	1.75	1.75	1.49	1.49
San Jose	2.45	2.45	2.45	2.08	2.08
Santa Clara	2.45	2.45	2.45	2.08	2.08
Stanford	1.47	1.47	1.47	1.25	1.25
Sunnyvale	6.59	6.59	6.59	5.61	5.61
Westborough	0.46	0.46	0.46	0.39	0.39
Total	**88.7**	**88.7**	**88.7**	**75.4**	**75.4**

Section 3: Drought Allocations *Without* Bay-Delta Plan

Table L: RWS Supply Available to the Wholesale Customers (Combined Tables 4a-4f from the SFPUC's March 30th letter) *Without* Bay-Delta Plan (mgd)[h]

	2020	2025	2030	2035	2040	2045
Projected Purchases[i]	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 1st Dry Year	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 2nd Dry Year	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 3rd Dry Year	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 4th Dry Year	132.2	146.0	147.9	151.9	156.3	139.1
Consecutive 5th Dry Year	132.2	146.0	147.9	151.9	156.3	139.1

[h] The SFPUC's modeling approach does not allow for varying demands over the course of a dry year sequence. However, the SFPUC has indicated that sufficient supplies are available to meet wholesale RWS demand so long as they reasonably stay within 2020 and 2040 levels. The SFPUC's modeling does not indicate cutbacks will be required till the 4th and 5th consecutive dry year at 2045 levels.

[i] Values for 2020 are actual purchases. This row aligns with what is labeled as an "Average Year" in Tables 4a-4f in the SFPUC's March 30th letter. However, these values do not represent an average year and instead are actual purchases for 2020 or projected purchases for 2025 through 2045.

Table M: Wholesale RWS Demand (Combined Totals from Tables A and B) (mgd)

	2020	2025	2030	2035	2040	2045
Projected Purchases[i]	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 1st Dry Year	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 2nd Dry Year	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 3rd Dry Year	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 4th Dry Year	132.2	146.0	147.9	151.9	156.3	162.8
Consecutive 5th Dry Year	132.2	146.0	147.9	151.9	156.3	162.8

Table N: Percent Cutback to the Wholesale Customers *Without* Bay-Delta Plan

	2020	2025	2030	2035	2040	2045
Projected Purchases[i]	0%	0%	0%	0%	0%	0%
Consecutive 1st Dry Year	0%	0%	0%	0%	0%	0%
Consecutive 2nd Dry Year	0%	0%	0%	0%	0%	0%
Consecutive 3rd Dry Year	0%	0%	0%	0%	0%	0%
Consecutive 4th Dry Year	0%	0%	0%	0%	0%	15%
Consecutive 5th Dry Year	0%	0%	0%	0%	0%	15%

Table O1: Basis of Water Supply Data [For Tables 7-1 and 7-4], Base Year 2045, *Without* Bay-Delta Plan (mgd)

Consecutive Dry Year	1st	2nd	3rd	4th	5th
Wholesale RWS Demand	162.8	162.8	162.8	162.8	162.8
Wholesale RWS Supply Available	162.8	162.8	162.8	139.1	139.1
Percent Cutback	0%	0%	0%	Tier 2 Plan	Tier 2 Plan

Table O2: Individual Agency Drought Allocations [For Tables 7-1 and 7-4], Base Year 2045, *Without* Bay-Delta Plan (mgd)

	Wholesale RWS Drought Allocations					Tier 2 Drought Cutback
Consecutive Dry Year	1st	2nd	3rd	4th	5th	
ACWD	9.11	9.11	9.11	8.20	8.20	10.0%
Brisbane/GVMID	0.89	0.89	0.89	0.74	0.74	16.8%
Burlingame	4.69	4.69	4.69	4.02	4.02	14.3%
Coastside	1.33	1.33	1.33	1.19	1.19	10.0%
CalWater Total	30.70	30.70	30.70	26.73	26.73	12.9%
Daly City	3.43	3.43	3.43	3.01	3.01	12.4%
East Palo Alto	2.89	2.89	2.89	2.68	2.68	7.3%
Estero	4.38	4.38	4.38	3.94	3.94	10.0%
Hayward	22.14	22.14	22.14	18.67	18.67	15.7%
Hillsborough	3.26	3.26	3.26	2.93	2.93	10.2%
Menlo Park	4.29	4.29	4.29	3.58	3.58	16.5%
Mid-Peninsula	2.93	2.93	2.93	2.63	2.63	10.0%
Millbrae	3.20	3.20	3.20	2.54	2.54	20.7%
Milpitas	7.53	7.53	7.53	6.55	6.55	13.1%
Mountain View	9.93	9.93	9.93	8.91	8.91	10.3%
North Coast	2.34	2.34	2.34	2.11	2.11	10.0%
Palo Alto	10.79	10.79	10.79	9.71	9.71	10.0%
Purissima Hills	2.15	2.15	2.15	1.41	1.41	34.5%
Redwood City	8.90	8.90	8.90	7.92	7.92	11.1%
San Bruno	3.21	3.21	3.21	2.60	2.60	19.1%
San Jose	4.50	4.50	4.50	2.95	2.95	34.5%
Santa Clara	4.50	4.50	4.50	2.95	2.95	34.5%
Stanford	2.70	2.70	2.70	2.27	2.27	16.0%
Sunnyvale	12.10	12.10	12.10	10.11	10.11	16.5%
Westborough	0.84	0.84	0.84	0.76	0.76	10.0%
Total	**162.8**	**162.8**	**162.8**	**139.1**	**139.1**	

Attachment B: Updated 2020 UWMP Drought Cutbacks

The January 22, 2021, SFPUC Regional Water System (RWS) Supply Reliability Letter (Supply Reliability Letter) provides RWS supplies available to the Wholesale Customers under two scenarios: (1) With Bay-Delta Plan, and (2) Without Bay-Delta Plan. Your agency must choose which scenario to use for your agency's 2020 UWMP submittal tables. However, you may discuss both scenarios in the body of your agency's UWMP. The purpose of this attachment is to provide further detail about your agency's allocation of total RWS supplies available to the Wholesale Customers under both scenarios.

Data Sources for Projected RWS Purchases

Supply allocations are based on projected RWS purchases provided to BAWSCA by the Member Agencies. Following the completion of the Demand Study in June 2020, BAWSCA used the results to develop a table for each Member Agency listing possible supplies and total demand for 2025, 2030, 2035, 2040, and 2045. BAWSCA populated the tables with total demand after passive conservation and entered active conservation, as calculated in the agencies' DSS Model, as a source of supply. Multi-source agencies were asked to complete the table with supply projections, including from the RWS, to meet total demand. Single-source agencies were offered the opportunity to review the tables upon request. Because active conservation was treated as a source of supply, projected RWS purchases are after passive and active conservation.

Water Management Representatives (WMRs) received a draft copy of all projected wholesale RWS purchase requests as part of the January 7, 2021 WMR meeting agenda packet and meeting slides. Agencies were asked to notify BAWSCA if changes were necessary regarding their purchase requests prior to BAWSCA sending those purchase requests to the SFPUC. Purchase requests were transmitted to the SFPUC via a letter dated January 15, 2021 for use in their 2020 UWMP efforts.

Note that the projected RWS purchases used by BAWSCA for fiscal years 2020-21 and for 2021-22 were provided to Christina Tang, BAWSCA's Finance Manager, by each Member Agency in January 2021. This annual reporting is part of the SFPUC's wholesale rate setting process. Member Agencies have provided BAWSCA with these projected purchases annually for the past 10 years.

UWMP Tables 7-1 and 7-5

UWMP Table 7-1 requests supply reliability for a normal year, a single dry year, and multiple (five) dry years. Tables 3, 4, 5, and 6 provided in the Supply Reliability Letter will help your agency complete UWMP Table 7-1. The Drought Risk Assessment (DRA) in UWMP Table 7-5 also requests a five-year drought sequence but specifies years 2021 through 2025. Supply Reliability Letter Tables 9 and 10 will help your agency complete UWMP Table 7-5.

The Supply Reliability Letter provides four tables for completing UWMP Table 7-1. The Supply Reliability Letter Tables 3 (with Bay-Delta Plan) and 4 (without Bay-Delta Plan) use 2020 as the base year. Depending on which scenario you choose, these will be the basis for your agency's five-year DRA (UWMP Table 7-5). The Supply Reliability Letter Tables 5 (with Bay-Delta Plan) and 6 (without Bay-Delta Plan) use 2025 as the base year. Depending on which scenario you choose, these will be the basis for UWMP Tables 7-2 through 7-4. Your agency may submit multiple UWMP Tables 7-1 with different base years (see Figure 1 below).

Attachment B: Updated 2020 UWMP Drought Cutbacks

Figure 1: Footnote from Draft UWMP Table 7-1

Supplier may use multiple versions of Table 7-1 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 Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.

Total RWS supplies available to the Wholesale Customers in the first through fifth consecutive dry years in Supply Reliability Letter Table 3 align with those in Table 9 of the same letter. Similarly, Supply Reliability Letter Table 4 aligns with Table 10 of the same letter.

Table A below provides a summary of the Member Agencies' RWS supply drought cutbacks under each of the four supply availability conditions and is intended to help you complete UWMP Tables 7-1and 7-5.

Table A: Wholesale Customer Drought Cutbacks Based on a Single Dry Year and Multiple Dry Years (Base Year 2020)

	(a)	(b)	(c)	(d)	(e)	(f)	(g)
(1)	Projected SF RWS Wholesale Purchases	132.2 MGD	138.6 MGD	140.8 MGD	140.8 MGD	140.8 MGD	140.8 MGD
(2)	Supply Available to the Wholesale Customers	Percent Cutback on Wholesale RWS Purchases					
		2020	**2021**	**2022**	**2023**	**2024**	**2025**
(3)	157.5 MGD	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
(4)	132.5 MGD	0.0%	-4.4%	-5.9%	-5.9%	-5.9%	-5.9%
(5)	82.8 MGD	-37.4%	-40.3%	-41.2%	-41.2%	-41.2%	-41.2%
(6)	74.5 MGD	-43.7%	-46.3%	-47.1%	-47.1%	-47.1%	-47.1%

Table A, column (a), rows 3 through 6 lists total RWS supplies available to the Wholesale Customers as provided in the Supply Reliability Letter tables. Row 1 provides cumulative actual wholesale RWS purchases for 2020. In years when the Bay-Delta Plan is not in effect, sufficient RWS supplies will be available to meet the Wholesale Customers' purchase requests assuming that they are between the 2020 and 2025 projected levels. As such, RWS supply available to the Wholesale Customers in the 2021 and 2022 is equal to the cumulative projected wholesale RWS.. Projected RWS purchases for years 2021 and 2022 were provided to Christina Tang, BAWSCA's Finance Manager, by the Member Agencies in January 2021. The SFPUC's modeling approach does not allow for varying demands over the course of a dry year sequence. Additionally, the Tier 2 Plan calculates each agencies' Allocation Factor once at the onset of a drought and it remains the same until the shortage condition is over. Therefore, wholesale RWS demand in 2023 through 2025 is assumed to be static based on the 2022 projected demand.

Table B below provides a summary of the Member Agencies' RWS supply drought cutbacks under each of the four supply availability conditions and is intended to help you complete UWMP Table 7-1.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table B: Wholesale Customer Drought Cutbacks Based on a Single Dry Year and Multiple Dry Years (Base Year 2025)

	(a)	(b)	(c)	(d)	(e)	(f)
(1)	Projected SF RWS Wholesale Purchases	146.0 MGD	146.0 MGD	146.0 MGD	146.0 MGD	146.0 MGD
(2)	Supply Available to the Wholesale Customers	Percent Cutback on Wholesale RWS Purchases				
		2025	**2026**	**2027**	**2028**	**2029**
(3)	157.5 MGD	0.0%	0.0%	0.0%	0.0%	0.0%
(4)	132.5 MGD	-9.2%	-9.2%	-9.2%	-9.2%	-9.2%
(5)	82.8 MGD	-43.3%	-43.3%	-43.3%	-43.3%	-43.3%
(6)	74.5 MGD	-49.0%	-49.0%	-49.0%	-49.0%	-49.0%

Table B, column (a), rows 3 through 6 lists total RWS supplies available to the Wholesale Customers as provided in the Supply Reliability Letter tables. Row 1 provides cumulative projected wholesale RWS purchases for 2025 through 2029. The SFPUC's modeling approach does not allow for varying demands over the course of a dry year sequence. Additionally, the Tier 2 Plan calculates each agencies' Allocation Factor once at the onset of a drought and it remains the same until the shortage condition is over. Therefore, wholesale RWS demand is assumed to be static between 2025 and 2029 based on the 2025 projected demand.

To complete UWMP Tables 7-1 and 7-5, reference tables in the Supply Reliability Letter to identify total RWS supplies available to the Wholesale Customers and apply the percent cutback in the corresponding year of the drought sequence using Tables A and B. For example, in Supply Reliability Letter Table 3, in the 5th consecutive year of a drought, the volume available to the Wholesale Customers is 74.5 MGD. To calculate RWS supplies available to your agency in 2025 using table A, locate the row with 74.5 MGD on the table – row 6 – and the column for 2025 – column (g). Then apply the percent cutback to your agency's RWS demand in 2025.

A list of purchase projections by agency are provided in Tables C, D, E, and F. The table also indicates the percent cutback that should be applied based on total RWS supplies available to the Wholesale Customers. Tables C and E use Scenario 1: <u>With</u> Bay-Delta Plan. Tables D and F use Scenario 2: <u>Without</u> Bay-Delta Plan. Tables C and D use 2020 as the base year and Tables E and F use 2025 as the base year.

BAWSCA understands that agencies are updating projected demands for their 2020 UWMPs and that projected RWS purchases may change from what was previously provided. Additionally, BAWSCA recognizes that not all Member Agencies will choose the same scenario for their UWMP supply reliability tables. For both reasons, projected RWS purchases in each Member Agency's 2020 UWMP may not add up to total Wholesale demands in the SFPUC's 2020 UWMP. This is consistent with direction given by the Department of Water Resources, which encourages suppliers use the UWMP tables to represent what they believe to be the most likely supply reliability scenario and to characterize the five-consecutive year drought in a manner that is best suited for understanding and managing their water service reliability and individual agency level of risk tolerance.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table C: Scenario 1: With Bay-Delta Plan - Projected Wholesale Customer RWS Demand and Percent Cutback for a Single Dry Year and Multiple Dry Years (Base Year 2020)

	2020 (184 MGD)		**2021** (157.5 MGD)		**2022** (132.5 MGD)		**2023** (74.5 MGD)		**2024** (74.5 MGD)		**2025** (74.5 MGD)	
Agency	Actual Purchases	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback
ACWD	7.87	0.0%	9.44	0.0%	9.46	-5.9%	9.46	-47%	9.46	-47%	9.46	-47%
Brisbane/GVMID	0.64	0.0%	0.62	0.0%	0.65	-5.9%	0.65	-47%	0.65	-47%	0.65	-47%
Burlingame	3.48	0.0%	3.34	0.0%	3.35	-5.9%	3.35	-47%	3.35	-47%	3.35	-47%
Coastside	1.02	0.0%	1.54	0.0%	1.23	-5.9%	1.23	-47%	1.23	-47%	1.23	-47%
CalWater Total	29.00	0.0%	29.66	0.0%	29.81	-5.9%	29.81	-47%	29.81	-47%	29.81	-47%
Daly City	3.97	0.0%	4.00	0.0%	4.01	-5.9%	4.01	-47%	4.01	-47%	4.01	-47%
East Palo Alto	1.57	0.0%	1.63	0.0%	1.69	-5.9%	1.69	-47%	1.69	-47%	1.69	-47%
Estero	4.34	0.0%	4.48	0.0%	4.51	-5.9%	4.51	-47%	4.51	-47%	4.51	-47%
Hayward	13.92	0.0%	14.47	0.0%	15.12	-5.9%	15.12	-47%	15.12	-47%	15.12	-47%
Hillsborough	2.62	0.0%	2.95	0.0%	3.05	-5.9%	3.05	-47%	3.05	-47%	3.05	-47%
Menlo Park	2.96	0.0%	2.92	0.0%	2.93	-5.9%	2.93	-47%	2.93	-47%	2.93	-47%
Mid-Peninsula	2.66	0.0%	2.65	0.0%	2.80	-5.9%	2.80	-47%	2.80	-47%	2.80	-47%
Millbrae	1.90	0.0%	1.95	0.0%	2.15	-5.9%	2.15	-47%	2.15	-47%	2.15	-47%
Milpitas	5.92	0.0%	5.88	0.0%	5.34	-5.9%	5.34	-47%	5.34	-47%	5.34	-47%
Mountain View	7.67	0.0%	7.80	0.0%	8.05	-5.9%	8.05	-47%	8.05	-47%	8.05	-47%
North Coast	2.37	0.0%	2.58	0.0%	2.66	-5.9%	2.66	-47%	2.66	-47%	2.66	-47%
Palo Alto	9.75	0.0%	9.44	0.0%	9.66	-5.9%	9.66	-47%	9.66	-47%	9.66	-47%
Purissima Hills	1.75	0.0%	1.97	0.0%	2.02	-5.9%	2.02	-47%	2.02	-47%	2.02	-47%
Redwood City	8.76	0.0%	8.72	0.0%	9.07	-5.9%	9.07	-47%	9.07	-47%	9.07	-47%
San Bruno	0.95	0.0%	3.39	0.0%	3.40	-5.9%	3.40	-47%	3.40	-47%	3.40	-47%
San José	4.26	0.0%	4.31	0.0%	4.51	-5.9%	4.51	-47%	4.51	-47%	4.51	-47%
Santa Clara	3.27	0.0%	3.29	0.0%	3.50	-5.9%	3.50	-47%	3.50	-47%	3.50	-47%
Stanford	1.43	0.0%	1.40	0.0%	1.54	-5.9%	1.54	-47%	1.54	-47%	1.54	-47%
Sunnyvale	9.33	0.0%	9.35	0.0%	9.45	-5.9%	9.45	-47%	9.45	-47%	9.45	-47%
Westborough	0.82	0.0%	0.84	0.0%	0.81	-5.9%	0.81	-47%	0.81	-47%	0.81	-47%
Wholesale Total	**132.2**	**132.2†**	**138.6**	**138.6†**	**140.8**	**132.5†**	**140.8**	**74.5†**	**140.8**	**74.5†**	**140.8**	**74.5†**

† Total supply available to the Wholesale Customers after drought cutback.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table D: Scenario 2: Without Bay-Delta Plan - Projected Wholesale Customer RWS Demand and Percent Cutback for a Single Dry Year and Multiple Dry Years (Base Year 2020)

	2020 (184 MGD)		**2021** (157.5 MGD)		**2022** (132.5 MGD)		**2023** (132.5 MGD)		**2024** (132.5 MGD)		**2025** (132.5 MGD)	
Agency	Actual Purchases	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback
ACWD	7.87	0.0%	9.44	0.0%	9.46	-5.9%	9.46	-5.9%	9.46	-5.9%	9.46	-5.9%
Brisbane/GVMID	0.64	0.0%	0.62	0.0%	0.65	-5.9%	0.65	-5.9%	0.65	-5.9%	0.65	-5.9%
Burlingame	3.48	0.0%	3.34	0.0%	3.35	-5.9%	3.35	-5.9%	3.35	-5.9%	3.35	-5.9%
Coastside	1.02	0.0%	1.54	0.0%	1.23	-5.9%	1.23	-5.9%	1.23	-5.9%	1.23	-5.9%
CalWater Total	29.00	0.0%	29.66	0.0%	29.81	-5.9%	29.81	-5.9%	29.81	-5.9%	29.81	-5.9%
Daly City	3.97	0.0%	4.00	0.0%	4.01	-5.9%	4.01	-5.9%	4.01	-5.9%	4.01	-5.9%
East Palo Alto	1.57	0.0%	1.63	0.0%	1.69	-5.9%	1.69	-5.9%	1.69	-5.9%	1.69	-5.9%
Estero	4.34	0.0%	4.48	0.0%	4.51	-5.9%	4.51	-5.9%	4.51	-5.9%	4.51	-5.9%
Hayward	13.92	0.0%	14.47	0.0%	15.12	-5.9%	15.12	-5.9%	15.12	-5.9%	15.12	-5.9%
Hillsborough	2.62	0.0%	2.95	0.0%	3.05	-5.9%	3.05	-5.9%	3.05	-5.9%	3.05	-5.9%
Menlo Park	2.96	0.0%	2.92	0.0%	2.93	-5.9%	2.93	-5.9%	2.93	-5.9%	2.93	-5.9%
Mid-Peninsula	2.66	0.0%	2.65	0.0%	2.80	-5.9%	2.80	-5.9%	2.80	-5.9%	2.80	-5.9%
Millbrae	1.90	0.0%	1.95	0.0%	2.15	-5.9%	2.15	-5.9%	2.15	-5.9%	2.15	-5.9%
Milpitas	5.92	0.0%	5.88	0.0%	5.34	-5.9%	5.34	-5.9%	5.34	-5.9%	5.34	-5.9%
Mountain View	7.67	0.0%	7.80	0.0%	8.05	-5.9%	8.05	-5.9%	8.05	-5.9%	8.05	-5.9%
North Coast	2.37	0.0%	2.58	0.0%	2.66	-5.9%	2.66	-5.9%	2.66	-5.9%	2.66	-5.9%
Palo Alto	9.75	0.0%	9.44	0.0%	9.66	-5.9%	9.66	-5.9%	9.66	-5.9%	9.66	-5.9%
Purissima Hills	1.75	0.0%	1.97	0.0%	2.02	-5.9%	2.02	-5.9%	2.02	-5.9%	2.02	-5.9%
Redwood City	8.76	0.0%	8.72	0.0%	9.07	-5.9%	9.07	-5.9%	9.07	-5.9%	9.07	-5.9%
San Bruno	0.95	0.0%	3.39	0.0%	3.40	-5.9%	3.40	-5.9%	3.40	-5.9%	3.40	-5.9%
San José	4.26	0.0%	4.31	0.0%	4.51	-5.9%	4.51	-5.9%	4.51	-5.9%	4.51	-5.9%
Santa Clara	3.27	0.0%	3.29	0.0%	3.50	-5.9%	3.50	-5.9%	3.50	-5.9%	3.50	-5.9%
Stanford	1.43	0.0%	1.40	0.0%	1.54	-5.9%	1.54	-5.9%	1.54	-5.9%	1.54	-5.9%
Sunnyvale	9.33	0.0%	9.35	0.0%	9.45	-5.9%	9.45	-5.9%	9.45	-5.9%	9.45	-5.9%
Westborough	0.82	0.0%	0.84	0.0%	0.81	-5.9%	0.81	-5.9%	0.81	-5.9%	0.81	-5.9%
Wholesale Total	**132.2**	**132.2†**	**138.6**	**138.6†**	**140.8**	**132.5†**	**140.8**	**132.5†**	**140.8**	**132.5†**	**140.8**	**132.5†**

† Total supply available to the Wholesale Customers after drought cutback.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table E: Scenario 1: With Bay-Delta Plan - Projected Wholesale Customer RWS Demand and Percent Cutback for a Single Dry Year and Multiple Dry Years (Base Year 2025)

Agency	**2025** (184 MGD) Projected Demand	**2025** Drought Cutback	**2026** (82.8 MGD) Projected Demand	**2026** Drought Cutback	**2027** (74.5 MGD) Projected Demand	**2027** Drought Cutback	**2028** (74.5 MGD) Projected Demand	**2028** Drought Cutback	**2029** (74.5 MGD) Projected Demand	**2029** Drought Cutback
ACWD	7.68	0%	7.68	-43.3%	7.68	-49%	7.68	-49%	7.68	-49%
Brisbane/GVMID	0.89	0%	0.89	-43.3%	0.89	-49%	0.89	-49%	0.89	-49%
Burlingame	4.33	0%	4.33	-43.3%	4.33	-49%	4.33	-49%	4.33	-49%
Coastside	1.40	0%	1.40	-43.3%	1.40	-49%	1.40	-49%	1.40	-49%
CalWater Total	29.99	0%	29.99	-43.3%	29.99	-49%	29.99	-49%	29.99	-49%
Daly City	3.57	0%	3.57	-43.3%	3.57	-49%	3.57	-49%	3.57	-49%
East Palo Alto	1.88	0%	1.88	-43.3%	1.88	-49%	1.88	-49%	1.88	-49%
Estero	4.07	0%	4.07	-43.3%	4.07	-49%	4.07	-49%	4.07	-49%
Hayward	17.86	0%	17.86	-43.3%	17.86	-49%	17.86	-49%	17.86	-49%
Hillsborough	3.26	0%	3.26	-43.3%	3.26	-49%	3.26	-49%	3.26	-49%
Menlo Park	3.55	0%	3.55	-43.3%	3.55	-49%	3.55	-49%	3.55	-49%
Mid-Peninsula	2.86	0%	2.86	-43.3%	2.86	-49%	2.86	-49%	2.86	-49%
Millbrae	2.29	0%	2.29	-43.3%	2.29	-49%	2.29	-49%	2.29	-49%
Milpitas	6.59	0%	6.59	-43.3%	6.59	-49%	6.59	-49%	6.59	-49%
Mountain View	8.60	0%	8.60	-43.3%	8.60	-49%	8.60	-49%	8.60	-49%
North Coast	2.34	0%	2.34	-43.3%	2.34	-49%	2.34	-49%	2.34	-49%
Palo Alto	10.06	0%	10.06	-43.3%	10.06	-49%	10.06	-49%	10.06	-49%
Purissima Hills	2.09	0%	2.09	-43.3%	2.09	-49%	2.09	-49%	2.09	-49%
Redwood City	8.46	0%	8.46	-43.3%	8.46	-49%	8.46	-49%	8.46	-49%
San Bruno	3.24	0%	3.24	-43.3%	3.24	-49%	3.24	-49%	3.24	-49%
San José	4.50	0%	4.50	-43.3%	4.50	-49%	4.50	-49%	4.50	-49%
Santa Clara	4.50	0%	4.50	-43.3%	4.50	-49%	4.50	-49%	4.50	-49%
Stanford	2.01	0%	2.01	-43.3%	2.01	-49%	2.01	-49%	2.01	-49%
Sunnyvale	9.16	0%	9.16	-43.3%	9.16	-49%	9.16	-49%	9.16	-49%
Westborough	0.86	0%	0.86	-43.3%	0.86	-49%	0.86	-49%	0.86	-49%
Wholesale Total	**146.0**	**146.0†**	**146.0**	**82.8†**	**146.0**	**74.5†**	**146.0**	**74.5†**	**146.0**	**74.5†**

† Total supply available to the Wholesale Customers after drought cutback.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table F: Scenario 2: Without Bay-Delta Plan - Projected Wholesale Customer RWS Demand and Percent Cutback for a Single Dry Year and Multiple Dry Years (Base Year 2025)

	2025 (184 MGD)		**2026** (157.5 MGD)		**2027** (157.5 MGD)		**2028** (157.5 MGD)		**2029** (132.5 MGD)	
Agency	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback	Projected Demand	Drought Cutback
ACWD	7.68	0.0%	7.68	0.0%	7.68	0.0%	7.68	0.0%	7.68	-9.2%
Brisbane/GVMID	0.89	0.0%	0.89	0.0%	0.89	0.0%	0.89	0.0%	0.89	-9.2%
Burlingame	4.33	0.0%	4.33	0.0%	4.33	0.0%	4.33	0.0%	4.33	-9.2%
Coastside	1.40	0.0%	1.40	0.0%	1.40	0.0%	1.40	0.0%	1.40	-9.2%
CalWater Total	29.99	0.0%	29.99	0.0%	29.99	0.0%	29.99	0.0%	29.99	-9.2%
Daly City	3.57	0.0%	3.57	0.0%	3.57	0.0%	3.57	0.0%	3.57	-9.2%
East Palo Alto	1.88	0.0%	1.88	0.0%	1.88	0.0%	1.88	0.0%	1.88	-9.2%
Estero	4.07	0.0%	4.07	0.0%	4.07	0.0%	4.07	0.0%	4.07	-9.2%
Hayward	17.86	0.0%	17.86	0.0%	17.86	0.0%	17.86	0.0%	17.86	-9.2%
Hillsborough	3.26	0.0%	3.26	0.0%	3.26	0.0%	3.26	0.0%	3.26	-9.2%
Menlo Park	3.55	0.0%	3.55	0.0%	3.55	0.0%	3.55	0.0%	3.55	-9.2%
Mid-Peninsula	2.86	0.0%	2.86	0.0%	2.86	0.0%	2.86	0.0%	2.86	-9.2%
Millbrae	2.29	0.0%	2.29	0.0%	2.29	0.0%	2.29	0.0%	2.29	-9.2%
Milpitas	6.59	0.0%	6.59	0.0%	6.59	0.0%	6.59	0.0%	6.59	-9.2%
Mountain View	8.60	0.0%	8.60	0.0%	8.60	0.0%	8.60	0.0%	8.60	-9.2%
North Coast	2.34	0.0%	2.34	0.0%	2.34	0.0%	2.34	0.0%	2.34	-9.2%
Palo Alto	10.06	0.0%	10.06	0.0%	10.06	0.0%	10.06	0.0%	10.06	-9.2%
Purissima Hills	2.09	0.0%	2.09	0.0%	2.09	0.0%	2.09	0.0%	2.09	-9.2%
Redwood City	8.46	0.0%	8.46	0.0%	8.46	0.0%	8.46	0.0%	8.46	-9.2%
San Bruno	3.24	0.0%	3.24	0.0%	3.24	0.0%	3.24	0.0%	3.24	-9.2%
San José	4.50	0.0%	4.50	0.0%	4.50	0.0%	4.50	0.0%	4.50	-9.2%
Santa Clara	4.50	0.0%	4.50	0.0%	4.50	0.0%	4.50	0.0%	4.50	-9.2%
Stanford	2.01	0.0%	2.01	0.0%	2.01	0.0%	2.01	0.0%	2.01	-9.2%
Sunnyvale	9.16	0.0%	9.16	0.0%	9.16	0.0%	9.16	0.0%	9.16	-9.2%
Westborough	0.86	0.0%	0.86	0.0%	0.86	0.0%	0.86	0.0%	0.86	-9.2%
Wholesale Total	**146.0**	**146.0†**	**146.0**	**146.4†**	**146.0**	**146.8†**	**146.0**	**147.1†**	**146.0**	**132.5†**

† Total supply available to the Wholesale Customers after drought cutback.

Attachment B: Updated 2020 UWMP Drought Cutbacks

UWMP Table 7-4

Supply Reliability Letter Tables 7 and 8 will help your agency complete UWMP Table 7-4. Table G below provides a summary of the Member Agencies' RWS supply drought cutbacks under each of the four supply availability conditions and is intended to help you complete UWMP Table 7-4. The table assumes (1) the Tier 2 Plan will be used to allocate supplies available to the Wholesale Customers when average Wholesale Customers' RWS shortages are greater than 10 and up to 20 percent, and (2) an equal percent reduction will be shared across all Wholesale Customers when average Wholesale Customers' RWS shortages are 10 percent or less or greater than 20 percent.

Table G: Drought Cutbacks Based on Projected Demands Under All Water Supply Availability Conditions

	(a)	(b)	(c)	(d)	(e)	(f)
(1)	Projected SF RWS Wholesale Purchases	146.0 MGD	147.9 MGD	151.9 MGD	156.3 MGD	162.8 MGD
(2)	Supply Available to the Wholesale Customers	% Cutback on Wholesale RWS Purchases				
		2025	**2030**	**2035**	**2040**	**2045**
(3)	157.5 MGD	0.0%	0.0%	0.0%	0.0%	-3.2%
(4)	132.5 MGD	-9.3%	-10.4%	Tier 2 Avg. -14%*	Tier 2 Avg. -16%*	Tier 2 Avg. -19%*
(5)	82.8 MGD	-43.3%	-44.0%	-45.5%	-47.0%	-49.1%
(6)	74.5 MGD	-49.0%	-49.6%	-51.0%	-52.3%	-54.2%

* Calculated average. Individual agency cutbacks are calculated in Table H.

Table G, column (a) lists total RWS supplies available to the Wholesale Customers as provided in the Supply Reliability Letter tables. Row 1 provides cumulative projected wholesale RWS purchases for 2025, 2030, 2035, 2040, and 2045.

Tables H, I, J and K provide additional detail by agency for each of the four supply availability conditions listed in Table G. To complete UWMP Table 7-4, reference Table 7 or 8 (depending on which Bay-Delta Plan scenario you choose) in the Supply Reliability Letter to identify total RWS supplies available to the Wholesale Customers and apply the percent cutback in the corresponding year using Table G or input the volumetric drought allocation using Tables H, I, J and K below.

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table H: Drought Allocations when Total Supplies Available to the Wholesale Customers are Equal to 157.5 MGD

Projected SF RWS Wholesale Purchases	146.0 MGD	147.9 MGD	151.9 MGD	156.3 MGD	162.8 MGD
	Drought Allocation (MGD)				
Agency	**2025**	**2030**	**2035**	**2040**	**2045**
ACWD	7.68	7.68	7.68	7.68	8.82
Brisbane/GVMID	0.89	0.89	0.88	0.89	0.87
Burlingame	4.33	4.40	4.47	4.58	4.54
Coastside	1.40	1.38	1.36	1.33	1.28
CalWater Total	29.99	29.74	29.81	30.27	29.71
Daly City	3.57	3.52	3.49	3.46	3.32
East Palo Alto	1.88	1.95	2.10	2.49	2.80
Estero	4.07	4.11	4.18	4.23	4.24
Hayward	17.86	18.68	19.75	20.82	21.43
Hillsborough	3.26	3.25	3.26	3.26	3.15
Menlo Park	3.55	3.68	3.87	4.06	4.15
Mid-Peninsula	2.86	2.84	2.88	2.89	2.83
Millbrae	2.29	2.50	2.45	2.82	3.10
Milpitas	6.59	6.75	7.03	7.27	7.29
Mountain View	8.60	8.90	9.20	9.51	9.61
North Coast	2.34	2.33	2.34	2.34	2.27
Palo Alto	10.06	10.15	10.28	10.51	10.44
Purissima Hills	2.09	2.09	2.12	2.13	2.08
Redwood City	8.46	8.49	8.64	8.74	8.62
San Bruno	3.24	3.22	3.20	3.20	3.11
San José	4.50	4.50	4.50	4.50	4.35
Santa Clara	4.50	4.50	4.50	4.50	4.35
Stanford	2.01	2.18	2.35	2.53	2.61
Sunnyvale	9.16	9.30	10.70	11.44	11.71
Westborough	0.86	0.85	0.85	0.84	0.82
Wholesale Total	**146.0**	**147.9**	**151.9**	**156.3**	**157.5**

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table I: Drought Allocations when Total Supplies Available to the Wholesale Customers are Equal to 132.5 MGD

Projected SF RWS Wholesale Purchases	146.0 MGD	147.9 MGD	151.9 MGD	156.3 MGD	162.8 MGD
	Drought Allocation (MGD)				
Agency	**2025**	**2030**	**2035**	**2040**	**2045**
ACWD	6.97	6.88	6.91	6.91	8.20
Brisbane/GVMID	0.81	0.79	0.73	0.73	0.72
Burlingame	3.93	3.94	3.96	3.89	3.80
Coastside	1.27	1.24	1.22	1.20	1.19
CalWater Total	27.21	26.65	26.46	25.69	24.69
Daly City	3.24	3.15	3.04	3.01	2.98
East Palo Alto	1.70	1.75	1.97	2.30	2.62
Estero	3.69	3.68	3.76	3.87	3.77
Hayward	16.20	16.74	17.32	17.69	18.07
Hillsborough	2.96	2.92	2.90	2.75	2.56
Menlo Park	3.22	3.30	3.37	3.33	3.26
Mid-Peninsula	2.59	2.54	2.59	2.62	2.54
Millbrae	2.07	2.24	2.16	2.32	2.45
Milpitas	5.98	6.05	6.25	6.31	6.35
Mountain View	7.80	7.97	8.28	8.49	8.34
North Coast	2.12	2.09	2.11	2.11	2.11
Palo Alto	9.13	9.09	9.26	9.46	9.71
Purissima Hills	1.89	1.87	1.42	1.38	1.32
Redwood City	7.67	7.61	7.89	7.70	7.49
San Bruno	2.94	2.88	2.56	2.51	2.45
San José	4.08	4.03	3.03	2.91	2.76
Santa Clara	4.08	4.03	3.03	2.91	2.76
Stanford	1.82	1.95	2.06	2.13	2.16
Sunnyvale	8.31	8.33	9.46	9.51	9.43
Westborough	0.78	0.76	0.76	0.76	0.76
Wholesale Total	**132.5**	**132.5**	**132.5**	**132.5**	**132.5**

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table J: Drought Allocations when Total Supplies Available to the Wholesale Customers are Equal to 82.8 MGD

Projected SF RWS Wholesale Purchases	146.0 MGD	147.9 MGD	151.9 MGD	156.3 MGD	162.8 MGD
	Drought Allocation (MGD)				
Agency	**2025**	**2030**	**2035**	**2040**	**2045**
ACWD	4.36	4.30	4.19	4.07	4.64
Brisbane/GVMID	0.51	0.50	0.48	0.47	0.45
Burlingame	2.45	2.46	2.44	2.43	2.39
Coastside	0.79	0.77	0.74	0.71	0.68
CalWater Total	17.00	16.65	16.25	16.03	15.62
Daly City	2.02	1.97	1.90	1.83	1.75
East Palo Alto	1.06	1.09	1.14	1.32	1.47
Estero	2.31	2.30	2.28	2.24	2.23
Hayward	10.13	10.46	10.77	11.03	11.26
Hillsborough	1.85	1.82	1.78	1.73	1.66
Menlo Park	2.01	2.06	2.11	2.15	2.18
Mid-Peninsula	1.62	1.59	1.57	1.53	1.49
Millbrae	1.30	1.40	1.34	1.49	1.63
Milpitas	3.74	3.78	3.83	3.85	3.83
Mountain View	4.88	4.98	5.01	5.04	5.05
North Coast	1.33	1.30	1.28	1.24	1.19
Palo Alto	5.71	5.68	5.61	5.57	5.49
Purissima Hills	1.18	1.17	1.15	1.13	1.10
Redwood City	4.80	4.76	4.71	4.63	4.53
San Bruno	1.83	1.80	1.75	1.70	1.63
San José	2.55	2.52	2.45	2.38	2.29
Santa Clara	2.55	2.52	2.45	2.38	2.29
Stanford	1.14	1.22	1.28	1.34	1.37
Sunnyvale	5.19	5.21	5.83	6.06	6.16
Westborough	0.49	0.48	0.46	0.45	0.43
Wholesale Total	**82.8**	**82.8**	**82.8**	**82.8**	**82.8**

Attachment B: Updated 2020 UWMP Drought Cutbacks

Table K: Drought Allocations when Total Supplies Available to the Wholesale Customers are Equal to 74.5 MGD

Projected SF RWS Wholesale Purchases	146.0 MGD	147.9 MGD	151.9 MGD	156.3 MGD	162.8 MGD
	Drought Allocation (MGD)				
Agency	**2025**	**2030**	**2035**	**2040**	**2045**
ACWD	3.92	3.87	3.77	3.66	4.17
Brisbane/GVMID	0.46	0.45	0.43	0.42	0.41
Burlingame	2.21	2.21	2.19	2.18	2.15
Coastside	0.71	0.70	0.67	0.64	0.61
CalWater Total	15.30	14.98	14.62	14.43	14.05
Daly City	1.82	1.77	1.71	1.65	1.57
East Palo Alto	0.96	0.98	1.03	1.19	1.32
Estero	2.08	2.07	2.05	2.02	2.00
Hayward	9.11	9.41	9.69	9.92	10.14
Hillsborough	1.66	1.64	1.60	1.55	1.49
Menlo Park	1.81	1.86	1.90	1.94	1.96
Mid-Peninsula	1.46	1.43	1.41	1.38	1.34
Millbrae	1.17	1.26	1.20	1.34	1.47
Milpitas	3.36	3.40	3.45	3.47	3.45
Mountain View	4.39	4.48	4.51	4.53	4.54
North Coast	1.19	1.17	1.15	1.12	1.07
Palo Alto	5.14	5.11	5.04	5.01	4.94
Purissima Hills	1.06	1.05	1.04	1.02	0.99
Redwood City	4.31	4.28	4.24	4.17	4.08
San Bruno	1.65	1.62	1.57	1.53	1.47
San José	2.30	2.27	2.21	2.14	2.06
Santa Clara	2.30	2.27	2.21	2.14	2.06
Stanford	1.03	1.10	1.15	1.21	1.24
Sunnyvale	4.67	4.69	5.25	5.45	5.54
Westborough	0.44	0.43	0.41	0.40	0.39
Wholesale Total	**74.5**	**74.5**	**74.5**	**74.5**	**74.5**

APPENDIX J
26 MARCH 2021 SFPUC COMMISSION SPECIAL MEETING – WATER WORKSHOP NUMBER 3 WATER SUPPLY PLANNING SCENARIOS SFPUC STAFF PRESENTATION MATERIALS

Hetch Hetchy Regional Water System

Operated by the San Francisco Public Utilities Commission

Water Workshop Number 3
Water Supply Planning Scenarios

March 26, 2021

Introduction

- Ten water supply planning scenarios were run using our HHLSM system modeling tool and the Regional Water System Supply and Demand Worksheet.
- For each scenario the ultimate result is either a surplus or deficit of supply, and each scenario produces different results, demonstrating the effect of the choices that are made.
- The assumptions and results for each scenario will be displayed in this presentation.
- The presentation concludes with a summary table of the bottom-line results for all the scenarios.

The Ten Scenarios

I. Previous Demand Estimates
II. Current Conditions
III. Tuolumne River Voluntary Agreement
IV. Bay-Delta Plan
V. Bay-Delta Plan with Alternative Water Supply Projects
VI. Bay-Delta Plan with Alternative Water Supply Projects and Modified Rationing Policy
VII. Bay-Delta Plan with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought
VIII. Water Quality Certification (401) with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought
IX. NGO scenario 1: Current system, 198 mgd constant demand, Bay-Delta Plan flows
X. NGO Scenario 2: Current system, 223 mgd constant demand, 7 ½ year design drought, Bay-Delta Plan flows

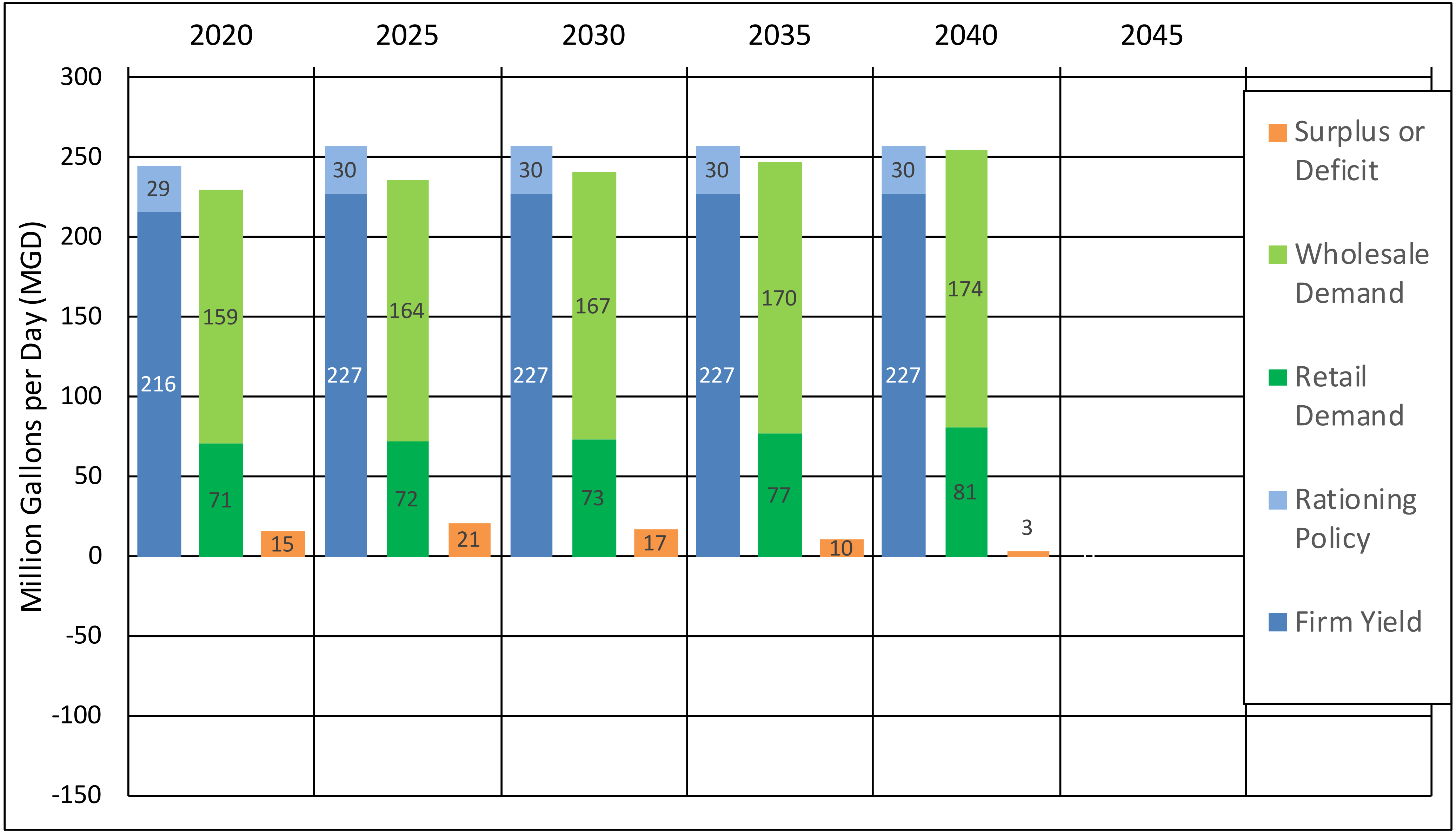
I. Prior Demand Estimates

- Includes retail demand projections from the 2015 Urban Water Management Plan
- Includes 2015 purchase projections from wholesale customers
- Includes current side agreement on flows in the lower Tuolumne River
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	2020	2025	2030	2035	2040	2045
Total Yield:	245	257	257	257	257	NA
RWS Demand:	230	236	241	247	255	NA
Lower Tuolumne Contribution:	NA	NA	NA	NA	NA	NA
Surplus or Deficit:	15	21	17	10	3	NA

I. Prior Demand Estimates



II. Current Conditions

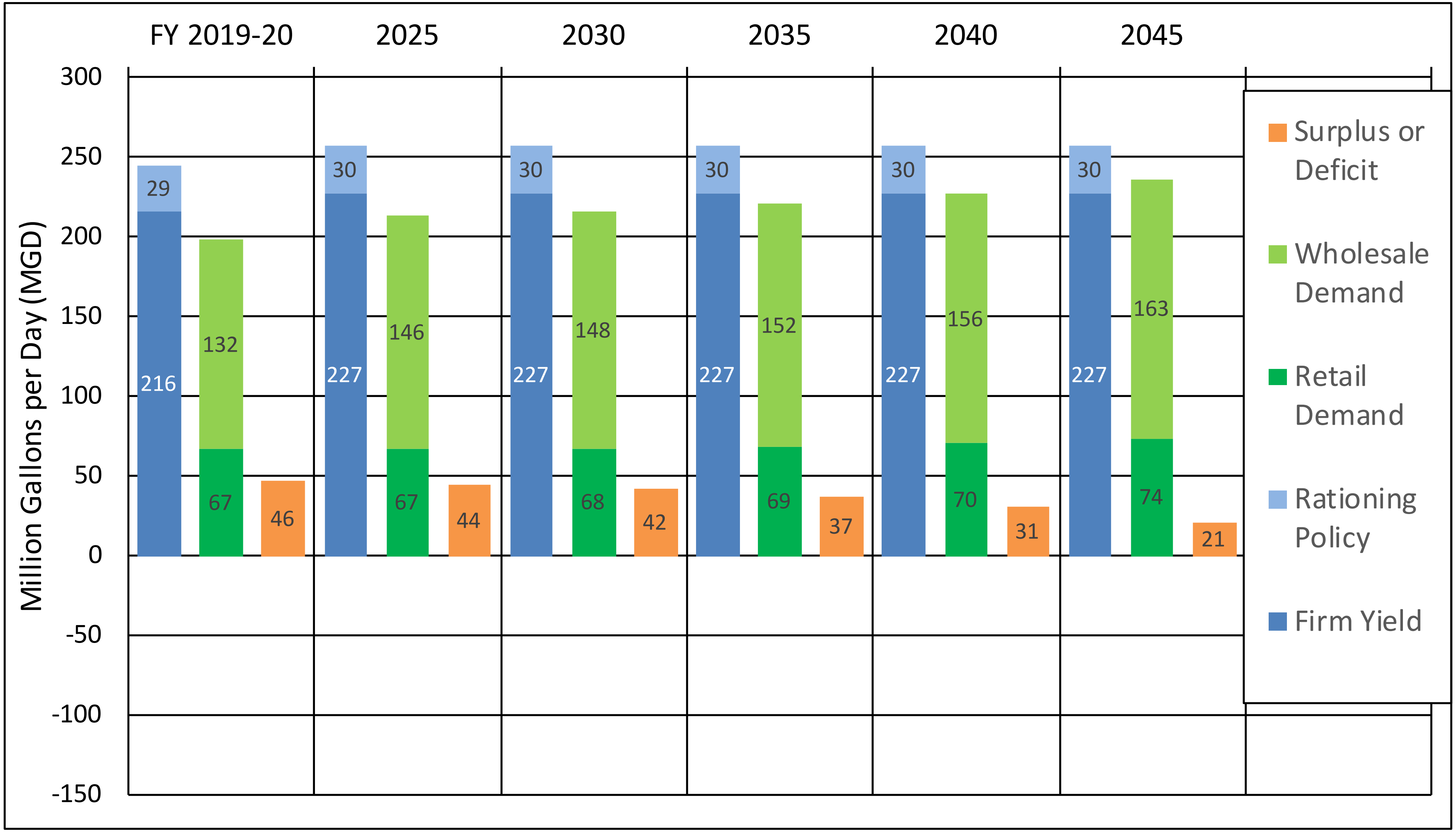
- Includes updated demand projections for anticipated development in retail service area*
- Includes most recent purchase projections from wholesale customers*
- Includes a total of 9 MGD for San Jose and Santa Clara*
- Includes the 1995 side agreement on flows in the lower Tuolumne River
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	245	257	257	257	257	257
RWS Demand:	198	213	215	220	227	236
Lower Tuolumne Contribution:	NA	NA	NA	NA	NA	NA
Surplus or Deficit:	46	44	42	37	31	21

* Base Conditions in later slides

II. Current Conditions



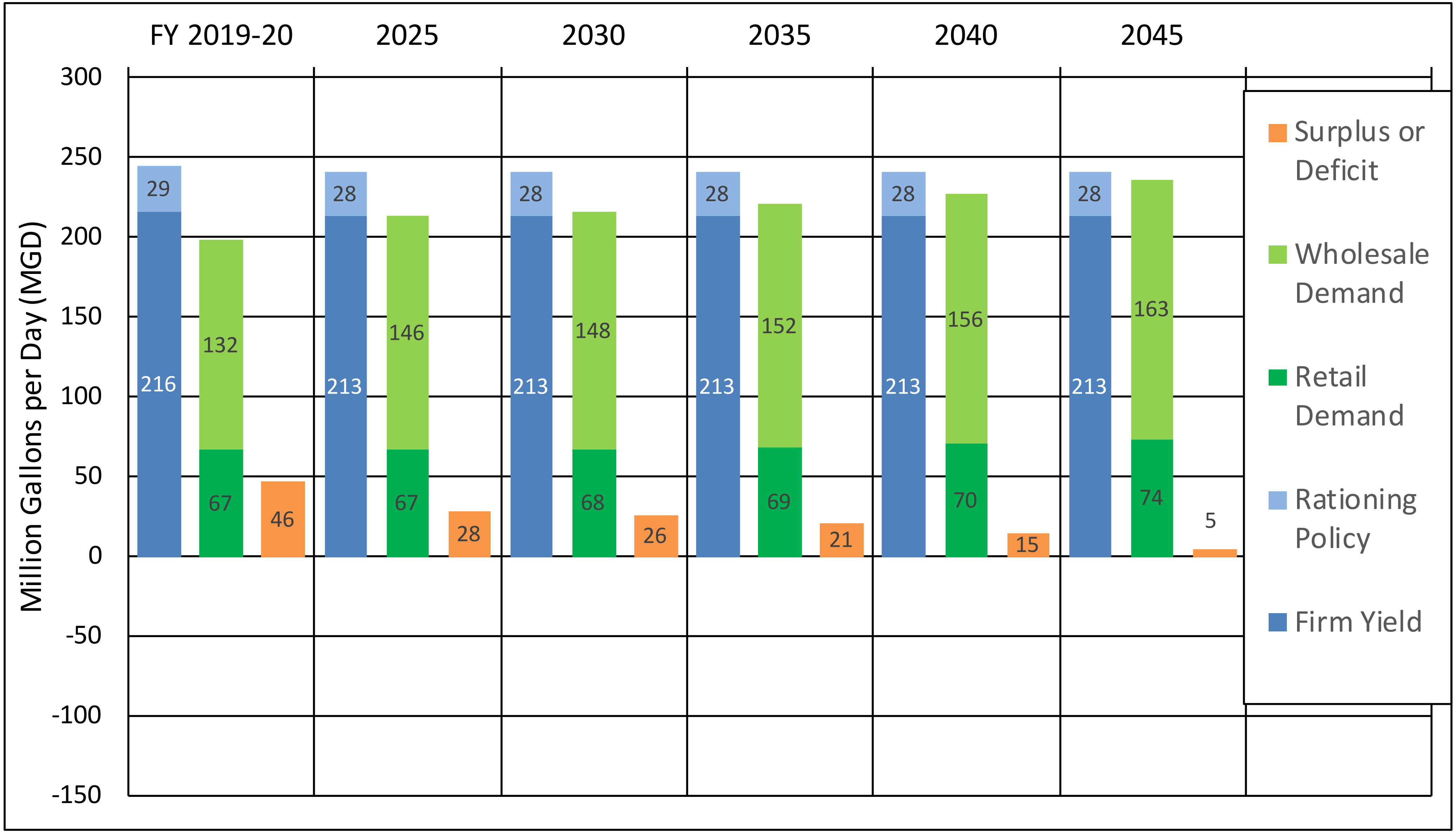
III. Tuolumne River Voluntary Agreement

- Base Conditions
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy
- Includes SFPUC contribution to the TRVA, displayed in the graph as a reduction in Firm Yield
- SFPUC contributions are calculated according to the 4th Agreement and assumes continuation of the 1995 side agreement.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	245	241	241	241	241	241
RWS Demand:	198	213	215	220	227	236
Lower Tuolumne Contribution:	NA	14	14	14	14	14
Surplus or Deficit:	46	28	26	21	15	5

III. Tuolumne River Voluntary Agreement



IV. Bay-Delta Plan

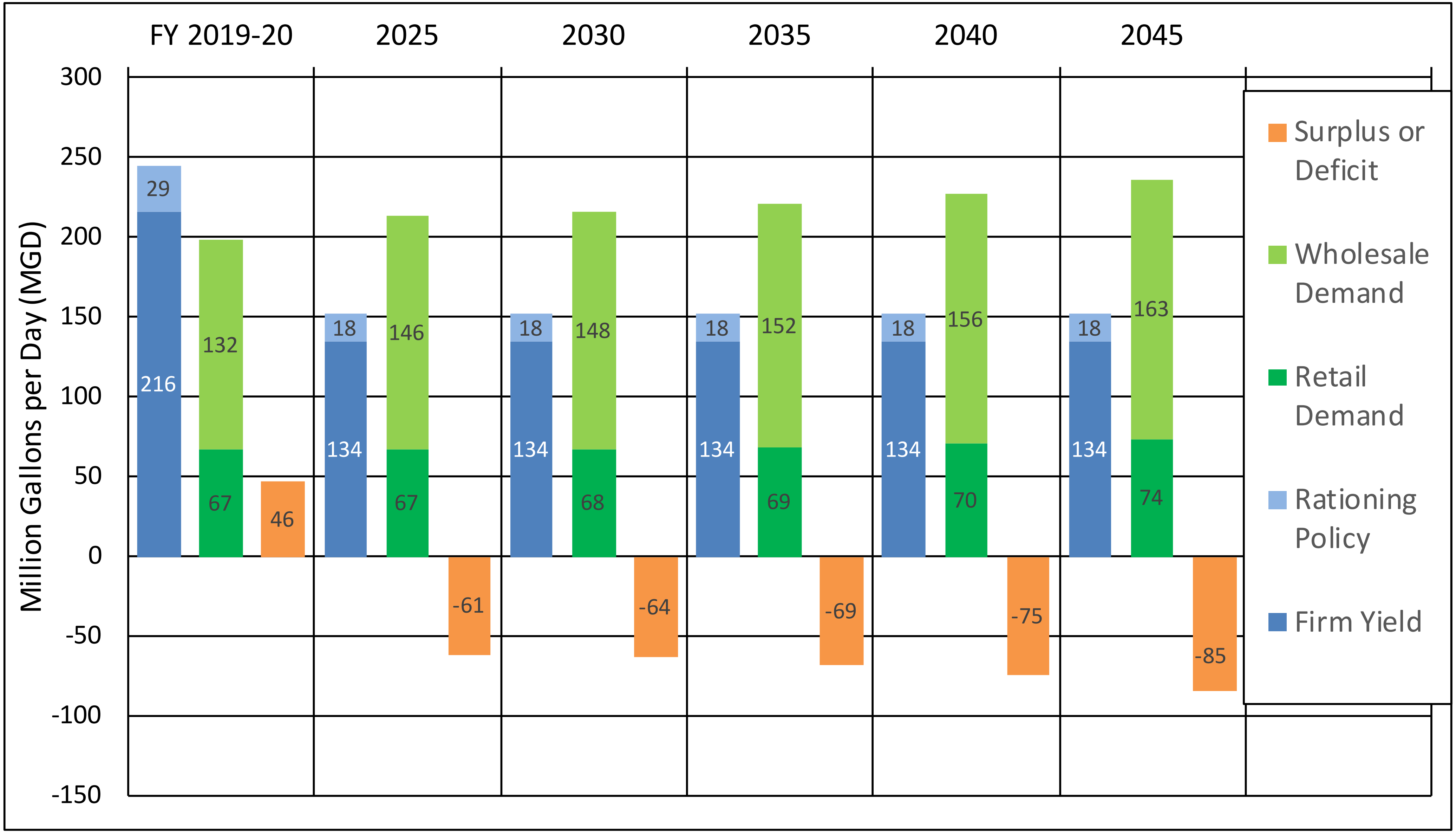
- Base Conditions
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy
- Includes SFPUC contribution to the Bay-Delta Plan displayed in the graph as a reduction in Firm Yield, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	245	152	152	152	152	152
RWS Demand:	198	213	215	220	227	236
Lower Tuolumne Contribution:	NA	93	93	93	93	93
Surplus or Deficit:	46	-61	-64	-69	-75	-85

Hetch Hetchy Regional Water System

IV. Bay-Delta Plan



Hetch Hetchy Regional Water System

V. Bay-Delta Plan with Alternative Water Supply Projects

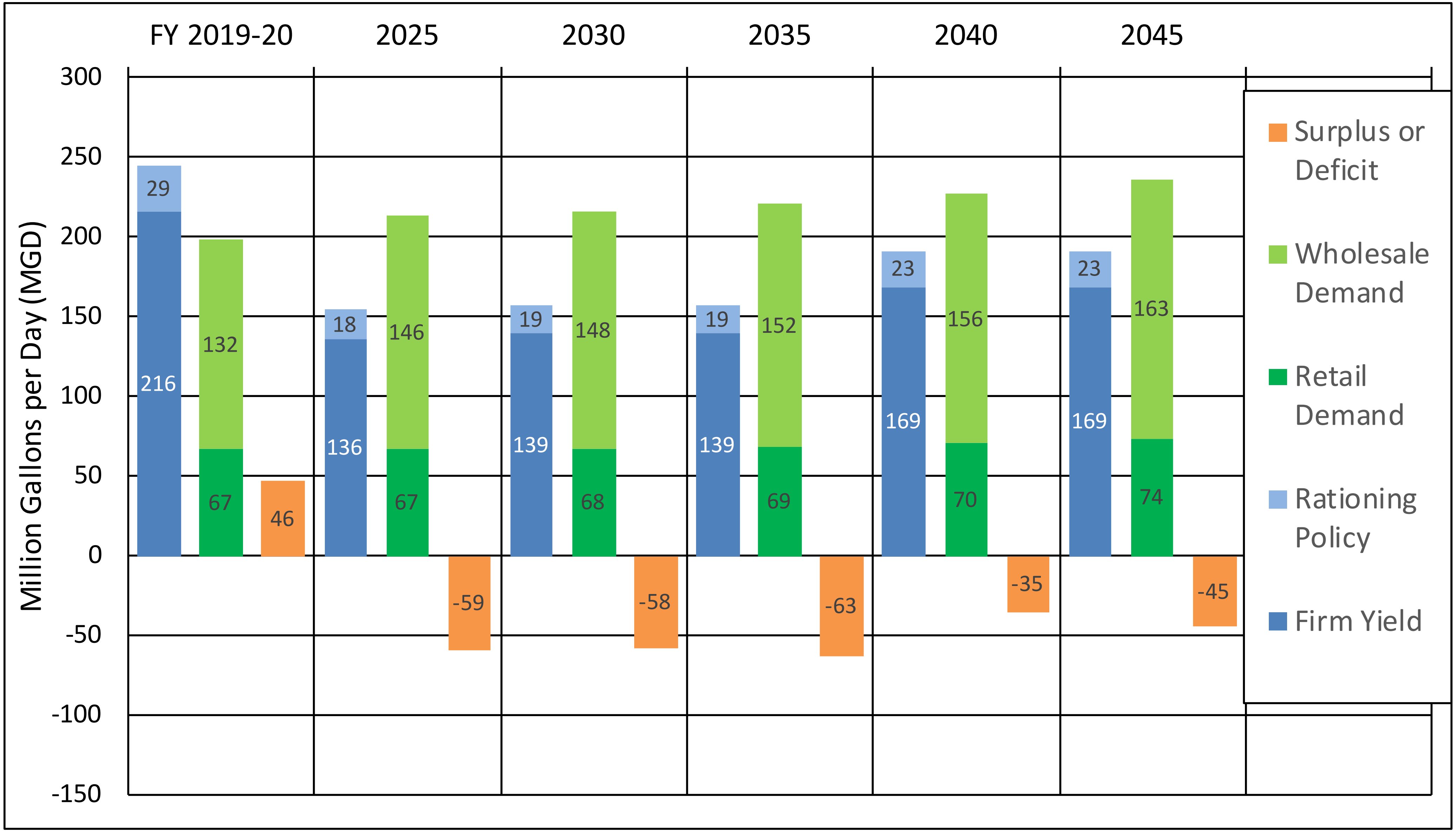
- Base Conditions
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy
- Includes SFPUC contribution to the Bay-Delta Plan displayed in the graph as a reduction in Firm Yield, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year.
- SFPUC contributions are calculated according to the 4th Agreement and continuation of the 1995 side agreement.
- Includes a total of 35 MGD of new water supply projects, which are assumed to be added between 2025 and 2040. The firm yield from the new projects is shown separately in the table to demonstrate the estimated development of the projects over time. The new project yield is also included in the Total Yield shown in the table.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	245	154	158	158	192	192
RWS Demand:	198	213	215	220	227	236
Lower Tuolumne Contribution:	NA	93	93	93	93	93
Alternative Water Supply Projects:	NA	2	5	5	35	35
Surplus or Deficit:	46	-59	-58	-63	-35	-45

Hetch Hetchy Regional Water System

V. Bay-Delta Plan with Alternative Water Supply Projects



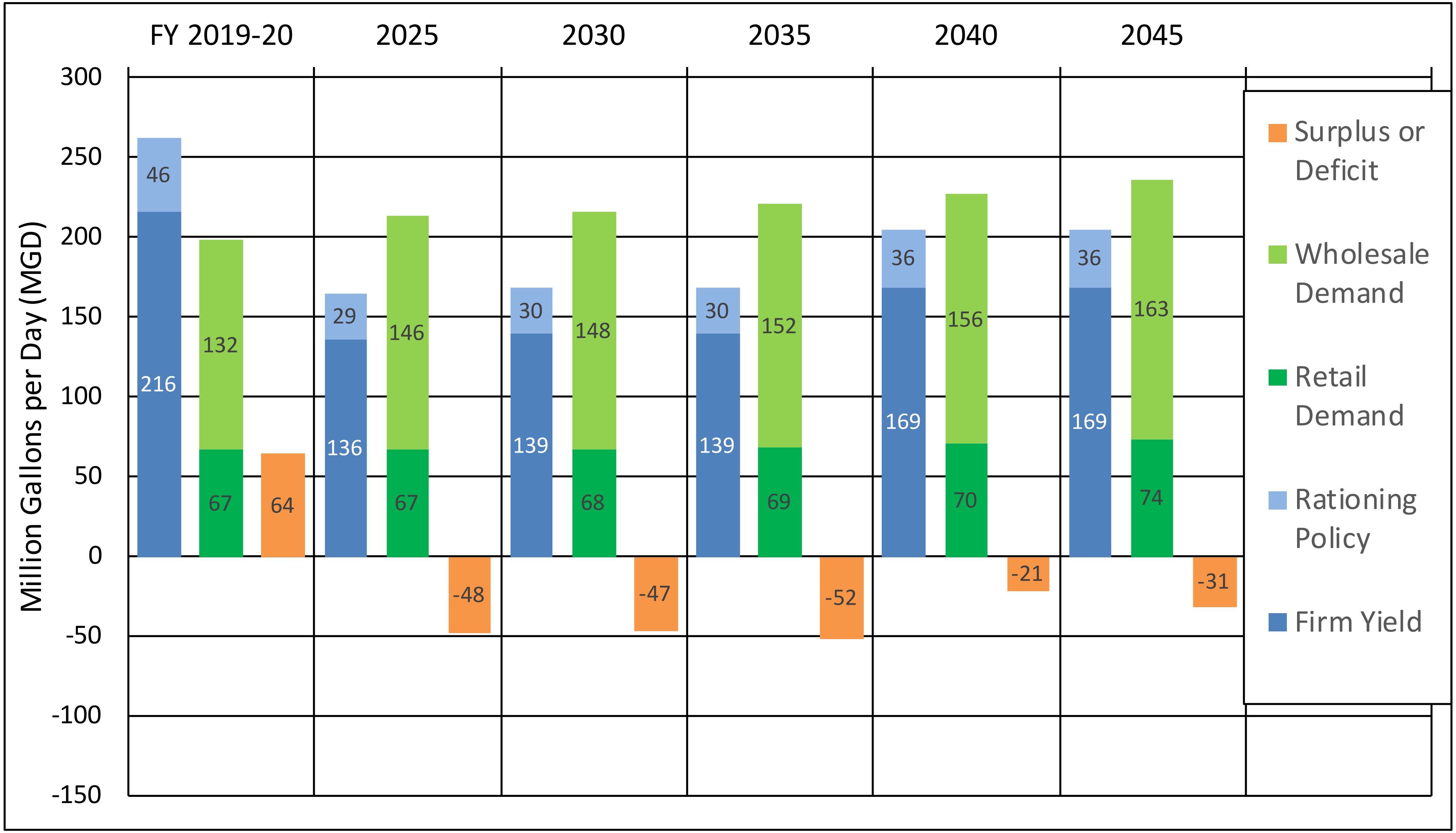
VI. Bay-Delta Plan with Alternative Water Supply Projects and Modified Rationing Policy

- Base Conditions
- Yield values are based on the 8.5-year design drought
- Includes SFPUC contribution to the Bay-Delta Plan displayed in the graph as a reduction in Firm Yield, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.
- Includes a total of 35 MGD of new water supply projects, as described on slide 12 for scenario V
- Includes 7.5 years of rationing at 20% in the 8.5-year design drought sequence

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	262	165	169	169	205	205
RWS Demand:	198	213	215	220	227	236
Lower Tuolumne Contribution:	NA	93	93	93	93	93
Surplus or Deficit:	64	-48	-47	-52	-21	-31

VI. Bay-Delta Plan with Alternative Water Supply Projects and Modified Rationing Policy



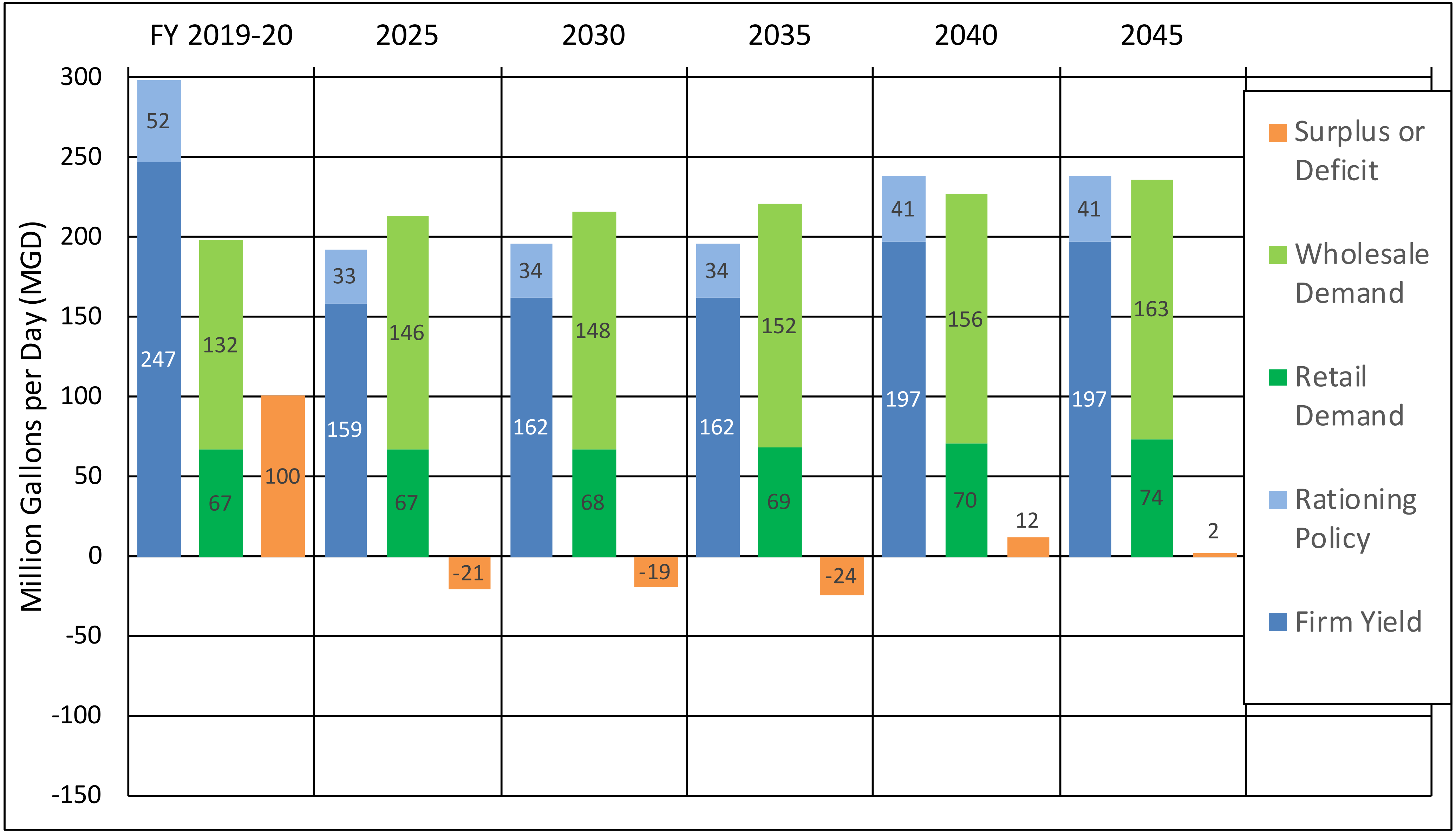
VII. Bay-Delta Plan with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought

- Base Conditions
- Includes SFPUC contribution to the Bay-Delta Plan displayed in the graph as a reduction in Firm Yield, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.
- Includes a total of 35 MGD of new water supply projects, as described on slide 12 for scenario V
- Yield values are estimated using a 7.5-year design drought
- Includes 6.5 years of rationing at 20% in the 7.5-year design drought sequence.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	299	192	196	196	238	238
RWS Demand:	198	213	215	220	227	236
Lower Tuolumne Contribution:	NA	101	101	101	101	101
Surplus or Deficit:	100	-21	-19	-24	12	2

VII. Bay-Delta Plan with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought



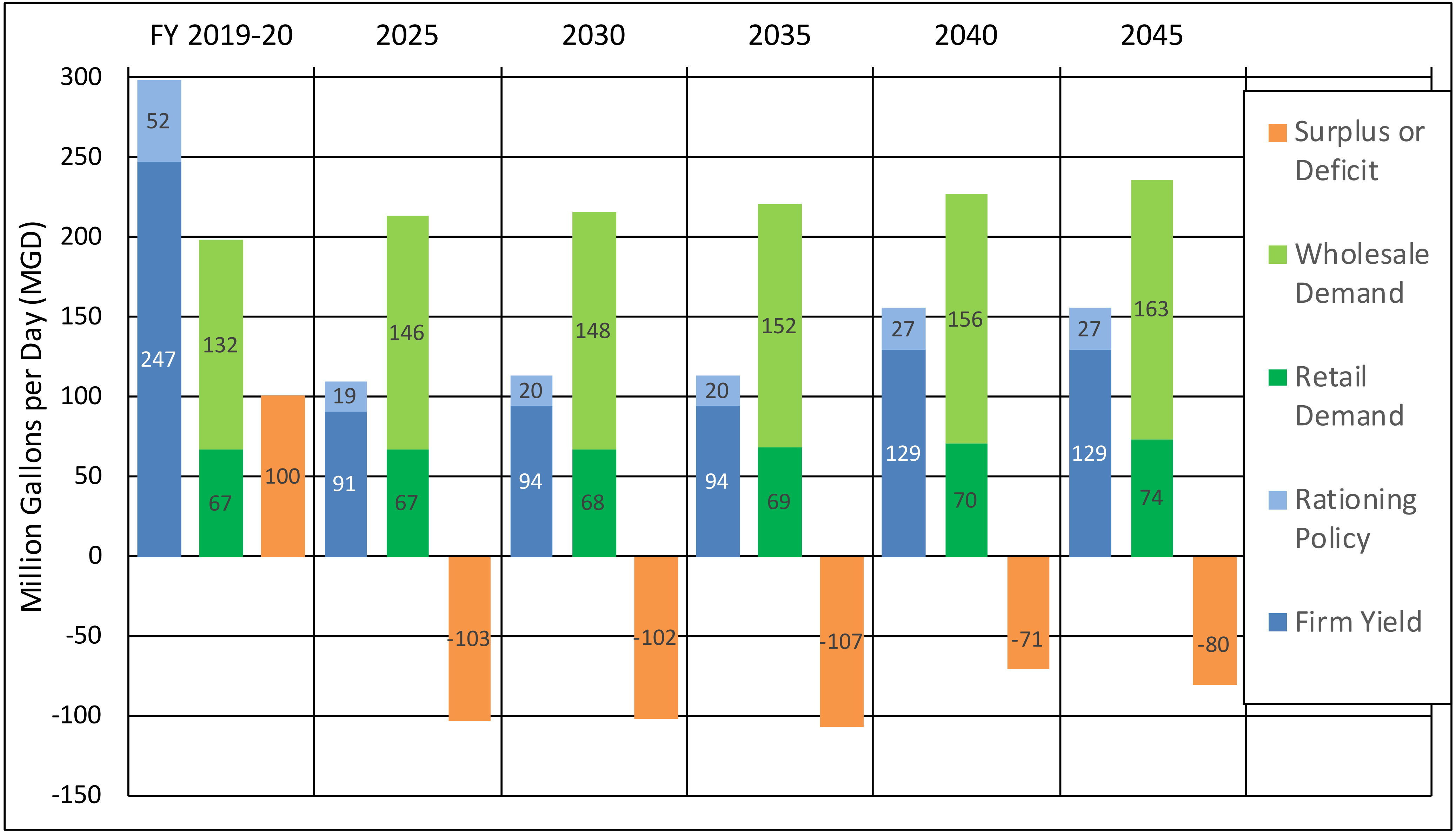
VIII. Water Quality Certification (401) with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought

- Base Conditions
- Includes SFPUC contribution to the Section 401 water quality certification on the FERC license displayed in the graph as a reduction in Firm Yield.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.
- Includes a total of 35 MGD of new water supply projects, as described on slide 12 for scenario V
- Yield values are estimated using a 7.5-year design drought
- Includes 6.5 years of rationing at 20% in the 7.5-year design drought sequence.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	299	110	114	114	156	156
RWS Demand:	198	213	215	220	227	236
Lower Tuolumne Contribution:	NA	169	169	169	169	169
Surplus or Deficit:	100	-103	-102	-107	-71	-80

VIII. Water Quality Certification (401) with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought



Hetch Hetchy Regional Water System

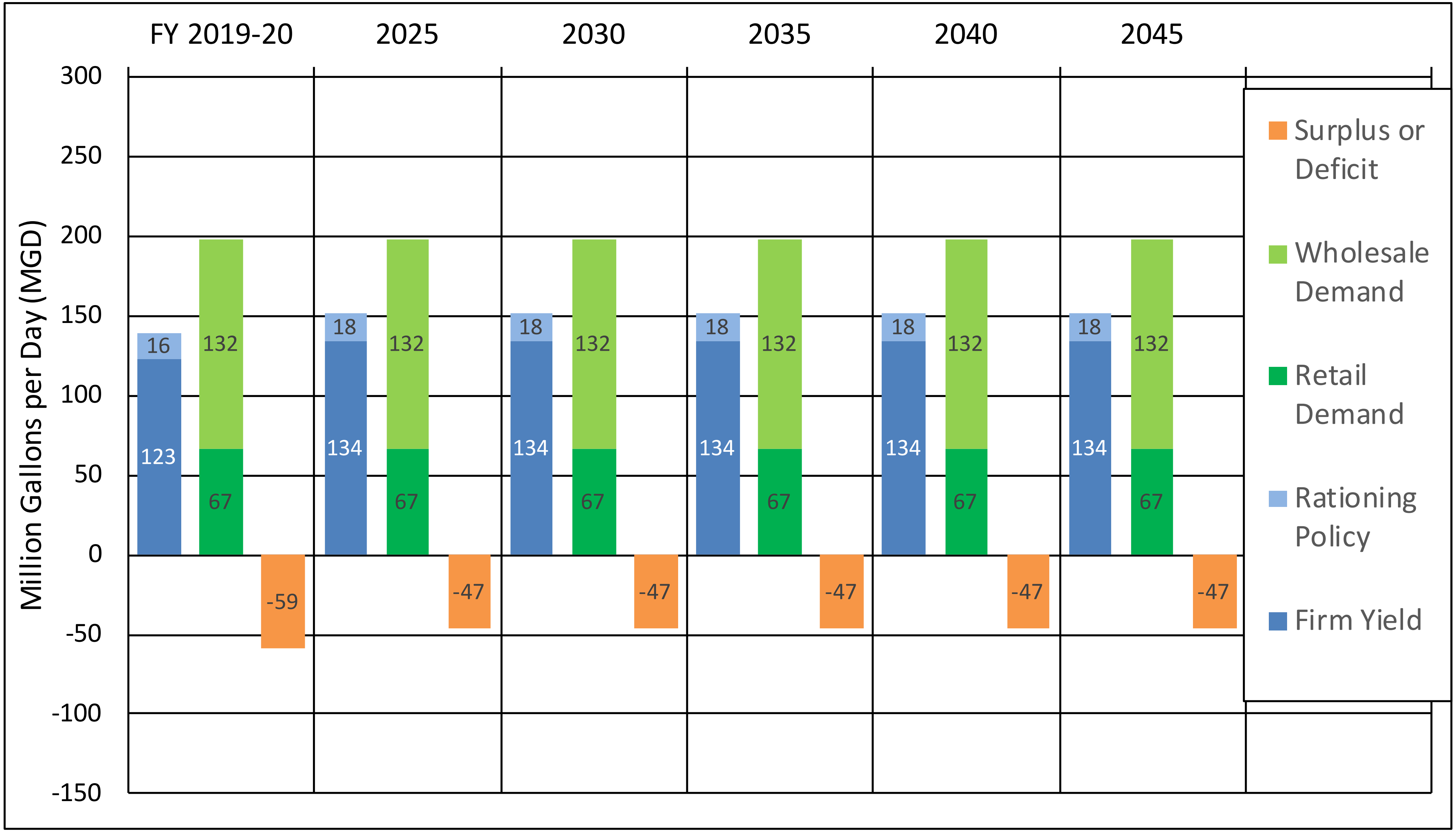
IX. NGO scenario 1: Current system, 198 mgd constant demand, Bay-Delta Plan flows

- Assumes that retail and wholesale demand on the RWS remain at the current level of approximately 198 MGD, and that SFPUC contributions to the Bay-Delta Plan are being made now
- Yield values are based on the 8.5-year design drought and the adopted WSIP rationing policy
- Includes SFPUC contribution to the Bay-Delta Plan, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	139	152	152	152	152	152
RWS Demand:	198	198	198	198	198	198
Lower Tuolumne Contribution:	93	93	93	93	93	93
Surplus or Deficit:	-59	-47	-47	-47	-47	-47

IX. NGO scenario 1: Current system, 198 mgd constant demand, Bay-Delta Plan flows



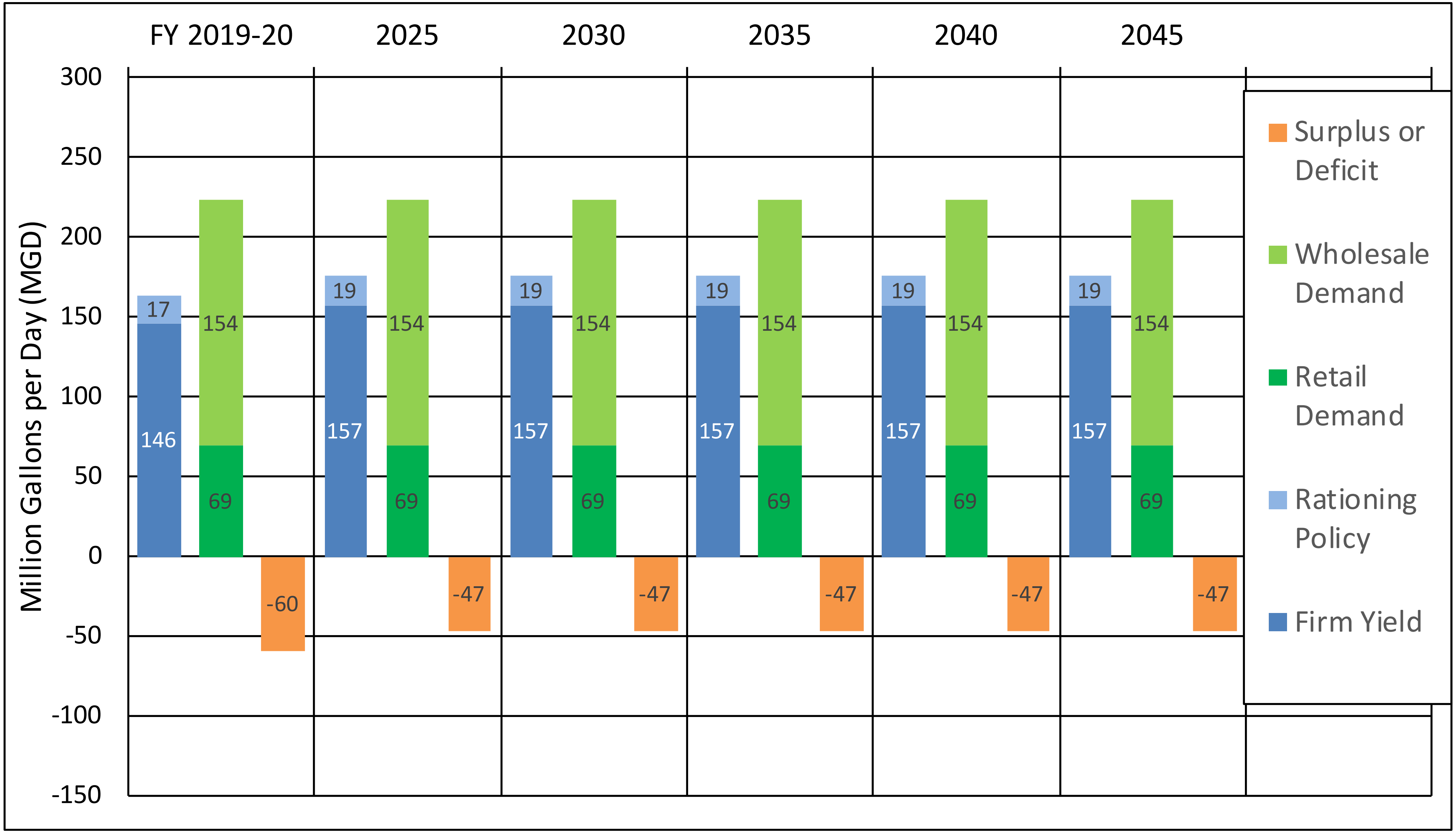
X. NGO scenario 2: Current system, 223 mgd constant demand, 7½ year design drought, Bay-Delta Plan flows

- Includes an assumed demand of 223 MGD for the SFPUC service area in all years
- Includes a total of 9 MGD for San Jose and Santa Clara
- Includes SFPUC contribution to the Bay-Delta Plan, assuming the flow requirement is 40% of unimpaired flow at La Grange from February through June. Current FERC flow requirements are assumed for the rest of the year. Assumes this contribution begins now.
- SFPUC contributions are calculated according to the 4th Agreement and assuming continuation of the 1995 side agreement.
- Yield values are estimated using a 7.5-year design drought and a truncated version of the adopted WSIP rationing policy

SFPUC Water Supply and Demand Worksheet Results
All values are in million gallons per day (MGD)

	FY 2019-20	2025	2030	2035	2040	2045
Total Yield:	163	176	176	176	176	176
RWS Demand:	223	223	223	223	223	223
Lower Tuolumne Contribution:	101	101	101	101	101	101
Surplus or Deficit:	-59	-47	-47	-47	-47	-47

X. NGO scenario 2: Current system, 223 mgd constant demand, 7½ year design drought, Bay-Delta Plan flows



SCENARIO SURPLUSES OR DEFICITS						
SCENARIOS	**FY19-20**	**2025**	**2030**	**2035**	**2040**	**2045**
I. Previous Demand Estimates	15	21	17	10	3	NA
II. Current Conditions	46	44	42	37	31	21
III. Tuolumne River Voluntary Agreement	46	28	26	21	15	5
IV. Bay-Delta Plan	46	-61	-64	-69	-75	-85
V. Bay-Delta Plan with Alternative Water Supply Projects	46	-59	-58	-63	-35	-45
VI. Bay-Delta Plan with Alternative Water Supply Projects and Modified Rationing Policy	64	-48	-47	-52	-21	-31
VII. Bay-Delta Plan with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design	100	-21	-19	-24	12	2
VIII. Water Quality Certification (401) with Alternative Water Supply Projects, Modified Rationing Policy and Modified Design Drought	100	-103	-102	-107	-71	-80
IX. NGO scenario 1: Current system and 198 mgd constant demand and Bay-Delta Plan flows	-59	-47	-47	-47	-47	-47
X. NGO Scenario 2: Current system, 223 mgd constant demand, 7 ½ year design drought and Bay-Delta Plan	-60	-47	-47	-47	-47	-47

APPENDIX K
WATER SHORTAGE CONTINGENCY PLAN

Water Shortage Contingency Plan
2020 Update

Menlo Park Municipal Water

June 2021

TABLE OF CONTENTS

TABLES

ATTACHMENTS

1. INTRODUCTION

☑ ***CWC § 10640***

(a) Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630). The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

(b) Every urban water supplier required to prepare a water shortage contingency plan shall prepare a water shortage contingency plan pursuant to Section 10632. The supplier shall likewise periodically review the water shortage contingency plan as required by paragraph (10) of subdivision (a) of Section 10632 and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

Menlo Park Municipal Water's (MPMW's) Water Shortage Contingency Plan (WSCP) is developed to serve as a flexible framework of planned response measures to mitigate future water supply shortages. This WSCP builds upon and supersedes the WSCP that was presented in the 2015 Urban Water Management Plan (UWMP).

The WSCP includes the stages of response to a water shortage caused by drought or by supply interruptions caused by infrastructure failure, regulatory mandate, or catastrophic human-caused or natural events. The primary objective of the WSCP is to ensure that MPMW has in place the necessary resources and management responses needed to protect health and human safety, minimize economic disruption, and preserve environmental and community assets during water supply shortages and interruptions. The WSCP also includes procedures to conduct an annual assessment of water supply and demand in order to determine whether water shortage conditions are likely to exist in the forthcoming year, and to proactively begin the process of implementing WSCP stages of action, as appropriate.

This WSCP has been prepared in accordance with California Water Code (CWC) § 10640 and CWC § 10632 of the UWMP Act. Text from the UWMP Act has been included in grey text boxes with italicized font at beginning of relevant sections of this WSCP. The information presented in the respective WSCP sections and the associated text and tables are collectively intended to fulfill the requirements of that sub-section of the UWMP Act.

MPMW has authority within Section 7.35 of City of Menlo Park's (City's) Municipal Code to require water rationing and conservation and to enforce penalties. Municipal Code Section 7.35 is included as Attachment 1 of this WSCP.

MPMW developed this WSCP based on the following guiding principle:

> *Eliminate water waste, prioritize the reduction of non-essential water uses, and preserve water uses that are essential to the health, safety, welfare, and economic vitality of MPMW's customers during periods of water shortage.*

Practically, this principle guides MPMW to ask for a shared contribution from all of its customers towards meeting water reduction goals during periods of water shortage. It further directs MPMW to focus its water conservation efforts on reducing discretionary water uses such as outdoor irrigation, while attempting to minimize economic and other impacts to its residential and commercial customers.

MPMW also adopted a Water Service Priority Policy by Resolution No. 6187, in compliance with requirements of Government Code Section 65589.7. The Water Service Priority Policy prioritizes water service to proposed developments that include units for lower income households.

2. WATER SUPPLY RELIABILITY ANALYSIS

☑ ***CWC § 10632 (a) (1)*** *The analysis of water supply reliability conducted pursuant to Section 10635.*

This section provides a summary of MPMW's water supply reliability analysis in Chapter 7 of MPMW's 2020 UWMP, recognizing that the WSCP is intended to be a standalone document that can be adopted and amended independently.

MPMW relies on the San Francisco Public Utilities Commission Regional Water System (SFPUC RWS) for all of its potable water supply. In accordance with the SFPUC's perpetual obligation to MPMW's Supply Assurance, MPMW has an Individual Supply Guarantee (ISG) of 4.456 million gallons per day (MGD), or 1,630 million gallons (MG) per year. MPMW also uses recycled water for non-potable uses. Recycled water is currently supply 2% of MPMW's total demand and is anticipated to supply 8% of MPMW's total demand by 2040. The recycled water supply is expected to be 100% reliable in all year types.

MPMW's supply reliability relies largely on the reliability of the SFPUC RWS. The SFPUC has committed to, among other things, meeting the retail and wholesale customers' average annual water demand during non–drought years and meeting dry-year delivery needs while limiting rationing to a maximum 20% system-wide reduction in water service during extended droughts. However, several potential constraints have been identified on the future supply availability of the SFPUC RWS. One of the key factors is the adoption of the 2018 Bay-Delta Plan Amendment. If the Bay-Delta Plan Amendment is implemented, the SFPUC is anticipated to have sufficient supplies to meet the projected water demands in normal years but would experience significant supply shortages in single dry years or multiple dry years.

Based on the current allocation methodology[1] and SFPUC dry year cutbacks, MPMW is anticipated to experience up to 422 MG (28%) supply shortfall in single dry years by 2040 and up to 652 MG (44%) supply shortfall in multiple dry years by 2040.

However, numerous uncertainties remain in the implementation of the Bay-Delta Plan Amendment and the allocation of the available supply between the wholesale customers. The resultant actual supply reliability and the frequency of supply shortfalls for MPMW cannot be known currently. MPMW has placed high priority on working with SFPUC and the Bay Area Water Supply and Conservation Agency (BAWSCA) to better refine the estimates of RWS supply reliability and may revise its UWMP accordingly. The SFPUC and BAWSCA have also been taking various actions to improve the reliability of the RWS supply,

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[1] The SFPUC and the wholesale customers have negotiated and adopted a plan to allocate the RWS supply during system-wide shortages of 20% or less. To address the instances where the supply shortfalls are projected to be greater than 20%, BAWSCA has developed a revised methodology to allocate the RWS supply. This allocation method is intended to serve as the preliminary basis for the 2020 UWMP supply reliability analysis and does not in any way imply an agreement by BAWSCA member agencies as to the exact allocation methodology. Details on the SFPUC RWS supply reliability are provided by the SFPUC and the BAWSCA and are documented in Sections 7.1 through 7.3 as well as Appendix H of the 2020 UWMP.

including implementing a number of dry year water supply projects, exploring alternative water supplies, and implementing Long-Term Reliable Water Supply Strategy recommendations.

As part of the supply reliability analysis, MPMW has conducted a Drought Risk Assessment (DRA), which evaluates the effects on available water supply sources of an assumed five-year drought commencing the year after the assessment is completed (i.e., from 2021 through 2025). Prior to the assumed implementation of the Bay-Delta Plan Amendment in 2023, MPMW's supply is expected to be sufficient to meet demands during the first two consecutive dry years (i.e., 2021 and 2022). However, based on the current allocation methodology and SFPUC dry year cutbacks, MPMW is expected to experience significant shortfalls in subsequent years of the assumed drought through 2025. The largest shortfall is estimated to be 587 MG in 2025.

MPMW has developed this WSCP to address water shortage conditions resulting from any cause (e.g., droughts, impacted distribution system infrastructure, regulatory-imposed shortage restrictions, etc.). The WSCP identifies a variety of actions that MPMW will implement to reduce demands and further ensure supply reliability at various levels of water shortage.

3. PRIOR DROUGHT ACTIONS

MPMW has historically developed different strategies for reducing water demand during water shortages. MPMW's actions in response to the recent severe drought that occurred in California between 2014 and 2017 are discussed below.

On 1 April 2015, Governor Brown issued the fourth in a series of Executive Orders regarding actions necessary to address California's severe drought conditions. Executive Order B-29-15 directed the State Water Resources Control Board (SWRCB) to impose the first ever mandatory restrictions on urban water suppliers to achieve a statewide 25% reduction in potable urban water usage through February 2016. The Executive Order also requires commercial, industrial, and institutional (CII) users to implement water efficiency measures, prohibits irrigation with potable water of ornamental turf in public street medians, and prohibits irrigation with potable water outside newly constructed homes and buildings that is not delivered by drip or microspray systems, along with numerous other directives.

On 5 May 2015, the SWRCB adopted Resolution 2015-0032 that mandates minimum actions by water suppliers and their customers to conserve water supplies into 2016 and assigns a mandatory water conservation savings goal to each water supplier based on their residential gallons per capita per day (R-GPCD) water use. The Office of Administrative Law approved the regulations and modified the CWC on 18 May 2015. On 2 February 2016, the SWRCB voted to extend the emergency regulations until October 2016 with some modifications. On 9 May 2016, the Governor issued Executive Order B-37-16, which directed the SWRCB to extend the emergency regulations through the end of January 2017 as well as make certain water use restrictions permanent. On 18 May 2016, the SWRCB adopted Resolution 2016-0029 that adjusts the water conservation savings goal and replaces the February 2016 emergency regulation. The SWRCB is expected to take separate action to make some of the requirements of the regulations permanent in response to the Executive Order.

The mandatory conservation standards included in CWC § 865(c) ranged from 8% for suppliers with an R-GPCD below 65 R-GPCD, up to 36% for suppliers with an R GPCD of greater than 215 GPCD. As with previous emergency drought regulations adopted by the SWRCB in 2014, the new water conservation regulation was primarily intended to reduce outdoor urban water use. Based on the SWRCB's Regulatory Framework Tier 4 residential per capita use of 88.6 GPCD , MPMW was required to reduce water use by 16% relative to its 2013 water use.

Prior to the 2015 SWRCB Resolution, the City Council had already declared Stage 2 of the 2014 WSCP to respond to 2014 SWRCB actions. Stage 2 of the 2014 WSCP called for an up to 20% water reduction and included prohibitions that targeted water waste and discretionary outdoor uses. This stage of action remained in place to meet the 2015 SRWCB mandated reduction target.

During the June 2015 through February 2016 compliance period, the City surpassed its water use reduction target of 16% with a cumulative saving of 38% relative to its 2013 use. The reductions were largely due to high savings (up to a 50% reduction in total demand) during the summer and fall months, likely corresponding to large cutbacks in irrigation water use.

The 2014 WSCP was updated as part of the 2015 UWMP. In June 2016, the City adopted its 2015 UWMP and associated WSCP update. In April 2017, the Governor Brown ended the drought State of Emergency. On 2 May 2017, Resolution 6383 revoked the City's drought declaration and enacted Stage 1 of its 2015

WSCP, which is a no-drought stage that maintains prohibitions to prevent water waste per State regulations.

4. ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES

☑ ***CWC § 10632 (a) (2)***

The procedures used in conducting an annual water supply and demand assessment that include, at a minimum, both of the following:

(A) The written decision-making process that an urban water supplier will use each year to determine its water supply reliability.

(B) The key data inputs and assessment methodology used to evaluate the urban water supplier's water supply reliability for the current year and one dry year, including all of the following:

(i) Current year unconstrained demand, considering weather, growth, and other influencing factors, such as policies to manage current supplies to meet demand objectives in future years, as applicable.

(ii) Current year available supply, considering hydrological and regulatory conditions in the current year and one dry year. The annual supply and demand assessment may consider more than one dry year solely at the discretion of the urban water supplier.

(iii) Existing infrastructure capabilities and plausible constraints.

(iv) A defined set of locally applicable evaluation criteria that are consistently relied upon for each annual water supply and demand assessment.

(v) A description and quantification of each source of water supply.

☑ ***CWC § 10632.1***

An urban water supplier shall conduct an annual water supply and demand assessment pursuant to subdivision (a) of Section 10632 and, on or before July 1 of each year, submit an annual water shortage assessment report to the department with information for anticipated shortage, triggered shortage response actions, compliance and enforcement actions, and communication actions consistent with the supplier's water shortage contingency plan. An urban water supplier that relies on imported water from the State Water Project or the Bureau of Reclamation shall submit its annual water supply and demand assessment within 14 days of receiving its final allocations, or by July 1 of each year, whichever is later.

☑ ***CWC § 10632.2***

An urban water supplier shall follow, where feasible and appropriate, the prescribed procedures and implement determined shortage response actions in its water shortage contingency plan, as identified in subdivision (a) of Section 10632, or reasonable alternative actions, provided that descriptions of the alternative actions are submitted with the annual water shortage assessment report pursuant to Section 10632.1. Nothing in this section prohibits an urban water supplier from taking actions not specified in its water shortage contingency plan, if needed, without having to formally amend its urban water management plan or water shortage contingency plan.

On an annual basis, MPMW will conduct an Annual Supply-Demand Assessment (Annual Assessment) to identify whether there is likely to be a water shortage condition in the following year. Because MPMW's sole source of potable water supply is from the SFPUC RWS, the evaluation of MPMW supplies for a particular year will be based on information provided by the SFPUC or BAWSCA. MPMW will conduct the Annual Assessment as part of a coordinated effort lead by BAWSCA. The procedure used by BAWSCA in conducting an Annual Assessment is outlined in Attachment 2 of this WSCP.

5. WATER SHORTAGE LEVELS

☑ ***CWC § 10632 (a) (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 subparagraph (A) by developing and including a cross-reference relating its existing categories to the six standard water shortage levels.

Consistent with the requirements of CWC § 10632(a)(3), this WSCP is based on the six water shortage levels (also referred to as "stages") shown in Table 5-1. These shortage stages are intended to address shortages caused by any condition, including catastrophic interruption of water supplies. Table 5-1 summarizes the water supply reductions and supply conditions associated with each stage of action.

Table 5-1 Water Shortage Contingency Plan Levels (DWR Table 8-1)

Shortage Level	Percent Shortage Range	Shortage Response Actions
No-Drought	N/A	• Includes water waste prohibitions effective at all times.
1	Up to 10%	• Declaration by the City Council upon the determination that the SFPUC or another governing authority (e.g., the SWRCB) has required a voluntary or mandatory reduction in water use of up to 10% due to water supply shortages or an emergency. • Includes implementation of mandatory restrictions on end uses (see Table 6-1) as well as agency actions (see Table 6-2).
2	Up to 20%	• Declaration by the City Council upon the determination that the SFPUC or another governing authority (e.g., the SWRCB) has required a voluntary or mandatory reduction in water use from 10% to 20% due to water supply shortages or emergency. • Includes implementation of mandatory restrictions on end uses (see Table 6-1) as well as agency actions (see Table 6-2).

Shortage Level	Percent Shortage Range	Shortage Response Actions
3	Up to 30%	• Declaration by the City Council upon the determination that the SFPUC or another governing authority (e.g., the SWRCB) has required a voluntary or mandatory reduction in water use from 20% to 30% due to water supply shortages or emergency. • Includes implementation of mandatory restrictions on end uses (see Table 6-1) as well as agency actions (see Table 6-2).
4	Up to 40%	• Declaration by the City Council upon the determination that the SFPUC or another governing authority (e.g., the SWRCB) has required a voluntary or mandatory reduction in water use from 30% to 40% due to water supply shortages or emergency. • Includes implementation of mandatory restrictions on end uses (see Table 6-1) as well as agency actions (see Table 6-2).
5	Up to 50%	• Declaration by the City Council upon the determination that the SFPUC or another governing authority (e.g., the SWRCB) has required a voluntary or mandatory reduction in water use from 40% to 50% due to water supply shortages or emergency. • Includes implementation of mandatory restrictions on end uses and water use budgets for customers (see Table 6-1), as well as agency actions and groundwater supply augmentation (see Table 6-2).
6	>50%	• Declaration by the City Council upon the determination that the SFPUC or another governing authority (e.g., the SWRCB) has required a voluntary or mandatory reduction in water use greater than 50% due to water supply shortages or emergency. • Includes implementation of mandatory restrictions on end uses and water use budgets for customers (see Table 6-1), as well as agency actions and groundwater supply augmentation (see Table 6-2).

6. SHORTAGE RESPONSE ACTIONS

☑ ***CWC § 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.

(B) Locally appropriate demand reduction actions to adequately respond to shortages.

(C) Locally appropriate operational changes.

(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.

☑ ***CWC § 10632 (b)***

For purposes of developing the water shortage contingency plan pursuant to subdivision (a), an urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

This section describes the response actions MPMW will take to deal with the shortages associated with each of the six stages enumerated in Section 5.

6.1 Demand Reduction Methods

As discussed above and shown in Table 6-1, the WSCP lists the demand reduction methods that MPMW will implement during each stage of action to reduce MPMW's water consumption and encourage reduction in water use by its customers. The monthly and cumulative annual water savings impacts associated with each restriction, prohibition and consumption reduction method were quantitatively estimated using the Drought Response Tool (DRT) for each stage of action, see Attachment 3.

A main focus of MPMW's planned demand reduction measures is to increase public outreach and keep customers informed of the water shortage emergency and actions they can take to reduce consumption. The public outreach efforts that MPMW will implement to respond to a water shortage are described in Section 8.

6.2 Supply Augmentation

As shown in Table 6-2, the City will utilize its emergency supply well(s) as supply augmentation during Stages 5 and 6. MPMW has constructed one emergency groundwater well (the Corporation Yard Well) which can produce up to 1,500 gallons per minute (gpm) of supply to the Lower Zone. An additional one or two emergency wells are being considered to achieve another 1,500 gpm of supply capacity (for a total of 3,000 gpm). Water supply from the emergency supply well(s) is currently not considered in MPMW's planning for normal or dry year supply. The well(s) will provide augmented supply for MPMW in the event of significant water shortage due to severe drought conditions, an earthquake, or other emergency.

According to the Corporation Yard Well's Initial Study/Mitigation Negative Declaration (IS/MND) document (Infrastructure Engineering Corporation, 2016), operating the well at 900 gpm over a 30-day failure on the SFPUC RWS will supply 119 acre-feet (AF) of water. The IS/NMD has estimated that the well could provide 1,900 AF over the course of a year without a significant impact to the groundwater basin.

Table 6-2 also includes other actions that the City will take, including coordination with other agencies, implementing drought surcharge, increasing water waste patrols, etc.

Table 6-1 Demand Reduction Actions (DWR Table 8-2)

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? (a)	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
No Drought	Other	--	1. Hoses must be equipped with a shut-off valve for washing vehicles, sidewalks, walkways, or buildings. 2. Ornamental fountains shall use only re-circulated or recycled water. 3. Potable water shall not be applied in any manner to any driveway, sidewalk, or other hard surface except when necessary to address immediate health or safety concerns. 4. Potable water shall not be used to water outdoor landscapes in a manner that causes more than incidental runoff onto non-irrigated areas, walkways, roadways, parking lots, or other hard surfaces. 5. Potable water cannot be applied to outdoor landscapes during and up to 48 hours after measurable rainfall. 6. Potable water shall not be used to irrigate ornamental turf on public street medians. 7. Hotels and motels shall provide guests an option whether to launder towels and linens daily. Hotels and motels shall prominently display notice of this option in each bathroom using clear and easily understood language. 8. Restaurants and other food service operations shall serve water to customers only upon request during a period for which the Governor has issued a proclamation of a state of emergency. 9. Broken or defective plumbing and irrigation systems must be repaired or replaced within a reasonable period. 10. Recreational water features shall be covered when not in use. 11. Single-pass cooling systems on new construction shall not be allowed. 12. Other measures as may be approved by the State Water Resources Control Board or City Council Resolution.	Yes

Table 6-1 Demand Reduction Actions (DWR Table 8-2)

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? (a)	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1	Other	5%	1. Continue with "no drought" restrictions and prohibitions except where superseded by more stringent requirements. 2. Newly constructed homes and buildings must irrigate with drip or microspray only. 3. Other measures as may be approved by City Council Resolution.	Yes
2	Other	15%	1. Continue with Stage 1 restrictions and prohibitions except where superseded by more stringent requirements. 2. Irrigating outdoor ornamental landscapes or turf with potable water is limited to no more than two (2) days per week on a schedule established by the Director and posted on the City's website, except for hand watering. Water customers may be granted an exception upon review and approval of a Drought Response Plan by the Public Works Director pursuant to such policies and procedures as may be established by the Public Works Director provided that such plan results in an equivalent or greater reduction in water use. 3. Hand watering must be with a continuously monitored hose fitted with an automatic shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use or monitored. 4. Other measures as may be approved by City Council Resolution.	Yes
3	Other	25%	1. Continue with Stage 2 restrictions and prohibitions except where superseded by more stringent requirements. 2. Permits for construction of new pools shall include a requirement that MPMW water shall not be used to fill new pools. 3. Vehicles may only be washed at vehicle washing facilities using recycled or recirculating water. 4. Other measures as may be approved by City Council Resolution.	Yes

Table 6-1 Demand Reduction Actions (DWR Table 8-2)

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? (a)	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
4	Other	35%	1. Continue with Stage 3 restrictions and prohibitions except where superseded by more stringent requirements. 2. Irrigating outdoor ornamental landscapes or turf with potable water is limited to no more than one (1) day per week on a schedule established by the Director and posted on the City's website, except for hand watering. Water customers may be granted an exception upon review and approval of a Drought Response Plan by the Public Works Director pursuant to such policies and procedures as may be established by the Public Works Director provided that such plan results in an equivalent or greater reduction in water use. 3. Potable water shall not be used for construction or dust control. 4. Potable water shall not be used for commercial vehicles that provide street washing, sweeping, or cleaning. 5. Other measures as may be approved by City Council Resolution.	Yes
5	Other	45%	1. Continue with Stage 4 restrictions and prohibitions except where superseded by more stringent requirements. 2. Water use shall not exceed water budgets established for each customer. 3. Hand watering outdoor ornamental landscapes is only allowed between designated hours, as determined by the Public Works Director. 4. Turf irrigation is prohibited at all times, including artificial turf. 5. Existing irrigation systems shall not be expanded. 6. Other measures as may be approved by City Council Resolution.	Yes
6	Other	55%	1. Continue with Stage 5 restrictions and prohibitions except where superseded by more stringent requirements. 2. Hand watering outdoor ornamental landscapes is prohibited at all times. 3. Other measures as may be approved by City Council Resolution.	Yes

Table 6-1 Demand Reduction Actions (DWR Table 8-2)

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? (a)	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
NOTES: (a) The percentages listed in this table are the cumulative savings for each shortage level with implementation of corresponding supply augmentation and other agency actions in Table 6-2. Detailed saving estimates based on end use, response action, and implementation rates can be found in Attachment 3.				

Table 6-2 Supply Augmentation and Other Actions (DWR Table 8-3)

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier	How much is this going to reduce the shortage gap? (a)	Additional Explanation or Reference
1	Other	5%	1. Initiate public outreach to inform customers that there is a water shortage emergency. 2. Implement Stage 1 drought surcharge.
2	Other	15%	1. Continue with actions and measures from Stage 1. 2. Increase public outreach for added restrictions and prohibitions, and to provide information regarding fines or penalties for non-compliance. 3. Coordinate with BAWSCA, SFPUC, and other Menlo Park water agencies (California Water Service, O'Connor Cooperative Water Tract, East Palo Alto, Palo Alto Park Mutual Water Company). 4. Evaluate if participation in BAWSCA's subscription water conservation programs can be increased. 5. Train City staff and billing contractor customer service representatives how to respond to customer calls, reports and complaints. 6. Evaluate options to capture water during routine flushing of water mains. 7. Implement Stage 2 drought surcharge.
3	Other	25%	1. Continue with actions and measures from Stage 2. 2. Increase public outreach for added restrictions and prohibitions, and to provide information how to report water waste to the City. 3. Increase public outreach to the top 10% water users in each customer category. 4. Coordinate with Police code enforcement to investigate water waste reports. 5. Request cooperation from Menlo Park Fire District to reduce fire training water use. 6. Implement Stage 3 drought surcharge.

Table 6-2 Supply Augmentation and Other Actions (DWR Table 8-3)

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier	How much is this going to reduce the shortage gap? (a)	Additional Explanation or Reference
4	Other	35%	1. Continue with actions and measures from Stage 3. 2. Increase public outreach for added restrictions and prohibitions. 3. Increase public outreach to the top 20% water users in each customer category. 4. Evaluate staff resources. May include hiring temporary staff or training additional City staff to assist with customer service and enforcement. 5. Reevaluate routine flushing of water mains except when necessary to address immediate health or safety concerns. 6. Consider increasing fines for multiple violations. 7. Implement Stage 4 drought surcharge.
5	Other	45%	1. Continue with actions and measures from Stage 4. 2. Increase public outreach for added restrictions and prohibitions. 3. Increase public outreach to the top 30% water users in each customer category. 4. Implement water waste patrols and increase enforcement. 5. Halt installations of new potable water meters (temporary or permanent) or meter upgrades except if a valid, unexpired building permit has been issued for the project; or the project is necessary to protect the public's health, safety, and welfare. 6. Halt issuing statements of immediate ability to serve or provide potable water service. 7. Consider increasing fines for multiple violations. 8. Develop water budgets for all accounts. 9. Use emergency groundwater well(s). 10. Implement Stage 5 drought surcharge.

Table 6-2 Supply Augmentation and Other Actions (DWR Table 8-3)

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier	How much is this going to reduce the shortage gap? (a)	Additional Explanation or Reference
6	Other	55%	1. Continue with actions and measures from Stage 5. 2. Increase public outreach for added restrictions and prohibitions. 3. Increase public outreach to the top 40% water users in each customer category. 4. Halt installations of new potable water meters (temporary or permanent) even if a valid, unexpired building permit has been issued for the project. 5. Consider increasing fines for multiple violations. 6. Increase water budget reduction requirements. 7. Implement other short-term emergency actions from the Emergency Response Plan. 8. Implement Stage 6 drought surcharge.
NOTES: (a) The percentages listed in this table are the cumulative savings for each shortage level with implementation of corresponding demand reduction actions in Table 6-1. Detailed saving estimates based on end use, response action, and implementation rates can be found in Attachment 3.			

6.3 Operational Changes

The WSCP lists the operational changes that MPMW will implement during each stage of action including measures to: (1) reduce system losses through a reduction in line flushing and fire training exercises, (2) increase enforcement and patrols, (3) develop water budgets, and in certain conditions, (4) implement a moratorium on new services.

6.4 Prohibitions on End Uses

MPMW has the authority to restrict or prohibit specific water use practices during water shortages (Municipal Code Section 7.35). Restrictions and prohibitions associated with each stage of action are presented in Table 6-1. As discussed above, these responses focus on the reduction of non-essential water uses such as ornamental landscape irrigation, and preserve water uses that are essential to the health, safety, welfare, and economic vitality of MPMW's customers.

In addition, several mandatory prohibitions are enforced at all times as part of the Non-Drought Stage to eliminate water waste, which include each of the prohibitions on end uses that are anticipated to be mandated by the SWRCB in response to Executive Order B-37-16. Prohibitions in subsequent stages go beyond the SWRCB requirements and become increasingly restrictive.

6.5 Defining Water Features

☑ ***CWC § 10632 (b)***

For purposes of developing the water shortage contingency plan pursuant to subdivision (a), an urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

As required by CWC § 10632, MPMW distinguishes between "decorative water features" such as ponds, lakes, and fountains that are artificially supplied with water and "recreational water features" such as swimming pools and spas. Prohibitions on water use for decorative water features are listed separately from those for recreational water features (see Table 6-1).

6.6 Shortage Response Action Effectiveness

In order to evaluate and ensure that effective actions will be implemented with the proper level of intensity, MPMW employed the DRT, an Excel spreadsheet model developed by EKI Environment and Water, Inc. The DRT model calculates monthly savings anticipated by implementing each stage of action as detailed below.

6.6.1 Baseline Water Use Profile

Using the DRT, MPMW developed a baseline water use profile that reflected usage patterns within MPMW's service area by major water use sector during 2019 and was used to guide development of the WSCP. Key findings from this analysis are presented below.

Residential Per Capita Demand

As shown in Table 6-3 and associated chart, MPMW's baseline R-GPCD demand in 2019 was approximately 62 R-GPCD. This R-GPCD is close to the BAWSCA-wide average of 61 R-GPCD but is significantly less than the statewide average of 85 R-GPCD.

Estimated Proportion of Outdoor Water Use

As shown in Table 6-4 and the associated charts, outdoor water use, which can generally be considered as a "discretionary water use", was estimated to be approximately 46% of MPMW's total consumption during this baseline time period (2019). Notably, dedicated irrigation meters accounted for approximately 26% of the total estimated irrigation demand, indicating that approximately 74% of outdoor water use is not metered with a separate meter, and is therefore more difficult to track and directly target.

The DRT estimates indoor water use to be equivalent to the lowest monthly water use for each sector, accounting for the number of days in each month. Outdoor water use for each sector was estimated to be the difference between the total water use and the estimated indoor water use. If MPMW customers tend to irrigate more heavily during winter months, an underestimation of the proportion of outdoor water use would occur.

The proportion of outdoor water use within residential and commercial sectors is estimated to be 41%. This indicates that there is the potential to achieve significant water savings across these sectors (e.g., up to WSCP Stage 4), simply by focusing on outdoor uses. If the proportion of outdoor water use is being underestimated by the DRT method, then even more substantial savings may be achieved through targeting outdoor water use. As further shown in Table 6-4 and the associated charts, the seasonal variation in baseline water use reflects increased irrigation demands during the summer and fall months. Therefore, the greatest potential for reductions in non-essential water use is expected during these months.

Table 6-3 Baseline Residential Per Capita Water Demand

	Baseline Residential Per Capita Water Demand (R-GPCD)
MPMW (a)	62
BAWSCA Agencies (b)	61
Statewide Average (c)	85

NOTES:
(a) MPMW R-GPCD calculated using 2019 metering data.
(b) Average BAWSCA R-GPCD calculated from data provided in BAWSCA Annual Survey FY 2018-19 (BAWSCA, 2020).
(c) State-wide R-GPCD for 2019 obtained from data provided at California State Water Resources Control Board Water Conservation Portal - Conservation Reporting, http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/conservation_reporting.shtml, accessed March 2021.

Chart 6-3 Baseline Residential Per Capita Water Demand

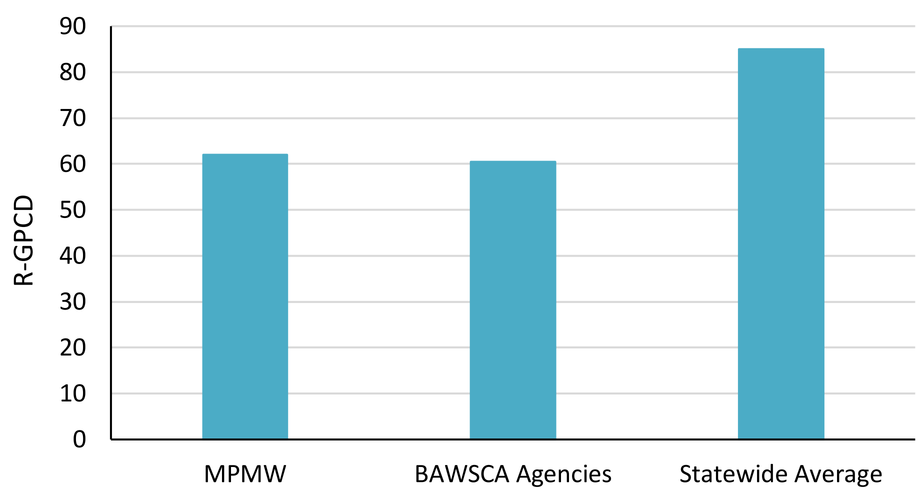


Table 6-4 Baseline Water Use Profile

Sector	End-Use	Baseline (2019) Water Use													Annual % of Total by Sector
		January	February	March	April	May	June	July	August	September	October	November	December	Annual	
Residential	Indoor	21	19	21	20	21	20	21	21	20	21	20	21	242	59%
	Outdoor	1	0	1	9	17	22	26	25	22	25	13	4	165	41%
	Subtotal Residential	*21*	*19*	*22*	*28*	*37*	*42*	*47*	*46*	*42*	*45*	*33*	*25*	*406*	-
CII	Indoor	23	21	23	22	23	22	23	23	22	23	22	23	268	59%
	Outdoor	0	0	5	15	17	22	31	30	26	27	11	2	186	41%
	Subtotal CII	*23*	*21*	*28*	*37*	*40*	*44*	*53*	*52*	*48*	*50*	*33*	*24*	*454*	-
Dedicated Irrigation	Outdoor	2	1	2	8	13	17	20	19	15	13	8	3	122	100%
Non-Revenue	Non-Revenue	6	6	3	-1	4	14	4	6	6	-3	6	0	50	100%
Total	Indoor	43	39	43	42	43	42	43	43	42	43	42	43	510	49%
	Outdoor	3	1	8	31	47	61	77	74	64	65	32	9	473	46%
	Non-Revenue	6	6	3	-1	4	14	4	6	6	-3	6	0	50	4.9%
	Total	**52**	**47**	**55**	**72**	**95**	**117**	**125**	**123**	**111**	**106**	**80**	**52**	**1,033**	-

NOTES:
(a) Volumes are in units of MG.
(b) Baseline water use from MPMW's monthly metering data for each sector.
(c) Indoor water use was estimated to be the lowest monthly water use for each sector, accounting for the number of days in each month. Outdoor water use for each sector was estimated to be the difference between the total water use and the estimated indoor water use.

Chart 6-4A Baseline Year Annual Water Use by Sector and End Use

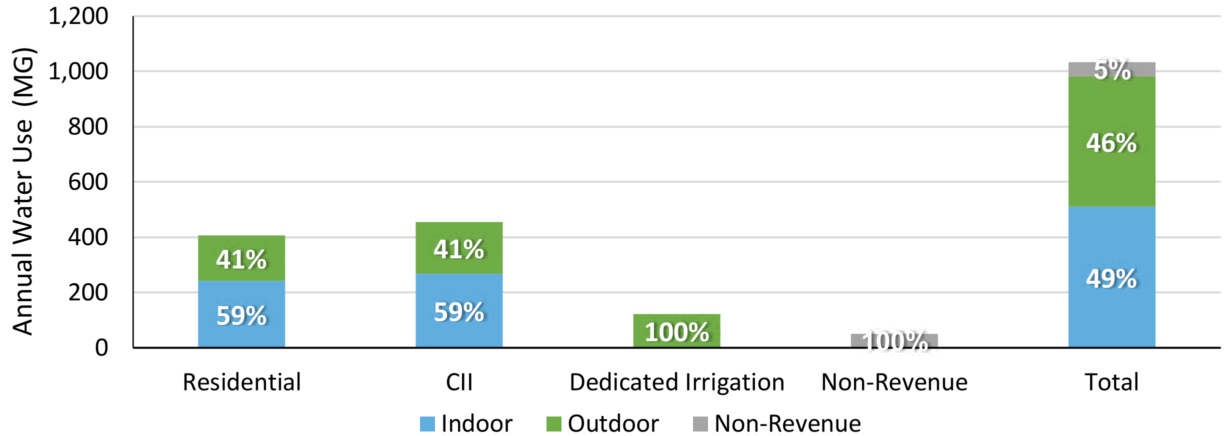
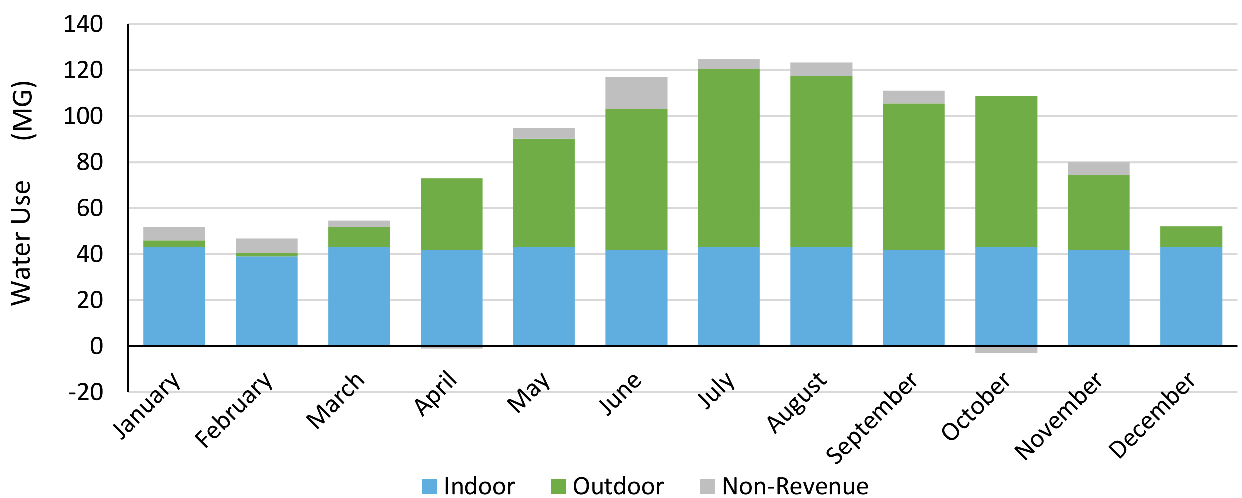


Chart 6-4B Baseline Year Monthly Indoor vs. Outdoor Water Use



6.6.2 Shortage Response Action Effectiveness

The DRT provides a quantitative framework that allows MPMW to systematically estimate the monthly and cumulative annual demand reductions expected to result from particular combinations of drought response actions and associated implementation rates. Data inputs to the DRT include total production, class-specific water use, population, and assumptions regarding the split between indoor and outdoor water use for each customer class.

For each drought response action, the user specifies:

- The customer class(es) and end use(s) that are affected;
- The percent savings for that end use for each account that implements the action. These are based on evaluations reported in the literature, or where such studies are not available, on best estimates based on MPMW's experience; and
- The percentage of accounts assumed to implement the action, which is presumed to be the result of the intensity level of MPMW's program implementation, including but not limited to, marketing and enforcement activities.

An additional critical DRT user input is a set of constraints on demand reductions to ensure that usage levels do not endanger health and safety or result in unacceptable economic impacts. The DRT will not permit estimated usage reductions to violate these constraints, regardless of the demand reduction actions selected. The constraints are:

- A minimum residential indoor per capita daily usage of 25 gallons,
- A maximum residential outdoor usage reduction of 100%,
- A maximum CII indoor usage reduction of 30%, and
- A maximum CII outdoor usage reduction of 100%.

Based on the foregoing data, the DRT model calculates the resulting monthly savings. MPMW adjusted the combination of actions and implementation levels to achieve the targeted savings levels at each of the six stages of action.

For each of the stages of action, the modeling targeted the mid-range of the required demand reduction range, ergo:

- 5% for Stage 1,
- 15% for Stage 2,
- 25% for Stage 3,
- 35% for Stage 4,
- 45% for Stage 5, and
- 55% for Stage 6.

MPMW's shortage response actions are summarized in Table 6-1 and Table 6-2. Key DRT inputs and outputs for each of the stages of action are reproduced in Attachment 3, including the water shortage reduction actions, savings assumptions, and implementation rates that are required for MPMW to achieve the required annual demand reductions for each of the six stages of action. At each stage, there are two types of demand-reduction actions identified:

- Restrictions on customer water usage; and
- Consumption reduction actions by MPMW to encourage decreased water usage.

Many actions are implemented across a number of stages, some at increasing implementation levels. Therefore the actions in Table 6-1 and Table 6-2 are listed as a row under the first stage at which they are implemented. The percentages shown in the tables represent savings of the end uses.

6.7 Catastrophic Supply Interruption

Catastrophic supply interruptions may be caused by a regional power outage, an earthquake, or other disaster. MPMW benefits from two levels of emergency planning: planning by SFPUC and its own emergency planning work. In the event of a catastrophic supply interruption, the response procedures that MPMW would follow are described in:

- SFPUC Emergency Operations Plan (EOP);
- San Mateo County's Operational Area EOP Potable Water Procurement and Distribution Annex;
- City of Menlo Park's EOP; and
- MPMW's Emergency Response Plan (ERP).

Actions described in the SFPUC EOP focus on maintaining flow within, and from, the SFPUC RWS pipelines. SFPUC's emergency preparedness procedures are described in detail in Attachment 4. City of Menlo Park's EOP was written in coordination with the County of San Mateo's Operational Area EOP Potable Water Procurement and Distribution Annex (County of San Mateo, 2004). Together, these EOPs provide the framework for responding to major emergencies or disasters associated with natural disasters, technological incidents, and national security/terrorism emergencies. Sections of these EOPs outline specific strategies to prepare for, mitigate, respond to, and recover from an emergency or disaster that affects the water utilities that serve the population within San Mateo County and the City, in particular.

MPMW's emergency planning efforts particular to its water distribution system are summarized below.

6.7.1 MPMW Emergency Response Plan

In accordance with the Emergency Services Act, MPMW has developed an ERP. This ERP guides response to unpredicted catastrophic events that might impact water delivery including regional power outages, earthquakes or other disasters. The ERP outlines standard operating procedures for all levels of emergency, from minor accidents to major disasters. Table 6-5 summarizes actions included in the ERP for specific catastrophic effects. MPMW's most recent ERP is dated 2016 and is being updated as required per Section 2013 of America's Water Infrastructure Act of 2018.

A water supply interruption may result in a partial or full interruption potable supply for MPMW and adjacent water suppliers. Therefore, the City plans for four levels of action triggers that depends on the severity and duration of a supply interruption. Table 6-6 summarizes MPMW's actions under each water supply action trigger.

In the seismic evaluation for MPMW, there was a recommendation to install saltwater standpipes at regular intervals, along its San Francisco Bay Frontage, to allow for additional firefighting capacity. MPMW has not pursued the recommendation at this time, because the Menlo Park Fire District has not identified this area as in need of additional fire protection. MPMW will re-evaluate this recommendation if substantial land use changes are proposed for this area.

Additionally, as discussed in Sections 6.2 and 6.7 of the 2020 UWMP, MPMW has constructed one emergency groundwater well (the Corporation Yard Well) which can produce up to 1,500 gpm of emergency/backup supply to the Lower Zone. Reservoir storage and an additional one or two emergency wells are being considered to achieve additional storage and another 1,500 gpm of supply capacity (for a total of 3,000 gpm). As the emergency storage and groundwater well(s) comes on-line, MPMW will add important redundancy and flexibility to its system and will have additional ability to manage catastrophic short-term interruptions in service.

Table 6-5 Preparation Actions for Catastrophes[2]

Possible Catastrophe	Summary of Actions
Earthquake	• Shut-off isolation valves and use of spare piping for ruptured mains • Storage supplies for service interruption • Portable and emergency generators available for facilities • Procedures for assessing water quality, notifying public, and disinfecting system
Flooding	• Portable and emergency generators available for facilities • Storage supplies for service interruption • Procedures for assessing water quality, notifying public, and disinfecting system
Toxic Spills (interrupts Agency Supply)	• Use of local groundwater • Procedures for assessing water quality, notifying public and disinfecting system
Fire	• Storage supplies for fire flows • Mutual aid plans and responders identified • Portable and emergency generators available for facilities
Power outage or grid failure	• Portable and emergency generators available for facilities
Severe Winter Storms	• Portable and emergency generators available for facilities
Hot Weather	• Portable and emergency generators available for facilities

[2] With completion of MPMW's Corporation Yard Well, MPMW may use groundwater supplies from the Corporation Yard Well depending on the impact to water supplies.

Table 6-6 Activation Action in Response to Supply Interruptions

Response Category	Sample Activation Triggers	Potential Activation Actions⊗
Level 0	• Changes in SFPUC wholesale water blends due to seasonal changes or plant maintenance • No loss in water supply	• None
Level 1	• Possible partial or full shutdown of SFPUC water supply source • Potential turnout threat	• Fill reservoirs and standby • Activate security monitoring of critical facilities (see ***Appendix 1***) • Mandatory rationing • Contact bottled water companies • Open water distribution points on reservoirs • Request assistance through WARN agreement
Level 2	• Complete loss of SFPUC supply (lasting < 24 hours*)	• Notify customers • Operate reservoirs • Close turnout(s) • Turn on pump stations • Open 4 key isolation valves • Mandatory rationing • Contact bottled water companies • Open water distribution points on reservoirs • Request assistance through WARN agreement
Level 3 (possible EOC activation)	• Complete loss of SFPUC supply (lasting > 24 hours*)	• Notify customers • Turn on wells • Open interties • Open remaining isolation valves • Mandatory rationing • Contact bottled water companies • Open water distribution points on reservoirs • Request assistance through WARN agreement

* The 24-hour period is an estimate only. The actual time period shall be the length of time that the City can supply reservoir water.

7. SEISMIC RISK ASSESSMENT

☑ ***CWC § 10632.5***

(a) In addition to the requirements of paragraph (3) of subdivision (a) of Section 10632, beginning January 1, 2020, the plan shall include a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities.

(b) An urban water supplier shall update the seismic risk assessment and mitigation plan when updating its urban water management plan as required by Section 10621.

(c) An urban water supplier may comply with this section by submitting, pursuant to Section 10644, a copy of the most recent adopted local hazard mitigation plan or multihazard mitigation plan under the federal Disaster Mitigation Act of 2000 (Public Law 106-390) if the local hazard mitigation plan or multihazard mitigation plan addresses seismic risk.

Ballantyne Consulting completed a Seismic Vulnerability Assessment for MPMW's water distribution system in July 2017. The report was incorporated into the MPMW 2018 Water Master Plan.[3]

In addition, as part of MPMW's Sand Hill Reservoir #2 Roof Replacement Project, Beyaz & Patel, Inc. (2019) performed a structural and seismic evaluation of Reservoir #2 and developed structural and seismic design criteria for the project. Construction of the Reservoir #2 Roof Replacement project is anticipated to start in fall 2021 and be completed by fall 2022.

[3] MPMW's 2018 Water Master Plan can be accessed at https://www.menlopark.org/watersystemmasterplan.

8. COMMUNICATION PROTOCOLS

☑ ***CWC § 10632 (a) (5)***

Communication protocols and procedures to inform customers, the public, interested parties, and local, regional, and state governments, regarding, at a minimum, all of the following:

(A) Any current or predicted shortages as determined by the annual water supply and demand assessment described pursuant to Section 10632.1.

(B) Any shortage response actions triggered or anticipated to be triggered by the annual water supply and demand assessment described pursuant to Section 10632.1.

(C) Any other relevant communications.

Each stage of the WSCP is implemented with a formal declaration by the City Council upon the determination that the SFPUC or another governing authority (e.g., the SWRCB) has required a voluntary or mandatory reduction in water use due to a water supply shortage or emergency. Procedures for water shortage declaration and termination are detailed below in Section 8.1.

Even before formal declaration of a water shortage, a public information program will be activated to provide customers with as much advance notice as possible. Following declaration of a shortage, MPMW's customers would need to be provided notice of water shortage rules and regulations via a variety of media and communications methods.

Coordination between MPMW and with other public agencies can begin prior to formal declaration of a water shortage and can be accomplished through regular meetings, e-mail group updates, and presentations. In a regional water shortage scenario, MPMW would use the public outreach resources and materials provided by BAWSCA and/or the SFPUC. In addition to these materials, MPMW may develop its own materials to communicate with customers, such as a dedicated customer service hotline, and expand its normal public outreach to support its water conservation efforts (see Chapter 9 of the 2020 UWMP). Communication and public outreach actions to be taken by MPMW under each shortage level are detailed in Table 6-2.

As discussed in Chapter 9 of the 2020 UWMP, the City has several staff members that jointly share the responsibility for water conservation. Staff time dedicated to water conservation and enforcement action will increase with the severity of a supply shortage. Additional duties may be assigned to current employees or hiring of temporary staff may be considered to meet staffing needs during extreme water shortages.

8.1 Water Shortage Declaration and Termination Procedures

The provisions of each water shortage stage of action are triggered upon the City Council's determination that a Governing Authority has required MPMW to achieve a voluntary or mandatory reduction in water use because of water shortage conditions.

The stage of action will become effective after the City Council declares a particular stage of action and MPMW has notified its customers of this determination. Once effective, the provisions of a water shortage stage of action will stay in effect until: (1) the City Council declares a different stage of action; or (2) the City Council determines that the water shortfall condition no longer exists and MPMW has notified its customers of this determination.

After the termination of the water shortage conditions, MPMW will oversee any remaining termination and WSCP review activities. These activities could include:

- Publicize gratitude for the community's cooperation.
- Restore water utility operations, organization, and services to pre-event levels.
- Document the event and response and compile applicable records for future reference.
- Collect cost accounting information, assess revenue losses and financial impact, and review deferred projects or programs.
- Debrief staff to review effectiveness of actions, to identify the lessons learned, and to enhance response and recovery efforts in the future.
- Update the WSCP, as needed.

9. COMPLIANCE AND ENFORCEMENT

☑ ***CWC § 10632 (a) (6)*** *For an urban retail water supplier, customer compliance, enforcement, appeal, and exemption procedures for triggered shortage response actions as determined pursuant to Section 10632.2.*

Enforcement of MPMW's water use restrictions and prohibitions focuses on soliciting cooperation from water customers who are unaware of the restrictions or have failed to comply with the provisions of the City's Water Conservation Ordinance (City Municipal Code Title 7, Chapter 7.35) and this WSCP. If discussions with the customer are unsuccessful in obtaining compliance, MPMW is authorized to issue penalties to customers that violate the restrictions and prohibitions. The City's current compliance and enforcement procedures are adopted in City Resolution No. 6383.

Table 9-1 describes the penalties, charges, and other enforcement actions that MPMW is authorized to take after each violation of the WSCP. The City takes progressively increasing actions associated with more egregious levels of violations. Actions range from a warning after the first violation, up to a $500 fine and discontinuance of water service after the sixth violation. As shown in Table 9-2, customers will incur additional charges for installation and removal of flow restricting devices and disconnection and reconnection of service if MPMW deems these actions necessary. Customers may contest a fine by submitting a written appeal to the Public Works Director within thirty (30) days of the fine.

Additionally, as shown in Table 6-2, MPMW will facilitate compliance with the WSCP by employing increasing levels of customer service, public outreach, and water-waste patrols with increasing shortage levels.

The City employees and members of the public may report water waste complaints through the City's website at www.menlopark.org/waterwaste. Staff is available to provide information and respond to complaints. Staff may also seek assistance from other City Departments in responding to complaints and enforcing water use restrictions.

Table 9-1 Enforcement of Water Use Restrictions and Prohibitions

Violation	Enforcement Action or Penalty
1st	Warning Only. Educate customer on proper water conservation practices
2nd	$50 fine
3rd	$100 fine
4th	$200 fine and review by the Public Works Director (or his or her designee) to determine if a flow restricting device should be installed
5th	$500 fine, and review by the Public Works Director (or his or her designee) to determine if water service should be discontinued
6th	$500 fine and water service shall be discontinued

References:

(1) City of Menlo Park, Resolution No. 6383, Resolution of the City Council of the City of Menlo Park Adopting a Water Conservation Plan, 2 May 2017.

Table 9-2 Charges for Installation or Removal of Flow Restricting Devices and Disconnection or Reconnection of Service

Meter Size	Installation Cost	Removal Cost
Charges for Installation or Removal of Flow Restricting Devices		
5/8" to 2"	$155.00	$155.00
3" or larger	Actual Cost	Actual Cost
Charges for Disconnecting and Reconnecting Service		
All sizes	$155.00	$155.00

References:

(1) City of Menlo Park, Resolution No. 6383, Resolution of the City Council of the City of Menlo Park Adopting a Water Conservation Plan, 2 May 2017.

10. LEGAL AUTHORITIES

☑ ***CWC § 10632 (a) (7)***

(A) A description of the legal authorities that empower the urban water supplier to implement and enforce its shortage response actions specified in paragraph (4) that may include, but are not limited to, statutory authorities, ordinances, resolutions, and contract provisions.

(B) A statement that an urban water supplier shall declare a water shortage emergency in accordance with Chapter 3 (commencing with Section 350) of Division 1.

(C) A statement that an urban water supplier shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code.

☑ ***CWC § 10632.3***

It is the intent of the Legislature that, upon proclamation by the Governor of a state of emergency under the California Emergency Services Act (Chapter 7 (commencing with Section 8550) of Division 1 of Title 2 of the Government Code) based on drought conditions, the board defer to implementation of locally adopted water shortage contingency plans to the extent practicable.

As discussed above, MPMW has authority within Section 7.35 of the City's Municipal Code to require water rationing and conservation and to enforce penalties. Municipal Code Section 7.35 is included as Attachment 1 of this WSCP. The City’s current WSCP stage and water waste prohibitions in effect were adopted in 2017 in Resolution 6383. An adopted water shortage contingency resolution corresponding to this 2021 WSCP update is included as Attachment 5.

MPMW shall declare a water shortage emergency in accordance with Water Code Chapter 3 (commencing with Section 350) of Division 1. MPMW shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency. A list of contacts for other water suppliers within the City of Menlo Park, and the County of San Mateo is provided below:

California Water Service, Bear Gulch District	(650) 561-9709
O’Connor Tract Co-operative Water	(650) 321-2723
Palo Alto Park Mutual Water Company	(650) 322-6903
San Mateo County Environmental Health	(650) 372-6200

MPMW is a member of BAWSCA and anticipates coordinating with other Member Agencies via BAWSCA during a water shortage or emergency on the SFPUC RWS.

11. FINANCIAL CONSEQUENCES OF WSCP

☑ ***CWC § 10632 (a) (8)***

A description of the financial consequences of, and responses for, drought conditions, including, but not limited to, all of the following:

(A) A description of potential revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4).

(B) A description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4).

(C) A description of the cost of compliance with Chapter 3.3 (commencing with Section 365) of Division 1.

In the event of a drought, if MPMW anticipates significant loss in revenue due to decreased consumption, MPMW may increase its water rates so that customers are charged for the actual cost of providing water during a shortage. These rates will be specified in MPMW's water rate schedule, as approved by the City Council and in accordance with Proposition 218 requirements.

Black & Veatch Management Consulting prepared a Water Rate Study for MPMW in March 2021 (Black & Veatch Management Consulting, 2021). The study includes an analysis of projected revenue and expenditure impacts resulting from implementation of the 2020 WSCP during periods of water shortage. To promote financial stability during water supply shortages, the 2021 Water Rate Study includes drought surcharge rates designed to compensate for lost revenue due to decreased volumetric water sales and additional expenses related to implementation of the WSCP. The City approved the five-year water rates including the drought surcharge rates on May 11, 2021. The drought surcharge rates are levied on all usage temporarily until MPMW determines that water supply conditions have returned to normal and drought-related expenditures and lost revenue have been recovered[4].

As shown in Table 6-2, the City will enforce a drought surcharge rate in each water shortage level. The City's drought surcharge rate prohibits excessive water use pursuant to CWC §365 et seq. The cost of compliance with CWC §365 et seq. has been considered in the development of the drought rate schedule in the 2021 Water Rate Study.

In addition, MPMW manages an emergency reserve fund to address the potential financial impacts of a severe drought. The City may also defer expense on capital improvement projects during a severe drought.

[4] Current City of Menlo Park five-year water rate structure including drought surcharge rate located online at https://www.menlopark.org/waterrates.

12. MONITORING AND REPORTING

☑ ***CWC § 10632 (a) (9)*** *For an urban retail water supplier, monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance and to meet state reporting requirements.*

MPMW monitors water use through analysis of wholesale water purchases and customer meter readings. MPMW reads meters installed on each of its supply turnouts to monitor wholesale water purchases, and SFPUC's AMI Eye On Water portal provides real-time turnout meter reads. In addition, each customer account is metered. Some non-residential and multi-family customers also have separate irrigation meters to monitor water use for landscape irrigation separately from indoor uses. The City's Water Efficient Landscaping Ordinance (February 2016) requires non-residential projects to install a separate irrigation meter if landscaped areas meet specific size thresholds.

MPMW contracts to have all meters read on a monthly basis. During a supply shortage, MPMW will continue to monitor water use on this schedule to determine the effectiveness of the customer response to the implementation of this WSCP. Monthly water meter readings also allow MPMW to document atypically high water use and notify individual customers to resolve the cause of the high water use.

In addition, MPMW is planning to install advanced metering infrastructure (AMI) over the next two fiscal years. Implementation of AMI will allow MPMW to automate meter reading and provide real-time water use data to MPMW staff and customers that can be used to aggressively target leaks and atypically high water use during normal years and periods of water shortage.

Pursuant to California Code of Regulations (CCR) Title 23 §991, MPMW reports monthly water use and production to the SWRCB[5]. Effective October 1, 2020, during a governor declared drought emergency or when an urban water supplier invokes a water shortage level to respond to a drought greater than 10%, each supplier is required to submit an expanded report that contains the supplier's actions and statistics in achieving planning reductions.

[5] Water supplier monthly reports can be accessed at https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/conservation_reporting.html

13. WSCP REFINEMENT PROCEDURES

☑ ***CWC § 10632 (a) (10)*** *Reevaluation and improvement procedures for systematically monitoring and evaluating the functionality of the water shortage contingency plan in order to ensure shortage risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented as needed.*

The WSCP is implemented as an adaptive management plan. MPMW will evaluate the need to revise its WSCP every year after performing its Annual Assessment. The evaluation will consider effectiveness of WSCP actions and any anticipated water supply shortages assessed by the Annual Assessment. If the WSCP is revised, the City Council will adopt a new resolution adopting the revised WSCP, and if necessary, declare a water shortage level to implement.

14. PLAN ADOPTION, SUBMITTAL, AND AVAILABILITY

☑ ***CWC § 10632 (c)*** *The urban water supplier shall make available the water shortage contingency plan prepared pursuant to this article to its customers and any city or county within which it provides water supplies no later than 30 days after adoption of the water shortage contingency plan.*

MPMW informed the public and the appropriate agencies of: (1) its intent to prepare a WSCP, (2) where the WSCP was available for public review, and (3) when the public hearing regarding the WSCP would be held. All notifications were completed in compliance with the stipulations of Section 6066 of the Government Code.

A copy of the adopted 2020 WSCP including any amendments will be provided to the Department of Water Resources (DWR), the California State Library, San Mateo County, and SFPUC within 30 days of the adoption. An electronic copy of the adopted 2020 WSCP will be submitted to the DWR using the DWR online submittal tool.

A copy of the adopted 2020 WSCP will be available for public review in the City Hall during normal business hours and on MPMW website within 30 days after filing the plan with DWR.

REFERENCES

BAWSCA, 2020. *Bay Area Water Supply and Conservation Agency Annual Survey FY 2018-19*, March 2020.

Beyaz & Patel, Inc., 2019. *Preliminary Design Report for Sand Hill Reservoir #2 Roof Replacement Project*, April 2019.

Black & Veatch Management Consulting, 2021. *City of Menlo Park Water Rate Study 2021*, March 2021.

County of San Mateo, 2004. *San Mateo County/Operational Area Emergency Operations Plan, Potable Water Procurement and Distribution Annex*, *3rd Edition*, July 2004.

Infrastructure Engineering Corporation, 2016. *Corporation Yard Emergency Back-Up Water Supply Well No. 1 Initial Study/Mitigated Negative Declaration*, April 2016.

ATTACHMENT 1
SECTION 7.35 OF CITY OF MENLO PARK'S MUNICIPAL CODE

Chapter 7.35
WATER CONSERVATION

Sections:

7.35.010 Purpose.

The purpose of this chapter is to promote water conservation and provide the city with the flexibility to respond to a drought emergency whether it be emergency regulations adopted by the State Water Board, or drought-related actions imposed by the San Francisco public utilities commission. (Ord. 1011 § 4 (part), 2014: Ord. 1010 § 4 (part), 2014).

7.35.020 Water conservation.

Upon the adoption of emergency water conservation regulations by the State Water Board and within the timelines prescribed by the State Water Board, or drought-related actions imposed by the San Francisco public utilities commission, the city council of the city of Menlo Park shall adopt by resolution a water conservation plan that mandates those water conservation measures. (Ord. 1011 § 4 (part), 2014: Ord. 1010 § 4 (part), 2014).

7.35.030 Penalty.

Any violations of the water conservation plan shall be an infraction or enforced as provided in the resolution adopted pursuant to Section 7.35.020. (Ord. 1011 § 4 (part), 2014: Ord. 1010 § 4 (part), 2014).

ATTACHMENT 2
ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES

ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES

Each year the SFPUC evaluates the amount of total water storage expected to occur throughout the RWS and compares it to expected demands. This annual Water Supply and Demand Assessment (WSDA) is described in the subsections below, which are organized by the sequential steps the SFPUC takes to conduct the assessment each year and reference the relevant California Water Code requirements for a WSDA.[1]

The SFPUC's annual WSDA is a robust planning system that considers a range of input factors unique to the SFPUC's water supplies and system configuration while also providing the flexibility to consider new factors. Traditional surface water supplies from the SFPUC's up country, East Bay, and Peninsula reservoirs are the backbone of the water supply, but the SFPUC extends and protects those supplies in many additional ways by: (1) partnering with the community to help save water through robust conservation programs; (2) minimizing the need for additional water to serve new developments through an onsite water reuse program; (3) recycling wastewater resources to deliver water for large non-potable uses; (4) utilizing local groundwater supplies to supplement surface water supplies; (5) investigating new, alternative water supply options such as purified water and desalination; 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 likelihood of a water shortage condition.

1.1 DEMAND ASSESSMENT [WATER CODE SECTION 10632(A)(2)(B)(I)]

To calculate unconstrained customer demand for the purpose of an annual WSDA, the SFPUC collects information on both the retail and wholesale system demands. Retail customer demand is estimated based on the best available information to date, and typically includes the previous year's demands as well as consideration of current demand use patterns or other conditions impacting demands, such as weather and growth. Each year, in February, the SFPUC receives from BAWSCA a report of estimated Wholesale Customer demand for the upcoming year. BAWSCA typically estimates unconstrained demands for the Wholesale Customers by using total water purchased by those customers in the prior year along with other relevant information. Relatively small demands from the two additional wholesale customers not part of the WSA are estimated based on the best available information to date, and typically includes the previous year's demands as well as consideration of current demand use patterns or other conditions impacting demands, such as weather and growth.

1.2 SUPPLY ASSESSMENT [WATER CODE SECTIONS 10632(A)(2)(B)(II) AND 10632(A)(2)(B)(V)]

The RWS collects water from the Tuolumne River watershed in the Sierra Nevada and from local reservoirs in the Alameda and Peninsula watersheds. The RWS draws an average of 85 percent 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 RWS supply is drawn from local surface waters in the Alameda and Peninsula watersheds. The split between these resources varies from year to year depending on the water year hydrology and operational circumstances.

To project and evaluate water supply conditions, the SFPUC uses measurements of precipitation and snowpack in the watersheds above Hetch Hetchy, Cherry, and Eleanor Reservoirs. Snowpack conditions are evaluated regularly by the Cooperative Snow Survey (conducted by the SFPUC in partnership with state and federal agencies) beginning in late January of each year. The SFPUC also estimates snowpack conditions using information from airborne snow observatory (ASO) and other sources. The SFPUC maintains a hydrologic model

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[1] California Water Code section 10632(a)(1) requires "*the analysis of water supply reliability conducted pursuant to Section 10635.*" Additional information about the SFPUC's water supply reliability analysis can be found in Chapter 7 of the SFPUC's 2020 UWMP.

of the watersheds that uses this information to project expected 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 takes into account stored water throughout the RWS, water acquired by the SFPUC from non-SFPUC sources, inactive storage, 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, such that water stored in previous years is relied upon to meet demands. Because of the importance of carry-over storage, the SFPUC constantly monitors and evaluates water supply conditions in the RWS. Look-ahead forecasts are updated 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 condition. 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 1.3 describes the system modeling SFPUC conducts

Table 0-1 shows the availability of RWS supplies for retail customers and Wholesale Customers in normal years. Table 0-2 shows the current and projected RWS supply needs to meet retail and wholesale demands based on information and projections presented in the SFPUC's 2020 UWMP.

The SFPUC sells water to 26 of its 28 wholesale customers under the terms of the 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. The WSA carries forward 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. The WSA also describes the temporary limitation on water sales established by the Phased Water System Improvement Plan (WSIP) in 2008. This "Interim Supply Limitation" (ISL) limits water sales from the RWS to an average annual amount of 265 mgd. The WSA allocations the ISL between the SFPUC's retail customers and Wholesale Customers as follows:

- Wholesale supply allocation: 184 mgd
- Retail supply allocation: 81 mgd[2]

Table 0-1. Regional Water System Supply Availability in Normal Years (mgd)

RWS Supply Allocation	Actual	Projected				
	2020	2025	2030	2035	2040	2045
Retail Customers[a, b]	81	81	81	81	81	81
Wholesale Customers[c, d]	184	184	184	184	184	184

2 Groveland CSD is considered a retail customer of the SFPUC. Thus, RWS supplies to Groveland CSD are accounted for in the retail supply allocation of 81 mgd.

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 Groveland CSD is reported as a wholesale customer for the purposes of this 2020 UWMP, but it is considered a retail customer of the SFPUC solely for purposes of allocating RWS supplies between retail and Wholesale Customers. Its demands would be met by 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, with their total supply not exceeding 9 mgd assuming supply is available (decision to be made by end of 2028).

d Cordilleras MWC is not a party to the WSA, and it is not included in the wholesale 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 2045.

Table 0-2. Regional Water System Supply Utilized in Normal Years (mgd)

RWS Supply Allocation	Actual	Projected				
	2020	2025	2030	2035	2040	2045
Retail Customers[a, b]	66.5	67.2	67.5	68.6	70.5	73.7
Wholesale Customers[c, d]	132.1	146.0	147.9	151.9	156.3	162.8
Total RWS Supplies	198.6	213.2	215.4	220.5	226.8	236.5

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 Groveland CSD is reported as a wholesale customer for the purposes of this 2020 UWMP, but it is considered a retail customer of the SFPUC solely for purposes of allocating RWS supplies between retail and Wholesale Customers. Its demands would be met by 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, with their total supply not exceeding 9 mgd assuming supply is available (decision to be made by end of 2028).

d Cordilleras MWC is not a party to the WSA, and it is not included in the wholesale 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 2045.

1.3 INFRASTRUCTURE CONSIDERATIONS [WATER CODE SECTION 10632(A)(2)(B)(III)]

On an ongoing basis, the SFPUC's Hetch Hetchy Water and Power, Water Supply and Treatment Division, and Hydrology and Water Systems group conduct analyses of the RWS that incorporate planned facility outages and multiple levels of projected system demands to evaluate and plan for potential water delivery constraints. These 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 system are evaluated extensively prior to initiation of any changes. Results from these modeling efforts are considered in the annual WSDA.

1.4 SYSTEM MODELING [WATER CODE SECTION 10632(A)(2)(B)(IV)]

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 supply rationing is added 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 rationing, is maintained through the design drought sequence.

Estimated rationing levels and corresponding storage threshold values 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 rationing 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 comparison for 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 water supply rationing 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.

1.5 DECISION-MAKING PROCESS [WATER CODE SECTION 10632(A)(2)(A)]

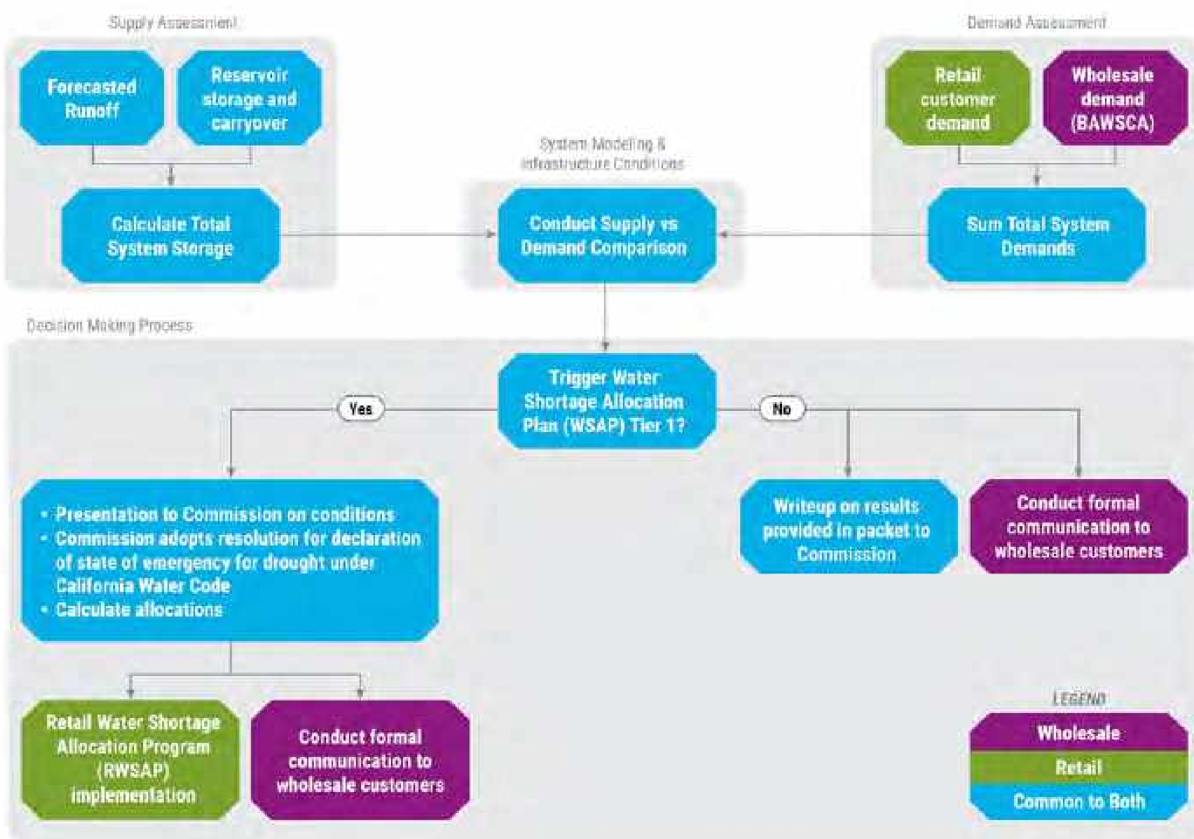
Regardless of the expectation of shortage conditions, as part of the normal course of business, the SFPUC provides a water supply condition update to its executive team every two weeks throughout the year. The SFPUC also provides water supply estimates to its Wholesale Customers on a monthly basis beginning February 1. A Wholesale Customer Annual Meeting is held in the last week of February at which the SFPUC makes a presentation on current water supply conditions and forecasts. The last snow survey of the season typically occurs within the first week of April, followed by a runoff forecast to determine total system storage expected as of July 1. By the middle of April, the SFPUC sends a formal letter to the Wholesale Customers summarizing the water supply availability for the coming year.

If the RWS appears incapable of meeting system-wide demand due to drought, the SFPUC is expected to declare a water shortage by March 31 of that drought year. The General Manager, or designee, is responsible for declaring such a shortage. A presentation would be made to the Commission as part of the General Manager's report, showing 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 Commission may adopt a resolution declaring a water shortage emergency under the California Water Code, or lesser actions such as a call for voluntary conservation efforts.

Prior to the initiation of 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 drought response plan to address the following: the water supply situation; proposed water use reduction objectives; alternatives to water use 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 **Error! Reference source not found.**. This drought response plan will be presented at a regularly scheduled SFPUC Commission meeting and advertised in accordance with the requirements of Section 6066 of the California Government Code.

The overall WSDA process is described visually in the flowchart presented in Figure 0-1.

Figure 0-1: Water Supply and Demand Assessment Process



ATTACHMENT 3
DROUGHT RESPONSE TOOL QUANTITATIVE ASSESSMENT

Drought Response Tool

Home | Input Baseline Year Water Use | Baseline Year Water Use Profile | Drought Response Actions | Estimated Water Savings | Drought Response Tracking

1 - Home

Menlo Park Municipal Water

Enter Agency Information	
Agency Name	Menlo Park Municipal Water
Total Population Served	17,780
Number of Residential Accounts	3,577
Number of Commercial, Industrial, and Institutional (CII) Accounts	462
Number of Dedicated Irrigation Accounts	142
Baseline Year(s)	2019
Percentage of Residential Indoor Use During Minimum Month (%)	100%
Percentage of CII Indoor Use During Minimum Month (%)	100%
Comments	

Navigation	
USER'S GUIDE	Download and read the guide before using this Tool
1 - HOME	Enter agency information
2 - INPUT BASELINE YEAR WATER USE	Enter Baseline Year production and use
3 - BASELINE YEAR WATER USE	Review and confirm entered information
4 - DROUGHT RESPONSE ACTIONS	Select Drought Response Actions and input estimated water savings and implementation rates.
5 - ESTIMATED WATER SAVINGS	Review estimated water production and compare estimated savings to conservation target.
6 - DROUGHT RESPONSE TRACKING	Track production and water savings against the conservation target.

Drought Response Tool

Home | Input Baseline Year Water Use | Baseline Year Water Use Profile | Drought Response Actions | Estimated Water Savings | Drought Response Tracking

1 - Home

Menlo Park Municipal Water

For questions about this tool or for additional information, contact:

Anona Dutton, P.G., C.Hg.
adutton@ekiconsult.com
(650) 292-9100

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2 - Input Baseline Year (2019) Water Use

Menlo Park Municipal Water

Input Baseline Year (2019) Production and Water Use

Units: (mg)

Select the units to input monthly production and use data. Enter the total monthly potable water production for the Baseline Year. Next, enter monthly water use data by sector for the Baseline Year. If you bill on a bi-monthly basis, divide your billing data between the months that the billing cycle includes. If your single-family and multi-family accounts are tracked separately, enter the combined water use for both sectors in the Residential Water Use column. If your commercial, industrial, and institutional (CII) accounts are tracked separately, enter the combined water use for each sector in the CII Water Use column. Your non-revenue water use is calculated by subtracting your monthly residential, CII, and dedicated irrigation water uses from your monthly production. Your monthly residential gallons per capita per day (R-GPCD) is calculated by dividing your monthly residential water use by your population entered in Worksheet 1 - Home.

Date	Total Production (mg)	Residential Water Use (mg)	CII Water Use (mg)	Dedicated Irrigation Water Use (mg)	Non-Revenue Water Use (mg)	Total R-GPCD	Comments
January	52	21	23	2	6	39	
February	47	19	21	1	6	37	
March	55	22	28	2	3	39	
April	72	28	37	8	-1	53	
May	95	37	40	13	4	67	
June	117	42	44	17	14	79	
July	125	47	53	20	4	85	
August	123	46	52	19	6	83	
September	111	42	48	15	6	79	
October	106	45	50	13	-3	82	
November	80	33	33	8	6	61	
December	52	25	24	3	0	45	

3 - Baseline Year (2019) Water Use Profile

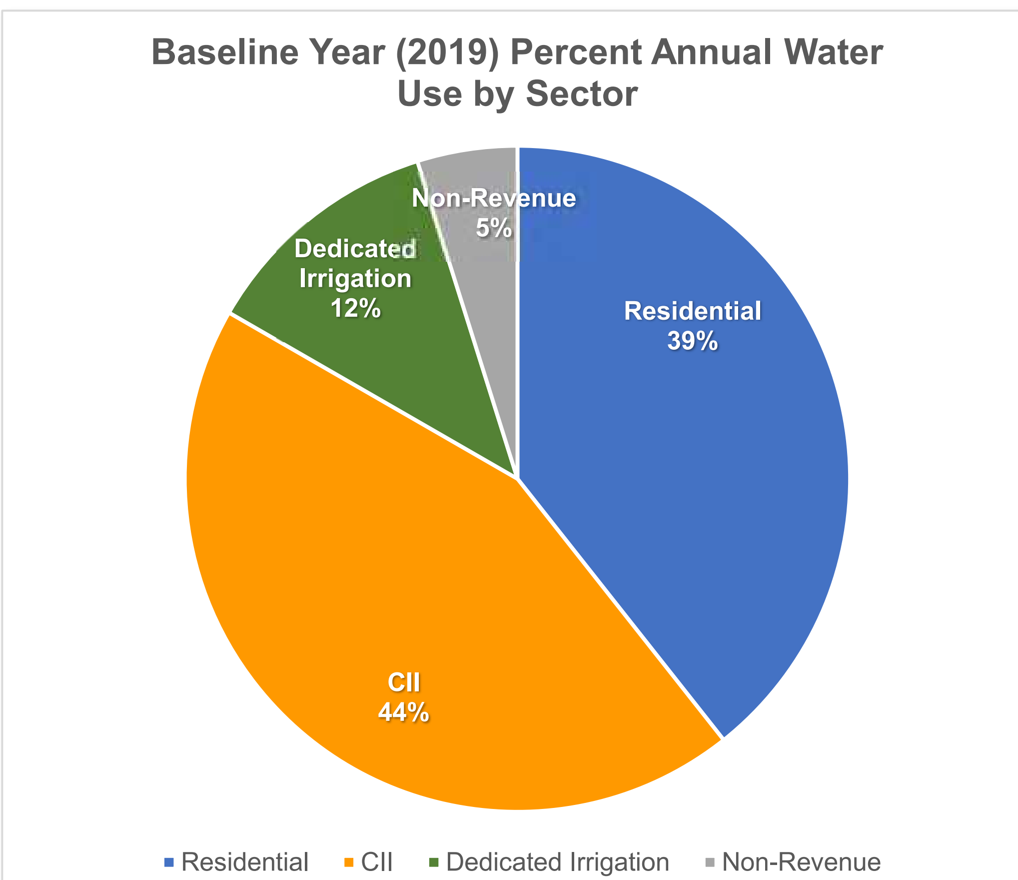
Menlo Park Municipal Water

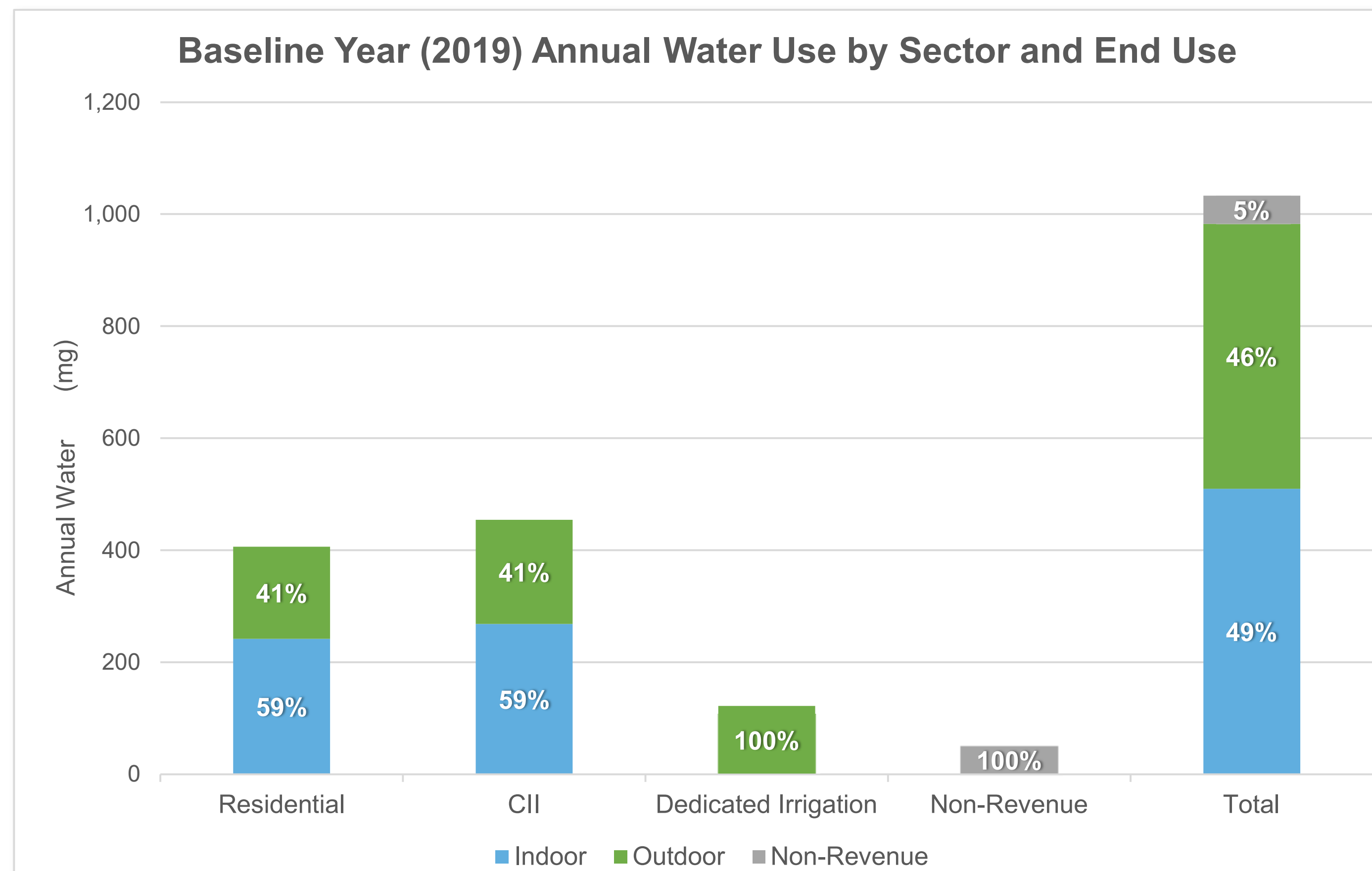
Baseline Year (2019) Annual Water Use Summary

Units: (mg)

A summary of your Baseline Year water use by sector and major end use category is shown below. Select the units in which your production and use data are displayed.

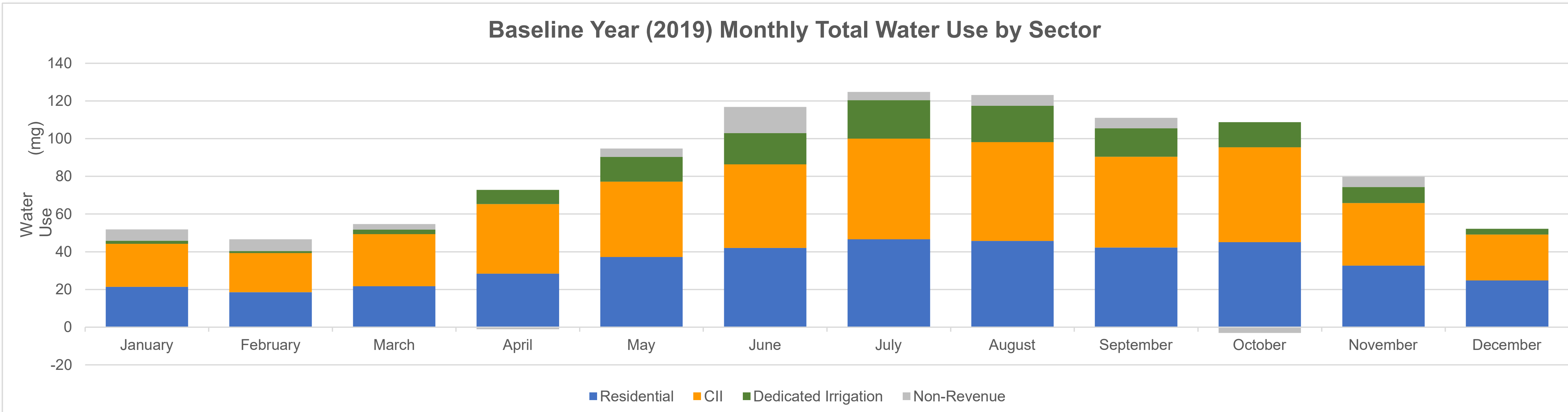
Water Use	Total Production (mg)	Water Use (mg)				Comments
		Residential	CII	Dedicated Irrigation	Non-Revenue	
Total	1,033	406	454	122	50	
Total Indoor	510	242	268	--	--	
Total Outdoor	473	165	186	122	--	
Total Non-Revenue	50	--	--	--	50	
Total Indoor %	49%	59%	59%	0%	--	
Total Outdoor %	46%	41%	41%	100%	--	
Total Non-Revenue %	5%	--	--	--	100%	

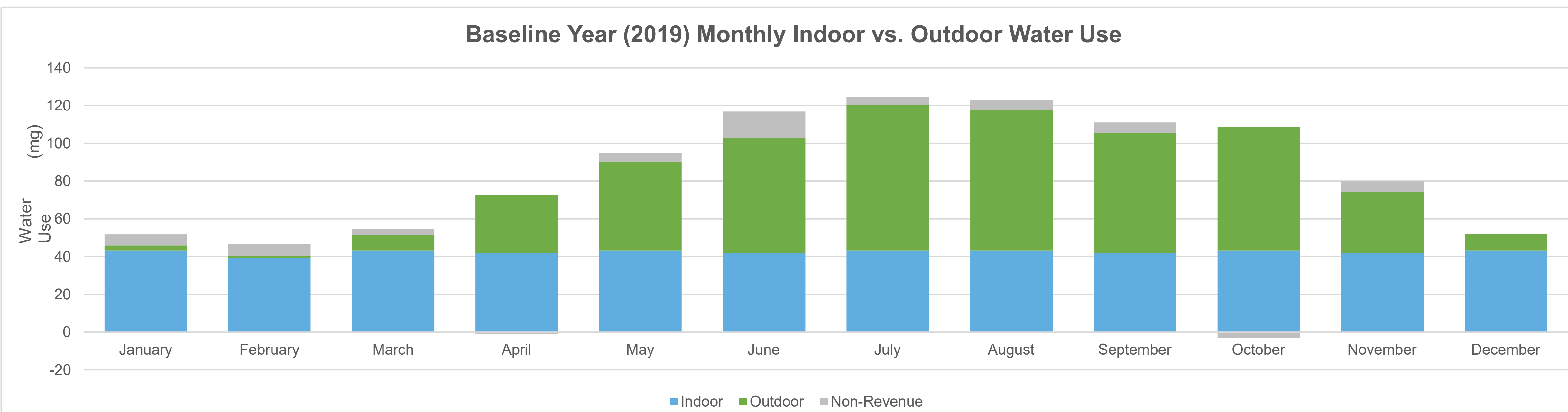




3 - Baseline Year (2019) Water Use Profile

Menlo Park Municipal Water





4 - Drought Response Actions - Stage 1

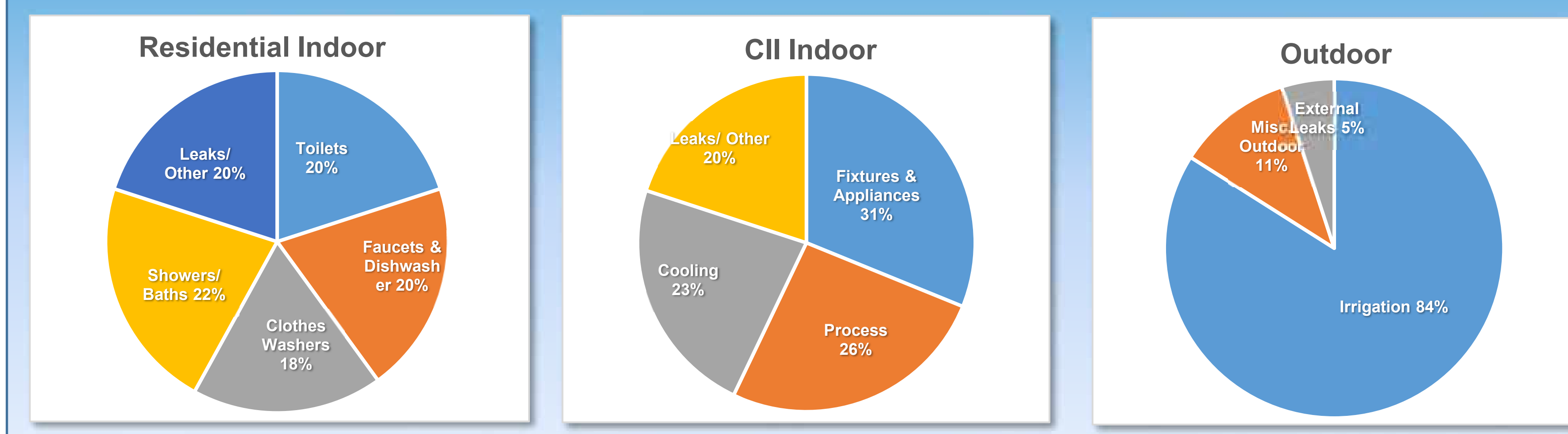
Menlo Park Municipal Water

Maximum Savings Potential

Use the default values or enter your own criteria for the maximum savings potential. Estimated water savings within each sector will not exceed the maximum savings criteria.

Minimum Residential Indoor GPCD	25	R-GPCD
Maximum Residential Outdoor Savings	100%	of Baseline Residential Outdoor Water Use
Maximum CII Indoor Savings	30%	of Baseline CII Indoor Water Use
Maximum CII Outdoor Savings	100%	of Baseline CII Outdoor Water Use
Maximum Dedicated Irrigation Account Savings	100%	of Baseline Dedicated Irrigation Water Use
Maximum Non-Revenue Water Savings	50%	of Baseline Non-Revenue Water Use
Resulting Total Maximum Annual Savings Potential	**64%**	of Total Baseline Production

Assumed Proportion of Water Use by End Uses and Sector



4 - Drought Response Actions - Stage 1

Menlo Park Municipal Water

Drought Response Actions

Select the Drought Response Actions you would like to include in your estimated savings calculations. For each selected action, use the default end use savings estimates and implementation rates or input your own values. The "End Use Savings" estimates the percent water use reduction that could occur at a particular end use as a result of a specific action. The "Implementation Rate" refers to the estimated percentage of accounts that will implement a specific action. The water savings potential at each end use is capped based on the assumed distribution of end use water demands shown in the pie charts above. A dash (--) indicates that professional judgement was used to establish the default value, or that savings are expected to be accounted for as part of a Public Information Program; additional basis for the default values are included in the User Manual.

Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ **Possible Mandatory Prohibitions**	All Outdoor	☑	14%	**35%**	--	--
Prohibit Irrigation with Potable Water Outside of Newly Constructed Homes and Buildings that is not Delivered by Drip or Microspray Systems	Irrigation	☐			--	--
Require Shut-Off Nozzles on Hoses for Vehicle Washing	Misc. Outdoor	☑	17%	50%	See Appendix D of the DRP	--
Prohibit Use of Potable Water to Wash Sidewalks and Driveways	Misc. Outdoor	☐	17%	50%		--
Prohibit the Use of Potable Water for Street Washing	Misc. Outdoor	☐	17%	50%		--
Prohibit Irrigation with Potable Water in a Manner that causes Runoff	Irrigation	☑	3%	50%	DeOreo et al., 2011	--
Prohibit Irrigation with Potable Water within 48 Hours following Measurable Rainfall	Irrigation	☐			--	--
Prohibit Irrigation of Ornamental Turf with Potable Water on Street Medians	Irrigation	☐			--	--
Prohibit Potable Water Use for Decorative Water Features that do not Recirculate Water	Misc. Outdoor	☑	50%	50%	EBMUD, 2008	--
Provide Linen Service Opt Out Options	Fixtures & Appliances	☑	0.5%	50%	EBMUD, 2011	--
Prohibit Serving Drinking Water other than upon Request in Eating or Drinking Establishments	Fixtures & Appliances	☑	0.5%	50%	EBMUD, 2011	--

4 - Drought Response Actions - Stage 1

Menlo Park Municipal Water

Drought Response Actions						
Action Description	**End Use(s)**	**Implement Program**	**End Use Savings (%)**	**Implementation Rate**	**Source of Default Savings Estimate**	**Source of Default Implementation Rate**
▶ **Agency Drought Actions / Restrictions**						
▶ **Agency Actions**						
Media Campaign, Newspaper Articles, Website	All	☑	0.5%	50%	EBMUD, 2011	--
Promote Water Conservation / Rebate Programs	All	☐		50%	--	--
Water Efficiency Workshops, Public Events	All	☐	0.5%	25%	EBMUD, 2011	--
Water Bill Inserts	All	☑	0.5%	100%	EBMUD, 2011	--
Promote / Expand Use of Recycled Water	Irrigation	☐	100%		--	--
Home or Mobile Water Use Reports	All	☐	5%	10%	WaterSmart Software, 2015	--
Decrease Frequency and Length of Line Flushing	Non Revenue Water	☐	25%	50%	See Appendix D of the DRP	Reduced flushing by 50%.
Audit and Reduce System Water Loss	Non Revenue Water	☐	45%	50%	DWR, 2015	Target 50% of leakage.
Implement Drought Rate Structure / Water Budgets	All	☑	**1%**	100%	CUWCC, 2015	--
Establish Retrofit on Resale Ordinance	All Residential Indoor	☐	21%	6%	SFPUC, 2004	First Tuesday, 2015
Require Net Zero Demand Increase on New Connections	All	☐			--	--
Moratorium on New Connections	All	☐			--	--
Move to Monthly Metering / Billing	All	☐	5%	10%	See Appendix D of the DRP	--
Increase Water Waste Patrols / Enforcement	All	☐			--	--
Establish Drought Hotline	All	☐			--	--
Reduce Distribution System Pressures	Non Revenue Water	☐	4.5%	100%	CUWCC, 2010; DWR, 2015	--
▶ **Dedicated Irrigation**						
Conduct Irrigation Account Surveys	Irrigation	☐	30%	10%	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	38%	50%	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	79%	50%		
Prohibit use of Potable Water for Irrigation	Irrigation	☐	100%	50%		
Require Repair of all Leaks within 24 hours	External Leaks	☑	100%	5%	--	--
Customer Water Budgets						
Establish Water Budget - 25% Reduction	Irrigation	☐	25%	50%	--	--
Establish Water Budget - 50% Reduction	Irrigation	☐	50%	50%	--	--
Establish Water Budget - 75% Reduction	Irrigation	☐	75%	50%	--	--

4 - Drought Response Actions - Stage 1

Menlo Park Municipal Water

Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ Agency Drought Actions / Restrictions						
▶ Residential						
Conduct Water Use Surveys Targeting High Water Users	All Residential Uses	☐	10%	10%	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	38%	50%	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	79%	50%		
Prohibit use of Potable Water for Irrigation	Irrigation	☐	100%	50%		
Prohibit Vehicle Washing Except with Recycled Water	Misc. Outdoor	☐	50%	50%	EBMUD, 2008	--
Require Repair of all Leaks within 24 hours	Leaks	☑	100%	5%	--	--
Require Pool Covers	Misc. Outdoor	☑	28%	25%	Maddaus & Mayer, 2001	--
Prohibit Filling of Pools	Misc. Outdoor	☐	55%	25%	DeOreo et al., 2011	--
Customer Water Budgets						
Establish Water Budget - 10% Reduction	All Residential Uses	☐	10%	50%	--	--
Establish Water Budget - 20% Reduction	All Residential Uses	☐	20%	50%	--	--
▶ CII						
Conduct CII Surveys Targeting High Water Users	All CII uses	☐	10%	10%	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	38%	50%	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	79%	50%		
Prohibit Use of Potable Water for Construction and Dust Control	Misc. Outdoor	☐		100%	--	--
Prohibit Single-Pass Cooling Systems	Cooling	☑	80%	1%	Vickers, 2001	--
Require Repair of all Leaks within 24 hours	Leaks	☑	100%	5%	--	--
Prohibit Vehicle Washing Except with Recycled Water	Misc. Outdoor	☐	50%	50%	EBMUD, 2008	--
Require Water-Efficient Pre-Rinse Spray Valves	Fixtures & Appliances	☐	0.8%	50%	EPA, 2015; Pacific Institute, 2003	--
Customer Water Budgets						
Establish Water Budget - 10% Reduction	All CII uses	☐	10%	50%	--	--
Establish Water Budget - 20% Reduction	All CII uses	☐	20%	50%	--	--
Establish Water Budget - 30% Reduction	All CII uses	☐	30%	50%	--	--

4 - Drought Response Actions - Stage 1

Menlo Park Municipal Water

Drought Response Actions						
Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ **Residential Customer Actions to Encourage**						
Install Bathroom Faucet Aerators	Faucets and Dishwashers	☐			--	--
Install a Water-Efficient Showerhead	Showers/Baths	☐			--	--
Turn Off Water when Brushing Teeth, Shaving, Washing Dishes, or Cooking	Faucets and Dishwashers	☐			--	--
Fill the Bathtub Halfway	Showers/Baths	☐			--	--
Wash Only Full Loads of Clothes	Clothes Washers	☐			--	--
Install a High-Efficiency Toilet	Toilets	☐			--	--
Take Shorter Showers	Showers/Baths	☐			--	--
Run Dishwasher Only When Full	Faucets and Dishwashers	☐			--	--
Reduce Outdoor Irrigation	Irrigation	☐			--	--
Install Drip-Irrigation	Irrigation	☐			--	--
Use Mulch	Irrigation	☐			--	--
Plant Drought Resistant Trees and Plants	Irrigation	☐			--	--
Use a Broom to Clean Outdoor Areas	Misc. Outdoor	☐			--	--
Flush Less Frequently	Toilets	☐			--	--
Re-Use Shower or Bath Water for Irrigation	Irrigation	☐			--	--
Wash Car at Facility that Recycles the Water	Misc. Outdoor	☐			--	--

Drought Response Tool

Home | Input Baseline Year Water Use | Baseline Year Water Use Profile | Drought Response Actions | Estimated Water Savings | Drought Response Tracking

5 - Estimated Water Savings - Stage 1

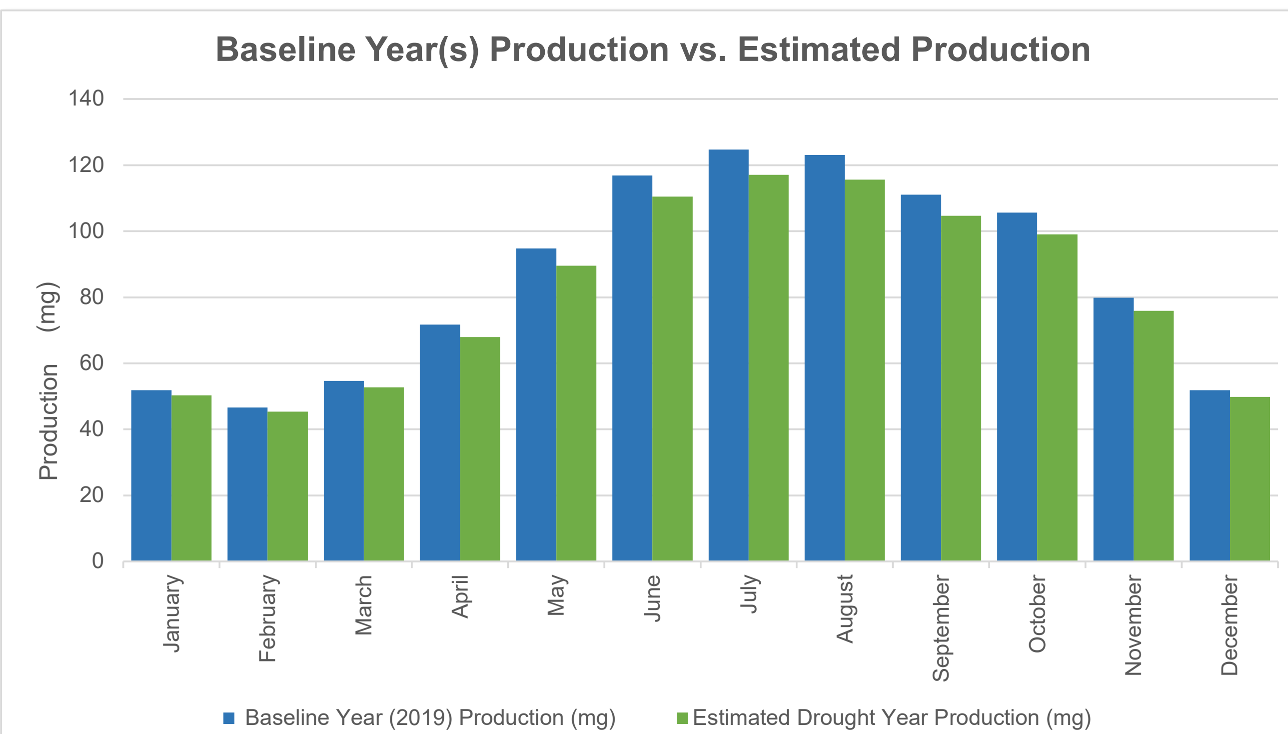
Menlo Park Municipal Water

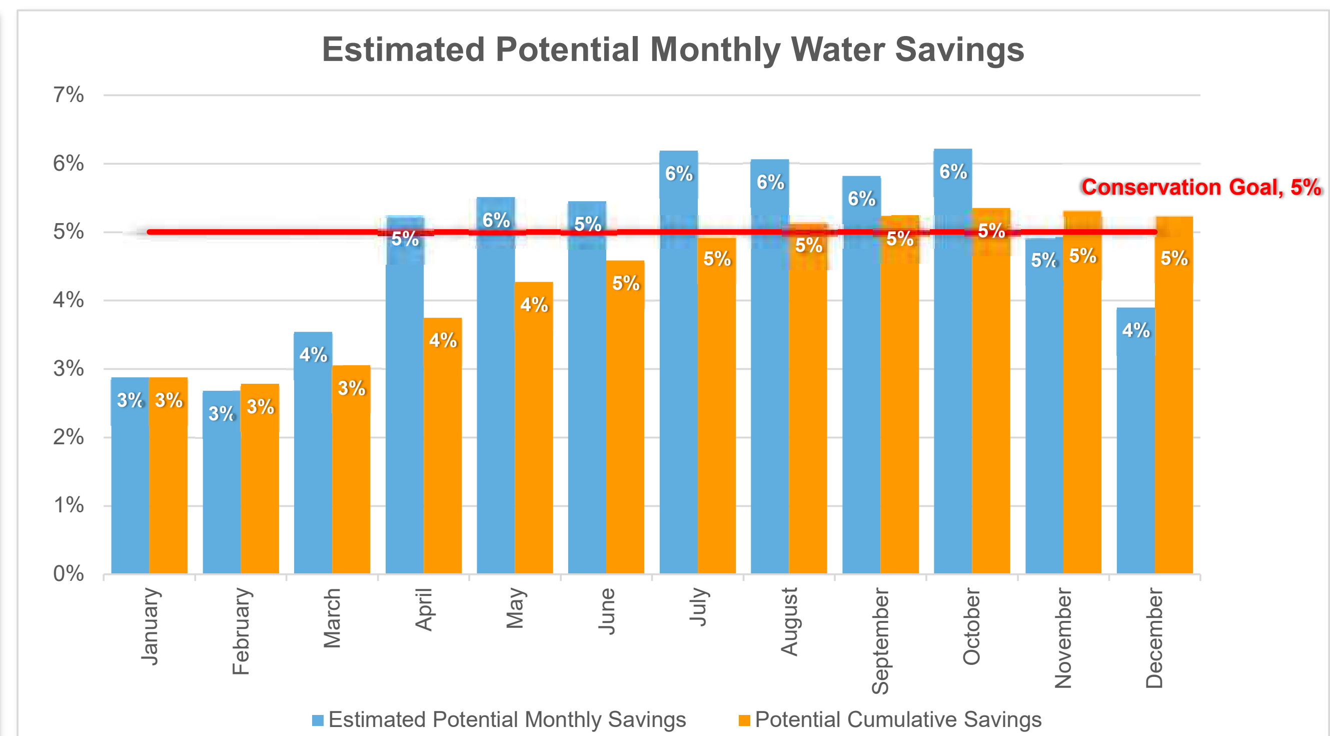
Estimated Monthly Water Use and Savings Summary

Units: (mg)

This provides a summary of the estimated production relative to Baseline Year production and potential water savings, assuming implementation of selected actions at the water savings and implementation rates indicated in the Drought Response Actions worksheet. Select the units that your production data are displayed in.

Month	Baseline Year (2019) Production (mg)	Estimated Drought Year Production (mg)	Estimated Potential Monthly Savings	Potential Cumulative Savings	Conservation Goal	Comments
January	52	50	3%	3%	5%	
February	47	45	3%	3%	5%	
March	55	53	4%	3%	5%	
April	72	68	5%	4%	5%	
May	95	90	6%	4%	5%	
June	117	111	5%	5%	5%	
July	125	117	6%	5%	5%	
August	123	116	6%	5%	5%	
September	111	105	6%	5%	5%	
October	106	99	6%	5%	5%	
November	80	76	5%	5%	5%	
December	52	50	4%	5%	5%	



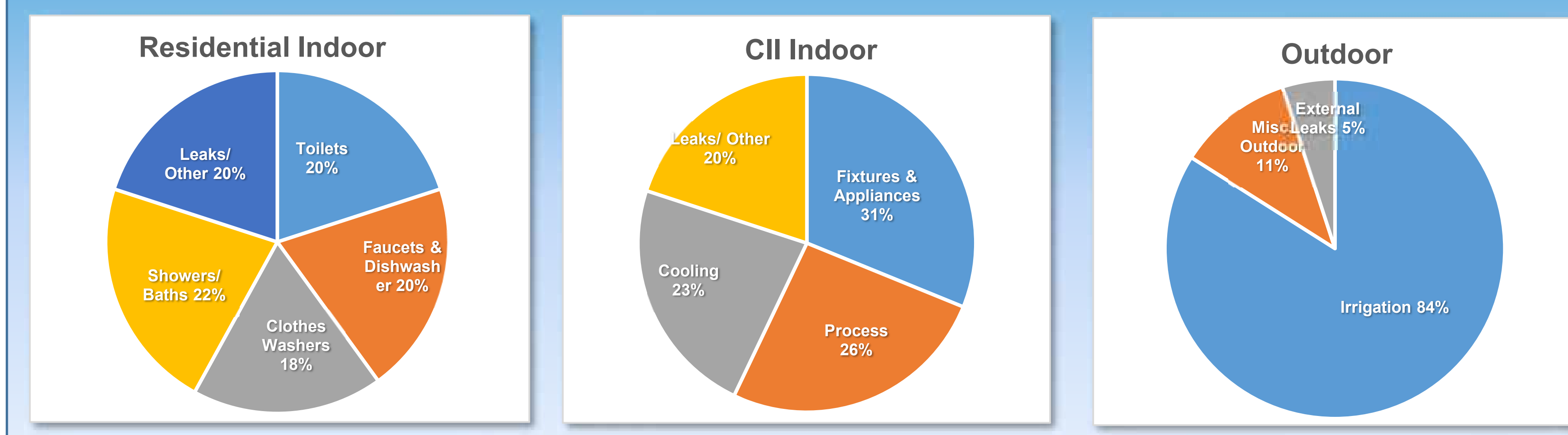


4 - Drought Response Actions - Stage 2

Menlo Park Municipal Water

Maximum Savings Potential		
Use the default values or enter your own criteria for the maximum savings potential. Estimated water savings within each sector will not exceed the maximum savings criteria.		
Minimum Residential Indoor GPCD	25	R-GPCD
Maximum Residential Outdoor Savings	100%	of Baseline Residential Outdoor Water Use
Maximum CII Indoor Savings	30%	of Baseline CII Indoor Water Use
Maximum CII Outdoor Savings	100%	of Baseline CII Outdoor Water Use
Maximum Dedicated Irrigation Account Savings	100%	of Baseline Dedicated Irrigation Water Use
Maximum Non-Revenue Water Savings	50%	of Baseline Non-Revenue Water Use
Resulting Total Maximum Annual Savings Potential	**64%**	of Total Baseline Production

Assumed Proportion of Water Use by End Uses and Sector



4 - Drought Response Actions - Stage 2

Menlo Park Municipal Water

Drought Response Actions

Select the Drought Response Actions you would like to include in your estimated savings calculations. For each selected action, use the default end use savings estimates and implementation rates or input your own values. The "End Use Savings" estimates the percent water use reduction that could occur at a particular end use as a result of a specific action. The "Implementation Rate" refers to the estimated percentage of accounts that will implement a specific action. The water savings potential at each end use is capped based on the assumed distribution of end use water demands shown in the pie charts above. A dash (--) indicates that professional judgement was used to establish the default value, or that savings are expected to be accounted for as part of a Public Information Program; additional basis for the default values are included in the User Manual.

Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ **Possible Mandatory Prohibitions**	All Outdoor	☑	14%	**55%**	--	--
Prohibit Irrigation with Potable Water Outside of Newly Constructed Homes and Buildings that is not Delivered by Drip or Microspray Systems	Irrigation	☐			--	--
Require Shut-Off Nozzles on Hoses for Vehicle Washing	Misc. Outdoor	☑	17%	50%	See Appendix D of the DRP	--
Prohibit Use of Potable Water to Wash Sidewalks and Driveways	Misc. Outdoor	☐	17%	50%		--
Prohibit the Use of Potable Water for Street Washing	Misc. Outdoor	☐	17%	50%		--
Prohibit Irrigation with Potable Water in a Manner that causes Runoff	Irrigation	☑	3%	50%	DeOreo et al., 2011	--
Prohibit Irrigation with Potable Water within 48 Hours following Measurable Rainfall	Irrigation	☐			--	--
Prohibit Irrigation of Ornamental Turf with Potable Water on Street Medians	Irrigation	☐			--	--
Prohibit Potable Water Use for Decorative Water Features that do not Recirculate Water	Misc. Outdoor	☑	50%	50%	EBMUD, 2008	--
Provide Linen Service Opt Out Options	Fixtures & Appliances	☑	0.5%	50%	EBMUD, 2011	--
Prohibit Serving Drinking Water other than upon Request in Eating or Drinking Establishments	Fixtures & Appliances	☑	0.5%	50%	EBMUD, 2011	--

4 - Drought Response Actions - Stage 2

Menlo Park Municipal Water

Drought Response Actions						
Action Description	**End Use(s)**	**Implement Program**	**End Use Savings (%)**	**Implementation Rate**	**Source of Default Savings Estimate**	**Source of Default Implementation Rate**
▶ **Agency Drought Actions / Restrictions**						
▶ **Agency Actions**						
Media Campaign, Newspaper Articles, Website	All	☑	0.5%	**55%**	EBMUD, 2011	--
Promote Water Conservation / Rebate Programs	All	☑		50%	--	--
Water Efficiency Workshops, Public Events	All	☐	0.5%	25%	EBMUD, 2011	--
Water Bill Inserts	All	☑	0.5%	100%	EBMUD, 2011	--
Promote / Expand Use of Recycled Water	Irrigation	☐	100%		--	--
Home or Mobile Water Use Reports	All	☑	5%	10%	WaterSmart Software, 2015	--
Decrease Frequency and Length of Line Flushing	Non Revenue Water	☐	25%	50%	See Appendix D of the DRP	Reduced flushing by 50%.
Audit and Reduce System Water Loss	Non Revenue Water	☑	45%	**30%**	DWR, 2015	Target 30% of leakage.
Implement Drought Rate Structure / Water Budgets	All	☑	**2%**	100%	CUWCC, 2015	--
Establish Retrofit on Resale Ordinance	All Residential Indoor	☐	21%	6%	SFPUC, 2004	First Tuesday, 2015
Require Net Zero Demand Increase on New Connections	All	☐			--	--
Moratorium on New Connections	All	☐			--	--
Move to Monthly Metering / Billing	All	☐	5%	10%	See Appendix D of the DRP	--
Increase Water Waste Patrols / Enforcement	All	☐			--	--
Establish Drought Hotline	All	☑			--	--
Reduce Distribution System Pressures	Non Revenue Water	☐	4.5%	100%	CUWCC, 2010; DWR, 2015	--
▶ **Dedicated Irrigation**						
Conduct Irrigation Account Surveys	Irrigation	☐	30%	10%	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	38%	50%	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	79%	50%		
Prohibit use of Potable Water for Irrigation	Irrigation	☐	100%	50%		
Require Repair of all Leaks within 24 hours	External Leaks	☑	100%	5%	--	--
Customer Water Budgets						
Establish Water Budget - 25% Reduction	Irrigation	☐	25%	50%	--	--
Establish Water Budget - 50% Reduction	Irrigation	☐	50%	50%	--	--
Establish Water Budget - 75% Reduction	Irrigation	☐	75%	50%	--	--

4 - Drought Response Actions - Stage 2
Menlo Park Municipal Water

Drought Response Actions						
Action Description	**End Use(s)**	**Implement Program**	**End Use Savings (%)**	**Implementation Rate**	**Source of Default Savings Estimate**	**Source of Default Implementation Rate**
▶ **Agency Drought Actions / Restrictions**						
▶ **Residential**						
Conduct Water Use Surveys Targeting High Water Users	All Residential Uses	☐	10%	10%	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	38%	50%	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	79%	50%		
Prohibit use of Potable Water for Irrigation	Irrigation	☐	100%	50%		
Prohibit Vehicle Washing Except with Recycled Water	Misc. Outdoor	☐	50%	50%	EBMUD, 2008	--
Require Repair of all Leaks within 24 hours	Leaks	☑	100%	5%	--	--
Require Pool Covers	Misc. Outdoor	☑	28%	25%	Maddaus & Mayer, 2001	--
Prohibit Filling of Pools	Misc. Outdoor	☐	55%	25%	DeOreo et al., 2011	--
Customer Water Budgets						
Establish Water Budget - 10% Reduction	All Residential Uses	☐	10%	50%	--	--
Establish Water Budget - 20% Reduction	All Residential Uses	☐	20%	50%	--	--
▶ **CII**						
Conduct CII Surveys Targeting High Water Users	All CII uses	☐	10%	10%	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	38%	50%	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	79%	50%		
Prohibit Use of Potable Water for Construction and Dust Control	Misc. Outdoor	☐		100%	--	--
Prohibit Single-Pass Cooling Systems	Cooling	☑	80%	1%	Vickers, 2001	--
Require Repair of all Leaks within 24 hours	Leaks	☑	100%	5%	--	--
Prohibit Vehicle Washing Except with Recycled Water	Misc. Outdoor	☐	50%	50%	EBMUD, 2008	--
Require Water-Efficient Pre-Rinse Spray Valves	Fixtures & Appliances	☐	0.8%	50%	EPA, 2015; Pacific Institute, 2003	--
Customer Water Budgets						
Establish Water Budget - 10% Reduction	All CII uses	☐	10%	50%	--	--
Establish Water Budget - 20% Reduction	All CII uses	☐	20%	50%	--	--
Establish Water Budget - 30% Reduction	All CII uses	☐	30%	50%	--	--

4 - Drought Response Actions - Stage 2

Menlo Park Municipal Water

Drought Response Actions						
Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ Residential Customer Actions to Encourage						
Install Bathroom Faucet Aerators	Faucets and Dishwashers	☐			--	--
Install a Water-Efficient Showerhead	Showers/Baths	☐			--	--
Turn Off Water when Brushing Teeth, Shaving, Washing Dishes, or Cooking	Faucets and Dishwashers	☐			--	--
Fill the Bathtub Halfway	Showers/Baths	☐			--	--
Wash Only Full Loads of Clothes	Clothes Washers	☐			--	--
Install a High-Efficiency Toilet	Toilets	☐			--	--
Take Shorter Showers	Showers/Baths	☐			--	--
Run Dishwasher Only When Full	Faucets and Dishwashers	☐			--	--
Reduce Outdoor Irrigation	Irrigation	☐			--	--
Install Drip-Irrigation	Irrigation	☐			--	--
Use Mulch	Irrigation	☐			--	--
Plant Drought Resistant Trees and Plants	Irrigation	☐			--	--
Use a Broom to Clean Outdoor Areas	Misc. Outdoor	☐			--	--
Flush Less Frequently	Toilets	☐			--	--
Re-Use Shower or Bath Water for Irrigation	Irrigation	☐			--	--
Wash Car at Facility that Recycles the Water	Misc. Outdoor	☐			--	--

5 - Estimated Water Savings - Stage 2

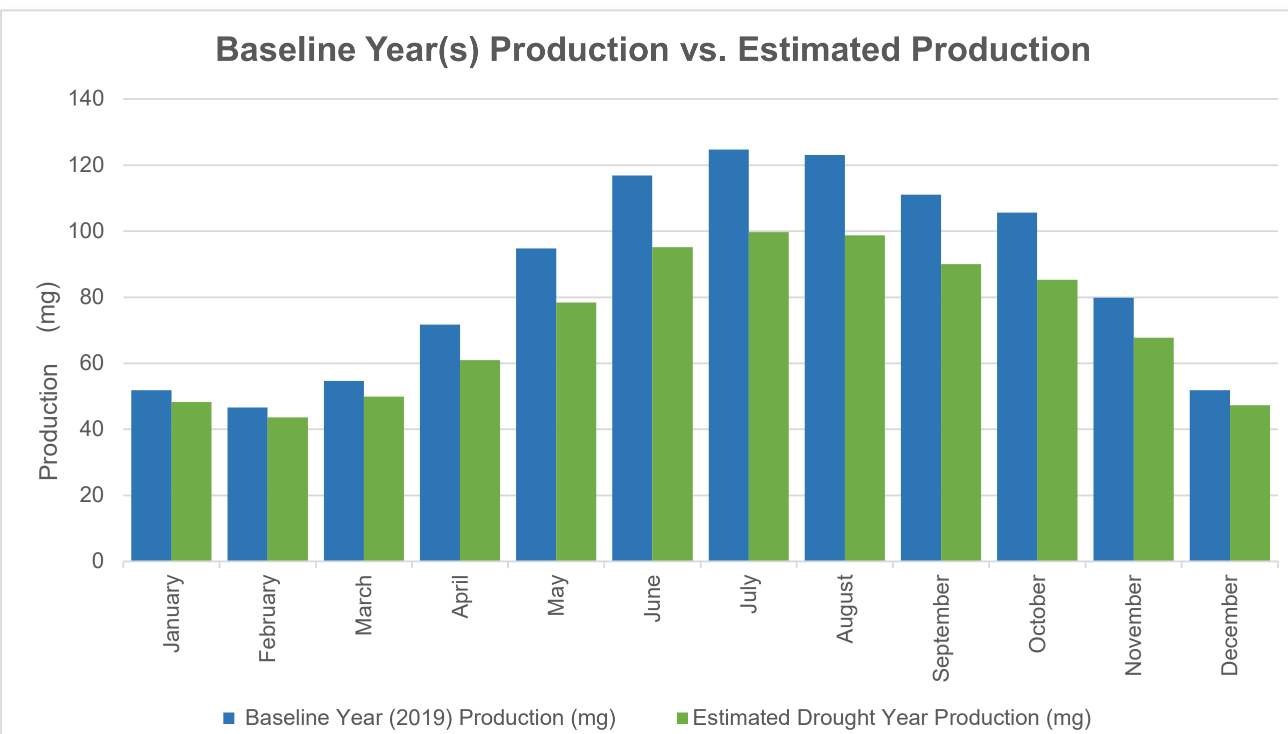
Menlo Park Municipal Water

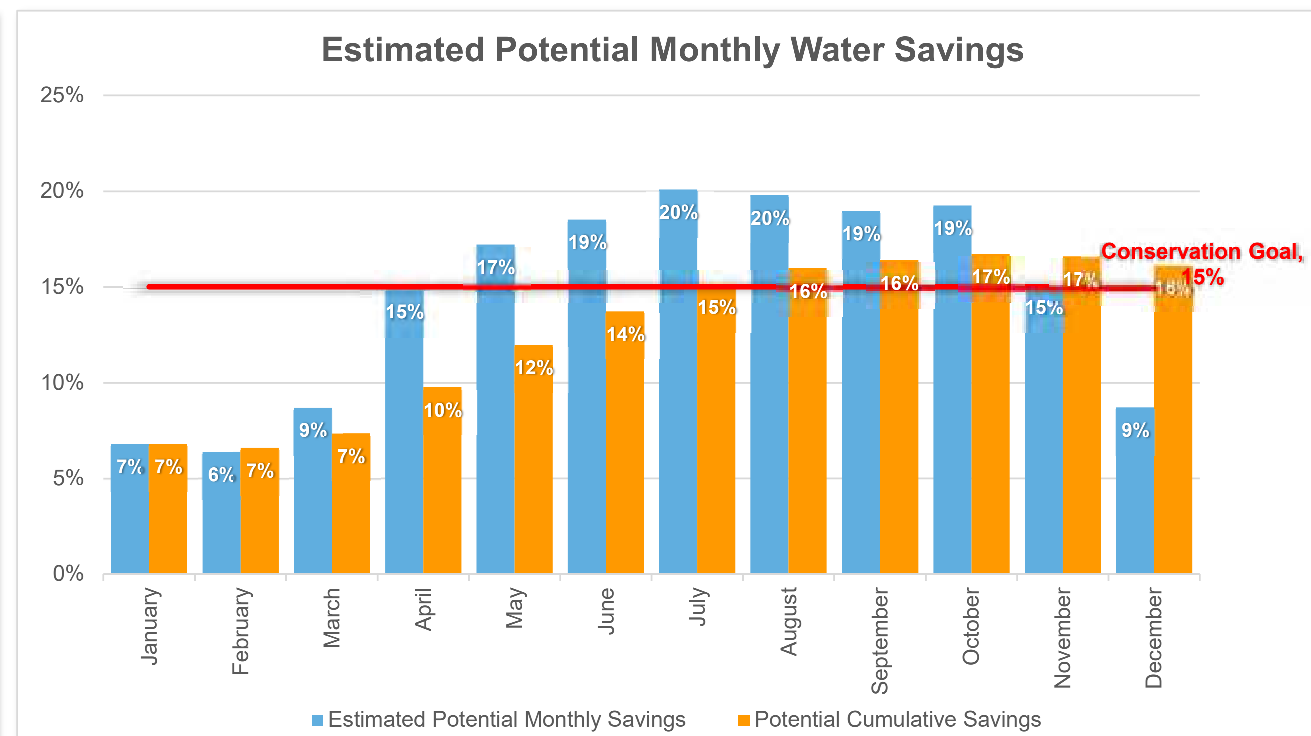
Estimated Monthly Water Use and Savings Summary

Units: (mg)

This provides a summary of the estimated production relative to Baseline Year production and potential water savings, assuming implementation of selected actions at the water savings and implementation rates indicated in the Drought Response Actions worksheet. Select the units that your production data are displayed in.

Month	Baseline Year (2019) Production (mg)	Estimated Drought Year Production (mg)	Estimated Potential Monthly Savings	Potential Cumulative Savings	Conservation Goal	Comments
January	52	48	7%	7%	15%	
February	47	44	6%	7%	15%	
March	55	50	9%	7%	15%	
April	72	61	15%	10%	15%	
May	95	78	17%	12%	15%	
June	117	95	19%	14%	15%	
July	125	100	20%	15%	15%	
August	123	99	20%	16%	15%	
September	111	90	19%	16%	15%	
October	106	85	19%	17%	15%	
November	80	68	15%	17%	15%	
December	52	47	9%	16%	15%	



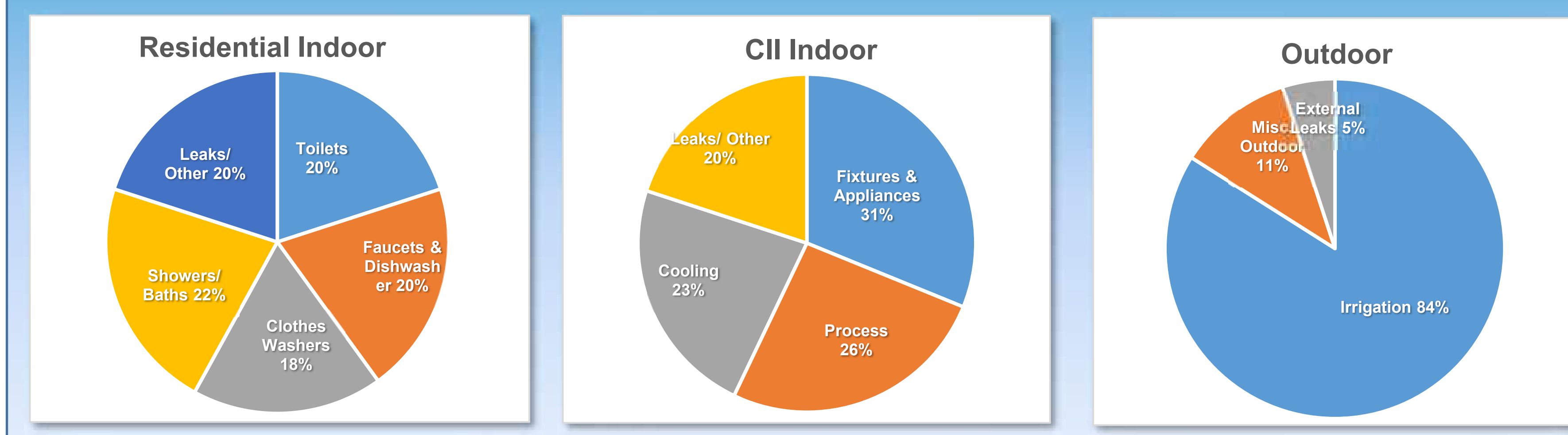


4 - Drought Response Actions - Stage 3

Menlo Park Municipal Water

Maximum Savings Potential		
Use the default values or enter your own criteria for the maximum savings potential. Estimated water savings within each sector will not exceed the maximum savings criteria.		
Minimum Residential Indoor GPCD	25	R-GPCD
Maximum Residential Outdoor Savings	100%	of Baseline Residential Outdoor Water Use
Maximum CII Indoor Savings	30%	of Baseline CII Indoor Water Use
Maximum CII Outdoor Savings	100%	of Baseline CII Outdoor Water Use
Maximum Dedicated Irrigation Account Savings	100%	of Baseline Dedicated Irrigation Water Use
Maximum Non-Revenue Water Savings	50%	of Baseline Non-Revenue Water Use
Resulting Total Maximum Annual Savings Potential	**64%**	of Total Baseline Production

Assumed Proportion of Water Use by End Uses and Sector



4 - Drought Response Actions - Stage 3

Menlo Park Municipal Water

Drought Response Actions

Select the Drought Response Actions you would like to include in your estimated savings calculations. For each selected action, use the default end use savings estimates and implementation rates or input your own values. The "End Use Savings" estimates the percent water use reduction that could occur at a particular end use as a result of a specific action. The "Implementation Rate" refers to the estimated percentage of accounts that will implement a specific action. The water savings potential at each end use is capped based on the assumed distribution of end use water demands shown in the pie charts above. A dash (--) indicates that professional judgement was used to establish the default value, or that savings are expected to be accounted for as part of a Public Information Program; additional basis for the default values are included in the User Manual.

Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ **Possible Mandatory Prohibitions**	All Outdoor	☑	14%	**70%**	--	--
Prohibit Irrigation with Potable Water Outside of Newly Constructed Homes and Buildings that is not Delivered by Drip or Microspray Systems	Irrigation	☐			--	--
Require Shut-Off Nozzles on Hoses for Vehicle Washing	Misc. Outdoor	☑	17%	50%	See Appendix D of the DRP	--
Prohibit Use of Potable Water to Wash Sidewalks and Driveways	Misc. Outdoor	☐	17%	50%		--
Prohibit the Use of Potable Water for Street Washing	Misc. Outdoor	☐	17%	50%		--
Prohibit Irrigation with Potable Water in a Manner that causes Runoff	Irrigation	☑	3%	50%	DeOreo et al., 2011	--
Prohibit Irrigation with Potable Water within 48 Hours following Measurable Rainfall	Irrigation	☐			--	--
Prohibit Irrigation of Ornamental Turf with Potable Water on Street Medians	Irrigation	☐			--	--
Prohibit Potable Water Use for Decorative Water Features that do not Recirculate Water	Misc. Outdoor	☑	50%	50%	EBMUD, 2008	--
Provide Linen Service Opt Out Options	Fixtures & Appliances	☑	0.5%	50%	EBMUD, 2011	--
Prohibit Serving Drinking Water other than upon Request in Eating or Drinking Establishments	Fixtures & Appliances	☑	0.5%	50%	EBMUD, 2011	--

4 - Drought Response Actions - Stage 3

Menlo Park Municipal Water

Drought Response Actions						
Action Description	**End Use(s)**	**Implement Program**	**End Use Savings (%)**	**Implementation Rate**	**Source of Default Savings Estimate**	**Source of Default Implementation Rate**
▶ Agency Drought Actions / Restrictions						
▶ Agency Actions						
Media Campaign, Newspaper Articles, Website	All	☑	0.5%	**65%**	EBMUD, 2011	--
Promote Water Conservation / Rebate Programs	All	☑		50%	--	--
Water Efficiency Workshops, Public Events	All	☑	0.5%	**30%**	EBMUD, 2011	--
Water Bill Inserts	All	☑	0.5%	100%	EBMUD, 2011	--
Promote / Expand Use of Recycled Water	Irrigation	☐	100%		--	--
Home or Mobile Water Use Reports	All	☑	5%	10%	WaterSmart Software, 2015	--
Decrease Frequency and Length of Line Flushing	Non Revenue Water	☐	25%	50%	See Appendix D of the DRP	Reduced flushing by 50%.
Audit and Reduce System Water Loss	Non Revenue Water	☑	45%	**30%**	DWR, 2015	Target 30% of leakage.
Implement Drought Rate Structure / Water Budgets	All	☑	**4%**	100%	CUWCC, 2015	--
Establish Retrofit on Resale Ordinance	All Residential Indoor	☐	21%	6%	SFPUC, 2004	First Tuesday, 2015
Require Net Zero Demand Increase on New Connections	All	☐			--	--
Moratorium on New Connections	All	☐			--	--
Move to Monthly Metering / Billing	All	☐	5%	10%	See Appendix D of the DRP	--
Increase Water Waste Patrols / Enforcement	All	☑			--	--
Establish Drought Hotline	All	☑			--	--
Reduce Distribution System Pressures	Non Revenue Water	☐	4.5%	100%	CUWCC, 2010; DWR, 2015	--
▶ Dedicated Irrigation						
Conduct Irrigation Account Surveys	Irrigation	☑	30%	10%	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	38%	**75%**	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	79%	50%		
Prohibit use of Potable Water for Irrigation	Irrigation	☐	100%	50%		
Require Repair of all Leaks within 24 hours	External Leaks	☑	100%	5%	--	--
Customer Water Budgets						
Establish Water Budget - 25% Reduction	Irrigation	☐	25%	50%	--	--
Establish Water Budget - 50% Reduction	Irrigation	☐	50%	50%	--	--
Establish Water Budget - 75% Reduction	Irrigation	☐	75%	50%	--	--

4 - Drought Response Actions - Stage 3

Menlo Park Municipal Water

Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ Agency Drought Actions / Restrictions						
▶ Residential						
Conduct Water Use Surveys Targeting High Water Users	All Residential Uses	☑	10%	10%	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	38%	**75%**	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	79%	50%		
Prohibit use of Potable Water for Irrigation	Irrigation	☐	100%	50%		
Prohibit Vehicle Washing Except with Recycled Water	Misc. Outdoor	☑	50%	50%	EBMUD, 2008	--
Require Repair of all Leaks within 24 hours	Leaks	☑	100%	5%	--	--
Require Pool Covers	Misc. Outdoor	☑	28%	25%	Maddaus & Mayer, 2001	--
Prohibit Filling of Pools	Misc. Outdoor	☑	55%	25%	DeOreo et al., 2011	--
Customer Water Budgets						
Establish Water Budget - 10% Reduction	All Residential Uses	☐	10%	50%	--	--
Establish Water Budget - 20% Reduction	All Residential Uses	☐	20%	50%	--	--
▶ CII						
Conduct CII Surveys Targeting High Water Users	All CII uses	☑	10%	10%	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	38%	**75%**	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	79%	50%		
Prohibit Use of Potable Water for Construction and Dust Control	Misc. Outdoor	☐		100%	--	--
Prohibit Single-Pass Cooling Systems	Cooling	☑	80%	1%	Vickers, 2001	--
Require Repair of all Leaks within 24 hours	Leaks	☑	100%	5%	--	--
Prohibit Vehicle Washing Except with Recycled Water	Misc. Outdoor	☑	50%	50%	EBMUD, 2008	--
Require Water-Efficient Pre-Rinse Spray Valves	Fixtures & Appliances	☐	0.8%	50%	EPA, 2015; Pacific Institute, 2003	--
Customer Water Budgets						
Establish Water Budget - 10% Reduction	All CII uses	☐	10%	50%	--	--
Establish Water Budget - 20% Reduction	All CII uses	☐	20%	50%	--	--
Establish Water Budget - 30% Reduction	All CII uses	☐	30%	50%	--	--

4 - Drought Response Actions - Stage 3

Menlo Park Municipal Water

Drought Response Actions						
Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ Residential Customer Actions to Encourage						
Install Bathroom Faucet Aerators	Faucets and Dishwashers	☐			--	--
Install a Water-Efficient Showerhead	Showers/Baths	☐			--	--
Turn Off Water when Brushing Teeth, Shaving, Washing Dishes, or Cooking	Faucets and Dishwashers	☐			--	--
Fill the Bathtub Halfway	Showers/Baths	☐			--	--
Wash Only Full Loads of Clothes	Clothes Washers	☐			--	--
Install a High-Efficiency Toilet	Toilets	☐			--	--
Take Shorter Showers	Showers/Baths	☐			--	--
Run Dishwasher Only When Full	Faucets and Dishwashers	☐			--	--
Reduce Outdoor Irrigation	Irrigation	☐			--	--
Install Drip-Irrigation	Irrigation	☐			--	--
Use Mulch	Irrigation	☐			--	--
Plant Drought Resistant Trees and Plants	Irrigation	☐			--	--
Use a Broom to Clean Outdoor Areas	Misc. Outdoor	☐			--	--
Flush Less Frequently	Toilets	☐			--	--
Re-Use Shower or Bath Water for Irrigation	Irrigation	☐			--	--
Wash Car at Facility that Recycles the Water	Misc. Outdoor	☐			--	--

5 - Estimated Water Savings - Stage 3

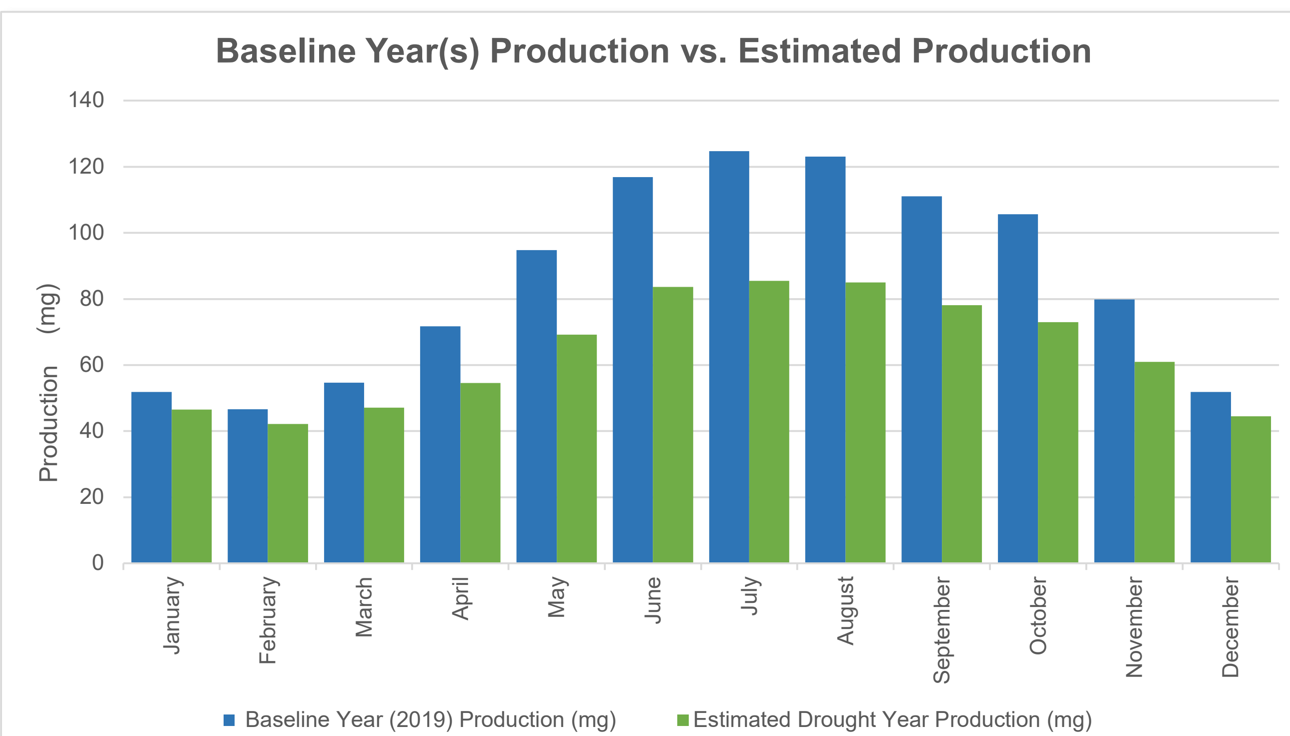
Menlo Park Municipal Water

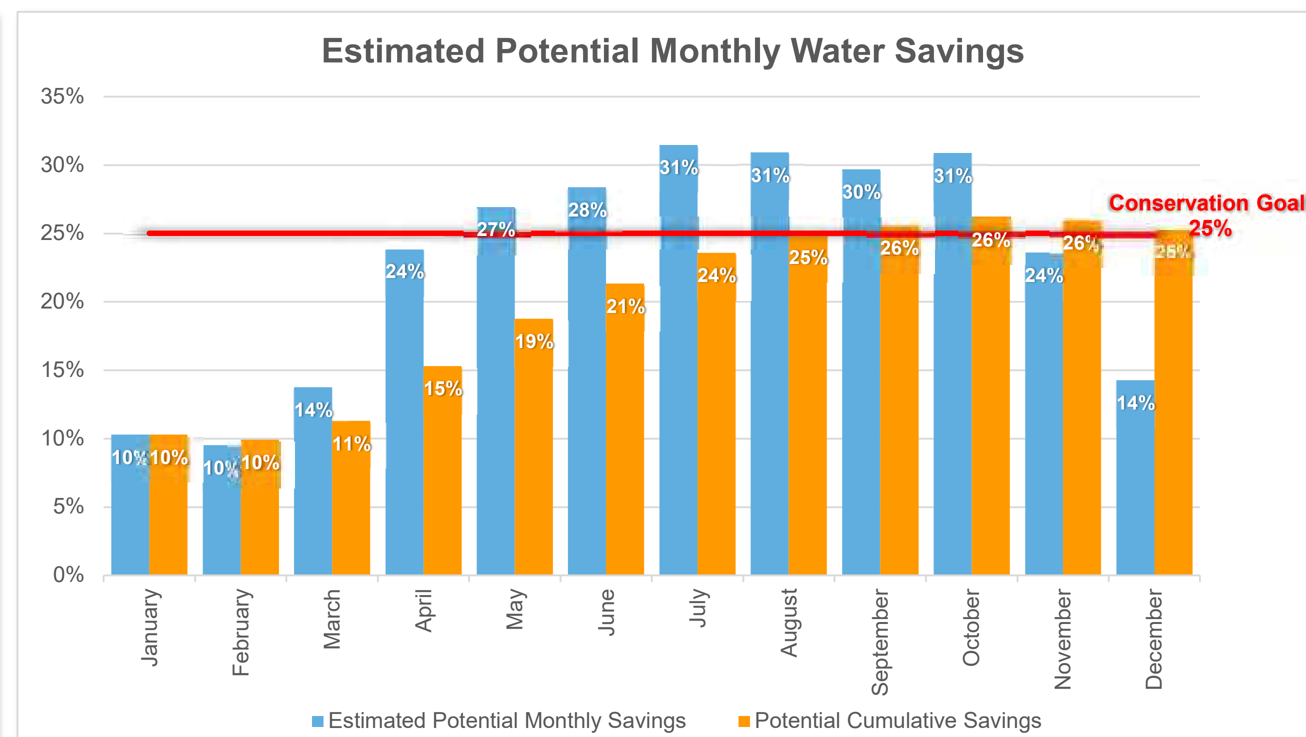
Estimated Monthly Water Use and Savings Summary

Units: (mg)

This provides a summary of the estimated production relative to Baseline Year production and potential water savings, assuming implementation of selected actions at the water savings and implementation rates indicated in the Drought Response Actions worksheet. Select the units that your production data are displayed in.

Month	Baseline Year (2019) Production (mg)	Estimated Drought Year Production (mg)	Estimated Potential Monthly Savings	Potential Cumulative Savings	Conservation Goal	Comments
January	52	46	10%	10%	25%	
February	47	42	10%	10%	25%	
March	55	47	14%	11%	25%	
April	72	55	24%	15%	25%	
May	95	69	27%	19%	25%	
June	117	84	28%	21%	25%	
July	125	85	31%	24%	25%	
August	123	85	31%	25%	25%	
September	111	78	30%	26%	25%	
October	106	73	31%	26%	25%	
November	80	61	24%	26%	25%	
December	52	44	14%	25%	25%	



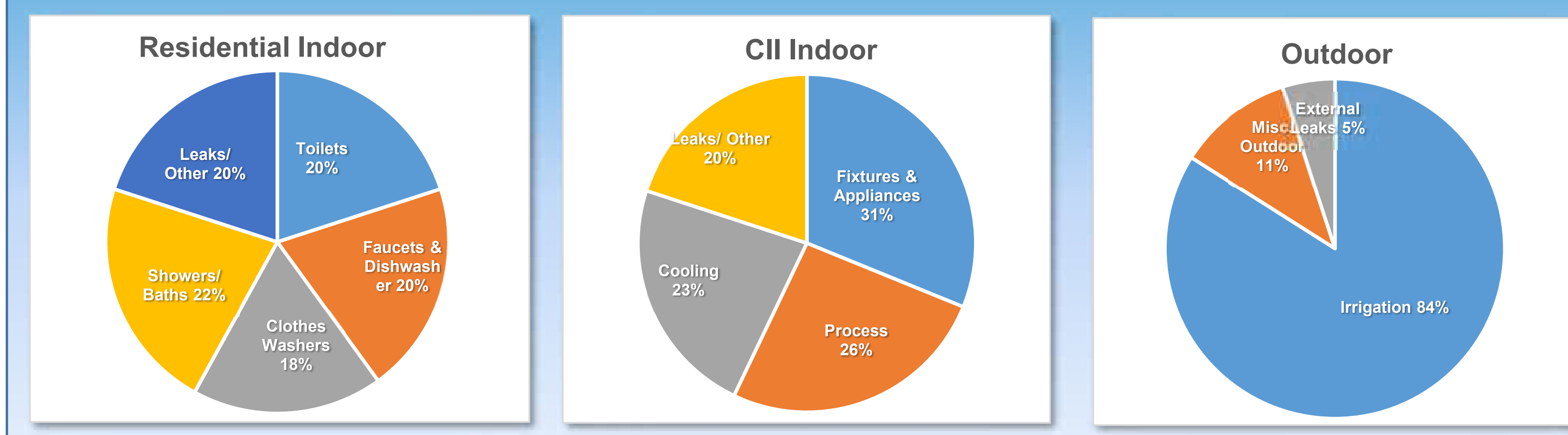


4 - Drought Response Actions - Stage 4

Menlo Park Municipal Water

Maximum Savings Potential		
Use the default values or enter your own criteria for the maximum savings potential. Estimated water savings within each sector will not exceed the maximum savings criteria.		
Minimum Residential Indoor GPCD	25	R-GPCD
Maximum Residential Outdoor Savings	100%	of Baseline Residential Outdoor Water Use
Maximum CII Indoor Savings	30%	of Baseline CII Indoor Water Use
Maximum CII Outdoor Savings	100%	of Baseline CII Outdoor Water Use
Maximum Dedicated Irrigation Account Savings	100%	of Baseline Dedicated Irrigation Water Use
Maximum Non-Revenue Water Savings	50%	of Baseline Non-Revenue Water Use
Resulting Total Maximum Annual Savings Potential	**64%**	of Total Baseline Production

Assumed Proportion of Water Use by End Uses and Sector



4 - Drought Response Actions - Stage 4

Menlo Park Municipal Water

Drought Response Actions

Select the Drought Response Actions you would like to include in your estimated savings calculations. For each selected action, use the default end use savings estimates and implementation rates or input your own values. The "End Use Savings" estimates the percent water use reduction that could occur at a particular end use as a result of a specific action. The "Implementation Rate" refers to the estimated percentage of accounts that will implement a specific action. The water savings potential at each end use is capped based on the assumed distribution of end use water demands shown in the pie charts above. A dash (--) indicates that professional judgement was used to establish the default value, or that savings are expected to be accounted for as part of a Public Information Program; additional basis for the default values are included in the User Manual.

Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ **Possible Mandatory Prohibitions**	All Outdoor	☑	14%	**70%**	--	--
Prohibit Irrigation with Potable Water Outside of Newly Constructed Homes and Buildings that is not Delivered by Drip or Microspray Systems	Irrigation	☐			--	--
Require Shut-Off Nozzles on Hoses for Vehicle Washing	Misc. Outdoor	☑	17%	50%	See Appendix D of the DRP	--
Prohibit Use of Potable Water to Wash Sidewalks and Driveways	Misc. Outdoor	☐	17%	50%		--
Prohibit the Use of Potable Water for Street Washing	Misc. Outdoor	☐	17%	50%		--
Prohibit Irrigation with Potable Water in a Manner that causes Runoff	Irrigation	☑	3%	50%	DeOreo et al., 2011	--
Prohibit Irrigation with Potable Water within 48 Hours following Measurable Rainfall	Irrigation	☐			--	--
Prohibit Irrigation of Ornamental Turf with Potable Water on Street Medians	Irrigation	☐			--	--
Prohibit Potable Water Use for Decorative Water Features that do not Recirculate Water	Misc. Outdoor	☑	50%	50%	EBMUD, 2008	--
Provide Linen Service Opt Out Options	Fixtures & Appliances	☑	0.5%	50%	EBMUD, 2011	--
Prohibit Serving Drinking Water other than upon Request in Eating or Drinking Establishments	Fixtures & Appliances	☑	0.5%	50%	EBMUD, 2011	--

4 - Drought Response Actions - Stage 4

Menlo Park Municipal Water

Drought Response Actions						
Action Description	**End Use(s)**	**Implement Program**	**End Use Savings (%)**	**Implementation Rate**	**Source of Default Savings Estimate**	**Source of Default Implementation Rate**
▶ **Agency Drought Actions / Restrictions**						
▶ **Agency Actions**						
Media Campaign, Newspaper Articles, Website	All	☑	0.5%	**65%**	EBMUD, 2011	--
Promote Water Conservation / Rebate Programs	All	☑		50%	--	--
Water Efficiency Workshops, Public Events	All	☑	0.5%	**30%**	EBMUD, 2011	--
Water Bill Inserts	All	☑	0.5%	100%	EBMUD, 2011	--
Promote / Expand Use of Recycled Water	Irrigation	☐	100%		--	--
Home or Mobile Water Use Reports	All	☑	5%	10%	WaterSmart Software, 2015	--
Decrease Frequency and Length of Line Flushing	Non Revenue Water	☑	25%	**50%**	See Appendix D of the DRP	Reduced flushing by 50%.
Audit and Reduce System Water Loss	Non Revenue Water	☑	45%	**30%**	DWR, 2015	Target 30% of leakage.
Implement Drought Rate Structure / Water Budgets	All	☑	5%	100%	CUWCC, 2015	--
Establish Retrofit on Resale Ordinance	All Residential Indoor	☐	21%	6%	SFPUC, 2004	First Tuesday, 2015
Require Net Zero Demand Increase on New Connections	All	☐			--	--
Moratorium on New Connections	All	☐			--	--
Move to Monthly Metering / Billing	All	☐	5%	10%	See Appendix D of the DRP	--
Increase Water Waste Patrols / Enforcement	All	☑			--	--
Establish Drought Hotline	All	☑			--	--
Reduce Distribution System Pressures	Non Revenue Water	☐	4.5%	100%	CUWCC, 2010; DWR, 2015	--
▶ **Dedicated Irrigation**						
Conduct Irrigation Account Surveys	Irrigation	☑	30%	**20%**	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	38%	60%		
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	79%	**60%**	UC IPM, 2014	--
Prohibit use of Potable Water for Irrigation	Irrigation	☐	100%	50%		
Require Repair of all Leaks within 24 hours	External Leaks	☑	100%	5%	--	--
Customer Water Budgets						
Establish Water Budget - 25% Reduction	Irrigation	☐	25%	50%	--	--
Establish Water Budget - 50% Reduction	Irrigation	☐	50%	50%	--	--
Establish Water Budget - 75% Reduction	Irrigation	☐	75%	50%	--	--

4 - Drought Response Actions - Stage 4

Menlo Park Municipal Water

Drought Response Actions						
Action Description	**End Use(s)**	**Implement Program**	**End Use Savings (%)**	**Implementation Rate**	**Source of Default Savings Estimate**	**Source of Default Implementation Rate**
▶ **Agency Drought Actions / Restrictions**						
▶ **Residential**						
Conduct Water Use Surveys Targeting High Water Users	All Residential Uses	☑	10%	**20%**	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	38%	60%	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	79%	**60%**		
Prohibit use of Potable Water for Irrigation	Irrigation	☐	100%	50%		
Prohibit Vehicle Washing Except with Recycled Water	Misc. Outdoor	☑	50%	50%	EBMUD, 2008	--
Require Repair of all Leaks within 24 hours	Leaks	☑	100%	5%	--	--
Require Pool Covers	Misc. Outdoor	☑	28%	25%	Maddaus & Mayer, 2001	--
Prohibit Filling of Pools	Misc. Outdoor	☑	55%	25%	DeOreo et al., 2011	--
Customer Water Budgets						
Establish Water Budget - 10% Reduction	All Residential Uses	☐	10%	50%	--	--
Establish Water Budget - 20% Reduction	All Residential Uses	☐	20%	50%	--	--
▶ **CII**						
Conduct CII Surveys Targeting High Water Users	All CII uses	☑	10%	**20%**	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	38%	60%	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	79%	**60%**		
Prohibit Use of Potable Water for Construction and Dust Control	Misc. Outdoor	☐		100%	--	--
Prohibit Single-Pass Cooling Systems	Cooling	☑	80%	1%	Vickers, 2001	--
Require Repair of all Leaks within 24 hours	Leaks	☑	100%	5%	--	--
Prohibit Vehicle Washing Except with Recycled Water	Misc. Outdoor	☑	50%	50%	EBMUD, 2008	--
Require Water-Efficient Pre-Rinse Spray Valves	Fixtures & Appliances	☐	0.8%	50%	EPA, 2015; Pacific Institute, 2003	--
Customer Water Budgets						
Establish Water Budget - 10% Reduction	All CII uses	☐	10%	50%	--	--
Establish Water Budget - 20% Reduction	All CII uses	☐	20%	50%	--	--
Establish Water Budget - 30% Reduction	All CII uses	☐	30%	50%	--	--

4 - Drought Response Actions - Stage 4

Menlo Park Municipal Water

Drought Response Actions						
Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ **Residential Customer Actions to Encourage**						
Install Bathroom Faucet Aerators	Faucets and Dishwashers	☐			--	--
Install a Water-Efficient Showerhead	Showers/Baths	☐			--	--
Turn Off Water when Brushing Teeth, Shaving, Washing Dishes, or Cooking	Faucets and Dishwashers	☐			--	--
Fill the Bathtub Halfway	Showers/Baths	☐			--	--
Wash Only Full Loads of Clothes	Clothes Washers	☐			--	--
Install a High-Efficiency Toilet	Toilets	☐			--	--
Take Shorter Showers	Showers/Baths	☐			--	--
Run Dishwasher Only When Full	Faucets and Dishwashers	☐			--	--
Reduce Outdoor Irrigation	Irrigation	☐			--	--
Install Drip-Irrigation	Irrigation	☐			--	--
Use Mulch	Irrigation	☐			--	--
Plant Drought Resistant Trees and Plants	Irrigation	☐			--	--
Use a Broom to Clean Outdoor Areas	Misc. Outdoor	☐			--	--
Flush Less Frequently	Toilets	☐			--	--
Re-Use Shower or Bath Water for Irrigation	Irrigation	☐			--	--
Wash Car at Facility that Recycles the Water	Misc. Outdoor	☐			--	--

5 - Estimated Water Savings - Stage 4

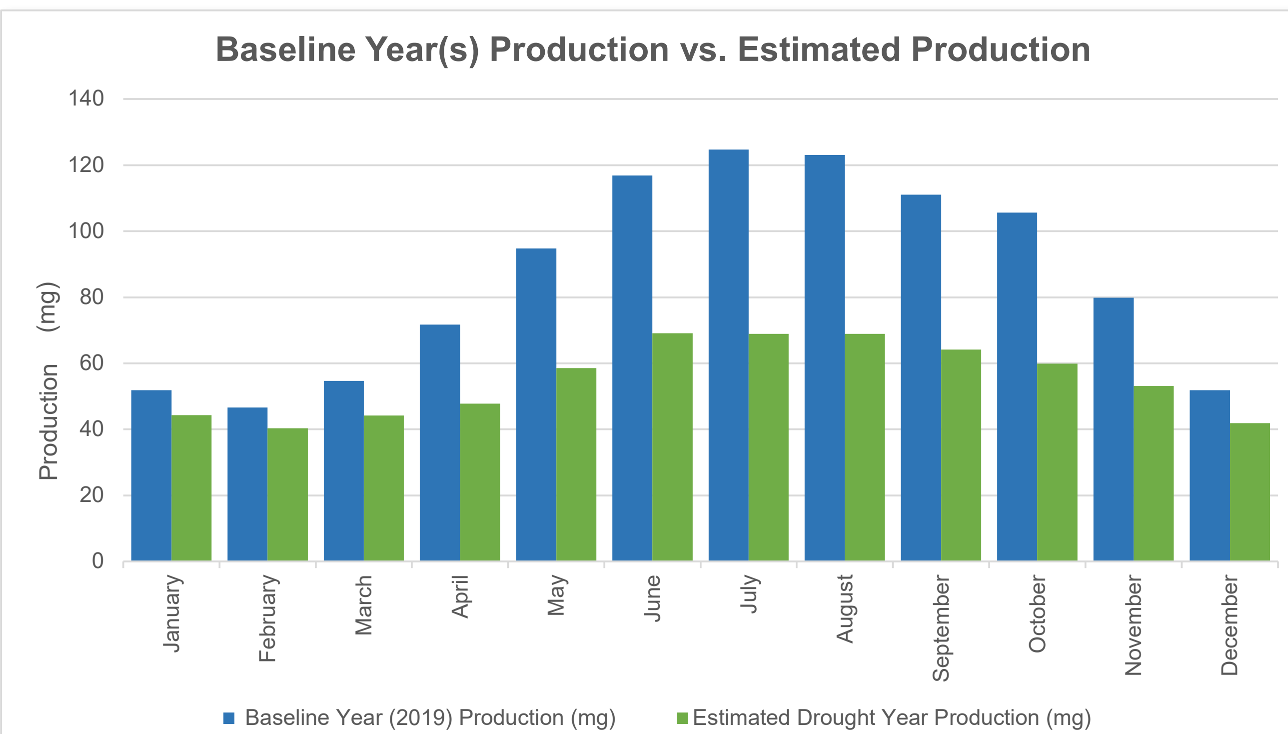
Menlo Park Municipal Water

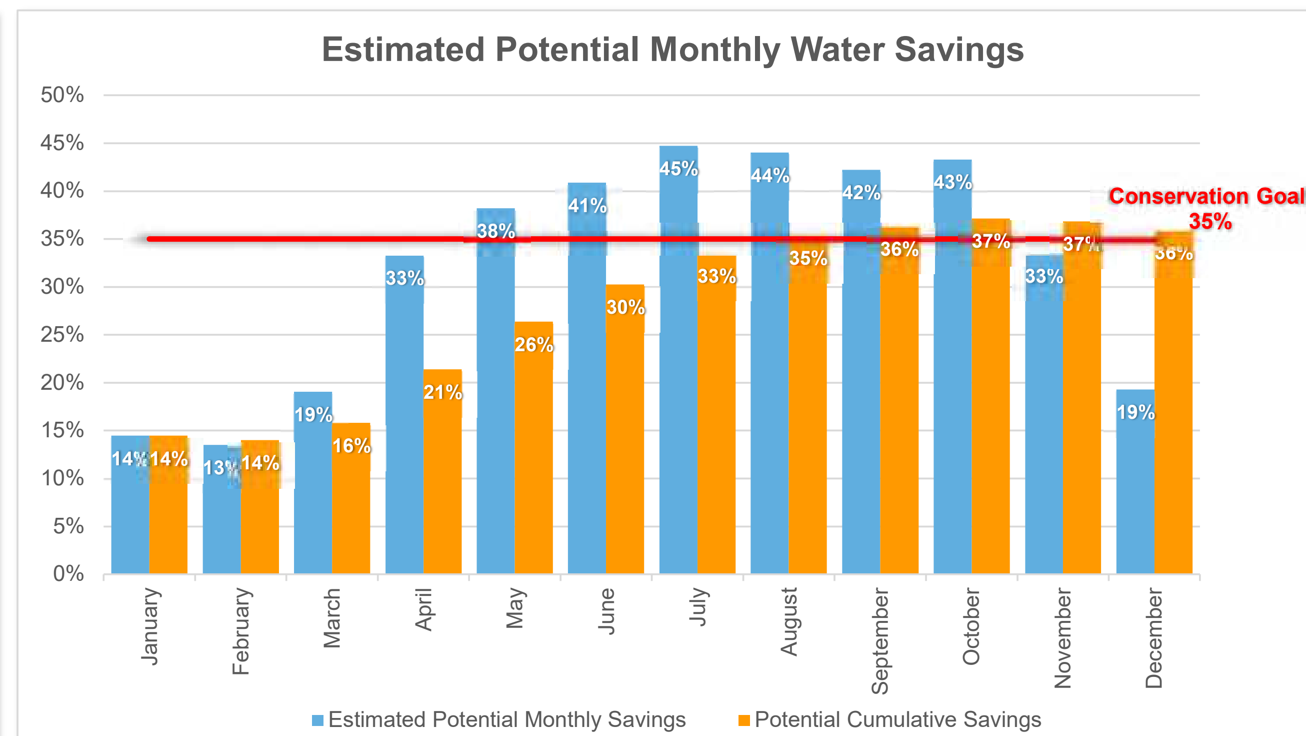
Estimated Monthly Water Use and Savings Summary

Units: (mg)

This provides a summary of the estimated production relative to Baseline Year production and potential water savings, assuming implementation of selected actions at the water savings and implementation rates indicated in the Drought Response Actions worksheet. Select the units that your production data are displayed in.

Month	Baseline Year (2019) Production (mg)	Estimated Drought Year Production (mg)	Estimated Potential Monthly Savings	Potential Cumulative Savings	Conservation Goal	Comments
January	52	44	14%	14%	35%	
February	47	40	13%	14%	35%	
March	55	44	19%	16%	35%	
April	72	48	33%	21%	35%	
May	95	59	38%	26%	35%	
June	117	69	41%	30%	35%	
July	125	69	45%	33%	35%	
August	123	69	44%	35%	35%	
September	111	64	42%	36%	35%	
October	106	60	43%	37%	35%	
November	80	53	33%	37%	35%	
December	52	42	19%	36%	35%	



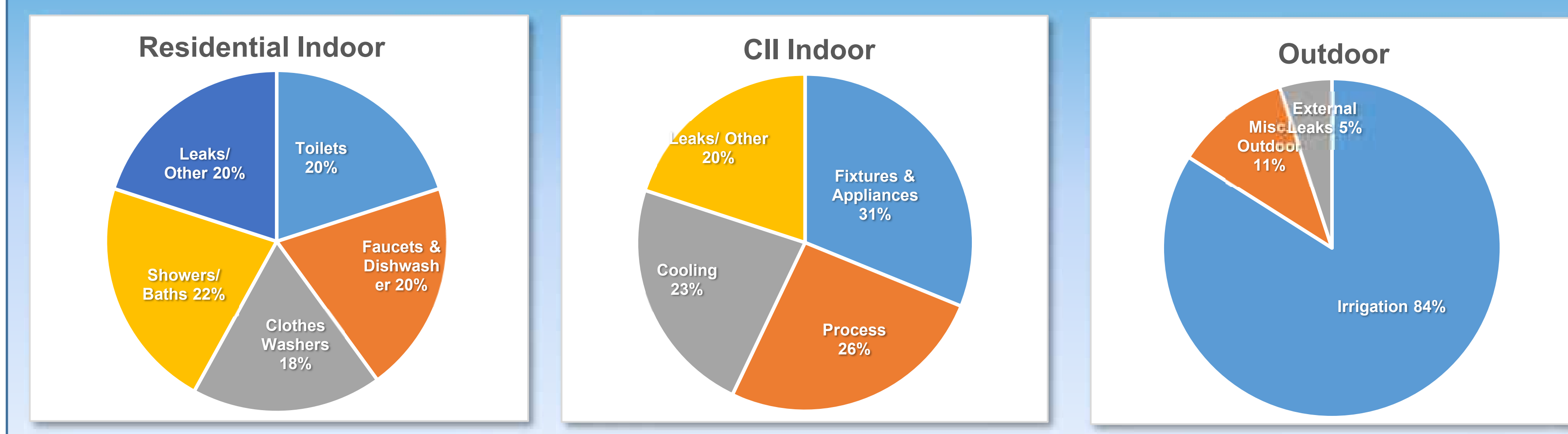


4 - Drought Response Actions - Stage 5

Menlo Park Municipal Water

Maximum Savings Potential		
Use the default values or enter your own criteria for the maximum savings potential. Estimated water savings within each sector will not exceed the maximum savings criteria.		
Minimum Residential Indoor GPCD	25	R-GPCD
Maximum Residential Outdoor Savings	100%	of Baseline Residential Outdoor Water Use
Maximum CII Indoor Savings	30%	of Baseline CII Indoor Water Use
Maximum CII Outdoor Savings	100%	of Baseline CII Outdoor Water Use
Maximum Dedicated Irrigation Account Savings	100%	of Baseline Dedicated Irrigation Water Use
Maximum Non-Revenue Water Savings	50%	of Baseline Non-Revenue Water Use
Resulting Total Maximum Annual Savings Potential	**64%**	of Total Baseline Production

Assumed Proportion of Water Use by End Uses and Sector



4 - Drought Response Actions - Stage 5

Menlo Park Municipal Water

Drought Response Actions

Select the Drought Response Actions you would like to include in your estimated savings calculations. For each selected action, use the default end use savings estimates and implementation rates or input your own values. The "End Use Savings" estimates the percent water use reduction that could occur at a particular end use as a result of a specific action. The "Implementation Rate" refers to the estimated percentage of accounts that will implement a specific action. The water savings potential at each end use is capped based on the assumed distribution of end use water demands shown in the pie charts above. A dash (--) indicates that professional judgement was used to establish the default value, or that savings are expected to be accounted for as part of a Public Information Program; additional basis for the default values are included in the User Manual.

Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ **Possible Mandatory Prohibitions**	All Outdoor	☑	14%	**70%**	--	--
Prohibit Irrigation with Potable Water Outside of Newly Constructed Homes and Buildings that is not Delivered by Drip or Microspray Systems	Irrigation	☐			--	--
Require Shut-Off Nozzles on Hoses for Vehicle Washing	Misc. Outdoor	☑	17%	50%	See Appendix D of the DRP	--
Prohibit Use of Potable Water to Wash Sidewalks and Driveways	Misc. Outdoor	☐	17%	50%		--
Prohibit the Use of Potable Water for Street Washing	Misc. Outdoor	☐	17%	50%		--
Prohibit Irrigation with Potable Water in a Manner that causes Runoff	Irrigation	☑	3%	50%	DeOreo et al., 2011	--
Prohibit Irrigation with Potable Water within 48 Hours following Measurable Rainfall	Irrigation	☐			--	--
Prohibit Irrigation of Ornamental Turf with Potable Water on Street Medians	Irrigation	☐			--	--
Prohibit Potable Water Use for Decorative Water Features that do not Recirculate Water	Misc. Outdoor	☑	50%	50%	EBMUD, 2008	--
Provide Linen Service Opt Out Options	Fixtures & Appliances	☑	0.5%	50%	EBMUD, 2011	--
Prohibit Serving Drinking Water other than upon Request in Eating or Drinking Establishments	Fixtures & Appliances	☑	0.5%	50%	EBMUD, 2011	--

4 - Drought Response Actions - Stage 5

Menlo Park Municipal Water

Drought Response Actions						
Action Description	**End Use(s)**	**Implement Program**	**End Use Savings (%)**	**Implementation Rate**	**Source of Default Savings Estimate**	**Source of Default Implementation Rate**
▶ Agency Drought Actions / Restrictions						
▶ Agency Actions						
Media Campaign, Newspaper Articles, Website	All	☑	0.5%	**70%**	EBMUD, 2011	--
Promote Water Conservation / Rebate Programs	All	☑		50%	--	--
Water Efficiency Workshops, Public Events	All	☑	0.5%	**30%**	EBMUD, 2011	--
Water Bill Inserts	All	☑	0.5%	100%	EBMUD, 2011	--
Promote / Expand Use of Recycled Water	Irrigation	☐	100%		--	--
Home or Mobile Water Use Reports	All	☑	5%	10%	WaterSmart Software, 2015	--
Decrease Frequency and Length of Line Flushing	Non Revenue Water	☑	25%	50%	See Appendix D of the DRP	Reduced flushing by 50%.
Audit and Reduce System Water Loss	Non Revenue Water	☑	45%	**30%**	DWR, 2015	Target 30% of leakage.
Implement Drought Rate Structure / Water Budgets	All	☑	5%	100%	CUWCC, 2015	--
Establish Retrofit on Resale Ordinance	All Residential Indoor	☐	21%	6%	SFPUC, 2004	First Tuesday, 2015
Require Net Zero Demand Increase on New Connections	All	☐			--	--
Moratorium on New Connections	All	☑			--	--
Move to Monthly Metering / Billing	All	☐	5%	10%	See Appendix D of the DRP	--
Increase Water Waste Patrols / Enforcement	All	☑			--	--
Establish Drought Hotline	All	☑			--	--
Reduce Distribution System Pressures	Non Revenue Water	☐	4.5%	100%	CUWCC, 2010; DWR, 2015	--
▶ Dedicated Irrigation						
Conduct Irrigation Account Surveys	Irrigation	☑	30%	**30%**	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	38%	**60%**		
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	79%	**70%**	UC IPM, 2014	--
Prohibit use of Potable Water for Irrigation	Irrigation	☐	100%	50%		
Require Repair of all Leaks within 24 hours	External Leaks	☑	100%	5%	--	--
Customer Water Budgets						
Establish Water Budget - 25% Reduction	Irrigation	☐	25%	50%	--	--
Establish Water Budget - 50% Reduction	Irrigation	☑	50%	50%	--	--
Establish Water Budget - 75% Reduction	Irrigation	☐	75%	**55%**	--	--

4 - Drought Response Actions - Stage 5

Menlo Park Municipal Water

Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ Agency Drought Actions / Restrictions						
▶ Residential						
Conduct Water Use Surveys Targeting High Water Users	All Residential Uses	☑	10%	**30%**	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	38%	60%	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	79%	**70%**		
Prohibit use of Potable Water for Irrigation	Irrigation	☐	100%	50%		
Prohibit Vehicle Washing Except with Recycled Water	Misc. Outdoor	☑	50%	50%	EBMUD, 2008	--
Require Repair of all Leaks within 24 hours	Leaks	☑	100%	5%	--	--
Require Pool Covers	Misc. Outdoor	☑	28%	25%	Maddaus & Mayer, 2001	--
Prohibit Filling of Pools	Misc. Outdoor	☑	55%	25%	DeOreo et al., 2011	--
Customer Water Budgets						
Establish Water Budget - 10% Reduction	All Residential Uses	☑	10%	50%	--	--
Establish Water Budget - 25% Reduction	All Residential Uses	☐	25%	55%	--	--
▶ CII						
Conduct CII Surveys Targeting High Water Users	All CII uses	☑	10%	**30%**	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	38%	60%	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	79%	**70%**		
Prohibit Use of Potable Water for Construction and Dust Control	Misc. Outdoor	☐		100%	--	--
Prohibit Single-Pass Cooling Systems	Cooling	☑	80%	1%	Vickers, 2001	--
Require Repair of all Leaks within 24 hours	Leaks	☑	100%	5%	--	--
Prohibit Vehicle Washing Except with Recycled Water	Misc. Outdoor	☑	50%	50%	EBMUD, 2008	--
Require Water-Efficient Pre-Rinse Spray Valves	Fixtures & Appliances	☐	0.8%	50%	EPA, 2015; Pacific Institute, 2003	--
Customer Water Budgets						
Establish Water Budget - 10% Reduction	All CII uses	☑	10%	50%	--	--
Establish Water Budget - 25% Reduction	All CII uses	☐	25%	60%	--	--
Establish Water Budget - 35% Reduction	All CII uses	☐	35%	55%	--	--

4 - Drought Response Actions - Stage 5

Menlo Park Municipal Water

Drought Response Actions						
Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ Residential Customer Actions to Encourage						
Install Bathroom Faucet Aerators	Faucets and Dishwashers	☐			--	--
Install a Water-Efficient Showerhead	Showers/Baths	☐			--	--
Turn Off Water when Brushing Teeth, Shaving, Washing Dishes, or Cooking	Faucets and Dishwashers	☐			--	--
Fill the Bathtub Halfway	Showers/Baths	☐			--	--
Wash Only Full Loads of Clothes	Clothes Washers	☐			--	--
Install a High-Efficiency Toilet	Toilets	☐			--	--
Take Shorter Showers	Showers/Baths	☐			--	--
Run Dishwasher Only When Full	Faucets and Dishwashers	☐			--	--
Reduce Outdoor Irrigation	Irrigation	☐			--	--
Install Drip-Irrigation	Irrigation	☐			--	--
Use Mulch	Irrigation	☐			--	--
Plant Drought Resistant Trees and Plants	Irrigation	☐			--	--
Use a Broom to Clean Outdoor Areas	Misc. Outdoor	☐			--	--
Flush Less Frequently	Toilets	☐			--	--
Re-Use Shower or Bath Water for Irrigation	Irrigation	☐			--	--
Wash Car at Facility that Recycles the Water	Misc. Outdoor	☐			--	--

5 - Estimated Water Savings - Stage 5

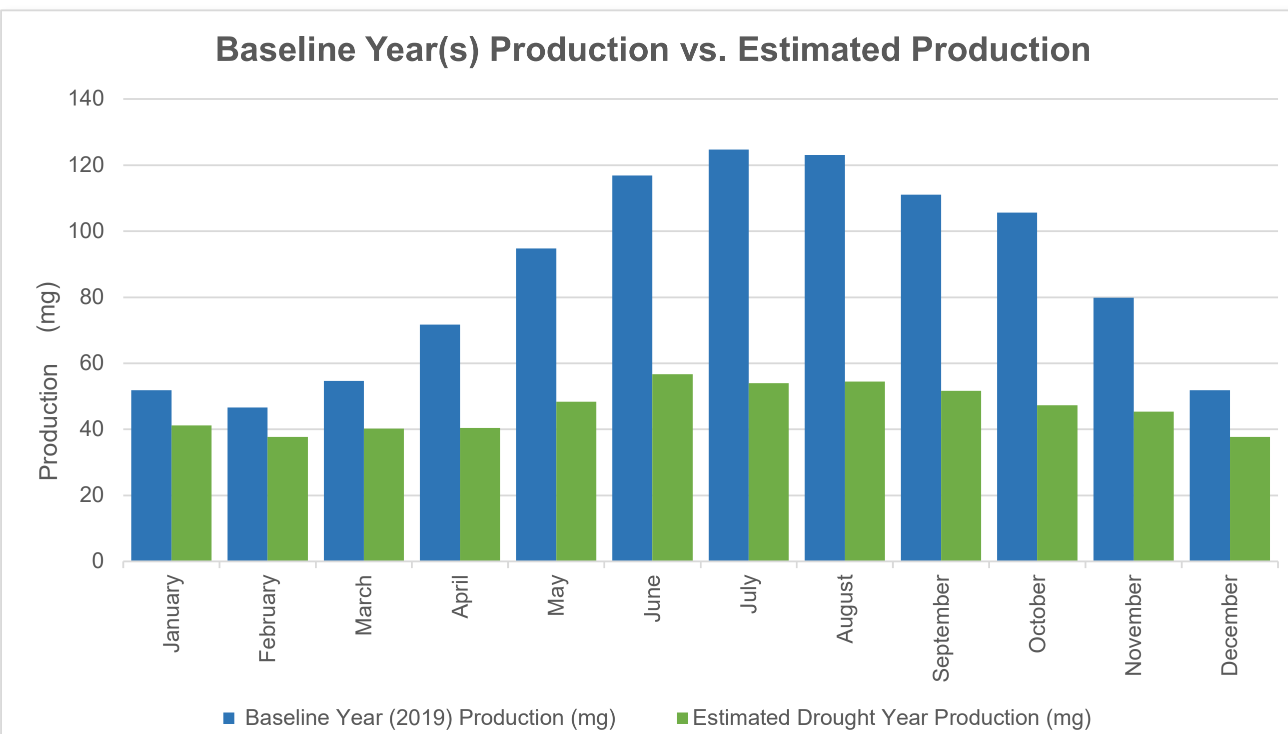
Menlo Park Municipal Water

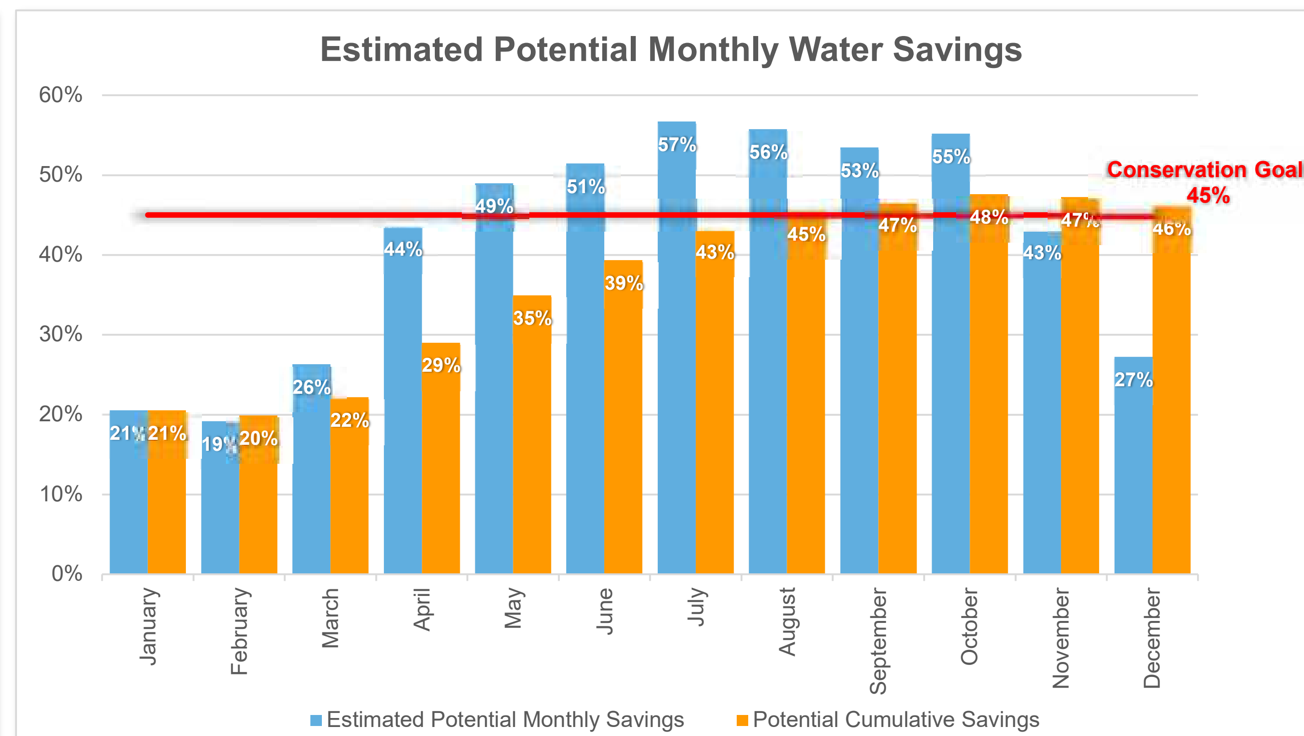
Estimated Monthly Water Use and Savings Summary

Units: (mg)

This provides a summary of the estimated production relative to Baseline Year production and potential water savings, assuming implementation of selected actions at the water savings and implementation rates indicated in the Drought Response Actions worksheet. Select the units that your production data are displayed in.

Month	Baseline Year (2019) Production (mg)	Estimated Drought Year Production (mg)	Estimated Potential Monthly Savings	Potential Cumulative Savings	Conservation Goal	Comments
January	52	41	21%	21%	45%	
February	47	38	19%	20%	45%	
March	55	40	26%	22%	45%	
April	72	40	44%	29%	45%	
May	95	48	49%	35%	45%	
June	117	57	51%	39%	45%	
July	125	54	57%	43%	45%	
August	123	54	56%	45%	45%	
September	111	52	53%	47%	45%	
October	106	47	55%	48%	45%	
November	80	45	43%	47%	45%	
December	52	38	27%	46%	45%	





Drought Response Tool

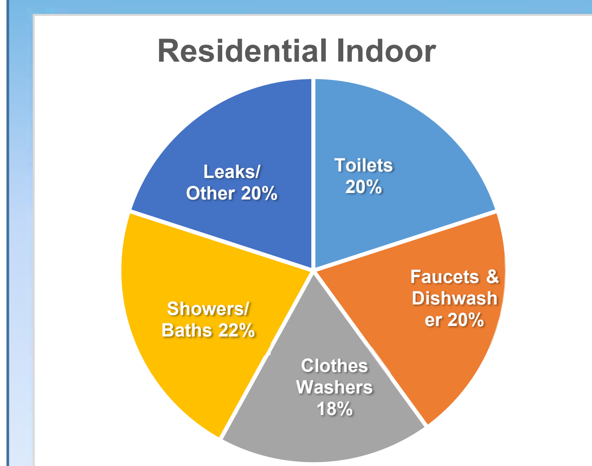
Home | Input Baseline Year Water Use | Baseline Year Water Use Profile | Drought Response Actions | Estimated Water Savings | Drought Response Tracking

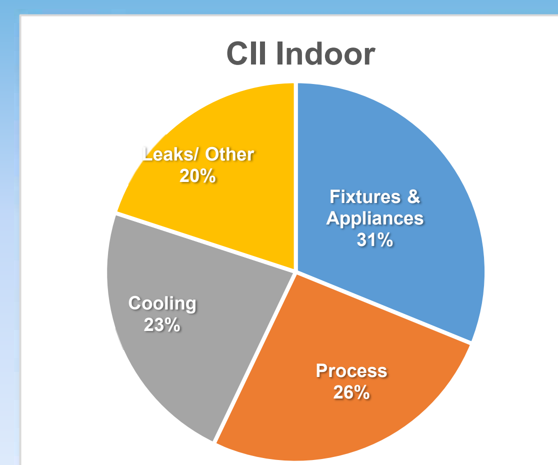
4 - Drought Response Actions - Stage 6

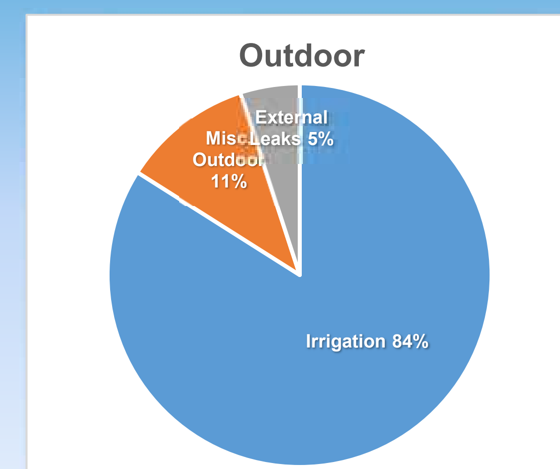
Menlo Park Municipal Water

Maximum Savings Potential		
Use the default values or enter your own criteria for the maximum savings potential. Estimated water savings within each sector will not exceed the maximum savings criteria.		
Minimum Residential Indoor GPCD	25	R-GPCD
Maximum Residential Outdoor Savings	100%	of Baseline Residential Outdoor Water Use
Maximum CII Indoor Savings	30%	of Baseline CII Indoor Water Use
Maximum CII Outdoor Savings	100%	of Baseline CII Outdoor Water Use
Maximum Dedicated Irrigation Account Savings	100%	of Baseline Dedicated Irrigation Water Use
Maximum Non-Revenue Water Savings	50%	of Baseline Non-Revenue Water Use
Resulting Total Maximum Annual Savings Potential	**64%**	of Total Baseline Production

Assumed Proportion of Water Use by End Uses and Sector







4 - Drought Response Actions - Stage 6

Menlo Park Municipal Water

Drought Response Actions

Select the Drought Response Actions you would like to include in your estimated savings calculations. For each selected action, use the default end use savings estimates and implementation rates or input your own values. The "End Use Savings" estimates the percent water use reduction that could occur at a particular end use as a result of a specific action. The "Implementation Rate" refers to the estimated percentage of accounts that will implement a specific action. The water savings potential at each end use is capped based on the assumed distribution of end use water demands shown in the pie charts above. A dash (--) indicates that professional judgement was used to establish the default value, or that savings are expected to be accounted for as part of a Public Information Program; additional basis for the default values are included in the User Manual.

Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ **Possible Mandatory Prohibitions**	All Outdoor	☑	14%	**70%**	--	--
Prohibit Irrigation with Potable Water Outside of Newly Constructed Homes and Buildings that is not Delivered by Drip or Microspray Systems	Irrigation	☐			--	--
Require Shut-Off Nozzles on Hoses for Vehicle Washing	Misc. Outdoor	☑	17%	50%	See Appendix D of the DRP	--
Prohibit Use of Potable Water to Wash Sidewalks and Driveways	Misc. Outdoor	☐	17%	50%		--
Prohibit the Use of Potable Water for Street Washing	Misc. Outdoor	☐	17%	50%		--
Prohibit Irrigation with Potable Water in a Manner that causes Runoff	Irrigation	☑	3%	50%	DeOreo et al., 2011	--
Prohibit Irrigation with Potable Water within 48 Hours following Measurable Rainfall	Irrigation	☐			--	--
Prohibit Irrigation of Ornamental Turf with Potable Water on Street Medians	Irrigation	☐			--	--
Prohibit Potable Water Use for Decorative Water Features that do not Recirculate Water	Misc. Outdoor	☑	50%	50%	EBMUD, 2008	--
Provide Linen Service Opt Out Options	Fixtures & Appliances	☑	0.5%	50%	EBMUD, 2011	--
Prohibit Serving Drinking Water other than upon Request in Eating or Drinking Establishments	Fixtures & Appliances	☑	0.5%	50%	EBMUD, 2011	--

4 - Drought Response Actions - Stage 6

Menlo Park Municipal Water

Drought Response Actions						
Action Description	**End Use(s)**	**Implement Program**	**End Use Savings (%)**	**Implementation Rate**	**Source of Default Savings Estimate**	**Source of Default Implementation Rate**
▶ **Agency Drought Actions / Restrictions**						
▶ **Agency Actions**						
Media Campaign, Newspaper Articles, Website	All	☑	0.5%	**70%**	EBMUD, 2011	--
Promote Water Conservation / Rebate Programs	All	☑		50%	--	--
Water Efficiency Workshops, Public Events	All	☑	0.5%	**30%**	EBMUD, 2011	--
Water Bill Inserts	All	☑	0.5%	100%	EBMUD, 2011	--
Promote / Expand Use of Recycled Water	Irrigation	☐	100%		--	--
Home or Mobile Water Use Reports	All	☑	5%	10%	WaterSmart Software, 2015	--
Decrease Frequency and Length of Line Flushing	Non Revenue Water	☑	25%	50%	See Appendix D of the DRP	Reduced flushing by 50%.
Audit and Reduce System Water Loss	Non Revenue Water	☑	45%	**30%**	DWR, 2015	Target 30% of leakage.
Implement Drought Rate Structure / Water Budgets	All	☑	5%	100%	CUWCC, 2015	--
Establish Retrofit on Resale Ordinance	All Residential Indoor	☐	21%	6%	SFPUC, 2004	First Tuesday, 2015
Require Net Zero Demand Increase on New Connections	All	☐			--	--
Moratorium on New Connections	All	☑			--	--
Move to Monthly Metering / Billing	All	☐	5%	10%	See Appendix D of the DRP	--
Increase Water Waste Patrols / Enforcement	All	☑			--	--
Establish Drought Hotline	All	☑			--	--
Reduce Distribution System Pressures	Non Revenue Water	☐	4.5%	100%	CUWCC, 2010; DWR, 2015	--
▶ **Dedicated Irrigation**						
Conduct Irrigation Account Surveys	Irrigation	☑	30%	**40%**	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	38%	**60%**	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	79%	**70%**		
Prohibit use of Potable Water for Irrigation	Irrigation	☐	100%	50%		
Require Repair of all Leaks within 24 hours	External Leaks	☑	100%	5%	--	--
Customer Water Budgets						
Establish Water Budget - 25% Reduction	Irrigation	☐	25%	50%	--	--
Establish Water Budget - 50% Reduction	Irrigation	☐	50%	50%	--	--
Establish Water Budget - 75% Reduction	Irrigation	☑	75%	50%	--	--

4 - Drought Response Actions - Stage 6

Menlo Park Municipal Water

Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ Agency Drought Actions / Restrictions						
▶ Residential						
Conduct Water Use Surveys Targeting High Water Users	All Residential Uses	☑	10%	**40%**	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	38%	60%	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	79%	**70%**		
Prohibit use of Potable Water for Irrigation	Irrigation	☐	100%	50%		
Prohibit Vehicle Washing Except with Recycled Water	Misc. Outdoor	☑	50%	50%	EBMUD, 2008	--
Require Repair of all Leaks within 24 hours	Leaks	☑	100%	5%	--	--
Require Pool Covers	Misc. Outdoor	☑	28%	25%	Maddaus & Mayer, 2001	--
Prohibit Filling of Pools	Misc. Outdoor	☑	55%	25%	DeOreo et al., 2011	--
Customer Water Budgets						
Establish Water Budget - 10% Reduction	All Residential Uses	☐	10%	50%	--	--
Establish Water Budget - 25% Reduction	All Residential Uses	☑	**25%**	50%	--	--
▶ CII						
Conduct CII Surveys Targeting High Water Users	All CII uses	☑	10%	**40%**	EBMUD, 2011	--
Limit Irrigation Days, Time and Duration (Select One)						
Limit Irrigation to 2 Days/Week, 15 Minutes/Day, Between 9PM and 6AM	Irrigation	☐	38%	60%	UC IPM, 2014	--
Limit Irrigation to 1 Day/Week, 10 Minutes/Day, Between 9PM and 6AM	Irrigation	☑	79%	**70%**		
Prohibit Use of Potable Water for Construction and Dust Control	Misc. Outdoor	☐		100%	--	--
Prohibit Single-Pass Cooling Systems	Cooling	☑	80%	1%	Vickers, 2001	--
Require Repair of all Leaks within 24 hours	Leaks	☑	100%	5%	--	--
Prohibit Vehicle Washing Except with Recycled Water	Misc. Outdoor	☑	50%	50%	EBMUD, 2008	--
Require Water-Efficient Pre-Rinse Spray Valves	Fixtures & Appliances	☐	0.8%	50%	EPA, 2015; Pacific Institute, 2003	--
Customer Water Budgets						
Establish Water Budget - 10% Reduction	All CII uses	☐	10%	50%	--	--
Establish Water Budget - 25% Reduction	All CII uses	☐	25%	60%	--	--
Establish Water Budget - 35% Reduction	All CII uses	☑	**35%**	50%	--	--

4 - Drought Response Actions - Stage 6

Menlo Park Municipal Water

Drought Response Actions						
Action Description	End Use(s)	Implement Program	End Use Savings (%)	Implementation Rate	Source of Default Savings Estimate	Source of Default Implementation Rate
▶ **Residential Customer Actions to Encourage**						
Install Bathroom Faucet Aerators	Faucets and Dishwashers	☐			--	--
Install a Water-Efficient Showerhead	Showers/Baths	☐			--	--
Turn Off Water when Brushing Teeth, Shaving, Washing Dishes, or Cooking	Faucets and Dishwashers	☐			--	--
Fill the Bathtub Halfway	Showers/Baths	☐			--	--
Wash Only Full Loads of Clothes	Clothes Washers	☐			--	--
Install a High-Efficiency Toilet	Toilets	☐			--	--
Take Shorter Showers	Showers/Baths	☐			--	--
Run Dishwasher Only When Full	Faucets and Dishwashers	☐			--	--
Reduce Outdoor Irrigation	Irrigation	☐			--	--
Install Drip-Irrigation	Irrigation	☐			--	--
Use Mulch	Irrigation	☐			--	--
Plant Drought Resistant Trees and Plants	Irrigation	☐			--	--
Use a Broom to Clean Outdoor Areas	Misc. Outdoor	☐			--	--
Flush Less Frequently	Toilets	☐			--	--
Re-Use Shower or Bath Water for Irrigation	Irrigation	☐			--	--
Wash Car at Facility that Recycles the Water	Misc. Outdoor	☐			--	--

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Drought Response Tool

Home | Input Baseline Year Water Use | Baseline Year Water Use Profile | Drought Response Actions | Estimated Water Savings | Drought Response Tracking

5 - Estimated Water Savings - Stage 6

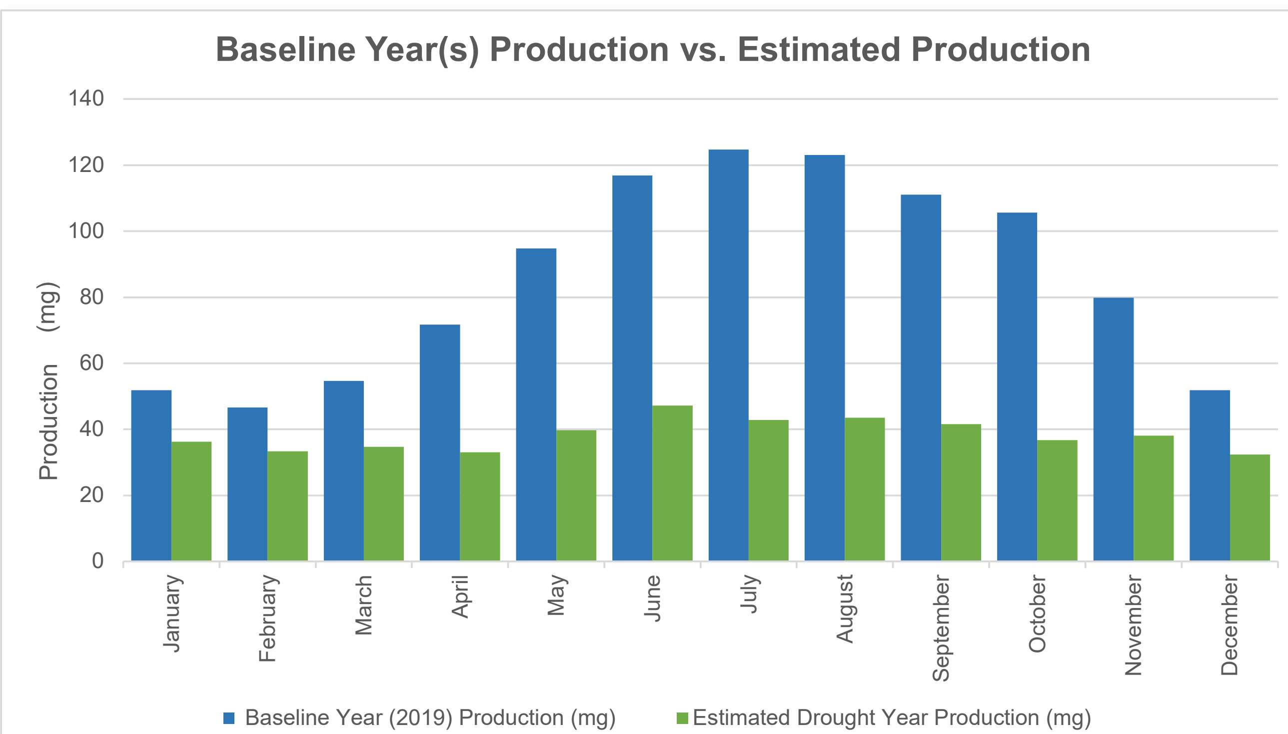
Menlo Park Municipal Water

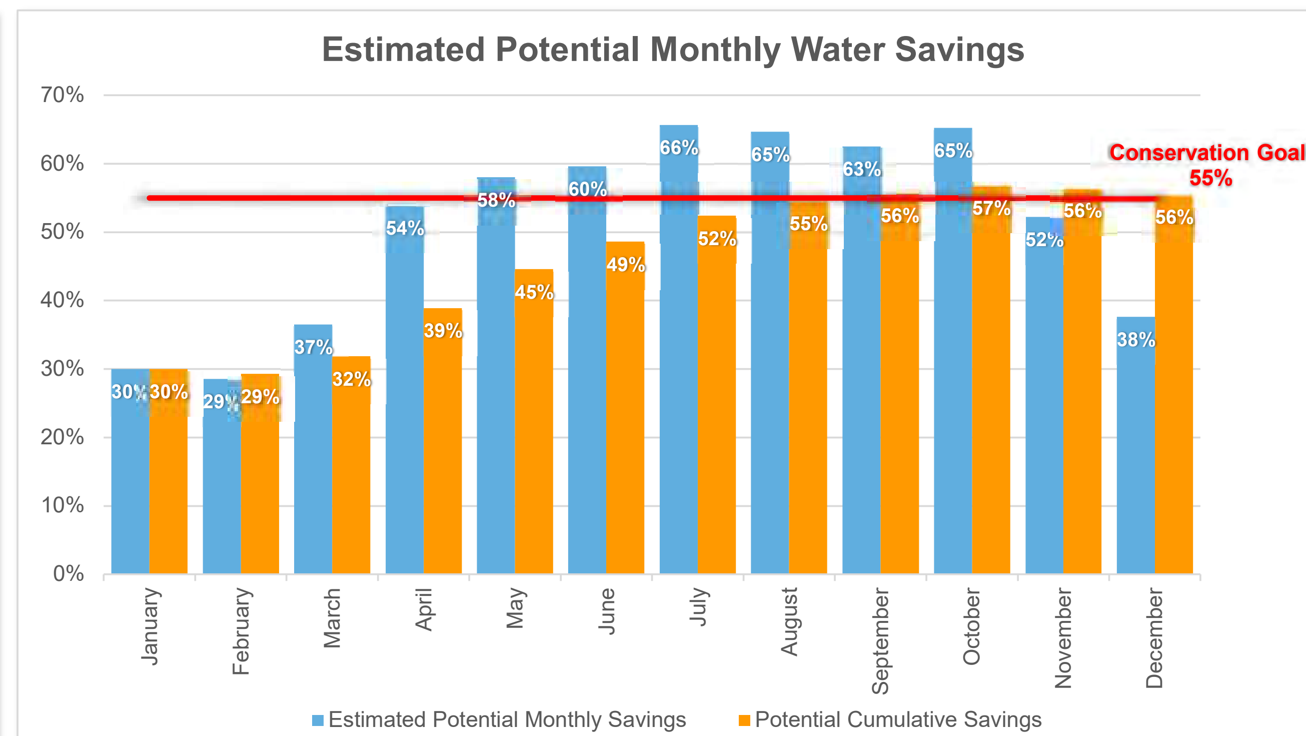
Estimated Monthly Water Use and Savings Summary

Units: (mg)

This provides a summary of the estimated production relative to Baseline Year production and potential water savings, assuming implementation of selected actions at the water savings and implementation rates indicated in the Drought Response Actions worksheet. Select the units that your production data are displayed in.

Month	Baseline Year (2019) Production (mg)	Estimated Drought Year Production (mg)	Estimated Potential Monthly Savings	Potential Cumulative Savings	Conservation Goal	Comments
January	52	36	30%	30%	55%	
February	47	33	29%	29%	55%	
March	55	35	37%	32%	55%	
April	72	33	54%	39%	55%	
May	95	40	58%	45%	55%	
June	117	47	60%	49%	55%	
July	125	43	66%	52%	55%	
August	123	43	65%	55%	55%	
September	111	42	63%	56%	55%	
October	106	37	65%	57%	55%	
November	80	38	52%	56%	55%	
December	52	32	38%	56%	55%	





ATTACHMENT 4
SFPUC EMERGENCY PREPAREDNESS PROCEDURES

PREPARATION FOR CATASTROPHIC SUPPLY INTERRUPTION

The SFPUC maintains various planning documents which 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 sections 1.1 (Emergency Preparedness Plans), 1.2 (Emergency Drinking Water Planning), and 1.3 (Power Outage Preparedness and Response) below. Section 1.4 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).

1.1 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 been updated as necessary ever since. Most recently, the SFPUC developed a Water System Emergency Response Plan (Water ERP) to comply with the America's Water Infrastructure Act (AWIA) passed in 2018. The Water ERP acts as a unifying document, integrating and referencing common components of SFPUC plans and programs that have been developed to date. The Water ERP is intended to address water transmission and distribution systems and identify the Enterprises, Divisions, and Bureaus with direct roles and responsibilities. The Water ERP integrates directly into, and functions as an annex to, the SFPUC Emergency Operations Plan (EOP). 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. Specifically, the purpose of the SFPUC EOP is to describe its emergency management organization, roles and responsibilities, and emergency policies and procedures.

In addition, SFPUC divisions and bureaus each have their own Division Emergency Operations Plans (DEOP) (in alignment with the SFPUC EOP), which detail that entity's specific emergency management organization, roles and responsibilities, and emergency policies and procedures. The SFPUC tests its DEOPs on a regular basis by conducting emergency exercises. Through these exercises, the SFPUC learns how well the plans and procedures will or will not work in response to an emergency. DEOP 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 requirements that are based on their emergency response roles.

The SFPUC EOP functions as a front end for the SFPUC's DEOPs, covering emergency response at the Department level; while each DEOP covers Division-specific information on the Division's emergency organization and response procedures specific to Division responsibilities, assets, technical scope, and operations. The types of events affecting SFPUC that may 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 break
- 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 include:

- Emergency Disinfection and Recovery Plan (EDRP)
- Emergency Response Action Plan (ERAP)
- Emergency Drinking Water Equipment and Alternatives Report
- Disinfection of SFPUC Water Trailers Procedure
- City Distribution Division Hydrant Manifold Standard Operating Procedure
- Pilot plant trailer (Mobile Pilot Plan O&M Plan)

1.2 EMERGENCY DRINKING WATER PLANNING

In February 2005, the SFPUC published the City Emergency Drinking Water Alternatives report. The purpose of this report was to outline a plan for supplying emergency drinking water in the City after damage and/or contamination of the SFPUC raw and/or treated water systems resulting from a major disaster. Since the publication of this report, the SFPUC has implemented a number of projects to increase its capability to support the provision of emergency drinking water during an emergency. These projects include:

- Completion of many Water System Improvement Program (WSIP) projects and other capital upgrades to improve security, detection, and communication (see Section 1.4);

- Public Information and materials for home and business;

- 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;

- Constructed 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 has also prepared the RWS Water Quality Notifications and Communications Plan. This plan, which was first prepared in 1996 and was most recently updated in 2017, provides contact information, procedures, and guidelines to be implemented by several SFPUC divisions, wholesale customers, and BAWSCA in the event of water quality impacts. The plan treats water quality issues as potential or actual supply problems, which fall under the emergency response structure of the SFPUC ERP.

1.3 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 portable generators to be used.

Although water conveyance throughout the RWS would not be greatly impacted by power outages 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), and the San Antonio Pump Station have back-up power on site in the form of generators or diesel-powered pumps. Additionally, both the SVWTP and San Antonio Pump Station would not be impacted by a failure of the regional power grid because these facilities are powered by hydropower generated by the Hetch Hetchy Water and Power System.

- Both the Harry Tracy Water Treatment Plant (HTWTP) and the Baden Pump Station (part of the Peninsula System) have back-up generators in place.

- Administrative facilities that will act as emergency operation centers also have back-up power.

- The SFPUC has an emergency water supply connection with the Santa Clara Valley Water District (SCVWD), the SCVWD intertie, which also has back-up generators in place.

- Additionally, as described in the next section, the WSIP includes projects that expand the SFPUC's ability to remain in operation during power outages and other emergency situations.

1.4 SEISMIC RISK ASSESSMENT AND MITIGATION PLAN

As part of the Facilities Reliability Program and the Water System Improvement Program (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 service goals for water quality, seismic reliability, delivery reliability, and water supply. One of the original goals of WSIP was to limit rationing to no more than 20 percent on a system-wide basis; the WSIP was developed to reduce the likelihood of shortages, thereby reducing the likelihood of needing to implement the WSCP.

The WSIP projects include several projects located in San Francisco to improve the seismic reliability of the in-City distribution system, including more wells that can be used as emergency drinking water sources. The WSIP also incorporates many projects related to the RWS to address both seismic reliability and overall system reliability. As of August 2018, the WSIP is over 96 percent complete. Local San Francisco projects are 100 percent complete as of June 2020. The current forecasted date to complete the overall WSIP is December 2021.

WSIP seismic levels of service (LOS) informed development of 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 City 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:

- A 35 mgd intertie with the EBMUD allowing EBMUD to serve the City of Hayward's demand and/or supply the SFPUC directly (and vice versa);
-
- A 40-mgd system intertie between the SFPUC and SCVWD; and,
-
- One permanent and one temporary intertie to the South Bay Aqueduct, which would enable the SFPUC to receive State Water Project water.

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 HTWTP), while hookups for portable engine generators are at two locations (San Antonio Reservoir and Calaveras Reservoir).The City of San Francisco also has a Hazard Mitigation Plan which was last updated in June 2014 and includes sections describing earthquakes hazards and mitigation for assets within the City's boundary, including state-regulated reservoirs (Sutro, Sunset North and South, and University Mound North and South).

ATTACHMENT 5
RESOLUTION 6630 WATER SHORTAGE CONTINGENCY PLAN, 2020 UPDATE

RESOLUTION NO. 6630

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MENLO PARK ADOPTING THE 2020 URBAN WATER MANAGEMENT PLAN AND WATER SHORTAGE CONTINGENCY PLAN

WHEREAS, the Urban Water Management Planning Act (Water Code Section 10610 – 10656 and 10608) requires every urban water supplier to prepare an Urban Water Management Plan ("UWMP"), the primary function of which is to support the suppliers' long-term resource planning to ensure that adequate water supplies are available to meet existing and future water needs; and

WHEREAS, the City's Menlo Park Municipal Water is an urban water supplier serving approximately 19,000 water customers; and

WHEREAS, the Water Shortage Contingency Plan ("WSCP") is included as a chapter of the UWMP and provides an action plan for a drought or catastrophic water supply; and

WHEREAS, the City's last Urban Water Management Plan was prepared in 2016; and

WHEREAS, the Urban Water Management Planning Act requires periodic review of the UWMP at least once every five years, followed by any amendments or changes to the UWMP that are indicated by that review; and

WHEREAS, an updated Urban Water Management Plan must be adopted by the City Council by July 1, 2021 and filed with the California Department of Water Resources within 30 days of adoption; and

WHEREAS, recent amendments to the Urban Water Management Planning Act require an updated Water Shortage Contingency Plan must be adopted by the City Council by July 1, 2021 and filed with the California Department of Water Resources within 30 days of adoption; and

WHEREAS, the City hired EKI Environmental & Water, Inc. ("EKI") to develop Menlo Park Municipal Water's ("MPMW") 2020 UWMP and WSCP; and

WHEREAS, MPMW receives all of its water from the San Francisco Public Utilities Commission (SFPUC); and

WHEREAS, the SFPUC has provided supply reliability data with the 2018 Bay-Delta Plan Amendment based on projected demands which reduces available supplies by almost 50 percent starting in year 2023 during dry years; and

WHEREAS, the Bay Area Water Supply and Conservation Agency ("BAWSCA") provided a temporary refined methodology that allocates SFPUC supplies as an equal percent reduction applied across all agencies when SFPUC shortages are greater than 20 percent. This allocation method is only temporary as the preliminary basis for the 2020 UWMP supply reliability analysis, and does not in any way imply an agreement by BAWSCA member agencies as to the exact allocation methodology; and

WHEREAS, the City has prepared and circulated a draft Urban Water Management Plan and Water Shortage Contingency Plan for public review, and properly noticed a public hearing regarding said plan held by the City Council on May 25, 2021; and

WHEREAS, the Menlo Park City Council considered the Urban Water Management Plan and Water Shortage Contingency Plan, staff report, and all public testimony on May 25, 2021;

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF MENLO PARK HEREBY RESOLVES, as follows:

1. The City Council hereby finds that the above recitations are true and correct and, accordingly, are incorporated as a material part of this Resolution.

2. The City Council adopts the 2020 Urban Water Management Plan.

3. The City Council adopts the 2020 Water Shortage Contingency Plan.

4. The City Council finds that adoption of the 2020 Urban Water Management Plan and 2020 Water Shortage Contingency Plan is categorically exempt from the California Environmental Quality Act ("CEQA") under Section 15307 of the CEQA Guidelines (Actions by Regulatory Agencies for Protection of Natural Resources).

I, Judi A. Herren, City Clerk of Menlo Park, do hereby certify that the above and foregoing City Council Resolution was duly and regularly passed and adopted at a meeting by said City Council on twenty-fifth day of May, 2021, by the following votes:

AYES: Combs, Mueller, Nash, Taylor, Wolosin

NOES: None

ABSENT: None

ABSTAIN: None

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Official Seal of said City on this twenty-fifth day of May, 2021.

DocuSigned by:

39280A20D0BE491...

Judi A. Herren, City Clerk

APPENDIX L
RESOLUTION 6630 URBAN WATER MANAGEMENT PLAN, 2020 UPDATE

RESOLUTION NO. 6630

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AYES: Combs, Mueller, Nash, Taylor, Wolosin

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ABSTAIN: None

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DocuSigned by:

39280A20D0BE491...

Judi A. Herren, City Clerk

eki environment & water

2001 Junipero Serra Blvd., Suite 300 | Daly City, CA 94014
(650) 292-9100 | Fax (650) 552-9012 | Ekiconsult.com

Appendix C
SFPUC 2020 Urban Water Management Plan

2020 URBAN WATER MANAGEMENT PLAN

for the City and County of San Francisco

June 2021

Prepared by:

The San Francisco Public Utilities Commission

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

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TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

Note: Primary table numbers and titles are specific to the body of this 2020 UWMP. Secondary table numbers and titles that are shown in brackets (e.g., [Standardized Table 3-1 Retail: Population – Current and Projected]) indicate the corresponding standardized table that is required to be submitted to DWR in a prescribed format. Standardized tables are provided in Appendix B, and SB X7-7 Verification Form tables are provided in Appendix D.

ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ABAG	Association of Bay Area Governments
AF	acre-feet (volume of water, equivalent to 325,851 gallons)
Act	California Urban Water Management Planning Act
ACWD	Alameda County Water District
AWWA	American Water Works Association
AMI	advanced metering infrastructure
BACWA	Bay Area Clean Water Agencies
BAIRWMP	Bay Area Integrated Regional Water Management Plan
BARR	Bay Area Regional Reliability
BAWSCA	Bay Area Water Supply and Conservation Agency
BDPL	Bay Division Pipeline
BG	billion gallons
BMP	Best Management Practice
CalWEP	California Water Efficiency Partnership
Castlewood CSA	Castlewood County Service Area
CCF	hundred cubic feet (volume of water, equivalent to 748 gallons)
CCWD	Contra Costa Water District
CEQA	California Environmental Quality Act
cfs	cubic feet per second (flow rate of water)
CII	commercial, industrial, and institutional
Cordilleras MWC	Cordilleras Mutual Water Company
City	City and County of San Francisco
CUWA	California Urban Water Agencies
CUWCC	California Urban Water Conservation Council
CWC	California Water Code
DMMs	demand management measures
DPR	direct potable reuse
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
ERRP	Emergency Response and Recovery Plan
FERC	Federal Energy Regulatory Commission
FY	fiscal year
GPCD	gallons per capita per day

gpm	gallons per minute
Groveland CSD	Groveland Community Services District
GSR	Groundwater Storage and Recovery
HET	high-efficiency toilet
HHLSM	Hetch Hetchy and Local Simulation Model
HTWTP	Harry Tracy Water Treatment Plant
IRWM	Integrated Regional Water Management
ISG	Individual Supply Guarantee
JPA	Joint Powers Authority
LCSD	Lower Crystal Springs Dam
LOS	Level of Service
LVE	Los Vaqueros Reservoir Expansion
MG	million gallons
mgd	million gallons per day (flow or usage rate of water)
MID	Modesto Irrigation District
MMWD	Marin Municipal Water District
MOU	Memorandum of Understanding
MW	megawatt
NSMCSD	North San Mateo County Sanitation District, a subsidiary of the City of Daly City
PEIR	Programmatic Environmental Impact Report
PREP	Potable Reuse Exploratory Plan
RWS	San Francisco Regional Water System
RWSAP	Retail Water Shortage Allocation Plan
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)
SCVWD	Santa Clara Valley Water District
SFDBI	San Francisco Department of Building Inspection
SFDPH	San Francisco Department of Public Health
SFDPH-EH	San Francisco Department of Public Health-Environmental Health
SFPUC	San Francisco Public Utilities Commission
SFUSD	San Francisco Unified School District
SFO	San Francisco International Airport
State	State of California
SVCW	Silicon Valley Clean Water
SVWTP	Sunol Valley Water Treatment Plant
SWAP	Shared Water Access Program
SWRCB	State Water Resources Control Board
SWRCB DDW	SWRCB Division of Drinking Water, formerly the California Department of Public Health Drinking Water Program

TID	Turlock Irrigation District
U.S.	United States
USD	Union Sanitary District
USEPA	U.S. Environmental Protection Agency
UV	ultraviolet
UWMP	Urban Water Management Plan
WPCP	water pollution control plant
WQC	Clean Water Act section 401 Water Quality Certification for the Turlock Irrigation District and Modesto Irrigation District Don Pedro Hydroelectric Project and La Grange Hydroelectric Project
WSA	2009 Water Supply Agreement between SFPUC and its Wholesale Customers
WSAP	Water Shortage Allocation Plan
WSCP	Water Shortage Contingency Plan
WSIP	Water System Improvement Program
WTP	water treatment plant
WUEdata	DWR Water Use Efficiency data online submittal tool
Zone 7	Zone 7 Water Agency

SECTION 1: INTRODUCTION AND OVERVIEW

The San Francisco Public Utilities Commission (SFPUC) is pleased to present this 2020 update to the Urban Water Management Plan (UWMP) for the City and County of San Francisco (City).

The City owns and operates the San Francisco Regional Water System (RWS), a public asset that plays a key role in delivering high-quality drinking water to more than 2.7 million residents and businesses in the San Francisco Bay Area. The system collects water from the Tuolumne River in the Sierra Nevada and from protected local watersheds in the East Bay and Peninsula.

With the RWS, the SFPUC delivers water to 28 wholesale customers in Alameda, Santa Clara, and San Mateo Counties, as well as the 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 their water conservation programming. The SFPUC also provides retail water service to customers in San Francisco (generally referred to as in-City retail customers) and a number of customers outside of San Francisco that are located along the RWS transmission system (generally referred to as suburban retail customers). Additionally, some retail customers are supplied with local groundwater and recycled water supplies.

This 2020 UWMP update presents the latest information on the SFPUC's retail and wholesale service areas; the RWS and other water systems operated by the SFPUC; system supplies and demands; water supply reliability; Water Conservation Act of 2009 compliance; and demand management. In addition, this update includes the SFPUC's current (Fiscal Year 2019-20) and projected demands and supplies for its retail and wholesale customers over the next 25 years. Retail demand projections have been updated to reflect population and employment growth, socioeconomic factors, and the latest conservation forecasts. This 2020 UWMP update coincides with additional planning efforts conducted by the SFPUC, including its 2020 Retail Water Conservation Plan update. When the UWMP was last updated in 2015, the State of California (State) was in the fourth year of a severe drought. During the drought, the unprecedented dry weather conditions prompted the implementation of Statewide conservation mandates; the SFPUC's customers met the call and continue to be among the lowest water consumers in the State. Consumption reached a historic low in 2015 and has remained low since. The SFPUC remains committed to comprehensive water efficiency efforts that will help sustain a continued reduction in water use.

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) to establish water quality objectives with the stated goal of increasing salmonid populations in three San Joaquin River tributaries (the Stanislaus, Merced, and Tuolumne Rivers) and the Bay-Delta. It remains unclear how or if the Bay-Delta Plan Amendment will be implemented. In acknowledgment of the uncertainty of whether and when the Bay-Delta Plan Amendment will come into effect, this UWMP presents future supply scenarios both with and without it. The two scenarios provided are intended to bookend the potential future supply conditions for the RWS. If the Bay-Delta Plan Amendment is implemented, the SFPUC will be able to meet the projected water use demands presented in this UWMP in normal years but would experience significant supply shortages in single dry years and multiple dry years. Without the implementation of the Bay-Delta Plan Amendment, the SFPUC will not experience shortages until the 4th and 5th year of a multi-year drought at 2045 levels of projected demand.

The SFPUC has initiated an Alternative Water Supply Planning Program to ensure that San Francisco can meet its retail and Wholesale Customer water needs, address projected dry year shortages, and limit rationing to a maximum of 20 percent system-wide in accordance with adopted SFPUC policies. This program is in early planning stages and is intended to meet future water supply challenges and vulnerabilities such as environmental flow needs and other regulatory changes; earthquakes, disasters, and emergencies; increases in population and employment; and climate change. As the region faces future challenges – both known and unknown – the SFPUC is considering a suite of diverse non-traditional supplies and leveraging regional partnerships to meet retail and Wholesale Customer needs through 2045.

In 2020, water suppliers are also required by the State of California to develop and adopt a Water Shortage Contingency Plan (WSCP). The WSCP contained herein describes the SFPUC's approach to meeting six standard water shortage stages, ranging from 10% to greater than 50% shortages. The WSCP includes a description of the SFPUC's annual Water Supply and Demand Assessment whereby total system water storage is compared to demands to evaluate the likelihood of a shortage in the coming year. Should a shortage be identified, the WSCP identifies appropriate shortage response actions, such as voluntary and mandatory rationing. The WSCP also describes the SFPUC's extensive emergency preparedness and planned response in the event of catastrophic interruptions of water supplies.

SECTION 2: PLAN PREPARATION AND IMPLEMENTATION

This section summarizes the actions taken by the SFPUC to assure agency coordination and public participation throughout the development of this 2020 UWMP.

2.1 BASIS FOR PREPARING A PLAN

The SFPUC has prepared this 2020 UWMP for the City and County of San Francisco (City) in accordance with the requirements of the 1983 California Urban Water Management Planning Act (Act), California Water Code (CWC) Division 6, Part 2.6, Sections 10610 through 10656, as last amended in 2020. A copy of the Act is provided in Appendix A. 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 2040 for the 2020 UWMP cycle. The planning horizon for the SFPUC's 2020 UWMP is 25 years, i.e., through 2045.

The Act requires all urban water suppliers to prepare an UWMP every five years. The 2020 UWMPs are due to the California Department of Water Resources (DWR) by July 1, 2021. 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 (AF) of water annually. The SFPUC meets these criteria as both a retail and wholesale supplier of water.

The SFPUC has 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 2020 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 2020 UWMP corresponds to FY 2019-2020, which represents the period from July 1, 2019 through June 30, 2020. Similarly, the projected year of 2025 denotes FY 2024-2025; 2030 denotes FY 2029-2030; and so on. Best efforts are made to convert data that are 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. However, the standardized tables prescribed by DWR only allow volumetric water data to be reported in units of acre-feet (AF), million gallons (MG), or hundred cubic feet (CCF) per year. Therefore, the SFPUC has reported volumetric water data in this 2020 UWMP's standardized tables in units of acre-feet (AF) rounded to the nearest 10 AF (see Appendix B). The corresponding data in the body of this 2020 UWMP, however, 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. This approach has been discussed with and accepted by DWR staff in 2015 and is being carried forward in the 2020 plan.

2.3 COORDINATION AND OUTREACH

2.3.1 Agency Coordination

2.3.1.1 Coordination with City Agencies

The SFPUC coordinated with City agencies in developing elements of this 2020 UWMP and the documents referenced herein. The SFPUC consulted with the San Francisco Planning Department in developing water demand projections based on the City's growth projections for housing and employment. City agencies were notified of the SFPUC's intent to prepare the 2020 UWMP. The notice included instructions for viewing the draft 2020 UWMP, as well as the date, time, and location of the public hearing on the draft 2020 UWMP. Comments received from these agencies on the proposed 2020 UWMP were reviewed and addressed, as appropriate. Documentation relating to these efforts and communications is provided in Appendix C.

2.3.1.2 Regional Interagency Coordination

The SFPUC coordinated the development of this 2020 UWMP with its wholesale customers and BAWSCA, a public agency representing 26 member agencies—24 cities and water districts, as well as two private utilities—in Alameda, Santa Clara, and San Mateo Counties that purchase water on a wholesale basis from the SFPUC. 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 of the SFPUC but not a member of BAWSCA. Groveland Community Services District (Groveland CSD) is considered a retail customer by the SFPUC, but for the purposes of this 2020 UWMP, is recognized as a wholesale customer. Throughout this document, references to Wholesale Customers generally 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 for distribution to all BAWSCA members. Supplies were projected in five-year increments from 2020 through 2045 for normal, single dry, and multiple dry years. These projections are provided in Appendix C. The SFPUC also worked with all of its wholesale customers, either individually or through BAWSCA, to obtain population and water supply purchase projections in five-year increments through the year 2045. Wholesale customers that are urban water suppliers are concurrently preparing their own 2020 UWMPs; therefore, the data provided for use in the SFPUC's 2020 UWMP are subject to change.

In addition to coordinating with its wholesale customers, the SFPUC also communicated with other Bay Area water agencies, including the East Bay Municipal Utility District (EBMUD), Santa Clara Valley Water District (SCVWD), Contra Costa Water District (CCWD), and Zone 7 Water Agency (Zone 7); and counties in which the SFPUC provides water, which are the counties of San Francisco, San Mateo, Alameda, Santa Clara, San Joaquin, and Tuolumne.

All wholesale customers, Bay Area water agencies, and counties in which SFPUC provides water were notified of the SFPUC's intent to prepare the 2020 UWMP. The notice included instructions for viewing the draft 2020 UWMP, as well as the date, time, and location of the public hearing on the draft 2020 UWMP. Comments received from these agencies on the proposed 2020 UWMP were reviewed and addressed, as appropriate. Documentation relating to these efforts and communications is provided in Appendix C.

2.3.2 Public Participation

The SFPUC has always actively encouraged public participation in its urban water management planning efforts. Public outreach activities for the 2020 UWMP update are listed below. Further documentation is included in Appendix C. Notification of the 2020 UWMP update was electronically mailed on February 8, 2021, with an additional mailing on March 8, 2021, to all cities and counties 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 2020 UWMP update, 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 C.

The draft 2020 UWMP was made available for review between April 5th and May 5th, 2021 at **www.sfpuc.org/uwmp**. The SFPUC met with the Citizens Advisory Committee (CAC) and the CAC Water Subcommittee on April 20th, 2021 and April 27th, 2021, respectively, to present on the draft 2020 UWMP update. The Citizens Advisory Committee meetings were publicly noticed on the SFPUC website at www.sfpuc.org.

A public hearing was held on April 13, 2021 during an SFPUC Commission meeting. A notice of the hearing was advertised in the local newspaper on March 29, 2021 and April 5, 2021 in accordance with California Government Code Section 6066. Copies of newspaper advertisements of the public hearing are provided in Appendix C. Public comments on the draft 2020 UWMP were taken during the public hearing, as well as throughout the 30 day public comment period. An adoption hearing was held at a the June 8th, 2021 SFPUC Commission meeting. For 2020 UWMP adoption, submittal, and implementation, see Section 11.1.

2.4 ACCOUNTING FOR GROVELAND CSD

Groveland CSD, located in a semi-rural area of southern Tuolumne County, serves approximately 3,500 customers in Groveland, Big Oak Flat, and Pine Mountain Lake that are primarily residential and commercial water users. Prior to 2015, the SFPUC's UWMP had reported Groveland CSD as a retail customer since Groveland CSD had not prepared its own UWMP until 2010. The SFPUC also considers Groveland CSD a retail customer and accounts for it as such in its contractual obligations and supply planning. However, for the purposes of the 2015 UWMP update, DWR directed the SFPUC to report Groveland CSD as a wholesale customer. In order to accommodate both the SFPUC's planning needs and DWR's requirements, this 2020 UWMP accounts for Groveland CSD differently (either as a retail customer or a wholesale customer) depending on the context:

- For the purposes of describing the SFPUC's wholesale service area, population, demands, and supplies as directed by DWR, and to avoid potential double counting during regional or Statewide aggregation of UWMP data, Groveland CSD is considered a wholesale customer and reported as such in Section 3 of the body of this UWMP and the standardized tables in Appendix B.

- For the purposes of describing contractual obligations and RWS supply allocations between the SFPUC and its Wholesale Customers, Groveland CSD is considered a retail customer and is reported as such in the body of this 2020 UWMP, specifically Sections 4, 6, 7, and 8.

- For the purposes of calculating per capita baselines and targets in accordance with the Water Conservation Act of 2009, also known as Senate Bill (SB) X7-7, Groveland CSD is considered a wholesale customer. Therefore, Section 5 of the body of this 2020 UWMP and the corresponding SB X7-7 Verification Form tables in Appendix D do not include Groveland CSD.

The SFPUC obtained actual and projected population and demand data from Groveland CSD. As Groveland CSD is currently preparing its 2020 UWMP update, the data provided for use in the SFPUC's 2020 UWMP are subject to change.

Any discrepancies between corresponding tables in the body of this 2020 UWMP and Appendix B resulting from the difference in Groveland CSD accounting will be noted. This approach has been discussed with and deemed appropriate by DWR staff.

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SECTION 3: SYSTEM DESCRIPTION

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

3.1 SFPUC WATER SYSTEM OVERVIEW

Over 2.7 million people in San Francisco and throughout the Bay Area rely on water supplied by the SFPUC to meet their daily water needs. The RWS is municipally-owned infrastructure operated by the SFPUC, a department of the City and County of San Francisco, and serves both retail and wholesale customers. The RWS supplies high-quality drinking water from the Tuolumne River watershed and from local reservoirs in the 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 split between these resources varies from year to year depending on the water year hydrology and operational circumstances.

Separate from the RWS, the in-City distribution system is also owned and operated by the SFPUC and serves a population of nearly 900,000 in San Francisco. In-City retail customers are primarily served with RWS supply, but a few customers also receive groundwater and recycled water. Similarly, the SFPUC's suburban retail customers[1], outside of San Francisco, are primarily served with RWS supply, but a few customers also receive groundwater. The RWS, in-City distribution system, and other localized systems 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 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 Hetch Hetchy Project. Because many of the Hetch Hetchy 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 Hetch Hetchy Project 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 high-quality sources.

[1] Suburban retail customers are retail customers located outside of SFPUC's retail service area. More information on suburban retail customers is provided in Section 3.1.5.2.

Since the 1930s, the major additions to the RWS have included the raising of O'Shaughnessy Dam and the development of Lake Lloyd (a.k.a., Cherry Lake); the construction of additional pipelines across the San Joaquin Valley; and the local construction of San Antonio Reservoir in Alameda County and Bay Division Pipelines (BDPL) Nos. 2, 3, and 4. 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, and two water treatment plants. It includes the Hetch Hetchy Project and the Bay Area water system facilities. The Hetch Hetchy Project is generally composed of the reservoirs, hydroelectric generation and transmission facilities, and water transmission facilities from the Hetch Hetchy Valley west to the Alameda East Portal of the Coast Range Tunnel in Sunol Valley. Water system components of the Hetch Hetchy Project are also referred to as the Hetch Hetchy System. The local 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 treatment 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 Hetch Hetchy Reservoir into 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 the 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 connect the Hetch Hetchy System and Alameda water sources to the Peninsula System. The BDPLs cross the South Bay to the Peninsula System delivering water to customers along the pipeline route. The Sunol Valley Water Treatment Plant (SVWTP) filters and disinfects water supplied from San Antonio Reservoir and Calaveras Reservoir.

- **Peninsula System:** The Peninsula System includes conveyance facilities connecting the BDPLs to the in-City distribution system 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 the Wholesale Customers, the Coastside County Water District (which includes the City of Half Moon Bay), along with 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 the in-City distribution system.

Figure 3-1. Regional Water System

a Three pump stations on Treasure Island are not depicted.

b The water service area shown is approximate and for illustrative purposes only. For more accurate boundaries of the retail and wholesale service areas, see Figures 3-3 and 3-4, respectively.

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. Water to the eastside of the in-City distribution system is fed by two pipelines that terminate at University Mound Reservoir. Water to the westside of the in-City distribution is fed by two pipelines that terminate at Sunset Reservoir and one that terminates at Merced Manor Reservoir. As shown in Figure 3-1, the in-City distribution system also includes ten reservoirs and eight water tanks that store water supplied by the RWS. Seventeen pump stations[2] and approximately 1,250 miles of pipelines move water throughout the system and deliver water to homes and businesses in the City.

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, which flows down the Tuolumne River to Hetch Hetchy Reservoir. This water meets or exceeds all federal and State criteria for watershed protection. Water from Hetch Hetchy Reservoir is protected in pipes and tunnels as it is conveyed to the Bay Area, and requires pH adjustment to control pipeline corrosion and disinfection for bacteria control. Based on the SFPUC's disinfection treatment practice, extensive bacteriological quality monitoring, and high operational standards, the U.S. Environmental Protection Agency (USEPA) and the 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.

A new USEPA regulation took effect in 2012 requiring secondary disinfection for all unfiltered drinking water systems to control the waterborne parasite cryptosporidium. To comply with this regulation, the SFPUC completed construction of a new ultraviolet (UV) treatment facility in 2011. The Tesla Treatment Facility is a key component of the Water System Improvement Program (WSIP) and enhances the high-quality water from the RWS. The facility has a capacity of 315 mgd, making it the third largest UV drinking water disinfection facility in the U.S.

All water derived from sources other than Hetch Hetchy Reservoir is treated at one of two treatment plants: the SVWTP or the HTWTP. The SVWTP primarily treats water from the Alameda System reservoirs and has both a peak capacity and sustainable capacity of 160 mgd. Treatment processes include coagulation, flocculation, sedimentation, filtration, disinfection, fluoridation, corrosion control treatment, and chloramination. Fluoridation, chloramination, and corrosion control treatment can also be provided for the combined Hetch Hetchy System and SVWTP water at the Sunol Valley Chloramination Facility. The HTWTP treats water from the Peninsula System reservoirs and has a peak capacity of 180 mgd and a sustainable capacity of 140 mgd. Treatment processes include ozonation, coagulation, flocculation, filtration, disinfection, fluoridation, corrosion control treatment, and chloramination. Major upgrades to the SVWTP were completed in 2013 and to the HTWTP in 2015.

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[2] 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

The majority 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 Reservoir, Lake Lloyd (a.k.a., Cherry Lake), 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 system operations.[3] 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.

As a by-product of water delivery and water supply management, hydroelectric power is generated by the Hetch Hetchy Water and Power System. Water stored in Hetch Hetchy Reservoir is used for hydroelectric generation and also satisfies instream flow requirements when released downstream. Normally, only Hetch Hetchy Reservoir water supplies are exported to the Bay Area, while releases from Lake Eleanor and Lake Lloyd are used to satisfy instream flow requirements, satisfy Raker Act entitlements to the Districts downstream, and produce hydroelectric power. The Hetch Hetchy Water and Power System includes three major hydroelectric powerhouses along the Tuolumne River—Holm, Kirkwood, and Moccasin—that have a collective generating capacity of nearly 400 megawatts.

Downstream of the Hetchy Hetchy System, the SFPUC utilizes local watersheds in the Bay Area. 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 Country, capture local runoff in the Alameda watershed. In addition to capturing local runoff, San Andreas, San Antonio, and Crystal Springs Reservoirs also provide storage for water from the Hetch Hetchy System and, along with Calaveras Reservoir, are an important water supply in the event of an interruption to Hetch Hetchy System deliveries. The storage capacity of each of these Bay Area reservoirs is included in Table 3-1.

Calaveras Reservoir had been operating in recent years 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 existing dam. The SFPUC began impounding water behind the new dam in the winter of 2018/2019 and continued the initial fill of the reservoir during the 2019/2020 winter season.

The in-City reservoirs and tanks collectively have the capacity to hold approximately 413 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 existing non-potable water immediately available within the City at Lake Merced. 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.

[3] The Turlock Irrigation District and Modesto Irrigation District (Districts) have senior water rights to the City for the 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	
	Acre-Feet (AF)	Billions of Gallons (BG)
Up-Country[a]		
Hetch Hetchy	360,360	117.4
Lake Lloyd[b]	273,300	89.1
Lake Eleanor	27,100	8.8
Subtotal Up-Country	660,760	215.3
Local		
Calaveras (East Bay)[c]	96,800	31.5
San Antonio (East Bay)	50,500	16.5
Crystal Springs (Peninsula)[d]	69,300	22.6
San Andreas (Peninsula)	19,000	6.2
Pilarcitos (Peninsula)	3,100	1.0
Subtotal Local	238,700	77.8
Total RWS Storage[e]	899,460	293.1

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

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

c Calaveras Reservoir was constructed with a storage capacity of 96,800 AF. Since December 2001, in response to safety concerns about the seismic stability of the dam and a directive from the Division of Safety of Dams (DSOD), the SFPUC held the maximum water level at approximately 37,800 AF (roughly 40% of its maximum capacity). The construction of a new replacement dam downstream was completed in 2019 to restore the dam's full storage capacity and the dam was continuing to be filled over the 2019/2020 winter season.

d Crystal Springs Reservoir has a maximum storage capacity of 22.6 BG (at 291.8 feet). Based on permit conditions, , the reservoir is currently operated at 287.8 feet (4 feet below capacity).

e This includes 63,700 AF in dead storage (i.e., the volume in a reservoir below the lowest controllable level). In addition, the SFPUC may draw against a credit of up to 570,000 AF in storage in a water bank account in Don Pedro Reservoir, for total storage for planning purposes of 1,469,460 AF.

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

[Standardized Table: Not Applicable]

In-City Reservoir	Storage	
	Acre-Feet (AF)	Millions of Gallons (MG)
Sunset	542	177
University Mound	432	141
Sutro	96	31
Summit	43	14
College Hill	41	13
Stanford Heights	40	13
Merced Manor	29	10
Lombard	8	3
Potrero	3	1
Hunters Point	3	1
Storage Tanks	29	9
Total In-City Storage	1,267[a]	413

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 in-City distribution system is the primary system serving San Francisco retail customers, several customers also receive groundwater or recycled water. The San Francisco Recreation and Park Department (RPD) operates and maintains groundwater wells 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 are provided recycled water for irrigation. Harding Park, an in-City retail customer, is served recycled water by the North San Mateo County Sanitation District (NSMCSD) in Daly City. Sharp Park, a suburban retail customer, is served recycled water by the North Coast County Water District (NCCWD) 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

The SFPUC serves a number of retail customers outside the City. These customers are collectively referred to as suburban retail customers or customers in the suburban retail service area. These customers are generally located right off of RWS transmission pipelines and do not form one contiguous service area. More information about the suburban retail service area is provided in Section 3.2. However, there are two small water systems in unincorporated Alameda County that are operated by the SFPUC as permitted by the SWRCB DDW: the Castlewood Well System and the Town of Sunol domestic water system.

- **Castlewood Well System:** The SFPUC owns and operates the Pleasanton Well Field Water System[4] (Public Water System No. CA0110018; herein referred to as the Castlewood Well System), which in FY 2019-2020 supplied approximately 0.3 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 and are supplied with 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. The supply is pumped to two 130,000-gallon storage tanks. Water quality is overseen by the SFPUC.

[4] 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.

3.2 RETAIL SERVICE AREA

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 (SFO), 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 3-2.

3.2.1 Climate

The San Francisco Bay Area as a whole has a Mediterranean climate. In the City and its vicinity, summers are cool and winters are mild with infrequent rainfall. Temperatures average 57 degrees Fahrenheit annually, ranging from the mid-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.[5] 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.

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[5] Average maximum and minimum temperatures and average monthly rainfall data obtained from Western Regional Climate Center, 1981-2010 data from two San Francisco monitoring stations (Mission Dolores/SF#047772 and Richmond/SF#047767). Accessed from: **www.wrcc.dri.edu**.

Figure 3-3. Retail Service Area

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 #5

6 Sharp Park Golf Course

7 San Francisco International Airport

8 SFPUC Millbrae Headquarters

9 Crystal Springs Golf Course

10 Penninsula 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 (two sites)

The suburban customers shown above represent the majority of water use in the suburban retail service area, but are not comprehensive. For the purposes of the 2020 UWMP, Groveland Community Services District is considered a retail customer in the context of the Water Supply Agreement and allocating Regional Water System supplies between retail and Wholesale Customers. Groveland is shown in Figure 3-4.

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 897,806 and is projected to increase to nearly 1.3 million by 2045. Retail population projections are provided here; however, when future retail water demands are forecast, they are based on actual demand from existing households and new demand from projected housing growth rather than projected population growth. See Section 4.1 for further discussion of retail demand forecasting.

Table 3-3. Retail Service Area Population

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

Retail Service Area	Actual	Projected				
	2020	2025	2030	2035	2040	2045
In-City Retail[a]	897,806	1,002,873	1,064,477	1,126,081	1,187,684	1,249.288
Suburban Retail[b]	1,926	1,926	1,926	1,926	1,926	1,926
Total Retail	899,732	1,004,799	1,066,403	1,128,007	1,189,610	1,251,214

a County of San Francisco population for January 1, 2020 obtained from the California Department of Finance Report E-5, released April 1, 2020. County of San Francisco population projections obtained from the San Francisco Planning Department consistent with their Housing Element 2022 Update.

b Actual and projected population based on the number of retail residential service connections in Redwood City, Daly City, Fremont, and Millbrae; the number of homes in Castlewood CSA; inmate population of the San Francisco County Jail #5 in San Bruno; Department of Water Resources (DWR) Population Tool for Town of Sunol; and 2000 and 2010 U.S. Census data. Methodology used to estimate population in the suburban retail service area was approved through pre-review with DWR and is detailed in Section 5.1. Population for Groveland CSD is not included as retail, but reported as wholesale in Table 3-4 instead.

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. Build-out is planned or already under construction at the few, large undeveloped or redevelopment areas that remain, 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. The majority of current and planned development is comprised of mixed-use, multi-family residential, and commercial high-rise buildings.

Housing unit estimates for San Francisco are based on the Housing Element 2022 Update objective, which plans to add an average of 5,000 housing units per year, or an approximate growth in housing units of 1.3% per year. 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 2:1 (i.e., one third of total housing is single family). As new housing is built, the majority of which will be multi-family units, the ratio will increase to over 3:1 (i.e., one fourth of total housing is single family) by 2040.

Retail demand projections presented in this 2020 UWMP (Section 4.1) are based on housing projections provided by the San Francisco Planning Department for the in-City retail service area and employment forecasts from the Association of Bay Area Governments (ABAG). Additional information about demographic data sources and assumptions supporting the retail demand projections can be found in Appendix E.

3.3 WHOLESALE SERVICE AREA

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). The SFPUC also sells water to two additional 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 and water districts, as well as two other utilities, in Alameda, Santa Clara, and San Mateo Counties that purchase water on a wholesale basis from the RWS. The SFPUC sells water to these Wholesale Customers under the terms of the WSA and the individual water sales contracts that each of the Wholesale Customers have with the SFPUC. Since 1970, the SFPUC has supplied approximately 65% of the total Wholesale Customers' demand. Some of the Wholesale Customers are entirely reliant on the SFPUC for their 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, 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 was directed by DWR to report Groveland CSD as a wholesale customer for the 2015 UWMP and maintains this distinction in the 2020 UWMP update. 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.

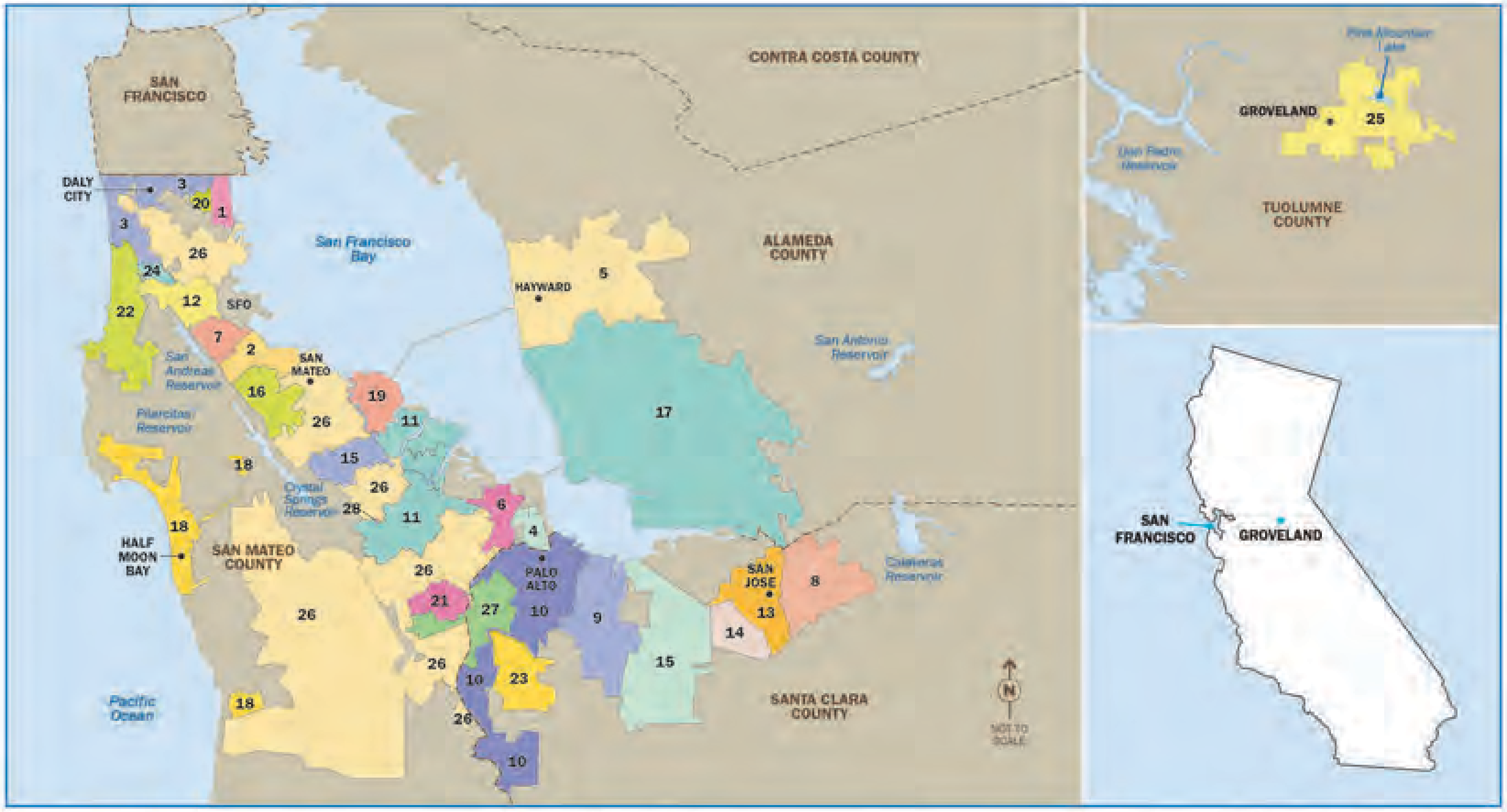
3.3.1 Climate

As described in Section 3.2.1 for the retail service area, the San Francisco Bay Area as a whole 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 and Cordilleras MWC experience a climate similar to the in-City retail service, except for customers located in the southern and inland regions 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 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



MUNICIPALITIES

1 City of Brisbane
2 City of Burlingame
3 City of Daly City
4 City of East Palo Alto
5 City of Hayward
6 City of Menlo Park
7 City of Millbrae
8 City of Milpitas
9 City of Mountain View
10 City of Palo Alto
11 City of Redwood City
12 City of San Bruno
13 City of San Jose[a]
14 City of Santa Clara[a]
15 City of Sunnyvale
16 Town of Hillsborough

WATER PURVEYING DISTRICTS

17 Alameda County Water District
18 Coastside County Water District
19 Estero Municipal Improvement District
20 Guadalupe Valley Municipal Improvement District
21 Mid-Peninsula Water District
22 North Coast County Water District
23 Purissima Hills Water District
24 Westborough Water District
25 Groveland Community Services District[b]

OTHER ENTITIES

26 California Water Service Company[c]
27 Stanford University
28 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 Groveland Community Services District is not a member of BAWSCA. For the purposes of the 2020 UWMP, Groveland is considered a retail customer in the context of the Water Supply Agreement and allocating Regional Water System supplies between retail customers and Wholesale Customers. However, Groveland is accounted for as a wholesale customer in the standardized tables provided in **Appendix B**.

c California Water Service Company, an investor-owned utility, provides water service to four separate districts: Bear Gulch (Atherton vicinity), San Carlos/San Mateo, South San Francisco, and Skyline County Water District.

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

3.3.2 Population and Demographics

As shown in Table 3-4, the total population in the wholesale service area is currently estimated to be about 1.86 million and is projected to increase to over 2.4 million by 2045. 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 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 Population

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

Wholesale Service Area	Actual	Projected				
	2020	2025	2030	2035	2040	2045
BAWSCA Member Agencies[a]	1,858,392	1,941,725	2,032,304	2,187,849	2,311,562	2,438,515
Cordilleras MWC[b]	64	64	64	64	64	64
Groveland CSD[c]	3,027	3,065	3,104	3,143	3,182	3,222
Total Wholesale	1,861,483	1,944,854	2,035,472	2,191,056	2,314,808	2,441,801

a Data provided by BAWSCA and published in BAWSCA's Regional Water Demand and Conservation Projections Report, June 2020.

b Data provided by Cordilleras MWC.

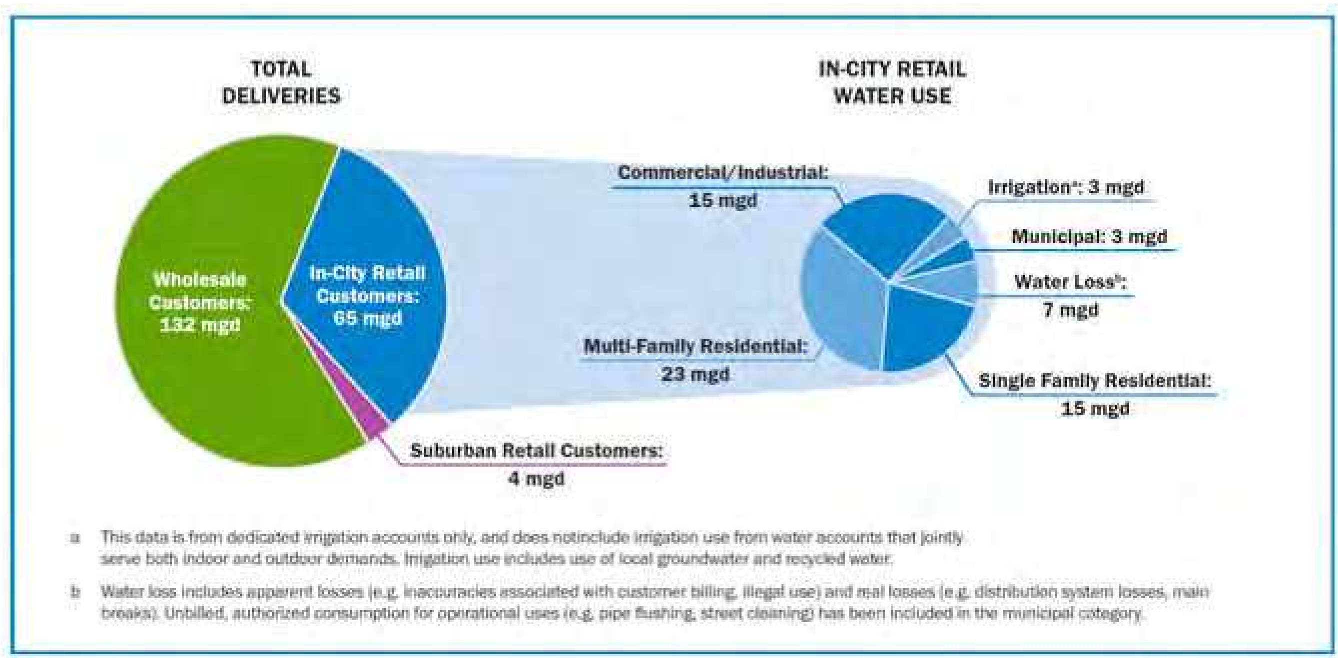
c Data provided by Groveland CSD (subject to change) and population projections are from Groveland CSD's 2015 UWMP and are according to a 0.25 percent annual growth rate estimate within the Groveland CSD service area through 2045.

SECTION 4: SYSTEM 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. Additionally, water loss is included in total retail demands unless otherwise noted.

As described previously, approximately two thirds of the SFPUC's water supply is delivered to wholesale customers, and the remaining one third is delivered to retail customers. In 2020, the SFPUC delivered approximately 198 mgd of RWS supplies to its entire water service area, with an additional 2.3 mgd in local groundwater and 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 2020



Note that Groveland CSD is accounted for differently between this section of the 2020 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. Where retail demands are subsequently compared to retail supplies in Section 8. Groveland CSD is accounted for in both the retail demand and retail supply projections. 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

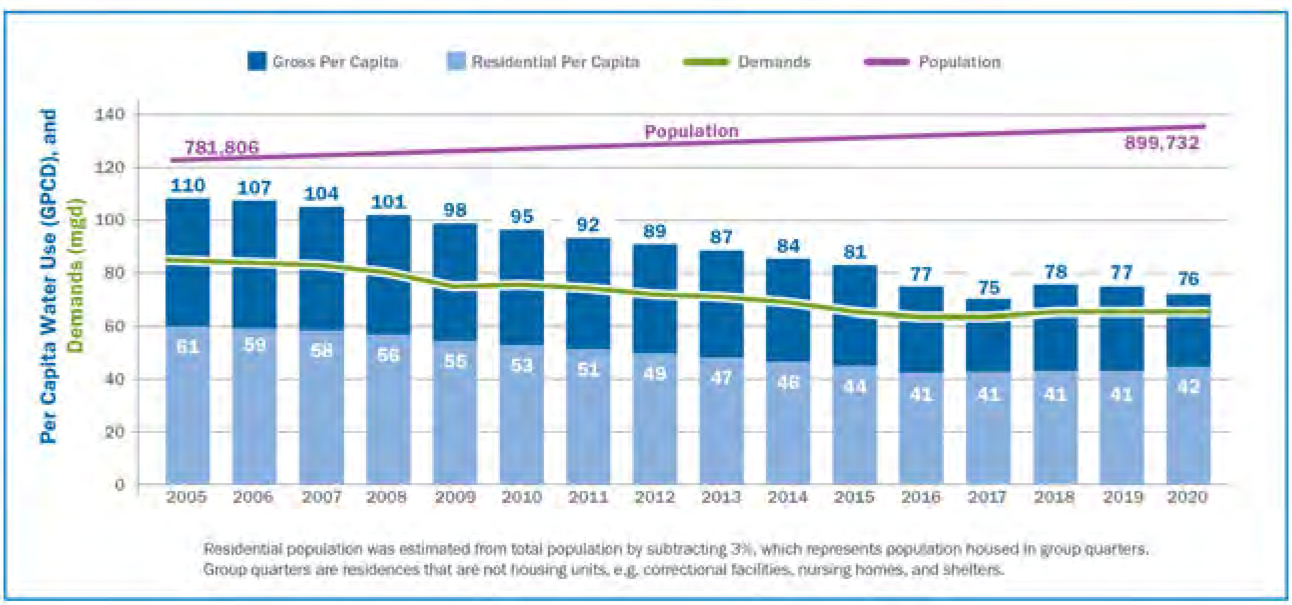
4.1.1 Current Retail Demands

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 most recent drought in 2012 – 2016 per capita water use further declined.

As illustrated in Figure 4-2, 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). Currently, gross and residential per capita water use by in-City retail customers are 73 and 42 GPCD, respectively. Taking suburban retail customers into account, gross and residential per capita water use by all retail customers are 76 and 42 GPCD, respectively. These per capita rates are among the lowest in the State.

Since the summer of 2014, the SFPUC has reported total water production and residential per capita water use on a monthly basis to the SWRCB in compliance with its emergency conservation regulations. The SFPUC continued to report this data voluntarily to the SWRCB after the emergency conservation regulations adopted during the last drought ended. In April 2020, the SWRCB adopted a regulation making the monthly reporting permanent, and effective October 2020, it again became mandatory. The SFPUC monthly per capita rates have consistently been among the lowest reported by urban water suppliers in the State.

Figure 4-2. Trends in Retail Demands, Population, and Per Capita Use between 2005 and 2020



Total retail demand (including both in-City and suburban retail) in 2020 was 69 mgd, which is much lower than anticipated in the 2015 UWMP update. Of this demand, in-City retail customers used approximately 65.3 mgd (95% of total retail demand), of which 1.9 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 3.7 mgd (5% of total retail demand), of which 0.3 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 7.18 mgd.

The SFPUC's retail demands are generally tracked and projected 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 households currently comprise approximately one third of the total households in the City, though this proportion is declining. This sector represents approximately 20% 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. Outdoor water use is estimated to be about 20% of single family residential use, on average.

- **Multi-Family Residential:** Multi-family households include apartments, condominiums, and townhouses. This sector comprises approximately two thirds of the total households in the City, and this proportion is increasing. This sector represents approximately 30% 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 sectors of water users not designated as residential and includes commercial, industrial, institutional, and municipal uses, as well as irrigation through dedicated meters. Non-residential water use represents approximately 40% 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 actually consumed by customers. It is comprised of both apparent losses and real losses. Water loss typically represents less than 10% of total retail demand. For more information on water loss, see Section 4.1.3 and Appendix G.

One factor that impacted demands in FY 19-20 was the COVID-19 pandemic and the shelter in place order that was issued in March 2020. There was a shift in water demand as a result of people remaining at home and office building occupancy decreasing. As part of the retail demand forecasting, the impact of COVID-19 on water demand was estimated by sector. For the residential sectors, there was an estimated increase of 9% for the single-family and 6% for multi-family sectors. In the commercial and industrial sectors, the estimated change was a decrease of 40 - 57%. These changes may account for a lower level of retail demand than would otherwise have occurred.

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 forecasts. Econometric models incorporate socioeconomic factors to project demands and are able to capture a more complete demand picture. This demand forecasting methodology is becoming more prevalent among urban water utilities and managers. The demand forecasts 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 sectors. Detailed information about these models is provided in Appendix E.

- 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. These savings were estimated by the SFPUC using an end-use-based water savings accounting model. This model is customized for the SFPUC from the Alliance for Water Efficiency Water Conservation Tracking Tool. Additional information about this customized model, referred to as the SFPUC Water Conservation Tracking Model, is provided in Appendix G.
- Passive conservation savings are savings that are achieved through natural fixture replacement and tightening of the plumbing code over time. In an effort to avoid double-counting of passive conservation savings, the passive savings estimated by the SFPUC Water Conservation Tracking Model were not subtracted from the modeled demands. It is assumed that some passive savings are accounted for in the response of demands to changes in water rates, e.g., when water rates increase, people may respond by replacing inefficient fixtures to reduce water consumption. Single family, multi-family, and commercial and industrial sectors all show a strong relationship between increasing water rates and decreasing water demands. Although all passive savings may not be accounted for in this rates impact, subtracting passive savings that were estimated separately would likely result in a double counting of conservation savings. For an estimate of both the passive and active conservation savings, refer to SFPUC's Retail Water Conservation Plan[6].
- The models incorporate savings from onsite water reuse. These savings were estimated by SFPUC staff. Additional information about this estimate can be found in Section 4.1.4.

- **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 2040 since no significant growth is anticipated among these sectors.

- **Water Loss**: Water loss is forecasted separately and is described in Section 4.1.3.

A key new aspect of the retail demand projections in this 2020 UWMP update is that the econometric models were calibrated using 10 years (2010-2020) of historical San Francisco account-level water usage data. This data was combined 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. Demands are then projected based on the growth assumptions discussed below, along with expected future changes in rates and climate.

The new set of models relies on household and employment forecasts provided by the San Francisco Planning Department. The Planning Department is currently updating the city's General Plan Housing Element (Housing Element 2022 Update). The housing element update is required to be adopted by the city and submitted to the state Department of Housing and Community Development by January 2023. One of the primary goals of the Housing Element 2022 Update is to improve housing affordability by increasing the rate of housing production compared with the past several decades. The housing projections are based on the Housing Element 2022 Update objective of producing an average of 5,000 housing units per year with adjustments for certain large development plans. The employment forecasts are from the Planning Department's Land Use Allocation (LUA) 2017, which is a City-specific refinement of ABAG's growth forecasts, ABAG Projections 2017, which reflect the growth that is assumed in ABAG's Plan Bay Area and Sustainable Communities Strategy Jobs-Housing Connections Scenario.

[6] 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 forecast. The Conservation 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 Conservation Plan may be accessed online at **https://sfpuc.org/learning/conserve-water**.

In the 2015 UWMP's demand projections, commercial and industrial demands were aggregated and based only on total employment, not sector-specific characteristics. In the updated models for this 2020 UWMP, 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 forecasts 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 FY19-20 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 forecasting 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 2020 UWMP update. The projected demands were estimated by multiplying projected population by the 2020 target daily per capita water use (107 GPCD) as reported in Groveland CSD's 2015 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 2020 UWMP update (see Appendix B). However, in the body of this 2020 UWMP, Groveland CSD's demands are included in retail demands. These demand projections are subject to change as part of Groveland CSD's UWMP process.

4.1.2.2 Retail Demand Projections by Sector

Table 4-1 presents the updated retail demand projections by sector for 2025 through 2045. The updated projections result in a total retail demand of 77.5 mgd in 2040, which is 12.9 mgd lower than the corresponding projection in the 2015 UWMP. (The 2015 UWMP did not include projections for 2045.)

Table 4-1. 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[a]	Projected[b]				
	2020	2025	2030	2035	2040	2045
In-City Retail						
Single Family Residential	14.5	13.7	13.5	13.4	13.5	13.5
Multi-Family Residential	*22.9*	*23.7*	*25.6*	*27.9*	*30.3*	*33.0*
Non-residential	20.9	22.9	22.9	22.8	23.1	23.6
Water Loss[c]	7.2	6.0	6.0	6.0	6.0	6.0
Subtotal In-City Retail Demand	65.3	66.3	68.0	70.0	72.9	76.2
Suburban Retail						
Single Family Residential[d]	0.1	0.1	0.1	0.1	0.1	0.1
Non-residential	3.1	4	4	4	4	4
Groveland CSD[e]	0.3	0.3	0.3	0.3	0.3	0.3
Water Loss[c]	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal Suburban Retail Demand	3.5	4.4	4.4	4.4	4.4	4.4
Total Retail Demand	**68.8**	**70.7**	**72.4**	**74.5**	**77.4**	**80.6**

a Actual consumption data are obtained from customer billing data.

b Single family residential and multi-family residential demand projections are from an econometric model developed for the SFPUC. Non-residential demands include commercial/industrial demands, which are also from an econometric model, as well as municipal and irrigation demands, which are assumed to remain constant at the previous five-year average level.

c Water losses include both apparent and real losses. Suburban retail water losses are considered to be negligible. Estimate of actual water loss in 2020 is based on a draft audit under review as of the publication of this 2020 UWMP.

d Suburban retail residential demands are for single family only as no multi-family residential buildings are served.

e Groveland CSD is accounted for as a retail customer for the purpose of this table and subsequent retail supply and demand comparisons. Demand projections were provided by Groveland CSD based on its population projections and assumed per capita water use of 107 GPCD (projections are subject to change as part of its UWMP process). In the corresponding standardized tables in Appendix B, Groveland CSD is not reported as retail, but rather wholesale.

Demand is forecasted to increase steadily through 2045, with more rapid growth happening in the later years of the projection period. After accounting for the projected conservation savings, the total retail demand (excluding water loss) is projected to increase by about 21%, from 61.6 mgd in 2020 to 74.6 mgd in 2045. Although population and total retail water demand are projected to increase, gross and residential per capita water usage are both forecasted to decrease (see Figure 4-3).

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

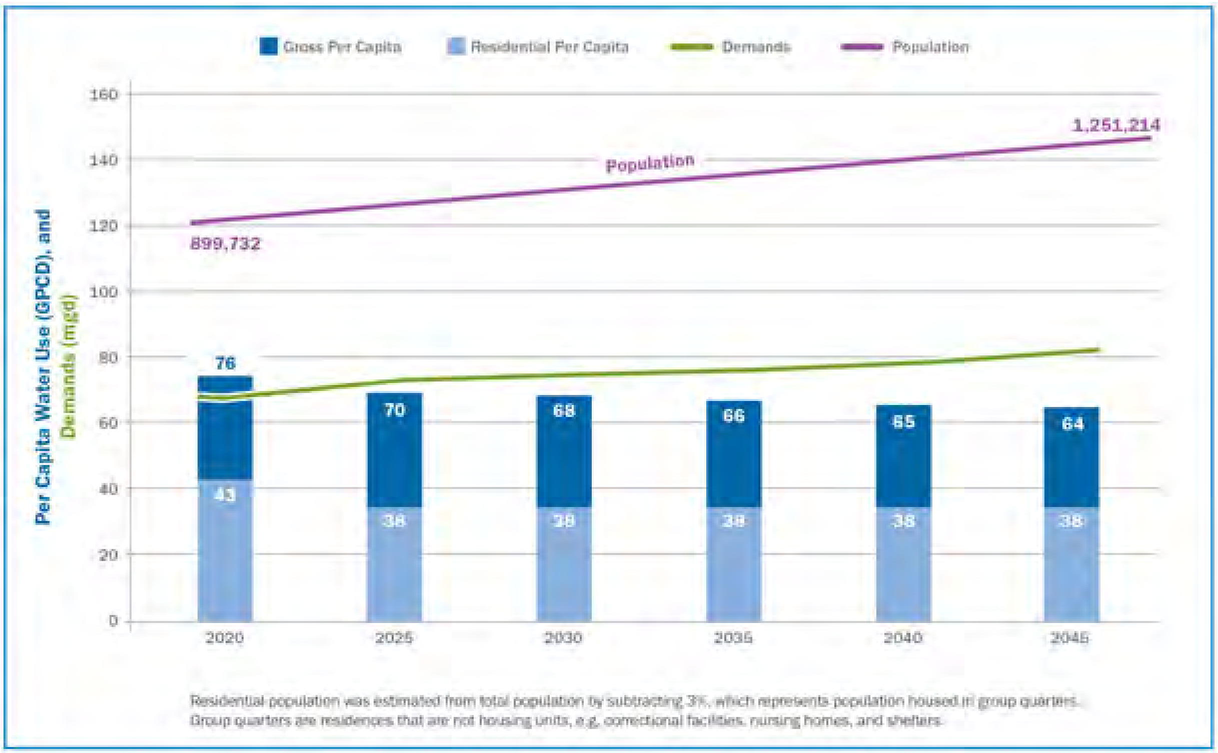
- **Single Family Residential:** Single family residential water use is projected to decrease by 7% between 2020 and 2045. Unlike the 2015 UWMP, the 2020 demand forecasts assume that no new single family homes will be constructed in the retail service area over the planning horizon. In-City single family 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 44% between 2020 and 2045. In-City multi-family residential demands are modeled as a function of the price of water, temperature, and precipitation. Compared to single family residential demands, multi-family residential demands are more responsive to price, but less responsive to increases in temperature or decreases in precipitation. Multi-family households have relatively little outdoor water use.

- **Non-residential:** Non-residential water use is projected to increase by 13% between 2020 and 2045. While the growth in in-City non-residential demands is directly related to the growth in employment, commercial and industrial water demands also reflect socioeconomic factors including price, precipitation, and temperature. As the price of water increases, the amount of water consumed per employee decreases.

- **Water Loss:** Water loss is projected to be a constant 6.0 mgd between 2020 and 2045 for planning purposes. More information on water loss projections is provided in the next section.

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



4.1.3 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 actually 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. In short, real losses are equivalent to distribution system water losses. Water loss in the retail service area ranges from 5 to 7 mgd annually, which is typically less than 10% of total retail demand.

The SFPUC has conducted water loss audits of its retail water 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 Water Code. The water loss audits were validated following the California Water Code of Regulations and submitted annually to DWR. The results of the water loss audits from the past five years are reported in Table 4-2; these include both apparent and real losses, as calculated in the AWWA worksheet. Water loss in FY19 audit, water loss in FY 2019-20 was determined to be 7.18 mgd, of which 6.0 mgd was attributed to real losses. The AWWA worksheet is provided in Appendix G.

Table 4-2: Retail Annual Water Losses over the Past Five Years

Submittal Table 4-4 Retail: 12 Month Water Loss Audit Reporting

Reporting Period Start Date (mm/yyyy)	Volume of Water loss (MG/yr)
07/2015	2,200.13
07/2016	1,899.82
07/2017	2,199.14
07/2018	2,253.01
07/2019	2,628.01

For planning purposes, the SFPUC projects total water loss in its in-City retail service area to be a flat 6.0 mgd through 2045. This estimate reflects, among other things, the anticipation of leaks and breaks due to aging infrastructure, continuance of system flushing as necessary, and active management of losses (described below). Because apparent losses are not projected separately, the SFPUC's total projection for in-City water loss is a conservative estimate and reported as such in this 2020 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 2020 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. There is no master meter to the Town of Sunol, so 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 (1.5 AF). 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 the spring of 2010 to upgrade all in-City retail water meters with wireless advanced metering technology. By 2013, 96% of meters were converted to Advanced Metering Infrastructure (AMI), and by 2020, 99.5% have been converted. The Linear Assets Management Program replaces and renews distribution system pipelines and customer service connections for approximately 1,250 miles of drinking water mains in the City. More information about management of retail system losses is provided in Section 10.2.5.

4.1.4 Onsite Water Reuse Water Savings

This 2020 UWMP update accounts for the water supply savings from buildings 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 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[7]). 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 Non-potable Water Program, since re-named the Onsite Water Reuse Program, which provides grant funding for projects meeting specific eligibility criteria.

In October 2013, the ordinance was amended to allow district-scale water systems consisting of two or more buildings sharing non-potable water. Article 12C was further amended in July 2015 to mandate the installation of onsite water systems in new developments meeting specified criteria. Beginning November 1, 2015, all new development projects of 250,000 square feet or more of gross floor area located within the boundaries of San Francisco's designated recycled water use areas, as defined by the Recycled Water Ordinance, must install onsite water systems to treat and reuse available alternate water sources for toilet and urinal flushing and irrigation. This requirement expanded to the entire City the following year, on November 1, 2016. While not required to install an onsite water system under Article 12C, developments between 40,000 and 250,000 square feet of gross floor area must submit a water budget application and accompanying Water Use Calculator to the SFPUC. Additional guidelines and rules were published in 2017 for development projects implementing district-scale non-potable water systems.

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 SFDPH'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.

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. 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 grant program includes water quality, treatment, and monitoring standards for brewery process water reuse systems.

The SFPUC received 21 water budget applications to install onsite water systems in FY 2019-2020, with a total of 119 water budget applications reviewed by the SFPUC since the beginning of the Onsite Water Reuse Program. 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 4-2. Note that this is a conservative estimate of future savings because it does not include savings from future unknown projects that are assumed in the demand forecasts; as these projects do not yet exist, no information about them is available to estimate the offsets from their potential onsite water reuse systems.

It is estimated that the Onsite Water Reuse Program (both mandatory and voluntary projects) will generate a total potable water offset of approximately 1.3 mgd by 2040, which will be sustained through 2045.

7 San Francisco Health Code, Article 12C, Sections 850-861. Note that this ordinance was amended in October 2013 by Ordinance 208-13 to allow district-scale water systems, and in July 2015 by Ordinance 109-15 to mandate installation of onsite water systems in new development meeting specified criteria.

Table 4-2. Onsite Water Reuse Program Potable Offsets (mgd)

	Actual[a]	Projected[b]				
	2020	2025	2030	2035	2040	2045
Onsite Water Reuse Savings	0.1	0.3	0.5	0.9	1.3	1.3

a Actual onsite water reuse potable offsets are obtained from existing onsite water reuse projects water budget applications.

b Projected potable offsets are based on water budget applications submitted to the SFPUC, as well as assumptions about future projects that have not yet submitted water budget applications but are known to need to comply with the Non-Potable Water Ordinance.

4.1.5 Demands of Lower Income Households

The Act requires water suppliers to separately estimate future 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. However, please note that the SFPUC does not use this estimate for any planning purposes. The demands of lower income households are included in the demand projections presented about in Table 4-1.

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

As described above, the demand projections presented here are based on housing growth projections from the 2022 update to the Housing Element of the San Francisco General Plan. The assumption used in the Housing Element is that 33% of future housing growth will be in lower income housing. Projected household growth between 2020 and 2025 is 25,805 new multi-family units. Based on the Housing Element's assumptions, that translates to 8,516 lower income households.

Based on the multi-family sector model (for additional information, see Appendix E), per household water use for future multi-family households is projected to be 78.7 gallons per household per day in 2025 (at an assumed occupancy rate of 2.3 persons per household, this translates to a per capita rate of about 34 gpcd). At this rate of household use, the demand in 2025 from 8,516 new lower income housing units will be an estimated 0.7 mgd.

This estimate of lower income water demand is reflected in the retail demand projections presented in Table 4-1. Lower income housing growth and demands have always been included in the SFPUC's retail demand projections and, subsequently, its related planning efforts.

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 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 receive over two thirds of the SFPUC's supply. 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 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, and 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 the majority 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 December 2018, 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, except the Cities of San Jose and Santa Clara, 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, and it does not have an ISG due to the terms of its 1962 individual water supply contract with the SFPUC that 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 the sum of the other 23 Wholesale Customers' ISGs. In the event that Hayward's water use exceeds its unspecified water supply allocation, the 23 Wholesale Customers with ISGs would be required to reduce their individual ISGs to accommodate the demands of Hayward.

Each of the 26 Wholesale Customers 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 contain additional specific provisions unique to the particular customer. The individual water sales contracts may be amended from time to time by the SFPUC and the applicable Wholesale Customers 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 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. The SFPUC has committed to making a decision by 2028 about whether or not to make San Jose and Santa Clara permanent customers of the RWS. Additional discussion about the San Jose and Santa Clara and the 2028 decision can be found in Section 7.3.3.

4.2.2 Wholesale Demands

Wholesale demands reached a historic low during the most recent drought and have increased slightly since the end of the drought. As shown in Table 4-3, RWS supplies purchased by the SFPUC's wholesale customers in 2020 totaled 132.1 mgd.

In 2020, BAWSCA updated the demand projections of its member agencies (26 of the SFPUC's 28 wholesale customers) using a combination of two different models: (1) an econometric (or statistical) model developed for each member agency and (2) the Demand Side Management Least Cost Planning Decision Support System (a.k.a., DSS Model). BAWSCA's population projections for its member agencies are based on each member agency's population projections, ABAG Plan Bay Area 2040 data, California Department of Finance, the U.S. Census, and agency planning documents. The forecast methodology and resulting projections are documented in BAWSCA's 2020 report titled "Regional Water Demand and Conservation Projections," and they support BAWSCA's Long-Term Reliable Water Supply Strategy (Strategy). The Strategy's projections indicate that demands by the Wholesale Customers for RWS supplies through 2045 will be significantly less than anticipated at the time the Phased WSIP was adopted in 2008. BAWSCA's member agencies that are urban water suppliers preparing an individual 2020 UWMP are in some cases using the projections developed for the Strategy, and in other cases using their own set of projections. Table 4-3 provides each Wholesale Customer's projected purchase requests for RWS supplies through 2045 provided to the SFPUC by BAWSCA.

Given the SFPUC's Supply Assurance to the Wholesale Customers described above, this 2020 UWMP also presents the wholesale demands based on contract obligations in Table 4-4.

Regarding the SFPUC's two additional wholesale customers, the demand projections for Cordilleras MWC shown in Table 4-3 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 2020 UWMP, but as part of wholesale demands in the corresponding standardized tables in Appendix B.

4.3 CLIMATE CHANGE IMPACTS TO DEMAND

The retail demand modeling included a sensitivity analysis that modeled a range of future temperature and precipitation conditions. The baseline assumptions for temperature and precipitation were an increase in average temperature of 1.1°C by 2045 and no change in average annual precipitation. The two other scenarios considered were a "hot and dry" scenario, which assumed a 1.7°C increase in temperature and an 8.3% decline in precipitation by 2045 relative to 2020; and a "wet and slower warming" scenario where average temperature increased by 0.5 °C and precipitation increased by 8.3% by 2045 relative to 2020. The demand forecasts for these three scenarios were not significantly different. For example, in the single-family sector model—where we might expect the biggest impact due to more outdoor water use—the unadjusted per-unit demand forecast (i.e. the forecast before being adjusted for conservation savings) in 2045 under the baseline conditions is 109.9 gallons per day (gpd). In the "hot and dry" scenario, the per-unit forecast in 2045 is 110.3 gpd, and in the "wet and slower warming" scenario it is 109.8 gpd. The impacts in the multi-family and commercial and industrial sector models are similarly small (see Appendix E for additional information).

The fact that the SFPUC's projected retail demands are not significantly impacted by future changes in temperature and precipitation as described above is likely primarily due to the fact that irrigation demands in the SFPUC's retail service area are relatively low due to the dense urban environment, especially in the City. Therefore, the potential increase in irrigation demand as a result of increased temperature or decreased precipitation is low.

Table 4-3. Wholesale 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 2020 Purchases[b]	Purchase Request[c]				
			2025	2030	2035	2040	2045
Alameda County Water District	13.76	7.76	7.68	7.68	7.68	7.68	9.11
City of Brisbane / Guadalupe Valley Municipal Improvement District[d]	0.98	0.63	0.89	0.89	0.88	0.89	0.89
City of Burlingame	5.23	3.48	4.33	4.40	4.47	4.58	4.69
California Water Service Company	35.68	29.02	29.99	29.74	29.81	30.27	30.70
Coastside County Water District	2.18	0.88	1.40	1.38	1.36	1.33	1.33
City of Daly City	4.29	3.92	3.57	3.52	3.49	3.46	3.43
City of East Palo Alto	1.96	1.57	1.88	1.95	2.10	2.49	2.89
Estero Municipal Improvement District	5.90	4.34	4.07	4.11	4.18	4.23	4.38
City of Hayward	22.08	14.20	17.86	18.68	19.75	20.82	22.14
Town of Hillsborough	4.09	2.57	3.26	3.25	3.26	3.26	2.26
City of Menlo Park	4.46	2.82	3.55	3.68	3.87	4.06	4.29
Mid-Peninsula Water District	3.89	2.66	2.86	2.84	2.88	2.89	2.93
City of Millbrae	3.15	1.90	2.29	2.50	2.45	2.82	3.20
City of Milpitas	9.23	6.06	6.59	6.75	7.03	7.27	7.53
City of Mountain View	13.46	7.60	8.60	8.90	9.20	9.51	9.93
North Coast County Water District	3.84	2.28	2.34	2.33	2.34	2.34	2.34
City of Palo Alto	17.08	9.75	10.06	10.15	10.28	10.51	10.79
Purissima Hills Water District	1.63	1.71	2.09	2.09	2.12	2.13	2.15
City of Redwood City	10.93	8.75	8.46	8.49	8.64	8.74	8.90
City of San Bruno	3.25	0.96	3.24	3.22	3.20	3.20	3.21
Stanford University	3.03	1.43	2.01	2.18	2.35	2.53	2.70
City of Sunnyvale	12.58	9.43	9.16	9.3	10.70	11.44	12.10
Westborough County Water District	1.32	0.87	0.86	0.85	0.85	0.84	0.84
Cordilleras Mutual Water Company[e]	—	0.01	0.01	0.01	0.01	0.01	0.01
Subtotal Permanent Customer Purchase Requests	**184.0**	**124.6**	**137.05**	**138.89**	**142.90**	**147.30**	**153.74**
City of San Jose	0.00	4.23	4.50	4.50	4.50	4.50	4.50
City of Santa Clara	0.00	3.29	4.50	4.50	4.50	4.50	4.50
Total Wholesale Purchase Requests	**—**	**132.1**	**146.05**	**147.89**	**151.90**	**156.30**	**162.74**

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 Purchase requests for RWS supplies as anticipated to be reported in each agency's individual 2020 UWMP if one is to be prepared (estimates are subject to change). Projections were provided to the SFPUC by BAWSCA in January 2021. See each agency's 2020 UWMPs for their most up to date purchase request projections.

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

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

Note: 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 standardized tables in Appendix B, Groveland CSD is reported as wholesale rather than retail.

Table 4-4. Wholesale Contractual Obligations (mgd)

[Standardized Table Not Applicable]

Wholesale Customer	ISG[a]	Actual 2020 Purchases[b]	Contractual Obligation[c]				
			2020	2025	2030	2035	2040
Alameda County Water District	13.76	7.76	13.76	13.76	13.76	13.76	13.76
City of Brisbane / Guadalupe Valley Municipal Improvement District[d]	0.98	0.63	0.98	0.98	0.98	0.98	0.98
City of Burlingame	5.23	3.48	5.23	5.23	5.23	5.23	5.23
California Water Service Company	35.68	29.02	35.68	35.68	35.68	35.68	35.68
Coastside County Water District	2.18	0.88	2.18	2.18	2.18	2.18	2.18
City of Daly City	4.29	3.92	4.29	4.29	4.29	4.29	4.29
City of East Palo Alto	1.96	1.57	1.96	1.96	1.96	1.96	1.96
Estero Municipal Improvement District	5.90	4.34	5.90	5.90	5.90	5.90	5.90
City of Hayward	22.08	14.20	22.08	22.08	22.08	22.08	22.08
Town of Hillsborough	4.09	2.57	4.09	4.09	4.09	4.09	4.09
City of Menlo Park	4.46	2.82	4.46	4.46	4.46	4.46	4.46
Mid-Peninsula Water District	3.89	2.66	3.89	3.89	3.89	3.89	3.89
City of Millbrae	3.15	1.90	3.15	3.15	3.15	3.15	3.15
City of Milpitas	9.23	6.06	9.23	9.23	9.23	9.23	9.23
City of Mountain View	13.46	7.60	13.46	13.46	13.46	13.46	13.46
North Coast County Water District	3.84	2.28	3.84	3.84	3.84	3.84	3.84
City of Palo Alto	17.08	9.75	17.08	17.08	17.08	17.08	17.08
Purissima Hills Water District	1.63	1.71	1.63	1.63	1.63	1.63	1.63
City of Redwood City	10.93	8.75	10.93	10.93	10.93	10.93	10.93
City of San Bruno	3.25	0.96	3.25	3.25	3.25	3.25	3.25
City of San Jose[e]	0.00	4.23	0.00	0.00	0.00	0.00	0.00
City of Santa Clara[e]	0.00	3.29	0.00	0.00	0.00	0.00	0.00
Stanford University	3.03	1.43	3.03	3.03	3.03	3.03	3.03
City of Sunnyvale	12.58	9.43	12.58	12.58	12.58	12.58	12.58
Westborough County Water District	1.32	0.87	1.32	1.32	1.32	1.32	1.32
Subtotal BAWSCA Member Agency Demand	**184.0**	**132.1**	**184.0**	**184.0**	**184.0**	**184.0**	**184.0**
Cordilleras Mutual Water Company[f]	—	0.01	0.01	0.01	0.01	0.01	0.01
Total Wholesale Demand[i]	**—**	**132.1**	**184.0**	**184.0**	**184.0**	**184.0**	**184.0**

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 Wholesale Customer ISGs are shown in lieu of purchase request projections, which are shown in Table 4-3.

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

e No contractual obligations are shown for the Cities of San Jose and Santa Clara, as they do not have an allocated share of the Supply Assurance due to their temporary, interruptible status under the WSA.

f Cordilleras MWC is not a member of BAWSCA or a party to the WSA, and therefore does not have an ISG. Cordilleras MWC has a water supply contract with the SFPUC for 3,007 CCF annually (about 0.006 mgd).

Note: 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 standardized tables in Appendix B, Groveland CSD is reported as wholesale rather than retail.

SECTION 5: RETAIL BASELINES AND TARGETS

With the adoption of the Water Conservation Act of 2009, also known as SB X7-7, the State was required to set a goal of reducing urban water use by 20% by the year 2020. Each retail urban water supplier was required to determine its baseline water use, expressed in gallons per capita per day (GPCD) during its baseline period, as well as its target water use for the years 2015 and 2020 in order to help the State achieve the 20% reduction.

In its 2010 UWMP, the SFPUC first established the baseline per capita water use, as well as the interim (i.e. 2015) and 2020 water use targets. In the 2015 UWMP, the SFPUC performed a detailed analysis to update the baselines and targets per capitas based on in-City retail service area population and water use, by (1) revising the population of the in-City retail service area to reflect the 2010 U.S. Census rather than the 2000 U.S. Census, and (2) including the population and water use of the suburban retail service area. The narrative of the 2015 baseline and targets analysis and the SB X7-7 2020 Compliance Form tables are included in Appendix D. This section provides a summary of the 2015 analysis and shows the SFPUC's compliance with the 2020 target.

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

As described in DWR's *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use (For the Consistent Implementation of the Water Conservation Act of 2009)*, the SFPUC calculated its per capita urban retail water use five-year baseline, 10-year baseline, 2015 interim target and 2020 compliance target in compliance with the Water Conservation Act of 2009. The SFPUC used Method 3 of the four approved methods provided by the Water Conservation Act of 2009 for determining 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 includes a summary of the baselines and targets calculated in the 2015 UWMP.

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

[Standardized Table 5-1: Baselines and Targets Summary]

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 includes the water from the RWS and the groundwater sources supplied by SFPUC to the In-city and suburban retail customers. No deductions for indirect recycled water, agricultural water use or process water was applied. All water sources are metered and meters are calibrated on an annual basis. Note that water use reflects gross water use (i.e., water use by all sectors, including water loss).

The 2020 service area population includes In-City population and suburban retail population. For the in-City retail service area, population data were obtained from the California Department of Finance for the County of San Francisco. However, the same method could not be used for the suburban retail service area since the service area does not align with municipal boundaries. The population estimates for the connections in Redwood City, Daly City, Fremont and Millbrae were calculated using persons-per-household data. Therefore, the SFPUC consulted with DWR (i.e., pre-review) on an appropriate, alternate methodology based on U.S. Census data at the census block level and persons-per-household data. Use of persons-per-household data was deemed adequate since it is assumed that all residential accounts serve single family homes in the suburban retail service area, and no multi-family residences are served. Therefore, the number of connections can be considered equivalent to number of households. For the Town of Sunol specifically, the SFPUC used the web-based DWR Population Tool since the corresponding service area was difficult to define at the census block level (output provided in Appendix H).

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

As shown in Error! Reference source not found., with a 2020 per capita water use of 76 GPCD, the SFPUC is in compliance with its 2020 target of 96 GPCD. No adjustments were needed.

Table 5-2. Gross Per Capita Water Use Baselines and Targets Summary (GPCD)

[SB X7-7 2020 Compliance Form Table 5: 2020 Gallons Per Capita Per Day (GPCD)]

2020 Gross Water Use (mgd)	2020 Service Area Population	2020 Daily Per Capita Water Use (GPCD)
68.5	899,732	76

Taking into consideration the impact of population and employment growth, as well as passive and active conservation efforts, the SFPUC initially projected in 2015 that its 2020 daily per capita water use would be approximately 86 GPCD. With its continued water conservation program, the SFPUC has achieved a lower than initially predicted per capita water use with a 2020 per capita water use of 76 GPCD, in compliance with the final 2020 target of 96 GPCD.

5.3 ASSISTANCE TO WHOLESALE CUSTOMERS

As a wholesale supplier, the SFPUC is required to provide an assessment of present and proposed future measures, programs, and policies that will help the retail water suppliers in their wholesale service area to achieve their water use reduction targets. This is further discussed in Section 10.3.

SECTION 6: SYSTEM SUPPLIES

This section describes current and projected water supplies, as well as the various sources of supplies available to meet retail and wholesale water demands. Potential recycled water uses and supply availability are addressed. This section also summarizes the options used, or being considered, by the SFPUC to maximize resources and minimize the need to import water from the RWS watersheds.

As explained in Section 2.4, Groveland CSD is accounted for 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 local Bay Area water production facilities and the Hetch Hetchy System. The local watershed facilities are operated to conserve local runoff for delivery and to maintain enough stored water to meet demands in the event of an emergency that affects the supply of water from Hetch Hetchy. Demands that are not met by local runoff are met with water diverted from the Tuolumne River through the Hetch Hetchy System. On average, the Hetch Hetchy System provides approximately 85% of the water delivered by the SFPUC. During dry years, the water received from the Hetch Hetchy System can amount to over 90% of the total water delivered.

The amount of water available to the SFPUC is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River. Due to these constraints, the SFPUC depends on reservoir storage to maximize the reliability of its water supplies. More importantly, reservoir storage provides water supply carry-over capability. During dry years, a very small share of the Tuolumne River supply is available to the SFPUC and the local watersheds produce very little water. Reservoir storage is critical during drought cycles because it enables the SFPUC to carry over water supply from wet years to dry years.

As discussed further in Section 7.1, deliveries from the RWS to both retail and wholesale customers are limited by the WSIP Phased Variant adopted by the Commission to an average annual of 265 mgd from the watersheds. The allocation between wholesale and retail customers is described in the Water Supply Agreement. It provides for 184 mgd to the Wholesale Customers consistent with the Supply Assurance and 81 mgd to the retail customers. Although SFPUC can take up to 265 mgd annual average from the RWS, for the purposes of the tables in this section and those in Chapter 8, supplies shown will be those projected to be utilized by the retail and wholesale customers. Given that the SFPUC has a Level of Service objective, based on its contractual obligations to its Wholesale Customers, to provide 265 mgd in normal years, an analysis of our ability to meet this objective in normal, single dry, and multiple dry years is provided in Appendix J.

6.1.1 Water Rights

The City and County of San Francisco holds both pre-1914 appropriative water rights and post-1914 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 particular water source without regard to the contiguity of the location of use to the source. These rights are based on seniority and the use of water must be reasonable, beneficial, and not wasteful. In 1914, California established a formal water rights permit system (by the 1913 Water Commission Act) administered by the SWRCB. The SWRCB does not have permitting jurisdiction over pre-1914 appropriative water rights.

With the Raker Act of 1913 (38 Stat. 242), Congress granted San Francisco rights of way for the construction and operation of Hetch Hetchy facilities, which are predominantly located on federally owned land in Yosemite National Park and Stanislaus National Forest. The Raker Act recognized the senior water rights of Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (collectively, the Districts) to divert water from the Tuolumne River, and specified conditions for the release of water to the Districts and other conditions imposed by Congress for the protection of recreation in Yosemite and other purposes.

Under Raker Act Section 9(c) and the subsequent Fourth Agreement between San Francisco and the Districts, the Districts are entitled to the natural flow of the Tuolumne River (2,416 cubic feet per second [cfs] between June 13 and April 15 of each year and 4,066 cfs between April 15 and June 13, the spring snowmelt period). These flows are computed on a daily basis based on unimpaired conditions at La Grange Dam below Don Pedro. During multiple drought years, the SFPUC's water diversions from the Tuolumne River may be limited to previously stored (carry-over) water in system reservoirs and the water bank account in Don Pedro reservoir.[8]

6.1.2 Water Quality of RWS Supplies

As described in Section 3.1, the RWS delivers high-quality water. The current surface water supplies available to the RWS include the Tuolumne River and supplies from local Bay Area reservoirs. The majority of the water supply originates in the upper Tuolumne River watershed high in the Sierra Nevada, remote from human development and pollution. This water from the Hetch Hetchy reservoir is protected in pipes and tunnels as it is conveyed to the Bay Area, requiring only primary disinfection and pH adjustment to control corrosion in the pipelines. In addition, this water undergoes UV disinfection at the Tesla Treatment Facility, further ensuring high water quality.

The USEPA and SWRCB DDW have approved the use of this drinking water source without requiring filtration at a treatment plant. However, local water from the local watersheds requires filtration to meet drinking water quality requirements. The filtered and treated water from the local watersheds is blended with water from the Hetch Hetchy reservoir, and most customers receive this blended water supply. System water quality, including both raw water and treated water, is continuously monitored and tested to assure that water delivered to customers meets or exceeds federal and State drinking water and public health requirements.

The SFPUC will continue to rely on these high-quality water sources. No degradation of water quality is anticipated in the future.

The SFPUC prepares an annual water quality report (i.e., Consumer Confidence Report) for its customers each spring, which is available at **www.sfpuc.org/accounts-services/water-quality/annual-water-quality-reports**.

6.1.3 Climate Change Impacts to RWS Supplies

Climate change has become an important factor in water resources planning in the State and is frequently considered in urban water management planning, although the extent and precise effects of climate change remain uncertain. There is convincing evidence that increasing concentrations of greenhouse gases have caused and will 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 shows that a warming trend occurred during the latter part of the 20th century and will likely continue through the 21st century. These changes will have a direct effect on water resources in California, and numerous studies have been conducted to determine the potential impacts to water resources. Based on these studies, climate change could result in the following types of water resource impacts, some of which are likely to affect the Tuolumne River watershed and local watersheds in the Bay Area:

- 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;

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[8] The Districts have senior water rights to the City for the Tuolumne River water and are provided to the first increment of flow in the Upper Tuolumne River watershed according to the apportionment set forth in the Raker Act of 1913. 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.

- 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 quantity and quality;
- Sea level rise and an increase in saltwater intrusion;
- Increased water temperatures with accompanying potential adverse effects on some fisheries and water quality;
- Increases in evaporation and concomitant increased irrigation need; and
- Changes in urban and agricultural water demand.

Both the SFPUC and BAWSCA participated in the 2019 update of the Bay Area Integrated Regional Water Management Plan (BAIRWMP), which includes an assessment of the potential climate change vulnerabilities of the region's water resources and identifies climate change adaptation strategies. In addition, the SFPUC has studied and continues to study the effects of climate change on the RWS. These works are summarized below.

6.1.3.1 Bay Area Integrated Regional Water Management Plan

Climate change adaptation was established as an overarching theme for the 2019 BAIRWMP update. As stated in the BAIRWMP, identification of watershed characteristics that could potentially be vulnerable to future climate change is the first step in assessing vulnerabilities of water resources in the Bay Area Region (Region). Vulnerability is defined as the degree to which a system is exposed to, susceptible to, and able to cope with or adjust to, the adverse effects of climate change. A vulnerability assessment was conducted in accordance with the DWR's *Climate Change Handbook for Regional Water Planning* and using the most current science available for the Region. The vulnerability assessment provides the main water planning categories applicable to the Region—including demand, supply, and water quality, ecosystems and habitat, and sea-level rise—and a general overview of the qualitative assessment of each category with respect to anticipated climate change impacts.

6.1.3.2 SFPUC Climate Change Studies

The SFPUC views assessment of the effects of climate change as an ongoing project requiring regular updating to reflect improvements in climate science, atmospheric/ocean modeling, and human response to the threat of greenhouse gas emissions. Climate change research by the SFPUC began in 2009 and continues to be refined. In its 2012 report "Sensitivity of Upper Tuolumne River Flow to Climate Change Scenarios," the SFPUC assessed the sensitivity of runoff into Hetch Hetchy Reservoir to a range of changes in temperature and precipitation due to climate change. Key conclusions from the report include the following:

- With differing increases in temperature alone, the median annual runoff at Hetch Hetchy would decrease by 0.7-2.1% from present-day conditions by 2040 and by 2.6-10.2% from present-day conditions by 2100. Adding differing decreases in precipitation on top of temperature increases, the median annual runoff at Hetch Hetchy would decrease by 7.6-8.6% from present-day conditions by 2040 and by 24.7-29.4% from present-day conditions by 2100.
- In critically dry years, these reductions in annual runoff at Hetch Hetchy would be significantly greater, with runoff decreasing up to 46.5% from present day conditions by 2100 utilizing the same climate change scenarios.
- In addition to the total change in runoff, there will be a shift in the annual distribution of runoff. Winter and early spring runoff would increase, and late spring and summer runoff would decrease.
- Under all scenarios, snow accumulation would be reduced and snow would melt earlier in the spring, with significant reductions in maximum peak snow water equivalent under most scenarios.

Currently, the SFPUC is conducting a Long-term Vulnerability Assessment which assesses the potential effects of climate change on 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 2020 to 2070. 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 nonetheless they need to be considered in SFPUC planning. To address this planning challenge, the assessment uses 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. This study is expected to be completed in the Summer of 2021.

6.1.4 Summary of Existing and Future RWS Supplies

As discussed further in Section 7.1, deliveries from the RWS to both retail and wholesale customers are limited by the WSIP Phased Variant adopted by the Commission to an average annual of 265 mgd for the watersheds. The allocation between wholesale and retail customers is described in the Water Supply Agreement. It provides for 184 mgd to the Wholesale Customers consistent with the Supply Assurance and 81 mgd to the retail customers. 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. Current and projected normal year RWS supplies for both retail and wholesale customers are shown in Table 6-1.

Table 6-1. Regional Water System Normal Year Supplies (mgd)

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

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

RWS Supply[a]	Actual	Projected				
	2020	2025	2030	2035	2040	2045
Retail Customers[b, c]	66.5	67.2	67.5	68.6	70.5	73.7
Wholesale Customers[d, e, f]	132.1	146.0	147.9	151.9	156.3	162.8
Total RWS Supplies	198.6	213.2	215.4	220.5	226.8	236.5

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 Groveland CSD is reported as a wholesale customer for the purposes of this 2020 UWMP, but it is considered a retail customer of the SFPUC solely for purposes of allocating RWS supplies between retail customers and Wholesale Customers. Its demands would be met by 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 January 2021. These purchase requests are subject to change in each individual agency's UWMP.

e Projected Wholesale Customer deliveries are limited to 184 mgd. 184 mgd includes the demands of the Cities of San Jose and Santa Clara, which are supplied on a temporary and interruptible basis, with their total supply not exceeding 9 mgd assuming supply is available (decision to be made by end of 2028).

f Cordilleras MWC is not a party to the WSA, and it is not included in the wholesale 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 2045.

6.2 LOCAL SUPPLIES FOR RETAIL CUSTOMERS

The RWS comprises about 97% of total retail water supplies, while the remaining portion is from locally produced groundwater, recycled water, and non-potable water. These local supplies are described in the following sections.

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. These groundwater basins include the Westside, Lobos, Marina, Downtown, Islais Valley, South San Francisco, and Visitacion Valley basins. The Lobos, Marina, Downtown, and South San Francisco basins are located wholly within City limits, while the remaining three extend south into San Mateo County. The portion of the Westside Basin aquifer located within the City is referred to as the North Westside Groundwater Basin (or North Westside Basin). With the exception of the Westside and Lobos basins, the basins are generally inadequate to supply groundwater for municipal supply due to low yield, contamination, or potential subsidence concerns.

Early in its history, the City made use of local groundwater, springs, and spring-fed surface water ranging from approximately 6.0 to 8.5 mgd prior to 1934. After imports of water from the Hetch Hetchy Reservoir began in October 1934, municipal supplies began to rely almost exclusively on surface water from the RWS. Local groundwater use, however, has continued in the City. In addition, groundwater has been used and continues to be used in the suburban retail service area.

The local groundwater basins are described below.

Westside Groundwater Basin. With an area of about 40 square miles, the Westside Groundwater Basin is the largest groundwater basin in San Francisco and is currently used to meet water demands for both irrigation and municipal uses. The Westside Groundwater Basin is separated from the Lobos Basin to the north by a northwest-trending bedrock ridge through the northeastern part of Golden Gate Park. San Bruno Mountain and San Francisco Bay form the eastern boundary, and the San Andreas Fault and Pacific Ocean form the western boundary. The southern limit of the Westside Groundwater Basin is defined by a bedrock high that separates it from the San Mateo Plain Groundwater Basin. The basin opens to the Pacific Ocean on the northwest and San Francisco Bay on the southeast. The Westside Groundwater Basin contains three relatively distinct aquifer zones referred to as the Shallow Aquifer, Primary Production Aquifer, and Deep Aquifer. The clayey aquitards that separate these aquifers become discontinuous or absent north of Lake Merced. The basin has not been adjudicated nor has it been identified by DWR as overdrafted, or as projected to be overdrafted in the future.

The Westside Groundwater Basin is subdivided for management purposes into northern and southern portions by the county line separating San Francisco and San Mateo Counties. The county-line boundary between the North and South Westside Groundwater Basins does not have hydrogeological significance other than influencing the jurisdictional distribution of groundwater pumping. No geologic features restrict groundwater flow between the northern and southern parts of the groundwater basin.

Within San Mateo County, the South Westside Groundwater Basin (or South Westside 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.[9] Municipal water demand within the South 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 entities.

The North 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 North Westside Basin is largely residential, with residential and

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

commercial land uses accounting for about 75%, 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 North 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 North Westside Basin is bounded on the north by a mostly buried bedrock ridge extending from Point Lobos southeast through Golden Gate Park and northeast through Lone Mountain. The basin boundary encompasses the panhandle of Golden Gate Park, then 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 Fault Zone trends offshore to the northwest of Daly City and is interpreted to bound the basin on the west. Existing retail groundwater sources are pumped from the North Westside Basin.

The SFPUC leads the basin-wide Westside Basin Groundwater Monitoring Program. It provides 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.org/programs/water-supply-planning/groundwater**. Monitoring in the North 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 North 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.

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

Since 1872, groundwater has been pumped from wells located in Golden Gate Park, and by the San Francisco Zoo since the 1930s. Based on flow meter data, about 1.5 mgd is produced by these wells on an average annual basis. The groundwater is mostly used by the San Francisco Recreation and Parks Department for 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.

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. 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 2020, the SFGW wells supplied an average of 0.5 mgd to the reservoirs. Once the Westside Recycled Water Project is completed 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 irrigation, this project represents approximately 2.7 mgd of net new supply. Two of the six wells are capable of serving as emergency drinking water supplies following an earthquake or other natural disaster, and include filling stations for emergency water tankers.

The SFPUC developed a draft Groundwater Management Plan (GMP) for the North Westside Basin in 2005 in response to the 1992 California Groundwater Management Act (AB 3030). Following passage of the 2014 California Sustainable Groundwater Management Act (SGMA), the SFPUC established itself in March 2015 as the Groundwater Sustainability Agency (GSA) for all of San Francisco. The SFPUC then completed a draft Groundwater Sustainability Plan (GSP) for the North Westside Basin in 2016. This plan has guided the implementation of the SFGW Project 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 salt water intrusion, land subsidence, and impacts to interconnected surface water resources. Because DWR designated the Westside Basin and San Francisco's other groundwater basins as very low priority in early 2019, the SFPUC is not required to submit a GSP to the State, but will sustainably 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 GMP under AB 3030. 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, about 0.4 mgd of groundwater is delivered to the Castlewood CSA from the Castlewood Well System operated by the SFPUC (this system is described in Section 3.1.5.2). Groundwater is drawn from the Central Groundwater Sub Basin in the Livermore Valley Basin. DWR has not identified this basin 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.

The volumes of groundwater pumped between 2016 and 2020 from the three 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	2016	2017	2018	2019	2020
Westside Groundwater Basin[a]	1.2	1.3	1.7	1.7	2.0
Livermore Valley Basin, Central Groundwater Sub Basin[b]	0.4	0.4	0.3	0.4	0.3

a Data from 2016-2019 are obtained from the 2019 Annual Groundwater Monitoring Report, Westside Basin (SFPUC, April 2020), 2020 data are from verbal communications with SFPUC groundwater staff. 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. The supplies are from subsurface flows directly tied to flow in the creek and creek bed. As such, it is considered to be surface water and is subject to surface water permitting. This supply source provided approximately 0.3 mgd of water for irrigation purposes to the Sunol Valley Golf Club until January 2016, when the golf course ceased operating and thus the source production was substantially reduced. Since 2016, the Gallery diversions from Alameda Creek have been limited to maintenance water supply and emergency fire water for the golf course property. The SFPUC is currently evaluating options to make the Sunol Filter Gallery fully operational and use the source to its full capacity

6.2.1.3 Local Recycled Water

From 1932 to 1981, the City's McQueen Treatment Plant provided recycled water to Golden Gate Park for irrigation and flow augmentation of its streams and lakes. Due to changes in State regulations, the plant could no longer meet required standards. Subsequently, the City closed the McQueen Treatment Plant and discontinued the use of recycled water in Golden Gate Park; however, a limited volume of recycled water is currently used in the retail service area as described below.

Southeast Water Pollution Control Plant. Disinfected secondary-treated recycled water from the Southeast WPCP was provided to construction contractors, City departments, and other interested parties for use within the City via the truck-fill station through 2015. The facility has not been operational since 2015. The SFPUC is exploring resuming recycled water production dedicated to onsite uses at the plant.

Harding Park. The Harding Park Recycled Water Project, a partnership between the SFPUC and NSMCSD, 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 the use of potable water from the RWS for golf course irrigation and has an average capacity of 0.23 mgd. However, in 2020, the system was offline for most of the year due to infrastructure upgrades. The system therefore supplied approximately 5 MG (0.01 mgd) to Harding Park, a retail customer of the SFPUC.

Sharp Park. The Pacifica Recycled Water Project provides recycled water to several irrigation customers in Pacifica including a portion of the Sharp Park Golf Course, a retail customer of the SFPUC. This project was developed and constructed through a partnership between the SFPUC and NCCWD. An automated irrigation system was installed on the east side of the golf course, and recycled water delivery began in October 2014. In 2020, the Sharp Park operation was fully online and recycled water deliveries were estimated to be 0.1 mgd.

Projections of recycled water use in the retail service area were provided in the 2015 UWMP. At that time, it was estimated that 0.3 mgd of recycled water would be used in 2020. Actual use in 2020 was approximately 0.1 mgd, since the Harding Park Recycled Water Project was offline during most of 2020. A comparison of projected and actual recycled water uses is shown in Table 6-3.

Table 6-3. Projected and Actual Recycled Water Use for 2020 (mgd)

[Standardized Table 6-5 Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual]

Use Type	2015 Projection for 2020	Actual Use in 2020
Golf Course Irrigation[a]	0.3	0.1
a Golf course irrigation includes Harding Park, Fleming and Sharp Park golf courses.		

6.2.1.4 Wastewater Assessment

The SFPUC's Wastewater Enterprise operates the City's wastewater collection, treatment, and disposal system, which consists of a combined sewer system (which collects both sewage and stormwater), three water pollution control plants, and outfalls to San Francisco Bay and the Pacific Ocean. The collection and conveyance system consists of over 900 miles of various sizes of underground sewer pipes, transport/storage structures, and pump stations located throughout the City. The Southeast WPCP and Oceanside WPCP provide secondary treatment and operate year-round; while the North Point Wet Weather Facility operates only during wet weather and provides primary treatment. Ultimate disposal of treated wastewater effluent is currently through outfalls to both San Francisco Bay and the Pacific Ocean. The Treasure Island Wastewater Treatment Plant provides secondary treatment of domestic and commercial wastewater from Treasure Island and Yerba Buena Island, located in the San Francisco Bay. The plant's effluent is discharged to Central San Francisco Bay. The Mel Leong Treatment Plan is located at the San Francisco International Airport and treats domestic and industrial wastewater from the airport facilities. The plant's effluent is eventually discharged to the Lower San Francisco Bay[10]. Table 6-4 summarizes the current volumes of wastewater collected, treated and discharged within the retail service area.

[10] The effluent of the Mel Leong Treatment Plant is discharged to the North Bayside System Unit forcemain, which conveys the treated wastewater to dechlorination facilities prior to its discharge to the Lower San Francisco Bay.

As mentioned previously, suburban retail water use in 2020 was 3.5 mgd, which was about 5% of total retail demand. As such, the volume of wastewater generated within the SFPUC's suburban water retail service area is assumed to be small compared to in-City wastewater generation. However, notable large suburban retail customers are included in Table 6-4.

Table 6-4. Wastewater Operations within Retail Service Area
[Standardized Table 6-2 Retail: Wastewater Collected Within Service Area]
[Standardized Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2020]

Treatment Plant	Operator	Location	Volume of Wastewater in 2020 (mgd)				Recycled Water Delivered within Retail Service Area in 2020 (mgd)
			Collected	Treated (Level)	Discharged	Recycled	
Southeast WPCP[a,b]	SFPUC	San Francisco	56.2	56.2 (secondary, disinfected)	52.1[c]	0	0
Oceanside WPCP[b]	SFPUC	San Francisco	14.5	14.5 (secondary, undisinfected)	15.0[d]	0	0
Treasure Island Wastewater Treatment Plant	US Navy and Treasure Island Development Authority	Treasure Island	0.33	0.33 (secondary disinfected)	0.30	0	0
Mel Leong Treatment Plant[e,f,]	City and County of San Francisco	San Francisco International Airport	0.38	0.38 (secondary, disinfected)	0.38	0	0

a The Southeast Water Pollution Control Plant (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 higher 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 water 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 2020.

6.2.2 Future Local Supplies

The SFPUC anticipates that the existing local supplies described above will be available in the future. However, to reliably and sustainably meet the future water needs of its retail customers, the SFPUC is supplementing and diversifying its water supply portfolio through the further development of local water supplies, such as increasing groundwater and recycled water production. These projects are critical to reducing impacts associated with any one supply being disrupted, reduced, or interrupted. Projects related to these efforts are described below, and projected volumes are later provided in Table 6-5. Additional water supply projects being developed under the new Alternative Water Supply Program are described in Section 7-4.

6.2.2.1 Westside Recycled Water Project

The Westside Recycled Water Project includes 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, and the Presidio Golf Course, as well as other landscaping in the Presidio. The plant is currently under construction on the west side of the City at the Oceanside WPCP. For planning purposes, deliveries from the Westside project are estimated to be 1.6 mgd in 2025 and 1.8 mgd in 2030 and beyond. The project is designed to deliver an annual average of up to 2 mgd.

The project Environmental Impact Report (EIR) was certified by the San Francisco Planning Commission and approved by the SFPUC's Commission in September 2015. The construction of the recycled water pipeline began in early 2017 and was completed in July 2018. The treatment facility and pump station are currently under construction, which began in late 2017 and mid-2019, respectively. Work is currently underway to retrofit the irrigation systems in Golden Gate Park and Lincoln Park and bring them into compliance with California recycled water regulations.

The SFPUC is currently in the early design phase of the San Francisco Zoo Recycled Water Project, which will extend recycled water service from the Westside Recycled Water Treatment Facility to the San Francisco Zoo. The recycled water pipeline that currently extends from the RWTF to Golden Gate Park includes a turnout to the Zoo. Extending a new pipeline from the turnout to the non-potable reservoir on Zoo grounds will allow RPD to switch from groundwater to recycled water to meet the Zoo's non-potable water demands, while supporting groundwater management goals for the Westside groundwater basin.

Recycled water deliveries to Golden Gate Park and Lincoln Park (annual average of 1.3 mgd) are expected to begin in early 2022. Deliveries to the San Francisco Zoo (annual average of 0.3 mgd) are expected to begin in 2023. SFPUC is also currently planning for deliveries to the Presidio (annual average of 0.2 mgd) beginning by 2030.

6.2.2.2 Treasure Island Recycled Water Project

The Treasure Island Water Resource Recovery Facility (TIWRRF) will be located on the northeast corner of Treasure Island (TI) in San Francisco, California on a geotechnically improved "greenfield" site of approximately 10 acres. The TIWRRF will provide tertiary wastewater treatment and wetlands to achieve an average dry weather flow (ADWF) capacity of at least 1.3 mgd and peak wet weather flow (PWWF) of 3.9 mgd. The TIWRRF will support the redevelopment of Treasure Island and Yerba Buena Island and the 8,000 new homes currently under construction.

The TIWRRF will include liquid treatment processes, solids handling, odor control, a wetland, and produce Title 22 disinfected tertiary quality of treated wastewater effluent. It is anticipated that the TI development will use an average of 0.4 MGD and a peak of 1.0 MGD of recycled water for uses that include dual plumbing in buildings and outdoor urban agriculture and irrigation. The TIWRRF and associated wetlands are consistent with the open space vision for the Development. Construction is anticipated to start in early to mid-2022 and be completed in early to mid-2024.

6.2.2.3 Other Actions to Expand Recycled Water Use

The SFPUC is actively involved in encouraging and expanding recycled water use and onsite water reuse. These efforts are described below.

Projects and Partnerships. As demonstrated by the Harding Park and Pacifica Recycled Water Projects, the SFPUC has and will continue to explore opportunities for regional recycled water partnerships with other Bay Area agencies. Through these partnerships, the SFPUC aims to develop recycled water projects that will benefit the SFPUC and partners by reducing demands for RWS supplies and/or freeing up groundwater that could be used for potable supplies.

Ordinances, Programs, and Services. The SFPUC administers or helps to administer the following 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.

- **Recycled Water Program and Ordinance:** To encourage the use of recycled water in San Francisco, the City adopted Ordinances 390-91 and 391-91, collectively referred to as the Recycled Water Ordinance.[11] This ordinance requires the installation of dual-plumbed systems within designated areas of the City for new, remodeled or converted buildings; all subdivisions of 40,000 square feet or more; and for new, modified, or existing irrigated areas of 10,000 square feet or more. The number of dual-plumbed systems installed as required by the ordinance continues to increase with the increase of new construction and rehabilitation projects in the City.

- **Soil Compaction and Dust Control Ordinance:** In 1991, the City also passed Ordinance 175-91[12], which restricts the use of potable water for soil compaction and dust control activities for construction and demolition projects. To facilitate the use of non-potable water for these activities, the SFPUC installed a recycled water truck-fill station at its Southeast WPCP. Construction contractors, City departments, and other interested parties may fill water trucks at the station after receiving a permit from the SFPUC.

- **Large Landscape Grant Program:** The SFPUC initiated a Large Landscape Grant Program in 2009. In-City retail customers with 1/4 acre or more (originally 2.5 acres or more when the program started) of irrigated landscape are eligible to apply. Grant funding is available for water-saving and recycled water retrofits that reduce potable water use for landscape irrigation. The SFPUC also provides technical assistance in implementing retrofits. The recycled water irrigation system retrofits at both Harding Park and Sharp Park received grant funding 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 for 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 SFDPH-EH, and the San Francisco Department of Building Inspection (SFDBI) during the review process. The ordinance was amended in 2015 to mandate the installation of onsite water systems in new development meeting specified criteria.

- **Public Outreach:** The SFPUC actively promotes its programs to conserve, diversify, and supplement RWS supplies. Marketing campaigns, factsheets, and articles are developed and shared with media, customers, and public officials.

Research and Knowledge Sharing. The SFPUC is a member of the Bay Area Clean Water Agencies (BACWA) Recycled Water Committee. BACWA is composed of Bay Area wastewater agencies that discharge into the San Francisco Bay estuary. The purpose of the Recycled Water Committee is to provide a forum to share recycled water information and expertise to support and advance regional water recycling efforts. SFPUC is also an active member of the national WateReuse Association and the California Section., SFPUC is also an active member of the Water Research Foundation.. In addition, SFPUC participates on the California Urban Water Association (CUWA) water reuse committee.

6.2.3 Water Quality of Local Supplies

Local groundwater, recycled water, and non-potable water supplies are primarily used for irrigation and other non-potable uses. The SFPUC strives to meet or exceed the quality standards established by State agencies for these end uses, and works closely with regulatory agencies and partners to achieve the highest standards. Water quality of each supply is further described below.

[11] 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.
[12] San Francisco Public Works Code, Article 21, Sections 1100-1107.

6.2.3.1 Local Groundwater Quality

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

Westside Groundwater Basin. Groundwater from the Westside Groundwater Basin has been supplying drinking water to Daly City, San Bruno, and South San Francisco for over 60 years, and in 2017 was incorporated into the drinking water supply for San Francisco. The pumped groundwater is disinfected and blended with RWS supplies before entering the in-City distribution system. Disinfection with sodium hypochlorite and pH adjustment for corrosion control is performed. The quality of the blended water satisfies all health-based drinking water standards set forth by the SWRCB DDW.

As described in Section 6.2.1.1, the SFPUC conducts the Westside Basin Groundwater Monitoring Program. It includes monitoring groundwater quality to provide early warning for potential saltwater intrusion and other potential sources of contamination. The SFPUC will continue to monitor these wells and add additional wells to the network as needed to assess how the basin is responding to SFGW and other related project operations.

Castlewood Well System. Groundwater supplies from the Castlewood Well System are disinfected via sodium hypochlorite injection and are potable when delivered to Castlewood CSA. Water quality is monitored weekly by the SFPUC.

6.2.3.2 Local Recycled Water Quality

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

Harding Park. Recycled water produced by NSMCSD's wastewater treatment plant in Daly City is used for irrigation at the Harding Park and Fleming Golf Courses. This tertiary-treated recycled water meets the Title 22 California Code of Regulations (Title 22) requirements for approved non-potable uses.

Sharp Park. Recycled water produced by the City of Pacifica's Calera Creek Water Recycling Plant and delivered by NCCWD is used to irrigate a portion of the Sharp Park Golf Course. This tertiary-treated recycled water meets the Title 22 requirements for approved non-potable uses.

Westside Recycled Water Project. Recycled water produced by the Westside Recycled Water Project treatment facility will undergo tertiary treatment, followed by reverse osmosis and UV, resulting in water quality that meets Title 22 requirements and the needs of the project's planned end uses, including irrigation at Golden Gate Park, Lincoln Park and Golf Course, the Presidio Golf Course, and other landscaped areas at 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 addressed in Section 6.1.3. Implementation of the Groundwater Sustainability Plan for the North Westside Basin will ensure that in-City groundwater supplies are maintained for current and future uses. Recycled water is considered a drought-resistant supply that is not impacted by precipitation or hydrologic year type.

6.2.5 Summary of Existing and Future Local Supplies

Table 6-5 provides a breakdown of current and projected water supply sources for meeting retail water demand through 2045. Up to 81 mgd of RWS supplies are available to retail customers in normal years. The SFPUC is also committed to developing local supplies to meet retail demands; therefore, the SFPUC would use local groundwater and recycled water supplies before using RWS supplies to meet retail demands.

Table 6-5. Retail Supplies (mgd)

[Standardized Table 6-4 Retail: Current and Projected Recycled Water Direct Beneficial uses Within Service Area]

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

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

Retail Supply	Actual	Projected				
	2020	2025	2030	2035	2040	2045
RWS Supply Utilized by Retail Customers[a]	66.5	67.2	67.5	68.6	70.5	73.7
Groundwater						
In-City Potable [b]	0.4	1.0	2.0	3.0	4.0	4.0
In-City Irrigation[b,c]	1.5	0.0	0.0	0.0	0.0	0.0
Castlewood Well System[d]	0.3	0.4	0.4	0.4	0.4	0.4
Subtotal Groundwater	2.2	1.4	2.4	3.4	4.4	4.4
Recycled Water						
Westside Recycled Water Project[e]	—	1.6	1.8	1.8	1.8	1.8
Harding Park Recycled Water Project[f]	0.0	0.2	0.2	0.2	0.2	0.2
Sharp Park Recycled Water Project[g]	0.1	0.1	0.1	0.1	0.1	0.1
Treasure Island Recycled Water Project[h]	0.0	0.2	0.4	0.4	0.4	0.4
Subtotal Recycled Water	0.1	2.1	2.5	2.5	2.5	2.5
Total Retail Supply	68.8	70.7	72.4	74.5	77.4	80.6

a Assuming that the retail supply allocation remains 81 mgd through 2045, 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 mgd in 2025 to 4 mgd by 2030. 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 No groundwater will be used for in-city irrigation once the Westside Recycled Water Project comes online.

d Castlewood CSA is served by the Castlewood Well System.

e The Westside Recycled Water Project will supply Golden Gate Park (1.2 mgd), Lincoln Park (0.1 mgd) and the Zoo (0.3 mgd) by 2025, and the Presidio (0.2 mgd) by 2030.

f Irrigation at Harding Park and Fleming Golf Courses is provided recycled water from NSMCSD. The Harding Park Recycled Water Project was not operational in 2020 and is planned to be back online by 2025.

g Irrigation at Sharp Park Golf Course is provided recycled water from NCCWD. The Sharp Park Recycled Water Project was fully online in 2020 and approximately 0.1 mgd was provided in 2020.

h Recycled water operations will begin in 2025, but the full infrastructure for delivery will not be built out at that time; the full capacity of 0.4 mgd annual average is anticipated to be reached by 2030.

6.3 ENERGY INTENSITY ANALYSIS

As mandated by Section 10631.2(a) of the CWC, energy intensity data for FY19-20 for the SFPUC system is included in the following section and in Appendix I.

Based on the SFPUC's water delivery system, it is not possible to separate the energy data for the retail and wholesale water deliveries. The Total Utility Approach is therefore used to report the system's available energy intensity information. 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. In addition, the electricity consumed by other entities to produce recycled water is not included.

The reported energy consumed includes the consequential hydropower produced as a result of the water delivery through the RWS. The RWS is almost entirely gravity-driven from its Sierra Reservoirs 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 in the 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 three (3) hydroelectric powerhouses, which account for a total hydroelectric generating capacity of 385 MW: Moccasin Powerhouse, Kirkwood Powerhouse and Holm Powerhouse.

SECTION 7: WATER SUPPLY RELIABILITY NARRATIVE

This section describes the reliability of the RWS and local supplies to meet retail and wholesale demands through the year 2045. As described previously, supplies to meet retail demands come from the RWS and local water supply sources, including groundwater and recycled water. Approximately one third of the SFPUC's RWS supply is delivered to retail customers, and the remaining two thirds is delivered to wholesale customers.

Reliability of the RWS is expressed in terms of the system's ability to deliver water during droughts. Reliability may be quantified by the amount and frequency of water delivery reductions (i.e., deficiencies) required to balance customer demands with available supplies. The SFPUC plans deliveries under the premise that a drought more severe than the worst drought on record may occur. This section describes the SFPUC's nearly-completed Water System Improvement Program (WSIP), new and continued factors that are impacting supply reliability, and the SFPUC's new Alternative Water Supply Planning Program whose aim is to address future potential supply shortfalls.

7.1 WATER SYSTEM IMPROVEMENT PROGRAM

The WSIP is a $4.8 billion, multi-year capital program to upgrade the RWS and is approximately 96% complete to date. 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.

As required under the California Environmental Quality Act (CEQA), the San Francisco Planning Department prepared a Programmatic Environmental Impact Report (PEIR) for the WSIP, which was certified in October 2008. The PEIR evaluated the potential environmental impacts of the proposed WSIP projects and identified potential mitigations to those impacts. The PEIR also evaluated several alternatives to meet the SFPUC service area's projected increase in water demand through 2030. The water supply improvement options that were evaluated included 10 alternatives using various water supply combinations from the local watersheds; the Tuolumne and Lower Tuolumne River; ocean desalination; and additional recycled water, groundwater, and conservation.

The Phased WSIP Variant includes the following water supply elements:

- Cap on RWS deliveries at 265 mgd annual average, referred to as the Interim Supply Limitation (ISL). This includes 184 mgd for the Wholesale Customers and 81 mgd for retail customers.[13]
- Water supply sources include 265 mgd average annual from the RWS and 20 mgd of water conservation[14], recycled water, and local groundwater developed within the SFPUC's service area (10 mgd in the retail service area and 10 mgd in the wholesale service area);
- Water supply projects to meet dry-year demands with no greater than 20% system-wide rationing in any one year. For a discussion of the WSIP dry-year projects and their current status, see Section 7.2 below.
- Reevaluation of 2030 demand projections, potential RWS purchase requests, and water supply options by December 31, 2018 and a separate SFPUC decision no later than 2018 regarding RWS future water deliveries after 2018. As discussed further below in Section 7.3.3, this process has been postponed to 2028 to allow for the necessary supply assessments and environmental review.

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[13] As explained in Section 2.4, Groveland CSD is considered a retail customer of the SFPUC. Thus, RWS supplies to Groveland CSD are accounted for in the retail supply allocation of 81 mgd.

[14] Water conservation is accounted for as a demand reduction.

7.2 WSIP DRY-YEAR WATER SUPPLY PROJECTS

The SFPUC undertook a number of water supply projects through WSIP to meet dry-year demands with no greater than 20 percent system-wide rationing in any one year.

Calaveras Dam Replacement Project. Calaveras Dam is located in the East Bay near a seismically active fault zone and was determined to be seismically vulnerable. The SFPUC operated Calaveras Reservoir at 39 percent of its capacity as a result of a California Division of Safety of Dams (DSOD) order from 2001 to 2018. The reduced capacity significantly affected the ability of the SFPUC to carryover dry-year water supplies from one year to the next and, therefore, impacted the SFPUC's dry-year water supplies. To address the dam's vulnerability, the SFPUC constructed a new dam of equal height downstream of the existing dam. Construction of the embankment dam was completed in Fall 2018; at that time, the SFPUC began impounding water behind the new dam in accordance with DSOD guidance. As of December 2020, reservoir storage was at 55% of total capacity. Maximum reservoir storage since refill began was 67% of capacity, in May of 2019. Storage has declined since then due to dry hydrologic conditions. The project reached final completion in July 2019 and has been in the closeout phase since 2019 without the Calaveras Reservoir reaching sufficient level to fulfill Initial Fill Plan inspections. The project team continues to monitor and is ready to resume reservoir initial fill inspections in 2021.

Alameda Creek Recapture Project. The Alameda Creek Recapture Project[15] will recapture the water system yield that is either lost due to instream flow releases at Calaveras Reservoir or bypassed around the Alameda Creek Diversion Dam and return this yield to the RWS through facilities in the Sunol Valley. Water that naturally infiltrates from Alameda Creek will be recaptured into an existing quarry pond known as SMP (Surface Mining Permit)-24 Pond F2. The project will be designed to allow the recaptured water to be pumped to the Sunol Valley Water Treatment Plant or to San Antonio Reservoir. Construction of this project will occur from spring 2021 to spring 2023.

Lower Crystal Springs Dam Improvements Project. The Lower Crystal Springs Dam (LCSD) 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. A WSIP follow up project to modify the LCSD Stilling Basin for fish habitat and upgrade the fish water release and other valves started in April 2019. While the main improvements to the dam have been completed, environmental permitting issues for reservoir operation remain significant. When the reservoir elevation was lowered due to DSOD restrictions, habitat for Fountain Thistle, an endangered plant species, was discovered in areas formerly inundated by the reservoir. Raising the reservoir elevation now requires that new plant populations be reinstated incrementally before the reservoir elevation is restored. The result is that it may be several years before pre-project water storage volumes can be realized.

Regional Groundwater Storage and Recovery Project. The Regional Groundwater Storage and Recovery (GSR) Project is a strategic partnership between the SFPUC and three San Mateo County agencies: 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 in order to provide the RWS with additional supplies during times of drought. During years of normal or heavy rainfall, the project would provide additional surface water to the partner agencies in San Mateo County, allowing them to reduce the amount of groundwater that they pump from the South Westside Groundwater Basin. Over time, the reduced pumping would allow 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.

Phase 1 of this project, which includes constructing of thirteen well sites, is over 99 percent complete. Testing of the groundwater delivery system took place in 2020. Construction of Phase 1 is expected to be complete in 2021. Phase 2 of this project consists of completing construction of the well station at the South San Francisco Main site that was delayed due to access restrictions, and also various carryover work at the other well sites that were not completed during Phase 1.

[15] The project formerly known as the Upper Alameda Creek Filter Gallery Project in the WSIP was later reconfigured as the Alameda Creek Recapture Project.

Phase 2 design work began in early 2020. The 95% design has been completed and submitted to fellow partner agencies for review, and the 100% design package is being drafted.

A new project called “Regional Groundwater Treatment Improvements” was approved in the 10-Year Water Enterprise Capital Improvement Program for FY 2021-2030 and includes treatment facilities for several of the GSR wells to address groundwater quality issues that have emerged since the wells were constructed. This project will be initiated in 2021.

Water Transfers. During the planning and implementation of the Phased WSIP, the SFPUC pursued a long-term agreement to transfer 2 mgd from Modesto irrigation District (MID) to the SFPUC in drought years. Negotiations with MID 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 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) to establish water quality objectives to maintain the health of the Bay-Delta ecosystem. 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 Bay-Delta. The Bay-Delta Plan Amendment requires the release of 30-50% of the “unimpaired flow”[16] 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 UWMP in normal years but would experience supply shortages in single dry years or multiple dry years. Implementation of the Bay-Delta Plan Amendment will require rationing in all single dry years and multiple dry years.

The SWRCB has stated that it intends to implement the Bay-Delta Plan Amendment on the Tuolumne River by the year 2022, assuming all required approvals are obtained by that time. But implementation of the Plan Amendment is uncertain for multiple reasons.

- Since adoption of the Bay-Delta Plan Amendment, 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 in the early stages and there have been no dispositive court rulings as of this date.
- The Bay-Delta Plan Amendment is not self-implementing and does not automatically allocate responsibility for meeting its new flow requirements to the SFPUC or any other water rights holders. Rather, the Bay-Delta Plan Amendment merely provides a regulatory framework for flow allocation, which must be accomplished by other regulatory and/or adjudicatory proceedings, such as a comprehensive water rights adjudication or, in the case of the Tuolumne River, may be implemented through the water quality certification process set forth in section 401

[16] "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**.)

of the Clean Water Act as part of the Federal Energy Regulatory Commission's (FERC) licensing proceedings for the Don Pedro and La Grange hydroelectric projects.

- On January 15, 2021, the SWRCB released the Clean Water Act section 401 Water Quality Certification for the Turlock Irrigation District and Modesto Irrigation District Don Pedro Hydroelectric Project and La Grange Hydroelectric Project, FERC Project Nos. 2299 and 14581 (WQC). The WQC includes the 40% unimpaired flow objective from the Bay Delta Plan Amendment, as well as additional conditions that, if incorporated into FERC licenses for the Don Pedro and La Grange Projects, would severely impact SFPUC's water supply; the WQC's requirements differ significantly from the recommended flows and conditions that FERC has analyzed in the Staff Alternative of its Final Environmental Impact Statement for the licenses. To date, FERC has not taken action to incorporate the WQC into the licenses or to finalize the licenses for issuance. At this time, it is highly uncertain whether the WQC will be implemented by either the state or federal government for several reasons:

  - On February 16, 2021, multiple parties, including the City, Modesto and Turlock Irrigation Districts, and BAWSCA, filed with the SWRCB Petitions for Reconsideration of the WQC. Those petitions are currently pending before the SWRCB. In its March 15, 2021 order denying the Districts' request for a stay of the WQC, SWRCB stated that "[i]t is not the State Water Board's practice to seek enforcement while a petition for reconsideration of a certification is pending" and that "the State Water Board has *never* sought to enforce a certification before [a FERC] license is issued." (SWRCB, Order No. WQ 2021-0007-EXEC.) SWRCB emphasized that there was further "no information to support the conclusion that FERC will imminently issue licenses incorporating some or all of the certification." (Id.)

  - If the SWRCB denies the pending petitions for reconsideration or otherwise fails to revise or rescind the WQC, litigation is expected. In addition, the Districts filed a petition for declaratory order at FERC alleging that the SWRCB has waived its authority to issue the WQC, and they sought rehearing of FERC's January 19, 2021 order denying that petition. On March 22, 2021, FERC issued a Notice of Denial of Rehearing by Operation of Law and Providing for Further Consideration. The Districts have the option to appeal FERC's decision. These legal challenges could take years to resolve and may result in temporary or permanent stays of implementation of the WQC. FERC's policy is not to issue a license when a WQC has been stayed pending appeal within a state process. *See Alcoa Power Generating Inc.*, 130 FERC ¶ 61,037, P 15 (2010).

  - Aside from legal challenges, there are additional steps to complete in the licensing process before FERC is likely to issue the licenses: (a) completion of Endangered Species Act consultation, and (b) additional environmental review under NEPA to evaluate the WQC conditions. FERC also cannot issue the licenses without making a determination that the terms and conditions, including the requirements of the WQC, meet the statutory criteria of the Federal Power Act.

  - If FERC were to issue license(s) for the Don Pedro and La Grange Projects incorporating the current WQC, the Districts and other parties to the licensing proceeding would have the option to seek rehearing of FERC's licensing order, and depending on the outcome of that process, then challenge the license(s) in the court and seek a stay. The Districts would also have the option to refuse to accept the license(s).

Due to the above, it is speculative whether the current WQC will be placed in the FERC licenses and when these licenses will be issued. Accordingly, this UWMP does not model projections of SFPUC water supply under the WQC.

In recognition of the obstacles to implementation of the Bay-Delta Plan Amendment, the SWRCB 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" by March 1, 2019, 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.” In accordance with the SWRCB’s instruction, on March 1, 2019, the SFPUC, in partnership with other key stakeholders, submitted a proposed project description for the Tuolumne River that could be the basis for a voluntary substitute agreement with the SWRCB (“March 1st Proposed Voluntary Agreement”). On March 26, 2019, the SFPUC adopted Resolution No. 19-0057 to support the SFPUC’s participation in the Voluntary Agreement negotiation process. To date, those negotiations are ongoing under the California Natural Resources Agency and the leadership of the Newsom administration.[17]

Because of the uncertainty surrounding implementation of the Bay-Delta Plan Amendment, the water service reliability assessment presented in Section 8 of this draft UWMP looks at two future supply scenarios, both with and without implementation of the Bay-Delta Plan Amendment. Although the SWRCB has stated it intends to implement the Bay-Delta Plan Amendment on the Tuolumne River by the year 2022, given the current level of uncertainty, it is assumed for the purposes of this draft UWMP that the Bay-Delta Plan Amendment will be fully implemented starting in 2023.

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 water supply is managed. 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 PEIR, 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, as noted earlier, 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 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. The final Environmental Impact Statement was released by FERC on July 7, 2020. There is no schedule for when FERC will issue the relicense.

7.3.3 Additional Water Supply Decisions

In the 2009 WSA, the SFPUC committed to make two decisions before the end of 2018 that affect water supply development:

- Whether or not to make the Cities of San Jose and Santa Clara permanent customers of the RWS, and
- Whether or not to increase Supply Assurance above 184 mgd to meet future Wholesale Customer demands.

The SFPUC determined prior to 2018 that it needed to reevaluate water system demands and supply options, and conduct additional supply reliability studies and environmental reviews necessary to address the water supply decisions. As a result, instead of arriving at a decision point in 2018, the SFPUC and the Wholesale Customers updated the WSA and deferred the supply decisions to 2028 to allow the SFPUC to conduct the necessary water supply planning and CEQA analysis.

[17] California Natural Resources Agency, “Voluntary Agreements to Improve Habitat and Flow in the Delta and its Watersheds,” available at **https://files.resources.ca.gov/voluntary-agreements/**.

The SFPUC's planning efforts to fulfill the water supply needs for the Cities of San Jose and Santa Clara are included in the Alternative Water Supply Program as described further below in Section 7.4.

7.4 ALTERNATIVE WATER SUPPLY PROGRAM

The SFPUC is increasing and accelerating its efforts to acquire additional water supplies and explore other projects that would increase overall water supply resilience through the Alternative Water Supply Planning Program. The drivers for the program include: (1) the adoption of the Bay-Delta Plan Amendment and the resulting potential limitations to RWS supply during dry years, (2) the net supply shortfall following the implementation of WSIP, (3) San Francisco's perpetual obligation to supply 184 MGD to the Wholesale Customers, (4) adopted Level of Service (LOS) Goals and Objectives to limit rationing to no more than 20 percent system-wide during droughts, and (5) the potential need to identify water supplies that would be required to offer permanent status to interruptible customers. Developing additional supplies through this program would reduce water supply shortfalls and reduce rationing associated with such shortfalls. The planning priorities guiding the Alternative Water Supply Program are as follows:

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

In conjunction with these planning priorities, the SFPUC considers how the new framework fits within the LOS Goals and Objectives related to water supply and sustainability when considering new water supply opportunities. The SFPUC adopted LOS Goals and Objectives in 2008, in conjunction with the adoption of WSIP. The key LOS Goals and Objectives relevant to this effort can be summarized as:

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

Together, the planning priorities and LOS Goals and Objectives provide a lens through which the SFPUC considers water supply options and opportunities to meet all foreseeable water supply needs.

In addition to the Daly City Recycled Water Expansion project[18], which was a potential project identified in the 2015 UWMP and had committed funding at that time, the SFPUC has taken action to fund the study of several other potential additional water supply projects. Capital projects under consideration to develop additional water supplies include surface

[18] While this potential project was identified in the 2015 UWMP, it has since been approved by Daly City following environmental review and has a higher likelihood of being implemented.

water storage expansion, recycled water expansion, water transfers, desalination, and potable reuse projects. A more detailed list and descriptions of these efforts are provided below.

The capital projects that are under consideration would be costly and are still in the early feasibility or conceptual planning stages. Because these water supply projects would take 10 to 30 years to implement, and because required environmental permitting negotiations may reduce the amount of water that can be developed, the yield from these projects are not currently incorporated into the SFPUC's supply projections. State and federal grants and other financing opportunities would be pursued for eligible projects, to the extent feasible, to offset costs borne by ratepayers.

If all the projects identified through the current planning process could be implemented, there would still be a supply shortfall to meet projected needs. Furthermore, each of the supply options being considered has its own inherent challenges and uncertainties that may affect the SFPUC's ability to implement it.

Given the limited availability of water supply alternatives - unless the supply risks are significantly reduced or the SFPUC's needs change significantly - the SFPUC will continue to plan, develop, and implement all project opportunities that can help bridge the anticipated water supply gaps during droughts. In 2019, the SFPUC completed a survey among water and wastewater agencies within the SFPUC's service area to identify additional opportunities for purified water. Such opportunities remain limited, but the SFPUC continues to pursue all possibilities.

The SFPUC will prepare an Alternative Water Supply Plan by July 2023, which will include a planning framework that will 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 the meantime, the SFPUC has been preparing quarterly reports that provide an update on the status of planning efforts regarding the regional and local water supply, storage, and related infrastructure planned projects.

The following capital projects are the alternative local and regional water supply and storage projects that represent the SFPUC's early planning to meet future water supply challenges and vulnerabilities, such as environmental flow needs and other regulatory changes, earthquakes, disasters and emergencies, population and employment increases, and climate change.

7.4.1 Local Projects

San Francisco Purified Water. The San Francisco Purified Water Project envisions providing a new, local drinking water supply in San Francisco. The project would treat secondary effluent sourced from the SFPUC's Southeast Treatment Plant or Oceanside Treatment Plant through a multi-stage, multi-barrier advanced treatment process to produce water that meets state and federal drinking water standards. The treated water would then be blended at one or more of San Francisco's drinking water reservoirs. Before engaging at a project-level, the SFPUC will participate in research and data collection around water quality and process reliability for purified water opportunities.

With the successful completion of PureWaterSF, San Francisco's initial research and demonstration of a small-scale Direct Potable Reuse (DPR) project, the SFPUC is beginning to plan next steps for the development of purified water. SFPUC staff has begun putting together a scope of work to consider the size and scope of purified water opportunities in San Francisco, as well as identify research, training and outreach needs.

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

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

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

7.4.2 Regional Projects

Daly City Recycled Water Expansion. This project has been designed to produce up to 3 mgd of tertiary recycled water during the irrigation season (~7 months). On an average annual basis, this is equivalent to 1.25 mgd or 1,400 acre-feet per year. The project is envisioned to provide recycled water to 13 cemeteries and other smaller irrigation customers, offsetting existing groundwater pumping from the South Westside Groundwater Basin; this will increase groundwater storage, enhancing the reliability of the GSR Project in the Basin. The project is a regional partnership between the SFPUC the City of Daly City, and the California Water Service Company, whose service area includes numerous irrigators using a combination of groundwater and surface water from the RWS. RWS customers will benefit from the increased reliability of the South Westside Basin for additional drinking water supply during droughts.

ACWD-USD Purified Water Partnership. This project could provide a new purified water supply to the RWS utilizing Union Sanitary District's (USD) treated wastewater. Purified water produced by advanced water treatment at USD in the East Bay could be transmitted to the Quarry Lakes Groundwater Recharge Area to supplement recharge into the Niles Cone Groundwater Basin as part of an indirect potable reuse project or be put to other uses in ACWD's service area. With the latter option, providing additional water supply to ACWD as part of an in-lieu exchange with the SFPUC would result in more water left in the RWS. Additional water supply could also be directly transmitted to the SFPUC through a new intertie between ACWD and the SFPUC.

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

Los Vaqueros Reservoir Expansion. The Los Vaqueros Reservoir Expansion (LVE) Project is a multi-agency storage project that will enlarge the existing reservoir located in northeastern Contra Costa County from 160,000 acre-feet to 275,000 acre-feet. While the existing reservoir is owned and operated by Contra Costa Water District (CCWD), the expanded reservoir will have regional benefits for numerous water agencies and their customers and will be managed by a Joint Powers Authority (JPA) that will be set up prior to construction. Meanwhile, CCWD is leading the planning, design and environmental review efforts. CCWD's Board certified the EIS/EIR and approved the LVE Project on May 13, 2020.

The additional storage capacity from the LVE Project would provide a dry year water supply benefit to the SFPUC. However, the challenges of securing a water supply to store in the SFPUC's portion of reservoir and ensuring there is an available path for conveyance of that water supply to and from the reservoir may both be significant barriers to realizing the full water supply potential of storage for SFPUC customers. In particular, issues related to conveyance must be better understood before the SFPUC can determine the extent of its participation in the LVE project. As such, this project is being planned in conjunction with the following projects described below: Conveyance Alternatives, the Bay Area Regional Reliability (BARR) Shared Water Access Program, and the Bay Area Brackish Water Desalination Project.

Conveyance Alternatives. The SFPUC is considering two main pathways to move water from storage in a prospective LVE Project to the SFPUC's service area: either directly to RWS facilities or indirectly via an exchange with partner agencies. The SFPUC is evaluating potential alignments for conveyance.

The Bay Area Regional Reliability (BARR) Shared Water Access Program. As part of the BARR Partnership, a consortium of 8 Bay Area water utilities (including ACWD, BAWSCA, CCWD, East Bay Municipal Utility District (EBMUD), Marin Municipal Water District (MMWD), SFPUC, Valley Water, and Zone 7 Water Agency) are exploring opportunities to move water across the region as efficiently as possible, particularly during times of drought and emergencies. The BARR agencies are proposing two separate pilot projects in 2020-2021 through the Shared Water Access Program (SWAP) to test conveyance pathways and identify potential hurdles to better prepare for sharing water during a future drought or emergency. A strategy report identifying opportunities and considerations will accompany these pilot projects and will be completed in 2021.

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

Calaveras Reservoir Expansion. This storage project envisions the expansion of the existing Calaveras Reservoir to create up to 289,000 AF of additional capacity to store excess RWS supplies or other source water in wet and normal years. In addition to reservoir enlargement, the project would involve infrastructure to pump water to the reservoir, such as pump stations and transmission facilities. Unlike the other regional projects under review in this program, no external partners are anticipated for this project. The SFPUC has conducted a preliminary analysis reviewing potential dam raise scenarios, which indicated that an expansion of the dam at various elevations is technical feasible. Water supply, conveyance, and capacity constraints at related facilities will be evaluated.

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

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

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

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

Dry-Year Transfers. WSIP included a water transfer between the SFPUC and other water users on the Tuolumne River. In 2012, staff of the SFPUC and MID developed a term sheet for a 2 mgd dry-year water supply transfer for approval by their governing boards. The SFPUC and MID were ultimately unable to reach agreement on mutually beneficial terms and the water transfer negotiations were terminated. Subsequently, the SFPUC began discussions with the Oakdale Irrigation District (OID) for a one-year transfer agreement with the SFPUC for 2 mgd. No progress towards agreement on a transfer was made in 2020, but the irrigation districts recognize the SFPUC's continued interest, and the SFPUC is continuing to pursue transfers in conjunction with ongoing discussions associated with the implementation of the Bay-Delta Plan Amendment.

7.5 BAY AREA REGIONAL EFFORTS TO IMPROVE WATER SUPPLY RELIABILITY

The following projects and efforts are currently underway or completed and will help the RWS meet its water supply reliability needs. 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 (ACWD, BAWSCA, CCWD, EBMUD, MMWD, 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), is to identify projects and processes to enhance water supply reliability across the region, leverage existing infrastructure investments, facilitate water transfers during critical shortages, and improve climate change resiliency. In 2017, with funding support from the U.S. Bureau of Reclamation, the BARR partner agencies completed a Drought Contingency Plan. The Plan identified short-term response actions and longer-term projects that could facilitate the sharing of infrastructure for the benefit of the region including interties, expanded storage, new water supply and operational improvements. To further evaluate the potential for building regional resilience, in 2019 the BARR partners (with the exception of MMWD) initiated development of the Bay Area Shared Water Access Program (Bay Area SWAP). The Bay Area SWAP effort has also received funding support from the U.S. Bureau of Reclamation and is ongoing. The goal of Bay Area SWAP is to develop a Strategy Report outlining an implementation plan to facilitate transfers to and exchanges within the Bay Area, leveraging existing infrastructure and institutional agreements and identifying new components that may be needed. Through the Drought Contingency Plan and Bay Area SWAP efforts, the BARR partner agencies have convened a Stakeholder Task Force to provide stakeholders, interested parties and BARR partners an opportunity for meaningful engagement and input.

Regional Interties. Regional interties help increase the reliability of the RWS by allowing for water exchanges 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 their systems. These facilities can convey up to 30 mgd among these three agencies to boost water supply reliability when needed. 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 Emergency 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 Interties:** In the 1990s, the SFPUC used a temporary intertie from the South Bay Aqueduct into San Antonio Reservoir for water a two-year water transfer. To enable deliveries from the Los Vaqueros Reservoir Expansion project, the SFPUC is evaluating the potential for a new intertie.

Bay Area Integrated Regional Water Management Plan. The SFPUC chairs the nine-county Bay Area Integrated Regional Water Management Plan Coordinating Committee. The BAIRWMP was first completed in November 2006 and was updated in 2013 and 2019. The BAIRWMP describes the region's water supply and water quality, wastewater and water recycling, storm water and flood protection, and habitat protection and ecosystem restoration objectives and efforts. The BAIRWMP also identifies integrated and collaborative projects among Bay Area agencies. To date, the Bay Area has received $148.5 million in Propositions 50 and 84 Integrated Regional Water Management (IRWM) implementation grant funding. More recently, the Bay Area received $65 million in Proposition 1 IRWM grant funding for implementation, planning, and disadvantaged community involvement efforts.

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SECTION 8: WATER SUPPLY RELIABILITY ASSESSMENT

8.1 CONSTRAINTS ON 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 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, we 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. The SFPUC is currently pursuing a voluntary agreement as well as a lawsuit which would limit implementation of the Plan. With both of these processes occurring on an unknown timeline, the SFPUC does not know at this time when the Bay-Delta Plan Amendment is likely to go into effect. As a result, it makes sense to conduct future supply modeling for a scenario that doesn't include implementation of the Bay-Delta Plan Amendment, as that represents a potential supply reliability scenario.

Because of the uncertainty surrounding implementation of the Bay-Delta Plan Amendment, the following water service reliability assessment includes two sets of tables: (1) a scenario in which the Bay-Delta Plan Amendment is fully implemented in 2023, and (2) a scenario that considers the SFPUC system's current situation without the Bay-Delta Plan Amendment. The two scenarios provide a bookend for the possible future scenarios regarding RWS supplies. The standardized tables associated with this UWMP contain the future scenario that assumes implementation of the Bay-Delta Plan Amendment starting in 2023.

8.2 WATER SUPPLY MODELING

8.2.1 Data & Methods

The SFPUC used the Hetch Hetchy and Local Simulation Model (HHLSM) to perform the water supply analyses for the supply reliability assessment and the drought risk assessment. HHLSM combines a historical record of hydrology from 1920 through 2017 with a current representation of SFPUC 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 model is the anticipated level of demand on the RWS. Supply modeling results presented in the text of this plan reflect an input of projected demands on the RWS consisting of (1) projected retail demands on the RWS (total retail demands minus local groundwater and recycled water supplies, see Table 4-1 and Table 6-5), and (2) projected Wholesale Customer purchases (see Table 4-3). 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, as well as a contractual obligation to supply 184 mgd to the Wholesale Customers. Therefore, the SFPUC has also conducted modeling based on a demand of 265 mgd in order to facilitate planning that supports meeting this Level of Service goal and our contractual obligations. The results of this modeling can be found in Appendix J.

Note that, as shown in Appendix J, 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, within 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.

8.2.2 Design Drought

In the six-year period from 1987-92, a shortfall developed between the SFPUC's supplies and its customers' demands such that significant rationing of water supply became necessary. Other than during the drought of 1976-77, drought sequences in the past did not seriously affect the ability of the RWS to sustain full deliveries to its retail and wholesale customers. Following the 1987-92 drought experience, the SFPUC includes 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 latest drought (2012-2015) consists of 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 Multi-dry Years)*

The total amount of water the SFPUC can deliver to 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 that water that must be released 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 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 indicators for water supply rationing that are developed through analysis with the design drought sequence described above. 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 and after multiple-year droughts.

The supply reliability assessment presented herein assumed the statuses of the ongoing WSIP projects shown in Table 8-1. The WSIP projects will contribute to reducing the anticipated RWS supply reductions in a multi-dry year event.

The levels of water supply deficiency presented for this 2020 UWMP were estimated using the design drought methodology discussed above. The five-consecutive-year dry sequence shown in the tables below represents years 2 through 6 of the design drought; this sequence was chosen because year 2 is the first year when system-wide rationing would come into effect. The results are presented in the standardized format prescribed by DWR for use in the 2020 UWMPs.

Table 8-2 and Table 8-3 summarize the expected availability of local groundwater, recycled water, and RWS supplies under normal, single dry, and multiple dry year conditions. These are the bases for the retail and wholesale supply reliability assessments presented in Sections 8.3 and 8.4. The SFPUC currently operates under a plan that anticipates multiple stages of response to water supply shortages, ranging from use of dry year water supplies (when available) and voluntary customer demand reductions to enforced mandatory water use reductions.

For RWS supplies, supply modeling both with and without the implementation of the Bay-Delta Plan Amendment is included here. The two modeled scenarios show significantly different supply reliability projections for the RWS:

- **With Full Implementation of the Bay-Delta Plan Amendment:** Under the Bay-Delta Plan Amendment conditions, it is anticipated that the RWS supplies will experience a reduction of up to 49% 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:** Assuming the availability of existing supplies at current demand levels, the SFPUC system can expect to experience no RWS supply reductions until the level of demand anticipated in 2045 is reached. At that level of demand, 10% shortages of RWS supply would occur in years 4 and 5 of the five-consecutive dry year sequence.

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

Projects	Base Year 2020	Base Year 2025 and Beyond
Calaveras Dam Replacement Project	Calaveras Reservoir partially refilled at spring 2020 level of 63,900 AF	Calaveras Reservoir fully refilled
Lower Crystal Springs Dam Improvements	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 23,500 AF; GSR recovery rate of 6.2 mgd[a]	GSR account fully filled; GSR recovery rate of 6.2 mgd[a]
Alameda Creek Recapture Project	Project not built	Project built
Dry-year Transfers	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 Using 2025 Base Year

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

Water Supply	Normal Year	Single Dry Year	Multiple Dry Years				
			Year 1	Year 2	Year 3	Year 4	Year 5
Projected Years 2025 through 2045 (post-WSIP completion) – both with and without Bay-Delta Plan Amendment							
Local Groundwater[a]	100%	100%	100%	100%	100%	100%	100%
Local Recycled Water[a]	100%	100%	100%	100%	100%	100%	100%

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 availability are not impacted by the implementation of the Bay-Delta Plan Amendment.

a Local supplies are available only to meet retail demands.

Table 8-3. Regional Water System Supply Availability During Normal and Dry Years for Base Years 2025 through 2045 – With and Without Bay-Delta Plan Amendment

Base Year	Normal Year[a]	Single Dry Year	Multiple Dry Years				
			Year 1	Year 2	Year 3	Year 4	Year 5
With Bay-Delta Plan Amendment							
2020[b]	100%	100%	100%	100%	60%	60%	60%
2025	100%	70%	70%	60%	60%	60%	60%
2030	100%	70%	70%	60%	60%	60%	60%
2035	100%	70%	70%	60%	60%	60%	55%
2040	100%	70%	70%	60%	60%	53%	53%
2045	100%	60%	60%	60%	60%	51%	51%
Without Bay-Delta Plan Amendment							
2020	100%	100%	100%	100%	100%	100%	100%
2025	100%	100%	100%	100%	100%	100%	100%
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%	90%	90%

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.

RWS supplies are available to meet both retail and wholesale demands. Retail and wholesale allocations are provided in Section 8.3 and Section 8.4(Table 8-4 and Table 8-6 for retail, and Table 8-5 and Table 8-7 for wholesale)

a 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.

b For base year 2020, the Bay-Delta Plan Amendment is assumed to come into effect in 2023, which is shown here as Year 3 of the multiple dry year sequence.

8.2.4 Allocating Regional Water System Supply

In order to compare retail and wholesale supplies and demands, the available RWS supply in a dry year must first be allocated between the Retail and Wholesale Customers. Procedures to allocate RWS supplies between Retail and Wholesale Customers during system shortages are specified in the SFPUC's Water Shortage Allocation Plan (WSAP), which is an appendix to the Water Supply Agreement. The WSAP is further described in Appendix K. The WSAP defines a percentage split between Retail and Wholesale Customers at different RWS system-wide shortage levels. For example, at a 10% RWS shortage, 36% of available RWS supply is allocated to the Retail Customers, and 64% to the Wholesale Customers. Appendix K presents the percentage splits between Wholesale and Retail Customers at different shortage levels. Per the WSAP, in the event that the retail share of the available water supply results in retail customers having a positive allocation (i.e. a supply of additional water rather than a percentage reduction in water use), the share of the available water supply for retail customers shall be reduced to eliminate any positive allocation, with a corresponding increase in the percentage share of the available water supply allocated to the Wholesale Customers.

In addition, as amended in 2018, the WSAP requires Retail Customers to conserve a minimum of 5% during droughts. If retail demands on the RWS are lower than the retail allocation in a dry year, it is assumed that the retail customers will achieve a 5% demand reduction.

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 for the scenario with full implementation of the Bay-Delta Plan Amendment. The demand assumptions for this analysis are as follows:

- Total retail demands are presented in Section 4.1 and reflect active and passive conservation, onsite water reuse savings, and water loss.
- Wholesale Customer purchase request projections as presented in Table 4-3. A reliability assessment for the Level of Service objective of 265 mgd, which includes the Supply Assurance of 184 mgd, is presented in Appendix J.

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, but as a wholesale customer in the corresponding standardized tables in Appendix B.

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

The instream flow requirements of the Bay-Delta Plan Amendment would impact the RWS supplies in the dry-year and multi-dry scenarios. The comparison of retail demands and supplies under the Bay-Delta Plan Amendment is presented in Table 8-4 and demonstrates the following:

- **Normal Years:** During normal hydrologic years, the SFPUC will have adequate supplies to meet its projected retail water demands.
- **Single Dry Year:** During single dry years, there would be an anticipated 30 - 40% shortage of RWS supplies, as described in Table 8-2. When the available RWS supply is allocated between retail and Wholesale Customers (described in Section 8.2.4), and the supplies available to retail customers (RWS plus local supplies) are compared to the projected retail demands (as shown in Table 8-4), a retail supply shortfall of 14% to 25% (11 – 20 mgd) is expected in single dry year conditions.

- **Multiple Dry Years:** If a multiple dry year event occurs, there would be anticipated shortages in RWS supplies of 30 to 49%, depending on demand levels. When the available RWS supply is allocated between retail and Wholesale Customers (described in Section 8.2.4), and the supplies available to retail customers (RWS plus local supplies) are compared to the projected retail demands (as shown in Table 8-4), there is an anticipated shortfall of up to 35%, or almost 29 mgd, by the fifth dry year at 2045 projected levels of demand.

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 presented in Table 8-5 demonstrates the following:

- **Normal Years:** During normal hydrologic years, the SFPUC will have adequate supplies to meet its projected wholesale water demands.

- **Single Dry Year:** During single dry years, there would be an anticipated 30 - 40% shortage of RWS supplies, as described in Table 8-2. When the available RWS supply is allocated between retail and Wholesale Customers (described in Section 8.2.4), and the Wholesale Customer allocation is compared to the projected Wholesale Customer demand (as shown in Table 8-5), this would result in a 36 to 46% (53 – 74 mgd) shortfall for the Wholesale Customers.

- **Multiple Dry Years:** In a multiple dry year event, there would be anticipated shortages in RWS supplies for all projected years, ranging from 30 to 49% shortages. When the available RWS supply is allocated between retail and Wholesale Customers (described in Section 8.2.4), and the Wholesale Customer allocation is compared to the projected Wholesale Customer demand (as shown in Table 8-5), these RWS shortages would result in up to 54% shortfalls for the Wholesale Customers.

Table 8-4. Retail Supply and Demand Comparison for Projected Normal & 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]	Multiple Dry Years[b]				
				Year 1	Year 2	Year 3	Year 4	Year 5
2025	Total Retail Demand	70.7	70.7	70.7	70.7	70.7	70.7	70.7
	Baseline Retail Demand[c]	*70.7*	*70.7*	*70.7*	*70.7*	*70.7*	*70.7*	*70.7*
	WSA 5% Demand Reduction	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	Total Retail Supply	70.7	59.5	59.5	51.5	51.5	51.5	51.5
	Retail Groundwater[e]	*1.4*	*1.4*	*1.4*	*1.4*	*1.4*	*1.4*	*1.4*
	Retail Recycled Water[f]	*2.1*	*2.1*	*2.1*	*2.1*	*2.1*	*2.1*	*2.1*
	RWS Supply Utilized by Retail[g]	*67.2*	*56.0*	*56.0*	*48.0*	*48.0*	*48.0*	*48.0*
	Difference (Supply Surplus or Shortfall)	0.0	-11.2	-11.2	-19.2	-19.2	-19.2	-19.2
	Difference as Percentage of Demand	0.0%	-15.9%	-15.9%	-27.2%	-27.2%	-27.2%	-27.2%
2030	Total Retail Demand	72.4	72.4	72.4	72.4	72.4	72.4	72.4
	Baseline Retail Demand[c]	*72.4*	*72.4*	*72.4*	*72.4*	*72.4*	*72.4*	*72.4*
	WSA 5% Demand Reduction	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	Total Retail Supply	72.4	61.4	61.4	53.4	53.4	53.4	53.4
	Retail Groundwater[e]	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
	RWS Supply Utilized by Retail[g]	*67.5*	*56.5*	*56.5*	*48.5*	*48.5*	*48.5*	*48.5*
	Difference (Supply Surplus or Shortfall)	0.0	-11.0	-11.0	-19.0	-19.0	-19.0	-19.0
	Difference as Percentage of Demand	0.0%	-15.1%	-15.1%	-26.3%	-26.3%	-26.3%	-26.3%
2035	Total Retail Demand	74.5	74.5	74.5	74.5	74.5	74.5	74.5
	Baseline Retail Demand[c]	*74.5*	*74.5*	*74.5*	*74.5*	*74.5*	*74.5*	*74.5*
	WSA 5% Demand Reduction	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	Total Retail Supply	74.5	63.8	63.8	55.5	55.5	55.5	51.4
	Retail Groundwater[e]	*3.4*	*3.4*	*3.4*	*3.4*	*3.4*	*3.4*	*3.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
	RWS Supply Utilized by Retail[g]	*68.6*	*57.9*	*57.9*	*49.6*	*49.6*	*49.6*	45.5
	Difference (Supply Surplus or Shortfall)	0.0	-10.7	-10.7	-19.0	-19.0	-19.0	-23.1
	Difference as Percentage of Demand	0.0%	-14.4%	-14.4%	-25.5%	-25.5%	-25.5%	-31.0%
2040	Total Retail Demand	77.4	77.4	77.4	77.4	77.4	77.4	77.4
	Baseline Retail Demand[c]	*77.4*	*77.4*	*77.4*	*77.4*	*77.4*	*77.4*	*77.4*
	WSA 5% Demand Reduction	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	Total Retail Supply	77.4	66.4	66.4	57.9	57.9	52.0	52.0
	Retail Groundwater[e]	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*

Year	Retail Supply and Demand	Normal Year	Single Dry Year[a]	Multiple Dry Years[b]				
				Year 1	Year 2	Year 3	Year 4	Year 5
	RWS Supply Utilized by Retail[g]	*70.5*	*59.5*	*59.5*	*51.0*	*51.0*	45.1	45.1
	Difference (Supply Surplus or Shortfall)	0.0	-11.0	-11.0	-19.5	-19.5	-24.5	-25.4
	Difference as Percentage of Demand	0.0%	-14.2%	-14.2%	-25.2%	-25.2%	-32.8%	-32.8%
2045	Total Retail Demand	80.6	80.6	80.6	80.6	80.6	80.6	80.6
	Baseline Retail Demand[c]	*80.6*	*80.6*	*80.6*	*80.6*	*80.6*	*80.6*	*80.6*
	WSA 5% Demand Reduction	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	Total Retail Supply	80.6	60.1	60.1	60.1	60.1	52.1	52.1
	Retail Groundwater[e]	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
	RWS Supply Utilized by Retail[g]	*73.7*	*53.2*	*53.2*	*53.2*	*53.2*	45.2	45.2
	Difference (Supply Surplus or Shortfall)	0.0	-20.5	-20.5	-20.5	-20.5	-28.5	-28.5
	Difference as Percentage of Demand	0.0%	-25.4%	-25.4%	-25.4%	-25.4%	-35.4%	-35.4%

Normal, single dry, and multiple dry year conditions are on a water year basis.

a During a single dry year, system-wide shortages of 30 – 40% are in effect (see Table 8-3). For this analysis, shortages greater than 20% are considered to have the same retail/wholesale allocation as the maximum Stage 4, 16-20% system-wide shortage in the WSAP.

b During multiple dry years, system-wide shortages of 30 – 55% are in effect (see Table 8-3). For this analysis, shortages greater than 20% are considered to have the same retail/wholesale allocation as the maximum Stage 4, 16-20% system-wide shortage in the WSAP.

c Total retail demands correspond to those in Table 4-1, and reflect passive and active conservation, onsite water reuse savings, and water loss. Demands for Groveland CSD is included in the table above. However, in the corresponding standardized tables in Appendix B, Groveland CSD is accounted for as a wholesale customer instead of a retail customer, as explained in Section 2.4.

d As amended in 2018, the WSAP Tier One Allocation Plan requires retail customers to conserve a minimum of 5% during droughts. If, during a declared water shortage, retail demands on the Regional Water System are lower than the retail allocation in a dry year, retail demands on the RWS will be reduced by 5%. An N/A on this row means that either this 5% rationing requirement doesn't apply (i.e. no declared water shortage), or retail customers are already rationing greater than 5%.

e Groundwater supplies are assumed to be equivalent to projected demands for the San Francisco Groundwater Supply Project (ramping up to 4 mgd by 2040) and Castlewood CSA (0.4 mgd). Groundwater availability would not be affected by dry year conditions.

f Recycled water supplies are assumed to be equivalent to projected demands related to the Westside Recycled Water Project (1.6 mgd by 2021 and 1.8 mgd by 2030), Harding Park and Fleming Golf Courses (0.23 mgd), and Sharp Park Golf Course (up to 0.1 mgd) and Treasure Island (0.2 mgd by 2025 and 0.4 mgd by 2030). Recycled water availability would not be affected by dry year conditions.

g Procedures for RWS allocations and the WSAP are described in Section 8.3. 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 supplies are not available, up to 81 mgd of RWS supply could be used.

Table 8-5. 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]	Multiple Dry Years [b]				
				Year 1	Year 2	Year 3	Year 4	Year 5
2025	Total Wholesale Demand[c]	146.0	146.0	146.0	146.0	146.0	146.0	146.0
	Total Wholesale RWS Supply[d]	146.0	93.3	93.3	80.0	80.0	80.0	80.0
	Difference (Surplus or Shortfall)	0.0	-52.7	-52.7	-66.0	-66.0	-66.0	-66.0
	Difference as % of Demand	0.0%	-36.1%	-36.1%	-45.2%	-45.2%	-45.2%	-45.2%
2030	Total Wholesale Demand[c]	147.9	147.9	147.9	147.9	147.9	147.9	147.9
	Total Wholesale RWS Supply[d]	147.9	94.2	94.2	80.8	80.8	80.8	80.8
	Difference (Surplus or Shortfall)	0.0	-53.7	-53.7	-67.1	-67.1	-67.1	-67.1
	Difference as % of Demand	0.0%	-36.3%	-36.3%	-45.4%	-45.4%	-45.4%	-45.4%
2035	Total Wholesale Demand[c]	151.9	151.9	151.9	151.9	151.9	151.9	151.9
	Total Wholesale RWS Supply[d]	151.9	96.5	96.5	82.7	82.7	82.7	75.8
	Difference (Surplus or Shortfall)	0.0	-55.4	-55.4	-69.2	-69.2	-69.2	-76.1
	Difference as % of Demand	0.0%	-36.5%	-36.5%	-45.6%	-45.6%	-45.6%	-50.1%
2040	Total Wholesale Demand[c]	156.3	156.3	156.3	156.3	156.3	156.3	156.3
	Total Wholesale RWS Supply[d]	156.3	99.2	99.2	85.1	85.1	75.1	75.1
	Difference (Surplus or Shortfall)	0.0	-57.1	-57.1	-71.2	-71.2	-81.2	-81.2
	Difference as % of Demand	0.0%	-36.5%	-36.5%	-45.6%	-45.6%	-52.0%	-52.0%
2045	Total Wholesale Demand[c]	162.8	162.8	162.8	162.8	162.8	162.8	162.8
	Total Wholesale RWS Supply[d]	162.8	88.7	88.7	88.7	88.7	75.4	75.4
	Difference (Surplus or Shortfall)	0.0	-74.1	-74.1	-74.1	-74.1	-87.4	-87.4
	Difference as % of Demand	0.0%	-45.5%	-45.5%	-45.5%	-45.5%	-53.7%	-53.7%

Normal, single dry, and multiple dry year conditions are on a water year basis.

Groveland CSD is not accounted for as a wholesale customer for the purpose of this table. Refer to Table 8-4 for the retail supply and demand comparison including Groveland CSD. However, in the corresponding standardized tables in Appendix B, Groveland CSD is reported as wholesale rather than retail.

a During a single dry year, system-wide shortages of 30 – 40% are in effect (see Table 8-3). For this analysis, shortages greater than 20% are considered to have the same retail/wholesale allocation as the maximum Stage 4, 16-20% system-wide shortage in the WSAP.

b During multiple dry years, system-wide shortages of 30 – 55% are in effect (see Table 8-3). For this analysis, shortages greater than 20% are considered to have the same retail/wholesale allocation as the maximum Stage 4, 16-20% system-wide shortage in the WSAP.

c Total wholesale demands correspond to projected purchase requests shown in Table 4-3, including those of the Cities of San Jose and Santa Clara.

d Procedures for RWS allocations and the WSAP are described in Section 8.3.

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

The following sections summarize the projected retail and wholesale supplies and demands during normal, single dry, and multiple dry years for the scenario without implementation of the Bay-Delta Plan Amendment.

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

In general, the comparison of retail demands and supplies presented in Table 8-6 demonstrates the following:

- **Normal Years:** During normal hydrologic years, the SFPUC will have adequate supplies to meet its projected retail water demands.
- **Single Dry Year:** During single dry years, there are no anticipated shortages of RWS supplies.
- **Multiple Dry Years:** In the multiple dry year scenario, the SFPUC would only experience shortages in RWS supplies of 10% during years 4 and 5 of an extended drought at 2045 levels of demand. In a 10% shortage, retail customers are allocated 36% of available supplies, which results in a positive allocation to retail (i.e. allocation greater than demand). The allocation above the retail demand level would be re-allocated to the Wholesale Customers, and retail customers would reduce their demands by 5% as required by the WSA.

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

In general, the comparison of wholesale demands and supplies presented in Table 8-7 demonstrates the following:

- **Normal Years:** During normal hydrologic years, the SFPUC will have adequate supplies to meet its projected wholesale water demands.
- **Single Dry Year:** During single dry years, there are no anticipated shortages of RWS supplies.
- **Multiple Dry Years:** In a multiple dry year event, there would only be anticipated shortages in RWS supplies for years 4 and 5 of an extended drought at 2045 levels of demand. In a 10% shortage, the Wholesale Customers are allocated 64% of available supplies, and as described above, they receive any allocation above the retail demands. This would result in a 15% shortage (about 23 mgd) for the Wholesale Customers.

Table 8-6. Retail Supply and Demand Comparison for Projected Normal & Dry Year Scenarios Without Bay-Delta Plan Amendment (mgd)

Year	Retail Supply and Demand	Normal Year	Single Dry Year[a]	Multiple Dry Years[b]				
				Year 1	Year 2	Year 3	Year 4	Year 5
2025	Total Retail Demand	70.7	70.7	70.7	70.7	70.7	70.7	70.7
	Baseline Retail Demand[c]	*70.7*	*70.7*	*70.7*	*70.7*	*70.7*	*70.7*	*70.7*
	WSA 5% Demand Reduction	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	Total Retail Supply	70.7	70.7	70.7	70.7	70.7	70.7	70.7
	Retail Groundwater[e]	*1.4*	*1.4*	*1.4*	*1.4*	*1.4*	*1.4*	*1.4*
	Retail Recycled Water[f]	*2.1*	*2.1*	*2.1*	*2.1*	*2.1*	*2.1*	*2.1*
	RWS Supply Utilized by Retail[g]	*67.2*	*67.2*	*67.2*	*67.2*	*67.2*	*67.2*	*67.2*
	Difference (Supply Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Difference as Percentage of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2030	Total Retail Demand	72.4	72.4	72.4	72.4	72.4	72.4	72.4
	Baseline Retail Demand[c]	*72.4*	*72.4*	*72.4*	*72.4*	*72.4*	*72.4*	*72.4*
	WSA 5% Demand Reduction	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	Total Retail Supply	72.4	72.4	72.4	72.4	72.4	72.4	72.4
	Retail Groundwater[e]	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*	*2.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
	RWS Supply Utilized by Retail[g]	*67.5*	*67.5*	*67.5*	*67.5*	*67.5*	*67.5*	*67.5*
	Difference (Supply Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Difference as Percentage of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2035	Total Retail Demand	74.5	74.5	74.5	74.5	74.5	74.5	74.5
	Baseline Retail Demand[c]	*74.5*	*74.5*	*74.5*	*74.5*	*74.5*	*74.5*	*74.5*
	WSA 5% Demand Reduction	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	Total Retail Supply	74.5	74.5	74.5	74.5	74.5	74.5	74.5
	Retail Groundwater[e]	*3.4*	*3.4*	*3.4*	*3.4*	*3.4*	*3.4*	*3.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
	RWS Supply Utilized by Retail[g]	*68.6*	*68.6*	*68.6*	*68.6*	*68.6*	*68.6*	*68.6*
	Difference (Supply Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Difference as Percentage of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2040	Total Retail Demand	77.4	77.4	77.4	77.4	77.4	77.4	77.4
	Baseline Retail Demand[c]	*77.4*	*77.4*	*77.4*	*77.4*	*77.4*	*77.4*	*77.4*
	WSA 5% Demand Reduction	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	Total Retail Supply	77.4	77.4	77.4	77.4	77.4	77.4	77.4
	Retail Groundwater[e]	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
	RWS Supply Utilized by Retail[g]	*70.5*	*70.5*	*70.5*	*70.5*	*70.5*	*70.5*	*70.5*
	Difference (Supply Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Year	Retail Supply and Demand	Normal Year	Single Dry Year[a]	Multiple Dry Years[b]				
				Year 1	Year 2	Year 3	Year 4	Year 5
	Difference as Percentage of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2045	Total Retail Demand	80.6	80.6	80.6	80.6	80.6	76.6	76.6
	Baseline Retail Demand[c]	*80.6*	*80.6*	*80.6*	*80.6*	*80.6*	*80.6*	*80.6*
	WSA 5% Demand Reduction	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*-4.0*	*-4.0*
	Total Retail Supply	80.6	80.6	80.6	80.6	80.6	80.6	80.6
	Retail Groundwater[e]	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
	RWS Supply Utilized by Retail[g]	*73.7*	*73.7*	*73.7*	*73.7*	*73.7*	*73.7*	*73.7*
	Difference (Supply Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	4.0	4.0
	Difference as Percentage of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	5.3%	5.3%

Normal, single dry, and multiple dry year conditions are on a water year basis.

a During all single dry years, no RWS system-wide shortages are in effect.

b During multiple dry years, no RWS system-wide shortages are in effect until years 4 and 5 at 2045 levels of demand. During those years, a 10% system-wide shortage is in effect.

c Total retail demands correspond to those in Table 4-1, and reflect passive and active conservation, onsite water reuse savings, and water loss. Demands from Groveland CSD are included in the table above. However, in the corresponding standardized tables in Appendix B, Groveland CSD is accounted for as a wholesale customer instead of a retail customer, as explained in Section 2.4.

d As amended in 2018, the WSAP Tier One Allocation Plan requires retail customers to conserve a minimum of 5% during droughts. If, during a declared water shortage, retail demands on the Regional Water System are lower than the retail allocation in a dry year, retail demands on the RWS will be reduced by 5%. An N/A on this row means that either this 5% rationing requirement doesn't apply (i.e. no declared water shortage), or retail customers are already rationing greater than 5%.

e Groundwater supplies are assumed to be equivalent to projected demands for the San Francisco Groundwater Supply Project (ramping up to 4 mgd by 2040) and Castlewood CSA (0.4 mgd). Groundwater availability would not be affected by dry year conditions.

f Recycled water supplies are assumed to be equivalent to projected demands related to the Westside Recycled Water Project (1.6 mgd by 2021 and 1.8 mgd by 2030), Harding Park and Fleming Golf Courses (0.23 mgd), and Sharp Park Golf Course (up to 0.1 mgd) and Treasure Island (0.2 mgd by 2025 and 0.4 mgd by 2030). Recycled water availability would not be affected by dry year conditions.

g Procedures for RWS allocations and the WSAP are described in Section 8.3. 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.

Table 8-7. 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[a]	Multiple Dry Years [b]				
				Year 1	Year 2	Year 3	Year 4	Year 5
2025	Total Wholesale Demand[c]	146.0	146.0	146.0	146.0	146.0	146.0	146.0
	Total Wholesale RWS Supply[d]	146.0	146.0	146.0	146.0	146.0	146.0	146.0
	Difference (Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2030	Total Wholesale Demand[c]	147.9	147.9	147.9	147.9	147.9	147.9	147.9
	Total Wholesale RWS Supply[d]	147.9	147.9	147.9	147.9	147.9	147.9	147.9
	Difference (Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2035	Total Wholesale Demand[c]	151.9	151.9	151.9	151.9	151.9	151.9	151.9
	Total Wholesale RWS Supply[d]	151.9	151.9	151.9	151.9	151.9	151.9	151.9
	Difference (Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2040	Total Wholesale Demand[c]	156.3	156.3	156.3	156.3	156.3	156.3	156.3
	Total Wholesale RWS Supply[d]	156.3	156.3	156.3	156.3	156.3	156.3	156.3
	Difference (Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2045	Total Wholesale Demand[c]	162.8	162.8	162.8	162.8	162.8	162.8	162.8
	Total Wholesale RWS Supply[d]	162.8	162.8	162.8	162.8	162.8	139.1	139.1
	Difference (Surplus or Shortfall)	0.0	0.0	0.0	0.0	0.0	-23.7	-23.7
	Difference as % of Demand	0.0%	0.0%	0.0%	0.0%	0.0%	-14.6%	-14.6%

Normal, single dry, and multiple dry year conditions are on a water year basis.

Groveland CSD is not accounted for as a wholesale customer for the purpose of this table. Refer to Table 8-6.

for the retail supply and demand comparison including Groveland CSD. However, in the corresponding standardized tables in Appendix B, Groveland CSD is reported as wholesale rather than retail.

a During all single dry years, no RWS system-wide shortages are in effect.

b During multiple dry years, no RWS system-wide shortages are in effect until years 4 and 5 at 2045 levels of demand. During those years, a 10% system-wide shortage is in effect.

c Total wholesale demands correspond to projected purchase requests shown in Table 4-3, including those of the Cities of San Jose and Santa Clara.

d Procedures for RWS allocations and the WSAP are described in Section 8.3.

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 2021 to 2025.

8.5.1 Data & 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 model with the design drought sequence to perform the water supply analyses and simulate the water supply shortage conditions over the five-year drought period.

As with the supply reliability assessment, the DRA includes two scenarios, with and without the implementation of the Bay-Delta Plan Amendment, to show the drought conditions under two potential regulatory scenarios that may occur over the 2021-2025 period. The Bay-Delta Plan Amendment implementation scenario considers the implementation of the full Bay-Delta Plan Amendment in 2023.

The DRA takes into consideration the roll-out of recycled water and groundwater supply projects that the SFPUC has planned to be implemented by 2025. In addition, the retail demands for the DRA are based on linear interpolation between the current 2020 retail demands of 68.8 mgd and the projected 2025 retail demands of 70.7, as presented in Section 4.

8.5.2 Basis for Supply Shortage Conditions

The DRA analysis uses 2020 as a base year and considers the current status of the ongoing supply WSIP projects, as shown in Table 8-1.

The anticipated supply availabilities for the five-year drought period were presented above in Table 8-2 and Table 8-3. The overall impacts for the two scenarios are as follows:

- **With Full Implementation of the Bay-Delta Plan Amendment:** In this dry-year sequence, there would not be anticipated reductions in RWS supplies prior to the implementation of the Bay-Delta Plan Amendment in 2023. The RWS supply reductions would reach 40% upon the implementation of the Bay-Delta Plan Amendment in 2023 until the end of the drought sequence in 2025. The split between wholesale and retail customers (see Section 8.2.4) at this shortage level informs the available retail RWS supplies considered in this analysis.

- **Without Implementation of the Bay-Delta Plan Amendment:** 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 takes into account 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 5 years are integrated into the available supply portfolio for this five-year drought scenario. The SFPUC plans to increase recycled water supplies from 0.1 mgd in 2021 to 2.1 mgd in 2025, through the implementation of the Westside Recycled Water Project, the Treasure Island Recycled Water Project, and the restoration of the Harding Park 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 in 2022 and will serve approximately 0.3 mgd to the San Francisco Zoo by 2023. In addition, the groundwater supplies used for irrigation in 2022 will be replaced by recycled water from the Westside Recycled Water Project. The groundwater production from 2022 to 2024 includes the in-city potable use (~0.5 mgd) and the Castlewood well system (~0.4 mgd). The in-City potable groundwater use is assumed to increase from 0.5 mgd to 1 mgd in 2025.

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

The supply and demand comparisons for the hypothetical drought sequence from 2021 to 2025 are presented below in Table 8-8 and Table 8-9 for scenarios with and without the implementation of the Bay-Delta Plan Amendment, respectively. Where a shortage condition is identified, the tables reflect actions that would be taken in accordance with the Water Shortage Contingency Plan (WSCP), as shown in Appendix K.

With Implementation of the Bay-Delta Plan Amendment. Table 8-8 compares the total water supply sources available with the total projected water demand through the 2021-2025 drought scenario, assuming the full implementation of the Bay-Delta Plan Amendment starting in 2023. As such, the years 2021 and 2022 are not affected by upcoming regulatory changes and show no supply shortfall.

The implementation of the Bay-Delta Plan Amendment in 2023 is expected to result in a 40% shortage of RWS supplies. The WSAP does not address shortages above 20%; therefore, for the purposes of this analysis it was assumed that the 20% shortage allocations would apply for the 40% shortage scenario. Based on this split, starting in the third year of this drought sequence, the retail allocation from the RWS drops to 44.7 mgd. This reduction in RWS supplies for retail would lead to a supply shortfall of up to 32%, or 22.5 mgd in 2024 and 2025. As detailed in the WSCP, the supply shortfall will be addressed through mandatory water use rationing.

Without Implementation of the Bay-Delta Plan Amendment. Table 8-9 compares the total water supply sources available with the total projected water use through this 2021-2025 drought scenario without the Bay-Delta Plan Amendment. Without implementation of the Bay-Delta Plan Amendment, the SFPUC has sufficient supplies to serve its retail demands in the event of a five-year drought starting in 2021.

Table 8-8. Retail Supply and Demand Comparison for Five-Year Drought Risk Assessment – With Bay-Delta Plan Amendment (mgd)

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

	2021	2022	2023	2024	2025
Gross Water Use[a]	69.2	69.6	69.9	70.3	70.7
Supply Sources					
RWS Supply[b]	66.9	67.3	44.7	44.7	44.7
Groundwater[c]	2.2	0.9	0.9	0.9	1.4
Recycled Water[d]	0.1	1.4	1.7	1.7	2.1
Total Supplies	65.8	66.2	47.3	47.3	48.2
Surplus/(Shortfall) w/o WSCP Action	0.0	0.0	(22.6)	(23.0)	(22.5)
Planned WSCP Actions (use reduction and supply augmentation)					
WSCP - supply augmentation benefit	-	-	-	-	-
WSCP - use reduction savings benefit[f]	-	-	22.6	23.0	22.5
Revised Surplus/(Shortfall)	-	-	0.0	0.0	0.0
Resulting % Use Reduction from WSCP action[e]	-	-	32.4%	32.07	31.8%

a. Total retail demands reflect active and passive conservation, onsite water reuse savings, and water loss and demands are linearly interpolated between 2020 and 2025.
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. Assuming that the in-city irrigation groundwater capacity accounts for approximately 1.5 mgd , the in-city potable groundwater use is 0.5 mgd and Castlewood CSA uses 0.3 mgd in 2021. When the Westside Recycled Water Project comes online in 2022 and the irrigation groundwater use is phased out. The groundwater production from 2022 to 2024 assumes 0.5 mgd production for in-city potable use and 0.4 mgd supplied by the Castlewood Well System. The potable groundwater production is anticipated to increase to 1.4 mgd in 2025.
d. Assuming that the Westside Recycled Water Project will provide 1.3 mgd to Golden Gate Park and Lincoln Park by 2022, and 0.3 mgd to the San Francisco Zoo by 2023.
e. The demand rationing actions and respective shortage levels are detailed in the WSCP.

Table 8-9. Retail Supply and Demand Comparison for Five-Year Drought Risk Assessment – Without Bay-Delta Plan Amendment (mgd)

	2021	2022	2023	2024	2025
Gross Water Use[a]	69.2	69.6	69.9	70.3	70.7
Supply Sources					
RWS Supply[b]	66.9	67.3	67.3	67.7	67.2
Groundwater[c]	2.2	0.9	0.9	0.9	1.4
Recycled Water[d]	0.1	1.4	1.7	1.7	2.1
Total Supplies	69.2	69.6	69.9	70.3	70.7
Surplus/(Shortfall) w/o WSCP Action	0	0	0	0	0
Planned WSCP Actions (use reduction and supply augmentation)					
WSCP - supply augmentation benefit	-	-	-	-	-
WSCP - use reduction savings benefit	-	-	-	-	-
Revised Surplus/(Shortfall)	-	-	-	-	-
Resulting % Use Reduction from WSCP action	-	-	-	-	-

a. Total retail demands reflect active and passive conservation, onsite water reuse savings, and water loss and demands are linearly interpolated between 2020 and 2025.

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. Assuming that the in-city irrigation groundwater capacity accounts for approximately 1.5 mgd , the in-city potable groundwater use is 0.5 mgd and Castlewood CSA uses 0.3 mgd in 2021. When the Westside Recycled Water Project comes online in 2022 and the irrigation groundwater use is phased out. The groundwater production from 2022 to 2024 assumes 0.5 mgd production for in-city potable use and 0.4 mgd supplied by the Castlewood Well System. The potable groundwater production is anticipated to increase to 1.4 mgd in 2025.

d. Assuming that the Westside Recycled Water Project will provide 1.3 mgd to Golden Gate park and Lincoln Park by 2022, and 0.3 mgd to the San Francisco Zoo by 2023

SECTION 9: WATER SHORTAGE CONTINGENCY PLAN

The Water Shortage Contingency Plan is included as Appendix K.

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SECTION 10: DEMAND MANAGEMENT MEASURES

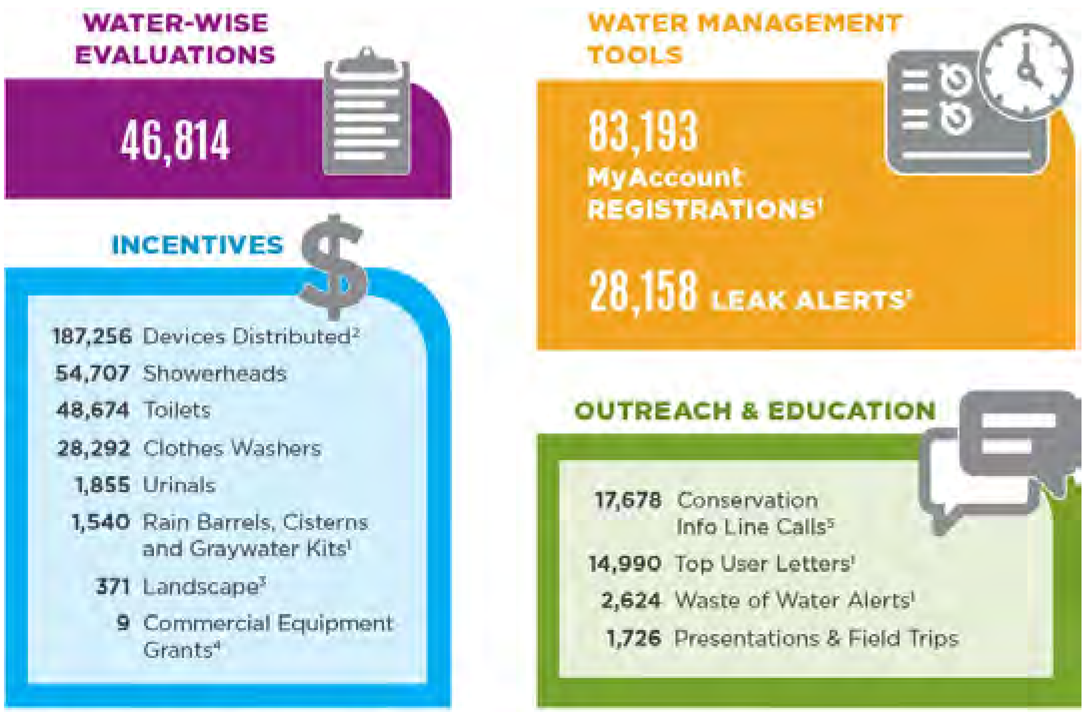
This section describes the SFPUC's efforts to promote conservation and to reduce demand on water supply. Several demand management measures (DMMs)—including metering, public education and outreach, and water conservation program coordination—are addressed.

10.1 RETAIL WATER CONSERVATION PROGRAM

The SFPUC's retail water conservation program has historically consisted of a mix of financial incentives, technical assistance, water management tools, education and outreach, and mandates. These offerings are planned to continue over the next five years and beyond. Between 2005 and 2025, the SFPUC will have evaluated and implemented over 80 different conservation measures and mandates, providing extensive customer water-savings assistance that has played a major role in the significant decline in water use occurring over this period. These include conservation best management practices found successful by major water utilities and efficiency experts across the nation; measures demonstrated by third-party studies to have water savings and customer benefits; and measures that make sense for the site conditions and characteristics unique to San Francisco water use. During its Retail Water Conservation Plan updates in 2011, 2015 and 2020, the SFPUC conducted thorough analyses of all measures in place at the time of each plan, potential new measures not implemented before, and measures previously offered and discontinued.

The SFPUC estimates its conservation program and efficient plumbing codes have a "past savings" of approximately 86,385 AF (28,149 MG or 5.5 mgd) between 2005 (the year the SFPUC developed its first conservation forecast model) and 2019. "Future savings" are estimated at 117,221 AF (38,197 MG or 4.2 mgd) between 2020 and 2045. 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. 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 2020.

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



1 Tracking of participation in measure started later than 2009
2 Aerators, toilet flappers, fill valves, pre-rinse spray valves, nozzles, soil moisture meters
3 Landscape includes Water Efficient Irrigation Ordinance projects, landscape audits, community irrigation grants and rebates
4 Includes ice machines, industrial dishwashers, sterilization equipment
5 Doesn't include calls to the SFPUC's Call Center regarding conservation

The SFPUC's conservation measures can be broadly characterized as foundational customer assistance measures and water efficiency mandates that the SFPUC anticipates continuing through the 2045 planning horizon with no definite end date, such as evaluations, site usage reports and tools, free devices, education and outreach, and mandates or incentive-based measures that have specific and varying end dates, depending on factors such as plumbing code impacts and market saturation rates. Collectively, the measures proposed for 2020 and beyond support the SFPUC's strategies for tapping into anticipated remaining water-saving opportunities, specifically:

- Maintaining efficiency among customers, properties and sites that already have water-wise use.
- Improving efficiency among residential customers with over average water use due to leaks, old fixtures, inefficient irrigation, or other forms of water waste.
- Increasing commercial property compliance with requirements for efficient plumbing fixtures and awareness of opportunities for equipment retrofits, reuse technologies, and efficiency audits and action plans.
- Increasing commercial customer awareness of constant and/or abnormally high-water use, with focus on hotels, restaurants, office buildings, and schools that represent the non-residential sectors with the overall highest water use.
- Promoting compliance with new efficiency standards among large landscapes served by dedicated irrigation meters and smaller sites with inefficient irrigation
- Maximizing opportunities for onsite reuse in new development.

Moving forward, the SFPUC will continue to utilize a mix of demand-side, customer water-saving strategies, including voluntary incentives, assistance services, tools to help customers understand and manage their water use, education and outreach, and mandates that require indoor and outdoor water efficiency.

10.2 RETAIL DMMs

The SFPUC's conservation program is now guided by a mix of agency and City policy directives and state and local water efficiency requirements that have evolved over time. On the state level, these requirements have shifted from meeting Best Management Practices (BMPs) to meeting the state per capita water reduction targets set by the Water Conservation Action of 2009 (SB x7-7) to meeting new water efficiency targets mandates by AB 1668 and SB 606 that urban suppliers will need to meet starting in 2023 based on standards for efficient indoor, outdoor water use, and supply side water loss. Locally, San Francisco has adopted state requirements for mandating water-efficient plumbing fixtures, landscapes and irrigation systems, as well as restrictions against outdoor water waste and sub-metering in new multi-family construction. The SFPUC also continues to set its own Level of Service (LOS) goals that promote efficiency and sustainability, including maintaining average residential per capita use under 50 gallons a day. The SFPUC met state BMP goals for the many years they were in effect; is well below its state-imposed SB x7-7 per capita use target for 2020; and is on track to meet California's new efficiency targets.

The SFPUC has been implementing conservation measures for decades. Through the SFPUC's longstanding, intensive efforts to promote conservation and educate San Franciscans and its other retail customers on efficient and appropriate uses of water, San Francisco has had one of the lowest per capita water uses in the State. As stated in Section 4.1, gross and residential per capita consumption by in-City retail water customers are 73 and 42 GPCD, respectively. Taking suburban retail use into account, gross and residential per capita consumption by all retail water customers are 76 and 42 GPCD, respectively.

The SFPUC voluntarily prepares a conservation plan for its retail service area, which includes more details on DMMs planned over the next five to 25 years. The 2020 conservation plan can be viewed on or downloaded from the SFPUC's website at **www.sfpuc.org/learning/conserve-water**.

The SFPUC was a signatory of the California Urban Water Conservation Council (CUWCC)'s Memorandum of Understanding (MOU) for the duration of its existence from 1991 to 2016, agreeing to voluntarily meet and report on conservation BMPs. During that time, the SFPUC implemented conservation measures in accordance with CUWCC BMP compliance goals and met requirements for biannual BMP reporting. In 2016, the CUWCC underwent an organizational transformation and decided to sunset in response to social, economic, environmental, regulatory and political conditions that changed substantially over its 25 years of existence, including passage of California's Water Conservation Act of 2009 mandating a 20 percent reduction in statewide urban per capita water use by 2020 followed by new state water conservation mandates (Executive Order B-37-16) and reporting requirements. In 2017, it relaunched as a new organization, the California Water Efficiency Partnership (CalWEP), dedicated to advancing water efficiency in the state through research, assistance, tools, and education but not through a MOU requiring member compliance with specific BMPs. The SFPUC is a member of CalWEP and continues to implement numerous DMMs in the form of conservation programs, most of which builds from and meet the goals of the last iteration of the CUWCC's foundational and programmatic BMPs.

10.2.1 Water Waste Prevention Ordinances

10.2.1.1 Past Implementation

Permanent water use restrictions were first established in Section E of the SFPUC Rules and Regulations Governing Water Service to Customers. During the 1987-92 drought, the SFPUC enacted numerous additional water use restrictions and prohibitions in response to the severe water shortage. With the end of the drought in 1993, the SFPUC elected to continue certain restrictions to promote long-term conservation. These restrictions are also included as part of the WSCP's water waste prohibitions (see Appendix K).

Violation of any water use restriction may result in the installation of a flow-restricting device in the service line of the customer, and continued violation could result in termination of service. The customer bears the cost of any enforcement action.

Section F of the SFPUC Rules and Regulations Governing Water Service to Customers, which is implemented as part of the City's Water Efficient Irrigation Ordinance, took effect in 2010 and was updated in 2015. Section F establishes water efficient irrigation rules, which prohibit water runoff from landscapes of any size due to low head drainage, overspray, broken irrigation hardware, or other conditions where water flows onto adjacent property, walks, roadways, parking lots, or other structures.

In 2016, the SFPUC adopted expanded permanent water waste restrictions as part of Section E, Rule 12 of its Rules and Regulations Governing Water Service to Customers. These rules restrict the following uses of water:

- 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
- Use of hoses for any purpose without a positive shut off valve
- 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 (per the Department of Public Works Streets and Sidewalks Maintenance Manual as required by City Charter Section F, 102) and in a non-water-efficient manner that causes runoff to storm drains and sewer catch basins
- Use of single-pass cooling systems, fountains, decorative water features, and commercial car washes
- Application of potable water to outdoor landscapes during and within 48 hours after measurable rainfall
- Irrigation with potable water of ornamental turf on public street medians
- Use of potable water for consolidation of backfill, dust control, or other nonessential construction purposes if foundation drainage or recycled water is available and approved by the Department of Public Health
- 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
- 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

Members of the public are encouraged to report incidents of water waste online or by phone through the City of San Francisco's 311 system, and the SFPUC Water Conservation Section investigates and responds to all reports.

10.2.1.2 Planned Implementation

The SFPUC will continue to implement the water use restrictions and water efficient irrigation rules in its Rules and Regulations Governing Water Service to Customers and continue to monitor and respond to public reports of water waste.

10.2.2 Metering

10.2.2.1 Past Implementation

All in-City retail customers have been metered since 1916 and are billed by volume. All suburban retail customers are also fully metered and are billed by volume. There are approximately 181,000 existing water meters in the City and approximately 225 in the suburban retail service area.

By 2018, the SFPUC completed substantial deployment of its Automated Water Meter Program to upgrade in-City and suburban retail water meters with wireless advanced metering technology. The SFPUC was the first major water utility in the State to implement a system of this scale. As of 2020, 99% of retail system meters are automated.

The automated water meter reading system enabled the launch of tools to help monitor customer water use and identify potential high or unusual usage: My Account and the Leak Alert Program. My Account, a bill management system and web portal for viewing water use, was launched in May 2014 and upgraded since and allows customers to view their hourly and daily water use data provided by the automated water meter reading system. The SFPUC also launched a Leak Detection 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 its program to include multi-family, commercial and irrigation account customers. Hourly water consumption data collected through the automated water meter reading system are analyzed, and if continuous water use is observed, automated courtesy alerts via email, text message, phone message and letter are sent to the account holder, property owner and site occupant.

Existing sub-metering requirements are established in the San Francisco Green Building Code and Section F of the SFPUC Rules and Regulations Governing Water Service to Customers. Per the Green Building Code, new non-residential buildings must install a separate sub-meter for each individual building tenant that would 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 that consumes more than 100 gallons per day. Section F of the SFPUC Rules and Regulations Governing Water Service to Customers, which is implemented as part of the Water Efficient Irrigation Ordinance, requires dedicated irrigation meters for landscape areas greater than 5,000 square feet. In 2016, California passed Senate Bill 7 (SB 7), which requires new multi-family residential buildings in California constructed after January 1, 2018 to include a submeter for each dwelling unit and to bill tenants in apartment buildings accordingly for their water use. In response, the SFPUC, in coordination with the San Francisco Department of Building Inspection (DBI) and Department of Public Health (DPH), began requiring proof of sub-metering before approving requests for water service from new multi-family residential buildings.

10.2.2.2 Planned Implementation

Replacement of a small number of remaining old meters is ongoing. The SFPUC will be continuing and expanding its Leak Alert Program.

10.2.3 Conservation Pricing

10.2.3.1 Past Implementation

For many years, the SFPUC has used conservation pricing as an incentive to conserve water. To promote the installation of efficient plumbing fixtures, the SFPUC implemented an incentive rate structure for its retail customers. Under the four-year rate schedule for FY2018-2019 through FY 2021-2022, water rates for both single family and multi-family residential accounts were set with a two-tier increasing block rate structure, where the Tier 1 threshold was 4 CCF for single family and 3 CCF for multi-family. Non-residential (i.e., commercial) water rates were set with a uniform rate structure. Water rates across all customer sectors were scheduled to increase annually.

The rate schedule also addresses violation of water use restrictions. Violations may result in the installation of flow-restricting devices, and continued violation may result in discontinuance of water service. The costs of these actions are borne by the customer.

The SFPUC's current rate schedule, effective for FY 2018-2019 through FY2021-2021, may be accessed at: . **www.sfpuc.org/accounts-services/water-power-and-sewer-rates**.

10.2.3.2 Planned Implementation

The current rate schedule is in effect through FY2021-2022. 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 markets its conservation services and assistance measures through numerous means, including social media, digital and print newsletters, bill inserts, email blasts, direct mailings, local media and trade publications, and its website. For example, the SFPUC periodically contacts top residential water users to encourage them to improve efficiency, alert them to the possibility of plumbing leaks, and offer free Water Wise Evaluations. The SFPUC's newsletters issued in print and digitally to customers and stakeholders almost always feature a conservation-related article or water-saving tips in each issue.

The SFPUC also participates in community events and presentations that reach residents and businesses, as well as events that target specific audiences and industry trade groups. Water conservation staff, along with education partners, conduct in-class and virtual (during the COVID pandemic) presentations during the school year. Program offerings are aligned with State curriculum standards, and many focus on providing placed-based or outdoor learning opportunities to supplement students' classroom work. The SFPUC also participates in local festivals, street fair events, and community presentations. The SFPUC offers a variety of free teacher resources, including guides, lesson plans, fact sheets and activity sheets. The SFPUC maintains and offers public access and organized adult and youth programming at several demonstration gardens that promote water-efficient gardening and irrigation practices.

Below is a summary of some of the key educational and outreach activities conducted between FY 2015-2016 and FY 2019-2020.

Table 10-1. Summary of SFPUC Retail Educational and Outreach Activities Over Five Years (Conducted between FY15-16 and FY19-20)

Activity	Total
School Presentations & Field Trips	374
Community Events, & Presentations	209
Conservation Information Line Calls	13,441
Waste of Water Reports	1,383
Leak Incidents Notified by Alerts	28,158
Top User Letters	5,788
MyAccount Online Portal Users	Over 86,000 customers

10.2.4.2 Planned Implementation

The SFPUC plans to continue conducting a wide range of 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 controls system losses primarily through asset and leak management. The SFPUC's Linear Assets Management Program replaces and renews distribution system pipelines and customer service connections for approximately 1,250 miles of drinking water mains in the City. Planning analysis has demonstrated an annual pipeline improvement rate of 15 miles per year is needed to meet customer Level of Service goals for uninterrupted service. Improvements include replacement, rehabilitation, re-lining, and cathodic protection of all pipe size categories to extend or renew pipeline useful life.

A renew service program renews assets at the end of their useful life between the water main and the customer's service connection. These assets include 1-inch to 8-inch diameter service pipes made of cast iron, galvanized steel, and plastic, to be replaced with copper or ductile iron; broken meter boxes; outdated or undersized meters and associated piping; and subsequent associated sidewalk and roadway restoration.

The SFPUC's proactive leak management employs 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 for uninterrupted service and to reduce real water losses.

The SFPUC also collects and compiles main break data throughout its system. A study analyzed historic main break data to determine what types of pipes are statistically prone to failure due to natural causes. A geographical hot-spot analysis was also conducted to identify areas in the City that are especially prone to high occurrences of main breaks. This information is used to target high risk pipes for prioritized replacement or improvement.

In addition, the SFPUC's Automated Water Meter Program (described previously in Section 10.2.2) enables improved management of system losses.

10.2.5.2 Planned Implementation

The SFPUC is developing a Water Loss Control Master Plan to reduce water loss and to comply with California Senate Bill 555 (SB 555), Water Loss Management.

10.2.6 Water Conservation Program

10.2.6.1 Past Implementation

The SFPUC Water Conservation Section has 13 full-time time staff under the direction of a Water Conservation Section Manager. Conservation staff coordinate implementation of various residential, landscape, and CII conservation programs. The SFPUC's retail water conservation program consists of an extensive mix of measures, including incentives, services, and educational assistance. Incentives include rebates for high-efficiency fixtures, free toilets and installations for qualifying customers, discounts for graywater and rainwater systems, grants for large landscape irrigation efficiency improvements, and free efficient devices. Services include conservation surveys, landscape plan review, and school education programs. The SFPUC also provides a host of tools to help customers understand and manage their water use, including the previously mentioned My Account feature, leak alerts, and a bill adjustment program for leak repair. Below is a summary of key activities accomplished between FY 2015-2016 and FY 2019-2020.

Table 10-2. Summary of Key Water Conservation Programs Over Five Years (Conducted between FY15-16 and FY19-20)

Activity	Total
Surveys	15,409
Toilet Installations	4,326
Toilet Rebates	8,765
Washer Rebates	4,579
Urinal Rebate / Installations	642
Showerheads Distributed	15,884
Landscape and Irrigation Meter Grants	19
Laundry-to-Landscape Kit Discounts	37
Rain Barrel Discounts	1,330
Cistern Discounts	64
Water-Saving Devices Distributed	44,119

10.2.6.2 Planned Implementation

The SFPUC will continue to evaluate and adapt its conservation measures to respond to changing conditions and regulations. This dynamic approach to conservation has contributed to significant reductions in water demand, despite population growth. Moving forward, the SFPUC will continue to utilize a mix of demand-side, customer water-saving strategies, including voluntary incentives, assistance services, tools to help customers understand and manage their water use, education and outreach, and mandates that require indoor and outdoor water efficiency. Foundational customer assistance measures will continue to include water evaluation surveys, site usage reports and tools, free devices, landscape water budgets, and public education and outreach. Fixture incentive measures will continue to include toilets, clothes washers, rainwater barrels and cisterns, residential outdoor graywater system parts, and large commercial equipment over the next five years. Several new incentives are planned to launch within the next five years, including rebates for residential on-demand recirculating hot water pumps and weather-based irrigation controllers.

10.2.7 Other DMMs

In addition to DMMs administered through its water conservation section, the SFPUC also implements several other programs expected to contribute to potable water savings. These include its onsite 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; its stormwater management program that mandates and incentivizes use of rainwater for irrigation; and a high bill adjustment and water and sewer lateral insurance program that may reduce water waste through faster leak repair.

10.3 WHOLESALE DMMs

As described in Section 5.3, BAWSCA coordinates water conservation programs and services for its member agencies. Under the terms of the WSA, the SFPUC cannot provide direct financial assistance for conservation programs to a single Wholesale Customer. For details about BAWSCA-coordinated conservation measures provided in the SFPUC's wholesale service area, visit **https://bawsca.org**. However, the SFPUC's past and planned implementation of wholesale DMMs, to the extent allowed under the WSA, are described below.

10.3.1 Metering

10.3.1.1 Past Implementation

The SFPUC's wholesale customers are fully metered. Approximately 91% of wholesale meters were outfitted with a wireless transmitter so they can transmit hourly water consumption through a cellular endpoint that does not require a fixed network infrastructure. The water consumption is analyzed and recorded in advanced metering software, allowing SFPUC and its wholesale customers to view hourly and daily water consumption rather than waiting for a monthly billing meter read. The software also provides custom alerts for issues in the system or unusual consumption patterns, such as leaks.

10.3.1.2 Planned Implementation

SFPUC's ongoing preventative maintenance program ensures that the meters are regularly inspected, maintained and calibrated. The SFPUC is currently in the process of evaluating the calibration, maintenance and replacement procedures of the wholesale meters and will update the current practices of the annual meter calibration program.

10.3.2 Public Education and Outreach

The SFPUC provides technical and administrative assistance for public information and school education to its Wholesale Customers as requested. The last such assistance was a regional drought awareness marketing and media campaign that covered some of Wholesale Customers' service areas that started in 2014 and continued into 2017.

10.3.3 Water Conservation Program Coordination and Staffing Support

As previously described in Section 5.3, BAWSCA manages a Regional Water Conservation Program (see http://bayareaconservation.org) and represents the interests of the Wholesale Customers. The program is composed of several different conservation measures and is designed to support and augment its member agencies' customer efforts to use water more efficiently.

Under the terms of the WSA with its Wholesale Customers, the SFPUC cannot provide direct financial assistance for conservation programs to an individual Wholesale Customer and add this expense to the wholesale revenue requirement for that year. The SFPUC can provide staff to assist Wholesale Customer conservation efforts and, through agreement with BAWSCA, can develop service area-wide conservation programs that can be funded as a joint expense by its retail customers and Wholesale Customers.

10.3.4 Asset Management

The SFPUC initiated a Pipeline Inspection Program in the early 1990s for the 350 miles of water transmission lines in the RWS. Routine inspections are considered preventive maintenance measures, but they also provide information on pipeline leaks. These inspections are usually conducted year-round with no more than one section of a major pipeline out of service at any time. The Pipeline Inspection Program covers the entire water transmission system over a 20-year period and then repeats. The SFPUC has a goal to inspect one section per quarter, averaging 10 to 12 miles per year. In 2018 and 2019, 13 and 12 miles of pipe were inspected, respectively. Due to the COVID-19 pandemic, the rate of inspection decreased in 2020 (approximately 3.6 miles), and is expected to return to normal in 2021. Technically, the RWS does not have any distribution system components, only transmission system components. In addition to inspections, SFPUC staff also 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 wholesale system in the past decade has been the WSIP. To date, the program is at approximately 96% completion. Within the last five years, system improvements included significant pipeline and tunnel construction, rehabilitation and replacement. Since 2016, the completed WSIP projects include the completion of the new 3.52 mile-long steel-lined Irvington Tunnel (now IT2), the implementation of seismic upgrades and pipeline improvements along the BDPL Nos. 3 and 4, the completion of the new 5-mile long steel-line Bay Tunnel under the San Francisco Bay, and targeted pipeline replacements and seismic upgrades along the San Andreas Pipeline Nos. 2 and 3, and the Sunset Supply Pipeline. The implemented improvements provide additional system redundancy, increased system capacity and improved seismic resiliency. Two additional major projects were completed within the last five years, which included key seismic upgrades, such as the addition of isolation valves and the upgrade of existing appurtenances, and pipeline replacements along the San Andreas Pipeline No.2.

10.3.4.2 Planned Implementation

Major pipeline rehabilitation and replacement projects are planned within the next 5 to 10 years. Key pipeline replacements will be implemented along the Crystal Springs Pipeline No.2, which will involve the replacement of welded steel pipe, the replacement of coal tar lining, the addition of new access manholes and isolation valves, and improvements to appurtenances. The SFPUC also plans to conduct internal lining repairs (removing corrosion accumulation at pipe joints and spalled mortar lining, cleaning metal surfaces, applying new mortar lining, and cleaning debris and sediment found inside the pipe) at the Bay Division Pipeline Nos 1-4 and will implement targeted repairs, rehabilitation or replacement of the pre-stressed concrete pipe of the Bay Division Pipeline No.4, as needed. Sections of the Bay Division Pipelines Nos. 3 and 4 will be relocated in the Santa Clara area.

During implementation of the WSIP, about half of the wholesale system transmission pipelines were replaced. The transmission lines that were not replaced under the WSIP are subject to a prioritization program based on findings from the Pipeline Inspection Program and additional factors such as material type, age, redundancy, leak history, and water quality issues. The program is informed by ongoing inspections to determine when pipelines need to be replaced and the SFPUC has been focusing on unmanned-type inspections. As part of the Safe Pipeline Entry Program, the SFPUC initiated considering the installation of additional valves to be included as part of pipeline replacement projects.

10.3.5 Assistance to Wholesale Customers

BAWSCA is the only entity of its kind to have authority to perform regional water supply reliability planning for its member agencies. Among other services, it also has the authority to coordinate water conservation programs and services for its member agencies. BAWSCA manages a Regional Water Conservation Program that is composed of several different conservation measures and is designed to support and augment its member agencies' customer efforts to use water more efficiently. These efforts include the administration of several regional water conservation measures, including measures designed to educate member agency customers about water-efficient landscaping and incentivize irrigated turf removal.

As previously stated, under the terms of the WSA with its Wholesale Customers, the SFPUC cannot provide direct financial assistance for conservation programs to an individual Wholesale Customer and subsequently adds this expense to the wholesale revenue requirement for that year. The SFPUC can provide staff to assist Wholesale Customer conservation efforts and, through agreement with BAWSCA, can develop service area-wide conservation programs that can be funded as a joint expense by its retail customers and Wholesale Customers. To this end, the SFPUC works closely with BAWSCA as opportunities arise to jointly develop outreach and communications related to the RWS and conservation. Refer to Section 10.3.2 for information on the SFPUC's collaborative efforts with BAWSCA on public education and outreach efforts. The SFPUC also provides technical and administrative assistance to the Wholesale Customers on preparing information to the public as requested.

SECTION 11: PLAN ADOPTION AND UWMP CHECKLIST

This section describes the adoption, submittal, and implementation of this 2020 UWMP. A checklist is also provided to facilitate DWR's review of the 2020 UWMP.

11.1 PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

The SFPUC prepared this draft 2020 UWMP and presented it to the SFPUC Commission for adoption at the regular meeting on June 8, 2021. The plan was adopted at a special meeting of the Commission on June 11, 2021. A copy of the SFPUC resolution adopting this 2020 UWMP update is provided in Appendix L.

Within 30 days of SFPUC Commission approval, the adopted 2020 UWMP will be submitted electronically to the DWR via its Water Use Efficiency data online submittal tool (WUEdata). Electronic copies will also be provided on compact disc to the California State Library and via e-mail to cities and counties within which the SFPUC provides water. The SFPUC will implement the adopted 2020 UWMP in accordance with the California Urban Water Management Planning Act.

Following adoption, the SFPUC will continue to implement water supply planning programs and projects identified in this 2020 UWMP, including those related to conservation, groundwater, recycled water, and Alternative Water Supply Planning.

11.2 UWMP CHECKLIST

The UWMP 2020 checklist is provided in Appendix M to facilitate DWR's review of the completeness of this document and is organized by subject matter. In addition, complete sets of standardized tables and SB X7-7 Verification Form tables prescribed by DWR are provided in Appendices B and D, respectively.

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2020 URBAN WATER MANAGEMENT PLAN

for the City and County of San Francisco

APPENDICES

June 2021

Prepared by:

The San Francisco Public Utilities Commission

San Francisco Water Power Sewer

Services of the San Francisco Public Utilities Commission

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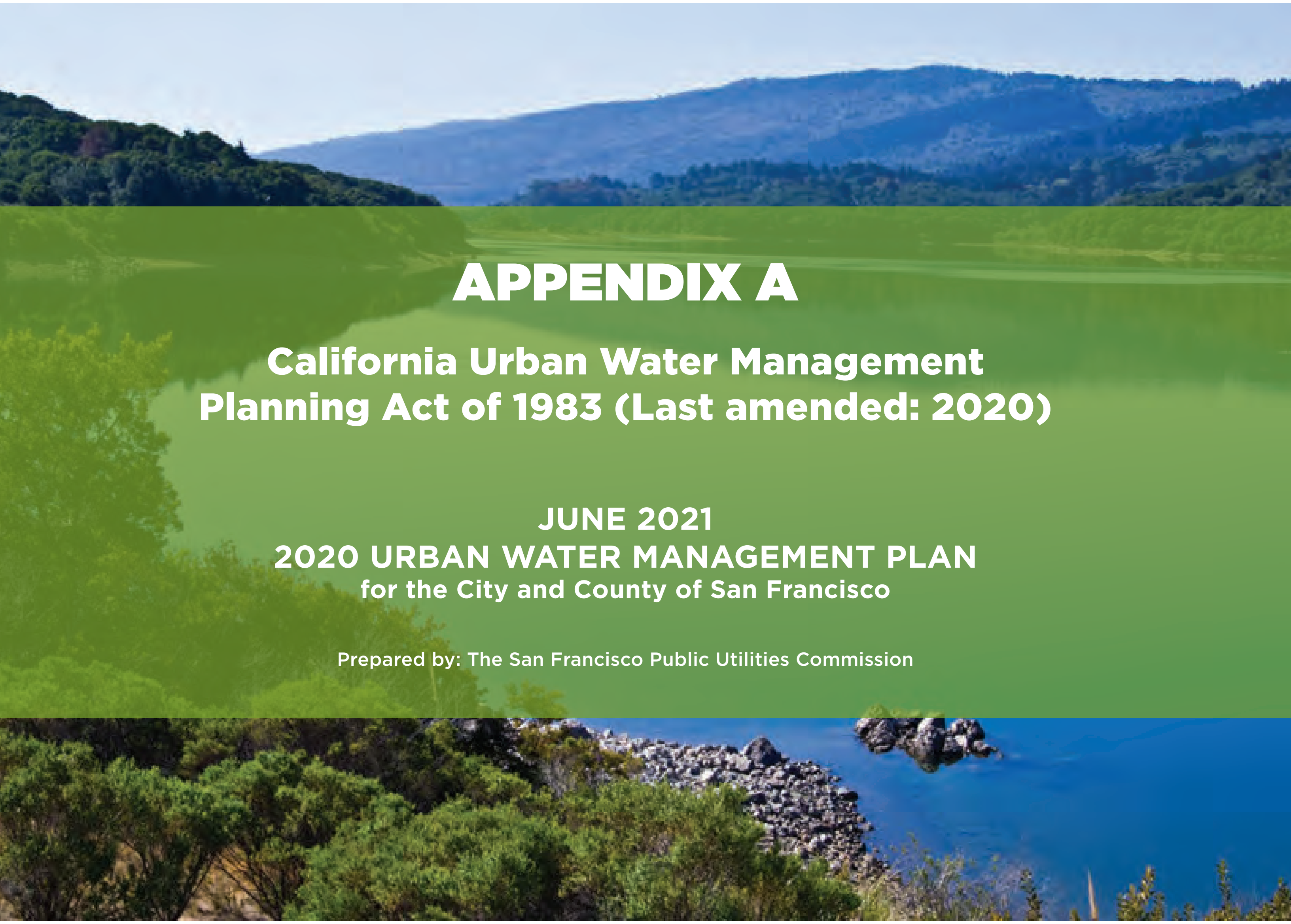

APPENDIX A

California Urban Water Management Planning Act of 1983 (Last amended: 2020)

JUNE 2021

2020 URBAN WATER MANAGEMENT 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

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Urban Water Management Planning Act, Water Code Division 6, Part 2.6

All Codes have been updated to include the 2020 Statues, as of January 1, 2020.

PART 2.6. URBAN WATER MANAGEMENT PLANNING [10610 – 10657]

CHAPTER 1. General Declaration and Policy [10610 – 10610.4]

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:

(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.

(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate, and increasing long-term water conservation among Californians, improving water use efficiency within the state's communities and agricultural production, and strengthening local and regional drought planning are critical to California's resilience to drought and climate change.

(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years now and into the foreseeable future, and every urban water supplier should collaborate closely with local land-use authorities to ensure water demand forecasts are consistent with current land-use planning.

(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.

(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.

(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.

(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.

(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.

(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to achieve the efficient use of available supplies and strengthen local drought planning.

CHAPTER 2. Definitions [10611 – 10618]

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.3. “Customer” means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10611.5. “Demand management” means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. “Drought risk assessment” means a method that examines water shortage risks based on the driest five-year historic sequence for the agency’s water supply, as described in subdivision (b) of Section 10635.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

10617.5. “Water shortage contingency plan” means a document that incorporates the provisions detailed in subdivision (a) of Section 10632 and is subsequently adopted by an urban water supplier pursuant to this article.

10618. "Water supply and demand assessment" means a method that looks at current year and one or more dry year supplies and demands for determining water shortage risks, as described in Section 10632.1.

CHAPTER 3. Urban Water Management Plans

ARTICLE 1. General Provisions [10620 – 10621]

10620. (a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d) (1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation, efficient water use, and improved local drought resilience.

(2) Notwithstanding paragraph (1), each urban water supplier shall develop its own water shortage contingency plan, but an urban water supplier may incorporate, collaborate, and otherwise share information with other urban water suppliers or other governing entities participating in an areawide, regional, watershed, or basinwide urban water management plan, an agricultural management plan, or groundwater sustainability plan development.

(3) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621. (a) Each urban water supplier shall update its plan at least once every five years on or before July 1, in years ending in six and one, incorporating updated and new information from the five years preceding each update.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days before the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) An urban water supplier regulated by the Public Utilities Commission shall include its most recent plan and water shortage contingency plan as part of the supplier's general rate case filings.

(d) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

(e) Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.

(f) Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.

ARTICLE 2. Contents of Plans [10630 – 10634]

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied, while accounting for impacts from climate change.

10630.5. Each plan shall include a simple lay description of how much water the agency has on a reliable basis, how much it needs for the foreseeable future, what the agency's strategy is for meeting its water needs, the challenges facing the agency, and any other information necessary to provide a general understanding of the agency's plan.

10631. A plan shall be adopted in accordance with this chapter that shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other social, economic, and demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available. The description shall include the current and projected land uses within the existing or anticipated service area affecting the supplier's water management planning. Urban water suppliers shall coordinate with local or regional land use authorities to determine the most appropriate land use information, including, where appropriate, land use information obtained from local or regional land use authorities, as developed pursuant to Article 5 (commencing with Section 65300) of Chapter 3 of Division 1 of Title 7 of the Government Code.

(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, including all of the following:

(1) A detailed discussion of anticipated supply availability under a normal water year, single dry year, and droughts lasting at least five years, as well as more frequent and severe periods of drought, as described in the drought risk assessment. For each source of water supply, consider any information pertinent to the reliability analysis conducted pursuant to Section 10635, including changes in supply due to climate change.

(2) When multiple sources of water supply are identified, a description of the management of each supply in correlation with the other identified supplies.

(3) For any planned sources of water supply, a description of the measures that are being undertaken to acquire and develop those water supplies.

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

(A) The current version of any groundwater sustainability plan or alternative adopted pursuant to Part 2.74 (commencing with Section 10720), any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management for basins underlying the urban water supplier's service area.

(B) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater.

For basins that a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For a basin that has not been adjudicated, information as to whether the department has identified the basin as a high- or medium-priority basin in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to coordinate with groundwater sustainability agencies or groundwater management agencies listed in subdivision (c) of Section 10723 to maintain or achieve sustainable groundwater conditions in accordance with a groundwater sustainability plan or alternative adopted pursuant to Part 2.74 (commencing with Section 10720).

(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.

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

(c) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(d) (1) For an urban retail water supplier, quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, based upon information developed pursuant to subdivision (a), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following: (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.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

(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.

(B) The distribution system water loss quantification shall be reported in accordance with a worksheet approved or developed by the department through a public process. The water loss quantification worksheet shall be based on the water system balance methodology developed by the American Water Works Association.

(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.

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

(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.

(e) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) (A) For an urban retail water supplier, as defined in Section 10608.12, a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years. The narrative shall describe the water demand management measures that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.20.

(B) The narrative pursuant to this paragraph shall include descriptions of the following water demand management measures:

(i) Water waste prevention ordinances.

(ii) Metering.

(iii) Conservation pricing.

(iv) Public education and outreach.

(v) Programs to assess and manage distribution system real loss.

(vi) Water conservation program coordination and staffing support.

(vii) Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovative measures, if implemented.

(2) For an urban wholesale water supplier, as defined in Section 10608.12, a narrative description of the items in clauses (ii), (iv), (vi), and (vii) of subparagraph (B) of paragraph (1), and a narrative description of its distribution system asset management and wholesale supplier assistance programs.

(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.

(g) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

(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. 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). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (f).

10631.1. (a) The 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 defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.

(b) It is the intent of the Legislature that the identification of projected water use for single-family and multifamily residential housing for lower income households will assist a supplier in complying with the requirement under Section 65589.7 of the Government Code to grant a priority for the provision of service to housing units affordable to lower income households.

10631.2. (a) In addition to the requirements of Section 10631, an urban water management plan shall include any of the following information that the urban water supplier can readily obtain:

(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 through 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.

(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. The department may consider studies and calculations conducted by the Public Utilities Commission in developing the methodology.

(c) The Legislature finds and declares that energy use is only one factor in water supply planning and shall not be considered independently of other factors.

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:

(1) The analysis of water supply reliability conducted pursuant to Section 10635.

(2) The procedures used in conducting an annual water supply and demand assessment that include, at a minimum, both of the following:

(A) The written decision making process that an urban water supplier will use each year to determine its water supply reliability.

(B) The key data inputs and assessment methodology used to evaluate the urban water supplier's water supply reliability for the current year and one dry year, including all of the following:

(i) Current year unconstrained demand, considering weather, growth, and other influencing factors, such as policies to manage current supplies to meet demand objectives in future years, as applicable.

(ii) Current year available supply, considering hydrological and regulatory conditions in the current year and one dry year. The annual supply and demand assessment may consider more than one dry year solely at the discretion of the urban water supplier.

(iii)Existing infrastructure capabilities and plausible constraints.

(iv)A defined set of locally applicable evaluation criteria that are consistently relied upon for each annual water supply and demand assessment.

(v) A description and quantification of each source of water supply.

(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 subparagraph (A) by developing and including a cross- reference relating its existing categories to the six standard water shortage levels.

(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. (B) Locally appropriate demand reduction actions to adequately respond to shortages.

(C) Locally appropriate operational changes.

(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.

(5) Communication protocols and procedures to inform customers, the public, interested parties, and local, regional, and state governments, regarding, at a minimum, all of the following:

(A) Any current or predicted shortages as determined by the annual water supply and demand assessment described pursuant to Section 10632.1.

(B) Any shortage response actions triggered or anticipated to be triggered by the annual water supply and demand assessment described pursuant to Section 10632.1.

(C) Any other relevant communications.

(6) For an urban retail water supplier, customer compliance, enforcement, appeal, and exemption procedures for triggered shortage response actions as determined pursuant to Section 10632.2.

(7) (A) A description of the legal authorities that empower the urban water supplier to implement and enforce its shortage response actions specified in paragraph (4) that may include, but are not limited to, statutory authorities, ordinances, resolutions, and contract provisions.

(A) A statement that an urban water supplier shall declare a water shortage emergency in accordance with Chapter 3 (commencing with Section 350) of Division 1.

(B) A statement that an urban water supplier shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency, as defined in Section 8558 of the Government Code.

(8) A description of the financial consequences of, and responses for, drought conditions, including, but not limited to, all of the following:

(A) A description of potential revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4).

(B) A description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions described in paragraph (4).

(C) A description of the cost of compliance with Chapter 3.3 (commencing with Section 365) of Division 1.

(9) For an urban retail water supplier, monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance and to meet state reporting requirements.

(10) Reevaluation and improvement procedures for systematically monitoring and evaluating the functionality of the water shortage contingency plan in order to ensure shortage risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented as needed.

(b) For purposes of developing the water shortage contingency plan pursuant to subdivision (a), an urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

(c) The urban water supplier shall make available the water shortage contingency plan prepared pursuant to this article to its customers and any city or county within which it provides water supplies no later than 30 days after adoption of the water shortage contingency plan.

10632.1. An urban water supplier shall conduct an annual water supply and demand assessment pursuant to subdivision (a) of Section 10632 and, on or before July 1 of each year, submit an annual water shortage assessment report to the department with information for anticipated shortage, triggered shortage response actions, compliance and enforcement actions, and communication actions consistent with the supplier's water shortage contingency plan. An urban water supplier that relies on imported water from the State Water Project or the Bureau of Reclamation shall submit its annual water supply and demand assessment within 14 days of receiving its final allocations, or by July 1 of each year, whichever is later.

10632.2. An urban water supplier shall follow, where feasible and appropriate, the prescribed procedures and implement determined shortage response actions in its water shortage contingency plan, as identified in subdivision (a) of Section 10632, or reasonable alternative actions, provided that descriptions of the alternative actions are submitted with the annual water shortage assessment report pursuant to Section 10632.1. Nothing in this section prohibits an urban water supplier from taking actions not specified in its water shortage contingency plan, if needed, without having to formally amend its urban water management plan or water shortage contingency plan.

10632.3. It is the intent of the Legislature that, upon proclamation by the Governor of a state of emergency under the California Emergency Services Act (Chapter 7 (commencing with Section 8550) of Division 1 of Title 2 of the Government Code) based on drought conditions, the board defer to implementation of locally adopted water shortage contingency plans to the extent practicable.

10632.5. (a) In addition to the requirements of paragraph (3) of subdivision (a) of Section 10632, beginning January 1, 2020, the plan shall include a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities.

(b) An urban water supplier shall update the seismic risk assessment and mitigation plan when updating its urban water management plan as required by Section 10621.

(c) An urban water supplier may comply with this section by submitting, pursuant to Section 10644, a copy of the most recent adopted local hazard mitigation plan or multihazard mitigation plan under the federal Disaster Mitigation Act of 2000 (Public Law 106-390) if the local hazard mitigation plan or multihazard mitigation plan addresses seismic risk.

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:

(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.

(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.

(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.

(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.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

CHAPTER 3. Urban Water Management Plans

ARTICLE 2.5. Water Service Reliability [10635]

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. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) Every urban water supplier shall include, as part of its urban water management plan, a drought risk assessment for its water service to its customers as part of information considered in developing the demand management measures and water supply projects and programs to be included in the urban water management plan. The urban water supplier may conduct an interim update or updates to this drought risk assessment within the five-year cycle of its urban water management plan update. 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, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.

(d) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(e) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(f) Nothing in this article is intended to change existing law concerning an urban water supplier’s obligation to provide water service to its existing customers or to any potential future customers.

ARTICLE 3. Adoption and Implementation of Plans [10640 – 10645]

10640. (a) Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630). The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

(b) Every urban water supplier required to prepare a water shortage contingency plan shall prepare a water shortage contingency plan pursuant to Section 10632. The supplier shall likewise periodically review the water shortage contingency plan as required by paragraph

(10) of subdivision (a) of Section 10632 and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan or a water shortage contingency plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of both the plan and the water shortage contingency plan. Prior to adopting either, the urban water supplier shall make both the plan and the water shortage contingency plan available for public inspection and shall hold a public hearing or hearings thereon. Prior to any of these hearings, notice of the time and place of the hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of a hearing to any city or county within which the supplier provides water supplies. Notices by a local public agency pursuant to this section shall be provided pursuant to Chapter 17.5 (commencing with Section 7290) of Division 7 of Title 1 of the Government Code. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing or hearings, the plan or water shortage contingency plan shall be adopted as prepared or as modified after the hearing or hearings.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644. (a) (1) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

(2) The plan, or amendments to the plan, submitted to the department pursuant to paragraph (1) shall be submitted electronically and shall include any standardized forms, tables, or displays specified by the department.

(b) If an urban water supplier revises its water shortage contingency plan, the supplier shall submit to the department a copy of its water shortage contingency plan prepared pursuant to subdivision (a) of Section 10632 no later than 30 days after adoption, in accordance with protocols for submission and using electronic reporting tools developed by the department.

(c) (1) (A) Notwithstanding Section 10231.5 of the Government Code, the department shall prepare and submit to the Legislature, on or before July 1, in the years ending in seven and two, a report summarizing the status of the plans and water shortage contingency plans adopted pursuant to this part. The report prepared by the department shall identify the exemplary elements of the individual plans and water shortage contingency plans. The department shall provide a copy of the report to each urban water supplier that has submitted its plan and water shortage contingency plan to the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans and water shortage contingency plans submitted pursuant to this part.

(B) The department shall prepare and submit to the board, on or before September 30 of each year, a report summarizing the submitted water supply and demand assessment results along with appropriate reported water shortage conditions and the regional and statewide analysis of water supply conditions developed by the department. As part of the report, the department shall provide a summary and, as appropriate, urban water supplier specific information regarding various shortage response actions implemented as a result of annual supplier-specific water supply and demand assessments performed pursuant to Section 10632.1.

(C) The department shall submit the report to the Legislature for the 2015 plans by July 1, 2017, and the report to the Legislature for the 2020 plans and water shortage contingency plans by July 1, 2022.

(2) A report to be submitted pursuant to subparagraph (A) of paragraph (1) shall be submitted in compliance with Section 9795 of the Government Code.

(d) The department shall make available to the public the standard the department will use to identify exemplary water demand management measures.

10645. (a) Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

(b) Not later than 30 days after filing a copy of its water shortage contingency plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

CHAPTER 4. Miscellaneous Provisions [10650 – 10657]

10650. Any actions or proceedings, other than actions by the board, to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan or a water shortage contingency plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan or water shortage contingency plan, or action taken pursuant to either, does not comply with this part shall be commenced within 90 days after filing of the plan or water shortage contingency plan or an amendment to either pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan or a water shortage contingency plan, or an action taken pursuant to either by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

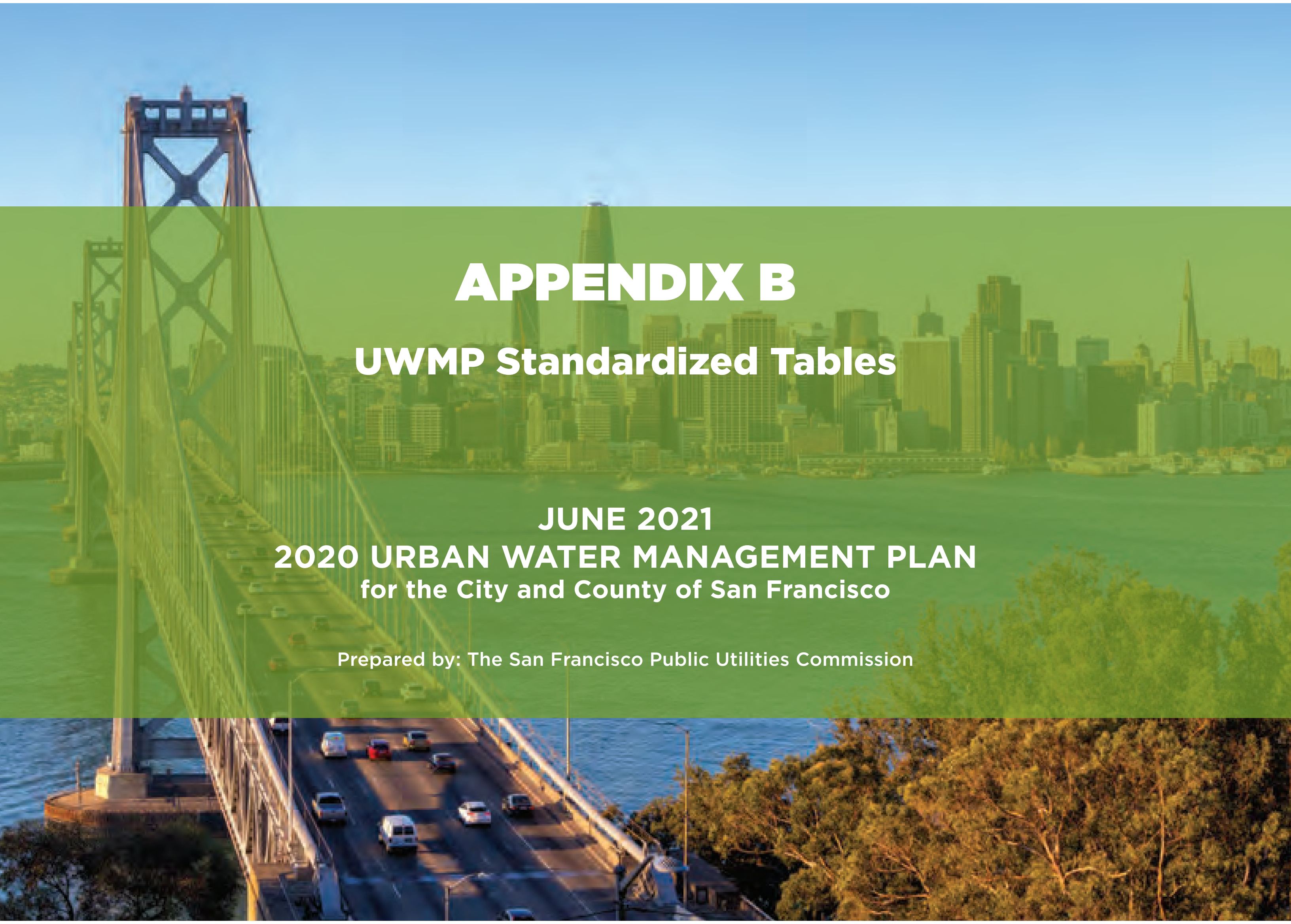
10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the board and the Public Utilities Commission, for the preparation of water management plans, water shortage contingency plans, or conservation plans; provided, that if the board or the Public Utilities Commission requires additional information concerning water conservation, drought response measures, or financial conditions to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan that complies with analogous federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its urban water management plan, its drought risk assessment, its water supply and demand assessment, and its water shortage contingency plan and implementing the reasonable water conservation measures included in either of the plans.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier is not eligible for a water grant or loan awarded or administered by the state unless the urban water supplier complies with this part.

10657. The department may adopt regulations regarding the definitions of water, water use, and reporting periods, and may adopt any other regulations deemed necessary or desirable to implement this part. In developing regulations pursuant to this section, the department shall solicit broad public participation from stakeholders and other interested persons.



APPENDIX B

UWMP Standardized Tables

JUNE 2021

2020 URBAN WATER MANAGEMENT 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

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Submittal Table 2-1 Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020 *
Add additional rows as needed			
CA3810011	SFPUC - CITY DISTRIBUTION DIVISION	181,011	73,150
CA0110018	SFPUC - PLEASANTON WELLS	1	340
CA0110012	SFPUC - TOWN OF SUNOL	141	470
	TOTAL	181,153	73,960
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Some suburban retail water connections served by the SFPUC are not included in this list, as they are covered under the San Francisco Regional Water System PWS (CA3810001), which primarily serves wholesale connections.			

Submittal Table 2-2: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable* (select from drop down list)
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

Submittal Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
☑	Supplier is a wholesaler
☑	Supplier is a retailer
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 drop down)	
Unit	AF
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES: Values are rounded to the nearest 10 AF in the standardized tables. The units of measure used in the body of the UWMP are millions of gallons per day (mgd).	

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

Submittal Table 2-4 Wholesale: Water Supplier Information Exchange (select one)	
☑	Supplier has informed more than 10 other water suppliers of water supplies available in accordance with Water Code Section 10631. 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.
☐	Supplier has informed 10 or fewer other water suppliers of water supplies available in accordance with Water Code Section 10631. **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 2020 UWMP update, SFPUC was directed by DWR to report Groveland CSD as a wholesale customer.

Submittal Table 3-1 Retail: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	899,732	1,004,799	1,066,403	1,128,007	1,189,610	1,251,214
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.						

Submittal Table 3-1 Wholesale: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	1,861,643	1,944,854	2,035,472	2,191,056	2,314,808	2,441,801
NOTES: Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is included this table.						

Submittal Table 4-1 Retail: Demands for Potable and Non-Potable[1] Water - Actual			
Use Type	2020 Actual		
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)	Level of Treatment When Delivered Drop down list	Volume[2]
Add additional rows as needed			
Single Family		Drinking Water	16,350
Multi-Family		Drinking Water	25,650
Other	Non-residential: commercial, industrial and institutional	Drinking Water	26,880
Losses	Includes both apparent losses and real losses (See Appendix F for AWWA audit worksheet)	Drinking Water	8,070
		TOTAL	76,950

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.*
[2] *Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in 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 retail table in the UWMP includes Groveland CSD.

Submittal Table 4-1 Wholesale: Demands for Potable and Non-Potable[1] Water - Actual			
Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only use types that will be recognized by the WUE data online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume[2]
Add additional rows as needed			
Sales to other agencies		Drinking Water	148,310
		TOTAL	148,310
[1] Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4. *[2] Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: 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.			

Submittal Table 4-2 Retail: Use for Potable and Non-Potable[1] Water - Projected						
Use Type	Additional Description (as needed)	Projected Water Use[2] *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		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Single Family		15,460	15,240	15,120	15,240	15,230
Multi-Family		26,550	28,680	31,260	33,940	36,970
Other	All non-residential [1]	27,780	27,330	27,220	27,670	28,230
Losses		6,720	6,720	6,720	6,720	6,720
TOTAL		76,510	77,970	80,320	83,570	87,150

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.*
[2] *Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Per DWR direction, Groveland CSD is not accounted for as a retail customer, but rather wholesale customer. Their demand is included in Table 4-2W. However, the corresponding retail table in the UWMP includes Groveland CSD.
1. The "Other" category includes all non-residential water demands (commercial, industrial, irrigation, etc.). Water demands served by recycled water supplies fall under this category and were subtracted from the numbers reported in this table, in accordance with Table 6-4, which provides a separate line item for the "Recycled Water Demands".

Submittal Table 4-2 Wholesale: Use for Potable and Raw Water - Projected						
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.		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Sales to other agencies	Projected purchase requests	163,940	166,000	170,490	175,420	182,640
	TOTAL	163,940	166,000	170,490	175,420	182,640

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

NOTES: Per DWR direction, Groveland CSD is accounted for as a wholesale customer in this standardized table. However, the corresponding wholesale table in the UWMP excludes Groveland CSD.

Submittal Table 4-3 Retail: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045 (opt)
Potable Water, Raw, Other Non-potable *From Tables 4-1R and 4-2 R*	76,950	76,510	77,970	80,320	83,560	87,150
Recycled Water Demand[1] *From Table 6-4*	110	2,350	2,800	2,800	2,800	2,800
Optional Deduction of Recycled Water Put Into Long-Term Storage[2]						
TOTAL WATER USE	77,060	78,860	80,770	83,120	86,360	89,950

[1]Recycled water demand fields will be blank until Table 6-4 is complete
[2] Long term storage means water placed into groundwater or surface storage that is not removed from storage in the same year. Supplier ***may*** *deduct recycled water placed in long-term storage from their reported demand. This value is manually entered into Table 4-3.*

NOTES:
Recycled water use for landscape irrigation in 2020 reflects the recycled water supplied by the Sharp Park Recycled Water Project for golf course irrigation. Future projections reflect recycled water supply served by the planned Westside Recycled Water Project, and the existing Sharp Park Recycled Water Project and the Harding Park Recycled Water Project.
Also note that per DWR direction, Groveland CSD is not accounted for as a retail customer, but rather wholesale customer in all standardized tables. Their demand is included in Table 4-3W. However, the corresponding retail table in the UWMP includes Groveland CSD.

Submittal Table 4-3 Wholesale: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045 (opt)
Potable and Raw Water From Tables 4-1W and 4-2W	148,310	163,940	166,000	170,490	175,420	182,640
Recycled Water Demand* From Table 6-4W	0	0	0	0	0	0
TOTAL WATER DEMAND	148,310	163,940	166,000	170,490	175,420	182,640
**Recycled water demand fields will be blank until Table 6-4 is complete.*						
NOTES: Wholesale demands are based on purchase requests projections. Per DWR direction, Groveland CSD is accounted for as a wholesale customer in all the standardized tables and is therefore included in this table. However, the corresponding wholesale table in the UWMP excludes Groveland CSD.						

Submittal Table 4-4 Retail: Last Five Years of Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
07/2015	6,750
07/2016	5,830
07/2017	6,750
07/2018	6,910
07/2019	8,070
[1] Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet. *[2] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES:	

Submittal Table 4-5 Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) *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.	Appendix G
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes
NOTES:	

Submittal Table 5-1 Baselines and Targets Summary From SB X7-7 Verification Form *Retail Supplier or Regional Alliance Only*				
Baseline Period	Start Year *	End Year *	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	*2001*	*2010*	*107*	*96*
5 Year	*2006*	*2010*	*101*	
**All cells in this table should be populated manually from the supplier's SBX7-7 Verification Form and reported in Gallons per Capita per Day (GPCD)*				
NOTES: Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore excluded from SB X7-7 calculations.				

Submittal Table 5-2: 2020 Compliance From SB X7-7 2020 Compliance Form *Retail Supplier or Regional Alliance Only*				
2020 GPCD			2020 Confirmed Target GPCD*	Did Supplier Achieve Targeted Reduction for 2020? Y/N
Actual 2020 GPCD*	2020 TOTAL Adjustments*	Adjusted 2020 GPCD* *(Adjusted if applicable)*		
76	*-*	*-*	*96*	*Y*
**All cells in this table should be populated manually from the supplier's SBX7-7 2020 Compliance Form and reported in Gallons per Capita per Day (GPCD)*				
NOTES: Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore excluded from SB X7-7 calculations.				

Submittal Table 6-1 Retail: Groundwater Volume Pumped						
☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
☐	All or part of the groundwater described below is desalinated.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
Add additional rows as needed						
Alluvial Basin	Westside Basin (1)	1340	1460	1900	1904	2240
Alluvial Basin	Livermore Valley Basin, Central Groundwater Sub Basin (2)	450	450	340	450	340
	TOTAL	1,790	1,910	2,240	2,354	2,580
**** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						

NOTES:
(1) Data from 2016-2019 are obtained from the 2019 Annual Groundwater Monitoring Report, Westside Basin (SFPUC, April 2020), 2020 data are from verbal communications with SFPUC groundwater staff. Pumping volumes are reported on a calendar year basis, but are used to approximate fiscal year data for this table.
(2) The Livermore Valley Basin and Central Groundwater Sub Basin are the source of water for the Castlewood Well System. Pumping volumes are assumed to be equivalent to billed consumption for Castlewood CSA.

Submittal Table 6-1 Wholesale: Groundwater Volume Pumped						
☑	Supplier does not pump groundwater. The supplier will not complete the table below.					
☐	All or part of the groundwater described below is desalinated.					
Groundwater Type *Drop Down List* *May use each category multiple times*	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
Add additional rows as needed						
	TOTAL	0	0	0	0	0
**** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES:						

Submittal Table 6-2 Retail: Wastewater Collected Within Service Area in 2020						
☐	There is no wastewater collection system. The supplier will not complete the table below.					
100%	Percentage of 2015 service area covered by wastewater collection system *(optional)*					
100%	Percentage of 2015 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? *Drop Down List*	Volume of Wastewater Collected from UWMP Service Area 2020 *	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? *Drop Down List*	Is WWTP Operation Contracted to a Third Party? *(optional)* *Drop Down List*
SFPUC [1]	Metered	63,350	SFPUC	Southeast Water Pollution Control Plant	Yes	No
SFPUC [1]	Metered	16,410	SFPUC	Oceanside Water Pollution Control Plant	Yes	No
US Navy	Metered	370	US Navy and Treasure Island Development Authority	Treasure Island Wastewater Treatment Plant	Yes	Yes
City and County of San Francisco [2]	Metered	430	City and County of San Francisco	Mel Leong Treatment Plant	Yes	No
Total Wastewater Collected from Service Area in 2020:		80,560				
**** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						

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. Volume of wastewater collected at the Mel Leong Treatment Plant corresponds to calendar year 2020.

Submittal Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2020												
☐	**No wastewater is treated or disposed of within the UWMP service area.** The supplier will not complete the table below.											
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)* 2	Method of Disposal ***Drop down list***	Does This Plant Treat Wastewater Generated Outside the Service Area? ***Drop down list***	Treatment Level ***Drop down list***	**2020 volumes** [1]				
							Waste water Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
Southeast Water Pollution Control Plant and North Point Wet Weather Facility [1,2]	Discharge Point No. 001; Discharge Point No. 002; Discharge Point Nos. 003-006	Lower San Francisco Bay; Islais Creek; Central San Francisco Bay	2 386010001	Bay or estuary outfall	Yes	Secondary, Undisinfected*	62,920	58,310 [4]	0	0	0
Oceanside Water Pollution Control Plant [1]	Discharge Point No. 001	Pacific Ocean, Offshore	2 386009001	Ocean outfall	Yes	Secondary, Undisinfected	16,300	16,790 [5]	0	0	0
Treasure Island Wastewater Treatment Plant [2]	Discharge Point No. 001	Central San Francisco Bay	2 386013001	Bay or estuary outfall	No	Secondary, Undisinfected*	370	330	0	0	0
Mel Leong Treatment Plant [2,3]	North Bayside System Unit	Lower San Francisco Bay	2 417033001	Bay or estuary outfall	No	Secondary, Undisinfected*	430	430	0	0	0
						Total	80,020	75,860	0	0	0

[1]**Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.
[2] If the **Wastewater Discharge ID Number** is not available to the UWMP preparer, access the SWRCB CIWQS regulated facility website at https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility

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 (that option was not available in the spreadsheet template's original dropdown menu.)
3. Volume of wastewater collected at the Mel Leong Treatment Plant corresponds to calendar year 2020.
4. 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.
5. The volume discharged is higher than the volume collected because the discharged volume includes additional plant recycle streams.

Submittal Table 6-3 Wholesale: Wastewater Treatment and Discharge Within Service Area in 2020

☑ Wholesale Supplier neither distributes nor provides supplemental treatment to recycled water. The Supplier will not complete the table below.

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)* [2]	Method of Disposal ***Drop down list***	Does This Plant Treat Wastewater Generated Outside the Service Area? ***Drop down list***	Treatment Level ***Drop down list***	**2020 volumes** [1]				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
Add additional rows as needed											
							Total	0	0	0	0	0

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.
[2] If the **Wastewater Discharge ID Number** is not available to the UWMP preparer, access the SWRCB CIWQS regulated facility website at https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility

NOTES:

Submittal Table 6-4a Retail: Recycled Water Direct Beneficial Uses Within Service Area Please see Tables 6-4b and 6-4c below.										
☐	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.									
Name of Supplier Producing (Treating) the Recycled Water:			SFPUC							
Name of Supplier Operating the Recycled Water Distribution System:			SFPUC							
Supplemental Water Added in 2020 (volume) *Include units*			0							
Source of 2020 Supplemental Water			Not applicable							
Beneficial Use Type *Insert additional rows if needed.*	**Potential** Beneficial Uses of Recycled Water (Describe)	Amount of **Potential** Uses of Recycled Water (Quantity) *Include volume units*[1]	General Description of 2020 Uses	Level of Treatment *Drop down list*	2020 [1]	2025 [1]	2030[1]	2035[1]	2040[1]	2045[1] (opt)
Landscape irrigation (exc golf courses)	Irrigation for Golden Gate Park and SF Zoo		No uses in 2020	Advanced	0	1,680	1,680	1,680	1,680	1,680
Landscape irrigation (exc golf courses)	Irrigation for Treasure Island		No uses in 2020	Tertiary	0	220	220	220	220	220
Golf course irrigation	Irrigation for Lincoln Park and Presidio golf courses		No uses in 2020	Advanced	0	120	340	340	340	340
Other (Description Required)	Direct non-potable reuse to serve dual plumbed buildings on Treasure Island		No uses in 2020	Tertiary	0	0	230	230	230	230
				Total:	0	2,020	2,470	2,470	2,470	2,470
				2020 Internal Reuse						
[1] ***Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*										
NOTES: The landscape and irrigation recycled water uses included in this table will be supplied by the Westside Recycled Water Project and the Treasure Island Recycled Water Project.										

Submittal Table 6-4b Retail: Recycled Water Direct Beneficial Uses Within Service Area										
☐	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.									
Name of Supplier Producing (Treating) the Recycled Water:			North San Mateo County Sanitation District (NSMCSD)							
Name of Supplier Operating the Recycled Water Distribution System:			NSMCSD (portion of transmission line within the City and County of San Francisco is operated by SFPUC)							
Supplemental Water Added in 2020 (volume) *Include units*			0							
Source of 2020 Supplemental Water			Not applicable							
Beneficial Use Type *Insert additional rows if needed.*	**Potential** Beneficial Uses of Recycled Water (Describe)	Amount of **Potential** Uses of Recycled Water (Quantity) *Include volume units*[1]	General Description of 2020 Uses	Level of Treatment *Drop down list*	2020 [1]	2025 [1]	2030[1]	2035[1]	2040[1]	2045[1] (opt)
Golf course irrigation	Harding Park and Fleming Golf Courses irrigation		No uses in 2020	Tertiary	0	220	220	220	220	220
				Total:	0	220	220	220	220	220
				2020 Internal Reuse						
[1] ***Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*										
NOTES:										

Submittal Table 6-4c Retail: Recycled Water Direct Beneficial Uses Within Service Area											
☐	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.										
Name of Supplier Producing (Treating) the Recycled Water:					North Coast County Water District						
Name of Supplier Operating the Recycled Water Distribution System:					North Coast County Water District						
Supplemental Water Added in 2020 (volume) *Include units*					0						
Source of 2020 Supplemental Water					Not applicable						
Beneficial Use Type *Insert additional rows if needed.*	**Potential** Beneficial Uses of Recycled Water (Describe)	Amount of **Potential** Uses of Recycled Water (Quantity) *Include volume units*[1]	General Description of 2020 Uses	Level of Treatment *Drop down list*	2020 [1]	2025 [1]	2030[1]	2035[1]	2040[1]	2045[1] (opt)	
Golf course irrigation	irrigation of Sharp Park Golf Course		irrigation of Sharp Park Golf Course	Tertiary	110	110	110	110	110	110	
				Total:	110	110	110	110	110	110	
2020 Internal Reuse											
[1] ***Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*											
NOTES:											

Submittal Table 6-4 Wholesale: Current and Projected Retailers Provided Recycled Water Within Service Area							
☑	Recycled water is not directly treated or distributed by the Supplier. The Supplier will not complete the table below.						
Name of Receiving Supplier or Direct Use by Wholesaler	Level of Treatment *Drop down list*	2020*	2025*	2030*	2035*	2040*	2045* *(opt)*
Add additional rows as needed							
	Total	0	0	0	0	0	0
*** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.							
NOTES:							

Submittal Table 6-5 Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual		
☐	Recycled water was not used in 2015 nor projected for use in 2020. The supplier will not complete the table below. If recycled water was not used in 2020, and was not predicted to be in 2015, then check the box and do not complete the table.	
Beneficial Use Type	**2015 Projection for 2020 [1]**	**2020 Actual Use[1]**
Insert additional rows as needed.		
Agricultural irrigation		
Landscape irrigation (exc golf courses)		
Golf course irrigation	340	110
Commercial use		
Industrial use		
Geothermal and other energy production		
Seawater intrusion barrier		
Recreational impoundment		
Wetlands or wildlife habitat		
Groundwater recharge (IPR)		
Reservoir water augmentation (IPR)		
Direct potable reuse		
Other (Description Required)		
Total	340	110

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.

NOTE:
Golf course irrigation includes Harding Park, Fleming and Sharp Park golf courses. The disparity between the predicted 2020 recycled water use and the actual 2020 recycled water used is approximately 230 acre-feet because the Harding Park Recycled Water Project was offline in 2020 due to necessary infrastructure upgrades.

Submittal Table 6-5 Wholesale: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual		
☑	Recycled water was not used or distributed by the supplier in 2015, nor projected for use or distribution in 2020. The wholesale supplier will not complete the table below.	
Name of Receiving Supplier or Direct Use by Wholesaler	2015 Projection for 2020*	2020 Actual Use*
Add additional rows as needed		
Total	0	0
***Units of measure (AF, CCF, MG)** *must remain consistent throughout the UWMP as reported in Table 2-3.*		
NOTES:		

Submittal Table 6-6 Retail: Methods to Expand Future Recycled Water Use			
☐	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 UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use *
Add additional rows as needed			
Westside 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, Presidio Golf Course, and other irrigated areas in the Presidio.	2025	2,020
Treasure Island Water Resource Recovery Facility	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.	2022	450
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.	2022	0
		Total	2,470
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: See UWMP Section 6.2.2 for more information.			

Submittal Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☑	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 & 7.4	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other suppliers?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Supplier* *This may be a range*
	Drop Down List (y/n)	*If Yes, Supplier Name*				
Add additional rows as needed						
Westside Recycled Water Project	No			2025	All Year Types	2,020
Treasure Island Recycled Water Project	No			2022	All Year Types	450 - 1120
San Francisco Groundwater Supply Project [1]	No			Existing & Progressive Expansion	All Year Types	Up to 4480
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: 1. Part of the San Francisco Groundwater Supply Project has been implemented, and currently produces approximately 450 acre-feet of potable water. A progressive expansion is planned, adding 1120 acre-feet of supply at a time, with a total anticipated capacity of 4480 acre-feet.						

Submittal Table 6-7 Wholesale: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☑	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.					
Section 7.4	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other suppliers?		Description *(if needed)*	Planned Implementation Year	Planned for Use in Year Type *Drop Down list*	Expected Increase in Water Supply to Supplier*
	Drop Down Menu	*If Yes, Supplier Name*				
Add additional rows as needed						
***Units of measure (AF, CCF, MG)** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES:						

Submittal Table 6-8 Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2020		
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		Actual Volume*	Water Quality Drop Down List	Total Right or Safe Yield* (optional)
Add additional rows as needed				
Surface water (not desalinated)		74,490	Drinking Water	
Groundwater (not desalinated)		450	Drinking Water	
Groundwater (not desalinated)		1,680	Other Non-Potable Water	
Purchased or Imported Water	Sharp Park	110	Recycled Water	
Purchased or Imported Water	Harding Park	0	Recycled Water	
	Total	76,730		0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*				
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.				

Submittal Table 6-8 Wholesale: Water Supplies — Actual				
Water Supply		2020		
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	Actual Volume*	Water Quality Drop Down List	Total Right or Safe Yield* (optional)
Add additional rows as needed				
Surface water (not desalinated)		148,310	Drinking Water	
	Total	148,310		0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES: 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.				

Submittal Table 6-9 Retail: Water Supplies — Projected

Water Supply	Additional Detail on Water Supply	**Projected Water Supply *** Report To the Extent Practicable									
		2025		**2030**		**2035**		**2040**		**2045** (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		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Add additional rows as needed											
Surface water (not desalinated)		74,940		75,280		76,510		78,640		82,220	
Groundwater (not desalinated)		1,570		2,690		3,810		4,930		4,930	
Recycled Water	See Table 6-4R for recycled water supplies	2,350		2,800		2,800		2,800		2,800	
	Total	78,860	0	80,770	0	83,120	0	86,370	0	89,950	0

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

NOTES: Per DWR direction, Groveland CSD is reported as a wholesale customer in all standardized tables.

Submittal Table 6-9 Wholesale: Water Supplies — Projected											
Water Supply	Additional Detail on Water Supply	**Projected Water Supply*** Report To the Extent Practicable									
		2025		**2030**		**2035**		**2040**		**2045** (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		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Add additional rows as needed											
Surface water (not desalinated)		163,940		166,000		170,490		175,420		182,640	
	Total	163,940	0	166,000	0	170,490	0	175,420	0	182,640	0
***Units of measure (AF, CCF, MG)** *must remain consistent throughout the UWMP as reported in Table 2-3.*											
NOTES:											

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 2019-2020, use 2020	**Available Supplies if Year Type Repeats**	
		☑ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location: Table 8-2 & Table 8-3	
		☐ Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available *	**% 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			

Supplier may use multiple versions of Table 7-1 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 Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.

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

NOTES:

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 1999-2000, use 2000	Available Supplies if Year Type Repeats	
		☑	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 *	% 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			

Supplier may use multiple versions of Table 7-1 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 Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table. Suppliers may create an additional worksheet for the additional tables.

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

NOTES:

Submittal Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 *(Opt)*
Supply totals (*autofill from Table 6-9)*	78,860	80,770	83,120	86,370	89,950
Demand totals *(autofill from Table 4-3)*	78,860	80,770	83,120	86,370	89,950
Difference	0	0	0	0	0
NOTES: Per DWR direction, Groveland CSD is reported as a wholesale customer in the standardized tables. Their supplies and demands are included in Table 7-2W.					

Submittal Table 7-2 Wholesale: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	163,940	166,000	170,490	175,420	182,640
Demand totals *(autofill fm Table 4-3)*	163,940	166,000	170,490	175,420	182,640
Difference	0	0	0	0	0
NOTES: Per DWR direction, Groveland CSD is reported as a wholesale customer in the standardized tables. Their supplies and demands are included in this table.					

Submittal Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 (Opt)
Supply totals*	66,650	68,780	71,470	74,380	67,320
Demand totals*	79,200	81,100	83,450	86,700	90,290
Difference	(12,550)	(12,320)	(11,980)	(12,320)	(22,970)
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore included in Table 7-3W. These tables assume implementation of the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan Amendment) starting in 2023. The implementation of the Bay-Delta Plan Amendment is uncertain for multiple reasons, including ongoing litigation. The SFPUC recognizes that the Bay-Delta Plan Amendment has been adopted and that, given that it is now state law, we 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. The SFPUC is currently pursuing a voluntary agreement as well as a lawsuit which would limit implementation of the Plan. With both of these processes occurring on an unknown timeline, the SFPUC does not know at this time when the Bay-Delta Plan Amendment is likely to go into effect.					

Submittal Table 7-3 Wholesale: Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040 (Opt)	2045
Supply totals*	104,510	105,520	108,100	111,120	99,360
Demand totals*	163,550	165,680	170,160	175,080	182,370
Difference	(59,040)	(60,160)	(62,060)	(63,960)	(83,010)
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: Groveland CSD is accounted for as a wholesale customer and is included in this table. These tables assume implementation of the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan Amendment) starting in 2023. The implementation of the Bay-Delta Plan Amendment is uncertain for multiple reasons, including ongoing litigation. The SFPUC recognizes that the Bay-Delta Plan Amendment has been adopted and that, given that it is now state law, we 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. The SFPUC is currently pursuing a voluntary agreement as well as a lawsuit which would limit implementation of the Plan. With both of these processes occurring on an unknown timeline, the SFPUC does not know at this time when the Bay-Delta Plan Amendment is likely to go into effect.					

Submittal Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	66,650	68,780	71,470	74,380	67,320
	Demand totals	79,200	81,100	83,450	86,700	90,290
	Difference	(12,550)	(12,320)	(11,980)	(12,320)	(22,970)
Second year	Supply totals	57,690	59,820	62,170	64,860	67,320
	Demand totals	79,200	81,100	83,450	86,700	90,290
	Difference	(21,510)	(21,280)	(21,280)	(21,840)	(22,970)
Third year	Supply totals	57,690	59,820	62,170	64,860	67,320
	Demand totals	79,200	81,100	83,450	86,700	90,290
	Difference	(21,510)	(21,280)	(21,280)	(21,840)	(22,970)
Fourth year	Supply totals	57,690	59,820	62,170	58,250	58,360
	Demand totals	79,200	81,100	83,450	86,700	90,290
	Difference	(21,510)	(21,280)	(21,280)	(28,450)	(31,930)
Fifth year	Supply totals	57,690	59,820	57,580	58,250	58,360
	Demand totals	79,200	81,100	83,450	86,700	90,290
	Difference	(21,510)	(21,280)	(25,870)	(28,450)	(31,930)
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						

NOTES: Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore reported in Table 7-4 Wholesale instead of this table. However, the corresponding retail table in the UWMP includes Groveland CSD.
These tables assume implementation of the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan Amendment) starting in 2023. The implementation of the Bay-Delta Plan Amendment is uncertain for multiple reasons, including ongoing litigation. The SFPUC recognizes that the Bay-Delta Plan Amendment has been adopted and that, given that it is now state law, we 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. The SFPUC is currently pursuing a voluntary agreement as well as a lawsuit which would limit implementation of the Plan. With both of these processes occurring on an unknown timeline, the SFPUC does not know at this time when the Bay-Delta Plan Amendment is likely to go into effect.

Submittal Table 7-4 Wholesale: Multiple Dry Years Supply and Demand Comparison						
		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	104,510	105,520	108,100	111,120	99,360
	Demand totals	163,550	165,680	170,160	175,080	182,370
	Difference	(59,040)	(60,160)	(62,060)	(63,960)	(83,010)
Second year	Supply totals	104,180	90,510	92,640	95,330	99,360
	Demand totals	163,550	165,680	170,160	175,080	182,370
	Difference	(59,370)	(75,170)	(77,520)	(79,750)	(83,010)
Third year	Supply totals	89,610	90,510	92,640	95,330	99,360
	Demand totals	163,550	165,680	170,160	175,080	182,370
	Difference	(73,940)	(75,170)	(77,520)	(79,750)	(83,010)
Fourth year	Supply totals	89,610	90,510	92,640	84,130	84,460
	Demand totals	163,550	165,680	170,160	175,080	182,370
	Difference	(73,940)	(75,170)	(77,520)	(90,950)	(97,910)
Fifth year	Supply totals	89,610	90,510	84,910	84,130	84,460
	Demand totals	163,550	165,680	170,160	175,080	182,370
	Difference	(73,940)	(75,170)	(85,250)	(90,950)	(97,910)
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
***Units of measure (AF, CCF, MG) m**ust remain consistent throughout the UWMP as reported in Table 2-3.*						

NOTES: 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.
These tables assume implementation of the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan Amendment) starting in 2023. The implementation of the Bay-Delta Plan Amendment is uncertain for multiple reasons, including ongoing litigation. The SFPUC recognizes that the Bay-Delta Plan Amendment has been adopted and that, given that it is now state law, we 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. The SFPUC is currently pursuing a voluntary agreement as well as a lawsuit which would limit implementation of the Plan. With both of these processes occurring on an unknown timeline, the SFPUC does not know at this time when the Bay-Delta Plan Amendment is likely to go into effect.

Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)	
2021	**Total**
Total Water Use	77,520
Total Supplies	73,710
Surplus/Shortfall w/o WSCP Action	(3,810)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	-3,810
Resulting % Use Reduction from WSCP action	0%
2022	**Total**
Total Water Use	77,960
Total Supplies	74,160
Surplus/Shortfall w/o WSCP Action	(3,800)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	-3,800
Resulting % Use Reduction from WSCP action	0%
2023	**Total**
Total Water Use	78,300
Total Supplies	52,980
Surplus/Shortfall w/o WSCP Action	(25,320)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	25,320
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	32%
2024	**Total**
Total Water Use	78,750
Total Supplies	52,980
Surplus/Shortfall w/o WSCP Action	(25,770)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	25,760
Revised Surplus/(shortfall)	-10
Resulting % Use Reduction from WSCP action	33%

2025	Total
Total Water Use	79,200
Total Supplies	53,990
Surplus/Shortfall w/o WSCP Action	(25,210)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	25,200
Revised Surplus/(shortfall)	-10
Resulting % Use Reduction from WSCP action	32%

NOTE: These tables assume implementation of the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan Amendment) starting in 2023. The implementation of the Bay-Delta Plan Amendment is uncertain for multiple reasons, including ongoing litigation. The SFPUC recognizes that the Bay-Delta Plan Amendment has been adopted and that, given that it is now state law, we 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. The SFPUC is currently pursuing a voluntary agreement as well as a lawsuit which would limit implementation of the Plan. With both of these processes occurring on an unknown timeline, the SFPUC does not know at this time when the Bay-Delta Plan Amendment is likely to go into effect.

Submittal Table 8-1 Water Shortage Contingency Plan Levels		
Shortage Level	**Percent Shortage Range**	**Shortage Response Actions** **(*Narrative description)***
1	Up to 10%	Voluntary retail water use reduction of 5%
2	Up to 20%	Voluntary retail water use reduction of 5%
3	Up to 30%	Voluntary retail water use reduction of 5%
4	Up to 40%	Voluntary or mandatory retail water use reduction of 5% to 18%
5	Up to 50%	Mandatory retail water use reduction of 18% to 32%
6	>50%	Mandatory retail water use reduction of >32%
NOTES:		

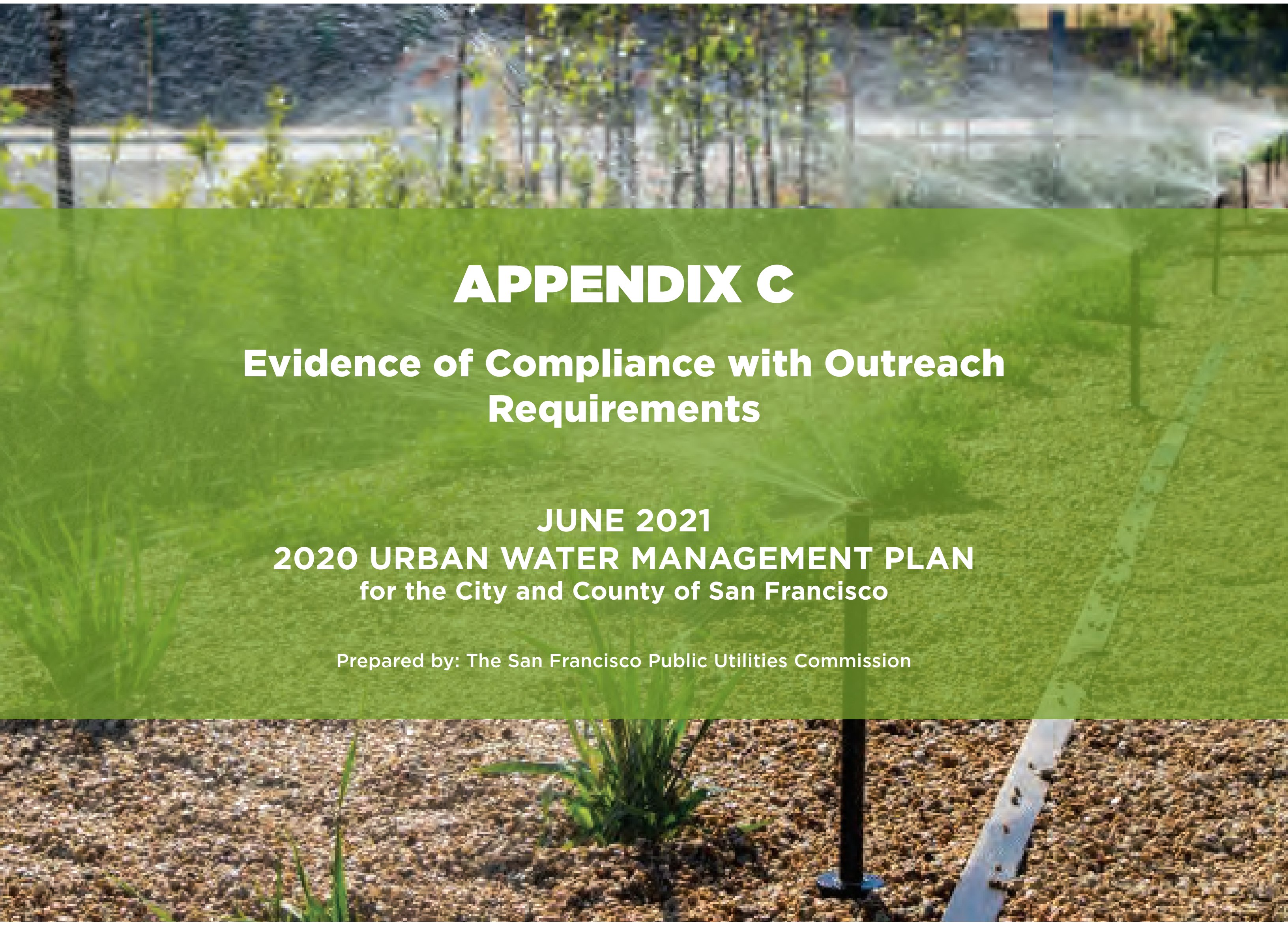
Submittal Table 8-2: Demand Reduction Actions				
Shortage Level	Demand Reduction Actions ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply.*	How much is this going to reduce the shortage gap? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? ***For Retail Suppliers Only*** *Drop Down List*
Add additional rows as needed				
1, 2, and 3	Other	3.3 mgd	Voluntary call for water use reductions	No
4	Other	6.3 mgd	Mandatory water use reduction	Yes
5	Other	16.2 mgd	Mandatory water use reduction	Yes
6	Other	21.2 mgd	Mandatory water use reduction	Yes

NOTES:
a. 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.
b. 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.
c. 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.

Submittal Table 8-3: Supply Augmentation and Other Actions			
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? *Include units used (volume type or percentage)*	Additional Explanation or Reference *(optional)*
Add additional rows as needed			
NOTES:			

Submittal Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
San Francisco	Yes	Yes
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
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 the cities and counties listed above, the SFPUC also notified various private organizations and communities that may be interested in participating in the UWMP process. A complete list of these entities can be found in Appendix C.		

Submittal Table 10-1 Wholesale: Notification to Cities and Counties (select one)		
☑	Supplier has notified more than 10 cities or counties in accordance with Water Code Sections 10621 (b) and 10642. **Completion of the table below is not required. Provide a separate list of the cities and counties that were notified.**	
Appendix C	Provide the page or location of this list in the UWMP.	
☐	Supplier has notified 10 or fewer cities or counties. **Complete the table below.**	
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
NOTES:		



APPENDIX C

Evidence of Compliance with Outreach Requirements

JUNE 2021
2020 URBAN WATER MANAGEMENT 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

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Summary Table of SFPUC Compliance with Public Notification Elements of the Urban Water Management Plan Act

Code Section	Code Requirement	Summary of Action Taken	Documentation (Attached after this Table)
Water Code Section 10620	Notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes.	✓ January 29, February 8 and March 12, 2021: Sent notification letters via email to City agencies, wholesale customers of the SFPUC Regional Water System, suburban retail customers (e.g., SFO), large regional water agencies (e.g., EBMUD), Bay Area Water Supply Conservation Agency (BAWSCA), and a larger distribution list of parties known by the SFPUC to be interested in water resources planning issues.	• Example of 2/08/21 letter sent via email • Example of 03/12/2021 letter sent via email • Recipient list
Water Code Section 10642	Encourage the 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.	✓ February 8 and March 12, 2021: Sent emails to a larger distribution list of parties known by the SFPUC to be interested in water resources planning issues. ✓ Currents hardcopy newsletter included with the March/April 2021 bill ✓ April 5, 2021: Posted the Draft 2020 UWMP on the SFPUC website at www.sfpuc.org ✓ March 29 and April 5, 2021: Posted advertisement in local community newspaper(s) regarding the availability of the Draft 2020 UWMP, as well as the time and location of the public hearing.	• Example of 2/08/21 letter sent via email (same letter sent via email on 03/12/21 to additional recipients) • Declaration of publication of San Francisco Chronicle and copy of advertisement • Copy of Currents newsletter included into customers' hard copy bills in March/April 2021
Water Code Section 10642	Prior to the required hearing, publish the notice of time and place of hearing within the jurisdiction of the supplier pursuant to Section 6066 of the Government Code.	✓ March 29 and April 5, 2021: Posted Notification of Public Hearing in local community newspaper meeting requirement of Section 6066 of the Government Code.	• Declaration of publication in San Francisco Chronicle and copy of advertisement
Water Code Section 10642	Prior to the required hearing, provide notice of time and place of hearing to any city of county within which the supplier provides water.	✓ February 8, March 12, April 5, 2021: Provided notification of public hearing, including time and place of the hearing, in the same notification letter regarding the preparation of the 2020 UWMP Update.	• Example of 2/08/21 letter sent via email (same letter sent via email on 03/12/21 to additional recipients) • Recipient list (same as recipient list listed earlier)

Code Section	Code Requirement	Summary of Action Taken	Documentation (Attached after this Table)
Water Code Section 10642	Prior to adoption, make the plan available for public inspection.	✓ April 5, 2021: Posted the Draft 2020 UWMP on the SFPUC website at www.sfpuc.org, sent a notification email to announce availability of the Plan for public inspection. ✓ April 5, 2021: Sent emails to all parties listed above regarding the availability of the Draft 2020 UWMP. ✓ April 19, 2021: Sent reminder notification email about availability of the Plan for public inspection.	• Copy of web posting • Example of 4/05/21 letter sent via email • Example of 04/19/2021 letter sent via email • Recipient list (same as recipient list listed earlier)
Water Code Section 10642	Prior to adoption, hold a public hearing.	✓ April 13, 2021: Held a public hearing during the meeting of the San Francisco Public Utilities Commission.	• Copy of Commission Meeting Agenda including public hearing
Water Code Section 10642	After the hearing, the plan shall be adopted as prepared or as modified after the meeting.	✓ June 11, 2021: Adopted the SFPUC 2020 UWMP during the meeting of the San Francisco Public Utilities Commission.	• Resolution to Adopt the 2020 UWMP
Water Code Section 10644(a)	Within 30 days of plan adoption, submit a copy to DWR.	✓ By July 1, 2021 (exact date to be determined): Will submit the adopted 2020 UWMP electronically via the WUEdata Online Submittal Tool.	• *On file with the SFPUC:* Copy of DWR submittal confirmation
Water Code Section 10644(a)	Within 30 days of plan adoption, submit a copy to the California State Library.	✓ By July 11, 2021 (exact date to be determined): Will mail an electronic copy of the adopted 2020 UWMP on compact disc to the California State Library.	• *On file with the SFPUC:* Copy of delivery confirmation to the California State Library
Water Code Section 10644(a)	Within 30 days of plan adoption, submit a copy to any city or county within which the supplier provides water.	✓ By July 11, 2021 (exact date to be determined): Will email the adopted 2020 UWMP to all wholesale customers of the SFPUC Regional Water System, and cities or counties within which the SFPUC provides water.	• *On file with the SFPUC:* Copy of notification email
Water Code Section 10645	Within 30 days of submittal to DWR, make the plan available for public review during normal business hours.	✓ By July 30, 2021 (exact date to be determined): Will provide two copies of the adopted 2020 UWMP to the San Francisco Main Library. ✓ By July 30, 2021 (exact date to be determined): Will post the adopted 2020 UWMP on the SFPUC website at www.sfpuc.org	• *On file with the SFPUC:* Copy of delivery confirmation to the San Francisco Public Library and copy of library catalog record • *On file with the SFPUC:* Copy of web posting

Urban Water Management Plan

Dear Stakeholders,

The Urban Water Management Planning Act (Water Code Section 10610-10657) requires urban water supplier to **update its Urban Water Management Plan (UWMP)** and submit the completed plan to the California Department of Water Resources (DWR) every 5 years. The City and County of San Francisco is currently reviewing its UWMP and will be considering amendments or changes to the document. The 2020 update to the UWMP is due to DWR by July 1, 2021.

State law requires that urban water suppliers conduct a public hearing during the UWMP update process and that, at least 60 days prior to the public hearing, the City and County of San Francisco provide notice that it intends to update the UWMP to any city and county within which it provides water supplies. This letter serves as the required notification.

The UWMP will **provide an overview of our water deliveries and uses, water supply sources, and water conservation programs.** It will also include discussions on supply and demand projections over a 25-year planning horizon (from 2020 to 2045), available water supplies to meet existing and future demands under a range of water supply conditions, and our water demand management measures to reduce long-term water demand.

Proposed revisions to the UWMP will be available for public review and comment from April 5, 2021 to May 5, 2021. The Draft UWMP 2020 Update will be available on the SFPUC website and available for physical review and/or pick-up at a central location in downtown San Francisco. Additional information on how to access the UWMP will be provided in a later notification, prior to the start of the public review period.

Notice of Public Hearing

A public hearing will be held on April 13, 2021 at 1:30 pm at the meeting of the San Francisco Public Utilities Commission to allow interested members of the public to participate in the review process. All interested parties are invited to attend the public hearing and present their views. The hearing will be held virtually and can be accessed using the following information:

WATCH LIVE MEETING

Call-in number: 1 (415) 655-0001 / **MEETING ID:** 146 929 4145 # #

The final 2020 UWMP will be adopted by the Commission in June.

Submission of Comments

Any interested parties may also submit written comments to the City during the public comment period in one of three ways.

1. Written comments can be **e-mailed to Sarah Triolo,** striolo@sfwater.org.
2. Written comments can be **mailed to the address below.** To ensure that comments can be reviewed and incorporated, any mailed comments must be post-marked by **April 30th, 2021.**

   Steve Ritchie, San Francisco Public Utilities Commission
   525 Golden Gate Avenue, 13th Floor
   San Francisco, CA 94102

3. Written comments can be **deposited in the drop box** at 525 Golden Gate Avenue. Comments submitted via the drop box must be in an envelope with the following information clearly printed: "Urban Water Management Plan Comments, c/o Sarah Triolo".

In the meantime, if you have any questions about our UWMP, or the process of updating it, please contact Sarah Triolo at striolo@sfwater.org.

Sincerely,

Paula Kehoe

Director of Water Resources

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

Letter sent on 03/12/2021 via email

Lauppe Rhodes, Betsy

From:	Paula Kehoe <PKehoe@sfwater.org>
Sent:	Friday, March 12, 2021 11:44 AM
To:	Lauppe Rhodes, Betsy
Subject:	[Test]:Reminder of Preparation of the City and County of San Francisco Urban Water Management Plan 2020 Update and Public Hearing

Dear Stakeholders,

As previously noticed, the City and County of San Francisco is currently reviewing its Urban Water Management Plan (UWMP) and will be considering amendments or changes to the document. The 2020 update to the UWMP is due to the Department of Water Resources by July 1, 2021.

The UWMP will provide an overview of our water deliveries and uses, water supply sources, and water conservation programs. It will also include discussions on supply and demand projections over a 25-year planning horizon (from 2020 to 2045), available water supplies to meet existing and future demands under a range of water supply conditions, and our water demand management measures to reduce long-term water demand.

Proposed revisions to the UWMP will be available for public review and comment from April 5, 2021 to May 5, 2021. The Draft UWMP 2020 Update will be available on the SFPUC website at sfpuc.org/uwmp.

Notice of Public Hearing

A public hearing will be held on April 13, 2021 at 1:30 pm at the meeting of the San Francisco Public Utilities Commission to allow interested members of the public to participate in the review process. All interested parties are invited to attend the public hearing and present their views. The hearing will be held virtually and can be accessed using the following information:

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In the meantime, if you have any questions about our UWMP, or the process of updating it, please contact Sarah Triolo at striolo@sfwater.org.

Sincerely,

Paula Kehoe

Director of Water Resources

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

Contact list of stakeholders

Recipients of 2020 UWMP Update Notification
(Sent via e-mail on January 29, 2021, February 8, 2021 and March 12, 2021)

No.	Organization	Contact
1	City College of San Francisco	Robert Gabriner
2	Mayor - Senior Advisor on Environment	Tyrone Jue
3	Mayor's Office of Neighborhood Services	David Miree
4	Port of San Francisco	Brad Benson
5	Port of San Francisco	Monique Moyer
6	San Francisco Board of Supervisors	Aaron Peskin
7	San Francisco Board of Supervisors	Ahsha Safai
8	San Francisco Board of Supervisors	Catherine Stefani
9	San Francisco Board of Supervisors	Connie Chan
10	San Francisco Board of Supervisors	Dean Preston
11	San Francisco Board of Supervisors	Gordon Mar
12	San Francisco Board of Supervisors	Hillary Ronen
13	San Francisco Board of Supervisors	Rafael Mandelman
14	San Francisco Board of Supervisors	Matt Haney
15	San Francisco Board of Supervisors	Myrna Melgar
16	San Francisco Board of Supervisors	Shamann Walton
17	San Francisco Department of Building Inspection	Lily Madjus-Wu
18	San Francisco Department of Building Inspection	Patrick O'Riordan
19	San Francisco Department of Public Health	June Weintraub
20	San Francisco Department of Public Works	Alaric Degrafinried
21	San Francisco Department of Real Estate	Sachiko Tanikawa
22	San Francisco Department of the Environment	Debbie Raphael
23	San Francisco Fire Department	Janine Nicholson
24	San Francisco International Airport	Erin Cooke
25	San Francisco International Airport	Ivar C Satero
26	San Francisco International Airport	Jennifer Acton
27	San Francisco International Airport	Nupur Sinha
28	San Francisco Municipal Transportation Agency	Jeffrey Tumlin
29	San Francisco Office of Community Investment and Infrastructure	Jose Campos
30	San Francisco Office of Community Investment and Infrastructure	Salley Oerth
31	San Francisco Office of Small Business	Regina Dick-Endrizzi
32	San Francisco Office of the City Attorney	Dennis Herrera
33	San Francisco Planning Department	Chris Kern
34	San Francisco Planning Department	Rich Hillis
35	San Francisco Public Library	Michael Lambert
36	San Francisco Recreation and Park Department	Dennis Kern
37	San Francisco Recreation and Park Department	Phil Ginsburg
38	San Francisco Sheriff's Department	Paul Miyamoto
39	San Francisco Unified School District- Director of Sustainability	Nik Kaestner
40	San Francisco Unified School District- Water Conservation Mgr	Nate Kinsey

Recipients of 2020 UWMP Update Notification
(Sent via e-mail on January 29, 2021, February 8, 2021 and March 12, 2021)

41	Sunshine Ordinance Task Force	General
42	California Water Service Company	Dawn Smithson
43	California Water Service Company	Ken Jenkins
44	California Water Service Company	Ross Moilan
45	City of Brisbane	Jerry Flanagan
46	City of Brisbane/Guadalupe Valley Municipal Improvement District	Randy Breault
47	City of Burlingame	Art Morimoto
48	City of Burlingame	Tim McAuliffe
49	City of Daly City	Greg Krauss
50	City of Daly City	Ward Donnelly
51	City of East Palo Alto	Kamal Fallaha
52	City of East Palo Alto	Patrick Heisinger
53	City of Hayward	Alex Ameri
54	City of Hayward	Cheryl Munoz
55	City of Menlo Park	Christopher Lam
56	City of Menlo Park	Pam Lowe
57	City of Millbrae	Khee Lim
58	City of Millbrae	Shelley Reider
59	City of Milpitas	Tony Ndah
60	City of Mountain View	Elizabeth Flegel
61	City of Mountain View	Lisa Au
62	City of Palo Alto	Karla Dailey
63	City of Palo Alto	Lisa Bilir
64	City of Redwood City, Public Works Services Department	Justin Chapel
65	City of Redwood City, Public Works Services Department	Terrence Kyaw
66	City of San Bruno	Jimmy Tan
67	City of San Bruno	Mark Reinhardt
68	City of San Jose	Henry Louie
69	City of San Jose	Jeff Provenzano
70	City of Santa Clara	Gary Welling
71	City of Santa Clara	Shilpa Mehta
72	City of Sunnyvale	Mansour Nasser
73	City of Sunnyvale	Ramana Chinnakotla
74	Coastside County Water District	Cathleen Brennan
75	Coastside County Water District	Mary Rogren
76	Cordilleras Water District	Rick Thall
77	Estero Municipal Improvement District	Allen Smith
78	Estero Municipal Improvement District	Norm Dorais
79	Groveland Community Service	Peter Kampa
80	Mid-Peninsula Water District	Tammy Rudock
81	Mid-Peninsula Water District	Rene Ramirez

Recipients of 2020 UWMP Update Notification
(Sent via e-mail on January 29, 2021, February 8, 2021 and March 12, 2021)

82	North Coast County Water District	Adrianne Carr
83	Purissima Hills Water District	Phil Witt
84	Purissima Hills Water District	Sam Wu
85	Stanford University	Brian Manning
86	Stanford University	Julia Nussbaum
87	Town of Hillsborough	Paul Willis
88	Westborough Water District	Darryl Barrow
89	Town of Hillsborough	Ed Cooney
90	BAWSCA	Allison Schutte
91	BAWSCA	Christina Tang
92	BAWSCA	Danielle McPherson
93	BAWSCA	Kyle Ramey
94	BAWSCA	Enrique Lourdes
95	BAWSCA	Negin Ashoori
96	BAWSCA	Nicole Sandkulla
97	BAWSCA	Tom Francis
98	California State Assembly, AD12	Heath Flora
99	California State Coastal Conservancy	Moira McEnespy
100	California State Library Government Publications Section	Janet Coles
101	California State Seismic Safety Commission	Rick McCarthy
102	Department of Water Resources Office of Water Use Efficiency & Transfer	David Todd
103	San Francisco Housing Authority	Alicia Sisca
104	San Francisco Housing Authority	Barbara Smith
105	U.S. Environmental Protection Agency, Region 9	Eric Byous
106	U.S. EPA Region 9	David W. Smith
107	U.S. EPA Region 9	Tomas Torres
108	Contra Costa Water District	Steve Welch
109	East Bay Municipal Utility District	Clifford Chan
110	East Bay Municipal Utility District	Priyanka Jain
111	Marin Municipal Water District	Ben Horenstein
112	Santa Clara Valley Water District	Kristen Struve
113	Santa Clara Valley Water District	Rick Callender
114	Turlock Irrigation District	Tou Her
115	Zone 7 Water Agency	Amparo Flores
116	Zone 7 Water Agency	Elke Rank
117	Zone 7 Water Agency	Valerie Pryor
118	Alameda County	Susan S. Muranishi
119	County of San Mateo	Mike Callagy
120	County of Santa Clara	Jeffrey V. Smith
121	San Joaquin County	Matthew Paulin
122	Tuolumne County	Tracie Riggs

Recipients of 2020 UWMP Update Notification
(Sent via e-mail on January 29, 2021, February 8, 2021 and March 12, 2021)

123	Castlewood Country Club	John Vest
124	Golden Gate National Cemetery	Justin Blakeslee
125	Lawrence Livermore National Laboratory	Aaron W.Ward
126	Menlo Country Club	Kip Prahl
127	National Park Service GGNRA	Laura Joss
128	San Francisco State University	Caitlin Steele
129	San Francisco State University	Charles A. Meyer
130	San Francisco State University	General
131	San Francisco Zoo	Tanya Peterson
132	The Villas Parkmerced	General e-mail address
133	American True / True Youth	Daniel Leininger
134	Bay Area Council	Adrian Covert
135	Bayview Merchants Association	Al Norman
136	Building Owner and Management Association (BOMA)	Ken Cleaveland
137	Building Owner and Management Association (BOMA)	
138	California Native Plant Society - Yerba Buena Chapter	Eddie Bartley
139	California Sportfishing Protection Alliance	Chris Shutes
140	California Trout	Patrick Samuel
141	Coalition For San Francisco Neighborhoods	Joan Girardot
142	Coalition for San Francisco Neighborhoods	George Wooding
143	Coalition for San Francisco Neighborhoods	Nancy Wuerfel
144	Environmental Defense Fund	Ann Hayden
145	Environmental Defense Fund	Beth Trask
146	Golden Gate Audubon Society	Dan Murphy
147	Golden Gate Audubon Society	Pam Young
148	Golden Gate Heights Neighborhood Association	Frank Noto
149	Golden Gate Restaurant Association	Donnalyn Murphy
150	Golden Gate Restaurant Association	Laurie Thomas
151	Greater West Portal Neighborhood Association	Thomas Kanaley
152	Greater West Portal Neighborhood Association	Karen Tarantola
153	Greenway Belt- Visitacion Valley	Fran Martin
154	H2O Econ	Brian Browne
155	Hotel Council	Kevin Carroll
156	Joint Venture Silicon Valley	Kara Gross
157	Lakeshore Acres Improvement Club	Jim Stark
158	Natural Resources Defense Council	Ed Osann
159	North of the Panhandle Neighborhood Association	Julian Mackey
160	Oceanview, Merced Heights, Ingleside - Neighbors in Action (OMI-NIA)	Al Harris
161	Oceanview, Merced Heights, Ingleside - Neighbors in Action (OMI-NIA)	Mary Harris
162	Pacific Institute	Heather Cooley
163	Pacific Institute	Peter Gleick

Recipients of 2020 UWMP Update Notification
(Sent via e-mail on January 29, 2021, February 8, 2021 and March 12, 2021)

164	People of Parkside Sunset	Wesley Footracer
165	Planning and Conservation League	Jonas Minton
166	Planning Association for the Richmond (PAR)	Ray Holland
167	Planning Association for the Richmond (PAR)	Kate Lazarus
168	Plumbers Union Local 38	Larry Mazzola Jr.
169	Presidio Teachers Night	Lisa Hillstrom
170	Rebuild Together	Karen Nemsick
171	Restore Hetch Hetchy	Spreck Rosekrans
172	San Francisco Beautiful	Darcy Brown
173	San Francisco Chamber of Commerce	Emily Abraham
174	San Francisco Chamber of Commerce	Jay Cheng
175	San Francisco Chamber of Commerce	Rodney Fong
176	San Francisco Council of District Merchants	Maryo Mogannam
177	San Francisco Democratic County Central Committee	General e-mail address
178	San Francisco Neighborhood Parks Council- Exec Director	Meredith Thomas
179	San Francisco Parks Alliance	Drew Becher
180	San Francisco Parks Alliance	Kearstin Krehbiel
181	San Francisco Republican Central Committee	Christian Foster
182	San Francisco Republican County Central Committee	John Dennis
183	San Francisco Small Business Network	Art Swanson
184	San Francisco Tomorrow	Jennifer Clary
185	Save the Bay- Executive Director	David Lewis
186	SF Apartment Association	Janan New
187	SF Apartment Association	Maria Shea
188	SF Council of District Merchants - President	Henry Karnilowicz
189	SF Power	Steven Moss
190	SFPUC Citizens' Advisory Committee (CAC)	Amy Nagengast
191	SFPUC Citizens' Advisory Committee (CAC)	Amy Zock
192	SFPUC Citizens' Advisory Committee (CAC)	Anietie Ekanem
193	SFPUC Citizens' Advisory Committee (CAC)	Eliahu Perszyk
194	SFPUC Citizens' Advisory Committee (CAC)	Moises Garcia
195	SFPUC Citizens' Advisory Committee (CAC)	Jim McHugh
196	SFPUC Citizens' Advisory Committee (CAC)	Misty McKinney
197	SFPUC Citizens' Advisory Committee (CAC)	Mayara Ruski Augusto Sa
198	SFPUC Citizens' Advisory Committee (CAC)	Steven Kight
199	SFPUC Citizens' Advisory Committee (CAC)	Mark Tang
200	SFPUC Citizens' Advisory Committee (CAC)	Ted Lowenberg
201	Sierra Club San Francisco	Minda Berbeco
202	Silicon Valley Leadership Group	Mike Mielke
203	Southeast Community Facility	Emily Rogers-Pharr
204	SPUR	Laura Feinstein

Recipients of 2020 UWMP Update Notification
(Sent via e-mail on January 29, 2021, February 8, 2021 and March 12, 2021)

205	Sunset Beacon/Richmond Review	Paul Kozakiewicz
206	Sunset Heights Associaton of Responsible People	Dennis Minnick
207	Sunset Neighborhood Beacon Center	Matt Pemberton
208	Sunset Parkside Education and Action Committee (SPEAK)	Marc Duffett
209	Sunset-Parkside Education & Action Committee	Mary Anne Miller
210	Tuolumne River Trust	Eric Wesselman
211	Tuolumne River Trust	Peter Drekmeier
212	Tuolumne River Trust & California Sportfishing Protection Alliance	Cindy Charles
213	Twin Peaks Improvement Association	Doris Linnenbach
214	Urban Resource Systems	Isabel Wade
215	West of Twin Peaks Central Council	Dena Aslanian-Williams
216	West of Twin Peaks Central Council	George Wooding
217	Westsdie Observer	Doug Comstock
218	Westwood Park Association	Michael Ahrens
219	City College of San Francisco	Ted Aranas
220	Presidio Trust	Jean S Fraser
221	UCSF, Director Facilities Management	Maric S. Munn
222	University of San Francisco	Richard Hsu
223	Interested Stakeholders	Benny Bleiman
224	Interested Stakeholders	Bry Sarte
225	Interested Stakeholders	David Warner
226	Interested Stakeholders	Paul Collachi
227	Interested Stakeholders	William Martin
228	Interested Stakeholders	Ruth Gravanis
229	Interested Stakeholders	Dick Allen
230	Interested Stakeholders	Kathy Howard
231	Interested Stakeholders	Dick Morten
232	Interested Stakeholders	Steve Lawrence

Declaration of Publication - Notice of public hearing posted in San Francisco Chronicle on 03/29/2021 and 04/05/2021

DECLARATION OF PUBLICATION OF

SAN FRANCISCO CHRONICLE

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

NOTICE OF PUBLIC HEARING Tuesday, April 13, 2021 - 1:30pm at a Regular Meeting of the San Francisco Public Utilities Commission (SFPUC), the governing board of the publicly owned utility operations of the City and County of San Francisco: Notice is hereby given that the SFPUC will conduct a public hearing to consider the Draft 2020 Urban Water Management Plan (UWMP) for the City and County of San Francisco. The detailed agenda and related files will be available at least 72 hours before the scheduled meetings at the SFPUC website: www.sfwater.org or by calling (415) 554-3165. The hearing will be held virtually and can be accessed using the following information: Watch the meeting live: https://www.sfgovtv.org/sfpuc. Call-in number: 1 (415) 655-0001 / MEETING ID: 146 929 4145 # #

All interested parties are invited to attend the public hearing and present their views. Persons who are unable to attend the public hearing may also submit written comments regarding the subject of the hearing. These comments will be brought to the attention of the Commission and will become part of the official public record. Written comments can be delivered to SFPUC in one of three ways:

1) Emailed to Sarah Triolo, striolo@sfwater.org.
2) Mailed to the following address: Steve Ritchie, SFPUC, 525 Golden Gate Avenue, 13th Floor, SF, CA 94102.
3) Deposited in the drop box at 525 Golden Gate Avenue. Comments submitted via the drop box must be in an envelope with the following information clearly printed: "Urban Water Management Plan Comments, c/o Sarah Triolo".

The Draft 2020 UWMP can be viewed and printed from the SFPUC website at: https://sfpuc.org/uwmp.

DIANE FITZGIBBON

declares that:

The annexed advertisement has been regularly published in the

SAN FRANCISCO CHRONICLE

which is and was at all times herein mentioned established as newspaper of general circulation in the City and County of San Francisco, State of California, as that term is defined by Section 6000 of the Government Code.

SAN FRANCISCO CHRONICLE
(Name of Newspaper)

901 Mission Street
San Francisco, CA 94103

From 3/29/2021
To 4/5/2021
Namely, on 3/29, 4/5/2021

(Dates of Publication)

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 4/5/2021

at San Francisco, California.

Diane Fitzgibbon

DIANE FITZGIBBON

Currents Newsletter sent with March/April bill

A Newsletter of the San Francisco Public Utilities Commission

currents

MARCH/APRIL 2021

CHECK OUT OUR NEW WEBSITE

FIND US AT SFPUC.ORG

It has been more than **10 years** since we have updated our website. So much has changed over the last decade and it was time for our website to get a full refresh! We've even updated our name! You can now find us at **SFPUC.org**!

Water is still at the very core of everything we do, but it is only a fraction of what we focus on as a City department of more than 2,300 employees across various bureaus and divisions.

Our new site puts user experience first. It's mobile and tablet friendly, and a lot easier to navigate.

Now you can easily find exactly what you are looking for. From Bill Pay to Construction Updates and Start/Stop Services, everything is easily accessible right from the homepage.

If you are a CleanPowerSF customer, you will now find them at **SFPUC.org/CleanPowerSF**.

SCAN THE QR CODE AND EXPLORE THE **SFPUC.ORG** NOW!

We Want to Hear From You

We are engaging in long-term water supply planning through our update to the Urban Water Management Plan. Public comment on the plan will be accepted between April 5 and May 5, 2021. We invite all interested parties to review and comment. Review the plan and learn about public meeting dates at **SFPUC.org/UWMP**.

"Climate change is one of the great challenges of our day, which is why we prioritize our commitment to sustainability. Whether it is exploring innovative water reuse programs like the Westside Water Recycling Project, providing renewable energy through CleanPowerSF or investing in a new Biosolids Digester facility, we are always guided by responsible environmental standards." - Michael Carlin, Acting General Manager

Combating Climate Change with Clean Energy

Hetch Hetchy Power – San Francisco's publicly owned utility — has been generating 100 percent greenhouse gas-free hydro-electric power for over a century and continues to evolve to meet today's growing clean energy needs. The utility currently manages over 23 publicly-owned solar arrays in San Francisco, and recently constructed and energized its first solar plus battery storage project, which will allow excess solar energy produced during the day to be stored in batteries and used at night. These ongoing local investments are reducing climate change causing greenhouse gas emissions and accelerating San Francisco's transition to a 100% renewable energy future. **SFPUC.org/hetchypower**

Safeguarding Our Vital Infrastructure

San Francisco's Ocean Beach shoreline is being washed away. The City's vital wastewater infrastructure, the Great Highway, and even community access are threatened by the increasing pace of coastal erosion. The Ocean Beach Climate Adaptation Plan is a joint effort between the SFPUC and City, state, and federal agencies as well as beach users and community members. Projects outlined in the Plan will help us adapt to climate-driven changes and protect critical infrastructure while supporting open space, recreation, and natural habitats citywide. Learn more about our various short and long term climate change adaptation efforts at **SFPUC.org/oceanbeach**.

Color Our Bay & Ocean

Keeping key pollutants, like trash, pesticides, and oil from going down our storm drains helps the marine ecosystem stay healthy and safe.

Sharpen your pencils and color away!

CHECK OUT OUR COLORED VERSION AT:
SFPUCNEWSROOM.COM/BY-THE-NUMBERS/PUZZLE/

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

San Francisco Public Utilities Commission
525 Golden Gate Avenue
San Francisco, CA 94102

SFPUC.org

Customer Services **415-551-3000**
TDD Hearing/Speech Impaired **415-551-3052**
Citywide Customer Service **311**

Web Posting -Public Hearing Notice & Draft UWMP made available online

Urban Water Management Plan

The Urban Water Management Planning Act (Water Code Section 10610-10657) requires urban water suppliers to update their Urban Water Management Plan (UWMP) and submit the completed plan to the California Department of Water Resources (DWR) every 5 years. The City and County of San Francisco is currently reviewing its UWMP and will be considering amendments or changes to the document. The 2020 update to the UWMP is due to DWR by July 1, 2021.

The UWMP will provide an overview of our water deliveries and uses, water supply sources, and water conservation programs. It will also include discussions on supply and demand projections over a 25-year planning horizon (from 2020 to 2045), available water supplies to meet existing and future demands under a range of water supply conditions, and our water demand management measures to reduce long-term water demand.

Proposed revisions to the UWMP will be available for public review and comment from April 5, 2021 to May 5, 2021. The Draft UWMP 2020 Update will be available here. Additional information on how to access the UWMP will be provided here prior to the start of the public review period.

Notice of Public Hearing

A public hearing will be held on April 13, 2021 at 1:30 pm at the meeting of the San Francisco Public Utilities Commission to allow interested members of the public to participate in the review process. All interested parties are invited to attend the public hearing and present their views. The hearing will be held virtually and can be accessed using the following information:

Watch the meeting live: https://www.sfgovtv.org/sfpuc (https://www.sfgovtv.org/sfpuc).
Call-in number: 1 (415) 655-0001 / MEETING ID: 146 929 4145 # #

The final 2020 UWMP will be adopted by the Commission in June.

Additional Public Meetings

The SFPUC will also be presenting on the draft UWMP to the SFPUC Citizens Advisory Committee (CAC) on April 20, 2021 and to the CAC Water Subcommittee on April 27, 2021. See the agendas and log in information, which are available approximately 72 hours prior to each meeting at www.sfpuc.org/cac (https://sfpuc.org/about-us/boards-commissions-committees/citizens-advisory-committee).

Interested stakeholders are invited to attend these meetings; however, please note that these meetings are for informational purposes only. To make public comments, please attend the public hearing on April 13th or submit comments as described below.

Submission of Comments

Any interested parties may also submit written comments to the City during the public comment period in one of three ways.

1. Written comments can be e-mailed to Sarah Triolo, **striolo@sfwater.org (mailto:striolo@sfwater.org)**.
2. Written comments can be mailed to the address below. To ensure that comments can be reviewed and incorporated, any mailed comments must be post-marked by April 30th, 2021.
   Steve Ritchie, San Francisco Public Utilities Commission
   525 Golden Gate Avenue, 13th Floor
   San Francisco, CA 94102
3. Written comments can be deposited in the drop box at 525 Golden Gate Avenue. *Comments submitted via the drop box must be in an envelope with the following information clearly printed: "Urban Water Management Plan Comments, c/o Sarah Triolo".*

In the meantime, if you have any questions about our UWMP, or the process of updating it, please contact Sarah Triolo at striolo@sfwater.org (mailto:striolo@sfwater.org).

Other Documents

- 2020 Retail Conservation Plan (Draft)

2015 Urban Water Management Plan Documents:

- 2015 Urban Water Management Plan for San Francisco
- 2015 Urban Water Management Plan for San Francisco Appendices
- 2015 Urban Water Management Plan for San Francisco Errata
- 2009 Water Supply Agreement (/sites/default/files/programs/local-water/WholesaleAgreement_JUL2009.PDF)

Notice of plan availability for public inspection
and reminder notice of public hearing - 04/05/2021

Gmail

Lara Egbeola-Martial <lara@srtconsultants.com>

2020 Urban Water Management Plan for the City and County of San Francisco Now Available for Public Review

Paula Kehoe <PKehoe@sfwater.org> Mon, Apr 5, 2021 at 9:00 AM
Reply-To: Betsy Lauppe Rhodes <reply-febb10777d650c75-160_HTML-129025369-7290453-1@sfwateroutreach.org>
To: lara@srtconsultants.com

Dear Stakeholders,

As previously noticed, the City and County of San Francisco has prepared a draft 2020 Urban Water Management Plan (UWMP). The draft 2020 UWMP is now available for public review and comment through May 5th, 2021. The document can be found on our website at sfpuc.org/uwmp. See below for additional details on how to learn more and provide your comments on the document.

Notice of Public Hearing

A public hearing will be held on April 13, 2021 at 1:30 pm at the meeting of the San Francisco Public Utilities Commission to allow interested members of the public to participate in the review process. All interested parties are invited to attend the public hearing and provide formal comment on the draft. The hearing will be held virtually and can be accessed using the following information:

WATCH LIVE MEETING

Call-in number: 1 (415) 655-0001 / **MEETING ID:** 146 929 4145 # #

Additional Public Meetings

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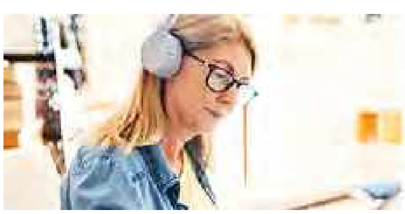

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If you have any questions about our UWMP, or the process of updating it, please contact Sarah Triolo at striolo@sfwater.org.

Sincerely,

Paula Kehoe

Director of Water Resources

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

Facebook | Twitter | Instagram | YouTube | LinkedIn

Reminder notice of plan availability for public inspection - 04/19/2021

Gmail

Lara Egbeola-Martial <lara@srtconsultants.com>

Reminder: Draft 2020 Urban Water Management Plan for the City and County of San Francisco Now Available for Public Review

Paula Kehoe <PKehoe@sfwater.org> Mon, Apr 19, 2021 at 9:00 AM
Reply-To: Betsy Lauppe Rhodes <reply-febf107876650374-160_HTML-129025369-7290453-1@sfwateroutreach.org>
To: lara@srtconsultants.com

Dear Stakeholders,
As previously noticed, the City and County of San Francisco has prepared a draft 2020 Urban Water Management Plan (UWMP). The draft 2020 UWMP became available on April 5th, 2021 and remains available for public review and comment through May 5th, 2021. The document can be found on our website at **sfpuc.org/uwmp** . See below for additional details on how to learn more and provide your comments on the document

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Interested stakeholders are invited to attend these meetings; however, please note that these meetings are for informational purposes only. **To make public comments, please submit comments as described above.**

If you have any questions about our UWMP, or the process of updating it, please contact Sarah Triolo at striolo@sfwater.org .

Sincerely,

Facebook Twitter Instagram YouTube LinkedIn

San Francisco Public Library Process due to COVID 19 pandemic

Urban Water Management Plan Update 2020

Note to file

March 31, 2021

Written by Betsy L. Rhodes

The San Francisco Public Library Government Section is the usual repository of hard copies of public documents that are under public review. This ensures that those without access to computers have access to the documents.

As of this writing, the San Francisco Public Library is closed until further notice due to the COVID 19 pandemic. Please find attached email from Library staff and SF Public Library public Website.

Therefore, SFPUC was not able to provide a hard copy document for public review at this writing.

Should members of the public request hard copies, SFPUC staff will respond on a case by case basis.

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

SAN FRANCISCO PUBLIC UTILITIES COMMISSION

City and County of San Francisco

London N. Breed
Mayor

REGULAR MEETING AGENDA
Tuesday, April 13, 2021
1:30 P.M.

This meeting is being held by Teleconference Pursuant to the Governor's Executive Order N-29-20 and the Twelfth Supplement to Mayoral Proclamation Declaring the Existence of a Local Emergency Dated February 25, 2020

WATCH LIVE:
https://www.sfgovtv.org/sfpuc

PUBLIC COMMENT CALL-IN:
1 (415) 655-0001 / MEETING ID: 146 758 0343 # #

During the Coronavirus Disease (COVID-19) emergency, the San Francisco Public Utilities Commission's (SFPUC) regular meeting room, City Hall, Room 400, is closed. Commissioners and SFPUC staff will convene Commission meetings remotely by teleconference.

Commissioners

Sophie Maxwell, President
Anson Moran, Vice President
Tim Paulson
Ed Harrington
Newsha Ajami

Michael Carlin
Acting General Manager

Donna Hood
Secretary

Accessible Meeting Policy: To obtain meeting materials in alternative format, please contact the Commission Secretary at 415-554-3165 or via email at Commission@sfwater.org. Providing at least 72 hours' notice will help to ensure availability. Written reports or background materials for calendar items are available on-line http://www.sfwater.org/index.aspx?page=167.

Know Your Rights Under the Sunshine Ordinance: Government's duty is to serve the public, reaching its decision in full view of the public. Commissions, boards, councils and other agencies of the City and County exist to conduct the people's business. This ordinance assures that deliberations are conducted before the people and that City operations are open to the people's review. For more information on your rights under the Sunshine Ordinance or to report a violation of the ordinance, contact Administrator, by mail to Sunshine Ordinance Task Force, 1 Dr. Carlton B. Goodlett Place, Room 244, San Francisco, CA 94102.4689; by phone at 554.7724; by fax at 554.7854; or by email at sotf@sfgov.org. Copies of the Sunshine Ordinance can be obtained from the Clerk of the Sunshine Task Force, the San Francisco Public Library and on the City's website at http://www.sfgov.org.

311 Free Language Assistance: 免費語言協助/ Ayuda gratuita con el idioma / Бесплатная помощь переводчиков / Trợ giúp Thông dịch Miễn phí / Assistance linguistique gratuite / 無料の言語支援/ 무료 언어 /지원 / คว"มชว ่ ยเหลอ ื ท"งภ"ษ"โดยไมเ ่ ส'ยคาใชจ ้าย / Libreng tulong para sa wikang Tagalog ยเหลอ ื

Lobbyist Registration and Reporting Requirements: Individuals and entities that influence or attempt to influence local legislative or administrative action may be required by the San Francisco Lobbyist Ordinance [SF Campaign & Governmental Conduct Code §2.100] to register and report lobbying activity. For more information about the Lobbyist Ordinance, please contact the San Francisco Ethics Commission at 25 Van Ness Avenue, Suite 220, San Francisco, CA 94102; telephone (415) 252-3100; fax (415) 252-3112; web site at www.sfgov.org/ethics.

CEQA Appeal Rights under Chapter 31 of the San Francisco Administrative Code: If the Commission's action on a project constitutes the Approval Action for that project (as defined in S.F. Administrative Code Chapter 31, as amended, Board of Supervisors Ordinance Number 161-13), then the CEQA determination prepared in support of that Approval Action is thereafter subject to appeal within the time frame specified in S.F. Administrative Code Section 31.16. Typically, an appeal must be filed within 30 calendar days of the Approval Action for a project that has received an exemption or negative declaration pursuant to CEQA. For information on filing an appeal under Chapter 31, contact the Clerk of the Board of Supervisors at City Hall, 1 Dr. Carlton B. Goodlett Place, Room 244, San Francisco, CA 94102, or call (415) 554-5184. If the Planning Department's Environmental Review Officer has deemed a project to be exempt from further environmental review, an exemption determination has been prepared and can be obtained on-line at http://www.sf- planning.org/index.aspx?page=3447.Under CEQA, in a later court challenge, a litigant may be limited to raising only those issues previously raised at a hearing on the project or in written correspondence delivered to the Board of Supervisors, Planning Commission, Planning Department or San Francisco Public Utilities Commission at, or prior to, such hearing, or as part of the appeal hearing process on the CEQA decision.

ORDER OF BUSINESS

1. Call to Order

2. Roll Call

3. Approval of the Minutes:
   a) March 23, 2021 Regular Meeting
   b) March 23, 2021 Special Joint Meeting with the San Francisco Board of Supervisors
   c) March 26, 2021 Special Meeting

4. General Public Comment
   Members of the public may address the Commission on matters that are within the Commission's jurisdiction and are not on today's agenda

5. Communications (discussion only)
   a) Advance Calendar
   b) Contract Advertisement Report
   c) Correspondence Log
   d) Annual Electric Reliability Compliance Program Report
   e) Annual Power Risk Management Update
   f) Peninsula Watershed – Proposed Prescribed Burn Project Update
   g) SFPUC High-Efficiency Direct Toilet Install Map and Installation Totals
   h) Water Pipeline Assessment
   i) Water Supply Conditions Update

6. Report of the General Manager (discussion only)
   a) 2020 Retail Water Conservation Plan which provides a summary of planned conservation measures
   b) Wastewater Enterprise Racial Equity Plan
   c) Report on Recent San Francisco Public Utilities Commission Activities, Events and Announcements

7. New Commission Business (discussion only)

CONSENT CALENDAR

8. *All matters listed hereunder constitute a Consent Calendar are considered to be routine by the San Francisco Public Utilities Commission and will be acted upon by a single vote of the Commission. There will be no separate discussion of these items unless a member of the Commission or the public so requests, in which event the matter will be removed from the Calendar and considered as a separate item.*

   a) Approve an increase of 180 calendar days to the contract duration contingency for **Contract No. DB-129.1** Bay Corridor Transmission and Distribution Phase 2 (2019) North, with Mitchell Engineering; and authorize the General Manager to approve future modifications to the contract for a total contract duration of up to 615 consecutive calendar days (approximately one year and eight months), with no change to the contract amount. (How)

b) Approve an increase of 180 calendar days to the contract duration contingency for **Contract No. DB-129.2** Bay Corridor Transmission and Distribution Phase 2 (2019) South, with Anvil Builders, Inc.; and authorize the General Manager to approve future modifications to the contract for a total contract duration of up to 615 consecutive calendar days (approximately one year and eight months), with no change to contract amount. (How)

c) Approve an increase of 360 calendar days to the contract duration contingency for **Contract No. DB-130** Bay Corridor Transmission and Distribution Phase 3 (2019), with Beta Engineering California, LP.; and authorize the General Manager to approve future modifications to the contract for a total contract duration of up to 795 consecutive calendar days (approximately two years and three months), with no change to the contract amount. (How)

d) Approve the plans and specifications, and award **Contract No. HH-1003R** Moccasin Powerhouse Generator Step Up Transformer Installation, in the amount of $3,321,432, and with a duration of 716 consecutive calendar days (approximately two years), to the responsible bidder submitting the lowest responsive bid, Big Valley Electric, to make improvements to the two transformer bays and install two new City-furnished generator step-up transformers. This action constitutes the Approval Action for the project for the purposes of CEQA, pursuant to Section 31.04(h) of the San Francisco Administrative Code. (How)

e) Approve an increase of 273 calendar days to the contract duration contingency for **Contract No. WD-2729**, Fish Passage Facilities within the Alameda Creek Watershed, a sub-project of the Calaveras Dam Replacement Project; and authorize the General Manager to approve future modifications to the contract for a total duration of up to 1,991 consecutive calendar days (approximately five years and five months), with no change to the contract amount. (How)

REGULAR CALENDAR

9. Approve program rules for the **Customer Affordability and Arrearage Management Plan Pilot Program** and authorize the General Manager to implement the Pilot Program which will provide up to 150 low-income SFPUC residential water and wastewater customers residing in the 94112, 94124, and 94134 zip codes, who have accrued high levels of arrearages on their SFPUC accounts, with a combination of rate discounts and/or debt relief, with a not-to-exceed program budget of $110,000 from SFPUC funds. (Ordikhani/Sandler)

10. Adopt the **2021 Revised Baseline Scope, Schedule, and Budget for the Water Enterprise Capital Improvement Program**, consisting of 36 projects (25 Regional projects and 11 Local projects) within the adopted San Francisco Public Utilities Commission 10-Year Capital Plan for FY 2020-21 through FY 2029-30 that have budgets greater than $5 million and are currently active or intended to be initiated within FY 2020-21 or FY 2021-22. (How)

11. Presentation and discussion only of the **Draft 2020 Urban Water Management Plan**

(UWMP), including the Draft 2020 Water Shortage Contingency Plan, for the City and County of San Francisco pursuant to California Water Code Section 10642. The Commission will consider approval of a Final UWMP at the June 8, 2021 Commission meeting. (Ritchie)

12. Approve Amendment No. 2 to **Agreement No. PRO.0092**, Engineering Services for South Ocean Beach Coastal Erosion and Wastewater Protection, with Moffatt and Nichol-AGS Joint Venture to provide engineering design services for the Ocean Beach Climate Change Adaptation Long-term Improvements Project; and authorize the General Manager to execute this amendment, increasing the agreement amount by $2,000,000 and extending the agreement duration by four years, for a total not-to-exceed agreement amount of $5,750,000, and a total duration of nine years. (How)

13. Approve the selection of Kennedy/Jenks Consultants, Water Resources Engineering, Inc., AECOM Technical Services, Inc., and Hazen-LEE Joint Venture (JV); award **Agreement Nos. PRO.0172.A-D**, As-needed Engineering Design Services, to provide specialized engineering design services on an as-needed basis for SFPUC enterprises and bureaus; and authorize the General Manager to execute these four professional services agreements with Kennedy/Jenks Consultants (PRO.0172.A), Water Resources Engineering, Inc. (PRO.0172.B), AECOM Technical Services, Inc. (PRO.0172.C), and Hazen-LEE Joint Venture (PRO.0172.D), each in an amount not-to-exceed $4,500,000, and each with a term of five years. (How)

14. Approve the plans and specifications, and award **Contract No. WD-2825R**, Alameda Creek Recapture Project in the amount of $19,511,500 and with a duration of 547 consecutive calendar days (approximately one year and six months), to the responsible bidder submitting the lowest responsive bid, Anvil Builders, Inc. to install a barge and pump system, pipelines, valves and valve vault, and control building to recapture and transfer creek flows to the San Francisco Public Utilities Commission's Regional Water System. (How)

15. Approve the plans and specifications, and award **Contract No. WW-711**, Wawona Area Stormwater Improvement and Vicente Street Water Main Replacement Project, in the amount of $29,132,100 and with a duration of 987 consecutive calendar days (approximately two years and eight months), to the responsible bidder submitting the lowest responsive bid, KJ Woods Construction Inc., to construct a stormwater conveyance system in the Wawona area and replace the water mains on Vicente Street. This action constitutes the Approval Action for the project for the purposes of California Environmental Quality Act, pursuant to Section 31.04(h) of the San Francisco Administrative Code. (How)

16. Public comment on matters to be addressed during Closed Session.

17. Motion on whether to assert the attorney-client privilege regarding the matters listed below as Conference with Legal Counsel.

The Commission will go into Closed Session to discuss the following items:

CLOSED SESSION

18. Conference with Legal Counsel – Pursuant to California Government Code, Section 54956.9(a), and San Francisco Administrative Code, Section 67.10(d)(1) (discussion only) (Mueller)

    Conferring with, or receiving advice from, the City Attorney regarding the following existing litigation in which the City is a petitioner and Pacific Gas & Electric Company is an adverse party: In re: PG&E Corporation and Pacific Gas & Electric Company, United States Bankruptcy Court, Northern District of California, Case No. 9-30088-DM, filed January 29, 2019; Federal Energy Regulatory Commission Case No. EL 19-38- 000, filed January 28, 2019; Federal Energy Regulatory Commission Case No. ER18- 1482-000, filed April 30, 2018; Federal Energy Regulatory Commission Case No. ER18-1102-000, filed March 15, 2018; Federal Energy Regulatory Commission Case No. ER18-790-000, filed, February 2, 2018; Federal Energy Regulatory Commission Case No. ER18-768-000, filed January 31, 2018; Federal Energy Regulatory Commission Case No. ER18-198-000, filed October 31, 2017; Federal Energy Regulatory Commission Case No. ER17-2406-000, filed August 31, 2017; Federal Energy Regulatory Commission Case No. ER17-2181-000, filed July 31, 2017; Federal Energy Regulatory Commission Case No. ER17-2204, filed July 31, 2017; Federal Energy Regulatory Commission Case No. ER17-1509-000, filed May 1, 2017; Federal Energy Regulatory Commission Case No. ER17-910-000, filed January 31, 2017; Federal Energy Regulatory Commission Case No. EL 15-3-000, filed October 10, 2014; Federal Energy Regulatory Commission Case No. ER15-702-000, filed December 23, 2014; Federal Energy Regulatory Commission Case No. ER15-703- 000, filed December 23, 2014; Federal Energy Regulatory Commission Case No. ER15-704-000, filed December 23, 2014; Federal Energy Regulatory Commission Case No. ER15-705-000, filed December 23, 2014; Federal Energy Regulatory Commission Case No. ER15-735-000, filed December 23, 2014; California Public Utilities Commission Case No. 1.15-08-019, filed February 25, 2015; California Public Utilities Commission Case No. R.18-10-007, filed October 25, 2018; California Public Utilities Commission Case No. R.19-01-006, filed January 10, 2019; and California Public Utilities Commission Case No. R.19-09-016, filed January 10, 2019.

19. Conference with Legal Counsel – Anticipated Litigation as Petitioner per California Government Code 54956.9(d)(4) and San Francisco Administrative Code Section 67.10(d)(2) (discussion only) (Whipps)

20. Conference with Legal Counsel – Pursuant to California Government Code Section 54965.9 (d)(1) and San Francisco Administrative Code Section 67.10 (d)(1) (discussion only) (Whipps)

    Existing Litigation
    San Joaquin Tributaries Authority, et al v. California State Water Resources Control Board
    Tuolumne Superior Court Case No. CV62094/Date Filed: January 10, 2019
    Coordinated as State Water Board Cases by order filed May 13, 2019 in Sacramento Superior Court, JCCP No. 5013

Following Closed Session, the Commission will reconvene in Open Session.

21. Announcement following Closed Session.

22. Motion regarding whether to disclose the discussions during Closed Session pursuant to San Francisco Administrative Code Section 67.12(a).

Adjournment.

SFPUC UWMP Public Comments

Name	Affiliation	Questions/Comments	Response
SFPUC 2020 UWMP Update - Comments Submitted at Public Hearing, April 13, 2021			
Tom Francis	Water Resources Manager at BAWSCA	Commenter acknowledged that both SFPUC and BAWSCA member agencies have low projected per capita usage but high projected population growth. Commenter expressed concern about the shortfalls created by the implementation of the Bay-Delta Plan, which may cause per capita water use for residents served by BAWSCA agencies to drop below 30 gpcd, which is below health and safety guidelines. Commenter asked that the Commission continue to fight the implementation of the Bay-Delta Plan and continue to move the Alternative Water Supply Program forward.	Comment noted.
Danielle Mcpherson	Senior Water Resources Specialist at BAWSCA	Commenter expressed appreciation for SFPUC staff for their high level of engagement and efforts on the development of the UWMP and the coordination with BAWSCA.	Comment noted.
John Stiefel	WASH Consultant and member of the SF Coalition on Homelessness Human Rights Working Group	Commenter expressed concern that the plan does not take into account the water demands of unhoused San Franciscans, and expressed concern about this population lacking access to water. Additional information is provided in response to the written comments on this topic.	Additional information is provided in response to the written comments on this topic.
Gary Welling	Director of Water and Sewer at the City of Santa Clara	Commenter expressed concern about the impacts resulting from the adoption of the Bay-Delta Plan and the scenarios presented in the UWMP, given that the information must be used for long-term planning including a major arena and housing requirements. Commenter asked the Commission to re-affirm its commitment to meet obligations to the Wholesale Customers and to take actions necessary, including the development of alternative water supply. Commenter also requested that the Commission make Santa Clara a permanent customer.	Comment noted.
Nicole Sandkulla	BAWSCA CEO	Commenter noted that the water supply scenarios with the Bay-Delta Plan involve significant impact to the wholesale water supplies, which would lead to a slow down in the economy, hinder job growth, and impact the health, safety, and economic risk for people and businesses. Commenter noted that BAWSCA supports the objectives of the Bay-Delta Plan and agrees that actions need to be taken to protect the fish and environment of the Tuolumne River. Commenter noted that the Tuolumne River Voluntary Agreement (TRVA) is a science-based alternative, and urged the SFPUC to continue its effort to secure the evaluation of the TRVA by the State Board. Commenter urged the SFPUC to identify additional water supply to meet its legal and contractual water supply reliability obligations to BAWSCA agencies.	Comment noted.
Francisco da Costa		Commenter noted that the SFPUC is supplying water to entities not prioritized in the Raker Act, and that the reservoir and its water belong to the First people. Commenter noted that the Commission is concerned about the degree to which conservation is impacting revenue.	Comment noted.
Peter Drekmeier	Tuolumne River Trust	Commenter asserted that the UWMP is a lobbying tool against the Bay-Delta Plan, showing 53% rationing in a single dry year. Commenter expressed disappointment that staff is trying to turn people against the Bay-Delta Plan. Commenter noted the possibility of shortening the design drought, adding alternative water supplies and getting more realistic about water demands. Commenter noted that the issues may not be able to be covered before the submission of the plan. Commenter noted that the SFPUC uses 5 years from the 8-year design drought, and that in their opinion SFPUC could get through a 5-year drought with no rationing with the Bay-Delta Plan.	The UWMP is prepared every five years and represents a snapshot of the SFPUC's long-term planning. The SFPUC is not precluded from making changes to policy between UWMPs; if the Commission adopts new policies that impact the water supply reliability assessment, new materials could be prepared to support Water Supply Assessments and other documents that rely on the UWMP.
Larry A.	Homeowner and volunteer with the Human Rights Working group of the SF Coalition on Homelessness	Commenter expressed concern about the unhoused population of San Francisco and their access to water. Commenter expressed a desire for the demand of the homeless population to be accounted for in the UWMP.	Additional information is provided in response to the written comments sent on this topic.

Batool Zaro	City of East Palo Alto	Commenter noted that the City of East Palo Alto (City) is almost 100% reliant on SFPUC's Regional Water Sustem supply fore their potable water supply. Commenter noted the City's low per capita water usage of 60 gpcd, and that 70% of the City's demand is residential, and 90% of residential demand is used to meet basic health and safety needs. Commenter noted that the City's contract with the SFPUC includes a Level of Service goal of no more than 20% cutback; in order to reach the projected cutbacks of up to 54%, the City's per capita usage would ahve to reach a dangerous level of 36 gpcd. Commenter noted that the City would have to consider harmful policies because of insufficient supply. Commenter noted that the City feels strongly that the SFPUC should do everything they can to ensure that its wholesale customers and residents have reliable water supply.	Comment noted. The SFPUC will be communicating with our Wholesale Customers collectively on this topic.
David Pilpel		- Does the plan incorporate the BAWSCA analysis that Nicole Sandkulla went through at the last workshop? - How do the UWMP population projections align with the estimates from the city's Planning Department and Plan bay Area? - Is there any additional public engagement planned prior to the Commission in June? Another meeting before the next commission meeting would be helpful. For the UWMP 15 to 20 years ago, there was an in-person meeting, where I met Steve Ritchie for the first time. Could there be a virtual meeting to discuss the UWMP with the public?	The Plan's supply reliability assessment is based on the wholesale customers' projected demands on the Regional Water System, after their local supplies have already been accounted for. The population projections presented in the Plan were provided by the Planning Department. Several notices were sent to stakeholders about the public hearing at the Commission meeting, as well as about SFPUC presentations made at its Citizens Advisory Committee meetings on April 20th and April 27th; this information was also on the SFPUC website.
SFPUC 2020 UWMP Update - Comments Submitted at SFPUC CAC, April 20, 2021			
Anietie Ekanem	SFPUC CAC	Clarification about the distinction between the residential water use, at the wholesale vs. municipal level?	The UWMP addresses residential, irrigation, commercial and instruction so in case of rationing, SFPUC would require rationing across all water usages. For the wholesale customers, the WSA defines how water would be allocated to the wholesale customers and the UWMP analysis does not change any of that.
Anietie Ekanem	SFPUC CAC	Will enforcement of rationing be the same in all districts?	Enforcement of mandatory rationing would be the same for all customers regardless of location in the City.
Eliahu Perszyk	SFPUC CAC	The energy intensity is a new requirement and the energy intensity value calculated is negative. Can you explain why that is?	In this calculation, we can account for the energy generated as part of the water supply, which in this case is hydropower produced by the RWS. Since the RWS is mostly gravity-fed, energy use is mainly for water treatment; our net energy balance is negative, as we are producing more energy than we use.
Jennifer Clary	SFPUC CAC	Largest water users are multi family residential and are the largest anticipated growth in water use. Is the per capita for multi family calculated separated from single family? I am surprised to see that the per capita water use is expected to plateau, if the number of multi family dwellings units will increase and their per capita water use is lower.	The current estimate for average single-family per capita use is about 50 gpcd, and for multi-family is about 36 gpcd. The single-family per capita usage is projected to decrease over the course of the planning horizon, while the multi-family is projected to increase slightly. One potential reason for this is that our estimates of active conservation savings are highest in the next 5-10 years before existing programs expire; there will likely be additional future savings past that as we implement new programs, but those savings are not yet estimated.
Anietie Ekanem	SFPUC CAC	How do you go about estimating water use and savings separately for multi family units? In multi family buildings, it is hard to change behaviors directly, because units don't get individual bills, so they don’t necessarily see directly the monetary consequences meant to deter people from maintaining high water usage.	Our work with conservation savings in multi-family buildings has shown that significant savings can be achieved at the property level; most of the savings come from activities such as maintaining plumbing fixtures, appliances, irrigation; fixing leaks; and replacing old fixtures and equipment.
Emily Agire	SFPUC CAC	You mentioned that rationing programs would be enforced first in the irrigation sector, then residential, then commercial sector. How was this order chosen, and what does an irrigation sector look like in San Francisco?	Irrigation accounts include customers such as large golf courses, HOAs with shared irrigation areas, and parks. The rationale behind asking irrigation customers to conserve first is to cut outdoor irrigation before asking residents to cut indoor water use, while trying to reduce impacts on businesses and economic growth. To maintain green space in the City, irrigation customers would not be asked to completely eliminate their water use. During a declared water shortage, SFPUC would be working with all large water users to help them reduce their water use.

Jennifer Clary	SFPUC CAC	Can you explain water loss - what it entails, how it is measured and why your report estimated no reduction in water loss, despite new state requirements to address this area of water waste. In addition, why is the 2020 value 7.2 mgd and the projections 6 mgd?	Water loss includes both real losses, i.e. physical losses through leaks, and apparent losses, i.e. errors in the metering equipment. SFPUC has an asset management program, as described in Section 10 of the UWMP, and is committed to reducing real and apparent losses. In addition, the 2020 water loss value includes both real and appaent losses; the projected values include real losses only, as we have no way to project apparent losses.
Jennifer Clary	SFPUC CAC	Does water loss include water used for fire fighting?	No; that would be categorized as a municipal water use.
Suki Kott	SFPUC CAC	What happens with population growth in cities like ours - is there ever a concern that the infrastructure won't support the population beyond a certain point? Does it ever get to a point that the water supply won't be able to support population over a certain number of people?	The goal of the UWMP is to describe SFPUC's strategy for long-term water supply planning to meet current and future water demands. This information is used in Water Supply Assessments for large development projects as part of their environmental review process, to evaluate whether there is sufficient water supply to meet future demands.
Amy Nagengast	SFPUC CAC	I am hoping you could frame the "purposes of the UWMP" in terms of how this UWMP impacts the consumer instead of the agency's use? How do I as a consumer relate that to my daily life?	The UWMP is prepared according to specific requirements laid out in the Water Code. It is intended as a high-level planning document; it serves as a roadmap for future planning and decision-making, but does not commit us to any specific project(s). The document can help consumers understand how we are thinking about planning and water supply reliability. It is an opportunity for the public to comment on our approach for rationing, conservation, and other elements of our planning.
SFPUC 2020 UWMP Update - Comments Submitted at SFPUC Water CAC, April 27, 2021			
Eliahu Perszyk	SFPUC CAC	What will happen if the Bay Delta Plan gets implemented? Are there other water supply projects that can be implemented? It seems there is a significant risk that if the Bay Delta Plan gets implemented and there is no additional water supply, SFPUC will get hit by the water surcharge, and will in turn increase water bills for consumers.	The goal is to plan so that we can avoid this situation. SFPUC is exploring all potential opportunities for alternative water supply projects.
Jennifer Clary	SFPUC CAC	The solution seems to be increasing water supply. How realistic is that? What happens on year 8 of a 10-year drought. We have to stop taking water away from nature. The Bay Delta Plan seems pretty reasonable to me right now. We are looking at all those options to get additional water supply, but shouldn't we focus on using the water we have as much as we can, i.e. focusing on direct potable reuse to have any kind of security. I regard the reservoir projects as less reliable than other projects that make the best use of the water we already have.	SFPUC is working on maximizing reuse, which includes direct potable reuse. The alternative water supply project with ACWD, the Crystal Springs project and some of the other options explored for reuse in the city all look at direct potable reuse as a potential alternative. One impediment is that the regulations are for direct potable reuse are not finalized; they are expected to come out in 2023.
Jennifer Clary	SFPUC CAC	Looking at the graphs and data developed by the Pacific institute, it looks like SFPUC is closer than any other agency at estimating water demands. SFPUC is still overestimating water demands, but not as much as other agencies. You want to be conservative in forecasting water demands, but you don't want to overestimate them and put pressure on the planned water supplies. Cost is a big piece of it, and how we charge water. We don't want to be in a position where we have to pay a drought surcharge, even though the Commission has already stated that they would authorize it.	Comment noted. See response to similar comments about demand projections for additional information.
SFPUC 2020 UWMP Update - Comments Submitted via Email between 04/05/2021 and 05/05/2021			
Dick Morten		It would be helpful for the table of content to have an electronic link to each section and Appendix of the plan.	Electronic links to each chapter and the appendices were added in the final PDF version of the document.
Steven Lawrence		The notes of Table 8-3 contain 2 broken section references "Error! Reference source not found" that need to be updated with the correct referenced section numbers.	These errors have been corrected.
Dick Allen	District 7	I strongly encourage the SFPUC staff and Commissioners to add an additional Section 12 to the UWMP, which could be entitled "Tuolumne River Environment". The SFPUC needs to make science-based decisions that comply with (a) the State of California Endangered Species Act, (b) the Federal Endangered Species Act, (c) Public Trust Doctrine, to be authorized to limit water diversions from the Tuolumne River during any year.	This is beyond the scope of the UWMP. The UWMP is structured to meet the requirements in the California Water Code. The SFPUC is engaged in several regulatory processes regarding the Tuolumne River and Bay-Delta environment, including the State Board's Bay-Delta Plan and the FERC relicensing of Don Pedro Dam. These processes have not yet reached conclusions.

Dick Allen	District 7	Will the SF City Attorney issue a legal ruling that the SFPUC UWMP complies with (a) the State of California Endangered Species Act, (b) the Federal Endangered Species Act, (c) Public Trust Doctrine, (d) The 9th Circuit Court of Appeals?	No. The California Water Code is the law that sets forth the requirements for UWMPs~~,~~. The Water Code does not contain a requirement for such a “ruling,” nor does the City Attorney’s Office issue “rulings.” The UWMP is a planning document. The SFPUC consults with the City Attorney’s Office as needed regarding compliance with federal and state laws. From time to time, the City Attorney’s Office issues public legal opinions on specific matters. We do not see a basis to request that the City Attorney issue a public opinion regarding whether the UWMP complies with the four provisions that you cite in your letter. We also do not agree with your statement that the Mayor issued “conflicting environmental orders” to the SFPUC in 2018 or that she suggested Commissioners “be required to compromise or ignore” the federal or state laws cited in your letter. Of course, you are free to contact the Mayor’s Office directly regarding her comments.
Dick Allen	District 7	If the City Attorney refuses to issue a legal ruling that the SFPUC UWMP is in compliance with (a)(b)(c)(d), (1) can the 5-year UWMP be trusted? (2) Should the UWMP be implemented by the SFPUC absent a City Attorney legal ruling that it supports (a)(b)(c)(d)? (3) Would the absence of a legal ruling by the City Attorney that the UWMP is in compliance with (a)(b)(c)(d) invite lawsuits against San Francisco? I would encourage the Commissioners to schedule a public hearing to allow the City Attorney to provide them with legal opinions to resolve the Mayor's November 2018 conflicting environmental orders to the SFPUC.	See response above.
Peter Drekmeier (Tuolumne River Trust), Eric Wesselman (Friends of the River), Heinrich Albert (Sierra Club SF), Chris Shutes (California Sportfishing Proection Alliance), Carol Steinfeld (Sierra Club Loma Prieta), Cindy Charles (Golden West Women Flyfishers), Kristina Pappas (SF League of Conservation Voters), Allison Boucher (Tuolumne River Conservancy), Jeff Miller (Alameda Creek Alliance), Mark Rockwell (Fly Fishers International, Northern California Council), Mike Conroy (Pacific Coast Federation of Fishermen's Associations, Institute for Fisheries Resources), Larry Collins (SF Community Fishing Association, SF Crab Board Owners Association), Dick Allen (Lake Merced Task Force), John Buckley (Central Sierra Environmental Resource Center), Lauren Wetson (Acterra: Action for a Healthy Planet), Stuart Gross (SF Herring Association), Greg Reis (The Bay Institute), Konrad Fisher (Water Climate Trust), Laura Allen (Greywater Action), Bill Uyeki (Peninsula Fly Fishers), Elizabeth Dougherty (Wholly H2O)		The following actions are immediately requested from the SFPUC Commissioners: - Direct staff to produce an appendix that analyzes the impact of reducing the Design Drought to 7.5 years.	The UWMP reflects the use of the 8.5-year design drought, which is what SFPUC currently uses for water supply planning purposes and has been adopted through the Water System Improvement Program. If the Commission adopts a different policy, the SFPUC will produce an updated supply reliability analysis which will then be used in Water Supply Assessments. This information would be clearly communicated and transmitted to the Wholesale Customers for their use as well.
		- Commit to developing alternative water supplies and incorporate approximate yield into the UWMP water supply projections (with a focus on recycled water).	The UWMP describes extensively the alternative water supply (AWS) projects that are currently in the planning stages in Section 7. Given the early stages of these projects, SFPUC has determined it would not be prudent to include the estimated yield of these projects in its supply modeling for the purposes of the supply and demand analysis presented in Section 8. However, that does not mean that SFPUC is not making significant investments in moving these projects forward. Feasibility studies are still underway and AWS projects have not yet been modeled alongside the RWS operations and assumptions. Staff also continue to identify and explore additional opportunities including local, regional and upcountry projects. The SFPUC has committed to developing an Alternative Water Supply Plan by 2023, which will contain additional information about these projects, their anticipated yields, and next steps. As planning analyses continue between now and June 2023, SFPUC staff will regularly update water supply benefit estimates on a project-by-project basis and share them periodically through the Alternative Water Supply Program Quarterly Report.

		- Commission a peer review of San Francisco's and BAWSCA's population and demand projections, which would explain how past over-projections have been corrected, explain why the UWMP population forecasts are so much higher than the California Dept. of Finance projections, and explain why the UWMP demand projections are higher than the SFPUC's financial department's forecasts.	Basis for UWMP Demand Projections: As required by Water Code section 10631(a), SFPUC coordinates with the San Francisco Planning Department to obtain information about housing and population growth projections for the City. As described in Section 3.2.2 of the Plan, SFPUC develops its demand projections based on projections of household water use, not per capita water use. The Planning Department is currently updating the city's General Plan Housing Element (Housing Element 2022 Update). The housing element update is required to be adopted by the city and submitted to the state Department of Housing and Community Development by January 2023. One of the primary goals of the Housing Element 2022 Update is to improve housing affordability by increasing the rate of housing production compared with the past several decades. The housing projections are based on the Housing Element 2022 Update objective of producing an average of 5,000 housing units per year with adjustments for certain large development plans. The population projections presented in the plan correspond to the housing growth scenario described above from the Housing Element 2022 Update. Additional description about the basis for the demand projections was added to Section 4 for clarity. Regarding the projected population and demand growth for the Wholesale Customers, that information is provided to the SFPUC by BAWSCA in their Regional Water Demands and Conservation Projections Report. This is consistent with Water Code section 10631(h), which directs water suppliers that rely on wholesale agencies to provide the wholesale agency (in this case the SFPUC) with water use projections for that source of water.Differences between UWMP and Finance projections: SFPUC's 10-Year Financial Plan contains projections for water sales, whereas the UWMP contains projections for total water demand. The UWMP projections include water loss, which accounts for 6 mgd; this figure is not included in the Finance projections because it is not part of water sales. Comparing the retail demands from these two sources without water loss, there is a less than 10% difference between the UWMP and Financial Plan projections. This difference is appropriate given the different goals of the two sets of projections; for the Water Enterprise, demand projections are relied upon for future water supply needs. The goal of the Financial Plan is to ensure sufficient revenue for continued operation. Because all demand projections are an estimate, it is not possible to achieve 100% accurate projections. Different assumptions and approaches are warranted for different divisions based on planning priorities.
Peter Drekmeier	Tuolumne River Trust	The population projections included in the UWMP are much higher than the population growth trends in recent years and we recommend using the projections developed by the California Dept. of Finance, for both retail and wholesale service areas, instead of the Plan Bay Area numbers.	See response above to similar comment.
Peter Drekmeier	Tuolumne River Trust	Demand projections in the UWMP are highly inflated, which has been shown by the comparison of previous projections vs. actual demand (2018 RWS projected demand was 285 mgd, while actual demand in 2018 was 196 mgd). The main reason water demand has been decreasing is the rising water rates, and the water demands included in the 10-year Financial Plan are 8% lower than the UWMP water demand projections. SFPUC predictions forecast that water rates are going to increase by 65% by 2036 and that the combined water/wastewater rates will increase by 91%, whereas the UWMP includes an increase of 50% by 2045. Has the SFPUC's financial department reviewed Appendix E, and do they agree that the increase in water rates will be only 50% over the next 25 years? We recommend that the SFPUC create a group of stakeholders to meet with the Brattle Group to go over Appendix E before submission of the Plan.	SFPUC's Finance Division provided the information about projected rate increases that was used for the demand projections. See response above for similar comment about differences between UWMP and Finance projections
Peter Drekmeier	Tuolumne River Trust	The Design Drought appears arbitrary and the UWMP doesn't explain how the Design Drought scenario was developed. We encourage SFPUC staff to include an appendix that analyzes a 7.5-year design drought scenario.	The design drought is a tool used by the SFPUC for water supply planning. See response to above similar comment about the inclusion of an additional appendix.

Peter Drekmeier	Tuolumne River Trust	Section 6.1.3 about climate change impacts focuses on the negative potential impacts. This section should include a discussion about the potential benefits of climate change to water supply from earlier runoff.	Climate change is being covered in our Long Term Vulnerability Assessment. As stated in the UWMP, this study has not been completed yet.
Peter Drekmeier	Tuolumne River Trust	The development of alternative water supplies has been lagging. 30 years after ordinances 390/391-91 were adopted, SFPUC is using 0.1 mgd of recycled water (while the Hetch Hetchy System was built over 20 years). The SFPUC has identified 35 mgd of alternative water supplies and it would be worthy to determine if some of these projects could be factored into the UWMP's future water supply.	See response above to similar comment.
Peter Drekmeier	Tuolumne River Trust	The UWMP should include a table similar to Table 8-3, which excludes the interruptible customers, to see how the decision regarding San Jose and Santa Clara might impact San Francisco's interests.	The SFPUC is in the process of determining whether to make the Cities of San Jose and Santa Clara permanent customers. The UWMP is not the vehicle that the SFPUC will use to present the analysis of this decision-making process.
Doug Obegi & Jon Rosenfield	NRDC & San Francisco Baykeeper	The draft UWMP significantly overestimates water demand, which is directly correlated to an overestimation of the retail and wholesale population projections. The UWMP plans for a 39% population increase in the City from 2020 to 2045, which is 3 X higher than the California Dept. of Finance projections, and is not in accordance with the population growth trends of the last 10 years. The wholesale population projections also don't match the trends of Dept. of Finance population growth for the utilities' respective counties. The NRDC strongly encourages the Commission to review the UWMP to incorporate current estimates of population growth and the resulting lower estimates of total water demand	See response above to similar comment in how our demand projections are developed.
Doug Obegi & Jon Rosenfield	NRDC & San Francisco Baykeeper	The draft UWMP significantly overestimates demand (by approximately 20-25%) compared to the Commission's financial planning projections in the 10-Year Financial Plan adopted in February 2021. The Commission's 10-year Financial Plan forecasts declining retail and wholesale water sales over the coming decade, based on the observed historical trend.	Please note that this comment incorrectly characterizes the projected demand from the UWMP; the plan projects a retail demand of 72.4 mgd in 2030 (the demand shown in the comment letter is 80.6 mgd, which is the 2045 projected demand). The 10-Year Financial Plan projects total sales of 60.5 mgd in 2030. Half of the difference in these two projections is from the fact that the UWMP demands include 6 mgd of water loss, which is not included in the financial plan sales projections. Comparing the retail demands without water loss, there is a less than 10% difference between the UWMP and Financial Plan projections. See additional information in response above to similar comment.
Doug Obegi & Jon Rosenfield	NRDC & San Francisco Baykeeper	The draft UWMP fails to demonstrate that there is a surplus of water available for new development, and should review the assumptions to determine the available supply under the Bay Delta Plan scenario, including (1) the overestimated population growth and water demands in the retail and wholesale service areas, (2) the 8.5-year design drought, which is significantly longer than is required by State law for UWMP, (a shorter design drought could result in less frequent and severe shortages), (3) the assumed allocation of responsibility from meeting reduced diversions from the Tuolumne River borne by the Commission vs. the other water rights holders.	(1) See response above to similar comment; (2) See response above to similar comment; (3) Allocations of responsibility for meeting Tuolumne River instream flow requirements are assumed to be in accordance with the Fourth Agreement.
Doug Obegi & Jon Rosenfield	NRDC & San Francisco Baykeeper	Despite identifying significant water shortages for retail and wholesale customers, the draft UWMP includes minimal investments in local and regional water supply projects in retail service area and diversify supply sources (with 91% of supply still coming from the Tuolumne River in 2045), and does not include analysis of local water supplies in the wholesale service area. San Francisco should intensify its efforts to incorporate water recycling, stormwater capture and improved water use efficiency, comparably to other cities in Southern California.	Regarding investments in alternative water supplies, see response to similar comment above.
Doug Obegi & Jon Rosenfield	NRDC & San Francisco Baykeeper	There is a lack of information regarding wholesale water use and potential local supplies expansion opportunities, which raises questions about the projected RWS water needs for the wholesale customers.	The projected Wholesale Customer purchase requests shown in Section 4, Table 4-3 of the plan are specifically demands on the Regional Water System after accounting for local supplies developed by the Wholesale Customers. Additional information about these supplies can be found in the Wholesale Customer agencies' individual UWMPs.

Heinrich Albert	Sierra Club San Francisco Bay Chapter Water Committee	The draft UWMP significantly overestimates future water demand. The retail and wholesale population growth projections are significantly higher than the population growth trends provided by the California Dept. of Finance. In addition, the UWMP water demand projections are 20-25% higher than the Commission's 2030 water demand projections included in the 10-Year Financial Plan.	See response above to similar comment.
Heinrich Albert	Sierra Club San Francisco Bay Chapter Water Committee	The draft UWMP includes limited alternative water supply sources (wastewater recycling, groundwater, stormwater capture, etc.) and does not plan for supply vulnerability. San Francisco plans for minimal investments in water recycling and other local supply projects, unlike other Southern California cities.	See response above to similar comment.
Nicole Sandkulla	BAWSCA	The SFPUC should reflect the additional purchase requests (above their existing contract limit) of the City of San Jose (4.5 mgd) and the City of Santa Clara (2 mgd) in its regional water planning efforts and in this UWMP.	The UWMP is not the vehicle that the SFPUC will use to make decisions about water supply requests from its Wholesale Customers.
Nicole Sandkulla	BAWSCA	The estimated yield for each individual AWS project should be included in Sections 7.2, 8.4 and Table 8-1, as presented at the March 26 workshop. This would characterize each project's contribution to narrowing the system-wide shortage identified under drought conditions.	See response above to similar comment.
Nicole Sandkulla	BAWSCA	Discussion of the Tuolumne River Voluntary Agreement (TRVA) and associated modeling results should be included in the UWMP, as presented in the March 26 workshop.	The TRVA has not been adopted by the State Water Resources Control Board, and as such remains subject to change. The information presented at the March 26th workshop was intended for illustrative purposes, and is not appropriate for inclusion in the UWMP at this time.
Nicole Sandkulla	BAWSCA	The cutbacks to the wholesale customers in drought years under the BDP scenarios indicate that the SFPUC will not meet its established Level of Service Goals to limit rationing to no more than 20% system-wide during droughts if the BDP is implemented.	Comment noted.
Dick Morten		Neither the State of California nor San Francisco provide sufficient consideration to the environmental, natural resources and wildlife habitat. The UWMP must be the basis for having a sustainable freshwater ecosystem throughout the entire Hetch Hetchy water system from the watershed to the drinking faucet.	This is beyond the scope of the UWMP. The UWMP is structured to meet the requirements in the California Water Code. The SFPUC is engaged in several regulatory processes regarding the Tuolumne River and Bay-Delta environment, including the State Board's Bay-Delta Plan and the FERC relicensing of Don Pedro Dam. These processes have not yet reached conclusions.
Dick Morten		The global warming impacts on Hetch Hetchy discussed may not fully reflect the potential water scarcity forecasts. The SFPUC must take into account more dynamic global warming conditions in the UWMP. Further analysis of climate change and the related impacts on drought are needed to reduce the vulnerability of our scarce water resources.	Climate change is being covered in our Long Term Vulnerability Assessment.
Dick Morten		I support the recommendation to add a Section 12 to the UWMP about the Tuolumne River Environment to detail the SFPUC's commitment to enhance the Tuolumne River flows and protect fish and wildlife habitat.	Comment noted.
Dick Morten		Is there way for San Francisco's LWMP to influence the development of its wholesale customer's plans, including conservation, leakage, groundwater management, consumer price signals, recycled water, new construction water standards, etc.? Would SFPUC be able to influence the river intake from the Turlock and Modesto Irrigation Districts to effectively manage the scarce Tuolumne River resources?	As a wholesale water supplier, SFPUC provides its wholesale customers with information about anticipated supply reliability as required by the Water Code. Each wholesale customer is responsible for the preparation of their own UWMP.
Dick Morten		The UWMP should not confine itself to freshwater, groundwater and recycled water supply sources, and should include the abundant saltwater sources, which will be critical to the City's response in the event of earthquakes/fires.	UWMP is not an emergency water supply planning document, it is a long-term water supply planning document. The Water Shortage Contingency Plan references relevant emergency planning documents.
Dick Morten		SFPUC must not ignore the State Water Code 73505, which states that in the event of a water emergency, the SFPUC is obligated to deliver water from University Mound, Sunset and Merced Manor reservoirs to its wholesale peninsula customers. This situation could tax San Francisco's domestic water supply and firefighting capability.	UWMP is not an emergency water supply planning document, it is a long-term water supply planning document. The Water Shortage Contingency Plan references relevant emergency planning documents.

Dick Morten		The UWMP identifies Lake Merced as a water resource. It should be clarified that the lake is designated by the state as a non-potable water to be utilized for firefighting. Unfortunately, as far as I am aware there are no pumps, manifolds and pipes that would enable the fire department to have easy and quick access to this abundant water resource.	Section 3.1.4 identified Lake Merced as a non-potable water source: "In addition, there is an emergency supply of existing non-potable water immediately available within the City at Lake Merced."
Dick Morten		Consumer price signals for San Franciscans are likely to be more affected by rapidly increasing sewer rates rather than water rates. Will these increased rates bring about larger reductions in water consumption? To offset the growing consumer cost impacts there should be strong incentives for water conservation through provision of water conserving devices, stepping up water pipe leakage repair, etc.	Regarding the impacts of wastewater rates on demand, see response to similar comment above. Regarding our conservation program, refer to our 2020 Retail Water Conservation Plan for additional detail on our extensive conservation activities and planning.
Nancy Wuerfel		I request that language be added in Section 1 to acknowledge the AWSS as a city asset, transferred under the SFPUC's jurisdiction in 2010, and that notes the distinction between the AWSS as the non-potable firefighting supply source) and the EFWS as the potable water delivery system for firefighting.	UWMP is not an emergency water supply planning document, it is a long-term water supply planning document. Collectively in early 2019, the City Administrator's Office, Office of Resilience and Capital Planning, Mayor's Office, SFPUC, SFFD, and Public Works all collaboratively decided to utilize the term "Emergency Firefighting Water System" (EFWS) instead of "Auxiliary Water Supply System" (AWSS).
Nancy Wuerfel		I request that language be added in Section 3 that describes the historical development of the AWSS, and includes a description of the transferred AWSS assets.	UWMP is not an emergency water supply planning document, it is a long-term water supply planning document, and does not need to address the historical development of the Emergency Firefighting Water System.
Nancy Wuerfel		I request that Figure 3-2 be updated as follows:- update the title to note "map of in-city distribution system for potable water delivery"- remove Lombard reservoir from Figure 3-2 (and from Table 3-2) because the SFPUC transferred the reservoir's jurisdiction to the Recreation and Park Department in 2014- remove Harding Park recycled water facility because it is not part of the potable water distribution system- Create a new Figure 3-2.1 "Map of in-city distribution system for non-potable water delivery through the AWSS"	Figure 3-2 correctly illustrates the components of the SFPUC in-City distribution system. Lombard Reservoir remains under SFPUC jurisdiction (Francisco Reservoir was transferred to Rec and Park).
Nancy Wuerfel		I request that Section 6 and the WSCP section "Preparation for catastrophic supply interruption" include reference to the Budget and Legislative Draft Policy Analysis Report of February 2021 and the updated conceptual plan to expand the EFWS using Lake Merced as a primary source and Sunset Reservoir as a secondary source. In addition, I request additional language about cross-connection control to prevent raw water in Lake Merced from entering the potable water system pumped separately at the Lake Merced site.	UWMP is not an emergency water supply planning document, it is a long-term water supply planning document. Additionally, it is not a technical cross-connection control document. The SFPUC follows all cross-connection control regulations to ensure our customers receive high quality safe drinking water. In 2019, the San Francisco Board of Supervisors, via Resolution 484-19, urged SFPUC, SFFD, and the Office of Resilience and Capital Planning to develop a comprehensive Citywide EFWS Plan by December 31, 2021. The three agencies are diligently developing this Plan and will bring it to the Board of Supervisors by December 31, 2021.
Nancy Wuerfel		I request that the WSCP annual water supply and demand assessment include the AWSS.	The intent of the Annual Water Supply and Demand Assessment (WSDA) is to compare projected retail and wholesale demands with supplies (Regional Water System and local supplies). The AWSS is not a supply that is used to meet these demands, and thus is not pertinent for the Annual WSDA.
Nancy Wuerfel		I request that the Plan include Water Code Section 73503 and the use of the City's terminal reservoirs - Sunset, University Mound and Merced Manor, for emergency supply to the wholesale customers.	UWMP is not an emergency water supply planning document, it is a long-term water supply planning document. Water Code Section 73503 states the following: (a) The city, in consultation with the association and the offices of emergency services in Alameda County, Santa Clara County, and San Mateo County, shall prepare an emergency response plan describing how water service will be restored to the area served by the bay area regional water system after an interruption caused by earthquake or other natural or manmade catastrophe, and thereafter shall be implemented. (b) During any interruption in supply caused by earthquake, or other natural or manmade catastrophe, a regional wholesale water supplier shall distribute water to customers on an equitable basis, to the extent feasible given physical damage to the regional water system, without preference or discrimination based on a customer's geographic location within or outside the boundary of the regional wholesale water supplier.

Dave Warner		The SFPUC has consistently overestimated retail water demand in its 2010 and 2015 UWMP projections (2010 projection for 2020 - 71.7 mgd, 2015 projection for 2020 - 72.5 mgd, actual 2020 in-city demand, 65.3 mgd). It would be great to have Brattle show a reconciliation of the projections and actual demand, and how the overestimates are addressed in the new demand forecast.	The projections developed for this 2020 UWMP are significantly lower than those presented in the 2015 plan. The methodology was updated significantly, as described in Appendix E of the plan. One key indicator of the changes is that the projected per capita demands decreased significantly between the 2015 and 2020 projections; in 2015, per capita residential demand was projected to remain at about 44 gpcd through 2040; in the new projections, per capita residential demand is projected to decrease to 38 gpcd.
Dave Warner		The water demand is not adjusted for economic activity, which would lead to the overestimation of the demand (ex: during the drought, there was a substantial increase in economic activity, and a substantial decrease in economic activity resulted from the COVID pandemic in 2020).	The demand forecasts were developed under the assumption that future years are 'normal', i.e. not experiencing a drought or anomolous event such as the COVID-19 pandemic. Although such anomolous events are likely to occur in the future, we don't have a way to predict their occurrence. Because anomolous events can impact demands in both directions (i.e. increase or decrease depending on the nature of the event), excluding such events does not create a clear bias in the demand projections. In developing the model, the impacts of these events in the past were accounted for when determining the impacts of other variables such as rates. See Appendix E for additional discussion and quantification of the impact of drought and COVID-19 on demands.
Dave Warner		The demand projections are not adjusted to account for infill development, which would lead to the overestimation of the demand, since the increase in housing and employment would lead to a decrease in outdoor water use.	The residential and commercial demand forecasts are based on the number of projected households and employees in the City; if new residential units are replacing old ones, that would be accounted for in the total number of residential units. The largest outdoor water users in the retail service area, e.g. Golden Gate Park, golf courses, are not being replaced by infill development. Thus it is not clear that infill development would lead to a significant reduction in outdoor water use.
Dave Warner		The water demand analysis doesn't take into consideration the changing income levels of the city's population. Given the high housing prices, it could be expected that income levels would increase over time, which would affect water demands, by accelerating increased access to conservation measures.	The Brattle Group determined that the income parameter was not statistically significant when they also controlled for other housing characteristics. Therefore it was not used as an explanatory variable for the demand forecasts.
Dave Warner		It appears counterintuitive to assume that the newly built multi-family units would consume more water than the old ones, as we'd expect that newer units have more conservation measures in place.	This is indeed counterintuitive, and we will be further investigating this phenomenon. Although these newer buildings certainly have the latest water saving fixtures, in many cases we are seeing additional water fixtures in unit rather than shared such as clothes washers while also seeing more shared water-using amenities such as pools and cooling towers. The projections included in this study are based on the actual water use of recently constructed multi-family units.
Dave Warner		When adjusting demand projections to offset the impact of COVID, adjusted residential demand drops 0.5 mgd while adjusted commercial and industrial demand increases 3.1 mgd, which sounds counterintuitive. Given the in-city population of employees is less than the in-city residential population, it would be good to explain why the expected commercial and industrial demand would increase much less than residential demand decreases (closer or below the absolute value of the 0.5 mgd residential adjustment), particularly as per capita commercial and industrial demand is a fraction of per capita residential demand.	The impacts of COVID were opposite in the residential and commercial sectors; it increased residential demand while decreasing commercial demand. The magnitude of impact on the commercial demand was greater than the magnitude of impact on the residential sector, likely due to the fact that commercial buildings were occupied pre-COVID by a significant proportion of employees commuting from outside the City. The portion of employees who also live in the City stayed home and increased their residential consumption; but the large portion of employees who reside outside the City did not come to the office. However, for the demand projections in the UWMP, the projections were built off of a 2020 demand level that was normalized to remove the effects of COVID in both sectors.

Carlos Wadkins	San Francisco Coalition on Homelessness Human Rights Working Group	- The UWMP does not adequately capture the water needs of thousands of unhoused San Franciscans, and only accounts for housed residents with a household water connection, including the section about lower-income households, which only accounts for lower-income San Franciscans who reside in homes. - The 2020 Draft UWMP does not include public water access facilities (public drinking water fountains and public restrooms), which are a significant water source among San Francisco's unhoused community, but still do not provide sufficient access to public water. According to the 2021 "Water for All" Report by San Francisco's Coalition on Homelessness, the overwhelming majority of unhoused San Franciscans fall below the international minimum standards for water access.	Although the residential sector water use and projections only capture water use associated with households, water use of unhoused populations may be captured within other water use categories. For example, drinking fountains would be captured in municipal usage or irrigation usage (if these fountains are located in parks); water usage of homeless shelters or other supportive services would be captured in municipal or commercial water usage. The SFPUC, working with RPD, SFUSD, and SFPW, has supported the installation of 173 drink-tap stations. 70 drink tap stations have been installed in the public realm (right of way, parks, plazas, etc.), with the remaining 103 stations installed at SFUSD schools. The SFPUC is actively working on installing 3 additional stations in the public realm in the Tenderloin.
Greg Gaar		Recycling and water reuse will result in conserving potable water. Commenter suggests SFPUC make it a simple process to collect and store rainwater. Commenter suggests expanding removal of asphalt and concrete to allow rainwater to enter the ground. Commenter asks about San Francisco's efforts with water recycling.	See Section 7 of the Plan for additional descriptions of recycled water projects being pursued. See the Retail Water Conservation Plan for additional information on our conservation programs.
Ginny Stearns		Commenter supports the increased development and use of recycled water and the Onsite Water Reuse program. Commenter also supports replenishment of groundwater with recycled water, and expressed desire to maintain sufficient water for City green spaces. Commenter expressed concern about potential presents of chemicals in recycled water.	Comments noted.
Steve Lawrence		In analyzing the scenario where the Bay Delta Plan (Amendment) is implemented, are San Jose and Santa Clara made permanent customers?	No assumption is made about the status of San Jose and Santa Clara in our supply modeling in the text of the UWMP. Their demands are included in the wholesale customer demand projections that are analyzed, and the total demands for the planning horizon never exceed our wholesale customer contractual obligation of 184 mgd. We provided the wholesale allocation that resulted from our supply modeling to BAWSCA, who then determined the allocation for each of their member agencies.
Steve Lawrence		Is 6 mgd a reasonable estimate of water losses? Page 38/432. I doubt it. Firstly, you state that 7.18 mgd was lost in the latest year, '19-20, but if one divides the loss figure for the year by 365 one gets 7.45. Secondly, you simply state that 6 mgd is "real" loss. Is there an explanation? Losses have been increasing 2016 on; makes sense, infrastructure ages, and much street work and other city construction shakes pipes loose. Drier periods, then wetter, will probably stress pipes as climate changes in upcoming years.	The water loss value has been corrected in the final document. 6 mgd of real losses is a conservative estimate, and we have several programs in place to reduce both real and apparent water losses moving forward. You can read more about these efforts in Chapter 10 of the plan.
Steve Lawrence		Single family residents are assumed not to increase use (in fact decrease over 10%) despite, and without consideration that I can find, of: 1) will residents per SFR remain the same, or will the average rise as housing becomes more expensive, e.g. with adult children returning to parents' home and with aging parents living in? 2) will ADUs, a state policy, add to single unit lots another housing unit? (Accessory dwelling unit)	Our assumptions about single family housing units are provided by the Planning Department; we do not make our own projections about housing changes in the City. Our projections do not make assumptions about the number of residents per unit; rather, the projections are based on consumption at the household level and the response to rates, temperature, and precipitation, as well as conservation. We currently have no basis for projecting changes in household occupancy into the future.
Steve Lawrence		At about 38/432 the draft appears to say that temperature and precipitation changes caused by climate change will not significantly affect demand. This surprises. I wonder.	This assertion is based on the trends observed in the 10 years of historical water use data that showed that over that period, changes in temperature and precipitation did not have large impacts on demand, likely due to limited outdoor water use by residential customers in the city. It is true that climate change could lead to more extreme changes; however, given the uncertainty about future climate scenarios, this plan evaluated a limited number of future temperature and precipitation conditions. We are currently in the process of finalizing our Long Term Vulnerability Study that will further examine the implications of a range of future climate scenarios.

Steve Lawrence		Are the draft's assumptions right re wholesale customers' assurances and how much water SF gets during droughts if the state's plan is implemented? I don't pretend to follow, but I fear that the 2009 WSA assured wholesale customers that rationing for them would not exceed 20%. If WCs stood firm, SF would be severely parched. The draft does admit that it makes assumptions about what happens if supply shortage exceeds 20%.	SFPUC has adopted a Level of Service objective to limit system-wide rationing to no greater than 20%. Per the WSA, the Supply Assurance to the Wholesale Customers is subject to reduction by water shortage, drought, emergencies, or malfunctioning/rehabilitation of Regional Water System facilities. The process for allocating water shortages between the retail and wholesale customers is defined in the WSA, however as stated in the plan, there are additional procedures and negotiations that would be undertaken in the event of a system-wide shortage greater than 20%.
Steve Lawrence		4.1.1 of App.K says that over ten percent supply shortage --> rationing, but Table 3.2 says otherwise; which is right? pg366-7/432	Section 4.1.1 states that SFPUC will likely use calls for voluntary reductions if the target water use reduction is 10% or less, however the SFPUC retains the flexibility to implement voluntary or mandatory calls for water use reduction as needed during a water shortage. Table 3.2 shows that in a Stage 4 shortage, a water use reduction of 5 - 18% would be targeted, and thus depending on where we landed in that range, the calls may be voluntary or mandatory.
SFPUC 2020 UWMP Update – Wholesale Customer Comments Received After 05/05/2021 Deadline			
Darryl Barrow	General Manager, Westborough Water District	The draconian cuts that implementation of the UWMP would require would have a devastating impact on the customers of the Westborough Water District. The District has made aggressive efforts to conserve water; current water usage is 66 gallons per capita per day. In order to implement additional cuts, while still protecting the health and safety of its customers, the District would need to prohibit a range of important uses, including the use of potable water for construction and dust control, the use of water by landscape accounts, the use of water for landscape irrigation, and the issuance of new water connections. The water supply shortages presented in the UWMP are not sustainable for the basic health and safety needs of the District customers. We urge you to redouble your efforts to secure a voluntary agreement in the Bay-Delta proceeding and urge you to support an effort to hammer out an arrangement among the BAWSCA members to address what will occur in the event of a supply shortage that exceeds 20%. We urge the SFPUC to expedite water supply projects to meet its supply assurance obligations.	Comment noted. The SFPUC will be communicating with our Wholesale Customers collectively on this topic.
Justin Chapel	Public Works Superintendent, City of Redwood City	Redwood City is expressing concern regarding the water supply reliability resulting from implementation of the Bay-Delta Plan. For Redwood City, which purchases all of its drinking water from the SFPUC, the cutbacks are expected to be as high as 49% of available supply in multiple dry year scenarios. If such a reduction in demand is required the City will be forced to impose severe measures, including prohibition on irrigation with potable water, suspension of distribution system flushing, cutbacks for CII customers by 30%, a moratorium on new development, and a reduction of residential indoor water use to 27 gallons per capita per day, which raises concerns about basic health and safety needs and the economic vitality of our community. Redwood City requests that the SFPUC fully commit to the voluntary agreement process and fund the Alternative Water Supply Program at levels necessary to meet its Level of Service Goals and contractual obligations to the Wholesale Customers. Redwood City has been and continues to be committed to conservation and development of recycled water. Redwood City is also a partner in the Crystal Springs Purified Water Project, and requests that the SFPUC prioritize this project.	Comment noted. The SFPUC will be communicating with our Wholesale Customers collectively on this topic.

Thomas J. Piccolotti	President, Board of Directors, North Coast County Water District	North Coast County Water District (NCCWD) relies solely on water provided by the SFPUC to meet the potable water needs of its customers. NCCWD was shocked when it saw the huge cutbacks that would be imposed in drought years with implementation of the Bay-Delta Plan. The potential cutbacks far exceed SFPUC's level of service goal. NCCWD urges the SFPUC to expedite water supply projects to meet its supply assurance obligations and Individual Supply Guarantee. NCCWD 2020 per capita water use was 60 gpcd, with a residential water use of 48 gpcd. NCCWD will not be able to reduce its water consumption by 54% without significant risks to the health and safety of its customers. NCCWD expects SFPUC will take the steps necessary to ensure it meets its Level of Service goal.	Comment noted. The SFPUC will be communicating with our Wholesale Customers collectively on this topic.

PUBLIC UTILITIES COMMISSION

City and County of San Francisco

RESOLUTION NO. **21-0100**

WHEREAS, The Urban Water Management Planning Act of 1983, as amended through 2020 (the Act), requires that an urban water supplier serving 3,000 customers or 3,000 acre-feet per year must prepare an Urban Water Management Plan (Plan or UWMP) update every five years; and

WHEREAS, On June 14, 2016, by Resolution No. 16-0118, the San Francisco Public Utilities Commission (SFPUC) adopted the 2015 Urban Water Management Plan; and

WHEREAS, The SFPUC, in compliance with the Act, has prepared a 2020 update to its Plan, including the 2020 Water Shortage Contingency Plan; and

WHEREAS, The preparation of the Plan update has been coordinated with the City's wholesale water customers and other public agencies to the extent practicable, and staff has encouraged the active involvement of diverse social, cultural and economic elements of the population within the SFPUC's retail water service area during preparation of the Plan; and

WHEREAS, At this Commission's regular public meeting on April 13, 2021, a Draft Plan was presented to the Commission and a Public Hearing was held during the Commission meeting in order to receive public comment on the Draft Plan; and

WHEREAS, Minor revisions to the Draft Plan have been made based on public comments received at the Public Hearing and during the public comment period of April 5, 2021 through May 5, 2021; and

WHEREAS, The San Francisco Planning Department issued a statutory exemption determination on May 25, 2021 under California Environmental Quality Act Guidelines section 15282(v), under Planning Department Case Number 2021-005261ENV; and

WHEREAS, This action constitutes the Approval Action for the project for the purposes of CEQA, pursuant to Section 31.04(h) of the San Francisco Administrative Code; and

WHEREAS, A Final 2020 Urban Water Management Plan was presented to the Commission at its public meeting on June 8, 2021 for consideration and adoption in advance of the July 1, 2021 deadline for submittal to the State and copy of the Final Plan is on file with the Commission Secretary; now, therefore, be it

RESOLVED, That this Commission hereby adopts the 2020 Urban Water Management Plan for the City and County of San Francisco, including the 2020 Water Shortage Contingency Plan, and directs the General Manager to submit it to the California Department of Water Resources by July 1, 2021.

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of June 11, 2021.

Donna Hood

Secretary, Public Utilities Commission

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APPENDIX D

SB X7-7 Compliance Form

JUNE 2021
2020 URBAN WATER MANAGEMENT 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

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SB X7-7 Table 0: Units of Measure Used in 2020 UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent throughout the UWMP, as reported in Submittal Table 2-3.*
NOTES: The units of measure used in the body of the UWMP are millions of gallons per day (mgd).

SB X7-7 Table 1 pertains to baselines and targets and is not used in the SB X7-7 2020 Compliance Form.

SB X7-7 Table 2: Method for 2020 Population Estimate	
Method Used to Determine 2020 Population (may check more than one)	
☑	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☑	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☑	**4. Other** DWR recommends pre-review
NOTES:	

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	899,732
NOTES: Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore excluded from SB X7-7 calculations.	

SB X7-7 Table 4: 2020 Gross Water Use							
Compliance Year 2020	**2020 Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**2020 Deductions**					**2020 Gross Water Use**
		Exported Water *	**Change in Dist. System Storage*** (+/-)	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use***	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	
	76,730			-		-	**76,730**
* **Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.							
NOTES: Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore excluded from SB X7-7 calculations.							

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Regional Water System		
This water source is *(check one)*:			
☑	The supplier's own water source		
☐	A purchased or imported source		
Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional* *(+/-)*	Corrected Volume Entering Distribution System
	74,260	-	74,260

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*
[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:
Per DWR direction, Groveland CSD is accounted for as a wholesale customer and is therefore excluded from SB X7-7 calculations.

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s) Meter Error Adjustment

Complete one table for each source.

Name of Source	Groundwater		
This water source is *(check one)*:			
☑	The supplier's own water source		
☐	A purchased or imported source		
Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional* *(+/-)*	Corrected Volume Entering Distribution System
	2,470		2,470

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*
[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES: Groundwater use has found to be constant throughout the years, which consists of 1.5 mgd (1,680 AF) of in-city irrigation use, another 0.4 mgd (450 AF) of in-city potable water production, and 0.3 mgd (340 AF) for Castlewood CSA.

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water ***Fm SB X7-7 Table 4***	**2020 Population** ***Fm SB X7-7 Table 3***	**2020 GPCD**
76,730	899,732	**76**
NOTES:		

SB X7-7 Table 6 pertains to baselines and targets and is not used in the SB X7-7 2020 Compliance Form.

SB X7-7 Table 7 applies to baselines and targets and is not used in the SB X7-7 2020 Compliance Form.

SB X7-7 Table 8 was used for the 2015 Interim Target and is not used in the 2020 UWMP.

SB X7-7 Table 9: 2020 Compliance

Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD Enter "0" if Adjustment Not Used Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]	TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
76	-	-	-	-	76	96	**YES**

[1] *All values are reported in GPCD*
[2] ***2020 Confirmed Target GPCD** is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

SFPUC RETAIL BASELINES AND TARGETS NARRATIVE

With the adoption of the Water Conservation Act of 2009, also known as SB X7-7, the State was required to set a goal of reducing urban water use by 20% by the year 2020. Each retail urban water supplier was required to determine its baseline water use, expressed in gallons per capita per day (GPCD) during its baseline period, as well as its target water use for the years 2015 and 2020 in order to help the State achieve the 20% reduction.

In its 2010 UWMP, the SFPUC first established the baseline per capita water use, as well as the interim (i.e. 2015) and 2020 water use targets. In the 2015 UWMP, the SFPUC performed a detailed analysis to update the baseline and target per capitas based on in-City retail service area population and water use. The 2015 UWMP analysis by (1) revising the population of the in-City retail service area to reflect the 2010 U.S. Census rather than the 2000 U.S. Census, and (2) including the population and water use of the suburban retail service area. The baseline and targets established in 2015 do not need to be updated. This section provides a summary of the 2015 analysis and shows the SFPUC's compliance with the 2020 target.

Note that water use presented in this section reflects gross water use (i.e., water use by all sectors, including water loss). A complete set of standardized SB X7-7 Verification Form tables prescribed by DWR is provided Appendix D. Additionally, Groveland CSD is not included in this section, as explained in Section 2.4.

1.1 PER CAPITA WATER USE BASELINE CALCULATIONS

As described in DWR's *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use For the Consistent Implementation of the Water Conservation Act of 2009*, the Water Conservation Act of 2009 requires that each urban retail water supplier include in its UWMP an estimate of base daily per capita water use, expressed in GPCD, for a continuous multi-year base period. The California Water Code (CWC) specifies two different base periods:

- A continuous 10-year period, used to calculate baseline per capita water use, which may be extended up to an additional 5 years to a maximum of a continuous 15-year period for an urban retail water supplier that meets at least 10 percent of its retail water demand through recycled water, per CWC Section 10608.12(b)(1) and (2).

- A continuous five-year period, used to determine whether the 2020 per capita water use target meets the legislation's minimum water use reduction requirement, per CWC Section 10608.12(b)(3).

Because the SFPUC's current and past recycled water use does not equal or exceed 10% of retail water demand, the 15-year period cannot be used to calculate baseline per capita water use. The SFPUC will utilize a 10-year baseline period. Water use data from 2001 to 2010 have been used for this analysis, which is consistent with the baseline period used in the previous analysis in the 2010 UWMP.

Base daily per capita water use has been calculated for the 10-year baseline period as follows:

- Step 1: Estimate Distribution System Area. The distribution system area refers to the in-City and suburban retail areas, as described in Section 3.2.

- Step 2: Estimate Service Area Population for Base Period. The retail population was estimated for the period of 2001 to 2010 based on various sources depending on data availability. For the in-City retail service area, population data were obtained from the California Department of Finance for the County of San Francisco. However, the same method could not be used for the suburban retail service area since the service area does not align with municipal boundaries. Therefore, the SFPUC consulted with DWR (i.e., pre-review) on an appropriate, alternate methodology based on U.S. Census data at the census block level and persons-per-household data. Use of persons-per-household data was deemed adequate since it is assumed that all residential accounts serve single family homes in the suburban retail service area, and no multi-family residences are served. Therefore, the number of connections can be considered equivalent to number of households. For the Town of Sunol specifically, the SFPUC used the web-based DWR Population Tool since the corresponding service area was difficult to define at the census block level (output provided in Appendix H). The resulting retail population estimates are shown in Table 5-1.

- Step 3: Calculate Gross Water Use. Gross water use is summarized in
- Table 0-2. Gross water use is comprised of water from the SFPUC's own water supply sources delivered to all retail customers. Changes in storage were then factored in to develop gross water use. The SFPUC compiles daily flow data for the County-line, system input, and in-line meters, as well as daily reservoir water level data. The meters, water level sensors, and associated metering equipment are all inspected, tested, calibrated, and maintained according to the applicable meter calibration and maintenance frequency by an independent metering consultant. These include annual pitot tube tests, quarterly secondary meter equipment testing and calibration, cleaning, flushing, inspecting, and lubricating. The flow quantities are expected to be accurate and no meter error adjustment is necessary.

- Step 4: Calculate Annual Daily Per Capita Water Use. Annual daily per capita water use was calculated by dividing gross water use by population. Annual daily per capita water use is shown in Table 0-3.

- Step 5: Calculate Base Daily Per Capita Water Use. Base daily per capita water use is calculated as the average of per capita water use, or 107 GPCD as shown in Table 0-3.

Table 0-1. Retail Population for 10-Year and Five-Year Baselines
[SB X7-7 Verification Form Table 3: Service Area Population]

10-Year Baseline	Five-Year Baseline	Year	Service Area Population		
			In-City Retail[a]	Suburban Retail[c]	Total Retail
Year 1	—	2001	780,614	1,634	782,248
Year 2	—	2002	782,765	1,633	784,398
Year 3	—	2003	782,599	1,630	784,229
Year 4	—	2004	781,308	1,626	782,934
Year 5	—	2005	780,187	1,619	781,806
Year 6	Year 1	2006	781,295	1,611	782,906
Year 7	Year 2	2007	787,127	1,786	788,913
Year 8	Year 3	2008	795,002	1,773	796,775
Year 9	Year 4	2009	800,239	1,751	801,990
Year 10	Year 5	2010	805,235	1,747	806,982
2020 Compliance Year			897,806	1,926	899,732

a In-City population estimated as County of San Francisco population obtained from the California Department of Finance Report E-8: Historical Population and Housing Estimates for Cities, Counties, and the State, 2000-2010, released September 2012. Population data for 2001 through 2009 are for January 1 of the applicable year, whereas population data for 2010 is for April 1, 2010 per the revised 2010 decennial census count.

b In-City population estimated as County of San Francisco population obtained from the California Department of Finance Report E-5: Population and Housing Estimates for Cities, Counties, and the State, 2011-2020 with 2010 Census Benchmark, released May 2020. Population data corresponds to January 1, 2020.

c Suburban retail population based on estimates for the Town of Sunol, Redwood City, Daly City, Fremont, Millbrae, Castlewood CSA, and San Francisco County Jail #5. Groveland CSD is not included.

1) Population of retail customers in the Town of Sunol was estimated using the DWR Population Tool. Output from the tool is provided in Appendix H.
2) Populations of retail customers in Redwood City, Daly City, Fremont, Millbrae, and Castlewood were estimated using data from the 2000 and 2010 U.S. Census at the census block level.
3) Inmate population of the San Francisco County Jail #5 in San Bruno was provided by staff of the San Francisco Sheriff's Department.
4) Other suburban customers include individual research and commercial facilities, such as the Lawrence Livermore National Lab, San Francisco International Airport, National Aeronautics and Space Administration, etc. Because these are non-residential facilities, their population is assumed to be zero.

Table 0-2. Retail Gross Water Use for 10-Year and Five-Year Baselines

[SB X7-7 Verification Form Table 4: Annual Gross Water Use]

10-Year Baseline	Five-Year Baseline	Year	Volume Into Distribution System[a]	Deductions					Annual Gross Water Use [c]
				Exported Water	Change in Storage[b]	Indirect Recycled Water	Water Delivered for Agricultural Use	Process Water	
Year 1	—	2001	90.9	0	-0.01	0	0	0	91.0
Year 2	—	2002	91.2	0	0.00	0	0	0	91.2
Year 3	—	2003	88.0	0	0.15	0	0	0	87.9
Year 4	—	2004	85.6	0	0.02	0	0	0	85.6
Year 5	—	2005	85.6	0	-0.09	0	0	0	85.7
Year 6	Year 1	2006	83.9	0	0.00	0	0	0	84.0
Year 7	Year 2	2007	82.3	0	0.03	0	0	0	82.3
Year 8	Year 3	2008	80.6	0	0.00	0	0	0	80.6
Year 9	Year 4	2009	78.8	0	-0.01	0	0	0	78.8
Year 10	Year 5	2010	76.9	0	0.06	0	0	0	76.8
10-Year Baseline Average Gross Water Use									84.4
Five-Year Baseline Average Gross Water Use									80.5
2020 Compliance Year									68.5

a All sources are metered, and all meters are calibrated annually.

b Changes in distribution system storage were estimated based on storage records of all in-City storage. Most suburban retail systems do not have storage facilities or the changes in storage were found to be negligible.

c The annual gross water use does not include water supplied to Groveland CSD.

Table 0-3. Retail Gross Per Capita Water Use for 10-Year and Five-Year Baselines

[SB X7-7 Verification Form Table 5: Gallons Per Capita Per Day (GPCD)]

10-Year Baseline	Five-Year Baseline	Year	Service Area Population	Annual Gross Water Use (mgd)	Daily Per Capita Water Use (GPCD)
Year 1	—	2001	782,248	91.0	116
Year 2	—	2002	784,398	91.2	116
Year 3	—	2003	784,229	87.9	112
Year 4	—	2004	782,934	85.6	109
Year 5	—	2005	781,806	85.7	110
Year 6	Year 1	2006	782,906	84.0	107
Year 7	Year 2	2007	788,913	82.3	104
Year 8	Year 3	2008	796,775	80.6	101
Year 9	Year 4	2009	801,990	78.8	98
Year 10	Year 5	2010	806,982	76.8	95
10-Year Baseline Average GPCD					107
Five-Year Baseline Average GPCD					101
2020 Compliance Year					76

1.2 GROSS PER CAPITA WATER USE TARGETS CALCULATIONS

Consistent with its 2010 UWMP, the SFPUC used Method 3 of the four approved methods provided by the Water Conservation Act of 2009 for determining urban water use targets in 2015. The SFPUC's retail service area is contained entirely within the San Francisco Bay hydrologic region. The hydrologic region baseline, interim, and 2020 targets are 157, 144, and 131 GPCD, respectively. To calculate the urban water use targets using Method 3, 95% of the 2015 interim and 2020 targets are calculated, yielding 2015 interim and 2020 targets of 137 and 124 GPCD, respectively.

In the event that the five-year baseline exceeds the 100-GPCD threshold specified in CWC Section 10608.22, the 2015 and 2020 per capita water use targets shall be verified to determine whether they meet the minimum water use reduction requirements, which warrant that an urban retail water supplier's 2020 target shall be at least 95% of the five-year baseline per capita water use. The SFPUC's daily per capita water use for the five-year period from 2006 to 2010 is 101 GPCD. Because it is above the 100-GPCD threshold specified by the CWC, the 2020 target must be adjusted to reduce water use by a minimum of 5% of the five-year baseline, or 5 GPCD. As such, the SFPUC's highest allowable 2020 target is 96 GPCD (initial 2020 target of 101 GPCD minus the adjustment of 5 GPCD). Since the highest allowable 2020 target is less than the target calculated using Method 3, the SFPUC's 2020 target is adjusted to 96 GPCD. The resulting 2015 interim target was 102 GPCD (i.e., the midpoint between the 10-year baseline of 107 GPCD and the 2020 target of 96 GPCD) (see Table 0-4).

Table 0-4. Gross Per Capita Water Use Baselines and Targets Summary (GPCD)

[Standardized Table 5-1: Baselines and Targets Summary]

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	—	—

1.3 COMPLIANCE WITH 2020 DAILY PER CAPITA WATER USE TARGET

As shown in Table 0-3, with a 2020 per capita water use of 76 GPCD, the SFPUC is in compliance with its 2020 target of 96 GPCD. No adjustments were needed.

Taking into consideration the impact of population and employment growth, as well as passive and active conservation efforts, the SFPUC initially projected in 2015 that its 2020 daily per capita water use would be approximately 86 GPCD. With its continued water conservation program, the SFPUC has achieved a lower than initially predicted per capita water use with a 2020 per capita water use of 76 GPCD, in compliance with the final 2020 target of 96 GPCD.

1.4 ASSISTANCE TO WHOLESALE CUSTOMERS

As a wholesale supplier, the SFPUC is required to provide an assessment of present and proposed future measures, programs, and policies that will help the retail water suppliers in their wholesale service area to achieve their water use reduction targets. This is further discussed in Section 10.3.

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APPENDIX E

2020 Retail Demand Model and Projections Technical Memorandum

JUNE 2021

2020 URBAN WATER MANAGEMENT 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

Water Demand Forecast for the City of San Francisco

2020-2045

PREPARED BY

David Sunding
Oliver Browne

PREPARED FOR

The San Francisco Public Utilities Commission

MARCH 26, 2021

Brattle

San Francisco Water Power Sewer

Services of the San Francisco Public Utilities Commission

NOTICE

- This report was prepared for the San Francisco Public Utilities Commission, in accordance with The Brattle Group's engagement terms, and is intended to be read and used as a whole and not in parts.
- The report reflects the analyses and opinions of the authors and does not necessarily reflect those of The Brattle Group's clients or other consultants.
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TABLE OF CONTENTS

TABLE OF TABLES

Executive Summary

The San Francisco Public Utilities Commission (SFPUC) commissioned the Brattle Group to forecast water demand within SFPUC's in-City retail service area, encompassing the City and County of San Francisco (CCSF). We forecast demand 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 forecast 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 at the census block-group level, and historical climate data from the PRISM dataset.

We forecast account-level water demand based on each household's or business's historical average water consumption and statistical relationships between each household's water consumption and demand drivers such as water rates, weather, and other factors such drought and the COVID-19 pandemic. 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 dependent 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 as 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 average 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. The models also produce the estimated change in water use for each type of account during the COVID-19 pandemic and periods of drought.

For each account, future demand from 2020 to 2045 is forecast based on the historical aggregate water use for each account, and expected future changes in rates and climate. The assumptions for future rates and climate were developed in consultation with SFPUC. The forecasts assume that by 2045 water rates increase by 50% in real terms (i.e., after controlling for inflation), average temperatures in San Francisco increase 1.1°C, and average precipitation is unchanged. We forecast demands for normal years by removing the estimated impact of drought and the ongoing COVID-19 pandemic.

Total demand for the in-city retail service area is calculated by aggregating the monthly account-level forecasts by the number of units and businesses. In addition to the existing stock of residential and commercial accounts, San Francisco's Urban Water Management Plan assumes significant growth in both the number of multiple-family homes and employment within the City based on housing and employment forecasts provided by the San Francisco Planning Department. The forecast incorporates approximately 5,100 new multi-family residential units each year with a simulation that assumes that newly built buildings have the same number of units and per-unit level of consumption as similar existing buildings that have been built in San Francisco since 1990. This approach implicitly assumes that these new multifamily units adopt the current standards in water-efficient plumbing fixtures. The forecast incorporates employment growth of approximately 5,000 jobs per year, split across five different land-use types.[1] The forecast assumes that new commercial and industrial accounts have the same water use patterns as similarly sized existing firms with the same land-use category.

Table 1 summarizes our forecasts. By 2045, single-family residential consumption is forecast to fall to 13.54 million gallons per day; multi-family residential consumption is forecast to grow to 33.03 million gallons per day; and commercial and industrial consumption will remain approximately flat at 18.00 million gallons per day. These forecasts account for all single-family, multi-family, and commercial/industrial water use in the SFPUC retail service area, including fire accounts and combination accounts. However, these forecasts do not include water losses or other account types such as suburban retail accounts, irrigation accounts, or municipal accounts.

In 2015, The Brattle Group produced demand forecasts for SFPUC as part of the previous Urban Water Management Planning process. The model in this memo departs in several important ways from the model that we previously used to forecast water demand in San Francisco. First, the previous model was calibrated to 2010 levels of demand, which are out of date and significantly higher than current consumption. Second, San Francisco's forecasts for future housing and employment growth have changed substantially; the San Francisco Planning Department now expects zero growth in single-family units, but significant growth in multi-family units and in-city employment. Third, our statistical model relies on different data and a different estimation strategy. The new model is estimated from variation over-time in consumption within each individual account in the SFPUC retail service area, whereas the previous model was estimated based on a cross-section of aggregated city-level observations across the

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[1] Employment forecasts and the five different types of land-use categories come from the Plan Bay Area produced by the Association of Bay Area Governments. The five different types of land-use are: Office/Professional; Health/Education/Recreation; Manufacturing/Wholesale; Retail/Restaurants; and Other.

Regional Water System service area (i.e., the BAWSCA agencies and the City and County of San Francisco). Fourth, our model now explicitly adjusts for savings from active conservation programs and non-potable / onsite reuse in SFPUC's water conservation model.[2] Fifth, our previous model assumed that water consumption depends on household income levels as a proxy for each account's housing size and type, which we did not have individual-level data for our previous analysis. The model in this memo instead directly adjusts for every existing account's average water and forecasts the water use of homes built in the future.

TABLE 1: SUMMARY OF FORECASTS BY SECTOR

		FY2019-20 (Actual)	FY2019-20 (Forecast)	FY2024-25	FY2029-30	FY2034-35	FY2039-40	FY2044-45
		(millions of gallons per day)						
Single Family Residential								
Raw Prediction		14.45	14.32	13.83	13.63	13.60	13.63	13.65
Conservation:	*Active*	0.00	0.00	-0.15	-0.18	-0.17	-0.13	-0.11
Total		14.45	14.32	13.68	13.45	13.43	13.49	13.54
Multifamily Residential (5100 new units / year)								
Raw Prediction		22.91	22.47	24.03	26.14	28.65	31.32	33.99
Conservation:	Active	0.00	0.00	-0.15	-0.20	-0.18	-0.11	-0.06
	Non-Potable / Onsite Reuse	-0.07	-0.07	-0.21	-0.35	-0.63	-0.91	-0.91
Other Accounts:	*Fire*	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Total		22.85	22.41	23.68	25.60	27.85	30.31	33.03
Commercial and Industrial								
Raw Prediction		14.70	17.81	17.25	17.33	17.49	17.93	18.38
Conservation:	*Active*	0.00	0.00	-0.28	-0.30	-0.30	-0.28	-0.23
	Non-Potable / Onsite Reuse	-0.03	-0.03	-0.09	-0.15	-0.27	-0.39	-0.39
Other Accounts:	*Docks / Ships*	0.01	0.02	0.02	0.02	0.02	0.02	0.02
	Builders / Contractors	0.14	0.18	0.18	0.18	0.18	0.18	0.18
	Fire	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Total		14.86	18.02	17.12	17.11	17.16	17.51	18.00
Grand Total		52.15	54.75	54.47	56.16	58.44	61.31	64.57

Notes:

The FY2019-20 (Actual): This column is a forecast that reflects actual demands under the prevailing COVID-19 and weather conditions and perfectly matches with realized demand.

The FY2019-20 (Forecast): This column is a forecast that assumes no COVID-19 pandemic and average weather conditions.

Raw Prediction: This is the raw output of Brattle's statistical forecast. In each sector, this category includes both standard accounts and combination-fire accounts.

[2] Onsite water reuse savings result from buildings installing and operating onsite water reuse systems. These systems involve the collection, treatment, and reuse of alternate water sources such as blackwater, graywater, and foundation drainage for non-potable end uses such as toilet flushing and irrigation. The water supplies produced by these systems are not municipally-supplied by the SFPUC and thus they serve to reduce demands on SFPUC's system.

Conservation Adjustment: This is the output of the SFPUC Conservation model. This value accounts for estimated water savings from the SFPUC's active conservation program and on-site and non-potable water reuse program. Passive conservation savings from plumbing code are already assumed/reflected in the raw demand projections.

Residential Fire Accounts: These values were supplied by SFPUC

Commercial and Industrial – Other: This category includes Docks and Ships; Builders/Contractors; and Non-Residential Fire Accounts. These values were supplied by SFPUC.

Grand Total: This row does not include water losses, suburban accounts, irrigation accounts or municipal accounts.

I. Methodology

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

A. Data

1. Data Sources and Construction

Our estimates rely on account-level data from SFPUC's retail service area, matched with data on parcel characteristics, and local weather fluctuations. We matched SFPUC's monthly billing data to publicly available data on land-use and building characteristics based on addresses provided in San Francisco's 2017 Tax Assessor and 2016 Land Use data. We then used these parcels to add characteristics about each meter from the public Tax Assessor, and Land Use data, as well historical weather data from the University of Oregon State's PRISM dataset, US Census block-group characteristics from the 2018 American Community Survey, US Census tract characteristics from the 2010-2019 American Community Survey, and Employment and Land Use forecasts provided by the SFPUC.

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 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 forecast model.

We use climate data from the University of Oregon State's PRISM Climate Group.[3] 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. We use a dataset of monthly average temperature and precipitation at a resolution of 800m x 800m. These

[3] https://prism.oregonstate.edu/

datasets' 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 up with the land-use category of the property on which it lies. The ABAG Plan Bay Area forecasts the total employment between 2005 and 2045 within each TAZ (transportation assessment zone), a unit of geography about the size of a zip-code. Within each TAZ, Plan Bay Area forecasts employment in each of five sectors: 1) Retail / Restaurants; 2) Financial and Professional Services; 3) Health, Education and Recreational Services; 4) Manufacturing, Wholesale Trade and Transportation; and 5) Other Categories.

Consumption data is also matched to past rate data and forecasted future rate increases out to 2045, which were provided to us by the finance department at SFPUC. All of the rates in our data are adjusted for inflation to 2020 dollars using CPI data from the St. Louis Federal Reserve's Economic Data (FRED).

2. Remove Water Conservation Policy from Raw Data

In addition to these fundamental determinants, we also explicitly adjust the forecast demand based on expected future water conservation from active water conservation programs run by SFPUC and from non-potable and onsite water reuse programs. This approach of explicitly accounting for active conservation programs in demand forecasts has been advocated as best practice by local researchers and advocacy groups[4]. However, explicitly adjusting for water conservation introduces 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 SFPUC estimates have been generated as a result of their active conservation programs. Savings for water conservation are calculated at an aggregate level, 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.[5]

4 Diringer, Sarah E., Heather Cooley, Matthew Heberger, Rapichan Phurisamban, Andrea Turner, John McKibbin, and Mary Ann Dickinson. 2018. Integrating Water Efficiency Standards and Codes into Long-Term Demand Forecasting. Water Research Foundation.

Abraham, Sonali, Sarah Diringer, and Heather Cooley. 2020. An Assessment of Urban Water Demand Forecasts in California. Oakland, Calif.: Pacific Institute.

5 Although we make explicit adjustments for active water conservation programs, demand for which is driven my SFPUC outreach, we do not make a similar adjustment for passive water saving. Passive water savings are primarily driven consumers' changing their water consumption behavior to 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.

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

Future demand reduction as a result of onsite water reuse systems was also incorporated into the multi-family and commercial sector models. Estimates of future reductions were provided by SFPUC staff and were subtracted off the raw demand forecasts. In the last step of our analysis, we add back in thedr active conservation savings and savings from reuse and non-potable water programs to generate the final demand estimate.

B. Econometric Model

To predict how water demand in 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 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.

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 weather and 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 follow equation, for multi-family homes q_{it} is the average water use per unit.

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

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.
- **Weather $temp_{it}$ and ppt_{it}:** We obtain panel of modelled 800m x 800m climate characteristics from PRISM[6]. We control for each months' average precipitation and mean temperature.
- **Drought and COVID-19 Emergencies γ^{drght} and γ^{COVID}:** We include fixed effects, dummy variables which take on the value 0 or 1, during the 2015 to 16 drought, and during the COVID-19 pandemic beginning March 2020. These coefficient estimates on these dummy variables can be interpreted as the average change in the natural logarithm of water use during periods of drought and COVID-19, relative to periods without these factors.
- **Individual Fixed Effects $\boldsymbol{\gamma_i}$:** Using this high-resolution data, we can control for the average level of water use for each account in our data. Controlling for the average level of our water use within each household allows us to estimate how an individual account responds to changes in rates, rather than identifying our estimates based on a cross-sectional difference in water consumption.
- **Idiosyncratic error term $\boldsymbol{\varepsilon_{it}}$**: 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 the idiosyncratic error. 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 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:

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

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.

C. Forecast Data

1. Forecast Assumptions

Table 2 and Table 3 summarize the assumptions that we adopt in our forecast. Assumptions about growth in the number of single-family and multi-family units comes from the San Francisco Planning Department. Assumptions for the number of employees are from the Plan Bay Area out to the year 2045. Assumptions about future climate are based on the average of outcomes across multiple

[6] PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu, accessed 20 October 2020.

profession elicitations and climate change models specific to the San Francisco Peninsula considered by SFPUC's Long Term Vulnerability Assessment.

For each existing account, we then forecast demand from 2020 to 2045 based on the historical aggregate water use for each account, and expected future changes in rates and climate. Our forecasts assume that by 2045 water rates increase by 50% in real terms; that average temperatures in San Francisco increase 1.1°C, and that precipitation is unchanged.

In addition to our central climate forecast, we also tested the robustness of our results to two alternative climate-change scenarios. In footnotes, we have reported the unadjusted baseline demand per-unit, noting that these alternative scenarios did not substantially change the results.[7]

In addition to forecasting demand for existing accounts, we also need to account for growth from new accounts, including newly constructed multifamily units and employment growth in the non-residential sector. The forecast incorporates approximately 5,100 new multiple-family residential units each year with a simulation that assumes that newly built buildings have the same number of units and per-unit level of consumption as similar existing buildings that have been recently built since 1990. This approach implicitly assumes that these new multifamily units adopt the current standards in water-efficient plumbing fixtures. The forecast incorporates employment growth of approximately 5,100 jobs per year, split across five different land-use types[8]. The forecast assumes that new commercial and industrial accounts have the same water use patterns as similarly sized existing firms with the same land-use category.

[7] Specifically, we considered a "hot and dry" scenario, in which temperatures increase by 1.7 degrees Celsius and precipitation declines by 8.3% in 2045 relative to relative to 2020, and a "wet and slower warming" scenario where average temperatures increases by only 0.5 degrees Celsius and precipitation increases by 8.3% in 2045 relative to 2020. These scenarios reflect the expected range in climate trends, but do not reflect the expected range of year-to-year weather fluctuations.

[8] Employment forecasts and the five different types of land-use categories come from the Plan Bay Area produced by the Association of Bay Area Governments. The five different types of land-use are: Office/Professional; Health/Education/Recreation; Manufacturing/Wholesale; Retail/Restaurants; and Other.

TABLE 2: FORECAST ASSUMPTIONS – HOUSING UNIT AND EMPLOYMENT GROWTH

		FY2019-20 (Actual)	FY2019-20 (Forecast)	FY2024-25	FY2029-30	FY2034-35	FY2039-40	FY2044-45
No. Housing Units	Single-Family Residential	124,186	124,186	124,186	124,186	124,186	124,186	124,186
	Multi-Family Residential	275,127	275,127	300,932	326,737	352,542	378,347	404,152
	Total	399,313	399,313	425,118	450,923	476,728	502,533	528,338
No. Employees	Office/Professional	304,250	304,250	321,496	338,741	349,153	369,063	388,973
	Health/Education/Recreation	225,061	225,061	232,894	240,727	244,797	249,917	255,037
	Manufacturing/Wholesale	32,763	32,763	31,404	30,045	27,774	25,532	23,290
	Retail	50,541	50,541	52,208	53,875	54,979	56,479	57,979
	Other	160,952	160,952	164,819	168,686	169,471	170,885	172,299
	Total	773,567	773,567	802,821	832,074	846,174	871,876	897,578

TABLE 3: FORECAST ASSUMPTIONS - COVARIATES

	FY2019-20 (Actual)	FY2019-20 (Forecast)	FY2024-25	FY2029-30	FY2034-35	FY2039-40	FY2044-45
Average Real Marginal Rate (2020 Dollars / CCF)	9.2	9.2	12.1	13.6	14.0	14.0	14.0
Monthly Average Temperature (°C)	14.9	15.3	15.5	15.8	16.0	16.2	16.4
Monthly Average Precipitation (mm)	27.3	49.9	49.9	49.9	49.9	49.9	49.9
COVID-19	34%	0%	0%	0%	0%	0%	0%
Drought	0%	0%	0%	0%	0%	0%	0%

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 forecasts 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. Then based on these individual fixed effects we estimate individual level demand using the following equation:

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

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

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

3. Add Water Conservation Estimates and Other Demands back into Forecast

The final step of the forecasting process is to subtract the estimated savings from active conservation programs and non-potable / onsite reuse programs based on SFPUC's water conservation model and the additional demand from other sectors not covered in our model, specifically residential and non-residential fire accounts, docks and ship accounts, builder/contractors accounts back into our model to calculate total consumption in each sector. The forecasts for these accounts are outside of our model and were developed in consultation with SFPUC. Note that this memo does not address other sectors of water use, including losses, irrigation accounts, municipal accounts and suburban retail accounts.

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

II. Single-Family Residential Forecast

A. Model Estimates

Table 4 summarizes the estimates of the demand model for the single-family residential sector. The model has good fit to the data 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 of 0.72, implying that our estimate explains 72% 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 -0.26 to -0.02. 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 rates variable rates but not the fixed rate. We estimate an elasticity of demand with respect to temperature of 0.13 and with respect to precipitation of -0.008. This estimate implies that a 10% increase in average temperature will lead to a 1.3% increase in demand, and that a 10% increase in precipitation will lead to a 0.08% decrease in demand. These estimates are also both statistically significant.

We estimate that the 2014-15 drought caused a 9% decline in demand for residential water use and that the COVID-19 pandemic caused a 12% increase in demand for residential water use.

TABLE 4: MODEL ESTIMATES – SINGLE-FAMILY RESIDENTIAL SECTOR

	Coefficient	95% Confidence Interval	Change in Consumption from 10% Predictor Change
log(Marginal Rates)	-0.14	[-0.26, -0.02]	-1.4%
log(Temperature)	0.13	[0.08, 0.18]	1.3%
log(Precipitation)	-0.008	[-0.01, -0.005]	-0.08%
			Change in Consumption from Predictor Event
COVID-19 (Starting 3/20)	0.09	[0.08, 0.10]	9.3%
Drought (Starting 4/14)	-0.13	[-0.21, -0.06]	-12.4%
Account Fixed-Effects	Yes		
R-squared	0.72		

B. Demand Forecast

Table 5: Demand Forecast - Single-Family Residential Sector summarizes our demand forecast for the single-family residential sector. Between today and FY2044-45, SFPUC does not forecast any growth in the existing stock of 124,186 single-family residential units in San Francisco. The forecast is calibrated to match total family single-family residential consumption in FY2019-20, which was 14.45 MGD or 116.4 gal/day for each unit. However, when we adjust prediction to remove the estimated impacts of COVID-19 and the relatively hot and dry weather in that year, we find that demand would have been slightly lower had 2019-20 been a `normal` year, with total consumption of 14.32 MGD or 115.3 gal/unit each day. Due to increasing rates and average temperatures, per-unit demand is forecast to decrease from 14.32 MGD or 115.3 gal/day per unit in FY2019-20 to 13.65 MGD or a daily 109.9 gal/unit in FY2044-45[9]. SFPUC's conservation model forecasts that active SFPUC conservation programs will lead to an estimated reduction in the total demand for water of 0.22 MGD or 0.9 gal/unit daily by 2045. After accounting for these conservation savings, our total demand is forecast to decrease to 13.54 MGD or 109.1 gal/unit daily in FY2044-45.

[9] We also forecast demand under two alternative climate scenarios: in the "hot and dry" scenario, we estimate unadjusted baseline demand per-unit of 110.3 gal/unit in 2045. In the "wet and slower warming" scenario, we estimate unadjusted baseline demand per-unit of 109.8 gal/unit in 2045.

TABLE 5: DEMAND FORECAST - SINGLE-FAMILY RESIDENTIAL SECTOR

	FY2019-20 (Actual)	FY2019-20 (Forecast)	FY2024-25	FY2029-30	FY2034-35	FY2039-40	FY2044-45
Number of Units	124,186	124,186	124,186	124,186	124,186	124,186	124,186
Residents per Unit	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Avg. Consumption per Capita (gal / day)							
Baseline Demand per Unit	50.6	50.1	48.4	47.7	47.6	47.7	47.8
Conservation - Active	-	-	-0.5	-0.6	-0.6	-0.5	-0.4
Demand per Capita	50.6	50.1	47.9	47.1	47.0	47.2	47.4
Avg. Consumption per Unit (gal / day)							
Baseline Demand per Unit	116.4	115.3	111.4	109.8	109.5	109.7	109.9
Conservation - Active	-	-	-1.2	-1.4	-1.4	-1.1	-0.9
Demand per Unit	116.4	115.3	110.1	108.3	108.2	108.7	109.1
Total Consumption (MGD)							
Baseline Demand	14.45	14.32	13.83	13.63	13.60	13.63	13.65
Conservation - Active	-	-	-0.15	-0.18	-0.17	-0.13	-0.11
Total Demand	14.45	14.32	13.68	13.45	13.43	13.49	13.54

III. Multiple-Family Residential Demand Forecast

A. Model Estimates

Table 6 summarizes the estimates of the demand model for the multiple-family residential sector. Note that forecasts are made on a per-unit rather than per-account basis, this distinction is important in the multiple-family rsidential sector, where many accounts serve multiple units. The model has good fit to the data due with an R-squared of 0.75, implying that our estimate explains 75% of the total variation in demand.

Across all units in the sample, we estimate a price-elasticity of demand of -0.2. This elasticity implies that a 10% increase in rates will lead to a 2.0% reduction in demand. This estimate is statistically significant and has a confidence interval from -0.30 to -0.10. 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 rates variable rates but not the fixed rate. We estimate an elasticity of demand with respect to temperature of 0.09 and with respect to precipitation of -0.002. This estimate implies that a 10% increase in average temperature will lead to a 0.9% increase in demand, and that a 10% increase in precipitation will lead to a 0.02% decrease in demand.

We find that drought caused a decline in water use of 7.4% and that the COVID-19 pandemic caused an increase in water use of 5.8%.

TABLE 6: MODEL ESTIMATES - MULTIPLE-FAMILY RESIDENTIAL SECTOR

	Coefficient	95% Confidence Interval	Change in Consumption from 10% Predictor Change
log(Marginal Price)	-0.20	[-0.30, -0.10]	-2.0%
log(Temperature)	0.09	[0.06, 0.12]	0.9%
log(Precipitation)	-0.002	[-0.004, -0.001]	0.0%
			Change in Consumption from Predictor Event
COVID-19 (Starting 3/20)	0.06	[0.05, 0.07]	5.8%
Drought (Starting 4/14)	-0.08	[-0.13, -0.02]	-7.4%
Account Fixed-Effects	Yes		
R-squared	0.75		

B. Demand Forecast

Table 7 summarizes the multi-family residential demand forecast. The San Francisco Planning Department forecasts significant growth in the stock of multi-family residential units in San Francisco at a rate of approximately 5,100 units per year from 275,000 units in FY2019-20 to 404,000 units in FY2044-45.

The forecast is calibrated to match total multi-family residential consumption in FY2019-20, which was 22.9 MGD or 83.3 gal/day for each unit.[10] However, when we adjust our estimate to consider a typical year, removing the impacts of COVID-19 and the relatively hot and dry weather in that year, we find that demand would have been slightly lower, a total of 22.5 MGD or a daily 81.7 gal/unit. Increasing rates will push consumption down, and increasing average temperatures which will drive consumption up. Consumption will also be affected by the composition of dwellings, with newly build units on average consuming more water than older ones. On net, per-unit demand is forecast to increase from 81.7 gal/day per unit in 2019-20 to 84.1 gal/unit primarily driven by higher per-unit consumption in new

[10] This total demand number includes combination residential and fire accounts.

buildings[11]. Due to the significant growth in the number of units, total consumption is forecast to increase from 22.5 MGD to 34.0 MGD. SFPUC's conservation model also forecasts that there will be a reduction in water use as a result of active SFPUC conservation programs, and the implementation of onsite reuse systems. These conservation programs are expected to account for a total of 1.0 MGD or 2.4 gal/unit daily by FY2044-45. After accounting for conservation savings, total demand is forecast to be 33.0 MGD or 81.7 gal/unit daily in FY2044-45.

TABLE 7: DEMAND FORECAST – MULTIPLE-FAMILY RESIDENTIAL SECTOR

		FY2019-20 (Actual)	FY2019-20 (Forecast)	FY2024-25	FY2029-30	FY2034-35	FY2039-40	FY2044-45
Number of Units		275,127	275,127	300,932	326,737	352,542	378,347	404,152
Residents per Unit		2.3	2.3	2.3	2.3	2.3	2.3	2.3
Avg. Consumption per Capita (gal / day)								
Unadjusted Baseline Demand		36.2	35.5	34.7	34.8	35.3	36.0	36.6
Conservation:	*Active*	-	-	-0.2	-0.3	-0.2	-0.1	-0.1
	Non-Potable / Onsite Reuse	-0.1	-0.1	-0.3	-0.5	-0.8	-1.0	-1.0
Demand per Capita		36.1	35.4	34.2	34.0	34.3	34.8	35.5
Avg. Consumption per Unit (gal / day)								
Unadjusted Baseline Demand		83.3	81.7	79.8	80.0	81.3	82.8	84.1
Conservation:	*Active*	-	-	-0.5	-0.6	-0.5	-0.3	-0.1
	Non-Potable / Onsite Reuse	-0.3	-0.3	-0.7	-1.1	-1.8	-2.4	-2.3
Demand per Unit		83.0	81.4	78.7	78.3	79.0	80.1	81.7
Total Consumption (MGD)								
Unadjusted Baseline Demand		22.9	22.5	24.0	26.1	28.7	31.3	34.0
Conservation:	*Active*	-	-	-0.1	-0.2	-0.2	-0.1	-0.1
	Non-Potable / Onsite Reuse	-0.1	-0.1	-0.2	-0.4	-0.6	-0.9	-0.9
Total Demand		22.8	22.4	23.7	25.6	27.8	30.3	33.0

IV. Commercial and Industrial Demand Forecast

A. Model Estimates

Table 8 summarizes the estimates of the demand model for the commercial and industrial sector. Note that we estimate a model on a per-unit account, but we present our results on a per-employee basis, as this is the input data into our forecast model. Due to the substantial heterogeneity in the commercial and industrial sectors, we estimate a model that allows for different types of land-use to be differentially responsive to changes in rates and COVID-19. Specifically, we estimate different

[11] We also forecast demand under two alternative climate scenarios: in the "hot and dry" scenario, we estimate unadjusted baseline demand per-unit of 84.0 gal/unit in 2045. In the "wet and slower warming" scenario, we estimate unadjusted baseline demand per-unit of 84.3 gal/unit in 2045.

coefficients for different types of land-use. The model has good fit to the data due with an R-squared of 0.88 implying that our estimate explains 88% of the total variation in demand.

We estimate five price elasticities, which vary from -0.14 in the manufacturing/wholesale sector to -0.3 in the health/education/retail sector. These elasticities imply that a 10% increase in rates will lead to a reduction in demand of between 1.4 and 3.0 percent. We 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[12]. We estimate an elasticity of demand with respect to temperature of 0.14 and with respect to precipitation of -0.002. This estimate implies that a 10% increase in average temperature will lead to a 1.4% increase in demand, and that a 10% increase in precipitation will lead to a 0.02% decrease in demand.

We estimate that the COVID-19 pandemic caused a substantial reduction in demand across all sectors of commercial and industrial accounts. This reduction in demand was smallest in the Manufacturing/Wholesale and Retail/Restaurant sectors at -39.6% and -41.9% respectively, and it was largest in the Office/Professional, Health/Education/Recreation, and Other sectors at -53.6%, -49.7% and -56.5% respectively. We do not find that drought caused a statistically significant change in commercial and industrial consumption.

TABLE 8: MODEL ESTIMATES- COMMERCIAL AND INDUSTRIAL SECTOR

	Coefficient	95% Confidence Interval	Change in Consumption from 10% Predictor Change
log(Marginal Price) : Office/Professional	-0.19	[-0.33, -0.05]	-1.9%
log(Marginal Price) : Health/Education/Recreation	-0.30	[-0.42, -0.17]	-3.0%
log(Marginal Price) : Manufacturing/Wholesale	-0.14	[-0.32, 0.04]	-1.4%
log(Marginal Price) : Retail	-0.19	[-0.50, 0.12]	-1.9%
log(Marginal Price) : Other	-0.22	[-0.35, -0.09]	-2.2%
log(Temperature)	0.14	[0.09, 0.18]	1.4%
log(Precipitation)	-0.002	[-0.003, -0.001]	0.0%
			Change in Consumption from Predictor Event
COVID-19 (Starting 3/20) : Office/Professional	-0.77	[-0.83, -0.71]	-53.6%
COVID-19 (Starting 3/20) : Health/Education/Recreation	-0.69	[-0.71, -0.66]	-49.7%
COVID-19 (Starting 3/20) : Manufacturing/Wholesale	-0.50	[-0.53, -0.48]	-39.6%
COVID-19 (Starting 3/20) : Retail	-0.54	[-0.61, -0.48]	-41.9%
COVID-19 (Starting 3/20) : Other	-0.83	[-0.86, -0.80]	-56.5%
Drought (Starting 4/14)	0.004	[-0.05, 0.05]	0.4%
Account Fixed-Effects	Yes		
R-squared	0.88		

[12] Our estimates are deemed 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 fitting model, we include all variables in our forecasts regardless of whether or not they are statistically significant.

B. Demand Forecast

Table 9 summarizes the commercial and industrial demand forecast. The San Francisco Planning Department forecasts that the City will experience significant employment growth, of approximately 5,100 jobs per year, from 774,000 jobs in FY2019-20 to 898,000 jobs in FY2044-45.

The forecast is calibrated to match total multiple-family residential consumption in FY2019-20, which was 14.7 MGD or 19.0 gal/day for each employee. However, when we adjust our estimate to consider a typical year, removing the impacts of COVID-19 and the relatively hot and dry weather in that year, we find that demand would have been significantly higher, a total of 17.8 MGD or a daily 23.0 gal/employee. Per-employee demand is forecast to decrease from 23.0 gal/day per employee in 2019-20 to 20.5 gal/employee, driven primarily by increasing rates, and slightly offset by increasing temperatures[13]. However due to the significant growth in the number of employees, total consumption is forecast to increase from 17.8 MGD to 18.4 MGD. SFPUC's conservation model also forecasts that there will be a significant reduction in water use as a result of active SFPUC conservation programs and adoption of non-potable water and onsite reuse programs. These conservation programs are expected to reduce total water-use by 0.6 MGD or 0.7 gal/employee daily by FY2044-45. After accounting for conservation savings, total demand is forecast to be approximately flat, finishing at 17.8 MGD gal/employee daily in FY2044-45.

TABLE 9: DEMAND FORECAST - COMMERCIAL AND INDUSTRIAL SECTOR

		FY2019-20 (Actual)	FY2019-20 (Forecast)	FY2024-25	FY2029-30	FY2034-35	FY2039-40	FY2044-45
Number of Employees		773,567	773,567	802,821	832,074	846,174	871,876	897,578
Avg. Consumption per Employee (gal / day)								
Unadjusted Baseline Demand		19.0	23.0	21.5	20.8	20.7	20.6	20.5
Conservation:	*Active*	0.0	0.0	-0.4	-0.4	-0.4	-0.3	-0.3
	Non-Potable / Onsite Reuse	0.0	0.0	-0.1	-0.2	-0.3	-0.4	-0.4
Total Demand		19.0	23.0	21.0	20.3	20.0	19.8	19.8
Total Consumption (MGD)								
Unadjusted Baseline Demand		14.7	17.8	17.3	17.3	17.5	17.9	18.4
Conservation:	*Active*	0.0	0.0	-0.3	-0.3	-0.3	-0.3	-0.2
	Non-Potable / Onsite Reuse	0.0	0.0	-0.1	-0.2	-0.3	-0.4	-0.4
Total Demand		14.7	17.8	16.9	16.9	16.9	17.3	17.8

[13] We also forecast demand under two alternative climate scenarios: in the "hot and dry" scenario, we estimate unadjusted baseline demand per-unit of 20.6 gal/unit in 2045. In the "wet and slower warming" scenario, we estimate unadjusted baseline demand per-unit of 20.5 gal/unit in 2045.

APPENDIX F

In-City Retail Water Audit Worksheet (Draft)

JUNE 2021

2020 URBAN WATER MANAGEMENT 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

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AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Chris Hewes	
Email Address:	chewes@sfwater.org	
Telephone | Ext.:	4153213422	
Name of City / Utility:	San Francisco Public Utilities Commission	
City/Town/Municipality:	San Francisco	
State / Province:	California (CA)	
Country:	USA	
Year:	2020	Financial Year
Start Date:	07/2019	Enter MM/YYYY numeric format
End Date:	06/2020	Enter MM/YYYY numeric format
Audit Preparation Date:	12/1/2020	
Volume Reporting Units:	Million gallons (US)	
PWSID / Other ID:	3810011	

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% ◉ ○ Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

? Click to access definition
\+ Click to add a comment

Water Audit Report for: San Francisco Public Utilities Commission (3810011)
Reporting Year: 2020 | 7/2019 - 6/2020

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<----------- Enter grading in column 'E' and 'J' ---------->

WATER SUPPLIED

Item	Grade	Value	Units	Master Meter and Supply Error Adjustments: Grade	Pcnt	Value	Units
Volume from own sources:	10	23,139.650	MG/Yr	8		-49.147	MG/Yr
Water imported:	n/a	0.000	MG/Yr				MG/Yr
Water exported:	n/a	0.000	MG/Yr				MG/Yr
WATER SUPPLIED:		**23,188.797**	MG/Yr				

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

Item	Grade	Value	Units	Pcnt	Value	Units
Billed metered:	9	20,229.578	MG/Yr			
Billed unmetered:	n/a	0	MG/Yr			
Unbilled metered:	10	260.321	MG/Yr			
Unbilled unmetered:	8	70.753	MG/Yr		70.753	MG/Yr
AUTHORIZED CONSUMPTION:		**20,560.652**	MG/Yr			

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption)

2,628.145 MG/Yr

Apparent Losses

Item	Grade	Value	Units	Pcnt	Value	Units
Unauthorized consumption:	6	28.986	MG/Yr		28.986	MG/Yr
Customer metering inaccuracies:	7	391.905	MG/Yr		391.905	MG/Yr
Systematic data handling errors:	9	12.806	MG/Yr		12.806	MG/Yr
Apparent Losses:		**433.698**	MG/Yr			

Real Losses (Current Annual Real Losses or CARL)

Item	Value	Units
Real Losses = Water Losses - Apparent Losses:	**2,194.447**	MG/Yr
WATER LOSSES:	**2,628.145**	MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: **2,959.219** MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Item	Grade	Value	Units
Length of mains:	9	1,275.2	miles
Number of active AND inactive service connections:	9	179,156	
Service connection density:		140	conn./mile main
Are customer meters typically located at the curbstop or property line?		Yes	
Average length of customer service line:			(length of service line, beyond the property boundary, that is the responsibility of the utility)
Average operating pressure:	7	76.1	psi

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

COST DATA

Item	Grade	Value	Units
Total annual cost of operating water system:	10	$379,126,174	$/Year
Customer retail unit cost (applied to Apparent Losses):	10	$21.13	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	5	$294.10	$/Million gallons

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 89 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Variable production cost (applied to Real Losses)
2: Customer metering inaccuracies
3: Unauthorized consumption

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: San Francisco Public Utilities Commission (3810011)
Reporting Year: 2020 | 7/2019 - 6/2020

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 89 out of 100 ***

System Attributes:

	Apparent Losses:	433.698	MG/Yr
+	Real Losses:	2,194.447	MG/Yr
=	Water Losses:	2,628.145	MG/Yr
?	Unavoidable Annual Real Losses (UARL):	938.07	MG/Yr
	Annual cost of Apparent Losses:	$12,250,527	
	Annual cost of Real Losses:	$645,387	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	12.8%	
	Non-revenue water as percent by cost of operating system:	3.4%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	6.63	gallons/connection/day
	Real Losses per service connection per day:	33.56	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.44	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	2,194.45	million gallons/year
	? Infrastructure Leakage Index (ILI) [CARL/UARL]:	2.34	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	**Comment**
Volume from own sources:	
Vol. from own sources: Master meter error adjustment:	
Water imported:	
Water imported: master meter error adjustment:	
Water exported:	
Water exported: master meter error adjustment:	
Billed metered:	
Billed unmetered:	
Unbilled metered:	

Audit Item	Comment
Unbilled unmetered:	
Unauthorized consumption:	
Customer metering inaccuracies:	
Systematic data handling errors:	
Length of mains:	
Number of active AND inactive service connections:	
Average length of customer service line:	
Average operating pressure:	
Total annual cost of operating water system:	
Customer retail unit cost (applied to Apparent Losses):	
Variable production cost (applied to Real Losses):	

AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.

Water Audit Report for: **San Francisco Public Utilities Commission (3810011)**

Reporting Year: **2020** | **7/2019 - 6/2020**

Data Validity Score: **89**

<table>
<tr><td rowspan="8">Own Sources (Adjusted for known errors)
23,188.797</td><td rowspan="11">System Input
23,188.797</td><td>Water Exported
0.000</td><td colspan="3">Billed Water Exported</td><td>Revenue Water
0.000</td></tr>
<tr><td rowspan="10">Water Supplied
23,188.797</td><td rowspan="4">Authorized Consumption
20,560.652</td><td rowspan="2">Billed Authorized Consumption
20,229.578</td><td>Billed Metered Consumption (water exported is removed)
20,229.578</td><td rowspan="2">Revenue Water
20,229.578</td></tr>
<tr><td>Billed Unmetered Consumption
0.000</td></tr>
<tr><td rowspan="2">Unbilled Authorized Consumption
331.074</td><td>Unbilled Metered Consumption
260.321</td><td rowspan="8">Non-Revenue Water (NRW)
2,959.219</td></tr>
<tr><td>Unbilled Unmetered Consumption
70.753</td></tr>
<tr><td rowspan="6">Water Losses
2,628.145</td><td rowspan="3">Apparent Losses
433.698</td><td>Unauthorized Consumption
28.986</td></tr>
<tr><td>Customer Metering Inaccuracies
391.905</td></tr>
<tr><td>Systematic Data Handling Errors
12.806</td></tr>
<tr><td rowspan="3">Water Imported
0.000</td><td rowspan="3">Real Losses
2,194.447</td><td>Leakage on Transmission and/or Distribution Mains
Not broken down</td></tr>
<tr><td>Leakage and Overflows at Utility's Storage Tanks
Not broken down</td></tr>
<tr><td>Leakage on Service Connections
Not broken down</td></tr>
</table>

AWWA Free Water Audit Software: Dashboard

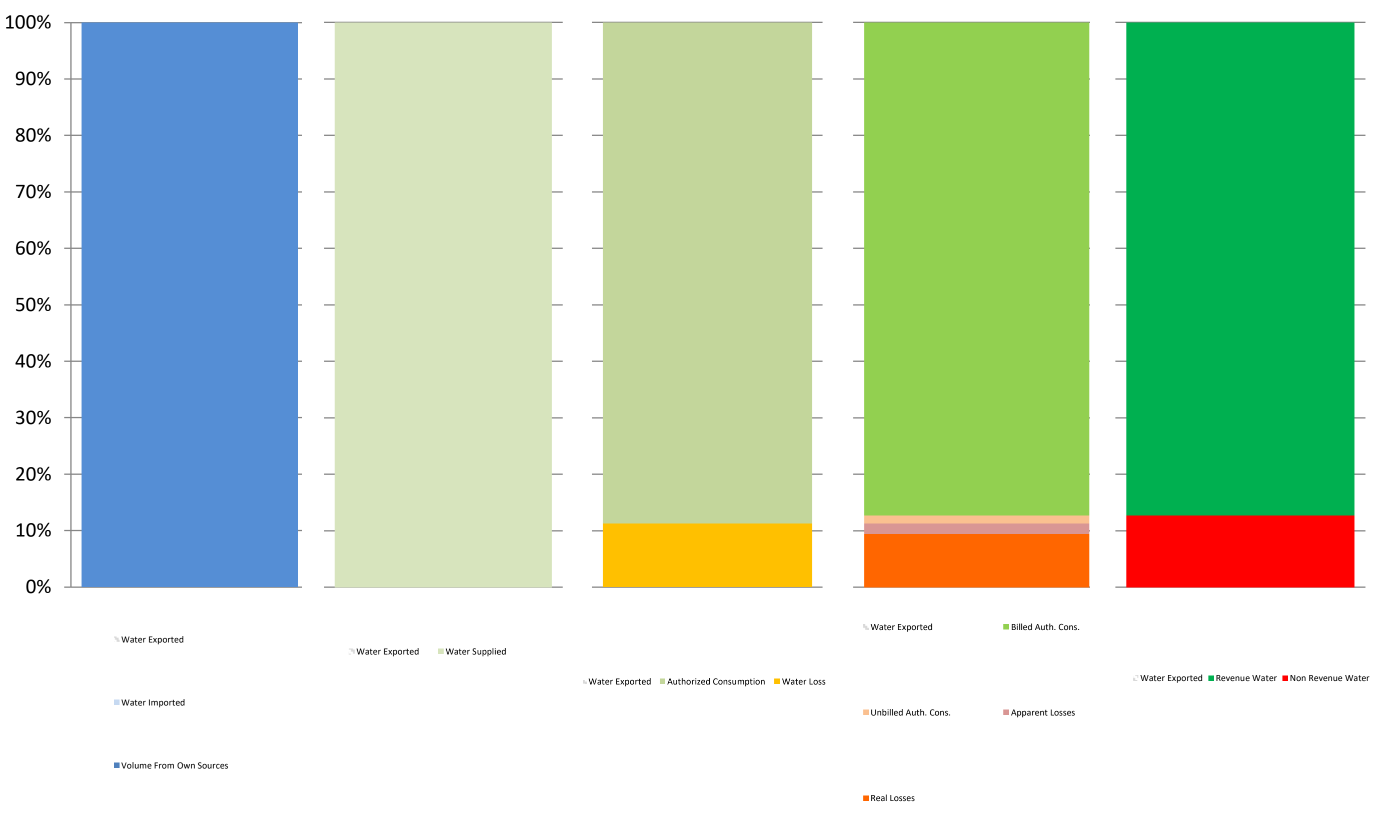
WAS v5.0

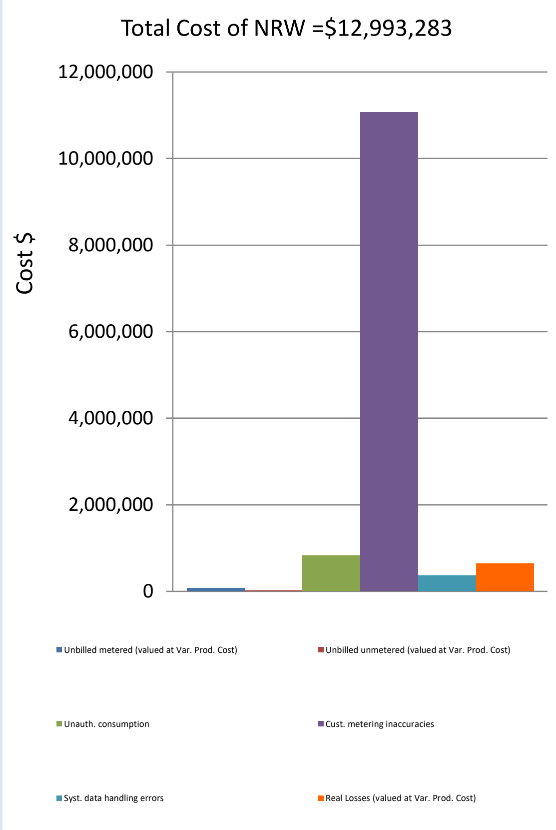
The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

Water Audit Report for:	San Francisco Public Utilities Commission (3810011)	
Reporting Year:	2020	7/2019 - 6/2020
Data Validity Score:	89	

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water





AWWA Free Water Audit Software: Grading Matrix

WAS 5.0

The grading assigned to each audit component and the corresponding recommended improvements and actions are highlighted in yellow. Audit accuracy is likely to be improved by prioritizing those items shown in red

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
WATER SUPPLIED											
Volume from own sources:	Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)	Less than 25% of water production sources are metered, remaining sources are estimated. No regular meter accuracy testing or electronic calibration conducted.	25% - 50% of treated water production sources are metered; other sources estimated. No regular meter accuracy testing or electronic calibration conducted.	Conditions between 2 and 4	50% - 75% of treated water production sources are metered, other sources estimated. Occasional meter accuracy testing or electronic calibration conducted.	Conditions between 4 and 6	At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources. Meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy. Procedures are reviewed by a third party knowledgeable in the M36 methodology.
Improvements to attain higher data grading for "Volume from own Sources" component:		to qualify for 2: Organize and launch efforts to collect data for determining volume from own sources	to qualify for 4: Locate all water production sources on maps and in the field, launch meter accuracy testing for existing meters, begin to install meters on unmetered water production sources and replace any obsolete/defective meters.		to qualify for 6: Formalize annual meter accuracy testing for all source meters; specify the frequency of testing. Complete installation of meters on unmetered water production sources and complete replacement of all obsolete/defective meters.		to qualify for 8: Conduct annual meter accuracy testing and calibration of related instrumentation on all meter installations on a regular basis. Complete project to install new, or replace defective existing, meters so that entire production meter population is metered. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Maintain annual meter accuracy testing and calibration of related instrumentation for all meter installations. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to further improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
Volume from own sources master meter and supply error adjustment:	Select n/a only if the water utility fails to have meters on its sources of supply	Inventory information on meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined	No automatic datalogging of production volumes; daily readings are scribed on paper records without any accountability controls. Flows are not balanced across the water distribution system: tank/storage elevation changes are not employed in calculating the "Volume from own sources" component and archived flow data is adjusted only when grossly evident data error occurs.	Conditions between 2 and 4	Production meter data is logged automatically in electronic format and reviewed at least on a monthly basis with necessary corrections implemented. "Volume from own sources" tabulations include estimate of daily changes in tanks/storage facilities. Meter data is adjusted when gross data errors occur, or occasional meter testing deems this necessary.	Conditions between 4 and 6	Hourly production meter data logged automatically & reviewed on at least a weekly basis. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and/or error is confirmed by meter accuracy testing. Tank/storage facility elevation changes are automatically used in calculating a balanced "Volume from own sources" component, and data gaps in the archived data are corrected on at least a weekly basis.	Conditions between 6 and 8	Continuous production meter data is logged automatically & reviewed each business day. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and/or results of meter accuracy testing. Tank/storage facility elevation changes are automatically used in "Volume from own sources" tabulations and data gaps in the archived data are corrected on a daily basis.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically balances flows from all sources and storages; results are reviewed each business day. Tight accountability controls ensure that all data gaps that occur in the archived flow data are quickly detected and corrected. Regular calibrations between SCADA and sources meters ensures minimal data transfer error.
Improvements to attain higher data grading for "Master meter and supply error adjustment" component:		to qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature.	to qualify for 4: Install automatic datalogging equipment on production meters. Complete installation of level instrumentation at all tanks/storage facilities and include tank level data in automatic calculation routine in a computerized system. Construct a computerized listing or spreadsheet to archive input volumes, tank/storage volume changes and import/export flows in order to determine the composite "Water Supplied" volume for the distribution system. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps.		to qualify for 6: Refine computerized data collection and archive to include hourly production meter data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Use daily net storage change to balance flows in calculating "Water Supplied" volume. Necessary corrections to data errors are implemented on a weekly basis.		to qualify for 8: Ensure that all flow data is collected and archived on at least an hourly basis. All data is reviewed and detected errors corrected each business day. Tank/storage levels variations are employed in calculating balanced "Water Supplied" component. Adjust production meter data for gross error and inaccuracy confirmed by testing.		to qualify for 10: Link all production and tank/storage facility elevation change data to a Supervisory Control & Data Acquisition (SCADA) System, or similar computerized monitoring/control system, and establish automatic flow balancing algorithm and regularly calibrate between SCADA and source meters. Data is reviewed and corrected each business day.		to maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters. Continue to replace or repair meters as they perform outside of desired accuracy limits. Stay abreast of new and more accurate water level instruments to better record tank/storage levels and archive the variations in storage volume. Keep current with SCADA and data management systems to ensure that archived data is well-managed and error free.
Water Imported:	Select n/a if the water utility's supply is exclusively from its own water resources (no bulk purchased/ imported water)	Less than 25% of imported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of imported water sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of imported water sources are metered, other sources estimated. Occasional meter accuracy testing conducted.	Conditions between 4 and 6	At least 75% of imported water sources are metered, meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually for all meter installations. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of imported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of imported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually for all meter installations, with less than 10% of accuracy tests found outside of +/- 3% accuracy.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Water Imported Volume" component: (*Note: usually the water supplier selling the water - "the Exporter" - to the utility being audited is responsible to maintain the metering installation measuring the imported volume. The utility should coordinate carefully with the Exporter to ensure that adequate meter upkeep takes place and an accurate measure of the Water Imported volume is quantified.*)		to qualify for 2: Review bulk water purchase agreements with partner suppliers; confirm requirements for use and maintenance of accurate metering. Identify needs for new or replacement meters with goal to meter all imported water sources.	To qualify for 4: Locate all imported water sources on maps and in the field, launch meter accuracy testing for existing meters, begin to install meters on unmetered imported water interconnections and replace obsolete/defective meters.		to qualify for 6: Formalize annual meter accuracy testing for all imported water meters, planning for both regular meter accuracy testing and calibration of the related instrumentation. Continue installation of meters on unmetered imported water interconnections and replacement of obsolete/defective meters.		to qualify for 8: Complete project to install new, or replace defective, meters on all imported water interconnections. Maintain annual meter accuracy testing for all imported water meters and conduct calibration of related instrumentation at least annually. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Conduct meter accuracy testing for all meters on a semi-annual basis, along with calibration of all related instrumentation. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Continue to conduct calibration of related instrumentation on a semi-annual basis. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
Water imported master meter and supply error adjustment:	Select n/a if the Imported water supply is unmetered, with Imported water quantities estimated on the billing invoices sent by the Exporter to the purchasing Utility.	Inventory information on imported meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined Written agreement(s) with water Exporter(s) are missing or written in vague language concerning meter management and testing.	No automatic datalogging of imported supply volumes; daily readings are scribed on paper records without any accountability controls to confirm data accuracy and the absence of errors and data gaps in recorded volumes. Written agreement requires meter accuracy testing but is vague on the details of how and who conducts the testing.	Conditions between 2 and 4	Imported supply metered flow data is logged automatically in electronic format and reviewed at least on a monthly basis by the Exporter with necessary corrections implemented. Meter data is adjusted by the Exporter when gross data errors are detected. A coherent data trail exists for this process to protect both the selling and the purchasing Utility. Written agreement exists and clearly states requirements and roles for meter accuracy testing and data management.	Conditions between 4 and 6	Hourly Imported supply metered data is logged automatically & reviewed on at least a weekly basis by the Exporter. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and to correct for error confirmed by meter accuracy testing. Any data gaps in the archived data are detected and corrected during the weekly review. A coherent data trail exists for this process to protect both the selling and the purchasing Utility.	Conditions between 6 and 8	Continuous Imported supply metered flow data is logged automatically & reviewed each business day by the Exporter. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and/or results of meter accuracy testing. Any data errors/gaps are detected and corrected on a daily basis. A data trail exists for the process to protect both the selling and the purchasing Utility.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically records data which is reviewed each business day by the Exporter. Tight accountability controls ensure that all error/data gaps that occur in the archived flow data are quickly detected and corrected. A reliable data trail exists and contract provisions for meter testing and data management are reviewed by the selling and purchasing Utility at least once every five years.
Improvements to attain higher data grading for "Water imported master meter and supply error adjustment" component:		to qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature. Review the written agreement between the selling and purchasing Utility.	to qualify for 4: Install automatic datalogging equipment on Imported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the Exporters to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.		to qualify for 6: Refine computerized data collection and archive to include hourly Imported supply metered flow data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Make necessary corrections to errors/data errors on a weekly basis.		to qualify for 8: Ensure that all Imported supply metered flow data is collected and archived on at least an hourly basis. All data is reviewed and errors/data gaps are corrected each business day.		to qualify for 10: Conduct accountability checks to confirm that all Imported supply metered data is reviewed and corrected each business day by the Exporter. Results of all meter accuracy tests and data corrections should be available for sharing between the Exporter and the purchasing Utility. Establish a schedule for a regular review and updating of the contractual language in the written agreement between the selling and the purchasing Utility; at least every five years.		to maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters; work with the Exporter to help identify meter replacement needs. Keep communication lines with Exporters open and maintain productive relations. Keep the written agreement current with clear and explicit language that meets the ongoing needs of all parties.
Water Exported:	Select n/a if the water utility sells no bulk water to neighboring water utilities (no exported water sales)	Less than 25% of exported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of exported water sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of exported water sources are metered, other sources estimated. Occasional meter accuracy testing conducted.	Conditions between 4 and 6	At least 75% of exported water sources are metered, meter accuracy testing and/or electronic calibration conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of exported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of exported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually for all meter installations, with less than 10% of accuracy tests found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Water Exported Volume" component: (*Note: usually, if the water utility being audited sells (Exports) water to a neighboring purchasing Utility, it is the responsibility of the utility exporting the water to maintain the metering installation measuring the Exported volume. The utility exporting the water should ensure that adequate meter upkeep takes place and an accurate measure of the Water Exported volume is quantified.*)		to qualify for 2: Review bulk water sales agreements with purchasing utilities; confirm requirements for use & upkeep of accurate metering. Identify needs to install new, or replace defective meters as needed.	To qualify for 4: Locate all exported water sources on maps and in field, launch meter accuracy testing for existing meters, begin to install meters on unmetered exported water interconnections and replace obsolete/defective meters		to qualify for 6: Formalize annual meter accuracy testing for all exported water meters. Continue installation of meters on unmetered exported water interconnections and replacement of obsolete/defective meters.		to qualify for 8: Complete project to install new, or replace defective, meters on all exported water interconnections. Maintain annual meter accuracy testing for all exported water meters. Repair or replace meters outside of +/- 6% accuracy.		to qualify for 10: Maintain annual meter accuracy testing for all meters. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		to maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Water exported master meter and supply error adjustment:	Select n/a only if the water utility fails to have meters on its exported supply interconnections.	Inventory information on exported meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined Written agreement(s) with the utility purchasing the water are missing or written in vague language concerning meter management and testing.	No automatic datalogging of exported supply volumes; daily readings are scribed on paper records without any accountability controls to confirm data accuracy and the absence of errors and data gaps in recorded volumes. Written agreement requires meter accuracy testing but is vague on the details of how and who conducts the testing.	Conditions between 2 and 4	Exported metered flow data is logged automatically in electronic format and reviewed at least on a monthly basis, with necessary corrections implemented. Meter data is adjusted by the utility selling (exporting) the water when gross data errors are detected. A coherent data trail exists for this process to protect both the utility exporting the water and the purchasing Utility. Written agreement exists and clearly states requirements and roles for meter accuracy testing and data management.	Conditions between 4 and 6	Hourly exported supply metered data is logged automatically & reviewed on at least a weekly basis by the utility selling the water. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and to correct for error found by meter accuracy testing. Any data gaps in the archived data are detected and corrected during the weekly review. A coherent data trail exists for this process to protect both the selling (exporting) utility and the purchasing Utility.	Conditions between 6 and 8	Continuous exported supply metered flow data is logged automatically & reviewed each business day by the utility selling (exporting) the water. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and any error confirmed by meter accuracy testing. Any data errors/gaps are detected and corrected on a daily basis. A data trail exists for the process to protect both the selling (exporting) Utility and the purchasing Utility.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically records data which is reviewed each business day by the utility selling (exporting) the water. Tight accountability controls ensure that all error/data gaps that occur in the archived flow data are quickly detected and corrected. A reliable data trail exists and contract provisions for meter testing and data management are reviewed by the selling Utility and purchasing Utility at least once every five years.
Improvements to attain higher data grading for "Water exported master meter and supply error adjustment" component:		<u>to qualify for 2</u>: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature. Review the written agreement between the utility selling (exporting) the water and the purchasing Utility.	<u>to qualify for 4</u>: Install automatic datalogging equipment on exported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the purchasing utilities to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.		<u>to qualify for 6</u>: Refine computerized data collection and archive to include hourly exported supply metered flow data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Make necessary corrections to errors/data errors on a weekly basis.		<u>to qualify for 8</u>: Ensure that all exported metered flow data is collected and archived on at least an hourly basis. All data is reviewed and errors/data gaps are corrected each business day.		<u>to qualify for 10</u>: Conduct accountability checks to confirm that all exported metered flow data is reviewed and corrected each business day by the utility selling the water. Results of all meter accuracy tests and data corrections should be available for sharing between the utility and the purchasing Utility. Establish a schedule for a regular review and updating of the contractual language in the written agreements with the purchasing utilities; at least every five years.		<u>to maintain 10</u>: Monitor meter innovations for development of more accurate and less expensive flowmeters; work with the purchasing utilities to help identify meter replacement needs. Keep communication lines with the purchasing utilities open and maintain productive relations. Keep the written agreement current with clear and explicit language that meets the ongoing needs of all parties.
AUTHORIZED CONSUMPTION											
Billed metered:	n/a (not applicable). Select n/a only if the entire customer population is not metered and is billed for water service on a flat or fixed rate basis. In such a case the volume entered must be zero.	Less than 50% of customers with volume-based billings from meter readings; flat or fixed rate billing exists for the majority of the customer population	At least 50% of customers with volume-based billing from meter reads; flat rate billing for others. Manual meter reading is conducted, with less than 50% meter read success rate, remaining accounts' consumption is estimated. Limited meter records, no regular meter testing or replacement. Billing data maintained on paper records, with no auditing.	Conditions between 2 and 4	At least 75% of customers with volume-based, billing from meter reads; flat or fixed rate billing for remaining accounts. Manual meter reading is conducted with at least 50% meter read success rate; consumption for accounts with failed reads is estimated. Purchase records verify age of customer meters; only very limited meter accuracy testing is conducted. Customer meters are replaced only upon complete failure. Computerized billing records exist, but only sporadic internal auditing conducted.	Conditions between 4 and 6	At least 90% of customers with volume-based billing from meter reads; consumption for remaining accounts is estimated. Manual customer meter reading gives at least 80% customer meter reading success rate; consumption for accounts with failed reads is estimated. Good customer meter records eixst, but only limited meter accuracy testing is conducted. Regular replacement is conducted for the oldest meters. Computerized billing records exist with annual auditing of summary statistics conducting by utility personnel.	Conditions between 6 and 8	At least 97% of customers exist with volume-based billing from meter reads. At least 90% customer meter reading success rate; <u>or</u> at least 80% read success rate with planning and budgeting for trials of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) in one or more pilot areas. Good customer meter records. Regular meter accuracy testing guides replacement of statistically significant number of meters each year. Routine auditing of computerized billing records for global and detailed statistics occurs annually by utility personnel, and is verified by third party at least once every five years.	Conditions between 8 and 10	At least 99% of customers exist with volume-based billing from meter reads. At least 95% customer meter reading success rate; <u>or</u> minimum 80% meter reading success rate, with Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) trials underway. Statistically significant customer meter testing and replacement program in place on a continuous basis. Computerized billing with routine, detailed auditing, including field investigation of representative sample of accounts undertaken annually by utility personnel. Audit is conducted by third party auditors at least once every three years.
Improvements to attain higher data grading for "Billed Metered Consumption" component:	If n/a is selected because the customer population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.	<u>to qualify for 2</u>: Conduct investigations or trials of customer meters to select appropriate meter models. Budget funding for meter installations. Investigate volume based water rate structures.	<u>to qualify for 4</u>: Purchase and install meters on unmetered accounts. Implement policies to improve meter reading success. Catalog meter information during meter read visits to identify age/model of existing meters. Test a minimal number of meters for accuracy. Install computerized billing system.		<u>to qualify for 6</u>: Purchase and install meters on unmetered accounts. Eliminate flat fee billing and establish appropriate water rate structure based upon measured consumption. Continue to achieve verifiable success in removing manual meter reading barriers. Expand meter accuracy testing. Launch regular meter replacement program. Launch a program of annual auditing of global billing statistics by utility personnel.		<u>to qualify for 8</u>: Purchase and install meters on unmetered accounts. If customer meter reading success rate is less than 97%, assess cost-effectiveness of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system for portion or entire system; <u>or</u> otherwise achieve ongoing improvements in manual meter reading success rate to 97% or higher. Refine meter accuracy testing program. Set meter replacement goals based upon accuracy test results. Implement annual auditing of detailed billing records by utility personnel and implement third party auditing at least once every five years.		<u>to qualify for 10</u>: Purchase and install meters on unmetered accounts. Launch Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system trials if manual meter reading success rate of at least 99% is not achieved within a five-year program. Continue meter accuracy testing program. Conduct planning and budgeting for large scale meter replacement based upon meter life cycle analysis using cumulative flow target. Continue annual detailed billing data auditing by utility personnel and conduct third party auditing at least once every three years.		<u>to maintain 10</u>: Continue annual internal billing data auditing, and third party auditing at least every three years. Continue customer meter accuracy testing to ensure that accurate customer meter readings are obtained and entered as the basis for volume based billing. Stay abreast of improvements in Automatic Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) and information management. Plan and budget for justified upgrades in metering, meter reading and billing data management to maintain very high accuracy in customer metering and billing.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Billed unmetered:	Select n/a if it is the policy of the water utility to meter all customer connections and it has been confirmed by detailed auditing that all customers do indeed have a water meter; i.e. no intentionally unmetered accounts exist	Water utility policy does not require customer metering; flat or fixed fee billing is employed. No data is collected on customer consumption. The only estimates of customer population consumption available are derived from data estimation methods using average fixture count multiplied by number of connections, or similar approach.	Water utility policy does not require customer metering; flat or fixed fee billing is employed. Some metered accounts exist in parts of the system (pilot areas or District Metered Areas) with consumption read periodically or recorded on portable dataloggers over one, three, or seven day periods. Data from these sample meters are used to infer consumption for the total customer population. Site specific estimation methods are used for unusual buildings/water uses.	Conditions between 2 and 4	Water utility policy does require metering and volume based billing in general. However, a liberal amount of exemptions and a lack of clearly written and communicated procedures result in up to 20% of billed accounts believed to be unmetered by exemption; or the water utility is in transition to becoming fully metered, and a large number of customers remain unmetered. A rough estimate of the annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 4 and 6	Water utility policy does require metering and volume based billing but established exemptions exist for a portion of accounts such as municipal buildings. As many as 15% of billed accounts are unmetered due to this exemption or meter installation difficulties. Only a group estimate of annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 6 and 8	Water utility policy does require metering and volume based billing for all customer accounts. However, less than 5% of billed accounts remain unmetered because meter installation is hindered by unusual circumstances. The goal is to minimize the number of unmetered accounts. Reliable estimates of consumption are obtained for these unmetered accounts via site specific estimation methods.	Conditions between 8 and 10	Water utility policy does require metering and volume based billing for all customer accounts. Less than 2% of billed accounts are unmetered and exist because meter installation is hindered by unusual circumstances. The goal exists to minimize the number of unmetered accounts to the extent that is economical. Reliable estimates of consumption are obtained at these accounts via site specific estimation methods.
Improvements to attain higher data grading for "Billed Unmetered Consumption" component:		to qualify for 2: Conduct research and evaluate cost/benefit of a new water utility policy to require metering of the customer population; thereby greatly reducing or eliminating unmetered accounts. Conduct pilot metering project by installing water meters in small sample of customer accounts and periodically reading the meters or datalogging the water consumption over one, three, or seven day periods.	to qualify for 4: Implement a new water utility policy requiring customer metering. Launch or expand pilot metering study to include several different meter types, which will provide data for economic assessment of full scale metering options. Assess sites with access difficulties to devise means to obtain water consumption volumes. Begin customer meter installation.		to qualify for 6: Refine policy and procedures to improve customer metering participation for all but solidly exempt accounts. Assign staff resources to review billing records to identify errant unmetered properties. Specify metering needs and funding requirements to install sufficient meters to significant reduce the number of unmetered accounts		to qualify for 8: Push to install customer meters on a full scale basis. Refine metering policy and procedures to ensure that all accounts, including municipal properties, are designated for meters. Plan special efforts to address "hard-to-access" accounts. Implement procedures to obtain a reliable consumption estimate for the remaining few unmetered accounts awaiting meter installation.		to qualify for 10: Continue customer meter installation throughout the service area, with a goal to minimize unmetered accounts. Sustain the effort to investigate accounts with access difficulties, and devise means to install water meters or otherwise measure water consumption.		to maintain 10: Continue to refine estimation methods for unmetered consumption and explore means to establish metering, for as many billed remaining unmetered accounts as is economically feasible.
Unbilled metered:	select n/a if all billing-exempt consumption is unmetered.	Billing practices exempt certain accounts, such as municipal buildings, but written policies do not exist; and a reliable count of unbilled metered accounts is unavailable. Meter upkeep and meter reading on these accounts is rare and not considered a priority. Due to poor recordkeeping and lack of auditing, water consumption for all such accounts is purely guesstimated.	Billing practices exempt certain accounts, such as municipal buildings, but only scattered, dated written directives exist to justify this practice. A reliable count of unbilled metered accounts is unavailable. Sporadic meter replacement and meter reading occurs on an as-needed basis. The total annual water consumption for all unbilled, metered accounts is estimated based upon approximating the number of accounts and assigning consumption from actively billed accounts of same meter size.	Conditions between 2 and 4	Dated written procedures permit billing exemption for specific accounts, such as municipal properties, but are unclear regarding certain other types of accounts. Meter reading is given low priority and is sporadic. Consumption is quantified from meter readings where available. The total number of unbilled, unmetered accounts must be estimated along with consumption volumes.	Conditions between 4 and 6	Written policies regarding billing exemptions exist but adherence in practice is questionable. Metering and meter reading for municipal buildings is reliable but sporadic for other unbilled metered accounts. Periodic auditing of such accounts is conducted. Water consumption is quantified directly from meter readings where available, but the majority of the consumption is estimated.	Conditions between 6 and 8	Written policy identifies the types of accounts granted a billing exemption. Customer meter management and meter reading are considered secondary priorities, but meter reading is conducted at least annually to obtain consumption volumes for the annual water audit. High level auditing of billing records ensures that a reliable census of such accounts exists.	Conditions between 8 and 10	Clearly written policy identifies the types of accounts given a billing exemption, with emphasis on keeping such accounts to a minimum. Customer meter management and meter reading for these accounts is given proper priority and is reliably conducted. Regular auditing confirms this. Total water consumption for these accounts is taken from reliable readings from accurate meters.
Improvements to attain higher data grading for "Unbilled Metered Consumption" component:		to qualify for 2: Reassess the water utility's policy allowing certain accounts to be granted a billing exemption. Draft an outline of a new written policy for billing exemptions, with clear justification as to why any accounts should be exempt from billing, and with the intention to keep the number of such accounts to a minimum.	to qualify for 4: Review historic written directives and policy documents allowing certain accounts to be billing-exempt. Draft an outline of a written policy for billing exemptions, identify criteria that grants an exemption, with a goal of keeping this number of accounts to a minimum. Consider increasing the priority of reading meters on unbilled accounts at least annually.		to qualify for 6: Draft a new written policy regarding billing exemptions based upon consensus criteria allowing this occurrence. Assign resources to audit meter records and billing records to obtain census of unbilled metered accounts. Gradually include a greater number of these metered accounts to the routes for regular meter reading.		to qualify for 8: Communicate billing exemption policy throughout the organization and implement procedures that ensure proper account management. Conduct inspections of accounts confirmed in unbilled metered status and verify that accurate meters exist and are scheduled for routine meter readings. Gradually increase the number of unbilled metered accounts that are included in regular meter reading routes.		to qualify for 10: Ensure that meter management (meter accuracy testing, meter replacement) and meter reading activities for unbilled accounts are accorded the same priority as billed accounts. Establish ongoing annual auditing process to ensure that water consumption is reliably collected and provided to the annual water audit process.		to maintain 10: Reassess the utility's philosophy in allowing any water uses to go "unbilled". It is possible to meter and bill all accounts, even if the fee charged for water consumption is discounted or waived. Metering and billing all accounts ensures that water consumption is tracked and water waste from plumbing leaks is detected and minimized.
Unbilled unmetered:		Extent of unbilled, unmetered consumption is unknown due to unclear policies and poor recordkeeping. Total consumption is quantified based upon a purely subjective estimate.	Clear extent of unbilled, unmetered consumption is unknown, but a number of events are randomly documented each year, confirming existence of such consumption, but without sufficient documentation to quantify an accurate estimate of the annual volume consumed.	Conditions between 2 and 4	Extent of unbilled, unmetered consumption is partially known, and procedures exist to document certain events such as miscellaneous fire hydrant uses. Formulae is used to quantify the consumption from such events (time running multiplied by typical flowrate, multiplied by number of events).	Default value of 1.25% of system input volume is employed	Coherent policies exist for some forms of unbilled, unmetered consumption but others await closer evaluation. Reasonable recordkeeping for the managed uses exists and allows for annual volumes to be quantified by inference, but unsupervised uses are guesstimated.	Conditions between 6 and 8	Clear policies and good recordkeeping exist for some uses (ex: water used in periodic testing of unmetered fire connections), but other uses (ex: miscellaneous uses of fire hydrants) have limited oversight. Total consumption is a mix of well quantified use such as from formulae (time running multiplied by typical flow, multiplied by number of events) or temporary meters, and relatively subjective estimates of less regulated use.	Conditions between 8 and 10	Clear policies exist to identify permitted use of water in unbilled, unmetered fashion, with the intention of minimizing this type of consumption. Good records document each occurrence and consumption is quantified via formulae (time running multiplied by typical flow, multiplied by number of events) or use of temporary meters.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Unbilled Unmetered Consumption" component:		to qualify for 5: Utilize the accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of this use. to qualify for 2: Establish a policy regarding what water uses should be allowed to remain as unbilled and unmetered. Consider tracking a small sample of one such use (ex: fire hydrant flushings).	to qualify for 5: Utilize accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of this use. to qualify for 4: Evaluate the documentation of events that have been observed. Meet with user groups (ex: for fire hydrants - fire departments, contractors to ascertain their need and/or volume requirements for water from fire hydrants).		to qualify for 5: Utilize accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process, and should focus on other components since the volume of unbilled, unmetered consumption is usually a relatively small quatity component, and other larger-quantity components should take priority.	to qualify for 6 or greater: Finalize policy and begin to conduct field checks to better establish and quantify such usage. Proceed if top-down audit exists and/or a great volume of such use is suspected.	to qualify for 8: Assess water utility policy and procedures for various unmetered usages. For example, ensure that a policy exists and permits are issued for use of fire hydrants by persons outside of the utility. Create written procedures for use and documentation of fire hydrants by water utility personnel. Use same approach for other types of unbilled, unmetered water usage.		to qualify for 10: Refine written procedures to ensure that all uses of unbilled, unmetered water are overseen by a structured permitting process managed by water utility personnel. Reassess policy to determine if some of these uses have value in being converted to billed and/or metered status.		to maintain 10: Continue to refine policy and procedures with intention of reducing the number of allowable uses of water in unbilled and unmetered fashion. Any uses that can feasibly become billed and metered should be converted eventually.
APPARENT LOSSES											
Unauthorized consumption:		Extent of unauthorized consumption is unknown due to unclear policies and poor recordkeeping. Total unauthorized consumption is guesstimated.	Unauthorized consumption is a known occurrence, but its extent is a mystery. There are no requirements to document observed events, but periodic field reports capture some of these occurrences. Total unauthorized consumption is approximated from this limited data.	conditions between 2 and 4	Procedures exist to document some unauthorized consumption such as observed unauthorized fire hydrant openings. Use formulae to quantify this consumption (time running multiplied typical flowrate, multiplied by number of events).	Default value of 0.25% of volume of water supplied is employed	Coherent policies exist for some forms of unauthorized consumption (more than simply fire hydrant misuse) but others await closer evaluation. Reasonable surveillance and recordkeeping exist for occurrences that fall under the policy. Volumes quantified by inference from these records.	Conditions between 6 and 8	Clear policies and good auditable recordkeeping exist for certain events (ex: tampering with water meters, illegal bypasses of customer meters); but other occurrences have limited oversight. Total consumption is a combination of volumes from formulae (time x typical flow) and subjective estimates of unconfirmed consumption.	Conditions between 8 and 10	Clear policies exist to identify all known unauthorized uses of water. Staff and procedures exist to provide enforcement of policies and detect violations. Each occurrence is recorded and quantified via formulae (estimated time running multiplied by typical flow) or similar methods. All records and calculations should exist in a form that can be audited by a third party.
Improvements to attain higher data grading for "Unauthorized Consumption" component:		to qualify for 5: Use accepted default of 0.25% of volume of water supplied. to qualify for 2: Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)	to qualify for 5: Use accepted default of 0.25% of system input volume to qualify for 4: Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)		to qualify for 5: Utilize accepted default value of 0.25% of volume of water supplied as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process.	to qualify for 6 or greater: Finalize policy updates to clearly identify the types of water consumption that are authorized from those usages that fall outside of this policy and are, therefore, unauthorized. Begin to conduct regular field checks. Proceed if the top-down audit already exists and/or a great volume of such use is suspected.	to quality for 8: Assess water utility policies to ensure that all known occurrences of unauthorized consumption are outlawed, and that appropriate penalties are prescribed. Create written procedures for detection and documentation of various occurrences of unauthorized consumption as they are uncovered.		to qualify for 10: Refine written procedures and assign staff to seek out likely occurrences of unauthorized consumption. Explore new locking devices, monitors and other technologies designed to detect and thwart unauthorized consumption.		to maintain 10: Continue to refine policy and procedures to eliminate any loopholes that allow or tacitly encourage unauthorized consumption. Continue to be vigilant in detection, documentation and enforcement efforts.
Customer metering inaccuracies:	select n/a only if the entire customer population is unmetered. In such a case the volume entered must be zero.	Customer meters exist, but with unorganized paper records on meters; no meter accuracy testing or meter replacement program for any size of retail meter. Metering workflow is driven chaotically with no proactive management. Loss volume due to aggregate meter inaccuracy is guesstimated.	Poor recordkeeping and meter oversight is recognized by water utility management who has allotted staff and funding resources to organize improved recordkeeping and start meter accuracy testing. Existing paper records gathered and organized to provide cursory disposition of meter population. Customer meters are tested for accuracy only upon customer request.	Conditions between 2 and 4	Reliable recordkeeping exists; meter information is improving as meters are replaced. Meter accuracy testing is conducted annually for a small number of meters (more than just customer requests, but less than 1% of inventory). A limited number of the oldest meters are replaced each year. Inaccuracy volume is largely an estimate, but refined based upon limited testing data.	Conditions between 4 and 6	A reliable electronic recordkeeping system for meters exists. The meter population includes a mix of new high performing meters and dated meters with suspect accuracy. Routine, but limited, meter accuracy testing and meter replacement occur. Inaccuracy volume is quantified using a mix of reliable and less certain data.	Conditions between 6 and 8	Ongoing meter replacement and accuracy testing result in highly accurate customer meter population. Testing is conducted on samples of meters of varying age and accumulated volume of throughput to determine optimum replacement time for various types of meters.	Ongoing meter replacement and accuracy testing result in highly accurate customer meter population. Statistically significant number of meters are tested in audit year. This testing is conducted on samples of meters of varying age and accumulated volume of throughput to determine optimum replacement time for these meters.	Good records of all active customer meters exist and include as a minimum: meter number, account number/location, type, size and manufacturer. Ongoing meter replacement occurs according to a targeted and justified basis. Regular meter accuracy testing gives a reliable measure of composite inaccuracy volume for the customer meter population. New metering technology is embraced to keep overall accuracy improving. Procedures are reviewed by a third party knowledgeable in the M36 methodology.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Customer meter inaccuracy volume" component:	If n/a is selected because the customer meter population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.	to qualify for 2: Gather available meter purchase records. Conduct testing on a small number of meters believed to be the most inaccurate. Review staffing needs of the metering group and budget for necessary resources to better organize meter management.	to qualify for 4: Implement a reliable record keeping system for customer meter histories, preferably using electronic methods typically linked to, or part of, the Customer Billing System or Customer Information System. Expand meter accuracy testing to a larger group of meters.		to qualify for 6: Standardize the procedures for meter recordkeeping within an electronic information system. Accelerate meter accuracy testing and meter replacements guided by testing results.		to qualify for 8: Expand annual meter accuracy testing to evaluate a statistically significant number of meter makes/models. Expand meter replacement program to replace statistically significant number of poor performing meters each year.		to qualify for 9: Continue efforts to manage meter population with reliable recordkeeping. Test a statistically significant number of meters each year and analyze test results in an ongoing manner to serve as a basis for a target meter replacement strategy based upon accumulated volume throughput.	to qualify for 10: Continue efforts to manage meter population with reliable recordkeeping, meter testing and replacement. Evaluate new meter types and install one or more types in 5-10 customer accounts each year in order to pilot improving metering technology.	to maintain 10: Increase the number of meters tested and replaced as justified by meter accuracy test data. Continually monitor development of new metering technology and Advanced Metering Infrastructure (AMI) to grasp opportunities for greater accuracy in metering of water flow and management of customer consumption data.
Systematic Data Handling Errors:	Note: all water utilities incur some amount of this error. Even in water utilities with unmetered customer populations and fixed rate billing, errors occur in annual billing tabulations. Enter a positive value for the volume and select a grading.	Policies and procedures for activation of new customer water billing accounts are vague and lack accountability. Billing data is maintained on paper records which are not well organized. No auditing is conducted to confirm billing data handling efficiency. An unknown number of customers escape routine billing due to lack of billing process oversight.	Policy and procedures for activation of new customer accounts and oversight of billing records exist but need refinement. Billing data is maintained on paper records or insufficiently capable electronic database. Only periodic unstructured auditing work is conducted to confirm billing data handling efficiency. The volume of unbilled water due to billing lapses is a guess.	Conditions between 2 and 4	Policy and procedures for new account activation and oversight of billing operations exist but needs refinement. Computerized billing system exists, but is dated or lacks needed functionality. Periodic, limited internal audits conducted and confirm with approximate accuracy the consumption volumes lost to billing lapses.	Conditions between 4 and 6	Policy and procedures for new account activation and oversight of billing operations is adequate and reviewed periodically. Computerized billing system is in use with basic reporting available. Any effect of billing adjustments on measured consumption volumes is well understood. Internal checks of billing data error conducted annually. Reasonably accurate quantification of consumption volume lost to billing lapses is obtained.	Conditions between 6 and 8	New account activation and billing operations policy and procedures are reviewed at least biannually. Computerized billing system includes an array of reports to confirm billing data and system functionality. Checks are conducted routinely to flag and explain zero consumption accounts. Annual internal checks conducted with third party audit conducted at least once every five years. Accountability checks flag billing lapses. Consumption lost to billing lapses is well quantified and reducing year-by-year.	Conditions between 8 and 10	Sound written policy and procedures exist for new account activation and oversight of customer billing operations. Robust computerized billing system gives high functionality and reporting capabilities which are utilized, analyzed and the results reported each billing cycle. Assessment of policy and data handling errors are conducted internally and audited by third party at least once every three years, ensuring consumption lost to billing lapses is minimized and detected as it occurs.
Improvements to attain higher data grading for "Systematic Data Handling Error volume" component:		to qualify for 2: Draft written policy and procedures for activating new water billing accounts and oversight of billing operations. Investigate and budget for computerized customer billing system. Conduct initial audit of billing records by flow-charting the basic business processes of the customer account/billing function.	to qualify for 4: Finalize written policy and procedures for activation of new billing accounts and overall billing operations management. Implement a computerized customer billing system. Conduct initial audit of billing records as part of this process.		to qualify for 6: Refine new account activation and billing operations procedures and ensure consistency with the utility policy regarding billing, and minimize opportunity for missed billings. Upgrade or replace customer billing system for needed functionality - ensure that billing adjustments don't corrupt the value of consumption volumes. Procedurize internal annual audit process.		to qualify for 8: Formalize regular review of new account activation process and general billing practices. Enhance reporting capability of computerized billing system. Formalize regular auditing process to reveal scope of data handling error. Plan for periodic third party audit to occur at least once every five years.		to qualify for 10: Close policy/procedure loopholes that allow some customer accounts to go unbilled, or data handling errors to exist. Ensure that billing system reports are utilized, analyzed and reported every billing cycle. Ensure that internal and third party audits are conducted at least once every three years.		to maintain 10: Stay abreast of customer information management developments and innovations. Monitor developments of Advanced Metering Infrastructure (AMI) and integrate technology to ensure that customer endpoint information is well-monitored and errors/lapses are at an economic minimum.
SYSTEM DATA											
Length of mains:		Poorly assembled and maintained paper as-built records of existing water main installations makes accurate determination of system pipe length impossible. Length of mains is guesstimated.	Paper records in poor or uncertain condition (no annual tracking of installations & abandonments). Poor procedures to ensure that new water mains installed by developers are accurately documented.	Conditions between 2 and 4	Sound written policy and procedures exist for documenting new water main installations, but gaps in management result in a uncertain degree of error in tabulation of mains length.	Conditions between 4 and 6	Sound written policy and procedures exist for permitting and commissioning new water mains. Highly accurate paper records with regular field validation; or electronic records and asset management system in good condition. Includes system backup.	Conditions between 6 and 8	Sound written policy and procedures exist for permitting and commissioning new water mains. Electronic recordkeeping such as a Geographical Information System (GIS) and asset management system are used to store and manage data.	Conditions between 8 and 10	Sound written policy exists for managing water mains extensions and replacements. Geographic Information System (GIS) data and asset management database agree and random field validation proves truth of databases. Records of annual field validation should be available for review.
Improvements to attain higher data grading for "Length of Water Mains" component:		to qualify for 2: Assign personnel to inventory current as-built records and compare with customer billing system records and highway plans in order to verify poorly documented pipelines. Assemble policy documents regarding permitting and documentation of water main installations by the utility and building developers; identify gaps in procedures that result in poor documentation of new water main installations.	to qualify for 4: Complete inventory of paper records of water main installations for several years prior to audit year. Review policy and procedures for commissioning and documenting new water main installation.		to qualify for 6: Finalize updates/improvements to written policy and procedures for permitting/commissioning new main installations. Confirm inventory of records for five years prior to audit year; correct any errors or omissions.		to qualify for 8: Launch random field checks of limited number of locations. Convert to electronic database such as a Geographic Information System (GIS) with backup as justified. Develop written policy and procedures.		to qualify for 10: Link Geographic Information System (GIS) and asset management databases, conduct field verification of data. Record field verification information at least annually.		to maintain 10: Continue with standardization and random field validation to improve the completeness and accuracy of the system.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Number of active AND inactive service connections:		Vague permitting (of new service connections) policy and poor paper recordkeeping of customer connections/billings result in suspect determination of the number of service connections, which may be 10-15% in error from actual count.	General permitting policy exists but paper records, procedural gaps, and weak oversight result in questionable total for number of connections, which may vary 5-10% of actual count.	Conditions between 2 and 4	Written account activation policy and procedures exist, but with some gaps in performance and oversight. Computerized information management system is being brought online to replace dated paper recordkeeping system. Reasonably accurate tracking of service connection installations & abandonments; but count can be up to 5% in error from actual total.	Conditions between 4 and 6	Written new account activation and overall billing policies and procedures are adequate and reviewed periodically. Computerized information management system is in use with annual installations & abandonments totaled. Very limited field verifications and audits. Error in count of number of service connections is believed to be no more than 3%.	Conditions between 6 and 8	Policies and procedures for new account activation and overall billing operations are written, well-structured and reviewed at least biannually. Well-managed computerized information management system exists and routine, periodic field checks and internal system audits are conducted. Counts of connections are no more than 2% in error.	Conditions between 8 and 10	Sound written policy and well managed and audited procedures ensure reliable management of service connection population. Computerized information management system, Customer Billing System, and Geographic Information System (GIS) information agree; field validation proves truth of databases. Count of connections recorded as being in error is less than 1% of the entire population.
Improvements to attain higher data grading for "Number of Active and Inactive Service Connections" component:	**Note: The number of Service Connections does <u>not</u> include fire hydrant leads/lines connecting the hydrant to the water main**	<u>to qualify for 2</u>: Draft new policy and procedures for new account activation and overall billing operations. Research and collect paper records of installations & abandonments for several years prior to audit year.	<u>to qualify for 4</u>: Refine policy and procedures for new account activation and overall billing operations. Research computerized recordkeeping system (Customer Information System or Customer Billing System) to improve documentation format for service connections.		<u>to qualify for 6</u>: Refine procedures to ensure consistency with new account activation and overall billing policy to establish new service connections or decommission existing connections. Improve process to include all totals for at least five years prior to audit year.		<u>to qualify for 8</u>: Formalize regular review of new account activation and overall billing operations policies and procedures. Launch random field checks of limited number of locations. Develop reports and auditing mechanisms for computerized information management system.		<u>to qualify for 10</u>: Close any procedural loopholes that allow installations to go undocumented. Link computerized information management system with Geographic Information System (GIS) and formalize field inspection and information system auditing processes. Documentation of new or decommissioned service connections encounters several levels of checks and balances.		<u>to maintain 10</u>: Continue with standardization and random field validation to improve knowledge of system.
Average length of customer service line:	Note: if customer water meters are located outside of the customer building next to the curb stop or boundary separating utility/customer responsibility, then the auditor should answer "Yes" to the question on the Reporting Worksheet asking about this. If the answer is Yes, the grading description listed under the Grading of 10(a) will be followed, with a value of zero automatically entered at a Grading of 10. See the Service Connection Diagram worksheet for a visual presentation of this distance.	Gradings 1-9 apply if customer properties are unmetered, if customer meters exist and are located inside the customer building premises, or if the water utility owns and is responsible for the entire service connection piping from the water main to the customer building. In any of these cases the average distance between the curb stop or boundary separating utility/customer responsibility for service connection piping, and the typical first point of use (ex: faucet) or the customer meter must be quantified. Gradings of 1-9 are used to grade the validity of the means to quantify this value. (See the "Service Connection Diagram" worksheet)									<u>Either of two conditions can be met for a grading of 10</u>: a) Customer water meters exist outside of customer buildings next to the curb stop or boundary separating utility/customer responsibility for service connection piping. If so, answer "Yes" to the question on the Reporting Working asking about this condition. A value of zero and a Grading of 10 are automatically entered in the Reporting Worksheet . b). Meters exist inside customer buildings, or properties are unmetered. In either case, answer "No" to the Reporting Worksheet question on meter location, and enter a distance determined by the auditor. For a Grading of 10 this value must be a very reliable number from a Geographic Information System (GIS) and confirmed by a statistically valid number of field checks.
		Vague policy exists to define the delineation of water utility ownership and customer ownership of the service connection piping. Curb stops are perceived as the breakpoint but these have not been well-maintained or documented. Most are buried or obscured. Their location varies widely from site-to-site, and estimating this distance is arbitrary due to the unknown location of many curb stops.	Policy requires that the curb stop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. The piping from the water main to the curb stop is the property of the water utility; and the piping from the curb stop to the customer building is owned by the customer. Curb stop locations are not well documented and the average distance is based upon a limited number of locations measured in the field.	Conditions between 2 and 4	Good policy requires that the curb stop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. Curb stops are generally installed as needed and are reasonably documented. Their location varies widely from site-to-site, and an estimate of this distance is hindered by the availability of paper records of limited accuracy.	Conditions between 4 and 6	Clear written policy exists to define utility/customer responsibility for service connection piping. Accurate, well-maintained paper or basic electronic recordkeeping system exists. Periodic field checks confirm piping lengths for a sample of customer properties.	Conditions between 6 and 8	Clearly worded policy standardizes the location of curb stops and meters, which are inspected upon installation. Accurate and well maintained electronic records exist with periodic field checks to confirm locations of service lines, curb stops and customer meter pits. An accurate number of customer properties from the customer billing system allows for reliable averaging of this length.	Conditions between 8 and 10	
Improvements to attain higher data grading for "Average Length of Customer Service Line" component:		<u>to qualify for 2</u>: Research and collect paper records of service line installations. Inspect several sites in the field using pipe locators to locate curb stops. Obtain the length of this small sample of connections in this manner.	<u>to qualify for 4</u>: Formalize and communicate policy delineating utility/customer responsibilities for service connection piping. Assess accuracy of paper records by field inspection of a small sample of service connections using pipe locators as needed. Research the potential migration to a computerized information management system to store service connection data.		<u>to qualify for 6</u>: Establish coherent procedures to ensure that policy for curb stop, meter installation and documentation is followed. Gain consensus within the water utility for the establishment of a computerized information management system.		<u>to qualify for 8</u>: Implement an electronic means of recordkeeping, typically via a customer information system, customer billing system, or Geographic Information System (GIS). Standardize the process to conduct field checks of a limited number of locations.		<u>to qualify for 10</u>: Link customer information management system and Geographic Information System (GIS), standardize process for field verification of data.		<u>to maintain 10</u>: Continue with standardization and random field validation to improve knowledge of service connection configurations and customer meter locations.
Average operating pressure:		Available records are poorly assembled and maintained paper records of supply pump characteristics and water distribution system operating conditions. Average pressure is guesstimated based upon this information and ground elevations from crude topographical maps. Widely varying distribution system pressures due to undulating terrain, high system head loss and weak/erratic pressure controls further compromise the validity of the average pressure calculation.	Limited telemetry monitoring of scattered pumping station and water storage tank sites provides some static pressure data, which is recorded in handwritten logbooks. Pressure data is gathered at individual sites only when low pressure complaints arise. Average pressure is determined by averaging relatively crude data, and is affected by significant variation in ground elevations, system head loss and gaps in pressure controls in the distribution system.	Conditions between 2 and 4	Effective pressure controls separate different pressure zones; moderate pressure variation across the system, occasional open boundary valves are discovered that breech pressure zones. Basic telemetry monitoring of the distribution system logs pressure data electronically. Pressure data gathered by gauges or dataloggers at fire hydrants or buildings when low pressure complaints arise, and during fire flow tests and system flushing. Reliable topographical data exists. Average pressure is calculated using this mix of data.	Conditions between 4 and 6	Reliable pressure controls separate distinct pressure zones; only very occasional open boundary valves are encountered that breech pressure zones. Well-covered telemetry monitoring of the distribution system (not just pumping at source treatment plants or wells) logs extensive pressure data electronically. Pressure gathered by gauges/dataloggers at fire hydrants and buildings when low pressure complaints arise, and during fire flow tests and system flushing. Average pressure is determined by using this mix of reliable data.	Conditions between 6 and 8	Well-managed, discrete pressure zones exist with generally predictable pressure fluctuations. A current full-scale SCADA System or similar realtime monitoring system exists to monitor the water distribution system and collect data, including real time pressure readings at representative sites across the system. The average system pressure is determined from reliable monitoring system data.	Conditions between 8 and 10	Well-managed pressure districts/zones, SCADA System and hydraulic model exist to give very precise pressure data across the water distribution system. Average system pressure is reliably calculated from extensive, reliable, and cross-checked data. Calculations are reported on an annual basis as a minimum.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
Improvements to attain higher data grading for "Average Operating Pressure" component:		to qualify for 2: Employ pressure gauging and/or datalogging equipment to obtain pressure measurements from fire hydrants. Locate accurate topographical maps of service area in order to confirm ground elevations. Research pump data sheets to find pump pressure/flow characteristics	to qualify for 4: Formalize a procedure to use pressure gauging/datalogging equipment to gather pressure data during various system events such as low pressure complaints, or operational testing. Gather pump pressure and flow data at different flow regimes. Identify faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) and plan to properly configure pressure zones. Make all pressure data from these efforts available to generate system-wide average pressure.		to qualify for 6: Expand the use of pressure gauging/datalogging equipment to gather scattered pressure data at a representative set of sites, based upon pressure zones or areas. Utilize pump pressure and flow data to determine supply head entering each pressure zone or district. Correct any faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) to ensure properly configured pressure zones. Use expanded pressure dataset from these activities to generate system-wide average pressure.		to qualify for 8: Install a Supervisory Control and Data Acquisition (SCADA) System, or similar realtime monitoring system, to monitor system parameters and control operations. Set regular calibration schedule for instrumentation to insure data accuracy. Obtain accurate topographical data and utilize pressure data gathered from field surveys to provide extensive, reliable data for pressure averaging.		to qualify for 10: Annually, obtain a system-wide average pressure value from the hydraulic model of the distribution system that has been calibrated via field measurements in the water distribution system and confirmed in comparisons with SCADA System data.		to maintain 10: Continue to refine the hydraulic model of the distribution system and consider linking it with SCADA System for real-time pressure data calibration, and averaging.

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
COST DATA											
Total annual cost of operating water system:		Incomplete paper records and lack of financial accounting documentation on many operating functions makes calculation of water system operating costs a pure guesstimate	Reasonably maintained, but incomplete, paper or electronic accounting provides data to estimate the major portion of water system operating costs.	Conditions between 2 and 4	Electronic, industry-standard cost accounting system in place. However, gaps in data are known to exist, periodic internal reviews are conducted but not a structured financial audit.	Conditions between 4 and 6	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited periodically by utility personnel, but not a Certified Public Accountant (CPA).	Conditions between 6 and 8	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited at least annually by utility personnel, and at least once every three years by third-party CPA.	Conditions between 8 and 10	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited annually by utility personnel and annually also by third-party CPA.
Improvements to attain higher data grading for "Total Annual Cost of Operating the Water System" component:		to qualify for 2: Gather available records, institute new financial accounting procedures to regularly collect and audit basic cost data of most important operations functions.	to qualify for 4: Implement an electronic cost accounting system, structured according to accounting standards for water utilities		to qualify for 6: Establish process for periodic internal audit of water system operating costs; identify cost data gaps and institute procedures for tracking these outstanding costs.		to qualify for 8: Standardize the process to conduct routine financial audit on an annual basis. Arrange for CPA audit of financial records at least once every three years.		to qualify for 10: Standardize the process to conduct a third-party financial audit by a CPA on an annual basis.		to maintain 10: Maintain program, stay abreast of expenses subject to erratic cost changes and long-term cost trend, and budget/track costs proactively
Customer retail unit cost (applied to Apparent Losses):	Customer population unmetered, and/or only a fixed fee is charged for consumption.	Antiquated, cumbersome water rate structure is used, with periodic historic amendments that were poorly documented and implemented; resulting in classes of customers being billed inconsistent charges. The actual composite billing rate likely differs significantly from the published water rate structure, but a lack of auditing leaves the degree of error indeterminate.	Dated, cumbersome water rate structure, not always employed consistently in actual billing operations. The actual composite billing rate is known to differ from the published water rate structure, and a reasonably accurate estimate of the degree of error is determined, allowing a composite billing rate to be quantified.	Conditions between 2 and 4	Straight-forward water rate structure in use, but not updated in several years. Billing operations reliably employ the rate structure. The composite billing rate is derived from a single customer class such as residential customer accounts, neglecting the effect of different rates from varying customer classes.	Conditions between 4 and 6	Clearly written, up-to-date water rate structure is in force and is applied reliably in billing operations. Composite customer rate is determined using a weighted average residential rate using volumes of water in each rate block.	Conditions between 6 and 8	Effective water rate structure is in force and is applied reliably in billing operations. Composite customer rate is determined using a weighted average composite consumption rate, which includes residential, commercial, industrial, institutional (CII), and any other distinct customer classes within the water rate structure.	Conditions between 8 and 10	Current, effective water rate structure is in force and applied reliably in billing operations. The rate structure and calculations of composite rate - which includes residential, commercial, industrial, institutional (CII), and other distinct customer classes - are reviewed by a third party knowledgeable in the M36 methodology at least once every five years.
Improvements to attain higher data grading for "Customer Retail Unit Cost" component:		to qualify for 2: Formalize the process to implement water rates, including a secure documentation procedure. Create a current, formal water rate document and gain approval from all stakeholders.	to qualify for 4: Review the water rate structure and update/formalize as needed. Assess billing operations to ensure that actual billing operations incorporate the established water rate structure.		to qualify for 6: Evaluate volume of water used in each usage block by residential users. Multiply volumes by full rate structure.	Launch effort to fully meter the customer population and charge rates based upon water volumes	to qualify for 8: Evaluate volume of water used in each usage block by all classifications of users. Multiply volumes by full rate structure.		to qualify for 10: Conduct a periodic third-party audit of water used in each usage block by all classifications of users. Multiply volumes by full rate structure.		to maintain 10: Keep water rate structure current in addressing the water utility's revenue needs. Update the calculation of the customer unit rate as new rate components, customer classes, or other components are modified.
Variable production cost (applied to Real Losses):	Note: if the water utility purchases/imports its entire water supply, then enter the unit purchase cost of the bulk water supply in the Reporting Worksheet with a grading of 10	Incomplete paper records and lack of documentation on primary operating functions (electric power and treatment costs most importantly) makes calculation of variable production costs a pure guesstimate	Reasonably maintained, but incomplete, paper or electronic accounting provides data to roughly estimate the basic operations costs (pumping power costs and treatment costs) and calculate a unit variable production cost.	Conditions between 2 and 4	Electronic, industry-standard cost accounting system in place. Electric power and treatment costs are reliably tracked and allow accurate weighted calculation of unit variable production costs based on these two inputs and water imported purchase costs (if applicable). All costs are audited internally on a periodic basis.	Conditions between 4 and 6	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Pertinent additional costs beyond power, treatment and water imported purchase costs (if applicable) such as liability, residuals management, wear and tear on equipment, impending expansion of supply, are included in the unit variable production cost, as applicable. The data is audited at least annually by utility personnel.	Conditions between 6 and 8	Reliable electronic, industry-standard cost accounting system in place, with all pertinent primary and secondary variable production and water imported purchase (if applicable) costs tracked. The data is audited at least annually by utility personnel, and at least once every three years by a third-party knowledgeable in the M36 methodology.	Conditions between 8 and 10	Either of two conditions can be met to obtain a grading of 10: 1) Third party CPA audit of all pertinent primary and secondary variable production and water imported purchase (if applicable) costs on an annual basis. or: 2) Water supply is entirely purchased as bulk water imported, and the unit purchase cost - including all applicable marginal supply costs - serves as the variable production cost. If all applicable marginal supply costs are not included in this figure, a grade of 10 should not be selected.
Improvements to attain higher data grading for "Variable Production Cost" component:		to qualify for 2: Gather available records, institute new procedures to regularly collect and audit basic cost data and most important operations functions.	to qualify for 4: Implement an electronic cost accounting system, structured according to accounting standards for water utilities		to qualify for 6: Formalize process for regular internal audits of production costs. Assess whether additional costs (liability, residuals management, equipment wear, impending infrastructure expansion) should be included to calculate a more representative variable production cost.		to qualify for 8: Formalize the accounting process to include direct cost components (power, treatment) as well as indirect cost components (liability, residuals management, etc.) Arrange to conduct audits by a knowledgable third-party at least once every three years.		to qualify for 10: Standardize the process to conduct a third-party financial audit by a CPA on an annual basis.		to maintain 10: Maintain program, stay abreast of expenses subject to erratic cost changes and budget/track costs proactively

AWWA Free Water Audit Software: Customer Service Line Diagrams

WAS v5.0

Average Length of Customer Service Line

The three figures shown on this worksheet display the assignment of the Average Length of Customer Service Line, Lp, for the three most common piping configurations.

Figure 1 shows the configuration of the water meter outside of the customer building next to the curb stop valve. In this configuration Lp = 0 since the distance between the curb stop and the customer metering point is essentially zero.

Figure 2 shows the configuration of the customer water meter located inside the customer building, where Lp is the distance from the curb stop to the water meter.

Figure 3 shows the configuration of an unmetered customer building , where Lp is the distance from the curb stop to the first point of customer water consumption, or, more simply, the building line.

In any water system the Lp will vary notably in a community of different structures, therefore the average Lp value is used and this should be approximated or calculated if a sample of service line measurements has been gathered.

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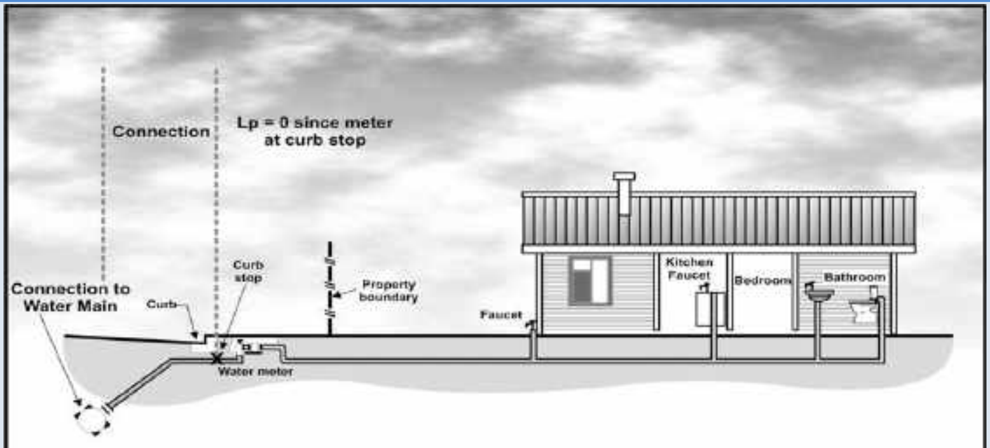


Figure 1

Typical house connection: Meter at curb stop
Not to scale

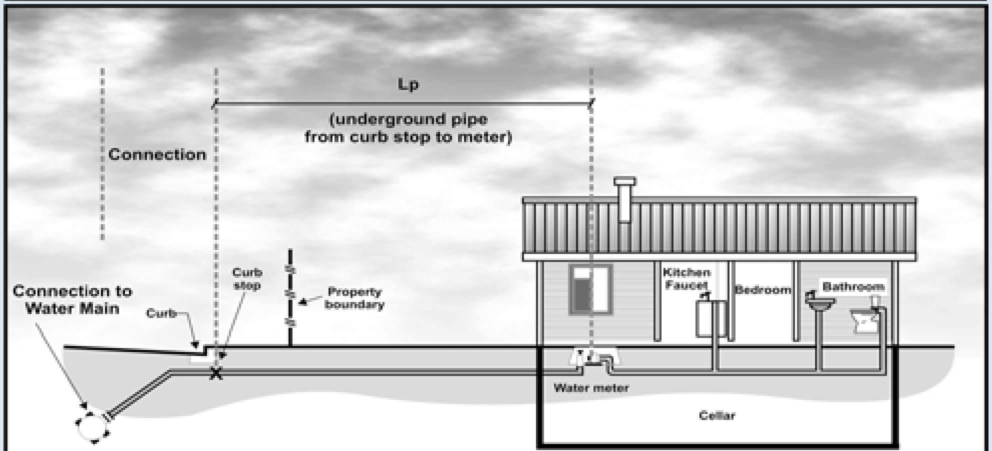


Figure 2

Typical house connection: Meter inside property
Not to scale

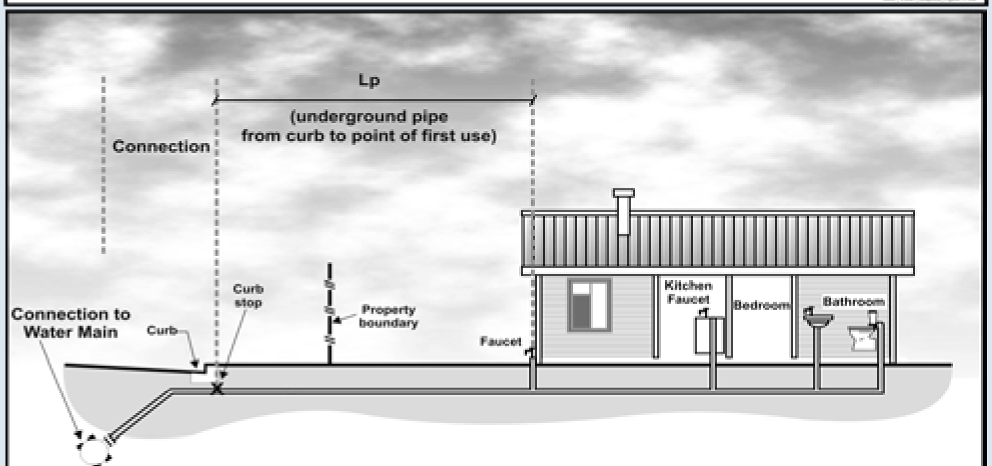


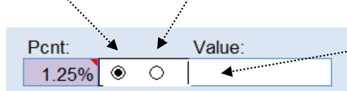
Figure 3

Typical house connection: Unmetered
Not to scale

Item Name	Description
Apparent Losses Find	= unauthorized consumption + customer metering inaccuracies + systematic data handling errors Apparent Losses include all types of inaccuracies associated with customer metering (worn meters as well as improperly sized meters or wrong type of meter for the water usage profile) as well as systematic data handling errors (meter reading, billing, archiving and reporting), plus unauthorized consumption (theft or illegal use). NOTE: Over-estimation of Apparent Losses results in under-estimation of Real Losses. Under-estimation of Apparent Losses results in over-estimation of Real Losses.
AUTHORIZED CONSUMPTION Find	= billed water exported + billed metered + billed unmetered + unbilled metered + unbilled unmetered consumption The volume of metered and/or unmetered water taken by registered customers, the water utility's own uses, and uses of others who are implicitly or explicitly authorized to do so by the water utility; for residential, commercial, industrial and public-minded purposes. Typical retail customers' consumption is tabulated usually from established customer accounts as billed metered consumption, or - for unmetered customers - billed unmetered consumption. These types of consumption, along with billed water exported, provide revenue potential for the water utility. **Be certain to tabulate the water exported volume as a separate component and do not "double-count" it by including in the billed metered consumption component as well as the water exported component.** Unbilled authorized consumption occurs typically in non-account uses, including water for fire fighting and training, flushing of water mains and sewers, street cleaning, watering of municipal gardens, public fountains, or similar public-minded uses. Occasionally these uses may be metered and billed (or charged a flat fee), but usually they are unmetered and unbilled. In the latter case, the water auditor may use a default value to estimate this quantity, or implement procedures for the reliable quantification of these uses. This starts with documenting usage events as they occur and estimating the amount of water used in each event. (See Unbilled unmetered consumption)
View Service Connection Diagram **Average length of customer service line** Find	This is the average length of customer service line, Lp, that is owned and maintained by the customer; from the point of ownership transfer to the customer water meter, or building line (if unmetered). The quantity is one of the data inputs for the calculation of Unavoidable Annual Real Losses (UARL), which serves as the denominator of the performance indicator: Infrastructure Leakage Index (ILI). The value of Lp is multiplied by the number of customer service connections to obtain a total length of customer owned piping in the system. The purpose of this parameter is to account for the unmetered service line infrastructure that is the responsibility of the customer for arranging repairs of leaks that occur on their lines. In many cases leak repairs arranged by customers take longer to be executed than leak repairs arranged by the water utility on utility-maintained piping. Leaks run longer - and lose more water - on customer-owned service piping, than utility owned piping. If the customer water meter exists near the ownership transfer point (usually the curb stop located between the water main and the customer premises) this distance is zero because the meter and transfer point are the same. This is the often encountered configuration of customer water meters located in an underground meter box or "pit" outside of the customer's building. The Free Water Audit Software asks a "Yes/No" question about the meter at this location. If the auditor selects "Yes" then this distance is set to zero and the data grading score for this component is set to 10. If water meters are typically located inside the customer premise/building, or properties are unmetered, it is up to the water auditor to estimate a system-wide average Lp length based upon the various customer land parcel sizes and building locations in the service area. Lp will be a shorter length in areas of high density housing, and a longer length in areas of low density housing and varied commercial and industrial buildings. General parcel demographics should be employed to obtain a composite average Lp length for the entire system. Refer to the "Service Connection Diagram" worksheet for a depiction of the service line/metering configurations that typically exist in water utilities. This worksheet gives guidance on the determination of the Average Length, Lp, for each configuration.
Average operating pressure Find	This is the average pressure in the distribution system that is the subject of the water audit. Many water utilities have a calibrated hydraulic model of their water distribution system. For these utilities, the hydraulic model can be utilized to obtain a very accurate quantity of average pressure. In the absence of a hydraulic model, the average pressure may be approximated by obtaining readings of static water pressure from a representative sample of fire hydrants or other system access points evenly located across the system. A weighted average of the pressure can be assembled; but be sure to take into account the elevation of the fire hydrants, which typically exist several feet higher than the level of buried water pipelines. If the water utility is compiling the water audit for the first time, the average pressure can be approximated, but with a low data grading. In subsequent years of auditing, effort should be made to improve the accuracy of the average pressure quantity. This will then qualify the value for a higher data grading.
Billed Authorized Consumption	All consumption that is billed and authorized by the utility. This may include both metered and unmetered consumption. See "Authorized Consumption" for more information.
Billed metered consumption Find	All metered consumption which is billed to retail customers, including all groups of customers such as domestic, commercial, industrial or institutional. **It does NOT include water supplied to neighboring utilities (water exported) which is metered and billed. Be sure to subtract any consumption for exported water sales that may be included in these billing roles. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component.** The metered consumption data can be taken directly from billing records for the water audit period. The accuracy of yearly metered consumption data can be refined by including an adjustment to account for customer meter reading lag time since not all customer meters are read on the same day of the meter reading period. However additional analysis is necessary to determine the lag time adjustment value, which may or may not be significant.
Billed unmetered consumption Find	All billed consumption which is calculated based on estimates or norms from water usage sites that have been determined by utility policy to be left unmetered. This is typically a very small component in systems that maintain a policy to meter their customer population. However, this quantity can be the key consumption component in utilities that have not adopted a universal metering policy. **This component should NOT include any water that is supplied to neighboring utilities (water exported) which is unmetered but billed. Water supplied as exports to neighboring water utilities should be included only in the Water Exported component.**

Item Name	Description
Customer metering inaccuracies Find	Apparent water losses caused by the collective under-registration of customer water meters. Many customer water meters gradually wear as large cumulative volumes of water are passed through them over time. This causes the meters to under-register the flow of water. This occurrence is common with smaller residential meters of sizes 5/8-inch and 3/4 inch after they have registered very large cumulative volumes of water, which generally occurs only after periods of years. For meters sized 1-inch and larger - typical of multi-unit residential, commercial and industrial accounts - meter under-registration can occur from wear or from the improper application of the meter; i.e. installing the wrong type of meter or the wrong size of meter, for the flow pattern (profile) of the consumer. For instance, many larger meters have reduced accuracy at low flows. If an oversized meter is installed, most of the time the routine flow will occur in the low flow range of the meter, and a significant portion of it may not be registered. It is important to properly select and install all meters, but particularly large customer meters, size 1-inch and larger. The auditor has two options for entering data for this component of the audit. The auditor can enter a percentage under-registration (typically an estimated value), this will apply the selected percentage to the two categories of metered consumption to determine the volume of water not recorded due to customer meter inaccuracy. Note that this percentage is a composite average inaccuracy for all customer meters in the entire meter population. The percentage will be multiplied by the sum of the volumes in the Billed Metered and Unbilled Metered components. Alternatively, if the auditor has substantial data from meter testing activities, he or she can calculate their own loss volumes, and this volume may be entered directly. Note that a value of zero will be accepted but an alert will appear asking if the customer population is unmetered. Since all metered systems have some degree of inaccuracy, a positive value should be entered. A value of zero in this component is valid only if the water utility does not meter its customer population.
Customer retail unit cost Find	The Customer Retail Unit Cost represents the charge that customers pay for water service. This unit cost is applied routinely to the components of Apparent Loss, since these losses represent water reaching customers but not (fully) paid for. Since most water utilities have a rate structure that includes a variety of different costs based upon class of customer, a weighted average of individual costs and number of customer accounts in each class can be calculated to determine a single composite cost that should be entered into this cell. Finally, the weighted average cost should also include additional charges for sewer, storm water or biosolids processing, but only if these charges are based upon the volume of potable water consumed. For water utilities in regions with limited water resources and a questionable ability to meet the drinking water demands in the future, the Customer Retail Unit Cost might also be applied to value the Real Losses; instead of applying the Variable Production Cost to Real Losses. In this way, it is assumed that every unit volume of leakage reduced by leakage management activities will be sold to a customer. Note: the Free Water Audit Software allows the user to select the units that are charged to customers (either $/1,000 gallons, $/hundred cubic feet, or $/1,000 litres) and automatically converts these units to the units that appear in the "WATER SUPPLIED" box. The monetary units are United States dollars, $.
Infrastructure Leakage Index (ILI) Find	The ratio of the Current Annual Real Losses (Real Losses) to the Unavoidable Annual Real Losses (UARL). The ILI is a highly effective performance indicator for comparing (benchmarking) the performance of utilities in operational management of real losses.
Length of mains Find	Length of all pipelines (except service connections) in the system starting from the point of system input metering (for example at the outlet of the treatment plant). It is also recommended to include in this measure the total length of fire hydrant lead pipe. Hydrant lead pipe is the pipe branching from the water main to the fire hydrant. Fire hydrant leads are typically of a sufficiently large size that is more representative of a pipeline than a service connection. The average length of hydrant leads across the entire system can be assumed if not known, and multiplied by the number of fire hydrants in the system, which can also be assumed if not known. This value can then be added to the total pipeline length. Total length of mains can therefore be calculated as: Length of Mains, miles = (total pipeline length, miles) + [{(average fire hydrant lead length, ft) x (number of fire hydrants)} / 5,280 ft/mile] or Length of Mains, kilometres = (total pipeline length, kilometres) + [{(average fire hydrant lead length, metres) x (number of fire hydrants)} / 1,000 metres/kilometre]
NON-REVENUE WATER Find	= Apparent Losses + Real Losses + Unbilled Metered Consumption + Unbilled Unmetered Consumption. This is water which does not provide revenue potential to the utility.
Number of active AND inactive service connections Find	Number of customer service connections, extending from the water main to supply water to a customer. Please note that this includes the actual number of distinct piping connections, including fire connections, whether active or inactive. This may differ substantially from the number of customers (or number of accounts). **Note: this number does not include the pipeline leads to fire hydrants - the total length of piping supplying fire hyrants should be included in the "Length of mains" parameter.**
Real Losses Find	Physical water losses from the pressurized system (water mains and customer service connections) and the utility's storage tanks, up to the point of customer consumption. In metered systems this is the customer meter, in unmetered situations this is the first point of consumption (stop tap/tap) within the property. The annual volume lost through all types of leaks, breaks and overflows depends on frequencies, flow rates, and average duration of individual leaks, breaks and overflows.
Revenue Water	Those components of System Input Volume that are billed and have the potential to produce revenue.
Service Connection Density Find	=number of customer service connections / length of mains

Item Name	Description
Systematic data handling errors Find	Apparent losses caused by accounting omissions, errant computer programming, gaps in policy, procedure, and permitting/activation of new accounts; and any type of data lapse that results in under-stated customer water consumption in summary billing reports. **Systematic Data Handling Errors result in a direct loss of revenue potential. Water utilities can find "lost" revenue by keying on this component.** Utilities typically measure water consumption registered by water meters at customer premises. The meter should be read routinely (ex: monthly) and the data transferred to the Customer Billing System, which generates and sends a bill to the customer. Data Transfer Errors result in the consumption value being less than the actual consumption, creating an apparent loss. Such error might occur from illegible and mis-recorded hand-written readings compiled by meter readers, inputting an incorrect meter register unit conversion factor in the automatic meter reading equipment, or a variety of similar errors. Apparent losses also occur from Data Analysis Errors in the archival and data reporting processes of the Customer Billing System. Inaccurate estimates used for accounts that fail to produce a meter reading are a common source of error. Billing adjustments may award customers a rightful monetary credit, but do so by creating a negative value of consumption, thus under-stating the actual consumption. Account activation lapses may allow new buildings to use water for months without meter readings and billing. Poor permitting and construction inspection practices can result in a new building lacking a billing account, a water meter and meter reading; i.e., the customer is unknown to the utility's billing system. Close auditing of the permitting, metering, meter reading, billing and reporting processes of the water consumption data trail can uncover data management gaps that create volumes of systematic data handling error. Utilities should routinely analyze customer billing records to detect data anomalies and quantify these losses. For example, a billing account that registers zero consumption for two or more billing cycles should be checked to explain why usage has seemingly halted. Given the revenue loss impacts of these losses, water utilities are well-justified in providing continuous oversight and timely correction of data transfer errors & data handling errors. If the water auditor has not yet gathered detailed data or assessment of systematic data handling error, it is recommended that the auditor apply the default value of 0.25% of the the Billed Authorized Consumption volume. However, if the auditor has investigated the billing system and its controls, and has well validated data that indicates the volume from systematic data handling error is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations and select an appropriate grading. Note: negative values are not allowed for this audit component. If the auditor enters zero for this component then a grading of 1 will be automatically assigned.
Total annual cost of operating the water system Find	These costs include those for operations, maintenance and any annually incurred costs for long-term upkeep of the drinking water supply and distribution system. It should include the costs of day-to-day upkeep and long-term financing such as repayment of capital bonds for infrastructure expansion or improvement. Typical costs include employee salaries and benefits, materials, equipment, insurance, fees, administrative costs and all other costs that exist to sustain the drinking water supply. Depending upon water utility accounting procedures or regulatory agency requirements, it may be appropriate to include depreciation in the total of this cost. This cost should not include any costs to operate wastewater, biosolids or other systems outside of drinking water.
Unauthorized consumption Find	Includes water illegally withdrawn from fire hydrants, illegal connections, bypasses to customer consumption meters, or tampering with metering or meter reading equipment; as well as any other ways to receive water while thwarting the water utility's ability to collect revenue for the water. Unauthorized consumption results in uncaptured revenue and creates an error that understates customer consumption. In most water utilities this volume is low and, if the water auditor has not yet gathered detailed data for these loss occurrences, it is recommended that the auditor apply a default value of 0.25% of the volume of water supplied. However, if the auditor has investigated unauthorized occurrences, and has well validated data that indicates the volume from unauthorized consumption is substantially higher or lower than that generated by the default value, then the auditor should enter a quantity that was derived from the utility investigations. Note that a value of zero will not be accepted since all water utilities have some volume of unauthorized consumption occurring in their system. Note: if the auditor selects the default value for unauthorized consumption, a data grading of 5 is automatically assigned, but not displayed on the Reporting Worksheet.
Unavoidable Annual Real Losses (UARL) Find	UARL (gallons)=(5.41Lm + 0.15Nc + 7.5Lc) xP, or UARL (litres)=(18.0Lm + 0.8Nc + 25.0Lc) xP where: Lm = length of mains (miles or kilometres) Nc = number of customer service connections Lp = the average distance of customer service connection piping (feet or metres) (see the Worksheet "Service Connection Diagram" for guidance on deterring the value of Lp) Lc = total length of customer service connection piping (miles or km) Lc = Nc X Lp (miles or kilometres) P = Pressure (psi or metres) The UARL is a theoretical reference value representing the technical low limit of leakage that could be achieved if all of today's best technology could be successfully applied. It is a key variable in the calculation of the Infrastructure Leakage Index (ILI). Striving to reduce system leakage to a level close to the UARL is usually not needed unless the water supply is unusually expensive, scarce or both. NOTE: The UARL calculation has not yet been proven as fully valid for very small, or low pressure water distribution systems. If, in gallons: (Lm x 32) + Nc < 3000 or P <35psi in litres: (Lm x 20) + Nc < 3000 or P < 25m then the calculated UARL value may not be valid. The software does not display a value of UARL or ILI if either of these conditions is true.

Item Name	Description
Unbilled Authorized Consumption	All consumption that is unbilled, but still authorized by the utility. This includes Unbilled Metered Consumption + Unbilled Unmetered Consumption. See "Authorized Consumption" for more information. For Unbilled Unmetered Consumption, the Free Water Audit Software provides the auditor the option to select a default value if they have not audited unmetered activities in detail. The default calculates a volume that is 1.25% of the Water Supplied volume. If the auditor has carefully audited the various unbilled, unmetered, authorized uses of water, and has established reliable estimates of this collective volume, then he or she may enter the volume directly for this component, and not use the default value.
Unbilled metered consumption Find	Metered consumption which is authorized by the water utility, but, for any reason, is <u>deemed by utility policy</u> to be unbilled. This might for example include metered water consumed by the utility itself in treatment or distribution operations, or metered water provided to civic institutions free of charge. **It does <u>not</u> include water supplied to neighboring utilities (water exported) which may be metered but not billed.**
Unbilled unmetered consumption Find	Any kind of Authorized Consumption which is neither billed or metered. This component typically includes water used in activities such as fire fighting, flushing of water mains and sewers, street cleaning, fire flow tests conducted by the water utility, etc. In most water utilities it is a small component which is very often substantially overestimated. **It does NOT include water supplied to neighboring utilities (water exported) which is unmetered and unbilled – an unlikely case.** This component has many sub-components of water use which are often tedious to identify and quantify. Because of this, and the fact that it is usually a small portion of the water supplied, it is recommended that the auditor apply the default value, which is 1.25% of the Water Supplied volume. Select the default percentage to enter this value. If the water utility <u>has</u> carefully audited the unbilled, unmetered activities occurring in the system, and has well validated data that gives a value substantially higher or lower than the default volume, then the auditor should enter their own volume. However the default approach is recommended for most water utilities. Note that a value of zero is not permitted, since all water utilities have some volume of water in this component occurring in their system.
Units and Conversions	The user may develop an audit based on one of three unit selections: 1) Million Gallons (US) 2) Megalitres (Thousand Cubic Metres) 3) Acre-feet Once this selection has been made in the instructions sheet, all calculations are made on the basis of the chosen units. Should the user wish to make additional conversions, a unit converter is provided below (use drop down menus to select units from the yellow unit boxes): Enter Units: 1 — Convert From… **Million Gallons (US)** = **Converts to…..** **3.06888329** **Acre-feet** (conversion factor = 3.06888328973723)
Use of Option Buttons	To use the default percent value choose this button To enter a value choose this button and enter the value in the cell to the right  **NOTE:** For Unbilled Unmetered Consumption, Unauthorized Consumption and Systematic Data Handling Errors, a recommended default value can be applied by selecting the Percent option. The default values are based on fixed percentages of Water Supplied or Billed Authorized Consumption and are recommended for use in this audit unless the auditor has well validated data for their system. Default values are shown by purple cells, as shown in the example above. If a default value is selected, the user does not need to grade the item; a grading value of 5 is automatically applied (howe ver, this grade will not be displayed).
Variable production cost (applied to Real Losses) Find	The cost to produce and supply the next unit of water (e.g., $/million gallons). This cost is determined by calculating the summed unit costs for ground and surface water treatment and all power used for pumping from the source to the customer. It may also include other miscellaneous unit costs that apply to the production of drinking water. It should also include the unit cost of bulk water purchased as an import if applicable. It is common to apply this unit cost to the volume of Real Losses. However, if water resources are strained and the ability to meet future drinking water demands is in question, then the water auditor can be justified in applying the Customer Retail Rate to the Real Loss volume, rather than applying the Variable Production Cost. The Free Water Audit Software applies the Variable Production costs to Real Losses by default. However, the auditor has the option on the Reporting Worksheet to select the Customer Retail Cost as the basis for the Real Loss cost evaluation if the auditor determines that this is warranted.
Volume from own sources Find	The volume of water withdrawn (abstracted) from water resources (rivers, lakes, streams, wells, etc) controlled by the water utility, and then treated for potable water distribution. Most water audits are compiled for utility retail water distribution systems, so this volume should reflect the amount of <u>treated</u> drinking water that entered the distribution system. Often the volume of water measured at the effluent of the treatment works is slightly less than the volume measured at the raw water source, since some of the water is used in the treatment process. Thus, it is useful if flows are metered at the effluent of the treatment works. If metering exists only at the raw water source, an adjustment for water used in the treatment process should be included to account for water consumed in treatment operations such as filter backwashing, basin flushing and cleaning, etc. If the audit is conducted for a wholesale water agency that sells untreated water, then this quantity reflects the measure of the raw water, typically metered at the source.

Item Name	Description
Volume from own sources: Master meter and supply error adjustment Find	An estimate or measure of the degree of inaccuracy that exists in the master (production) meters measuring the annual Volume from own Sources, and any error in the data trail that exists to collect, store and report the summary production data. This adjustment is a weighted average number that represents the collective error for all master meters for all days of the audit year and any errors identified in the data trail. Meter error can occur in different ways. A meter or meters may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Data error can occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of inaccuracy in master meters and data errors in archival systems are common; thus a value of zero should not be entered. Enter a negative percentage or value for metered data under-registration; or, enter a positive percentage or value for metered data over-registration.
Water exported Find	The Water Exported volume is the bulk water conveyed and sold by the water utility to neighboring water systems that exists outside of their service area. Typically this water is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water utility that is selling the water: i.e. the exporter. If the water utility who is compiling the annual water audit sells bulk water in this manner, they are an exporter of water. Note: The Water Exported volume is sold to wholesale customers who are typically charged a wholesale rate that is different than retail rates charged to the retail customers existing within the service area. Many state regulatory agencies require that the Water Exported volume be reported to them as a quantity separate and distinct from the retail customer billed consumption. For these reasons - and others - the Water Exported volume is always quantified separately from Billed Authorized Consumption in the standard water audit. **Be certain not to "double-count" this quantity by including it in both the Water Exported box and the Billed Metered Consumption box of the water audit Reporting Worksheet. This volume should be included only in the Water Exported box.**
Water exported: Master meter and supply error adjustment Find	An estimate or measure of the volume in which the Water Exported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived exported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some degree of error in their metered data, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived data. Thus, a value of zero should not be entered. Enter a negative percentage or value for metered data under-registration; or enter a positive percentage or value for metered data over-registration. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment. Corrections to data gaps or other errors found in the archived data should also be included as a portion of this meter error adjustment.
Water imported Find	The Water Imported volume is the bulk water purchased to become part of the Water Supplied volume. Typically this is water purchased from a neighboring water utility or regional water authority, and is metered at the custody transfer point of interconnection between the two water utilities. Usually the meter(s) are owned by the water supplier selling the water to the utility conducting the water audit. The water supplier selling the bulk water usually charges the receiving utility based upon a wholesale water rate.
Water imported: Master meter and supply error adjustment Find	An estimate or measure of the volume in which the Water Imported volume is incorrect. This adjustment is a weighted average that represents the collective error for all of the metered and archived imported flow for all days of the audit year. Meter error can occur in different ways. A meter may be inaccurate by under-registering flow (did not capture all the flow), or by over-registering flow (overstated the actual flow). Error in the metered, archived data can also occur due to data gaps caused by temporary outages of the meter or related instrumentation. All water utilities encounter some level of meter inaccuracy, particularly if meters are aged and infrequently tested. Occasional errors also occur in the archived metered data. Thus, a value of zero should not be entered. Enter a negative percentage or value for metered data under-registration; or, enter a positive percentage or value for metered data over-registration. If regular meter accuracy testing is conducted on the meter(s) - which is usually conducted by the water utility selling the water - then the results of this testing can be used to help quantify the meter error adjustment.
WATER LOSSES Find	= apparent losses + real losses Water Losses are the difference between Water Supplied and Authorized Consumption. Water losses can be considered as a total volume for the whole system, or for partial systems such as transmission systems, pressure zones or district metered areas (DMA); if one of these configurations are the basis of the water audit.

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AWWA Free Water Audit Software: Determining Water Loss Standing

Water Audit Report for:	San Francisco Public Utilities Commission (3810011)	
Reporting Year:	2020	7/2019 - 6/2020
Data Validity Score:	89	

Water Loss Control Planning Guide

Functional Focus Area	Water Audit Data Validity Level / Score				
	Level I (0-25)	**Level II** (26-50)	**Level III** (51-70)	**Level IV** (71-90)	**Level V** (91-100)
Audit Data Collection	Launch auditing and loss control team; address production metering deficiencies	Analyze business process for customer metering and billing functions and water supply operations. Identify data gaps.	Establish/revise policies and procedures for data collection	Refine data collection practices and establish as routine business process	Annual water audit is a reliable gauge of year-to-year water efficiency standing
Short-term loss control	Research information on leak detection programs. Begin flowcharting analysis of customer billing system	Conduct loss assessment investigations on a sample portion of the system: customer meter testing, leak survey, unauthorized consumption, etc.	Establish ongoing mechanisms for customer meter accuracy testing, active leakage control and infrastructure monitoring	Refine, enhance or expand ongoing programs based upon economic justification	Stay abreast of improvements in metering, meter reading, billing, leakage management and infrastructure rehabilitation
Long-term loss control		Begin to assess long-term needs requiring large expenditure: customer meter replacement, water main replacement program, new customer billing system or Automatic Meter Reading (AMR) system.	Begin to assemble economic business case for long-term needs based upon improved data becoming available through the water audit process.	Conduct detailed planning, budgeting and launch of comprehensive improvements for metering, billing or infrastructure management	Continue incremental improvements in short-term and long-term loss control interventions
Target-setting			Establish long-term apparent and real loss reduction goals (+10 year horizon)	Establish mid-range (5 year horizon) apparent and real loss reduction goals	Evaluate and refine loss control goals on a yearly basis
Benchmarking			Preliminary Comparisons - can begin to rely upon the Infrastructure Leakage Index (ILI) for performance comparisons for real losses (see below table)	Performance Benchmarking - ILI is meaningful in comparing real loss standing	Identify Best Practices/ Best in class - the ILI is very reliable as a real loss performance indicator for best in class service

For validity scores of 50 or below, the shaded blocks should not be focus areas until better data validity is achieved.

Once data have been entered into the Reporting Worksheet, the performance indicators are automatically calculated. How does a water utility operator know how well his or her system is performing? The AWWA Water Loss Control Committee provided the following table to assist water utilities is gauging an approximate Infrastructure Leakage Index (ILI) that is appropriate for their water system and local conditions. The lower the amount of leakage and real losses that exist in the system, then the lower the ILI value will be.

<u>Note:</u> this table offers an approximate guideline for leakage reduction target-setting. The best means of setting such targets include performing an economic assessment of various loss control methods. However, this table is useful if such an assessment is not possible.

General Guidelines for Setting a Target ILI
(without doing a full economic analysis of leakage control options)

Target ILI Range	Financial Considerations	Operational Considerations	Water Resources Considerations
1.0 - 3.0	Water resources are costly to develop or purchase; ability to increase revenues via water rates is greatly limited because of regulation or low ratepayer affordability.	Operating with system leakage above this level would require expansion of existing infrastructure and/or additional water resources to meet the demand.	Available resources are greatly limited and are very difficult and/or environmentally unsound to develop.
>3.0 -5.0	Water resources can be developed or purchased at reasonable expense; periodic water rate increases can be feasibly imposed and are tolerated by the customer population.	Existing water supply infrastructure capability is sufficient to meet long-term demand as long as reasonable leakage management controls are in place.	Water resources are believed to be sufficient to meet long-term needs, but demand management interventions (leakage management, water conservation) are included in the long-term planning.
>5.0 - 8.0	Cost to purchase or obtain/treat water is low, as are rates charged to customers.	Superior reliability, capacity and integrity of the water supply infrastructure make it relatively immune to supply shortages.	Water resources are plentiful, reliable, and easily extracted.
Greater than 8.0	Although operational and financial considerations may allow a long-term ILI greater than 8.0, such a level of leakage is not an effective utilization of water as a resource. Setting a target level greater than 8.0 - other than as an incremental goal to a smaller long-term target - is discouraged.		
Less than 1.0	If the calculated Infrastructure Leakage Index (ILI) value for your system is 1.0 or less, two possibilities exist. a) you are maintaining your leakage at low levels in a class with the top worldwide performers in leakage control. b) A portion of your data may be flawed, causing your losses to be greatly understated. This is likely if you calculate a low ILI value but do not employ extensive leakage control practices in your operations. In such cases it is beneficial to validate the data by performing field measurements to confirm the accuracy of production and customer meters, or to identify any other potential sources of error in the data.		

Example 1a: Million Gallons: | **Example 1b**: Million Gallons: Performance Indicators | **Example 2a**: Megalitres: Reporting Worksheet | **Example 2b**: Megalitres: Reporting Worksheet

Example Audit 1a:

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Association.

? Click to access definition
\+ Click to add a comment

Water Audit Report for: City of Asheville (01-11-010)
Reporting Year: 2013 7/2012 - 6/2013

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<----------- Enter grading in column 'E' and 'J' ---------->

WATER SUPPLIED

	Grade	Value	Unit	Master Meter Error Adjustments: Grade	Pcnt:	Value:	Unit
Volume from own sources:	7	7,352.880	MG/Yr	3		285.450	MG/Yr
Water imported:	n/a	0.000	MG/Yr				MG/Yr
Water exported:	n/a	0.000	MG/Yr				MG/Yr
WATER SUPPLIED:		**7,067.430**	MG/Yr				

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

	Grade	Value	Unit	Pcnt:	Value:	Unit
Billed metered:	8	4,782.250	MG/Yr			
Billed unmetered:	n/a	0.000	MG/Yr			
Unbilled metered:	7	27.757	MG/Yr			
Unbilled unmetered:	8	157.790	MG/Yr		157.790	MG/Yr
AUTHORIZED CONSUMPTION:		**4,967.797**	MG/Yr			

Unbilled Unmetered volume entered is greater than the recommended default value

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption)

2,099.633 MG/Yr

Apparent Losses

	Grade	Value	Unit	Pcnt:	Value:	Unit
Unauthorized consumption:		17.669	MG/Yr	0.25%		MG/Yr
Customer metering inaccuracies:	7	111.220	MG/Yr	2.26%		MG/Yr
Systematic data handling errors:	5	11.956	MG/Yr	0.25%		MG/Yr
Apparent Losses:		**140.844**	MG/Yr			

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **1,958.789** MG/Yr

WATER LOSSES: **2,099.633** MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: **2,285.180** MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

	Grade	Value	Unit
Length of mains:	4	1,236.5	miles
Number of active AND inactive service connections:	7	55,256	
Service connection density:		45	conn./mile main
Are customer meters typically located at the curbstop or property line?		Yes	
Average length of customer service line:			(length of service line, beyond the property boundary, that is the responsibility of the utility)
Average operating pressure:	4	145.3	psi

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

COST DATA

	Grade	Value	Unit
Total annual cost of operating water system:	10	$33,630,676	$/Year
Customer retail unit cost (applied to Apparent Losses):	10	$3.22	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	6	$335.94	$/Million gallons

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 72 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Variable production cost (applied to Real Losses)
3: Unauthorized consumption

Example Audit 1b:

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

Water Audit Report for: City of Asheville (01-11-010)
Reporting Year: 2013 | 7/2012 - 6/2013

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 72 out of 100 ***

System Attributes:

Apparent Losses:	140.844	MG/Yr
+ Real Losses:	1,958.789	MG/Yr
= Water Losses:	2,099.633	MG/Yr
? Unavoidable Annual Real Losses (UARL):	794.34	MG/Yr
Annual cost of Apparent Losses:	$606,265	
Annual cost of Real Losses:	$658,036	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	32.3%	
	Non-revenue water as percent by cost of operating system:	3.9%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	6.98	gallons/connection/day
	Real Losses per service connection per day:	97.12	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.67	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	1,958.79	million gallons/year
	? Infrastructure Leakage Index (ILI) [CARL/UARL]:	2.47	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

Example Audit 2a:

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

? Click to access definition
\+ Click to add a comment

Water Audit Report for: The City of Calgary
Reporting Year: 2013 — 1/2013 - 12/2013

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MEGALITRES (THOUSAND CUBIC METRES) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<----------- Enter grading in column 'E' and 'J' ---------->

WATER SUPPLIED

	Grade	Value	Units	Master Meter Error Adjustments: Grade	Pcnt	Value
Volume from own sources:	7	174,324.000	ML/Yr	7	1.00%	ML/Yr
Water imported:	n/a	0.000	ML/Yr			ML/Yr
Water exported:	7	8,190.131	ML/Yr	7	1.00%	ML/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 164,488.979 ML/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

	Grade	Value	Units	Pcnt	Value
Billed metered:	6	125,111.268	ML/Yr		
Billed unmetered:	8	3,503.386	ML/Yr		
Unbilled metered:	7	166.157	ML/Yr		
Unbilled unmetered:	6	1,444.000	ML/Yr		1,444.000 ML/Yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 130,224.811 ML/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

34,264.168 ML/Yr

Apparent Losses

	Grade	Value	Units	Pcnt	Value
Unauthorized consumption:		411.222	ML/Yr	0.25%	ML/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

	Grade	Value	Units	Pcnt	Value
Customer metering inaccuracies:	6	1,265.429	ML/Yr	1.00%	ML/Yr
Systematic data handling errors:		312.778	ML/Yr	0.25%	ML/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 1,989.429 ML/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 32,274.739 ML/Yr

WATER LOSSES: 34,264.168 ML/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 35,874.325 ML/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

	Grade	Value	Units
Length of mains:	8	4,945.0	kilometers
Number of active AND inactive service connections:	8	312,075	
Service connection density:		63	conn./km main
Are customer meters typically located at the curbstop or property line?		No	
Average length of customer service line:	8	12.0	metres
Average operating pressure:	8	50.8	metres (head)

(length of service line, beyond the property boundary, that is the responsibility of the utility)

COST DATA

	Grade	Value	Units
Total annual cost of operating water system:	9	$169,973,759	$/Year
Customer retail unit cost (applied to Apparent Losses):	9	$2.35	$/1000 litres
Variable production cost (applied to Real Losses):	9	$73.54	$/Megalitre

☑ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 72 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Billed metered
3: Customer metering inaccuracies

Example Audit 2b:

AWWA Free Water Audit Software: System Attributes and Performance Indicators

WAS v5.0

Water Audit Report for: The City of Calgary
Reporting Year: 2013 | 1/2013 - 12/2013

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 72 out of 100 ***

System Attributes:

Apparent Losses:	1,989.429	ML/Yr
+ Real Losses:	32,274.739	ML/Yr
= Water Losses:	34,264.168	ML/Yr
? Unavoidable Annual Real Losses (UARL):	8,015.57	ML/Yr
Annual cost of Apparent Losses:	$4,675,159	
Annual cost of Real Losses:	$75,845,637	Valued at Customer Retail Unit Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	21.8%	
	Non-revenue water as percent by cost of operating system:	49.6%	Real Losses valued at Customer Retail Unit Cost
Operational Efficiency:	Apparent Losses per service connection per day:	17.47	litres/connection/day
	Real Losses per service connection per day:	283.34	litres/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per meter (head) pressure:	5.58	litres/connection/day/m

From Above, Real Losses = Current Annual Real Losses (CARL):	32,274.74	ML/year
? Infrastructure Leakage Index (ILI) [CARL/UARL]:	4.03	

* This performance indicator applies for systems with a low service connection density of less than 20 service connections/kilometre of pipeline

AWWA Free Water Audit Software: Acknowledgements

AWWA Water Audit Software Version 5.0 Developed by the Water Loss Control Committee of the American Water Works Association August, 2014

This software is intended to serve as a basic tool to compile a preliminary, or “top-down”, water audit. It is recommended that users also refer to the current edition of the AWWA M36 Publication, Water Audits and Loss Control Programs, for detailed guidance on compiling a comprehensive, or “bottom-up”, water audit using the same water audit methodology.

DEVELOPED BY:

Andrew Chastain-Howley, PG, MCSM. Black & Veatch*
Will J. Jernigan, P.E. Cavanaugh & Associates, P.A.
George Kunkel, P.E. Philadelphia Water Department
Alain Lalonde, P.Eng. Master Meter Canada Inc.
Ralph Y. McCord, P.E. Louisville Water Company
David A. Sayers Delaware River Basin Commission
Brian M. Skeens, P.E. CH2M HILL
Reinhard Sturm Water Systems Optimization, Inc.
John H. Van Arsdel M.E. Simpson Company, Inc.

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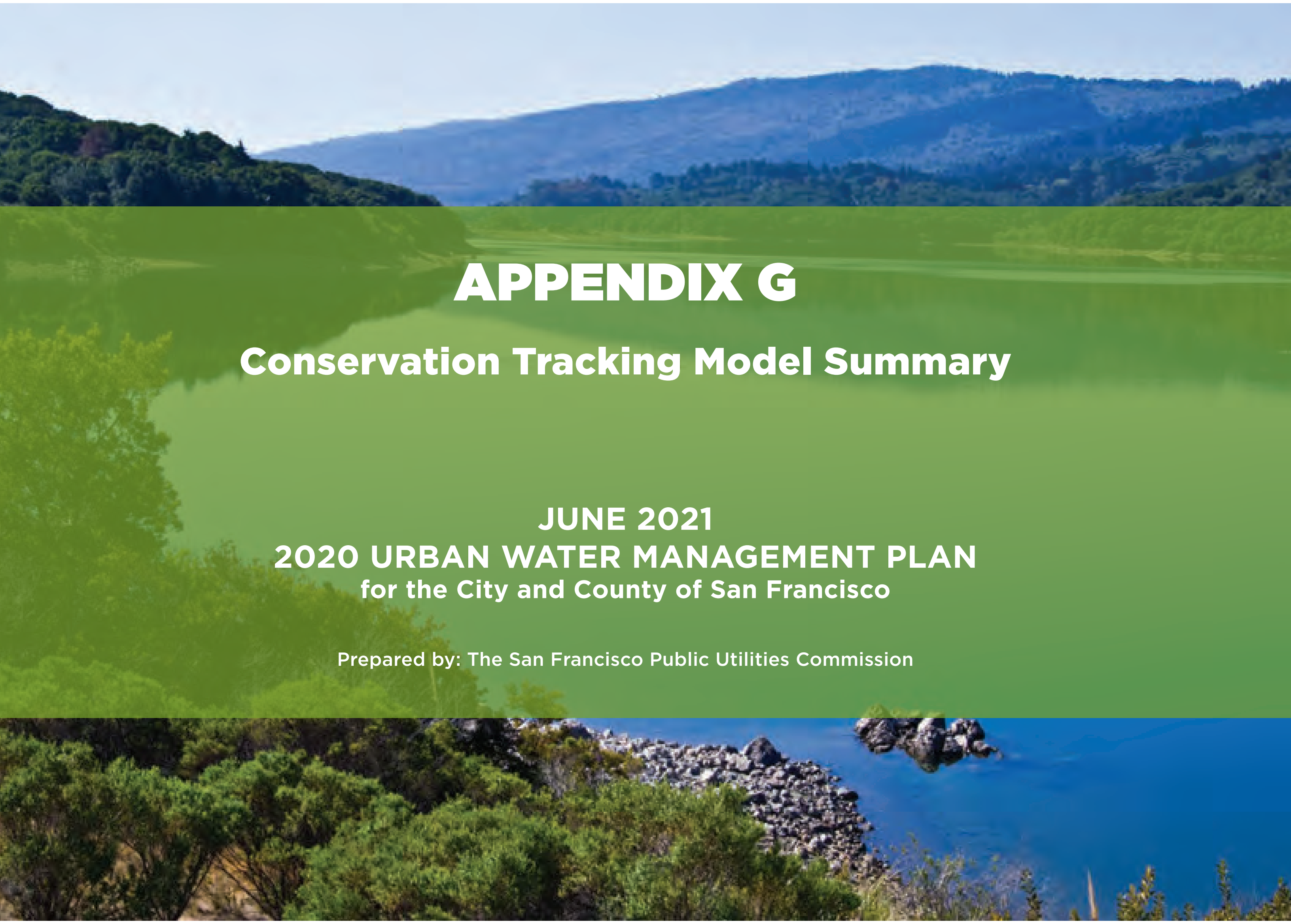
- Service Connection Diagrams courtesy of Ronnie McKenzie, WRP Pty Ltd.

VERSION HISTORY:

Version:	Release Date:	Number of Worksheets:	Key Features and Developments
v1	2005/ 2006	5	The AWWA Water Audit Software was piloted in 2005 (v1.0 beta). The early versions (1.x) of the software restricted data entry to units of Million Gallons per year. For each entry into the audit, users identified whether the input was measured or estimated.
v2	2006	5	The most significant enhancement in v2 of the software was to allow the user to choose the volumetric units to be used in the audit, Million Gallons or Thousand Cubic Metres (megalitres) per year. Two financial performance indicators were added to provide feedback to the user on the cost of Real and Apparent losses.
v3	2007	7	In v3, the option to report volumetric units in acre-feet was added. Another new feature in v3 was the inclusion of default values for two water audit components (unbilled unmetered and unauthorized consumption). v3 also included two examples of completed audits in units of million gallons and Megalitres. Several checks were added into v3 to provide instant feedback to the user on common data entry problems, in order to help the user complete an accurate water audit.
v4 - v4.2	2010	10	v4 (and versions 4.x) of the software included a new approach to data grading. The simple "estimated" or "measured" approach was replaced with a more granular scale (typically 1-10) that reflected descriptions of utility practices and served to describe the confidence and accuracy of the input data. Each input value had a corresponding scale fully described in the Grading Matrix tab. The Grading Matrix also showed the actions required to move to a higher grading score. Grading descriptions were available on the Reporting Worksheet via a pop-up box next to each water audit input. A water audit data validity score is generated (max = 100) and priority areas for attention (to improve audit accuracy) are identified, once a user completes the requied data grading. A service connection diagram was also added to help users understand the impact of customer service line configurations on water losses and how this information should be entered into the water audit software. An acknoweldgements section was also added. Minor bug fixes resulted in the release of versions 4.1 and 4.2. A French language version was also made available for v4.2.
v5	2014	12	In v5, changes were made to the way Water Supplied information is entered into software, with each major component having a corresponding Master Meter Error Adjustment entry (and data grading requirement). This required changes to the data validity score calculation; v5 of the software uses a weighting system that is, in part, proportional to the volume of input components. The Grading Matrix was updated to reflect the new audit inputs and also to include clarifications and additions to the scale descriptions. The appearance of the software was updated in v5 to make the software more user-friendly and several new features were added to provide more feedback to the user. Notably, a dashboard tab has been added to provide more visual feedback on the water audit results and associated costs of Non-Revenue Water. A comments sheet was added to allow the user to track notes, comments and to cite sources used.



APPENDIX G

Conservation Tracking Model Summary

JUNE 2021
2020 URBAN WATER MANAGEMENT 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

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SFPUC Conservation Tracking Model

Water and Energy Savings Specifications for Conservation Program Measures

David Mitchell, M.Cubed

Last Updated: 03-08-2021

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 developed by Brattle Group to estimate retail demands and to the SFPUC Conservation Tracking Model to estimate water savings from conservation measures. In 2020, the SFPUC updated its econometric demand model for its retail service area for use in preparing its 2020 Urban Water Management Plan and for providing updated demand estimates for its 2020 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 forecasts of population, housing units, and 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 Brattle Group econometric demand models. The baseline population forecast is from the Association of Bay Area Governments (ABAG).

Program Specification consists of parameterizing the conservation programs in the model. The model can hold up to 75 separate programs. The model can be extended to hold more than 75 programs if needed. 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 2045. 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 2045. 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. In addition, projected per capita water use is compared to per capita water use targets under SBx7-7 and the MOU.

- 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 what 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 and projections.
- 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.

Updated Population and Housing Projections

Both population and housing estimates have changed since the 2015 version of the conservation model due to new assumptions about growth in the City of San Francisco. The City has a goal of increased housing development on the order of 5,000 new units per year. However, as described elsewhere in this TM, 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 2020 were updated, as described below, and then held constant for the remainder of the planning horizon.

Population Projection Update

The City of San Francisco Planning Department provided an updated 2020 population of 941,269. Residential population in 2020 was estimated from total population by subtracting 3%, which represents population housed in group quarters. This value is based on historical estimates from 2011-2020 from Department of Finance E-5 Housing and Population Estimates (dated May 2020), as well as P-4 Household Projections for California Counties for 2020-2030 (dated June 2020).

The conservation model's original and updated population projections are shown in Table 1. As shown in this table, the population stops growing after 2020 to reflect no additional passive savings to be generated from future growth.

Table 1: Population Projection Update

Year	Total Population 2015 Model	Total Population 2020 Model	Total Population % Difference	Residential Population 2015 Model	Residential Population 2020 Model	Residential Population % 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	890,400	941,269	5.7%	863,800	913,031	5.7%
2025	934,800	941,269	0.7%	906,800	913,031	0.7%
2030	981,800	941,269	-4.1%	952,500	913,031	-4.1%
2035	1,032,500	941,269	-8.8%	1,000,800	913,031	-8.8%
2040	1,085,700	941,269	-13.3%	1,051,100	913,031	-13.1%
2045	1,085,700	941,269	-13.3%	1,051,100	913,031	-13.1%
2050	1,085,700	941,269	-13.3%	1,051,100	913,031	-13.1%

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

The City of San Francisco Planning Department provided an estimate of total housing units as of 2020 to the SFPUC in October 2020. This value is assumed to be a projection of total constructed housing units as opposed to occupied housing units.

Occupied single-family housing units in 2020 were set equal to the number of single-family residential accounts in the SFPUC's billing system as of August 2020. 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 2025 and beyond were kept the same as 2020.

Total 2020 housing units from the Planning Department were adjusted to estimate occupied housing units using a vacancy rate of 8.26%, which is an average of the last five estimates provided by the ACS 5-year estimates for the City of San Francisco from 2015-2019 (ranging 7.7% to 8.9%). Total occupied multi-family housing units in 2020 were estimated by subtracting the number of occupied single-family housing units in 2020 from the total 2020 occupied housing units.

2015 housing units for both single- and multi-family were interpolated between values used previously for 2010 and the updated inputs for 2020.

The conservation model's original and updated projections for total, single-, and multi-family housing units are shown in Table 2. As shown in this table, the 2020 housing units stop growing after 2020 to reflect no additional passive savings to be generated from future growth.

Table 2: Housing Projection Update

Year	Total Occupied Housing Units			Occupied Single-Family Housing Units			Occupied Multi-Family Housing Units		
	2015 Model	2020 Model	% Difference	2015 Model	2020 Model	% Difference	2015 Model	2020 Model	% Difference
2005	335,054	335,054	0.0%	109,500	109,500	0.0%	225,554	225,554	0.0%
2010	345,811	345,811	0.0%	110,759	110,759	0.0%	235,052	235,052	0.0%
2015	366,540	356,070	-2.9%	113,687	111,231	-2.2%	252,853	244,840	-3.2%
2020	377,684	366,330	-3.0%	115,073	111,702	-2.9%	262,611	254,628	-3.0%
2025	393,630	366,330	-6.9%	116,475	111,702	-4.1%	277,155	254,628	-8.1%
2030	410,227	366,330	-10.7%	117,894	111,702	-5.3%	292,333	254,628	-12.9%
2035	426,235	366,330	-14.1%	119,331	111,702	-6.4%	306,904	254,628	-17.0%
2040	442,905	366,330	-17.3%	120,785	111,702	-7.5%	322,120	254,628	-21.0%
2045	442,905	366,330	-17.3%	120,785	111,702	-7.5%	322,120	254,628	-21.0%
2050	442,905	366,330	-17.3%	120,785	111,702	-7.5%	322,120	254,628	-21.0%
Source: 2020 total housing units provided by San Francisco Planning Department and adjusted to account for occupancy using average vacancy rate from ACS 5-year estimates from 2015-2019. Count of single-family units equal to 2020 count of SFPUC single-family water accounts served with remainder allocated to multi-family 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 Brattle Group's baseline demand forecasts used in the Tracking Model are net of passive water savings. However, the Brattle 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 Brattle Group's baseline forecast before it is used in the model so that they can be represented explicitly. It is the Brattle Group's baseline forecast adjusted for passive savings that is entered on the Model Setup worksheet. The adjusted baseline forecast is:[1]

Adjusted Baseline Forecast = Brattle Baseline Forecast + Passive Water Savings

The final demand forecast generated by the Conservation Tracking Model is then:

[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 Brattle Group's baseline forecast. This is done to prevent the model from double counting these water savings.

Final Demand Forecast = Adjusted Baseline Forecast – Passive Water Savings – Program Water Savings

This is also equal to:

Final Demand Forecast = Brattle Baseline Forecast – Program Water Savings

This means the only determinants of the final demand forecast are the Brattle 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.

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 SFPUC's forecasts of single and multi-family housing units. These forecasts 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 San Francisco Residential End Uses of Water 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 forecast.

Residential Showerheads

The population of residential showerheads is based on SFPUC's forecasts of 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 San Francisco Residential End Uses of Water 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

[2] The estimate of average number of shower events per day from the San Francisco Residential End Uses of Water 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 take into account the lower density in multi-family housing.

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.

<u>Residential Clothes Washers</u>
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.

<u>Coin-op Clothes Washers</u>
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 ≥ 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 Urban Water Conservation Council (CUWCC) 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 $t \geq 2009$ 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)	Planned Annual Activity Level	Annual Water Savings (AF)	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	0	NA	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	500	9.8	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	0.7 gpd	109,000	85.5	Empirical Program Evaluations	Unit savings is per active Single-Family account	1

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings (AF)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
		how to check for and repair common leaks						
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	0	NA	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	500	3.6	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed in 2018. Assumes 54% installation rate	2
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	100	1.4	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed in 2018	1

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings (AF)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
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	0	NA	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	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	0	NA	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed in 2018	1
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	206	6.4	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit	1

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings (AF)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
							programs completed in 2018	
S9	HET Voucher	A voucher issued to eligible residents to replace their older toilets with HETs.	20.9 gpd	0	NA	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	2
S11	CEE Tier 3 Washer Rebate (WF 4.0)	Up to $100 rebate from SFPUC and $50 rebate from PG&E for a combined $150 rebate for a washer with 4 WF or lower.	10.2 gpd	0	NA	Engineering Estimate	Engineering estimate based on limited data on clothes washer market shares	3
S12	Energy Star Most Efficient Washer	Up to $100 rebate from SFPUC and $50 rebate from PG&E for a combined $150 rebate for a washer with 3.5 WF or lower.	11.6 gpd	80	1.0	Engineering Estimate	Engineering estimate based on limited data on clothes	3

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings (AF)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
	Rebate (WF 3.5)						washer market shares	
S16a	Rain Barrel Rebate	Subsidy program that discounts the purchase cost of rain barrel and provides training.	0.8 gpd	30	0.03	Engineering Estimate	60 gal capacity. Estimated with AWE Rain Barrel Harvest & Application Model	3
S16b	Rain Cistern Rebate	Subsidy program that discounts the purchase cost of cisterns and provides training.	2.4 gpd	15	0.04	Engineering Estimate	205 gal capacity. Estimated with AWE Rain Barrel Harvest & Application Model	3
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	50	0.2	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	1600	5.9	Engineering Estimate	Based on review of end use studies and engineering estimates of savings potential of	3

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings (AF)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
							aerators and other devices	

Multi-Family Measures

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings (AF)	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	206	2.4	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	500	5.9	Empirical Program Evaluations	Equal to indoor savings for S1 and S2. Savings assumed to decay by 20% per year	2
M3	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	2 gpd	27,000	60.5	Empirical Program Evaluations	Unit savings applies to all Multi-Family customers with 2-5 dwelling units	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	6.8 gpd	700	5.3	Empirical Program Evaluations	Based on empirical evaluation of bathroom	2

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings (AF)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
		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					retrofit programs completed in 2018. Assumes 54% installation rate	
M5	Showerhead Direct Install	Free installation of showerheads. **Pre-requisite:** WaterWise Direct Install Evaluations (Measure M1)	12.6 gpd	200	2.8	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed in 2018	1
M6	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	0	NA	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	2

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings (AF)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
							program free-riders	
M7	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	300	13.0	Empirical Program Evaluations	Based on empirical evaluation of bathroom retrofit programs completed in 2018	1
M8	HET Voucher	A voucher issued to eligible residents to replace their older toilets with HETs	30 gpd	0	NA	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	2
M9	HET Install thru On-Bill Financing	Partner with third-party vendors to find customers with remaining savings opportunity, sell them the	38.6 gpd	0	NA	Empirical Program Evaluations	Based on empirical evaluation of	1

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings (AF)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
		program, and conduct the installation. The customer pays for the program through savings received through their water bill.					bathroom retrofit programs completed in 2018	
M10	CEE Tier 3 Washer Rebate (WF 4.0)	Rebate for coin-op, common area clothes washer with WF of 4 or lower. (multi-family in-unit residential style washers are covered under SF measure)	126 gpd	80	11.3	Engineering Estimate	Engineering estimate based on limited data on clothes washer market shares	3
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	2750	10.2	Engineering Estimate	Based on review of end use studies and engineering estimates of savings potential of aerators and other devices	3

Non-Residential Measures

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings (AF)	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	50	12.0	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	0	NA	Empirical Program Evaluations	Based on empirical evaluations of CII surveys done in Southern California in the 1990s	3
N3	Surveys – Hospitals, Hotels, Schools	Free site consultation for hospitals, hotels, and schools	837 gpd	16	15.0	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	161 gpd	30	5.4	Engineering Estimate	Unit savings per acre surveyed. Assumes 10% reduction in average landscape	3

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings (AF)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
		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.					site water use of 1.8 AF/Acre	
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	3	17.2	Engineering Estimate	SFPUC staff estimate of water savings from consultant audits	2
N7	1.5 GPM Showerhead Giveaway	Provides free, high-efficiency 1.5 gpm showerheads for San Francisco businesses.	5.6 gpd	300	1.9	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	100	1.2	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),	3.3 gpd	700	2.6	Engineering Estimate	Based on review of end use studies and	3

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings (AF)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
		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.					engineering estimates of savings potential of aerators and other devices	
N10	HET Rebate	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).	28.4 gpd	0	NA	Empirical Program Evaluations	Based on CUWCC CII Toilet Savings Study. Estimate scales-up ULFT savings to account for improved efficiency of HET	2
N11	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	0	NA	Empirical Program Evaluations	Based on CUWCC CII Toilet Savings Study. Estimate scales-up ULFT savings to account for improved efficiency of HET	2
N12	HET Direct Install	Free installation of High-Efficiency Toilets for businesses in SF **Pre-requisite:** Direct Install Audit (Measure N2)	29 gpd	0	NA	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)	Planned Annual Activity Level	Annual Water Savings (AF)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
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	0	NA	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	0	NA	Empirical Program Evaluations	Based on CUWCC CII Toilet Savings Study. Estimate scales-up ULFT savings to account for improved efficiency of HET	2
N15	HET Voucher – Schools, Hotels	Same as N14 but directed at schools and hotels	17.8 gpd	0	NA	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	0	NA	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)	Planned Annual Activity Level	Annual Water Savings (AF)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
N17	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	0	NA	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	0	NA	Engineering Estimate	Based on CUWCC Urinal Savings Potential PBMP Study	3
N20	Energy Star Washer Rebate (WF 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	0	NA	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 (WF 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	40	2.0	Engineering Estimate	Engineering estimate based on limited data on clothes washer market shares and coin-op washer utilization rates	3
N22	Landscape Grants	Under Landscape Grant Program, landscapes with over 0.5 acre of irrigated areas are eligible to receive funding to implement retrofits and install	446 gpd/acre	11.2 acres (2 projects per year)	5.6	Empirical Program Evaluations	Based on SFPUC staff estimates of water savings for 11 large	2

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings (AF)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
		fixtures to facilitate water conservation.					landscape grant projects	
N24	Equipment Retrofit Rebate	Incentives to businesses to upgrade indoor equipment. Projects must achieve an annual water savings of 200 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 gpd per dollar of grant funding	1 project (200 ccf/yr)	0.5		Minimum required savings per $1 of grant funding – e.g. if $100K awarded, expected savings would be 200,000 gpd	1
N25	Custom Equipment Retrofit Rebate	Similar to Measure N24, but allows applicants to create customized project tailored toward their specific business needs and water use patterns.	2 gpd per dollar of grant funding	1 project (200 ccf/yr)	0.5		Minimum required savings per $1 of grant funding – e.g. if $100K awarded, expected savings would be 200,000 gpd	1
N27	Kitchen Low Flow Spray Valves	Rebate or giveaway of high-efficiency kitchen spray valves used primarily by dishwashing stations	30 gpd	10	0.3	Empirical Program Evaluations	Based on multiple empirical evaluations of savings from kitchen spray-valve retrofits. Estimate assumes 50%	1

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings (AF)	Basis for Savings Estimate	Notes on Savings Estimate	Water Savings Estimate Confidence Score
							installation/retention rate	

Measures Applicable to All Customers

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings	Notes on Savings Estimate	Water Savings Estimate Confidence Score
A3	Irrigation Customer Large Landscape Budget	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	TBD	Engineering Estimate	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
S16a	Rain Barrel Rebate	Subsidy program that discounts the purchase cost of rain barrel and provides training.	0.8 gpd	See Single-Family Table	Engineering Estimate	Originally specified as a single-family measure, multi-family and non-residential customers also can participate in the program. Currently single-family customer account for about 80% of program participants with the	3

ID	Measure Name	Measure Description	Expected Unit Water Savings (GPD)	Planned Annual Activity Level	Annual Water Savings	Notes on Savings Estimate	Water Savings Estimate Confidence Score
						other 20% split more or less evenly between multi-family and non-residential customers	
S16b	Rain Cistern Rebate	Subsidy program that discounts the purchase cost of cisterns and provides training.	2.4 gpd	See Single-Family Table	Engineering Estimate	See previous note	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

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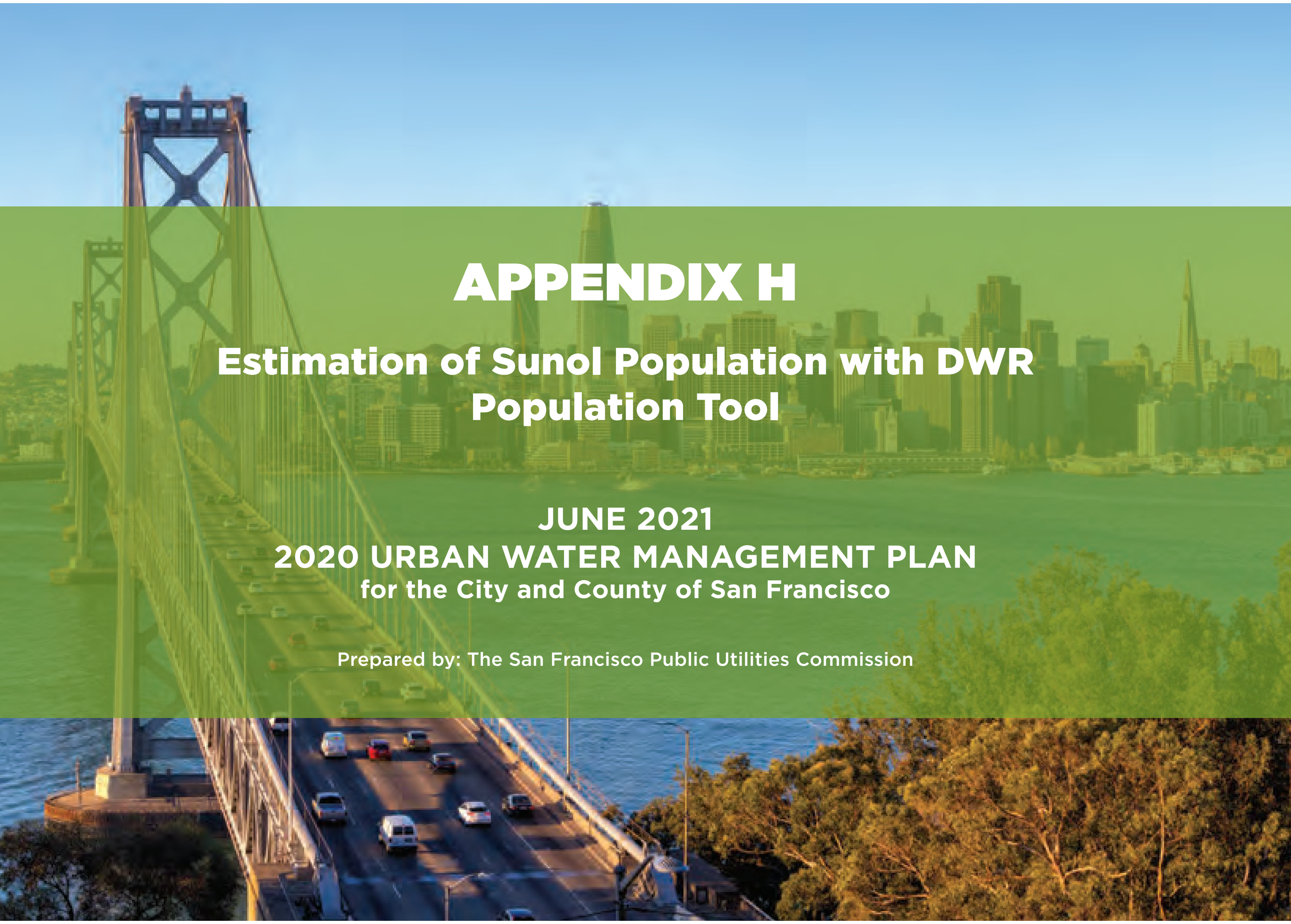

APPENDIX H

Estimation of Sunol Population with DWR Population Tool

JUNE 2021
2020 URBAN WATER MANAGEMENT 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

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SFPUC 2020 UWMP Update

Population Estimate for the Town of Sunol

Appendix H

The DWR Population Tool was used in the development of the 2015 UWMP in order to estimate the population of the Town of Sunol, one of SFPUC's suburban retail customer. However, the results from the Population Tool in 2015 showed that the linear interpolation process of the tool was underestimating the population of the area. The Population Tool (see Population Tool results below) showed that estimated a 1.08 persons-per-connection in 2015, which is not representative of the area, based on the historical persons-per-connection of 4.75 in 2000 and of 2.30 in 2010. Based on SFPUC's understanding of the local population density, SFPUC consulted with DWR and it was determined that the 2010 persons-per-connection value could be applied to estimate the 2015 population.

For the 2020 UWMP, SFPUC sought guidance from DWR staff and since the local population density in the Town of Sunol has not changed significantly since 2015, DWR informed SFPUC that the use of the 2010 persons-per-connection value, previously used in the 2015 UWMP, was appropriate the 2020 UWMP. The 2010 persons-per-connection value is therefore applied to the updated 2020 number of connections to estimate the population for the Town of Sunol, for the calculation of the 2020 per capita water use target.
The 2020 population estimate is therefore 141 * 2.30 = 324.

This appendix includes the email correspondence with DWR about the 2020 UWMP and the results of the Population Tool analysis obtained during the preparation of the 2015 UWMP.

Gmail Lara Egbeola-Martial <lara@srtconsultants.com>

Population Tool Estimates

Huff, Gwen@DWR <Gwen.Huff@water.ca.gov> Mon, Dec 14, 2020 at 12:21 PM
To: "lara@srtconsultants.com" <lara@srtconsultants.com>
Cc: "Ekstrom, Julia@DWR" <Julia.Ekstrom@water.ca.gov>

Lara -

Yes, you may modify the persons per connecĀon for the current year based on local knowledge of the popula. on.

In the UWMP, please describe the modifica ons made and a jus fica on for the change.

Feel free to contact me if you have addi onal ques ons.

Sincerely,

Gwen

Gwen Huff
Re red Annuitant - Senior Environmental Scien st (Specialist)
gwen.huff@water.ca.gov
(916) 873-5923

From: Lara Egbeola-Mar al <lara@srtconsultants.com>
Sent: Friday, December 11, 2020 2:33 PM
To: DWR Water Use Efficiency <wue@water.ca.gov>
Cc: Triolo, Sarah <STriolo@sfwater.org>; Lisa Pezzino <lisa@srtconsultants.com>
Subject: UWMP Update Ques on - Popula on Tool Es mates

Hi WUE Team,

My team and I at SRT Consultants are currently suppor ng the San Francisco Public U li es Commission (SFPUC) with the update of their 2020 UWMP.
I a ended the training session about the Popula on Tool on Tuesday this week and wanted to ask a case-specific ques on regarding the use of the tool.
The Popula on Tool facilitates the es ma on of the popula on for SFPUC's suburban retail customers that are located in the Town of Sunol. However, for the 2015 UWMP, the results from the Popula on Tool showed that the linear interpola on process of the tool was underes ma ng the popula on of the area (see document a ached - with a historical persons-per-connec on of 4.75 in 2000 and of 2.30 in 2010, the results showed an es mate of 1.08 persons-per-connec on for 2015, which is not representa ve of the area).
In 2015, SFPUC consulted with DWR staff, and it was determined that the 2010 persons-per-connec on value could be applied to es mate the 2015 popula on, considering the fact that the local popula on density had not changed much since 2010.

We are now in a similar situa on for the 2020 UWMP. It is my understanding that with the same input data, the popula on es mates results from the tool for year 2020 are likely to underes mate the popula on again.
Since SFPUC expects that the local popula on density in the Town of Sunol has not changed significantly since 2015, we are considering using the same persons-per-connec on used in the 2015 Plan (based on the 2010 es mate) and apply it to the updated 2020 number of connec ons to determine the popula on. We were hoping to get your feedback on this approach to es mate the popula on of a specific subset of SFPUC's retail customers for Chapter 5.

Thank you for your guidance,

Best,

--
Lara Egbeola-Martial, P.E.
SRT Consultants
Water Resources Engineers
415-231-5766 office
510-356-8236 mobile
415-776-5200 fax
www.srtconsultants.com
www.linkedin.com/company/srt-consultants

WUEdata - San Francisco City And County

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Please print this page to a PDF and include as part of your UWMP submittal.

Confirmation Information

Generated By	Water Supplier Name	Confirmation #	Generated On
Winola Cheong	San Francisco City And County	8639310538	1/19/2016 9:11:45 PM

Boundary Information

Census Year	Boundary Filename	Internal Boundary ID
1990	Sunol_11Jan2016.kml	457
2000	Sunol_11Jan2016.kml	457
2010	Sunol_11Jan2016.kml	457

Baseline Period Ranges

10 to 15-year baseline period

2008 total water deliveries[1]:	425311	Hundred Cubic Feet (CCF)
2008 total volume of delivered recycled water[1]:	0	Hundred Cubic Feet (CCF)
2008 recycled water as a percent of total deliveries:	0.00%	
Number of years in baseline period[2]:	10	
Year beginning baseline period range:	2001	
Year ending baseline period range[3]:	2010	

5-year baseline period

Year beginning baseline period range:	2006
Year ending baseline period range[4]:	2010

[1] The selected units of measure must apply to both the 2008 total water deliveries and the 2008 total volume of delivered recycled water. If the water supplier records use different units of measure for these volumes, the user must make a conversion so that both volumes are in the same units of measure.

[2] If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period.

[3] The ending year must be between December 31, 2004 and December 31, 2010.

[4] The ending year must be between December 31, 2007 and December 31, 2010.

Persons per Connection

Year	Census Block Level Total Population	Number of Connections *	Persons per Connection
1990	198	69	2.87
1991	-	-	3.06
1992	-	-	3.25
1993	-	-	3.43
1994	-	-	3.62
1995	-	-	3.81
1996	-	-	4.00
1997	-	-	4.19
1998	-	-	4.37
1999	-	-	4.56
2000	328	69	4.75
2001	-	-	4.50
2002	-	-	4.26
2003	-	-	4.01
2004	-	-	3.77
2005	-	-	3.52
2006	-	-	3.28
2007	-	-	3.04
2008	-	-	2.79
2009	-	-	2.54
2010	237	103	2.30
2015	-	-	1.08

** Number of Connections may be either All Residential Connections (Single Family and Multi-Family combined) or All Service Connections. This will depend on the data available from the water supplier's records, but must remain consistent throughout the table.*

Population Using Persons-Per-Connection

Year		Number of Connections *	Persons per Connection	Total Population
10 to 15 Year Baseline Population Calculations				
Year 1	2001	63	4.50	284
Year 2	2002	67	4.26	285
Year 3	2003	71	4.01	285
Year 4	2004	75	3.77	283
Year 5	2005	79	3.52	278
Year 6	2006	83	3.28	272
Year 7	2007	89	3.04	270
Year 8	2008	93	2.79	259
Year 9	2009	94	2.54	239
Year 10	2010	103	2.30	237
5 Year Baseline Population Calculations				
Year 1	2006	83	3.28	272
Year 2	2007	89	3.04	270
Year 3	2008	93	2.79	259
Year 4	2009	94	2.54	239
Year 5	2010	103	2.30	237
2015 Compliance Year Population Calculations				
2015		112	1.08	121

** Number of Connections may be either All Residential Connections (Single Family and Multi-Family combined) or All Service Connections. This will depend on the data available from the water supplier's records, but must remain consistent throughout the table.*

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APPENDIX I

Energy Intensity Analysis

JUNE 2021

2020 URBAN WATER MANAGEMENT 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

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Urban Water Supplier: *San Francisco Public Utilities Commission*

Water Delivery Product (If delivering more than one type of product use Table O-1C)

Other

Table O-1B: Recommended Energy Reporting - Total Utility Approach				
Enter Start Date for Reporting Period	7/1/2019	Urban Water Supplier Operational Control		
End Date	6/30/2020			
☐ Is upstream embedded in the values reported?		Sum of All Water Management Processes	Non-Consequential Hydropower	
Water Volume Units Used	*MG*	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process (volume unit)		74132		74132
Energy Consumed (kWh)		-1242727474		-1242727474
Energy Intensity (kWh/vol. converted to MG)		-16763.7	#DIV/0!	-16763.7

Quantity of Self-Generated Renewable Energy

kWh

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

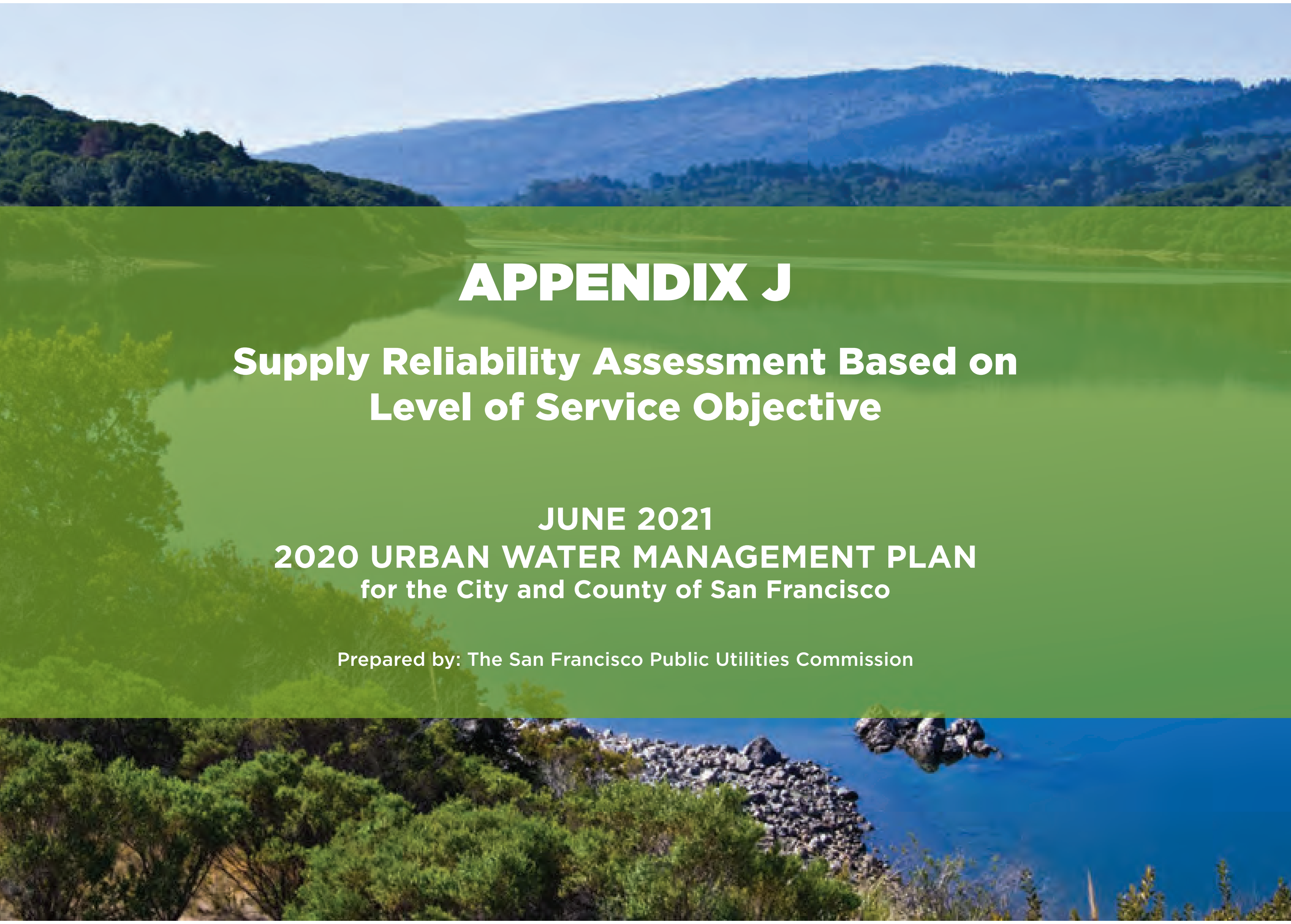
Metered Data

Data Quality Narrative:

The data reported covers FY2019-2020 (July 2019 to June 2020). 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 SPFUC. 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 FY2019-2020 (July 2019 to June 2020). 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 SPFUC. 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 in the 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 three (3) hydroelectric powerhouses, which account of a total hydroelectric generating capacity of 385 MW: Moccasin Powerhouse, Kirkwood Powerhouse and Holm Powerhouse.



APPENDIX J

Supply Reliability Assessment Based on Level of Service Objective

JUNE 2021
2020 URBAN WATER MANAGEMENT PLAN
for the City and County of San Francisco

Prepared by: The San Francisco Public Utilities Commission

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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 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.

As discussed in Section 7.1 of the UWMP, deliveries from the Regional Water System (RWS) to both retail and wholesale customers are limited to an average annual of 265 mgd for the watersheds. Current and projected supply available from the RWS is presented in Table J-1.

Table J-1. Regional Water System Supply Availability in Normal Years (mgd)

RWS Supply Allocation	Actual	Projected				
	2020	2025	2030	2035	2040	2045
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 Groveland CSD is reported as a wholesale customer for the purposes of this 2020 UWMP, but it is considered a retail customer of the SFPUC solely for purposes of allocating RWS supplies between retail customers and Wholesale Customers. Its demands would be met by the retail supply allocation of 81 mgd.

c Projected Wholesale Customer deliveries are limited to 184 mgd. 184 mgd includes the demands of the Cities of San Jose and Santa Clara, which are supplied on a temporary and interruptible basis, with their total supply not exceeding 9 mgd assuming supply is available (decision to be made by end of 2028).

d Cordilleras MWC is not a party to the WSA, and it is not included in the wholesale 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 2045.

Supply modeling to assess whether SFPUC can meet its Level of Service objective of providing an annual average of 265 mgd in normal years, with no greater than 20% rationing in extended droughts, was conducted using the same methodology described in Section 8.2. The level of demand assumed for the HHLSM model was 265 mgd. For RWS supplies, supply modeling both with and without the implementation of the Bay-Delta Plan Amendment is included here. The two modeled scenarios show significantly different supply reliability projections for the RWS:

- With Full Implementation of the Bay-Delta Plan Amendment: Under the Bay-Delta Plan Amendment conditions, it is anticipated that the RWS supplies will experience a reduction of up to 55% 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: In this scenario, the SFPUC system can expect to experience RWS supply reductions of at least 10% to 20% in a sequence of multiple dry years. Implementation of WSIP dry-year supply projects (see Section 7.1.2) will improve the SFPUC's water supply reliability, particularly in the earlier years of the design drought. However, in extended drought periods, the SFPUC will continue to experience multiple years of 10% to 20% reductions in RWS supply.

The supply modeling results are compared to retail demand projections and Wholesale Customer contractual obligations in Table J-3 through J-6 below.

Table J-2. Water Supply Availability During Normal and Dry Years – With and Without Bay-Delta Plan Amendment

Water Supply	Normal Year[a]	Single Dry Year	Multiple Dry Years				
			Year 1	Year 2	Year 3	Year 4	Year 5
Projected Years 2025 through 2045 (post-WSIP completion) – **With** Bay-Delta Plan Amendment							
RWS[b]	100%	50%	50%	45%	45%	45%	45%
Local Groundwater[c]	100%	100%	100%	100%	100%	100%	100%
Local Recycled Water[c]	100%	100%	100%	100%	100%	100%	100%
Projected Years 2025 through 2045 (post-WSIP completion) – **Without** Bay-Delta Plan Amendment							
RWS[b]	100%	90%	90%	90%	90%	80%	80%
Local Groundwater[c]	100%	100%	100%	100%	100%	100%	100%
Local Recycled Water[c]	100%	100%	100%	100%	100%	100%	100%

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.

a For RWS, normal year is defined relative to Table J-1 above, in which 265 mgd of RWS supply is available.

b RWS supplies are available to meet both retail and wholesale demands.

c Local supplies are available only to meet retail demands.

Table J-3. 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[a]	Multiple Dry Years				
				Year 1[a]	Year 2[b]	Year 3[b]	Year 4 [b]	Year 5 [b]
2025	Total Retail Demand	70.7	70.7	70.7	70.7	70.7	70.7	70.7
	Baseline Retail Demand[c]	*70.7*	*70.7*	*70.7*	*70.7*	*70.7*	*70.7*	*70.7*
	WSA 5% Demand Reduction Requirement[d]	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	Total Retail Supply	84.5	53.2	53.2	48.2	48.2	48.2	48.2
	Retail Groundwater[e]	*1.4*	*1.4*	*1.4*	*1.4*	*1.4*	*1.4*	*1.4*
	Retail Recycled Water[f]	*2.1*	*2.1*	*2.1*	*2.1*	*2.1*	*2.1*	*2.1*
	RWS Supply Available to Retail[g]	*81.0*	*49.7*	*49.7*	*44.7*	*44.7*	*44.7*	*44.7*
	Difference (Supply Surplus or Shortfall)	13.8	-17.5	-17.5	-22.5	-22.5	-22.5	-22.5
	Difference as Percentage of Demand	19.5%	-24.8%	-24.8%	-31.8%	-31.8%	-31.8%	-31.8%
2030	Total Retail Demand	72.4	72.4	72.4	72.4	72.4	72.4	72.4
	Baseline Retail Demand[c]	*72.4*	*72.4*	*72.4*	*72.4*	*72.4*	*72.4*	*72.4*
	WSA 5% Demand Reduction Requirement[d]	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	Total Retail Supply	87.9	56.6	56.6	51.6	51.6	51.6	51.6
	Retail Groundwater[e]	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
	RWS Supply Available to Retail[g]	*81.0*	*49.7*	*49.7*	*44.7*	*44.7*	*44.7*	*44.7*
	Difference (Supply Surplus or Shortfall)	15.5	-15.8	-15.8	-20.8	-20.8	-20.8	-20.8
	Difference as Percentage of Demand	21.4%	-21.8%	-21.8%	-28.7%	-28.7%	-28.7%	-28.7%
2035	Total Retail Demand	74	74	74	74	74	74	74

	Baseline Retail Demand[c]	*74.4*	*74.4*	*74.4*	*74.4*	*74.4*	*74.4*	*74.4*
	WSA 5% Demand Reduction Requirement[d]	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	Total Retail Supply	87.9	56.6	56.6	51.6	51.6	51.6	51.6
	Retail Groundwater[e]	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
	RWS Supply Available to Retail[g]	*81.0*	*49.7*	*49.7*	*44.7*	*44.7*	*44.7*	*44.7*
	Difference (Supply Surplus or Shortfall)	13.5	-17.8	-17.8	-22.8	-22.8	-22.8	-22.8
	Difference as Percentage of Demand	18.1%	-23.9%	-23.9%	-30.6%	-30.6%	-30.6%	-30.6%
2040	Total Retail Demand	77.3	77.3	77.3	77.3	77.3	77.3	77.3
	Baseline Retail Demand[c]	*77.3*	*77.3*	*77.3*	*77.3*	*77.3*	*77.3*	*77.3*
	WSA 5% Demand Reduction Requirement[d]	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	Total Retail Supply	87.9	56.6	56.6	51.6	51.6	51.6	51.6
	Retail Groundwater[e]	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
	RWS Supply Available to Retail[g]	*81.0*	*49.7*	*49.7*	*44.7*	*44.7*	*44.7*	*44.7*
	Difference (Supply Surplus or Shortfall)	10.6	-20.7	-20.7	-25.7	-25.7	-25.7	-25.7
	Difference as Percentage of Demand	13.7%	-26.8%	-26.8%	-33.2%	-33.2%	-33.2%	-33.2%
2045	Total Retail Demand	80.6	80.6	80.6	80.6	80.6	80.6	80.6
	Baseline Retail Demand[c]	*80.6*	*80.6*	*80.6*	*80.6*	*80.6*	*80.6*	*80.6*
	WSA 5% Demand Reduction Requirement[d]	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
	Total Retail Supply	87.9	56.6	56.6	51.6	51.6	51.6	51.6
	Retail Groundwater[e]	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
	RWS Supply Available to Retail[g]	*81.0*	*49.7*	*49.7*	*44.7*	*44.7*	*44.7*	*44.7*
	Difference (Supply Surplus or Shortfall)	7.3	-24.0	-24.0	-29.0	-29.0	-29.0	-29.0
	Difference as Percentage of Demand	9.1%	-29.8%	-29.8%	-36.0%	-36.0%	-36.0%	-36.0%

Normal, single dry, and multiple dry year conditions are on a water year basis.

a During a single dry year and multiple dry year 1, a system-wide shortage of 50% is in effect. For this analysis, a 50% shortage is considered equivalent to the maximum Stage 4, 16-20% system-wide shortage. Under the WSAP, the retail supply allocation at this stage of shortage is 36.0% of available RWS supply, or 49.7 mgd.

b During multiple dry years 2 to 5, a system-wide shortage of 55% is in effect. For this analysis, a 55% shortage is considered equivalent to the maximum Stage 4, 16-20% system-wide shortage. Under the WSAP, the retail supply allocation at this stage of shortage is 37.5% of available RWS supply, or 44.7 mgd.

c Total retail demands correspond to those in Table 4-1, and reflect active conservation, onsite water reuse savings as well as water loss. Demands for Groveland CSD is included in the table above. However, in the corresponding standardized tables in Appendix B, Groveland CSD is accounted for as a wholesale customer instead of a retail customer, as explained in Section 2.4.

d As amended in 2018, the WSAP Tier One Allocation Plan requires retail customers to conserve a minimum of 5% during droughts. If retail demands on the Regional Water System are lower than the retail allocation in a dry year, retail demands on the RWS will be reduced by 5%. An N/A on this row means that either this 5% rationing requirement doesn't apply, or retail customers are already rationing greater than 5%.

e 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 (0.4 mgd). Groundwater availability would not be affected by dry year conditions.

f Recycled water supplies are assumed to be equivalent to projected demands related to the Westside Recycled Water Project (1.6 mgd by 2021 and 1.8 mgd by 2030), Harding Park and Fleming Golf Courses (0.23 mgd), and Sharp Park Golf Course (up to 0.1 mgd) and Treasure Island (0.2 mgd by 2025 and 0.4 mgd by 2030). Recycled water availability would not be affected by dry year conditions.

g Procedures for RWS allocations and the WSAP are described in Section 8.3. 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 supplies are not available, up to 81 mgd of RWS supply could be used.

Table J-4. 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[a]	Multiple Dry Years				
				Year 1[a]	Year 2[b]	Year 3[b]	Year 4[b]	Year 5[b]
2025	Total Retail Demand	70.7	67.2	67.2	67.2	67.2	67.2	67.2
	Baseline Retail Demand[c]	*70.7*	*70.7*	*70.7*	*70.7*	*70.7*	*70.7*	*70.7*
	WSA 5% Demand Reduction Requirement[d]	*N/A*	*-3.5*	*-3.5*	*-3.5*	*-3.5*	*-3.5*	*-3.5*
	Total Retail Supply	84.5	84.5	84.5	84.5	84.5	83.0	83.0
	Retail Groundwater[e]	*1.4*	*1.4*	*1.4*	*1.4*	*1.4*	*1.4*	*1.4*
	Retail Recycled Water[f]	*2.1*	*2.1*	*2.1*	*2.1*	*2.1*	*2.1*	*2.1*
	RWS Supply Available to Retail[g]	*81.0*	*81.0*	*81.0*	*81.0*	*81.0*	*79.5*	*79.5*
	Difference (Supply Surplus or Shortfall)	13.8	17.3	17.3	17.3	17.3	15.8	15.8
	Difference as Percentage of Demand	19.5%	25.8%	25.8%	25.8%	25.8%	23.6%	23.6%
2030	Total Retail Demand	72.4	68.8	68.8	68.8	68.8	68.8	68.8
	Baseline Retail Demand[c]	*72.4*	*72.4*	*72.4*	*72.4*	*72.4*	*72.4*	*72.4*
	WSA 5% Demand Reduction Requirement[d]	*0*	*-3.6*	*-3.6*	*-3.6*	*-3.6*	*-3.6*	*-3.6*
	Total Retail Supply	87.9	87.9	87.9	87.9	87.9	86.4	86.4
	Retail Groundwater[e]	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
	RWS Supply Available to Retail[g]	*81.0*	*81.0*	*81.0*	*81.0*	*81.0*	*79.5*	*79.5*
	Difference (Supply Surplus or Shortfall)	15.5	19.1	19.1	19.1	19.1	17.6	17.6
	Difference as Percentage of Demand	21.4%	27.8%	27.8%	27.8%	27.8%	25.6%	25.6%
2035	Total Retail Demand	74	71	71	71	71	71	71
	Baseline Retail Demand[c]	*74.4*	*74.4*	*74.4*	*74.4*	*74.4*	*74.4*	*74.4*
	WSA 5% Demand Reduction Requirement[d]	*0*	*-3.7*	*-3.7*	*-3.7*	*-3.7*	*-3.7*	*-3.7*
	Total Retail Supply	87.9	87.9	87.9	87.9	87.9	86.4	86.4
	Retail Groundwater[e]	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
	RWS Supply Available to Retail[g]	*81.0*	*81.0*	*81.0*	*81.0*	*81.0*	*79.5*	*79.5*
	Difference (Supply Surplus or Shortfall)	13.5	17.2	17.2	17.2	17.2	15.7	15.7
	Difference as Percentage of Demand	18.1%	24.4%	24.4%	24.4%	24.4%	22.2%	22.2%
2040	Total Retail Demand	77.3	73.4	73.4	73.4	73.4	73.4	73.4
	Baseline Retail Demand[c]	*77.3*	*77.3*	*77.3*	*77.3*	*77.3*	*77.3*	*77.3*
	WSA 5% Demand Reduction Requirement[d]	*0*	*-3.9*	*-3.9*	*-3.9*	*-3.9*	*-3.9*	*-3.9*
	Total Retail Supply	87.9	87.9	87.9	87.9	87.9	86.4	86.4
	Retail Groundwater[e]	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
	RWS Supply Available to Retail[g]	*81.0*	*81.0*	*81.0*	*81.0*	*81.0*	*79.5*	*79.5*
	Difference (Supply Surplus or Shortfall)	10.6	14.5	14.5	14.5	14.5	13.0	13.0
	Difference as Percentage of Demand	13.7%	19.7%	19.7%	19.7%	19.7%	17.7%	17.7%

2045	Total Retail Demand	80.6	76.6	76.6	76.6	76.6	76.6	76.6
	Baseline Retail Demand[c]	*80.6*	*80.6*	*80.6*	*80.6*	*80.6*	*80.6*	*80.6*
	WSA 5% Demand Reduction Requirement[d]	*0*	*-4.0*	*-4.0*	*-4.0*	*-4.0*	*-4.0*	*-4.0*
	Total Retail Supply	87.9	87.9	87.9	87.9	87.9	86.4	86.4
	Retail Groundwater[e]	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*	*4.4*
	Retail Recycled Water[f]	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
	RWS Supply Available to Retail[g]	*81.0*	*81.0*	*81.0*	*81.0*	*81.0*	*79.5*	*79.5*
	Difference (Supply Surplus or Shortfall)	7.3	11.3	11.3	11.3	11.3	9.8	9.8
	Difference as Percentage of Demand	9.1%	14.8%	14.8%	14.8%	14.8%	12.8%	12.8%

Normal, single dry, and multiple dry year conditions are on a water year basis.

a During a single dry year and multiple dry years 1 to 3, a system-wide shortage of 10% is in effect. Under the WSAP, the retail supply allocation at this stage of shortage is 36.0% of available RWS supply, or 85.9 mgd. However, due to the Phased WSIP Variant, only 81 mgd of RWS supply can be delivered.

b During multiple dry years 4 and 5, a system-wide shortage of 20% is in effect. Under the WSAP, the retail supply allocation at this stage of shortage is 37.5% of available RWS supply, or 79.5 mgd. RWS supply is capped at this amount.

c Total retail demands correspond to those in Table 4-1, and reflect active conservation, onsite water reuse savings as well as water loss. Demands from Groveland CSD are included in the table above. However, in the corresponding standardized tables in Appendix B, Groveland CSD is accounted for as a wholesale customer instead of a retail customer, as explained in Section 2.4.

d As amended in 2018, the WSAP Tier One Allocation Plan requires retail customers to conserve a minimum of 5% during droughts. If retail demands on the Regional Water System are lower than the retail allocation in a dry year, retail demands on the RWS will be reduced by 5%. An N/A on this row means that either this 5% rationing requirement doesn't apply, or retail customers are already rationing greater than 5%.

e 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 (0.4 mgd). Groundwater availability would not be affected by dry year conditions.

f Recycled water supplies are assumed to be equivalent to projected demands related to the Westside Recycled Water Project (1.6 mgd by 2021 and 1.8 mgd by 2030), Harding Park and Fleming Golf Courses (0.23 mgd), and Sharp Park Golf Course (up to 0.1 mgd) and Treasure Island (0.2 mgd by 2025 and 0.4 mgd by 2030). Recycled water availability would not be affected by dry year conditions.

g Procedures for RWS allocations and the WSAP are described in Section 8.3. 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.

Table J-5. 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[a]	Multiple Dry Years[a]				
				Year 1	Year 2	Year 3	Year 4	Year 5
2025	Total Wholesale Demand[b]	184.0	184.0	184.0	184.0	184.0	184.0	184.0
	Total Wholesale RWS Supply[c]	184.0	82.8	82.8	74.5	74.5	74.5	74.5
	Difference (Surplus or Shortfall)	-0.0	-101.2	-101.2	-109.5	-109.5	-109.5	-109.5
	Difference as % of Demand	0.0%	-55.0%	-55.0%	-59.5%	-59.5%	-59.5%	-59.5%
2030	Total Wholesale Demand[b]	184.0	184.0	184.0	184.0	184.0	184.0	184.0
	Total Wholesale RWS Supply[c]	184.0	82.8	82.8	74.5	74.5	74.5	74.5
	Difference (Surplus or Shortfall)	-0.0	-101.2	-101.2	-109.5	-109.5	-109.5	-109.5
	Difference as % of Demand	0.0%	-55.0%	-55.0%	-59.5%	-59.5%	-59.5%	-59.5%
2035	Total Wholesale Demand[b]	184.0	184.0	184.0	184.0	184.0	184.0	184.0
	Total Wholesale RWS Supply[c]	184.0	82.8	82.8	74.5	74.5	74.5	74.5
	Difference (Surplus or Shortfall)	-0.0	-101.2	-101.2	-109.5	-109.5	-109.5	-109.5
	Difference as % of Demand	0.0%	-55.0%	-55.0%	-59.5%	-59.5%	-59.5%	-59.5%
2040	Total Wholesale Demand[b]	184.0	184.0	184.0	184.0	184.0	184.0	184.0
	Total Wholesale RWS Supply[c]	184.0	82.8	82.8	74.5	74.5	74.5	74.5
	Difference (Surplus or Shortfall)	-0.0	-101.2	-101.2	-109.5	-109.5	-109.5	-109.5
	Difference as % of Demand	0.0%	-55.0%	-55.0%	-59.5%	-59.5%	-59.5%	-59.5%
2045	Total Wholesale Demand[b]	184.0	184.0	184.0	184.0	184.0	184.0	184.0
	Total Wholesale RWS Supply[c]	184.0	82.8	82.8	74.5	74.5	74.5	74.5
	Difference (Surplus or Shortfall)	-0.0	-101.2	-101.2	-109.5	-109.5	-109.5	-109.5
	Difference as % of Demand	0.0%	-55.0%	-55.0%	-59.5%	-59.5%	-59.5%	-59.5%

Normal, single dry, and multiple dry year conditions are on a water year basis.

Groveland CSD is not accounted for as a wholesale customer for the purpose of this table.

a The WSA does not define a percentage split above a 20% shortage level. The same split as a 20% shortage level is assumed, and the Wholesale Customers are therefore allocated 62.5%.

b Total wholesale demands correspond to those in Table 4-3 of the UWMP. It is assumed that projected Wholesale Customer demands are limited to the Supply Assurance of 184 mgd. The 184 mgd assumes that San Jose and Santa Clara remain temporary, interruptible customers.

c Procedures for RWS allocations and the WSAP are described in Section 8.3.

Table J-6. 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[a]	Multiple Dry Years				
				Year 1[a]	Year 2[a]	Year 3[a]	Year 4[b]	Year 5[b]
2025	Total Wholesale Demand[c]	184.0	184.0	184.0	184.0	184.0	184.0	184.0
	Total Wholesale RWS Supply[d]	184.0	157.5	157.5	157.5	157.5	132.5	132.5
	Difference (Surplus or Shortfall)	-0.0	-26.5	-26.5	-26.5	-26.5	-51.5	-51.5
	Difference as % of Demand	0.0%	-14.4%	-14.4%	-14.4%	-14.4%	-28.0%	-28.0%
2030	Total Wholesale Demand[c]	184.0	184.0	184.0	184.0	184.0	184.0	184.0
	Total Wholesale RWS Supply[d]	184.0	157.5	157.5	157.5	157.5	132.5	132.5
	Difference (Surplus or Shortfall)	-0.0	-26.5	-26.5	-26.5	-26.5	-51.5	-51.5
	Difference as % of Demand	0.0%	-14.4%	-14.4%	-14.4%	-14.4%	-28.0%	-28.0%
2035	Total Wholesale Demand[c]	184.0	184.0	184.0	184.0	184.0	184.0	184.0
	Total Wholesale RWS Supply[d]	184.0	157.5	157.5	157.5	157.5	132.5	132.5
	Difference (Surplus or Shortfall)	-0.0	-26.5	-26.5	-26.5	-26.5	-51.5	-51.5
	Difference as % of Demand	0.0%	-14.4%	-14.4%	-14.4%	-14.4%	-28.0%	-28.0%
2040	Total Wholesale Demand[c]	184.0	184.0	184.0	184.0	184.0	184.0	184.0
	Total Wholesale RWS Supply[d]	184.0	157.5	157.5	157.5	157.5	132.5	132.5
	Difference (Surplus or Shortfall)	-0.0	-26.5	-26.5	-26.5	-26.5	-51.5	-51.5
	Difference as % of Demand	0.0%	-14.4%	-14.4%	-14.4%	-14.4%	-28.0%	-28.0%
2045	Total Wholesale Demand[c]	184.0	184.0	184.0	184.0	184.0	184.0	184.0
	Total Wholesale RWS Supply[d]	184.0	157.5	157.5	157.5	157.5	132.5	132.5
	Difference (Surplus or Shortfall)	-0.0	-26.5	-26.5	-26.5	-26.5	-51.5	-51.5
	Difference as % of Demand	0.0%	-14.4%	-14.4%	-14.4%	-14.4%	-28.0%	-28.0%

Normal, single dry, and multiple dry year conditions are on a water year basis.

Groveland CSD is not accounted for as a wholesale customer for the purpose of this table.

a Single dry year and multiple dry years 1 to 3 reflect a system-wide shortage of 10%. Under the WSAP, the wholesale supply allocation at this stage of shortage is 64.0% of available RWS supply, or 152.6 mgd. Retail allocation is 36%, or 85.9 mgd; retail allocations above 81 mgd are re-allocated to Wholesale Customers, per the 2018 WSA. 4.9 mgd is added to the wholesale allocation, bringing it to 157.5 mgd.

b Multiple dry years 4 and 5 reflect a system-wide shortage of 20%. Under the WSAP, wholesale supply allocation at this stage of shortage is 62.5% of available RWS supply, or 132.5 mgd.

c Total wholesale demands correspond to those in Table 4-3 of the UWMP. It is assumed that projected Wholesale Customer demands are limited to the Supply Assurance of 184 mgd. The 184 mgd assumes that San Jose and Santa Clara remain temporary, interruptible customers.

d Procedures for RWS allocations and the WSAP are described in Section 8.3.

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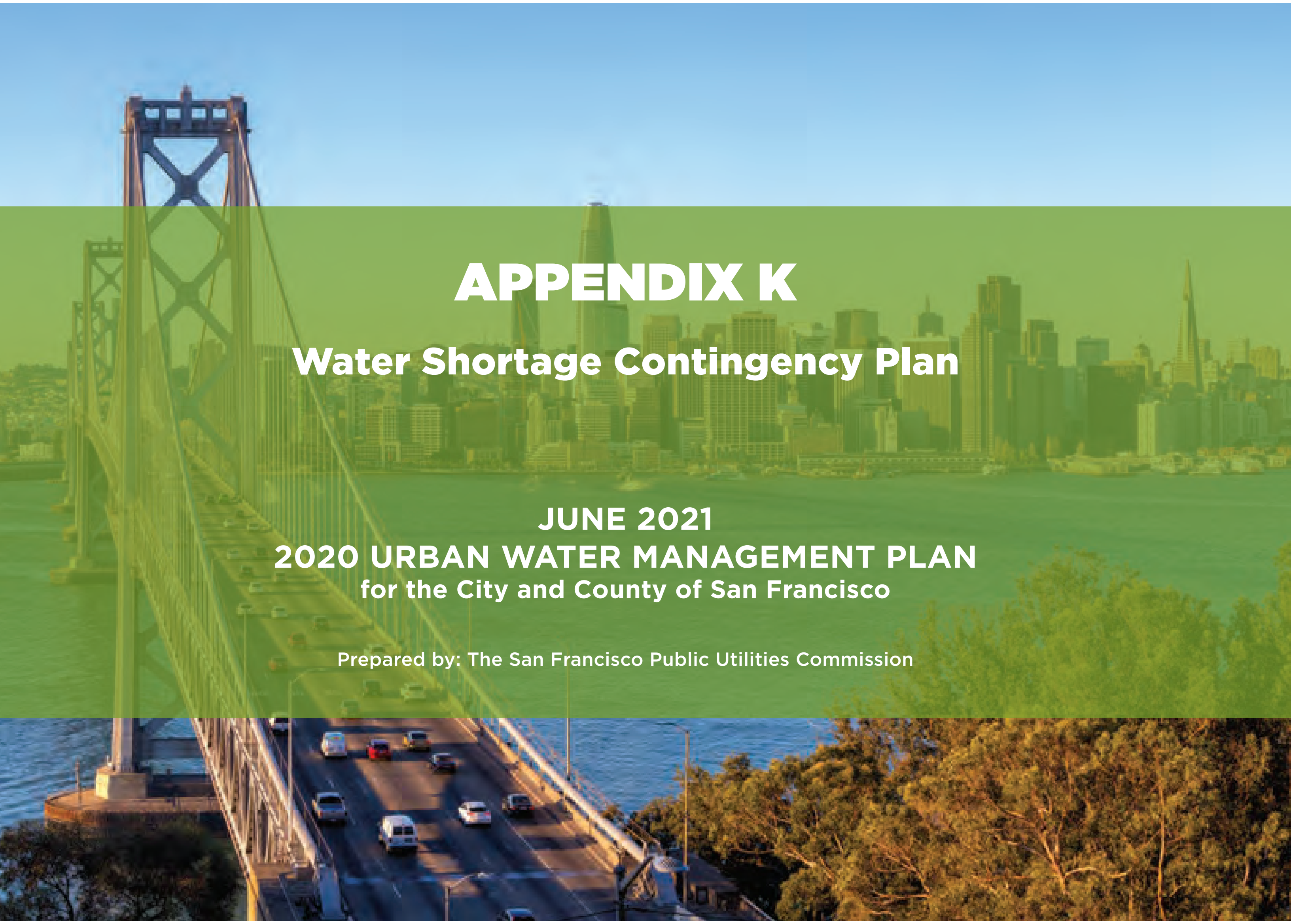

APPENDIX K

Water Shortage Contingency Plan

JUNE 2021

2020 URBAN WATER MANAGEMENT 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

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2020 WATER SHORTAGE CONTINGENCY PLAN

for the City and County of San Francisco

June 2021

Prepared by:

The San Francisco Public Utilities Commission

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

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TABLE OF CONTENTS

APPENDICES

Appendix A	Water Shortage Allocation Plan (Attachment H of Water Supply Agreement Between the City and County of San Francisco and with Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County)
Appendix B	Summary of San Francisco's Response to 1987-92 Drought Experience
Appendix C	Summary of San Francisco's Response to 2012-2016 Drought Experience
Appendix D	San Francisco Public Utilities Commission Resolution Adopting 2020 Water Shortage Contingency Plan

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

AF	acre-feet (volume of water, equivalent to 325,851 gallons)
ASO	airborne snow observatory
AWIA	2018 America's Water Infrastructure Act
BAWSCA	Bay Area Water Supply and Conservation Agency
CCF	hundred cubic feet (volume of water, equivalent to 748 gallons)
City	City and County of San Francisco
CWC	California Water Code
DEOP	Division Emergency Operations Plan
DMM	Demand Management Measure
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utility District
EDRP	Emergency Disinfection and Recovery Plan
EOP	Emergency Operations Plan
ERAP	Emergency Response Action Plan
ERP	Emergency Response Plan
ERRP	Emergency Response and Recovery Plan
GPCD	gallons per capita per day
Groveland CSD	Groveland Community Services District
HTWTP	Harry Tracy Water Treatment Plant
ISL	Interim Supply Limitation
LOS	levels of service
MG	million gallons
mgd	million gallons per day (flow or usage rate of water)
RWS	San Francisco Regional Water System,
RWSAP	Retail Water Shortage Allocation Plan
SCVWD	Santa Clara Valley Water District
SFPUC	San Francisco Public Utilities Commission
State	State of California
SVWTP	Sunol Valley Water Treatment Plant
SWRCB	State Water Resources Control Board
UWMP	Urban Water Management Plan
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
WSDA	Water Supply and Demand Assessment
WSIP	Water System Improvement Program

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SECTION 1 INTRODUCTION

The San Francisco Public Utilities Commission (SFPUC) is pleased to present this Water Shortage Contingency Plan (WSCP or Plan) for the City and County of San Francisco (City).

The City owns and operates the San Francisco Regional Water System (RWS), a public asset that plays a key role in delivering high-quality drinking water to more than 2.7 million residents and businesses in the San Francisco Bay Area. The system collects water from the Tuolumne River in the Sierra Nevada and from protected local watersheds in the East Bay and Peninsula.

The SFPUC operates the RWS to deliver water to 27 wholesale customers in Alameda, Santa Clara, and San Mateo Counties, as well as the Groveland Community Services District (Groveland CSD) in Tuolumne County. The Bay Area Water Supply and Conservation Agency (BAWSCA) represents the interests of 26 of the wholesale customers in Alameda, Santa Clara, and San Mateo Counties (collectively, Wholesale Customers) and coordinates their water conservation programming. The SFPUC also provides retail water service to customers in San Francisco (generally referred to as in-City retail customers) and a small number of customers outside of San Francisco that are located along the RWS transmission system (generally referred to as suburban retail customers). Additionally, some retail customers are supplied with local groundwater and recycled water supplies. The SFPUC also has a robust retail conservation program, as well as an Onsite Water Reuse program to reduce water demands and use water more efficiently.

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. This WSCP coincides with additional planning efforts conducted by the SFPUC, including its urban water management planning.

This introduction section provides background on the SFPUC's response to past water shortage experiences pre-2010 (Section 1.1, described in more detail in Appendix B) as well as the most recent 2012-2016 drought (Section 1.2, described in more detail in Appendix C).

1.1 EXPERIENCE WITH WATER SHORTAGES PRE-2010

Every water system has vulnerabilities in terms of its ability to provide a safe and reliable supply of water. Water shortages can occur in a number of ways. Very localized shortages can occur due to distribution system problems, and system shortages can occur due to major facility failures. Apart from system facility contingencies, potential drought periods may limit the amount of water that is available over a series of years. Drought contingency planning is not necessarily caused by physical facility limitations. Within the past 30 years, San Francisco has experienced both localized shortages due to earthquakes and system-wide shortages due to drought.

The SFPUC's past experiences with water shortages during drought and following major earthquakes have shaped its current water shortage preparedness plans and response policies:

- In 1987-92 San Francisco experienced a serious drought. During 6-year drought the SFPUC adopted various levels of action in response to the main Hetch Hetchy source of water available to the SFPUC 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 to 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 snow pack caused the SFPUC to initiate a 10% voluntary reduction in water use in the service area. The call for a voluntary reduction continued through 2009.

The 1987-92 drought illustrated the deficit between the SFPUC's supplies and its customers' demands. Other than the 1976-77 drought, drought sequences in the past did not seriously affect the ability of the SFPUC to maintain full deliveries to its customers. As the SFPUC progressed into the 1987-92 drought and reservoir storage continued to decline, it became evident that full deliveries could not be sustained without the risk of running out of water before the drought ended. This circumstance became a reality in early 1991 when the 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 provided relief from the severity of that instance of water shortage; however, the drought was far from over.

Appendix B provides a more detailed summary of San Francisco's 1987-92 drought experience and the actions taken at the time.

1.2 EXPERIENCE WITH THE 2012-2016 DROUGHT

From 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 percent in 2015). 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 water use reduction:** Spurred by the 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 percent. 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 percent reduction in water consumption. Ultimately, no water shortage emergency was declared, and no subsequent mandatory system-wide demand reductions and shortage allocations were imposed because customers exceeded the 10 percent 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 percent 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 require a mandatory 10 percent reduction in outdoor water use. 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 percent compared to 2013 water use, and conservation standards for individual urban water suppliers to meet the Statewide 25 percent 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's these regulations assigned the SFPUC retail service area a conservation standard of 8 percent in recognition of its low residential per capita water use. In the SFPUC wholesale service area, conservation standards assigned to the Wholesale Customers ranged from 8 percent to 36 percent. The conservation standards took effect in June 2015 and remained in effect through April 2017.
- **Mandatory reduction of outdoor water use:** In addition to the State mandates, the SFPUC imposed a mandatory 10% reduction on outdoor irrigation along with water use allocations and excess use charges for all retail irrigation customers starting in August 2014. Following the additional SWRCB regulations in the spring of 2015, the SFPUC increased the mandatory reduction on retail outdoor irrigation from 10 percent to 25 percent starting in July 2015. The SFPUC lifted the mandatory reduction on outdoor irrigation in July 2016.

Appendix C provides a more detailed overview of San Francisco's response to the 2012-2016 drought.

SECTION 2 ANNUAL WATER SUPPLY AND DEMAND ASSESSMENT PROCEDURES

Each year the SFPUC evaluates the amount of total water storage expected to occur throughout the RWS and compares it to expected demands. This annual Water Supply and Demand Assessment (WSDA) is described in the subsections below, which are organized by the sequential steps the SFPUC takes to conduct the assessment each year and reference the relevant California Water Code requirements for a WSDA.[1]

The SFPUC's annual WSDA is a robust planning system that considers a range of input factors unique to the SFPUC's water supplies and system configuration while also providing the flexibility to consider new factors. Traditional surface water supplies from the SFPUC's up country, East Bay, and Peninsula reservoirs are the backbone of the water supply, but the SFPUC extends and protects those supplies in many additional ways by: (1) partnering with the community to help save water through robust conservation programs; (2) minimizing the need for additional water to serve new developments through an onsite water reuse program; (3) recycling wastewater resources to deliver water for large non-potable uses; (4) utilizing local groundwater supplies to supplement surface water supplies; (5) investigating new, alternative water supply options such as purified water and desalination; 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 likelihood of a water shortage condition.

2.1 DEMAND ASSESSMENT [WATER CODE SECTION 10632(A)(2)(B)(I)]

To calculate unconstrained customer demand for the purpose of an annual WSDA, the SFPUC collects information on both the retail and wholesale system demands. Retail customer demand is estimated based on the best available information to date, and typically includes the previous year's demands as well as consideration of current demand use patterns or other conditions impacting demands, such as weather and growth. Each year, in February, the SFPUC receives from BAWSCA a report of estimated Wholesale Customer demand for the upcoming year. Estimates of projected demands are provided to BAWSCA by each Wholesale Customer. Relatively small demands from the two additional wholesale customers not part of the WSA are estimated based on the best available information to date, and typically includes 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 [WATER CODE SECTIONS 10632(A)(2)(B)(II) AND 10632(A)(2)(B)(V)]

The RWS collects water from the Tuolumne River watershed in the Sierra Nevada and from local reservoirs in the Alameda and Peninsula watersheds. The RWS draws an average of 85 percent 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 RWS supply is drawn from local surface waters in the Alameda and Peninsula watersheds. The split between these resources varies from year to year depending on the water year hydrology and operational circumstances.

To project and evaluate water supply conditions, the SFPUC uses measurements of precipitation and snowpack in the watersheds above Hetch Hetchy, Cherry, and Eleanor Reservoirs. Snowpack conditions are evaluated regularly by the Cooperative Snow Survey (conducted by the SFPUC in partnership with state and federal agencies) beginning in late January of each year. The SFPUC also estimates snowpack conditions using information from airborne snow observatory (ASO) and other sources. The SFPUC maintains a hydrologic model of the watersheds that uses this information to

[1] California Water Code section 10632(a)(1) requires "*the analysis of water supply reliability conducted pursuant to Section 10635.*" Additional information about the SFPUC's water supply reliability analysis can be found in Chapter 7 of the SFPUC's 2020 UWMP.

project expected 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 takes into account stored water throughout the RWS, water acquired by the SFPUC from non-SFPUC sources, inactive storage, 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, such that water stored in previous years is relied upon to meet demands. Because of the importance of carry-over storage, the SFPUC constantly monitors and evaluates water supply conditions in the RWS. Look-ahead forecasts are updated 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 condition. 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 2.3 describes the system modeling SFPUC conducts.

Table 2-1 shows the availability of RWS supplies for retail customers and Wholesale Customers in normal years. Table 2-2 shows the current and projected RWS supply needs to meet retail and wholesale demands based on information and projections presented in the SFPUC's 2020 UWMP.

The SFPUC sells water to 26 of its 28 wholesale customers under the terms of the 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. The WSA carries forward 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:

- Wholesale supply allocation: 184 mgd
- Retail supply allocation: 81 mgd[2]

[2] Groveland CSD is considered a retail customer of the SFPUC. Thus, RWS supplies to Groveland CSD are accounted for in the retail supply allocation of 81 mgd.

Table 2-1. Regional Water System Supply Availability in Normal Years (mgd)

RWS Supply Allocation	Actual	Projected				
	2020	2025	2030	2035	2040	2045
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 Groveland CSD is reported as a wholesale customer for the purposes of this 2020 UWMP, but it is considered a retail customer of the SFPUC solely for purposes of allocating RWS supplies between retail and Wholesale Customers. Its demands would be met by 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, with their total supply not exceeding 9 mgd assuming supply is available (decision to be made by end of 2028).

d Cordilleras MWC is not a party to the WSA, and it is not included in the wholesale 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 2045.

Table 2-2. Regional Water System Supply Utilized in Normal Years (mgd)

RWS Supply Allocation	Actual	Projected				
	2020	2025	2030	2035	2040	2045
Retail Customers[a, b]	66.5	67.2	67.5	68.6	70.5	73.7
Wholesale Customers[c, d]	132.1	146.0	147.9	151.9	156.3	162.8
Total RWS Supplies	198.6	213.2	215.4	220.5	226.8	236.5

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 Groveland CSD is reported as a wholesale customer for the purposes of this 2020 UWMP, but it is considered a retail customer of the SFPUC solely for purposes of allocating RWS supplies between retail and Wholesale Customers. Its demands would be met by 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, with their total supply not exceeding 9 mgd assuming supply is available (decision to be made by end of 2028).

d Cordilleras MWC is not a party to the WSA, and it is not included in the wholesale 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 2045.

2.3 INFRASTRUCTURE CONSIDERATIONS [WATER CODE SECTION 10632(A)(2)(B)(III)]

On an ongoing basis, the SFPUC's Hetch Hetchy Water and Power, Water Supply and Treatment Division, and Hydrology and Water Systems group conduct analyses of the RWS that incorporate planned facility outages and multiple levels of projected system demands to evaluate and plan for potential water delivery constraints. These 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 system are evaluated extensively prior to initiation of any changes. Results from these modeling efforts are considered in the annual WSDA.

2.4 SYSTEM MODELING [WATER CODE SECTION 10632(A)(2)(B)(IV)]

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 reduction is added 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 reduced water use levels and corresponding storage threshold values 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 comparison for 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 water use 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 [WATER CODE SECTION 10632(A)(2)(A)]

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. The SFPUC also provides water supply estimates to its Wholesale Customers on a monthly basis beginning February 1. A Wholesale Customer Annual Meeting is held in the latter portion of February at which the SFPUC makes a presentation on current water supply conditions and forecasts. The last snow survey of the season typically occurs within the first week of April, followed by a runoff forecast to determine total system storage expected as of July 1. By the middle of April, the SFPUC sends a formal letter to the Wholesale Customers summarizing the water supply availability for the coming year.

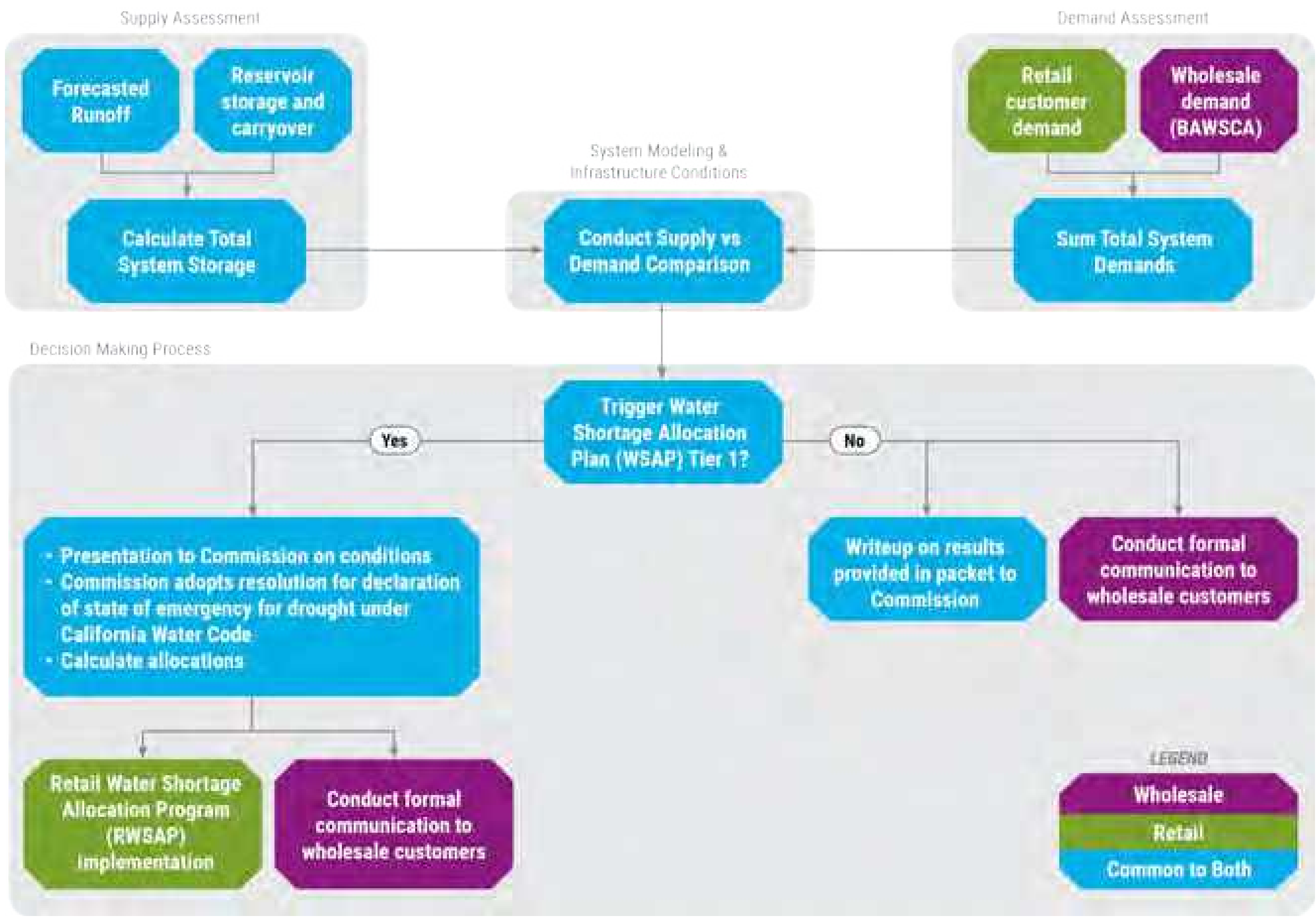
If the RWS appears incapable of meeting system-wide demand due to drought, the SFPUC is expected to declare a water shortage by March 31 of that drought year. The General Manager, or designee, is responsible for declaring such a shortage. A presentation would be made to the Commission as part of the General Manager’s report, showing 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 Commission may adopt a resolution declaring a water shortage emergency under the California Water Code, or lesser actions such as a call for voluntary conservation efforts.

Prior to the initiation of 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 drought response plan to address the following: the water supply situation; proposed water use reduction objectives; alternatives to water use 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 4.1. This drought response plan will be presented at a regularly scheduled SFPUC Commission meeting and advertised in accordance with the requirements of Section 6066 of the California Government Code.

The overall WSDA process is described visually in the flowchart presented in Figure 2-1.

Figure 2-1: Water Supply and Demand Assessment Process



SECTION 3 WATER SHORTAGE LEVELS

The SFPUC has two plans that determine how to allocate RWS supplies in the event of a water shortage condition: (1) the Water Shortage Allocation Plan (WSAP) defines how RWS supplies will be split between the SFPUC's retail customers and the Wholesale Customers collectively (see Section 3.1), and (2) the Retail Water Shortage Allocation Plan (RWSAP) defines how a retail water shortage will be allocated amongst the retail customers (see Section 3.2). The WSAP is also used for allocating the total wholesale supply allocation amongst the respective Wholesale Customers (see Appendix A). These two plans, and their associated water shortage levels, are described further below and in Section 4.1.

3.1 WATER SHORTAGE ALLOCATION PLAN (WSAP) AND ASSOCIATED WATER SHORTAGE LEVELS

The WSAP (see Appendix A) is an attachment to the Water Supply Agreement between the City and the Wholesale Customers described above. The WSAP describes the method for allocating water between the SFPUC's retail customers and the Wholesale Customers collectively during shortages caused by drought. The WSAP applies only when the SFPUC determines that a system-wide water shortage due to drought exists.

The WSAP includes specific allocations of the available water supply between the SFPUC's retail customers and the Wholesale Customers collectively for varying system-wide shortages of up to 20 percent, as shown in Table 3-1. In the event that the retail customer percentage share of the available water supply in Table 3-1 results in 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 customer 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 during shortages, the SFPUC shall require retail customers to conserve a minimum of 5 percent, with any resulting reallocated supply credited to storage for inclusion in calculation of projected available RWS water supply in a subsequent year.

Note that the WSAP does not define allocations between the SFPUC's retail customers and the Wholesale Customers above shortage levels of 20 percent. For the purposes of this WSCP, the SFPUC assumes that the allocations for the 16-20 percent shortage level 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 this allocation to shortage levels greater than 20 percent is appropriate or whether a change is required (for further information about this process, see Appendix A).

The SFPUC's shortage response actions as they relate to the Wholesale Customers are defined in the WSAP (see Appendix A) 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 2020 UWMP as a wholesale customer, it is considered a retail customer of the SFPUC solely for purposes of allocating RWS supplies between retail customers and Wholesale Customers. Thus, RWS supplies to Groveland CSD are accounted for in the retail supply allocation.

b Note that the WSAP does not define allocations between the SFPUC's retail customers and the Wholesale Customers above RWS shortage levels of 20%. The WSAP defines a process for the SFPUC and the Wholesale Customers to determine whether the application of the 16-20% allocation to shortage levels greater than 20% is appropriate or whether a change is required.

3.2 RETAIL WATER SHORTAGE LEVELS

The Retail Water Shortage Allocation Plan (RWSAP) (see Section 4.1 below), which pertains to retail customers only, outlines how any retail water shortages, after the application of the WSAP described above, will be allocated among the retail customers. Table 3-2 identifies the water shortage levels on a system-wide basis, and the corresponding retail water shortage condition that would need to be addressed at each shortage level under the RWSAP.

For the purposes of this analysis, system-wide shortages are expressed with respect to a normal year supply, i.e. 265 mgd, as shown above in Table 2-1. System-wide shortages are applied to this baseline supply of 265 mgd; subsequently, the WSAP allocation process described in Section 3.1 is applied to the actual RWS supply that is available to determine the shares of that supply that are available to the retail customers and the Wholesale Customers, respectively. The resulting share of RWS supply available for use by the retail customers, along with the retail groundwater and recycled water supplies that are projected to be available, are compared with the retail customers' demands to determine the level of retail shortage that would result.

The retail water shortage condition under the RWSAP may be different from the system-wide water shortage level. For example, in a 10 percent system-wide shortage of the Regional Water System, SFPUC would receive an allocation of 81 mgd.[3] Given that retail demands are projected to reach only 80.6 in 2045, there would not be an expected retail shortage

[3] 265 mgd of supply is first reduced by 10%, which results in an available supply of 238.5 mgd. Based on Table 3-1, the SFPUC retail share of available RWS supply is 36.0% under a 10% system-wide shortage: 238.5 mgd * 36.0% = 85.9 mgd. This results in retail customers having a positive allocation (i.e., a supply of additional

under that condition within the planning horizon of 2045. Under the terms of the Water Supply Agreement, as amended and restated in 2018, SFPUC has agreed to require 5 percent conservation in the event of any declared water shortage; thus in this scenario SFPUC would implement a voluntary reduction in water use of 5 percent.

At higher shortage levels, the retail allocation from the RWS results in a retail water shortage that varies depending on the retail demand levels. The ranges specified in Table 3-2 represent the expected water shortage conditions over the planning horizon from 2020 to 2045, over which time retail demands are increasing.

Table 3-2. Retail Water Shortage Levels of Action

[Standardized UWMP Table 8-1: Water Shortage Contingency Plan Levels]

Shortage Level	Required Level of System-wide Reduction in Water Use	Shortage Response Action
1	Up to 10%	Voluntary retail water use reduction of 5%
2	Up to 20%	Voluntary retail water use reduction of 5%
3	Up to 30%	Voluntary retail water use reduction of 5%
4	Up to 40%	Voluntary or mandatory retail water use reduction of 5% to 18%
5	Up to 50%	Mandatory retail water use reduction of 18% to 32%
6	>50%	Mandatory retail water use reduction of >32%

water rather than a required percentage reduction in water use), thus the retail customer percentage share of the available water supply is reduced to the normal retail supply allocation of 81 mgd to eliminate any positive allocation to retail customers.

SECTION 4 RETAIL WATER SHORTAGE RESPONSE ACTIONS

Once a water shortage has been identified, the SFPUC will implement its Retail Water Shortage Allocation Plan (RWSAP) to allocate available water supplies among the SFPUC's retail customers (see Section 4.1). The SFPUC also maintains several 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 several other 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 PLAN (RWSAP)

The RWSAP was initially adopted in 2001 to formalize a program of action to be taken in the retail service area to reduce water use during a drought. This WSCP updates and replaces the standalone RWSAP. The new, updated RWSAP described herein outlines the actions the SFPUC may take in response to a declaration of a water shortage. The actions taken depend on the applicable retail water shortage level, as described in Table 3-2. The declared retail water shortage level 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 vs. Mandatory Demand Reduction

During a declared water shortage emergency, the SFPUC may implement either voluntary or mandatory demand reductions, depending on the retail water shortage condition. Based on experience in previous droughts, the SFPUC will likely use voluntary calls for demand reduction if the target retail water use reduction is 10% or less. If the target retail water use reduction is greater than 10%, 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 program, the SFPUC must adopt a system for allocating water amongst its retail customers. During a water shortage emergency, multiple allocation methods may be needed for different customer types. During the 1987-1992 drought, four allocation methods were considered: (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. To implement this method, an accurate count of the number of occupants per metered account is required. Currently, customers can self-report this information, and the SFPUC has collected self-reported occupancy data for the majority of residential accounts. The method does not take into account 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 percent reduction to both indoor and outdoor use. 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 average water use by a customer during the winter months

(November, December, January, February) of the base year is used as the baseline for determining inside use for all 12 months. Water use in excess of 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 in the last decade, showing very little seasonal use and limited savings to be achieved 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 will be affected disproportionately 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 since 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 water allocation to be based on a straight percent reduction of past use. As an example, to achieve a specified reduction goal, all customers would be allotted a specific percentage of the amount of water that they used in each billing period in the base year. The method requires a much greater reduction in inside use and could cause hardship on both residential and commercial customers.

During the 1987-92 drought, the inside/outside method was implemented because it was found to be the most fair and reasonable method amongst the alternatives. At that time, for those customers that appealed their allocations, a per capita allocation was applied to the account. Since then, SFPUC's 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 as 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.

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 42 gallons per capita per day (GPCD) in Fiscal Year 2019-2020. In the event that mandatory demand reduction is instituted during a water shortage emergency, the SFPUC will adopt a minimum per-capita residential allocation, or water use "floor" to ensure a sufficient amount of water is available to its customers for basic health and safety needs. The appropriate floor will be determined by the General Manager or designee at the time a water shortage emergency is declared and will be specified in the drought response plan, as further described in Section 5.

4.1.4 Water Shortage Allocation Process

If a water shortage emergency is declared that results in the need for mandatory demand reduction, the SFPUC will allocate shortages to different customer types in an effort to minimize the economic impacts of mandatory demand reductions. An example of how shortages may be allocated by customer type is as follows:

1. The SFPUC will apply reductions for *irrigation-only* accounts; different levels of reduction may be required depending on whether the irrigation-only account is a residential, commercial, or municipal account type. Note that customers using recycled water for irrigation will not be required to ration their use of recycled water.

2. If there is still a shortage remaining, the SFPUC will 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
3. If there is still a shortage remaining, the SFPUC will apply reductions to *commercial and industrial* accounts, up to 30%
4. If there is still a shortage remaining, the SFPUC will apply reductions to *municipal and other* accounts, up to 30%.
5. If there is still a shortage remaining, the SFPUC will return to *irrigation-only* accounts and make further reductions, proceeding in same order with additional reductions from each sector.

The SFPUC will inform its retail customers of a water shortage by March 31 of every year in which there is a shortage. If mandatory demand reductions are being implemented, the SFPUC will determine water allocations for each retail customer account using the allocation method that is determined to be the most appropriate at the time based on the nature of the water shortage and water use trends. If an allocation method is chosen that requires establishment of baseline water use levels, allocations will be based on water use for the last year prior to the drought declaration. The SFPUC will provide water use allocations to all retail customers by May 1 of the drought year. The water use allocations will become effective July 1. Allocations for residential customers will not go below the per capita water use floor that will be established by the General Manager or designee at the time of declared water shortage emergency.

4.1.5 Appeal Process

On or before May 1, retail customers will be notified of their reduced water allocations. Each retail customer will have the opportunity to appeal the allocation based on increased occupancy, 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 supplementary information in support of their appeal. The SFPUC will also inform customers of the methodology to be used in modifying allocations if they are granted.

4.2 WATER WASTE PROHIBITIONS

Table 4-1 summarizes potential temporary prohibitions related to water use that the SFPUC may enforce during a drought, as well as permanent restrictions on retail customer water use established in the SFPUC Rules and Regulations Governing Water Service to Customers.[4] Appendix B describes various measures employed during the 1987-92 drought to achieve a 25 percent system-wide reduction in retail demands (as applied 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 C describes various measures employed during the 2012-2016 drought to achieve a primarily voluntary 10 percent system-wide reduction in retail demands.

Note that the SFPUC's implementation of each of the temporary prohibitions is not directly linked to a particular water shortage level under this WSCP. The only water shortage response action that will be implemented specifically in response to a particular shortage level is demand reduction (either voluntary or mandatory).

[4] The SFPUC Rules and Regulations Governing Water Service to Customers may be accessed at: https://www.sfpuc.org/sites/default/files/accounts-and-services/RulesRegs-waterservice_11FEB2020.pdf

Table 4-1. Water Use Restrictions and Prohibitions

Permanent[a]
Water waste, including but not limited to, any flooding or runoff into the street, sidewalk or gutter
Using hoses for any purpose without a positive shut-off valve
Serving water at a restaurant, café, or food counter without waiting for a request by a customer or customers
Potable water is not to be used to clean, fill or maintain levels in decorative fountains.
Use of potable water for consolidation of backfill, dust control or other nonessential construction purposes if groundwater or recycled water is available and approved by the San Francisco Department of Public Health[b]
Use of single-pass cooling systems, fountains, and commercial car washes
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
Watering outdoor landscapes with potable water during and within 48 hours after a rain event
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
Irrigation with potable water of ornamental turf on public street medians
Temporary (i.e., imposed during water shortage)
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. [c]
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[c]
Use of supplies other than groundwater and/or recycled water for irrigation of golf courses, median strips, and similar turf areas[c]
Use of potable water on golf courses outside irrigation of putting greens[c]
Use of potable water for street sweepers/washers[c]
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[c]
The filling of new swimming pools, spas, hot tubs, or the draining and refilling of existing pools, etc.[c]
a Established in SFPUC Rules and Regulations Governing Water Service to Customers, Section E, Rule 12. b Consistent with the Soil Compaction and Dust Control Ordinance, Ordinance 175-91 (San Francisco Public Works Code, Article 21, Sections 1100-1107). c Prescribed in the 1987-92 and 2012-16 drought; may be enforced during a future drought.

4.3 DEMAND REDUCTION ACTIONS

The following methods are employed or offered by the SFPUC to help reduce consumption in the retail service area. All of these methods, except for one, are implemented on a continuous basis or as needed, regardless of whether there is a water shortage. Many of these methods are also demand management measures (DMMs) that are currently implemented and described in more detail in the SFPUC's 2020 Urban Water Management Plan (UWMP). Some of these methods may have an increase in application, participation, or frequency as a result of a shortage (e.g., public outreach, rebates, Water Wise Evaluations), but the increase is not necessarily triggered by a specific level of shortage.

- **Expand Public Information Campaign:** Through its conservation program, the SFPUC develops media campaigns and extensive informational materials, and performs widespread outreach activities to (1) inform the public of a drought, (2) relay information about water use reductions and prohibitions, and (3) promote conservation and use of the SFPUC's conservation services. The SFPUC regularly notifies top residential and commercial water users of their consumption and the SFPUC's conservation services to help reduce demands.

- **Improve Customer Billing and Water Use Information:** In conjunction with the deployment of its Automated Water Meter Program, the SFPUC launched a new bill management system and web portal called My Account in May 2014. This system allows customers to view their daily and hourly water use data provided by the automated water meter reading system. The SFPUC also started to implement fractional billing in January 2017 so customers, instead of being billed on a 1 unit (i.e., 1 CCF) basis, are billed for each 0.01 unit (i.e., 1 cubic foot) consumed which provides customers with more detailed feedback on their water use on their monthly bills. The transition of the billing system from bi-monthly to monthly billing for all customers was completed in July 2013.

    - During the 2012-2016 drought, the SFPUC called for 10 percent voluntary reductions and added information and a graph to My Account so residential customers could visually connect with their water use and identify potential reductions.

- **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 or Giveaways of Plumbing Fixtures and Devices:** Through its conservation program, the SFPUC provides free conservation fixtures and devices to San Francisco residents. Incentive programs may be accelerated during a water shortage. Free devices include showerheads, faucet aerators, toilet leak detection tablets and standard repair parts, flow-measuring bags, soil moisture meters, pre-rinse spray valves, plumbing repair handbooks, and other items.

- **Provide Rebates for Landscape Irrigation Efficiency or Turf Replacement:** The SFPUC's Large Landscape Grant Program offers grants for large landscape irrigation efficiency improvements. Incentive programs may be accelerated during a water shortage.

- **Increase Water Waste Patrols:** SFPUC field inspectors watch for, report, and respond to potential water waste they may encounter as part of their regular travel throughout the City, and the SFPUC also encourages the general public to report potential water waste through the City's 311 service request system, as described in Section 4.2

4.4 OPERATIONAL CHANGES

The following methods are employed or offered by the SFPUC to help reduce water use in the retail service area. These methods, though not formally enacted in the event of a shortage, are employed at the discretion of the SFPUC's operations.

- **Decrease Line Flushing:** Pipeline and other system flushing may be decreased at the discretion of the SFPUC's operations management. Due to the recent drought, 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. Regular system maintenance flushing in the Town of Sunol was also temporarily reduced during the drought 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. The SFPUC expanded this program to include small multi-family homes (2-5 dwelling units) in September 2018, as well as dedicated irrigation customers in March 2019, and commercial customers in April 2020. The Leak Program will be expanded to all remaining customer sectors in 2021. 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.

4.5 SUPPLY AUGMENTATION ACTIONS

The SFPUC will use 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 and mandatory demand reduction, and will utilize the RWSAP described above in Section 4.1 to allocate water shortages amongst its retail customers. The SFPUC will also enforce restrictions and prohibitions of certain water uses (as described in Section 4.2) and provide 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, no supply augmentation shortage response actions have been identified 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 of a water shortage condition.

Table 4-2 shows the demand reduction actions and volumes of reduction associated with each shortage level described earlier in Table 3-2. For the purposes of this analysis, system-wide shortages are applied to the baseline available supply of 265 mgd; subsequently, the WSAP allocation process described above is applied to the actual RWS supply that is available to determine the shares of that supply that are available to the SFPUC's retail customers and the Wholesale Customers, respectively. The resulting share of RWS supply available for use by the retail customers, along with the retail groundwater and recycled water supplies that are projected to be available, are compared with the retail customer demands to determine the level of retail shortage that would result.

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 volumes associated with shortage response actions shown in Table 4-2 are intended for illustrative purposes, and are based on the projected 2025 levels of retail demand as presented in the SFPUC's 2020 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, as described in Section 3.1 above, the SFPUC has a contractual obligation to require retail customers to conserve a minimum of 5 percent for any level of required reduction in system-wide water use during shortages. A 5 percent reduction in retail demand can be achieved with a voluntary call for reductions in water use. Retail customers collectively conserved more than they were asked to conserve during a 10 percent voluntary system-wide reduction in 2014-2017 during the previous drought. If a retail demand reduction of greater than 10 percent is needed, mandatory demand reduction will be implemented; in the scenario shown in Table 4-2, that would occur starting at shortage level 4.. Communication actions taken during voluntary and mandatory demand reduction are described in Section 5.1.

At the higher levels of shortage (i.e. those that would require mandatory demand reduction) the SFPUC would identify the appropriate allocation methods for different customer types as described in the RWSAP. Table 4-2 shows that the SFPUC could meet the highest level shortage of 21.2 mgd (i.e. shortage level 6) by requiring reductions of 50 percent to irrigation-only accounts, 30 percent reductions in other non-residential accounts, and using a per capita allocation of 25 GPCD for single-family and multi-family residential accounts.

Table 4-2. Shortage Response Actions (Demand Reduction Actions)

[Standardized UWMP Table 8-2: Demand Reduction Actions]

<table>
<tr><th>Shortage Level (percent system-wide supply reduction)</th><th>Retail Demand Reduction Actions</th><th>Associated Volume (mgd)[a]</th><th>Penalty, Charge, or Other Enforcement?</th></tr>
<tr><td>1 (up to 10%)</td><td>Voluntary Reduction[b]</td><td rowspan="3">3.3</td><td>N</td></tr>
<tr><td>2 (up to 20%)</td><td>Voluntary Reduction[b]</td><td>N</td></tr>
<tr><td>3 (up to 30%)</td><td>Voluntary Reduction[b]</td><td>N</td></tr>
<tr><td>4 (up to 40%)</td><td>Mandatory Reduction</td><td>6.3</td><td>Y</td></tr>
<tr><td>5 (up to 50%)</td><td>Mandatory Reduction</td><td>16.2</td><td>Y</td></tr>
<tr><td>6 (>50%)[c]</td><td>Mandatory Reduction</td><td>21.2</td><td>Y</td></tr>
</table>

a. 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.

b. 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.

c. 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 (methodology described further in Section 4.1) 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.

SECTION 5 COMMUNICATION PROTOCOLS

Communication with the SFPUC's customers and the public is essential during drought, and particularly so when mandatory actions or restrictions are in effect. Demand reduction schedules and requirements must be communicated early and often to all customers. The SFPUC will employ multiple methods and means to inform and educate customers and the public.

Prior to the initiation of any water delivery reductions to its retail customers, whether it be initial implementation of delivery reduction or increasing the severity of water shortage response measures, the SFPUC will outline a drought response plan to address the following: the water supply situation; proposed water use reduction objectives; alternatives to water use reductions; methods to calculate water use allocations and adjustments; minimum per capita allocation (i.e. residential water use floor); compliance methodology and enforcement measures; and budget considerations.

This drought response plan will be presented at a regularly scheduled SFPUC Commission meeting for public input. The meeting will be advertised in accordance with the requirements of Section 6066 of the California Government Code, and the public will be invited to comment on the SFPUC's plan to address reduced supply.

5.1 COMMUNICATIONS ABOUT VOLUNTARY REDUCTIONS

Outreach that may be taken during a call for voluntary reductions include, but are not limited to:

- Milestone press releases and briefings to media
- Social media posts
- Dedicated and regularly updated drought section on sfpuc.org web site
- Articles in the SFPUC's digital and print Currents newsletter to customers
- Bill inserts
- Outdoor billboard, transit station, bus, television, radio and newspaper ads
- Email blasts to stakeholder organizations and groups
- Community presentations
- Direct mail, email, automated call, and mobile text notices
- My Account portal updates to communicate water reduction goals

5.2 COMMUNICATIONS ABOUT MANDATORY DEMAND REDUCTION

Outreach listed in Section 5.1 would likely also occur during mandatory demand reduction. Additional notifications to account holders that the SFPUC will disseminate include:

- Notification letter to all customers prior to activation of mandatory demand reduction that indicates mandatory water demand reduction will be implemented, customers are subject to excess use charges, and that a drought surcharge will be levied.

- 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 My Account, 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.

- End-of-mandatory reductions letters that inform all customers that water the water shortage emergency has been lifted and the SFPUC is ending 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.

Account holders receive mailed notifications either through the billing service utilized by Customer Service or the City's Reproduction and Mail Services (ReproMail).

5.3 COMMUNICATIONS RELATED TO WHOLESALE CUSTOMERS

Regardless of the expectation of shortage conditions, as part of normal course of business, the SFPUC provides water supply estimates to its Wholesale Customers on a monthly basis beginning February 1. A Wholesale Customer Annual Meeting is held in the latter part of February, at which the SFPUC makes a presentation on current water supply conditions and forecasts. The last snow survey of the season typically occurs within the first week of April, followed by a runoff forecast to determine total system storage expected as of July 1. By the middle of April, the SFPUC sends a formal letter to the Wholesale Customers summarizing the water supply availability for the coming year and, if applicable, the declaration of need for a voluntary or mandatory response. A flowchart depicting the annual Water Supply and Demand Assessment process, including communication processes, is shown in Figure 2-1.

SECTION 6 ENFORCEMENT AND PENALTIES

6.1 ENFORCEMENT OF WATER USE ALLOCATIONS

The SFPUC's primary methods of enforcing the water shortage response action of mandatory demand reduction include excess use charges, installation of flow restrictors on customers' service lines, and/or shut-off of water. In addition, a new state law passed in 2016 (SB 814, adding Chapter 3.3 to Division 1 of the Water Code) requires public disclosure of customers who are fined for exceeding water use allocations.

During the 1987-92 drought, the SFPUC applied drought excess use charges were applied as outlined below. The fines only applied to the amount of water used over their allotment.

- If a customer consumed up to 10% over its allotment, it was charged 2 times the normal rate;
- If a customer consumed 10.01% to 20% over its allotment, it was charged 8 times the normal rate; and
- If a customer consumed 20.01% or over its allotment, it was charged 10 times the normal rate.

During the 2012-2016 drought, the SFPUC called for a 10 percent voluntary reduction in water use by all customers system-wide. However, mandatory reductions and excess use charges were also applied to a small subset of customers:

- Established a mandatory reduction in water use by dedicated irrigation customers of 25%, subject to excess use charges of 1 times the normal rate.

- Established a mandatory reduction in water use by Interruptible Water Service accounts of 30%, subject to excess use charges of 3 times the normal rate.

Under this WSCP, in the event of mandatory demand reduction, the SFPUC will impose excess use charges at a level deemed appropriate at the time of a declared water shortage emergency. The General Manager, or designee, will inform retail customers of the specific multiplier rates that will be applied for determining excess use charges (as described in Section 5 about Communications). The SFPUC will also offer retail customers an audit at the first run-over of their water use allocation to determine if there are any leaks. In some cases, excess use charges may be reversed if leaks are found and repaired immediately.

In the event that a customer exceeds its water use allocation, the SFPUC may, after issuing one written warning, install a flow restrictor on the customer's service line. The SFPUC may charge the customer a fee for the installation and removal of the flow restrictor, as it did in the 1987-92 drought. The General Manager, or designee, will determine the relevant charge at the time of the drought. If a customer continues to consume water in excess of its allotment, the SFPUC has the authority to discontinue the customer's water service and require that the customer bear the cost for the re-connection of water service.

The Landlord Pass-through Ordinance[5] allows landlords to pass up to 50 percent of excess use charges on to their tenants under certain conditions.

6.2 ENFORCEMENT OF WATER WASTE PROHIBITIONS

The SFPUC has found customer outreach, communication, and responding to water waste reports submitted through the City's 311 service request system to be effective methods for enforcing water use prohibitions and restrictions. The SFPUC reviews reports of potential water waste and violation of prohibitions submitted through the 311 system. If a report contains sufficient information and reflects a restricted water use, the SFPUC issues a written notice to the water account holder, property owner, and occupant. If reports of waste continue, the SFPUC will call or visit the site to try to verify that there is waste. If water waste is verified and continues, the SFPUC will issue additional warning letters to the account holder. Account holders that receive multiple warnings of verified water waste may be subject to additional action. The SFPUC also takes the same actions for incidents of water waste observed by SFPUC conservation field inspectors, and the SFPUC may increase the number of and inspectors patrolling for water waste during drought periods.

The water use restrictions and prohibitions may be enforced using the following means:

- 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 the installation of a flow-restricting device in the service line of the customer, and continued violation could result in termination of service. The customer bears the cost of any enforcement action.

- Per the SFPUC Rules and Regulations Governing Water Service to Customers, violation of water waste prevention for landscaped areas[6] is subject to a written warning, followed by possible termination of service and penalties per Chapter 100 of the San Francisco Administrative Code if the violation is not corrected.

- As part of the SWRCB emergency conservation regulations, the California Water Code was amended to identify violations of water use prohibitions as infractions, and therefore punishable by a fine of up to $500 for each day in which the violation occurs.

[5] San Francisco Administrative Code Section 37.3
[6] SFPUC Rules and Regulations Governing Water Service to Customers, Section F, Rule 16.

SECTION 7 LEGAL AUTHORITIES

The SFPUC shall declare a water shortage emergency in accordance with California Water Code Chapter 3, Section 350 of Division 1 (general provision regarding water shortage emergencies).

The SFPUC shall coordinate with any city of county within which it provides water supply services for the possible proclamation of a local emergency (California Government Code, California Emergency Services Act Article 2, Section 8558). As described in Section 2.5, the SFPUC is in regular communication with its wholesale customers about water supply conditions.

Additional relevant statutory authorities, local ordinances, and resolutions that provide the legal authorities for implementing the WSCP are listed below:

- 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, established by Resolution No. 19.786 passed December 15, 1959.
- Water Efficient Irrigation Ordinance (City and County of San Francisco Ordinance No. 24-16, approved March 4, 2016).
- Chapter 3.3 of Division 1 of the California Water Code (Excessive Residential Water Use During Drought) requires public disclosure of customers who are fined for exceeding water use allocations.

SECTION 8 FINANCIAL CONSEQUENCES OF WSCP

The SFPUC includes a variable component to water rates for most retail customer classes. As a result, as sales decrease, revenues are lost on a per unit basis. Because the marginal cost of water production is relatively small, as production is reduced, the cost of service remains the same. Some new costs may be incurred to implement the water shortage action of mandatory demand reduction, such as the effort required to coordinate implementation of customer-specific allocations in the SFPUC's billing system and the cost of notifying customers (see Section 5.2). For both retail and wholesale customers, a reduction in water purchases – whether voluntary or mandated – would require the SFPUC to raise rates, cut costs, or use existing fund balance reserves to cover its expenses. The financial planning and rate-setting process is complex and iterative. While major impacts of a water shortage on rates are described below, the full process, especially for large water shortages, would incorporate significant stakeholder discussion about tradeoffs and financial impacts.

The SFPUC's current retail water rates have a provision for a "drought surcharge" that automatically increases adopted rates in the event of a declared water shortage. The drought surcharge is calculated so that, accounting for the expected reduction in retail water usage, total revenues are equal to what they would have been without the reduction. The drought surcharge protects the SFPUC's financial stability during water shortages, and provides customers an incentive to meet conservation targets.

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 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 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 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

Enforcement of the mandatory demand reduction program is described in more detail above in Section **Error! Reference source not found.**. Actual water savings are tracked through monthly consumption reports that are generated from the customer billing system. These consumption reports are highly accurate as all retail and wholesale customers are metered. Based on a comparison between monthly consumption data, the SFPUC can determine reductions in water use for both retail and wholesale customers. These data will also be used in evaluating the effectiveness of the WSCP (see Section 11). Additional data may be collected on a case-by-case basis. The SFPUC conducts ongoing monitoring of its watersheds, reservoirs, and other components of the RWS for reporting on the status of the water supply for purpose of determining applicability of the water shortage level.

SECTION 10 PREPARATION FOR CATASTROPHIC SUPPLY INTERRUPTION

The SFPUC maintains various planning documents which 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 sections 10.1 (Emergency Preparedness Plans), 10.2 (Emergency Drinking Water Planning), and 10.3 (Power Outage Preparedness and Response) below. Section 10.4 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 been updated as necessary ever since. Most recently, the SFPUC developed a Water System Emergency Response Plan (Water ERP) to comply with the America's Water Infrastructure Act (AWIA) passed in 2018. The Water ERP acts as a unifying document, integrating and referencing common components of SFPUC plans and programs that have been developed to date. The Water ERP is intended to address water transmission and distribution systems and identify the Enterprises, Divisions, and Bureaus with direct roles and responsibilities. The Water ERP integrates directly into, and functions as an annex to, the SFPUC Emergency Operations Plan (EOP). 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. Specifically, the purpose of the SFPUC EOP is to describe its emergency management organization, roles and responsibilities, and emergency policies and procedures.

In addition, SFPUC divisions and bureaus each have their own Division Emergency Operations Plans (DEOP) (in alignment with the SFPUC EOP), which detail that entity's specific emergency management organization, roles and responsibilities, and emergency policies and procedures. The SFPUC tests its DEOPs on a regular basis by conducting emergency exercises. Through these exercises, the SFPUC learns how well the plans and procedures will or will not work in response to an emergency. DEOP 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 requirements that are based on their emergency response roles.

The SFPUC EOP functions as a front end for the SFPUC's DEOPs, covering emergency response at the Department level; while each DEOP covers Division-specific information on the Division's emergency organization and response procedures specific to Division responsibilities, assets, technical scope, and operations. The types of events affecting SFPUC that may 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 break
- 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 include:

- Emergency Disinfection and Recovery Plan (EDRP)
- Emergency Response Action Plan (ERAP)
- Emergency Drinking Water Equipment and Alternatives Report
- Disinfection of SFPUC Water Trailers Procedure
- City Distribution Division Hydrant Manifold Standard Operating Procedure
- Pilot plant trailer (Mobile Pilot Plan O&M Plan)

10.2 EMERGENCY DRINKING WATER PLANNING

In February 2005, the SFPUC published the City Emergency Drinking Water Alternatives report. The purpose of this report was to outline a plan for supplying emergency drinking water in the City after damage and/or contamination of the SFPUC raw and/or treated water systems resulting from a major disaster. Since the publication of this report, the SFPUC has implemented a number of projects to increase its capability to support the provision of emergency drinking water during an emergency. These projects include:

- Completion of many Water System Improvement Program (WSIP) projects and other capital upgrades to improve security, detection, and communication (see Section 10.4);
- Public Information and materials for home and business;
- 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;

- Constructed 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 has also prepared the RWS Water Quality Notifications and Communications Plan. This plan, which was first prepared in 1996 and was most recently updated in 2017, provides contact information, procedures, and guidelines to be implemented by several SFPUC divisions, wholesale customers, and BAWSCA in the event of water quality impacts. The plan treats water quality issues as potential or actual supply problems, which fall under the emergency response structure of the SFPUC ERP.

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 portable generators to be used.

Although water conveyance throughout the RWS would not be greatly impacted by power outages 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), and the San Antonio Pump Station have back-up power on site in the form of generators or diesel-powered pumps. Additionally, both the SVWTP and San Antonio Pump Station would not be impacted by a failure of the regional power grid because these facilities are powered by hydropower generated by the Hetch Hetchy Water and Power System.

- Both the Harry Tracy Water Treatment Plant (HTWTP) and the Baden Pump Station (part of the Peninsula System) have back-up generators in place.

- Administrative facilities that will act as emergency operation centers also have back-up power.

- The SFPUC has an emergency water supply connection with the Santa Clara Valley Water District (SCVWD), the SCVWD intertie, which also has back-up generators in place.

- Additionally, as described in the next section, the WSIP includes projects that expand 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 Facilities Reliability Program and the Water System Improvement Program (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 service goals for water quality, seismic reliability, delivery reliability, and water supply. One of the original goals of WSIP was to limit rationing to no more than 20 percent on a system-wide basis; the WSIP was developed to reduce the likelihood of shortages, thereby reducing the likelihood of needing to implement the WSCP.

The WSIP projects include several projects located in San Francisco to improve the seismic reliability of the in-City distribution system, including more wells that can be used as emergency drinking water sources. The WSIP also incorporates many projects related to the RWS to address both seismic reliability and overall system reliability. As of August 2018, the WSIP is over 96 percent complete. Local San Francisco projects are 100 percent complete as of June 2020. The current forecasted date to complete the overall WSIP is December 2021.

WSIP seismic levels of service (LOS) informed development of 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 City 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:

- A 35 mgd intertie with the EBMUD allowing EBMUD to serve the City of Hayward's demand and/or supply the SFPUC directly (and vice versa);
- A 40-mgd system intertie between the SFPUC and SCVWD; and,
- One permanent and one temporary intertie to the South Bay Aqueduct, which would enable the SFPUC to receive State Water Project water.

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 HTWTP), while hookups for portable engine generators are at two locations (San Antonio Reservoir and Calaveras Reservoir).The City of San Francisco also has a Hazard Mitigation Plan which was last updated in June 2014 and includes sections describing earthquakes hazards and mitigation for assets within the City's boundary, including state-regulated reservoirs (Sutro, Sunset North and South, and University Mound North and South).

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 prepared this 2020 WSCP and presented it to the SFPUC Commission for adoption on June 8, 2021. A copy of the SFPUC resolution adopting this 2020 WSCP is provided in Appendix D.

Within 30 days of SFPUC Commission approval, the adopted 2020 WSCP will be submitted electronically to the DWR via its Water Use Efficiency data online submittal tool (WUEdata). Electronic copies will also be provided on compact disc to the California State Library and via e-mail (within 60 days of WSCP submittal to DWR) to cities and counties within which the SFPUC provides water supplies. In addition, the SFPUC will make this adopted 2020 WSCP available for public review within 30 days of SFPUC Commission approval during normal business hours by placing a copy at the San Francisco Main Public Library and main offices of the SFPUC, as well as by posting an electronic copy on the SFPUC web site at www.sfpuc.org.

Should amendments to the WSCP be required in future years, it is expected that the same adoption, submittal, and availability processes described above would be followed for the updated WSCP.

2020 WATER SHORTAGE CONTINGENCY PLAN

for the City and County of San Francisco

APPENDICES

June 2021

Prepared by:

The San Francisco
Public Utilities Commission

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

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APPENDIX A

Water Shortage Allocation Plan

(Attachment H of Water Supply Agreement Between the City and County of San Francisco and with Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County)

JUNE 2021

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 Interim Water Shortage Allocation Plan ("Plan") describes the method for allocating water between the San Francisco Public Utilities Commission ("SFPUC") and the Wholesale Customers collectively during shortages caused by drought. The Plan implements a method for allocating water among the individual Wholesale Customers which has been adopted by the Wholesale Customers. 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 adopted pursuant to Section 7.03(a) of the 1984 Settlement Agreement and Master Water Sales Contract and has been updated to correspond to the terminology used in the June 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").

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 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 year.

1.3. Shortage Conditions. The SFPUC will compare the 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 (defined as the period from July 1 through June 30). 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 shortage allocations 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 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%

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 Allocations among the Wholesale Customers. The annual water supply allocated to the Wholesale Customers collectively during system wide shortages of 20 percent or less will be apportioned among them based on a methodology adopted by all of the Wholesale Customers, 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 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 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 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 water 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 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 shortage 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.

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 B

Summary of San Francisco's Response to 1987-92 Drought Experience

JUNE 2021
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.

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

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I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of APRIL 22 1988

Romaine A. Boldridge
Secretary, Public Utilities Commission

PUBLIC UTILITIES COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

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.

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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 C

Summary of San Francisco's Response to 2012-2016 Drought Experience

JUNE 2021
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 2020 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): CY 2014, CY 2015, CY 2016, and CY 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 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 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 experiencing its fourth year of a severe drought and entering into 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 then adopted locally (Resolution 15-0102). Shortly thereafter, under an Executive Order (EO) issued by the Governor in April 2015 (EO B-29-15), a mandatory Statewide water use reduction of 25%, compared to a 2013 baseline, 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 call for a voluntary 10% reduction system-wide 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 in order 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 as for 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 it 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, SFPUC management desired a program that would avoid mandatory rationing while achieving the targeted level of savings.

It should be noted that 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).

The next few pages provide a timeline of the State and local regulatory actions described above, retail water use by sector compared to the CY 2013 baseline, and monthly production data submitted to the SWRCB per the emergency regulations adopted in July 2014. The monthly reports to the SWRCB include residential per capita estimates as well as implementation and enforcement metrics. For metrics related to excess use charges, see the summary provided in the introduction of this report.

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 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[1]. 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 January 2017[2]. 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 in light of 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.

[1] The regulation was set to expire in February 28, 2017 per the Office of Administrative Law.
[2] Same as previous footnote.

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 Agricultural (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 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 D

San Francisco Public Utilities Commission Resolution Adopting 2020 Water Shortage Contingency Plan

JUNE 2021
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

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PUBLIC UTILITIES COMMISSION

City and County of San Francisco

RESOLUTION NO. **21-0100**

WHEREAS, The Urban Water Management Planning Act of 1983, as amended through 2020 (the Act), requires that an urban water supplier serving 3,000 customers or 3,000 acre-feet per year must prepare an Urban Water Management Plan (Plan or UWMP) update every five years; and

WHEREAS, On June 14, 2016, by Resolution No. 16-0118, the San Francisco Public Utilities Commission (SFPUC) adopted the 2015 Urban Water Management Plan; and

WHEREAS, The SFPUC, in compliance with the Act, has prepared a 2020 update to its Plan, including the 2020 Water Shortage Contingency Plan; and

WHEREAS, The preparation of the Plan update has been coordinated with the City's wholesale water customers and other public agencies to the extent practicable, and staff has encouraged the active involvement of diverse social, cultural and economic elements of the population within the SFPUC's retail water service area during preparation of the Plan; and

WHEREAS, At this Commission's regular public meeting on April 13, 2021, a Draft Plan was presented to the Commission and a Public Hearing was held during the Commission meeting in order to receive public comment on the Draft Plan; and

WHEREAS, Minor revisions to the Draft Plan have been made based on public comments received at the Public Hearing and during the public comment period of April 5, 2021 through May 5, 2021; and

WHEREAS, The San Francisco Planning Department issued a statutory exemption determination on May 25, 2021 under California Environmental Quality Act Guidelines section 15282(v), under Planning Department Case Number 2021-005261ENV; and

WHEREAS, This action constitutes the Approval Action for the project for the purposes of CEQA, pursuant to Section 31.04(h) of the San Francisco Administrative Code; and

WHEREAS, A Final 2020 Urban Water Management Plan was presented to the Commission at its public meeting on June 8, 2021 for consideration and adoption in advance of the July 1, 2021 deadline for submittal to the State and copy of the Final Plan is on file with the Commission Secretary; now, therefore, be it

RESOLVED, That this Commission hereby adopts the 2020 Urban Water Management Plan for the City and County of San Francisco, including the 2020 Water Shortage Contingency Plan, and directs the General Manager to submit it to the California Department of Water Resources by July 1, 2021.

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of June 11, 2021.

Donna Hood

Secretary, Public Utilities Commission

2020
WATER SHORTAGE CONTINGENCY PLAN

for the City and County of San Francisco

PUBLIC REVIEW DRAFT

April 2021

Prepared by: The San Francisco Public Utilities Commission

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

APPENDIX L

Resolution to Adopt the 2020 Urban Water Management Plan

JUNE 2021

2020 URBAN WATER MANAGEMENT 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

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PUBLIC UTILITIES COMMISSION

City and County of San Francisco

RESOLUTION NO. **21-0100**

WHEREAS, The Urban Water Management Planning Act of 1983, as amended through 2020 (the Act), requires that an urban water supplier serving 3,000 customers or 3,000 acre-feet per year must prepare an Urban Water Management Plan (Plan or UWMP) update every five years; and

WHEREAS, On June 14, 2016, by Resolution No. 16-0118, the San Francisco Public Utilities Commission (SFPUC) adopted the 2015 Urban Water Management Plan; and

WHEREAS, The SFPUC, in compliance with the Act, has prepared a 2020 update to its Plan, including the 2020 Water Shortage Contingency Plan; and

WHEREAS, The preparation of the Plan update has been coordinated with the City's wholesale water customers and other public agencies to the extent practicable, and staff has encouraged the active involvement of diverse social, cultural and economic elements of the population within the SFPUC's retail water service area during preparation of the Plan; and

WHEREAS, At this Commission's regular public meeting on April 13, 2021, a Draft Plan was presented to the Commission and a Public Hearing was held during the Commission meeting in order to receive public comment on the Draft Plan; and

WHEREAS, Minor revisions to the Draft Plan have been made based on public comments received at the Public Hearing and during the public comment period of April 5, 2021 through May 5, 2021; and

WHEREAS, The San Francisco Planning Department issued a statutory exemption determination on May 25, 2021 under California Environmental Quality Act Guidelines section 15282(v), under Planning Department Case Number 2021-005261ENV; and

WHEREAS, This action constitutes the Approval Action for the project for the purposes of CEQA, pursuant to Section 31.04(h) of the San Francisco Administrative Code; and

WHEREAS, A Final 2020 Urban Water Management Plan was presented to the Commission at its public meeting on June 8, 2021 for consideration and adoption in advance of the July 1, 2021 deadline for submittal to the State and copy of the Final Plan is on file with the Commission Secretary; now, therefore, be it

RESOLVED, That this Commission hereby adopts the 2020 Urban Water Management Plan for the City and County of San Francisco, including the 2020 Water Shortage Contingency Plan, and directs the General Manager to submit it to the California Department of Water Resources by July 1, 2021.

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of June 11, 2021.

Donna Hood

Secretary, Public Utilities Commission

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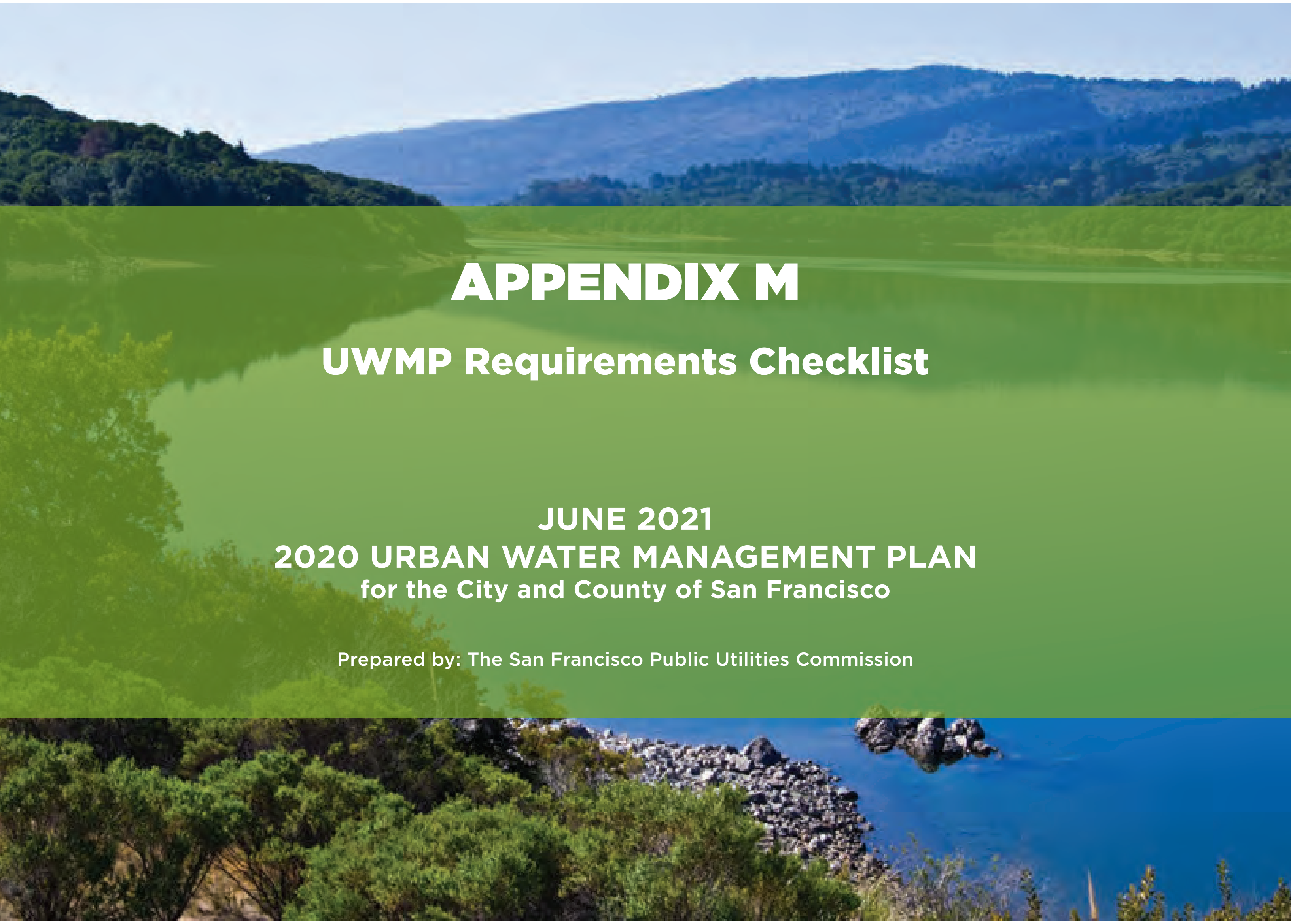

APPENDIX M

UWMP Requirements Checklist

JUNE 2021
2020 URBAN WATER MANAGEMENT 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

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Water Code Section	Summary as Applies to UWMP	2020 UWMP Location	
		Retail	Wholesale
Summary			
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.	Section 1	Section 1
Plan Preparation			
10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Section 10.1	Section 10.1
10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Section 2.3.1 and Appendix C	Section 2.3.1 and Appendix C
10642	Provide supporting documentation that the water supplier has encouraged 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
System Description			
10631(a)	Describe the water supplier service area.	Section 3.2	Section 3.3
10631(a)	Describe the climate of the service area of the supplier.	Section 3.2.1	section 3.3.1
10631(a)	Indicate the current population of the service area.	Table 3-3 & Table 5-1	Table 3-4
10631(a)	Provide population projections for 2025, 2030, 2035, 2040 and optionally 2045.	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
10631(a)	Describe the land uses within the service area.	Section 3.2.2	Section 3.3.2
System Water Use			
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 5 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.
System Description and Baselines and Targets			

10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Section 5.1 & Appendix D	N.A.
10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Section 5.2	N.A.
10608.24(a)	Retail suppliers shall meet their water use target by December 31, 2020.	Section 5.3	N.A.
10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	N.A.	N.A.
10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	N.A	Section 5.4 & Section 10.3
10608.4	Retail suppliers shall report on their progress in meeting their water use targets. The data shall be reported using a standardized form.	Appendix D	N.A.
10631(a)	Indicate the current population of the service area.	Table 3-3 & Table 5-1	N.A.
System Supplies			
10631(b)	Identify and quantify the existing and planned sources of water available for 2020, 2025, 2030, 2035, 2040 and optionally 2045.	Table 6-3 & Table 6-5	Table 6-3
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	Section 6.2.1.1	N.A
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.	Section 8.2	Section 8.2
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
10631(b)(3)	Describe measures taken to acquire and develop planned sources of water.	Section 6.2.2 & Section 7.4	N.A
10631(b)(4)(A)	Indicate whether a groundwater sustainability plan or groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater	Section 6.2.1.1	N.A

	management. Include a copy of the plan or authorization.		
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, indicate whether or not the department has identified the basin as a high or medium priority. 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)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	Section 6.2.1.1 & Table 6-2	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.	Section 6.2.1.1 & Table 6-5	N.A
10631(c)	Describe the opportunities for exchanges or transfers of water on a short-term or long- term basis.	Section 7.4.2 & Section 7.5	Section 7.4.2 & Section 7.5
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 5 consecutive water years.	Section 7.4	Section 7.4
10631(g)	Describe desalinated water project opportunities for long-term supply.	Section 7.4.2	Section 7.4.2
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 include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	N.A	Appendix C
System Supplies (Recycled Water)			
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.	Table 6-4	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 & Table 6-5	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 a description of the actual use of recycled water in comparison to uses previously projected.	Table 6-5 & Table 6-3	N.A
10633(f)	Describe the actions 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.	Section 6.2.2.3	N.A
10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	Section 6.2.2.3	N.A
Water Supply Reliability Assessment			
10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Section 6.2.2, Section 7.4	Section 7.2, Section 7.4 & Section 7.5
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	Section 6.1.2 & Section 6.2.3	Section 6.1.2
10635(a)	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Section 8.3 & Section 8.4	Section 8.3 & Section 8.4
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 5 consecutive years.	Section 8.5.1, Section 8.5.2, Section 8.2	N.A
10635(b)(2)	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Section 8.5.2, Section 8.5.3	N.A
10635(b)(3)	Include a comparison of the total water supply sources available to the water 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 condition, anticipated regulatory changes, and other locally applicable criteria.	Section 8.2.2 & Section 8.5.4	N.A
Water Shortage Contingency Planning			
10632(a)	Provide a water shortage contingency plan (WSCP) with specified elements below.	Appendix K	Appendix K
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 K Section 2.5 & Figure 2-1	Appendix K Section 2.5 & 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 K Section 2	Appendix K Section 2
10632(a)(3)(A)	Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and greater than 50 percent 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 K, Section 3, Table 3-1, Table 3-2	Appendix K, Section 3.1, Table 3-1
10632(a)(3)(B)	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Not Applicable; supplier uses 6 standard categories	Not Applicable; supplier uses 6 standard categories
10632(a)(4)(A)	Suppliers with water shortage contingency plans 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 K, Section 4	Not Applicable; supplier will meet shortage with Water Shortage Allocation Plan as described in Appendix K, Section 3
10632(a)(4)(B)	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Appendix K Section 4, Table 4-2	Supplier will meet shortage with Water Shortage Allocation Plan as described in Appendix K, Section 3
10632(a)(4)(C)	Specify locally appropriate operational changes.	Appendix M Section 4.4	Supplier will meet shortage with Water Shortage Allocation Plan as described in Appendix K, Section 3
10632(a)(4)(D)	Specify additional mandatory prohibitions against specific water use practices that are in addition to state-mandated	Appendix K Section 4.2, Table 4-1, Table 4-2	Supplier will meet shortage with Water Shortage Allocation

	prohibitions are appropriate to local conditions.		Plan as described in Appendix K, 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 K Table 4-2	Supplier will meet shortage with Water Shortage Allocation Plan as described in Appendix K, Section 3
10632(a)(5)(A)	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Appendix K Section 2.5, Figure 2-1, Section 5	Appendix K Section 2.5, Figure 2-1, 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 K Section 2.5, Figure 2-1, Section 5	Appendix K Section 2.5, Figure 2-1, Section 5
10632(a)(7)(A)	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Appendix K Section 7	Appendix K Section 7
10632(a)(7)(B)	Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3.	Appendix K Section 7	Appendix K 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 K Section 7	Appendix K Section 7
10632(a)(8)(A)	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Appendix K Section 8	Appendix K 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 K Section 8	Appendix K Section 8
10632(a)(8)(C)	Describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought.	Appendix K Section 8	Appendix K Section 8
10632(a)(9)	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Appendix K Section 9	N.A
10632(a)(10)	Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Appendix K Section 11	Appendix K Section 11
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 K Section 4	N.A

Demand Management Measures			
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.	Section 10.1	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 10.2
Plan Adoption, Submittal and Implementation			
10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.	Section 11.1 and Appendix L	N.A
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.	Section 11.1 and Appendix C	Section 11.1 and Appendix C
10621(f)	Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.	Section 11.1 and Appendix C	Section 11.1 and Appendix C
10635(c)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 60 days after the submission of the plan to DWR.	Section 11.1, Appendix C, Appendix K Section 12	Section 11.1 and Appendix C, Appendix K Section 12
10642	Provide supporting documentation that the urban water supplier made the plan and contingency plan available for public inspection, published notice of the public hearing, and held a public hearing.	Section 11.1 and Appendix C	Section 11.1 and Appendix C
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.	Section 11.1 and Appendix C	Section 11.1 and Appendix C
10642	Provide supporting documentation that the plan and contingency plan has been adopted as prepared or modified.	Section 11.1 and Appendix C	Section 11.1 and Appendix C
10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Section 11.1 and Appendix C	Section 11.1 and Appendix C
10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Section 11.1 and Appendix C	Section 11.1 and Appendix C
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Section 11.1 and Appendix C	Section 11.1 and Appendix C

10645(a)	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Section 11.1 and Appendix C	Section 11.1 and Appendix C
10645(b)	Provide supporting documentation that, not later than 30 days after filing a copy of its water shortage contingency plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Section 11.1 and Appendix C	Section 11.1 and Appendix C
Energy Intensity			
10631.2(a)	The UWMP must include energy intensity information as stated in the code.	Appendix I	Appendix I

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2020 URBAN WATER MANAGEMENT PLAN

for the City and County of San Francisco

June 2021

Prepared by:
The San Francisco
Public Utilities Commission

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