CITY OF PALO ALTO

2020
URBAN WATER MANAGEMENT PLAN AND WATER SHORTAGE CONTINGENCY PLAN

JUNE 2021

City of Palo Alto Utilities

2020
Urban Water Management Plan and Water Shortage Contingency Plan

June 2021

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List of Acronyms

AF	Acre Feet
ABAG	Association of Bay Area Governments
AF/Y	Acre Feet per Year
AWSP	Alternative Water Supply Planning
BAWAC	Bay Area Water Agencies Coalition
BAWSCA	Bay Area Water Supply and Conservation Agency
BCA	Baseline Consumption Allowance
BMP	Best Management Practices
CAFR	City Audited Financial Report
CALTRANS	California Department of Transportation
ccf	Centum Cubic Feet (hundred cubic feet)
CCSF	City and County of San Francisco
CEE	Consortium for Energy Efficiency
CEQA	California Environmental Quality Act
CIMIS	California Irrigation Management Information System
COM	Commercial
CPAU	City of Palo Alto Utilities
CUWCC	California Urban Water Conservation Council
DHS	Department of Health Services
DSM	Demand Side Management
DMM	Demand Management Measures
DSS	Demand Side Management Least Cost Planning Decision Support System
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
ET	Evapotranspiration
ETO	Reference Evapotranspiration
FEMA	Federal Emergency Management Agency
FY	Fiscal Year
gpm	Gallons per minute
GSI	Green Stormwater Infrastructure
GUA	Groundwater Use Assessment
HET	High Efficiency Toilets
ICI	Industrial Commercial and Institutional
WIRP	Integrated Resource Plan
IRWMP	Integrated Regional Water Management Plan
IT	Information Technology
IWSAP	Interim Water Shortage Allocation Plan

LOS	Level of Service
MF	Multi-family
mg/L	Milligrams per liter
MGD	Million Gallons per Day
MOU	Memorandum of Understanding
O&M	Operations and Maintenance
OES	Office of Emergency Services
RWQCP	Palo Alto Regional Water Quality Control Plant
PEIR	Program Environmental Impact Report
RWS	Regional Water System
Valley Water	Santa Clara Valley Water District
S/CAP	Sustainability and Climate Action Plan
SIP	Sustainability Implementation Plan
SF	Single-family
SFPUC	San Francisco Public Utilities Commission
SFWD	San Francisco Water Department
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TDS	Total Dissolved Solids
TRC	Total Resource Cost
UAC	Utilities Advisory Commission
UER	Utilities Emergency Response
ULF	Ultra Low Flow
ULFT	Ultra Low Flow Toilet
URS	United Research Services, Consultant Firm
UWMP	Urban Water Management Plan
WIRP	Water Integrated Resource Plan
WPL	West Pipeline
WSA	Water Supply Agreement
WSAP	Water Shortage Allocation Plan
WSIP	Water System Improvement Program
WSMP	Water Supply Master Plan

City of Palo Alto Utilities
2020 Urban Water Management Plan and Water Shortage Contingency Plan

Contact Sheet

Date plan submitted to the Department of Water Resources: June 23, 2021

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Utility services provided by the City include: **electric, natural gas, commercial fiber, refuse, recycled water, storm drain, wastewater collection, treatment and disposal.**

Is This Agency a Bureau of Reclamation Contractor? **No** Is This Agency a State Water Project Contractor? **No**

Section 1 – Plan Development and Adoption

Lay Description

Law* (see note)

California Water Code section 10620[1] (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).

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.

The City of Palo Alto (City) is located in northern Santa Clara County approximately 35 miles south of the City of San Francisco. In addition to serving about 20,000 residential and commercial water customers, the City operates electric, gas, wastewater, and fiber utilities.

The City receives 100% of its potable water from the San Francisco Public Utilities Commission (SFPUC) through the Regional Water System (RWS). The City also uses some recycled water produced at the Palo Alto-operated Regional Water Quality Control Plant (RWQCP) for irrigation of the municipal golf course, a park, and some other minor applications. A system of local groundwater wells and storage provide emergency water supply service.

The City partners with the Santa Clara Valley Water District (Valley Water) to offer a wide-range of water conservation programs to our residential and commercial customers. Through rebates, education and outreach, the City has been able to reduce per capita water use by about 15% over the past decade.

The City is active in regional efforts to address long-term water supply issues. In 2019 the City signed a historic 76-year agreement with Valley Water and the City of Mountain View. The agreement includes Valley Water funding for a salt-removal facility at the RWQCP which will improve the quality and thus the uptake of recycled water use, particularly in Mountain View. The transfer of effluent from the RWQCP to Valley Water enables development of a regional purified water supply.

In 2020, the City in collaboration with Valley Water, completed a recycled water strategic plan laying the groundwork for a One Water Plan that will incorporate an evaluation of all water supply options to meet both potable and non-potable demands in the City. The One Water Plan

* Note: Relevant sections and/or subparts or portions of the California Water Code are set forth at the beginning of each Section to provide the statutory context for the discussion.

[1] Unless noted, all statutory references herein are to the California Water Code.

will take into consideration long-term reliability and dry year needs as well as cost, quality, and public acceptance.

Since the City relies on the SFPUC RWS for its potable water supplies, the City's water supply reliability mirrors that of the RWS. During a water supply shortage, contractually agreed upon allocation methods apply in limited circumstances. Assumptions regarding how water will be allocated in critical, severe, and emergency water shortage scenarios were made. The amount of water available to San Francisco's Retail Customers (the residential and commercial customers in the City of San Francisco) and Wholesale Customers (the 26 agencies, including Palo Alto, that purchase water from the SFPUC) will be impacted by the outcome of the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay Delta Plan Amendment or Bay Delta Plan). This 2020 UWMP assumes the Bay Delta Plan and associated unimpaired flow requirements for the Tuolumne River will be implemented as adopted by the state.

Given the City's forecasted water demand and projections of water supply availability provided by the SFPUC, the City anticipates the need to implement water use reductions of nearly 50% in the first dry year post Bay Delta Plan implementation. During the most recent drought, the City was able to reduce water use by 31% by restricting landscape irrigation to two times per week as well as a number of other measures. The City's proposed Water Shortage Contingency Plan (WSCP) includes actions to achieve water use reductions above 40% and above 50%, but the City does not have actual experience in implementing such drastic measures. With each progressive stage, enforcement, rate strategies, and water use restrictions will be increased while putting in place mitigation measures to maintain the health of the City's tree canopy.

Short-term emergency water needs will be met with the City's groundwater wells and storage system which was recently renovated. The system was designed to provide adequate fire protection following a disaster such as a major earthquake.

Plan Structure

The City has not experienced significant changes in the water supply distribution system and reliability since the preparation of the 2015 Urban Water Management Plan (UWMP), and has determined the 2015 UWMP provided sufficient guidance to meet the City's needs during the 2015 UWMP cycle. For the 2020 UWMP report, the City has updated the 2015 UWMP and addressed any changes to the UWMP Act since 2015 as outlined in Appendix C of the Department of Water Resources (DWR) UWMP Guidebook.

Plan Adoption

The City began preparing this update of its UWMP in fall 2020. The updated plan will be considered by City Council before June 30, 2021 and submitted to the California Department of Water Resources within 30 days of Council adoption. This plan includes all information

necessary to meet the requirements of California Water Code Division 6, Part 2.6 (Urban Water Management Planning) as well as requirements of the California Water Code Division 6, Part 2.55 (Water Conservation Bill of 2009).

Public Participation

The City actively encourages community participation in its urban water management planning efforts. The City held public hearings before the Utilities Advisory Commission (UAC) and City Council prior to adoption. Table 1 shows the key dates. An UWMP webpage (www.cityofpaloalto.org/UWMP) was created to educate the public about the UWMP process, provide outreach for public meetings and opportunities to participate, as well as to make available background materials on the City's urban water management planning activities.

Table 1: Calendar for Adoption

Date	Meeting/Activity	Topic
May 12 2021	Utilities Advisory Commission	Review and Recommendation on UWMP and WSCP
May 28, 2021 and June 4, 2021	Published Notice of Public Hearing	Newspaper (Council meeting) on UWMP and WSCP
June 7, 2021	City Council	Review and Adoption of UWMP and WSCP
June 23, 2021	Final UWMP and Council Resolution	Submitted to DWR
July 1, 2021	Final UWMP and Council Resolution	Available to the Public

Appendix B contains samples of the public participation notices the City sent in compliance with Water Code 10621(b), 10620(d)(2), and 10642. A sample notice of the City Council meeting will be added to the Final Draft 2020 UWMP that will be presented to Council for approval.

The City's Utilities Advisory Commission (UAC) provides advice to the City Council on:

- The acquisition and development of electric, gas and water resources;
- Joint action projects with other public or private entities which involve electric, gas or water resources; wastewater collection and fiber optic issues;
- Environmental implications of electric, gas or water utility projects; and
- Resource conservation and demand management.

The UAC meets monthly and reviews the activities of the various utility services. One of the primary tasks of the UAC is to assist with the review and development of long-term plans for the City's utilities. The UAC meetings are open to the public and agendas are posted for public review prior to each meeting. The schedule for approval of the 2020 UWMP provides the opportunity for the UAC to review and comment on the Draft UWMP prior to submittal to the City Council for final approval.

Since adoption of the 2015 UWMP, the UAC and Council have been active in the review of water supply and water management activities.

Water Integrated Resource Planning was discussed at the following meetings:

- November 2016 UAC meeting: Discussed the draft Water Integrated Resource Plan (WIRP)
- November 2017 UAC meeting: UAC recommended WIRP for Council approval
- March 2017 Council meeting: Council adopted WIRP

Water Reuse was discussed publicly at the following meetings:

- April 2016 Council meeting: Council received an update on recycled water planning efforts and groundwater studies in partnership with Valley Water
- August 2018 UAC meeting: Discussed a business plan for expansion of Palo Alto's non-potable reuse irrigation network.
- October 2018 UAC meeting: Discussed wastewater reuse expansion opportunities
- November 2018 Council (Council Report #9731): Study session on high-level wastewater reuse expansion opportunities.
- April 2019 Community Engagement Event: Feedback solicited on water reuse opportunities
- September 2019 UAC meeting: Discussed water reuse options and the Partnership Agreement with Valley Water
- September 2019 Council meeting: Study session regarding water reuse opportunities and the Partnership Agreement with Valley Water
- October 2019 Community Engagement Event: Provided information and answered questions regarding the Partnership Agreement with Valley Water.
- November 2019 Council meeting: Council approved the Partnership Agreement with Valley Water

Bay Delta Plan

- August 2018 Council meeting: Council voted to support the State Water Resources Control Board's Bay Delta Plan to have 40 percent of natural water in the Central Valley to enter the Delta from February to June and associated Southern Delta salinity objectives; and send a letter expressing this policy position to Bay Area Water Supply and Conservation Agency (BAWSCA), California State Water Resources Control Board, San Francisco Public

Utilities Commission (SFPUC), and other stakeholders Staff believes should receive the letter.[2]

Water is the subject of one of seven chapters in the City's Sustainability and Climate Action Plan (S/CAP) discussed publicly at the following meetings:

- November 2016 Council meeting: Council adopted the S/CAP framework
- December 2017 Council meeting: Council accepted the 2018-2020 Sustainability Implementation Plan (SIP)
- May 2020 Council meeting: Council discussion of Goals and Key Actions for 2020 S/CAP

Council accepted the Green Stormwater Infrastructure Plan on May 13, 2019.

In August 2020, the UAC heard a "One Water" presentation by Professor Richard Luthy, Stanford University.

Agency Coordination

Law

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).

10620(d) (1) An urban water supplier may satisfy the requirement of this part by participation in area wide regional, watershed, or basis wide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

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.

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 the plan...

Internal City Coordination

Many members of City staff collaborated in the development of this plan, including representatives from all divisions of the City of Palo Alto Utilities Department (CPAU) and other City departments including Planning and Development Services, the City Manager's Office, the City Attorney's Office, the City Clerk's office, and Public Works. The UWMP is coordinated with other City planning and policy level documents to ensure the water policy direction in the

[2] See Council meeting minutes: https://www.cityofpaloalto.org/civicax/filebank/documents/66831

UWMP informs future decisions within the City of Palo Alto, including the Urban Forest Master Plan and the Comprehensive Plan.

Since completion of the 2015 UWMP, CPAU has completed several important water supply and planning milestones, including:

- **Approval of the 2017 Water Integrated Resources Plan Guidelines (March 2017) –** The WIRP provided Council with a comparison of potable water supply alternatives and demand-side management measures.
- **Approval of the Addendum to the 2015 Environmental Impact Report for the City of Palo Alto Recycled Water Program, and Approval of an Agreement Between the City of Palo Alto, City of Mountain View, and Santa Clara Valley Water District to Advance Resilient Water Reuse Programs in Santa Clara County, Including Funding for an Advanced Water Purification Facility in Palo Alto, a Long-Term Transfer of Effluent from the Regional Water Quality Control Plant to Valley Water, and Related Commitments (November 2019)** – The 76-year agreement enables an effluent transfer from the RWQCP in Palo Alto to Valley Water to be reused in Santa Clara County. The agreement also provides funding from Valley Water for a salt removal facility in Palo Alto to improve the quality of recycled water used in Palo Alto and the City of Mountain View.
- **Acceptance of the Northwest County Recycled Water Strategic Plan (March 2020) –** The plan presents the feasibility of various potable and non-potable opportunities to reuse water from the RWQCP within the plant's service territory. The study includes a robust evaluation of the groundwater aquifer in Northwest Santa Clara County.

The completion of the plans and agreements listed above required the cooperation of all divisions within the CPAU and several other departments within the City. Data and information from these reports was used in this document.

Interagency Coordination

The City is an active member of the California water community and coordinated with a number of agencies in preparation of its 2020 UWMP. The City is particularly active in the following organizations:

- The City is an active member of the Bay Area Water Supply and Conservation Agency (BAWSCA). The BAWSCA members, including the City, receive water from the City and County of San Francisco through a contract that is administered by the SFPUC.
- The City is represented on the Valley Water Commission, the Joint Recycled Water Committee, the Valley Water Retailers Group, the Valley Water Recycled Water Subcommittee, the Valley Water Communication Subcommittee, and the Valley Water Conservation Subcommittee.
- Through BAWSCA, the City is represented in the Bay Area Water Agencies Coalition (BAWAC), a group of the seven largest water agencies in the Bay Area. BAWAC was established to develop regional water planning objectives, coordinate projects and

programs that would meet the regional objectives to improve water supply reliability and water quality, and document, coordinate and communicate existing and planned programs and activities being implemented in the Bay Area region in the areas of water use efficiency and water treatment.

- The City is a member of the California Water Efficiency Partnership CalWEP, whose mission is to maximize urban water efficiency and conservation throughout California.
- The City is a member of the WateReuse Association, an organization of governmental, non-profit and private sector entities working together to encourage increased recycled water use in California.
- The City is a member of the Alliance for Water Efficiency.
- The City is a Partner in the Environmental Protection Agency's (EPA) WaterSense program, which promotes water efficient products and assists utilities in marketing its programs for water use efficiency.
- The City Council adopted the Ahwahnee Water Principles for Resource Efficient Land Use on October 17, 2005.[3] These principles were developed by the Local Government Commission, a nonprofit, nonpartisan organization working to create healthy, walkable, and resource-efficient communities.
- The City is a member of the Bay Area Clean Water Agencies (BACWA). BACWA members work together to carry out mutually beneficial projects, and to share scientific, economic and other information about the San Francisco Bay environment.
- The City is a member of the Western Recycled Water Coalition (WRWC), an organization that pursues highly leveraged, locally managed projects that will help ensure the security of water supplies.
- The City is a participant in the Bay Area Integrated Regional Water Management Plan (IRWMP) working to coordinate and improve water supply reliability, protect water quality, manage flood protection, maintain public health standards, protect habitat and watershed resources, and enhance the overall health of the Bay.

The City continually coordinates water-planning activities that support and inform the City's creation of this UWMP with neighboring communities and water agencies.

The Water Supply Master Plan

One early example of interagency coordination and planning was the development of the Water Supply Master Plan (WSMP). From 1996 through 1999, the BAWSCA agencies, the SFPUC, and the Valley Water worked cooperatively to develop a WSMP. A Palo Alto representative was on the steering committee for this project. The WSMP is intended to address the future water supply needs of the water agencies and 2.3 million people, who are served via the SFPUC water system. On April 25, 2000 the SFPUC formally adopted the WSMP including the implementation schedule for identified, selected projects.

[3] Staff Report CMR:367:05: http://www.cityofpaloalto.org/civicax/filebank/documents/5859

Integrated Regional Water Management Plan
The Association of Bay Area Government (ABAG) convened a broad-based group of stakeholders to develop an Integrated Regional Water Management Plan (IRWMP) for the Bay Area. The Bay Area IRWMP facilitates regional cooperation on issues of water supply, quality and reliability, water recycling and conservation, storm water and flood water management, wetlands and habitat restoration and creation, recreation and access.

The City was involved in the development of the Bay Area IRWMP on the water supply and reliability areas through BAWSCA's representation in BAWAC. In addition, the City also coordinates water recycling and wastewater for the IRWMP implementation through the City's membership in the Bay Area Clean Water Agencies (BACWA). The City adopted the 2019 Bay Area IRWMP in May 2019[4].

BAWSCA Long-Term Reliable Water Supply Strategy
The BAWSCA agencies identified a need for dry year supplies to meet future demands. The study, completed in February 2015 identified cost-effective regional and local projects that will meet individual BAWSCA member needs. One of the projects included in the strategy is the City's "Phase 3" recycled water system expansion project to serve the Stanford Research Park. The recycled water project is described in more detail in the alternative water supplies discussion and the long-term reliable water supply strategy is described in more detail in the system supplies discussion.

Palo Alto Regional Water Quality Control Plant Long Range Facilities Plan
The RWQCP has been in operation since 1934 and now serves the six communities of Palo Alto, East Palo Alto, Mountain View, Stanford, Los Altos and Los Altos Hills. Aging equipment, new regulatory requirements, and the movement to full sustainability will require rehabilitation, replacement and new processes. The Long Range Facilities Plan was completed in October 2012. Major recommendations in the plan were modeling influent sewer flows, continuing source control and flow reduction efforts, rehabilitating and replacing critical infrastructure, and preparing for regulatory action. In addition, it was recommended the plant be positioned for a possible increase in recycled water demand by reserving space on site for reverse osmosis facilities and being prepared to implement additional storage and pumping capabilities.

Northwest County Recycled Water Strategic Plan
The Northwest County Recycled Water Strategic Plan is a collaboration between the City of Palo Alto and Valley Water that seeks to identify the most appropriate ways to expand the City of Palo Alto's Recycled Water Program. The plan evaluated the potential expansion of the recycled water pipeline to the Stanford Research Park area as well as potable water reuse. The final plan was accepted by City Council in March 2020[5].

[4] See Staff Report 10243: https://www.cityofpaloalto.org/civicax/filebank/documents/71249

[5] See Staff Report 10319: https://www.cityofpaloalto.org/civicax/filebank/blobdload.aspx?t=59282.96&BlobID=75414

Valley Water 2040 Water Supply Master Plan
The City participated with other stakeholders in the preparation of a 2040 Water Supply Master Plan to address long range water supply and reliability needs in Santa Clara County. The Water Supply Master Plan[6] includes an annual Monitoring and Assessment Program (MAP) to provide a mechanism for adapting to changing supply and demand conditions, climate change, regulatory and policy changes, other risks, and uncertainty.

Valley Water Countywide Water Reuse Master Plan
The collaboration between Valley Water and the Partner Agencies, including Palo Alto, builds on existing partnerships, plans, and infrastructure; explores a wide range of reuse opportunities that support Valley Water's goals and yields multiple benefits for the collective region.

The City coordinated the 2020 update of the UWMP with the following agencies:

Table 2: Coordination with Appropriate Agencies

AGENCIES	Participated in Plan development	Sent notice of Plan preparation	Commented on the draft	Attended public meetings	Contacted for assistance	Received copy of draft	Sent notice of public hearing	Not involved / No information
SFPUC	X	X			X		X	
BAWSCA	X	X			X		X	
Valley Water	X	X			X		X	
City of East Palo Alto		X					X	
City of Mountain View		X					X	
City of Menlo Park		X					X	
Purissima Hills Water District		X					X	
City of Redwood City		X					X	
Stanford University		X					X	
All other BAWSCA agencies		X					X	
County of Santa Clara		X					X	

[6] See Valley Water's website: https://www.valleywater.org/your-water/recycled-and-purified-water

Section 2 – Service Area

Law

10631

(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.

Demographics

Palo Alto is located in northern Santa Clara County approximately 35 miles south of the City of San Francisco. The City's population in 2020 was approximately 69,000[7]. The City is roughly 26 square miles in area and is a part of the San Francisco Bay metropolitan area. The City is one of the area's most desirable residential communities with approximately 28,500[8] housing units. The City's desirability is partly due to the excellent public schools, comprehensive municipal services, shopping, restaurants and the community's aesthetics.

The City is considered the birthplace of the high technology industry and the Silicon Valley. Located directly adjacent to the City is Stanford University, which attracts major corporations from around the world. The City's 630-acre Stanford Research Park includes among its tenants such prestigious and innovative high-tech leaders as Hewlett-Packard, Varian, Tesla Motors, and VMware. The City has approximately 27 million square feet of non-residential floor-space, 36 parks and preserves (comprising 157 acres of urban parks and 3,752 acres of open space), tennis courts (51), community centers (4), theaters (3), swimming pools (1), nature centers (3), athletic centers (4), a golf course, an art center, and a junior museum and zoo[9].

Table 3 shows the population and employment projections for the City from 2020 to 2045 based on the City's 2030 Comprehensive Plan through 2030 and extrapolated using the same growth rates through 2045. Fiscal year values were calculated by averaging the two relevant

[7] City of Palo Alto 2030 Comprehensive Plan with fiscal year values estimated from calendar year values
[8] City of Palo Alto 2015-2023 Housing Element
[9] City of Palo Alto 2018-2019 Comprehensive Annual Financial Report (CAFR)

calendar year values from the plan. The City relied on ABAG population and employment projections for the 2010 and 2015 UWMPs. According to these projections, expected 2020-2045 population growth is about 0.8% per year with expected growth in employment 0.5% per year. These projections do not consider potential impacts of Covid-19.

Table 3: Population – Current and Projected

	2020	2025	2030	2035	2040	2045
Service Area Population	68,819	71,667	74,815	77,963	81,111	84,259
Five Year Percent Increase		4.1%	4.4%	4.2%	4.0%	3.9%
Total Employment	97,654	100,095	102,535	104,975	107,416	109,856
Five Year Percent Increase		2.5%	2.4%	2.4%	2.3%	2.3%

Climate Characteristics

The City enjoys a mild climate surrounded by the San Francisco Bay on the east, and coastal mountains on the west. The monthly average temperature, rainfall and ETO (Reference Evapotranspiration) for the area are presented in Table 4 below.

Table 4: Climate

Climate				
	Standard Monthly Average ETO[10]	**Average Rainfall (inches)[11]**	**Average Max Temperature (degrees F)[12]**	**Average Min Temperature (degrees F)**
Jan	1.31	3.2	57.4	38.5
Feb	2.69	2.9	61.1	41.3
Mar	2.99	2.3	64.2	43.1
Apr	4.31	1.0	68.4	44.7
May	6.08	0.4	72.9	48.5
Jun	6.88	0.1	77.4	52.5
Jul	6.82	0.0	78.4	54.9
Aug	5.67	0.1	78.4	54.8
Sep	4.01	0.2	78.3	52.6
Oct	3.58	0.7	73.0	48.0
Nov	1.76	1.7	64.3	42.6
Dec	1.10	2.7	57.8	38.2

[10] Average ETO data for closest active station (Union city) reported by CIMIS website http://www.cimis.water.ca.gov/

[11] Average rainfall data for Palo Alto reported by NOAA website http://www.wrcc.dri.edu/

[12] Average temperature data for Palo Alto reported by NOAA website http://www.wrcc.dri.edu/

Section 3 – System Supplies

Law

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)…..

Historical Background

The water utility was established on May 9, 1896, two years after the City was incorporated. Local water companies were bought out at that time with a $40,000 bond approved by the voters of the 750-person community. These private water companies operated one or more shallow wells to serve the nearby residents. The City grew, and the well system expanded until nine wells were in operation in 1932.

In December 1937, the City signed a 20-year contract with the City and County of San Francisco, administered by the San Francisco Water Department (SFWD), for water deliveries from the newly constructed pipeline bringing Hetch Hetchy water from Yosemite to the Bay Area. Water deliveries from San Francisco commenced in 1938, and well production declined to less than half of the total citywide water demand.

A 1950 engineering report noted, "the capricious alternation of well waters and the SFWD water . . . has made satisfactory service to the average consumer practically impossible." However, groundwater production increased in the 1950s, leading to lower groundwater tables and water quality concerns. In 1962, a survey of water softening costs to City customers determined that the City should purchase 100% of its water supply needs from the SFWD. A 20-year contract was signed with San Francisco, and the City's wells were placed in a standby condition. The SFWD later became known as the SFPUC. Since 1962 (except for some very short periods) the City's entire supply of potable water has come from the SFPUC.

BAWSCA is comprised of SFPUC's 26 Wholesale Customers. The City largely works through BAWSCA to manage its SFPUC contract and to interact with the SFPUC.

Water Integrated Resource Planning

The City prepared its first Water Integrated Resources Plan (WIRP) in 1993 when the City was faced with a decision to participate in a regional recycled water expansion program. The 1993 WIRP assessed the costs and benefits of the recycled water project compared to other supply alternatives and ultimately concluded that recycled water was not cost effective relative to existing supply.

In 2003, the City updated the WIRP. The 2003 WIRP indicated that supplies from the SFPUC were adequate during normal years, but additional supplies were needed in dry years to avoid shortages. The key conclusions from the 2003 WIRP analysis were:

1. The City's existing contractual entitlement with the SFPUC provides adequate supplies;
2. The cost to connect to Valley Water's West Pipeline (WPL) treated water pipeline was prohibitive;
3. Continuous use of groundwater was not recommended;
4. The City should continue to evaluate recycled water; and
5. Continue the current Demand Side Management programs and explore additional measures.

The WIRP work was coordinated with infrastructure work by the City to increase the distribution system reliability. Under a contract with the City, Carollo Engineers completed several studies of the water distribution system. These studies are discussed in Section 3, "System Supplies," under the heading "Groundwater."

The City and other Santa Clara County water retailers coordinated with Valley Water to examine extending the West Pipeline (WPL) that currently ends at Miramonte Road and Foothills Expressway to a point in Palo Alto to serve the City and other neighboring water agencies. In addition, the study examined creating an intertie between the WPL and the SFPUC's Bay Division Pipelines at Page Mill Road. The West Pipeline Conceptual Evaluation, completed in March 2003, concluded that the conceptual projects were constructible, but that no decisions could be made until Valley Water concluded additional studies. These ongoing studies include the Valley Water project to evaluate its system reliability, asset management program, and Water Treatment Plant Master Plan Project. These studies, completed in the fall of 2004, concluded that extending the WPL to serve the City could not be justified from a county-wide reliability aspect when evaluated against more cost-effective alternatives.

The information obtained from the studies completed on the groundwater and Valley Water's conceptual study on the WPL Extension was used to characterize the supply options examined in the WIRP.

Based on the WIRP analysis, the City Council adopted a set of WIRP guidelines in December 2003[13]. The WIRP guidelines include:

1. Preserve and enhance SFPUC supplies;
2. Continue to advocate for an interconnection between SFPUC and Valley Water;
3. Participate in the development of cost effective regional recycled water programs;
4. Scope water conservation programs to comply with Best Management Practices (BMPs);
5. Maintain emergency water conservation measures to be activated in case of droughts;
6. Retain groundwater supply options in case of changed future conditions; and
7. Survey community to determine its preferences regarding the best water resource portfolio.

[13] See City Manager Report 547:03: http://www.cityofpaloalto.org/cityagenda/publish/cmrs/2732.pdf

Since the major WIRP conclusion was that SFPUC supplies were adequate except in drought years, the focus turned to the options to reduce the supply deficit during droughts. These options include using groundwater, connecting to the Valley Water's treated water pipeline, developing recycled water, and expanding water efficiency programs. The goal was to find the proper balance between the key factors of cost, availability in a drought, water quality, and environmental impacts in determining the best portfolio for the community.

Following Council's adoption of the WIRP Guidelines, and to gain insight into the question of whether to use groundwater as supplemental supply in droughts, the City surveyed its residential customers. Respondents were asked to rank three options for water supply in a drought:

A. Blend Groundwater – Blend the groundwater with water from SFPUC in droughts. Water customers would still need to cut back water usage by 10% in droughts.
B. No Groundwater – Use no groundwater during droughts. Instead, community is subjected to larger water usage cutbacks in droughts (20% cutback).
C. Treat Groundwater – Highly treat the groundwater (reverse osmosis treatment) before introducing it into distribution system. Water customers would still need to cut back water usage by 10% in droughts.

Survey respondents generally preferred Options B (no groundwater) and C (treat groundwater), but Option A (blend groundwater) was not soundly rejected. Based on the survey, any of the three options would probably be accepted by the City's water customers under drought conditions. The survey did not address whether groundwater may or may not be an acceptable long-term water supply alternative.

Based on the WIRP and the results of the community survey, staff made the following conclusions and recommendations in June 2004:

1. Do not install advanced treatment systems for the groundwater at this time. This option is simply too expensive, both in capital and in operating costs.
2. Blending at an SFPUC turnout is the best way to use groundwater as a supplemental drought time supply while maintaining good water quality.
3. Staff should await the conclusion of the environmental review process for selecting any new emergency well sites before developing a recommendation on whether to use groundwater in droughts. In the selection process for new well sites, the costs for blending with SFPUC water in droughts should be considered. The least expensive location is a well at El Camino Park due to its proximity to an SFPUC turnout.
4. Actively participate in the development of long-term drought supply plans with SFPUC and BAWSCA.
5. Continue in the efforts identified in the Council-approved WIRP Guidelines:

a. Evaluate a range of demand-side management (DSM) options for their ability to reduce long-term water demands;
b. Evaluate feasibility of expanding the use of recycled water; and
c. Maintain emergency water conservation measures to be activated in case of droughts.

In 2017 the WIRP was updated again. Unprecedented drought conditions and regulatory action by the State Water Resource Control Board (SWRCB), including the first-ever mandatory potable water use reductions in addition to Palo Alto's S/CAP renewed the focus on water supply sustainability. The 2003 WIRP Guidelines served as a roadmap for the City's for evaluating the following potable water supply alternatives: 1) water from the SFPUC; 2) groundwater (with or without groundwater recharge); 3) treated water from the Valley Water; and 4) DSM. Recycled water was being evaluated outside of the WIRP in a recycled water strategic planning process.

The evaluation concluded that DSM was the best resource, but could not significantly displace potable water supplies. While SFPUC water was found to be the most expensive, it has higher water quality than groundwater or treated water from the Valley Water. In addition, groundwater and Valley Water treated water supplies may increase in cost and aren't likely to offer additional protection in droughts.

Council adopted the following 2017 WIRP Guidelines in March 2017[14]:

1. Pursue all cost-effective water efficiency and conservation;
2. Continue to investigate the technical feasibility and financial impact of increasing the use of non-traditional, non-potable sources such as black water, storm water, and water incidentally produced in an excavating project;
3. Proceed with the Recycled Water Strategic Plan to determine how to reduce the demand for imported water; and
4. Survey potentially impacted customers about their preference for SFPUC water versus blended water.

Sustainability and Climate Action Plan

In November 2016 Council adopted the Sustainability and Climate Action Plan (S/CAP) Framework[15] including four water-specific goals, all of which have implications for water reuse:

1. Utilize the right water supply for the right use;
2. Ensure sufficient water quantity and quality;
3. Protect the Bay, other surface waters, and groundwater; and
4. Lead in sustainable water management.

In December 2017, Council adopted the S/CAP Sustainability Implementation Plan (SIP)[16]. The SIP identified the following Key Actions:

1. Develop programs and ordinances to maximize water efficiency;
2. Develop programs and ordinances to facilitate the use of non-traditional, non-potable water sources (e.g. graywater, storm water, black water, etc.);
3. Develop Recycled Water Strategic Plan and explore the most effective uses of recycled water, both inside and outside Palo Alto;

[14] See Staff Report #7634 https://www.cityofpaloalto.org/civicax/filebank/documents/56088
[15] See Staff Report #7304 https://www.cityofpaloalto.org/civicax/filebank/documents/60858
[16] See Staff Report #8487 https://www.cityofpaloalto.org/civicax/filebank/documents/62406

4. Develop a Green Storm Water Infrastructure Plan to better capture and infiltrate storm water back into the hydrologic cycle; and
5. Reduce salinity of Palo Alto's recycled water to increase desirability of use.

Northwest County Recycled Water Strategic Plan

Palo Alto Utilities and Public Works staff collaborated with Valley Water to evaluate the most effective water reuse options within Palo Alto as well as within the RWQCP service area. The resulting Northwest County Recycled Water Strategic Plan Report and Appendices[17] contains a summary and ranking of the water reuse alternatives or "Concept Options" based on cost and non-cost criteria.

Effluent Transfer Agreement

A Council-approved agreement with Valley Water and the City of Mountain View[18] gives Valley Water an option to acquire about half of the treated wastewater produced by the RWQCP, which would render some local water reuse options infeasible. The Agreement Between and Among Palo Alto, Mountain View, and the Santa Clara Valley Water District to Advance Resilient Water Reuse Programs in Santa Clara County is referred to as the Partnership Agreement. Water reuse alternatives identified in the Northwest County Recycled Water Strategic Plan and compatible with the Partnership Agreement, traditional potable water supplies, DSM, stormwater and other non-traditional water supplies will be considered as part of an overall water resource portfolio in a 2021 "One Water Plan".

Current and Planned Water Supply Sources

Table 5 below shows the current and planned water supply sources for the City for normal years. As required by Section 10631(j), this information has been provided to the SFPUC, the City's wholesale supplier.

Table 5: Current and Planned Water Supply Sources[19]

Water Supply Sources (AF)	2020	2025	2030	2035	2040	2045
SFPUC	10,921	11,287	11,394	11,546	11,801	12,113
Local Groundwater	-	-	-	-	-	-
Local Surface Water	-	-	-	-	-	-
Recycled Water	316	316	316	316	316	316
Transfers In or Out	-	-	-	-	-	-
Exchanges In or Out	-	-	-	-	-	-
Desalinization	-	-	-	-	-	-
Other Sources	-	-	-	-	-	-
Total	11,237	11,603	11,710	11,862	12,117	12,429

[17] See Staff Report 10913 https://www.cityofpaloalto.org/civicax/filebank/blobdload.aspx?t=59282.96&BlobID=75414

[18] See Staff Report #10627 https://www.cityofpaloalto.org/civicax/filebank/documents/73982

[19] SFPUC usage data from BAWSCA Demand Side Management Least Cost Planning Decision Support System (DSS Model) in combination with an Econometric Model except for 2020 actual usage data

SFPUC Supply

Description of SFPUC Regional Water System

Palo Alto receives water from the City and County of San Francisco's RWS, operated by the SFPUC. Approximately 85% of this supply is from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, and approximately 15% is treated water produced by the SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties.

The amount of imported water available to the SFPUC's Retail and Wholesale Customers is constrained by hydrology, physical facilities and the institutional limitations that allocate the water supply of the Tuolumne River. Due to these constraints, the SFPUC is very dependent on reservoir storage to ensure water supply availability in dry years.

The SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from the Hetch Hetchy Reservoir. In practice, the local watershed facilities are operated to capture local runoff.

Water Supply Agreement

In July 2009, the Wholesale Customers and San Francisco adopted the Water Supply Agreement[20] (WSA), which includes a Water Shortage Allocation Plan (WSAP) to allocate water from the RWS to Retail and Wholesale Customers during system-wide shortages of 20 percent or less. The WSAP has two components:

1. The Tier One Plan, which allocates water between San Francisco and the Wholesale Customers collectively; and
2. The Tier Two Plan, which allocates the collective Wholesale Customer share among the Wholesale Customers.

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.

[20] Palo Alto City Council approved the WSA in June 2009 – See City Manager Report 269:09: http://www.cityofpaloalto.org/civicax/filebank/documents/15985

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[21]) 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 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.

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

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. Tier two is implemented when RWS shortage are between 10% and 20%. These Tier Two allocations are based on a formula that takes into account multiple factors for each Wholesale Customer including:

- Individual Supply Guarantee (ISG);
- 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 (ISG) , 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 RWS between Retail and Wholesale Customers during system-wide shortages of 20% or less. For RWS 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 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. For this 2020 UWMP it is assumed the Tier Two Plan will be used to allocate supplies available to Wholesale Customers when average Wholesale Customers' RWS shortages are greater than 10% and up to 20% . An equal percent reduction is assumed to be shared across all Wholesale Customers when average Wholesale Customers' RWS shortages are 10% or less or greater than 20%.

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 ISGs, which represent each Wholesale Customer's allocation of the 184 MGD Supply Assurance. Palo Alto's ISG is 16.575 MGD, or approximately 18,579 acre feet per year. The City's ISG was reduced to this level in May 2018 upon a permanent ISG transfer of 0.5 MGD to the City of East Palo Alto[22].

2018 SFPUC Decisions Extended to 2028

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 a 2018 WSA contract amendment[23], the decisions were deferred for 10 years to 2028.

[22] See Staff Report #9041 https://www.cityofpaloalto.org/civicax/filebank/documents/64801

[23] See Staff Report #9999
https://www.cityofpaloalto.org/civicax/filebank/blobdload.aspx?t=46434.97&BlobID=69371

SFPUC Water Supply Alternative Evaluation Efforts

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. More detail regarding the SFPUC's alternative water supply efforts is provided in Section 6, Water Supply Reliability.

BAWSCA and Its Role

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 RWS.

BAWSCA's role in the development of the 2020 UWMP updates is to work with its member agencies and the SFPUC to seek consistency among UWMP documents.

As a member of BAWSCA, the City is formally represented on the BAWSCA Board of Directors on matters involving decision-making, policy setting and issues of interest to the BAWSCA members. City staff participates in several advisory and policy committees, including the Water Quality Committee and the Water Resources Committee. Staff also represents the City with the other BAWSCA members on other issues that may arise from time to time.

Regional Water Demand and Conservation Projections

In June 2020, BAWSCA completed the Regional Water Demand and Conservation Projections Report (Demand Study).[24] 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

[24] Phase III Final Report: http://bawsca.org/uploads/pdf/BAWSCA_Regional_Water_Demand_and_Conservation%20Projections%20Report_Final.pdf

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.

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; and
- 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[25] (BARR), a partnership among eight Bay Area water utilities

[25] https://www.bayareareliability.com/

(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.

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 and
    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 Commercial, Industrial and Institutional (CII) audit pilot program, which BAWSCA aims to complete in 2021.[26]
- 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.

Alternative Water Supply Analysis

In anticipation of extended periods of drought and possible regulatory changes by the State, the City is evaluating a wide range of alternative water supplies. The Northwest County Recycled Water Strategic Plan, completed in collaboration with Valley Water, identified and evaluated a number of potable and non-potable water reuse concept options using effluent from the RWQCP in Palo Alto. Concept options that are compatible with the effluent transfer agreement with Valley Water will be considered along with traditional potable supply sources, demand management, green stormwater infrastructure, and graywater in a holistic 2021 "One Water" Plan. In addition, the City, through BAWSCA, has additional water supply management opportunities. Each is discussed in more detail below.

Transfer or Exchange Opportunities

Law

10631 (d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

[26] Efforts on the CII audit pilot program stalled in March 2020 due to the COVID 19 pandemic and related shelter-in-place orders.

Because the existing San Francisco RWS does not have sufficient supplies in dry years, dry-year water transfers are potentially an important part of future water supplies. As a result, in February 2011, the Palo Alto City Council approved a new Tier Two Plan to allocate water between the BAWSCA members. This plan includes the ability to transfer water allocated to the BAWSCA agencies between BAWSCA members during drought periods. All the BAWSCA agencies adopted the Plan by April 2011. The WSCP and SFPUC Supply sections provide further detail on The Tier Two Plan.

BAWSCA investigated water transfer opportunities as part of the Long Term Reliable Water Supply Strategy discussed above. The recent historic drought led to capacity and regulatory issues that made pilot transfers infeasible.

Groundwater

Law

> 10631 (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
> (B) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater.
> (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.
> (D) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier.

Deep Aquifer Groundwater

The City is located in Santa Clara County. Valley Water is the groundwater management agency in Santa Clara County as authorized by the California legislature under the Santa Clara Valley Water District Act, California Water Code Appendix, Chapter 60.

In September 2014, Governor Brown signed the Sustainable Groundwater Management Act (SGMA) to promote the local, sustainable management of groundwater supplies. SGMA requires sustainable groundwater management for all medium and high priority basins in California. SGMA identifies Valley Water[27] as the exclusive groundwater management agency for Santa Clara County. The District actively manages the Santa Clara sub-basin, designated as medium priority by the California Department of Water Resources. The groundwater basins in Santa Clara County are not adjudicated nor have the basins been identified by the Department of Water Resources as being in overdraft.

The 2016 Groundwater Management Plan for the Santa Clara and Llagas Subbasins (GWMP) describes Valley Water's groundwater sustainability goals, and the strategies, programs, and

[27] Valley Water Groundwater Sustainability Plan: https://www.valleywater.org/your-water/where-your-water-comes-from/groundwater/sustainable-groundwater-management

activities that support those goals. Following a public hearing, Valley Water's Board of Directors adopted the GWMP on Nov. 22, 2016. The GWMP was submitted to DWR as an Alternative on Dec. 21, 2016. On July 17, 2019, DWR approved the Alternative for both the Santa Clara and Llagas Subbasins, determining it satisfies the objectives of SGMA. DWR also proposed five recommended actions for Valley Water's consideration: identify groundwater dependent ecosystems, incorporate climate change analysis in the water budget, create separate water quality outcome measures for each subbasin, clarify quantifiable outcome measures, and develop a seawater intrusion outcome measure.

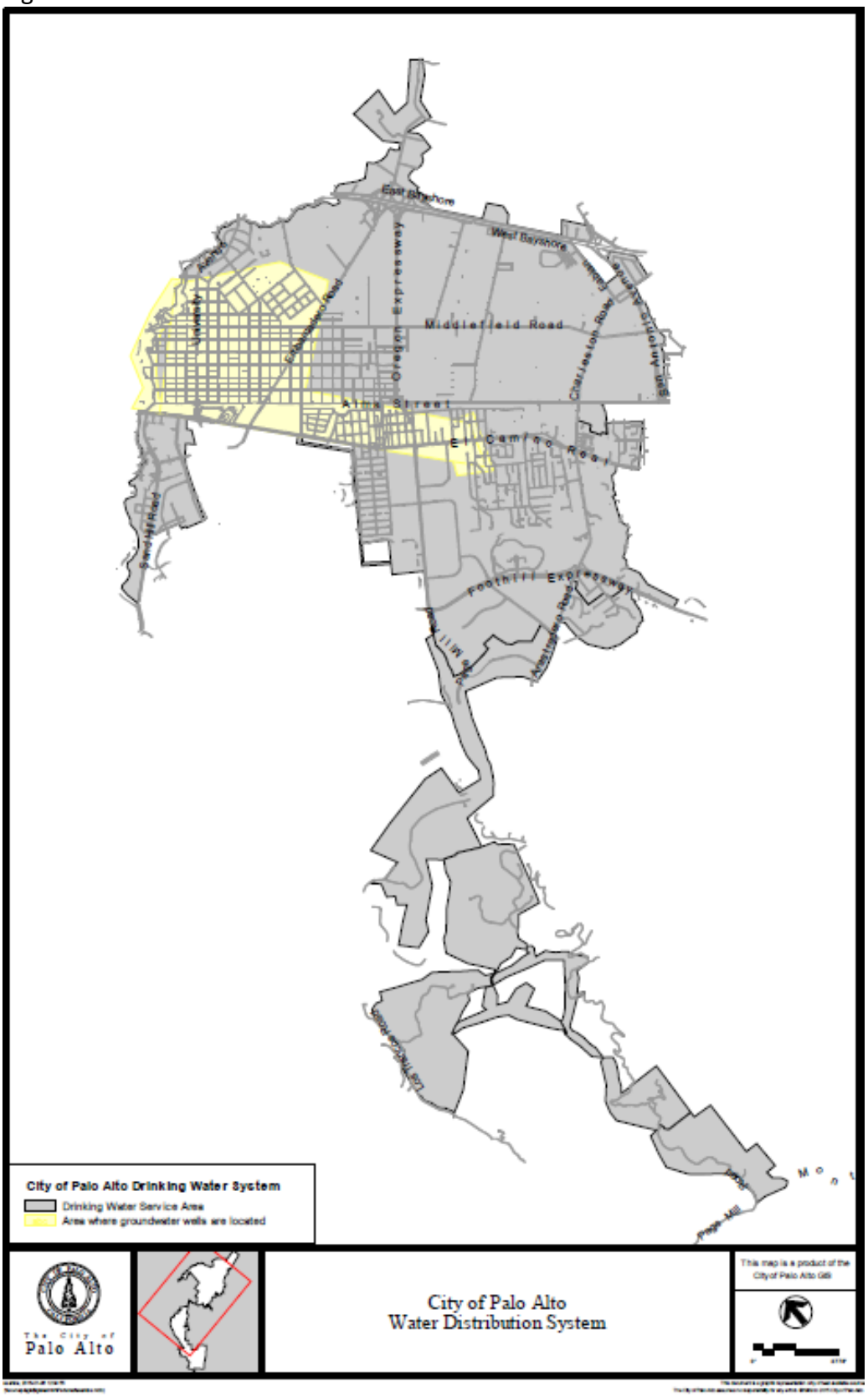
Although groundwater resources, including in South Santa Clara County, were heavily relied upon during the recent drought, groundwater levels throughout the county are generally good, as potable water demand has been reduced and as Valley Water efforts to prevent groundwater basin overdraft, curb land surface subsidence, and protect water quality have been largely successful.

The groundwater quality of the City's wells is considered fair to good quality, though significantly less desirable in comparison to SFPUC's supplies. The groundwater is approximately six times higher in total dissolved solids (TDS) and hardness than SFPUC's supplies. The City has not pumped groundwater since 1991, and, although not a planned future water supply source, groundwater is an available alternative that is evaluated and reviewed on a regular basis.

Five wells were constructed in Palo Alto in the mid-1950s and were operated continuously until 1962. In 1988, the wells were operated to provide supplemental supplies while SFPUC implemented mandatory rationing. Two of the wells were operated for about a month and a half in 1991 when it appeared that the City was facing a severe (45%) cutback requirement. Besides normal annual operational testing, the wells have not been used since 1991.

The five older wells were rehabilitated and three new wells and a 2.5 million gallon storage reservoir and associated pump station were constructed between 2009 and 2013 as part of the Emergency Water Supply and Storage Project. The primary goal was to correct the deficiency in the City's emergency water supply. The well system can now support a minimum of eight hours of normal water use at the maximum day demand level and four hours of fire suppression at the design fire duration level. The groundwater system may also be used to a limited extent for water supply during drought conditions (up to 1,500 acre feet per year) and is capable of providing normal wintertime supply needs during extended shutdowns of the SFPUC system. Up to 11,000 gpm of reliable well capacity is available for emergency use as well as 13 million gallons (MG) of storage. Figure 1 shows the potential groundwater use area in the City's service territory.

Figure 1: Potential Groundwater Use Area



In April 2010, the California Department of Public Health[28] (CDPH) approved a permit amendment to add the new Library/Community Center Well and the Eleanor Pardee Park Wells to the City's existing water supply permit. CDPH permitted the new El Camino Park well in 2014. As part of the permit process, all three wells were tested for primary and secondary drinking water quality standards. The results of the test indicate the wells currently meet primary and secondary water quality standards, but the potential remains for exceedance of secondary standards for manganese, iron and TDS. The wells are planned to remain as standby sources, and no additional treatment to ensure compliance with secondary standards is required at this point. In an emergency situation, the City can provide emergency chlorination treatment at several of the well sites, including the Library/Community, Eleanor Pardee, Hale, Peers, and Rinconada wells.

The City has identified the wells as a potential supply source for use during a prolonged drought. All wells are currently permitted and designated by the California Department of Public Health as "Standby" and, as such, can only be used for 5 consecutive days up to 15 days in a year. The wells may collectively supply up to 1,500 AFY during a drought[29].

The pumping restrictions for the well system are mitigation measures in the EIR prepared for the Emergency Water Supply and Storage Project. Any increase in the current restriction could require new or supplemental environmental review. The process to increase the current limitation will require supporting information on the sustainable yield of the groundwater basin in order to demonstrate increased pumping by the City will not have significant impacts.

If the wells were to be used as a dry year supply option, coordination with CDPH would be needed to ensure necessary treatment is in place to meet regulatory standards. In addition, several other issues need to be addressed prior to the use of the wells during a drought, including the capital costs of any treatment or blending upgrades, water quality compared to the City's SFPUC source and customer acceptance, Valley Water groundwater production costs, and the exact mechanism for how groundwater would form a part of any drought response portfolio.

Groundwater may hold some advantages in the long term for the City and may be useful during water supply shortage events. However, a water supply portfolio that includes potable groundwater does not benefit under the type of potable water reductions mandated by the State Water Resources Control Board (SWRCB) in 2015. Under those regulations, the City was required to reduce potable water consumption by 24% regardless of the supply source. Likewise, Valley Water, requests reductions in groundwater pumping during dry periods.

[28] CDPH issues and has the authority to revise domestic water supply permits pursuant to Health and Safety Code section 116525 (City of Palo Alto permit #4210009 and # 4310009)
[29] Final EIR, City of Palo Alto Emergency Water Supply and Storage Project, SCH #2006022038

One of the Northwest County Recycled Water Strategic Plan objectives was to gain a better understanding of the hydrology in northwest Santa Clara County. To that end, the Groundwater Use Assessment (GUA)[30] was completed including the development of a robust model of the shallow and deep aquifers, particularly focusing on potential recharge zones and the connectivity between the aquifers. The study concluded that Palo Alto could sustainably rely on groundwater at a rate of approximately 3,000 AFY, or for about 25% of 2040 potable water demands. Results of this effort were also used to evaluate the potential for Indirect Potable Reuse and may be used to demonstrate sustainable yield for a supplemental environmental review to pump more than 1,500 AFY should Palo Alto plan to incorporate groundwater into its supply portfolio.

Shallow Aquifer Groundwater

The shallow and deep aquifer research included in the GUA provided valuable insight to the relationship between the aquifers in the northwest part of Santa Clara County. The study found that, near the bay, a confining layer separates the deep and shallow aquifers. Further west, toward the foothills, the two aquifers exhibit connectivity.

Basement construction is often required for non-residential, mixed use and multifamily residential buildings, particularly if underground parking is involved. Additionally, the high value of land and housing in the City has resulted in more residential property owners seeking to increase the size of their single family homes by constructing basements. Basement construction groundwater pumping occurs when a basement is constructed in areas of shallow groundwater, typically in the neighborhoods closer to the bay or near current or former creek beds. Dewatering continues until enough of the house has been constructed to keep the basement in place, typically 10 weeks. Longer term pumping removes seepage for older underground structures such as the CalTrain underpass on Oregon Expressway.

Temporary groundwater dewatering from July 2019 to August 2020 produced over 461 AF. When discharged to the City's storm drain system, groundwater from dewatering activities enters one of four creeks that discharges to the Bay. Most dewatering sites discharge to creeks that have been channelized and offer negligible groundwater recharge opportunities. San Francisquito Creek is the only creek in the City with potential to recharge the shallow groundwater basin because it is not channelized within the City boundaries.

The City of Palo Alto issues permits for temporary and long-term (greater than 1 year) dewatering. The drought and resulting water use restriction increased public concern over basement construction groundwater pumping in Palo Alto. Concerns range from the apparent wasting of water by discharging to storm drains, to potential impacts on groundwater elevation and flow volume, to potential impacts on neighboring properties, such as subsidence and structure cracks, and impacts on trees and other landscaping.

[30] See full GUA report: https://cityofpaloalto.org/civicax/filebank/blobdload.aspx?t=64573.3&BlobID=68051

The City has long regulated several aspects of basement groundwater pumping for both residential and commercial sites. Public concerns regarding dewatering prompted City Council to approve several enhancements to the dewatering policy that were codified in the Palo Alto Municipal Code and went into effect in May 2017. Another iteration of requirements went into effect in February 2018[31].

The goals of the requirements are improving the prediction of the amount of pumped groundwater, decreasing impacts to surrounding structures and infrastructure, addressing traffic impacts during the construction period, and minimizing impacts to the area's groundwater quantity and quality as well as the quality of downstream water bodies. A summary of the requirements is listed below:

1. Fill stations are required so that others may fill water trucks or connect garden hoses for irrigation;
2. Use plans are required to demonstrate that the applicant/builder is arranging for use of as much of the pumped water as possible and minimizing storm drain discharge;
3. A Geotechnical Study is required to determine any potential effects and needed avoidance measures; and
4. Street Work/Dewatering permits are required (and are issued after requirements #1, #2 and #3 are completed).

In November 2020, a technical memo[32] evaluating the reuse of dewatering water was completed. While groundwater pumped from the basement dewatering is, in general, of suitable quality to be used for irrigation after treatment in a settling tank and is equivalent to about 12% of irrigation needs in Palo Alto in a typical year, the study identified limitations to reusing large volumes of dewatering water. The study found it is not feasible to use all of the groundwater for irrigation due to the high number of daily truck trips that would be required to haul it to irrigation sites. Approximately 2.8 AF per year, or less than 1% of Citywide irrigation needs, could potentially be reused for irrigation but at a significant cost in dollars and greenhouse gas emissions.

Water Recycling

Wastewater Collection and Treatment in Palo Alto

Law

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

[31] See Staff Report 8580: https://www.cityofpaloalto.org/civicax/filebank/documents/62404
[32] See Technical Memo:
https://www.cityofpaloalto.org/civicax/filebank/blobdload.aspx?t=64014.74&BlobID=79884

> 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…
>
> (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.

The City operates RWQCP, a wastewater treatment plant, for the East Palo Alto Sanitary District, Los Altos, Los Altos Hills, Mountain View, Palo Alto, and Stanford University. Wastewater from these communities is treated by the RWQCP prior to discharge to the Bay. Approximately 220,000 people live in the RWQCP service area. Of the wastewater flow to the RWQCP, about 60 percent is estimated to come from residences, 10 percent from industries, and 30 percent from commercial businesses and institutions.

The RWQCP is a Class V tertiary treatment facility featuring preliminary treatment (barscreens and grit removal), primary treatment (sedimentation settling), secondary treatment (fixed film reactors, conventional activated sludge, and clarification), and tertiary treatment (filtration through a sand and coal filter), and UV disinfection. After tertiary treatment, title 22 recycled water is produced through further filtration of tertiary effluent through sand filters at low loading rates and then disinfected with sodium hypochlorite (instead of UV disinfection). Through these treatments, 99% of ammonia, organic pollutants, and solid pollutants are removed.

The RWQCP has an average dry weather flow design capacity of 39 MGD (43,680 AF/Y) with full tertiary treatment, and a peak wet weather flow capacity of 80 MGD (89,600 AF/Y) with full secondary treatment. Current 2020 average flows are approximately 17.24 MGD (19,311 AF/Y). The plant capacity is sufficient for current dry and wet weather loads and for future load projections. There are no plans for expansion of the plant or to "build-out" the plant. New treatment technologies that will add nitrogen removing capabilities are being planned for installation and availability in approximately 2025 as part of a new Secondary Treatment Upgrades project that will address anticipated state nitrogen limits on regional effluent discharges. In any case, the total hydraulic capacity of the plant will remain unchanged after completion of the Secondary Treatment Upgrades project.

The plant's discharge meets very high standards to protect South San Francisco Bay. The quality of the water leaving the plant approaches the standards for drinking water. Table 6 provides flow data for the RWQCP. A full description of the treatment facility is included in the 1992 Water Reclamation Master Plan and the 2012 Long Range Facilities Plan[33].

[33] See document: https://www.cityofpaloalto.org/civicax/filebank/documents/32042

Table 6: Wastewater Treatment

Treatment Plant Name	Location (City)	Average Daily Flow (2020)	Maximum Daily Flow (2020)	Year of Planned Build-out	Planned Maximum Daily Volume
RWQCP	City of Palo Alto	19,311 AF/year 17.24 MGD	24,878 AF/year 22.21 MGD	Plant built out	90,000 AF/year = Maximum Design Daily Flow 44,000 AF/year = Average Design Daily Flow (Dry weather capacity)

Palo Alto Recycled Water Production

As shown in Table 7, the plant has capability to produce recycled water that meets the Title 22 unrestricted use standard (approximately 4.5 MGD of capacity). Current annual production is about 14% of capacity while peak summer monthly production is about 30% of capacity; peak hour summer demand uses nearly 100% of production capacity in conjunction with storage tanks to address limitations in the 4.5 MGD production capacity.

Table 7: Wastewater Collected and Treated – AF

	2020	2025	2030	2035	2040	2045
Waste Water Collected and Treated	19,324	19,324	19,324	19,324	19,324	19,324
Recycled Water Available if Full Capacity is Used	5,044	5,044	5,044	5,044	5,044	5,044

Disposal of Wastewater

Current and future City of Palo Alto RWQCP discharges of treated wastewater to the San Francisco Bay are shown in Table 8.

Table 8: Disposal of Wastewater (non-recycled) – AF

Method of Disposal	2020	2025	2030	2035	2040	2045
Discharged to San Francisco Bay	17,523	17,523	17,523	17,523	17,523	17,523
Discharged to Bay by way of Emily Renzel Marsh	1,043	1,043	1,043	1,043	1,043	1,043

Recycled Water Current and Potential Use

Law

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:

(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, 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.

Current Recycled Water Use

Phase 1 of the RWQCP's regional recycled water system has been in operation since 1980. It serves the Palo Alto Golf Course, Greer Park, the Emily Renzel Marsh, and the RWQCP. In 2009 the City completed a project to replace an existing deteriorating pipeline to Shoreline Golf Course in Mountain View and to extend the pipeline to the Mountain View-Moffett area. The pipeline replacement restored the golf course connection and provides recycled water services to the Shoreline community. City of Palo Alto Utilities (CPAU) paid $1 million of the cost for this pipeline to ensure the pipeline will be sized to meet possible future needs in the City. In addition, CPAU has committed to pay another $1 million if and when it taps into the new pipeline.

The recycled water produced by the RWQCP in FY 2020 was used for the following:

- Trucked water mostly for irrigation with some construction dust control (4 AF)
- Irrigation water for Palo Alto Parks (36 AF)
- Irrigation water for the Palo Alto Municipal Golf Course (250 AF)
- Irrigation water for the RWQCP (2 AF)[34]
- Water for the Duck Pond (25 AF)
- Irrigation water for CalTrans freeway landscape medians (1 AF)

In addition:

- Tertiary water is used for industrial processes at the plant itself using sub-Title 22 plant effluent. The amount of industrial use recycled water that replaces potable water for this use is 696 AF.
- The pipeline serving Shoreline Park and other customers in Mountain View (442 AF)

Actual recycled water use in Palo Alto in 2020 was lower than the projection in the 2015 UWMP (316 AF versus 850 AF). Process water for use at the RWQCP was incorrectly counted in total recycled water use in the 2015 UWMP. Those volumes have been removed from the recycled water totals and identified separately in the 2020 UWMP.

Potential Recycled Water Use

Palo Alto completed a Water Reclamation Master Plan (Master Plan) for the Palo Alto RWQCP in 1992 (Brown and Caldwell 1992) and the accompanying Final Program Environmental Impact Report (EIR) in 1995 (CH2MHill 1995). The Master Plan and program-level EIR evaluated the

[34] This is an estimated unmetered amount for landscaping inside the Palo Alto RWQCP and for that reason is excluded from actual and projected recycled water estimates in this UWMP.

development of a regional water reuse system that could ultimately provide service to the entire RWQCP service area. The Master Plan includes a phased approach to the expansion of treatment, distribution, storage, and use of recycled water. The City did not pursue any of the recommended expansion stages of a water recycling system as the cost of the projects could not be justified.

In 2005, the City engaged a consultant to complete a Recycled Water Market Survey (Market Survey). Completed in 2006[35], the objectives of the study were to review and update the list of potential recycled water users identified in the 1992 Master Plan and to update the estimated recycled water use potential and the cost estimates for the delivery of recycled water. The Market Survey included site investigations, market analysis, conceptual project design, and preparation of a preliminary financing and revenue plan.

In December 2008, the City completed the Recycled Water Facility Plan investigating the expansion of the regional recycled water system to serve areas in Palo Alto[36]. As described in the narrative regarding potential future uses for recycled water, in September 2015, City Council certified the project EIR for the expansion of the City's recycled water system to serve the Stanford Research Park.

On September 28, 2015 the Palo Alto City Council adopted a resolution certifying the EIR for an expansion of the existing recycled water distribution system[37]. The primary objectives of extending the recycled water pipeline would be:

1. To allow the City to maximize recycled water as a supplemental water source, thereby improving potable water supply reliability by conserving drinking water, which is currently used for irrigation and other non-potable uses;
2. To provide a dependable, drought-proof locally controlled non-potable water source;
3. To increase recycled water use from the RWQCP and reduce discharge to San Francisco Bay; and
4. To reduce reliance on imported water.

In 2019, the Northwest County Recycled Water Strategic Plan was undertaken in collaboration with Valley Water to assess drought-proof recycled water expansion opportunities throughout the RWQCP service territory. One element was a business plan for the Phase 3 Expansion Project. Phase 3 is a non-potable water pipeline extending the current recycled water

[35] The report was provided to the UAC in October 2006 and the Council in November 2006: http://www.cityofpaloalto.org/cityagenda/publish/uac-meetings/documents/Item1AttachmentARecycledWaterMarketSurveyfinalreport.pdf

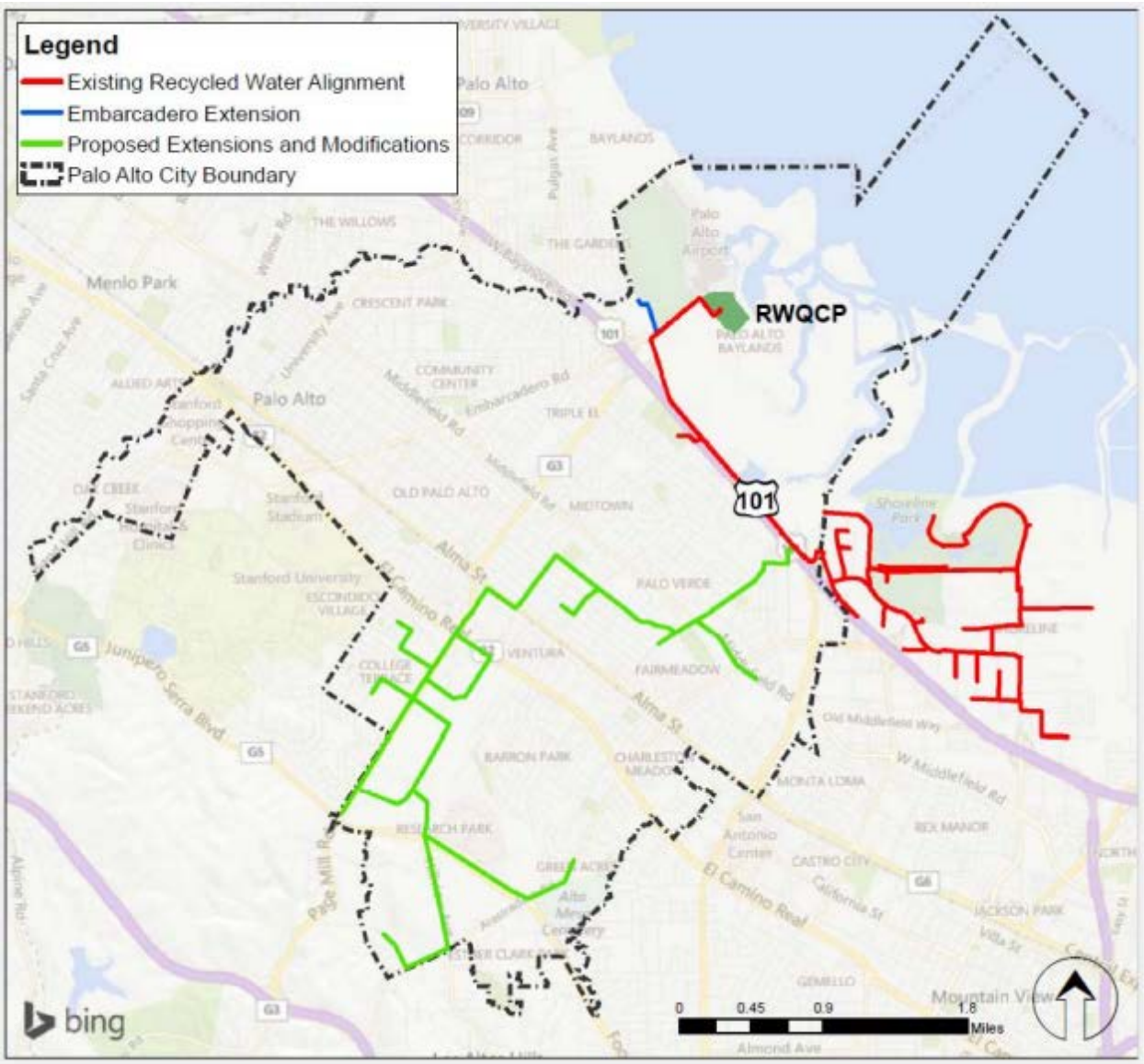
[36] Report provided to the UAC in March 2009: http://www.cityofpaloalto.org/civicax/filebank/documents/14932. The executive summary of the report provided to Council in April 2009 in informational Staff Report 203:09: http://www.cityofpaloalto.org/civicax/filebank/documents/15501

[37] See Staff Report 6071: http://www.cityofpaloalto.org/civicax/filebank/documents/49059

distribution system to the Stanford Research Park. The Business Plan[38] presented the costs, benefits and budgetary impacts of the project.

The map below shows an overview of the project alignment.

Figure 2: Phase 3 Recycled Water Expansion Project Overview



The need for external funding was identified as a key component of making the project economically feasible. Phase 3 and variations of it were included in the larger strategic plan.

[38] See Utilities Advisory Commission Report: https://www.cityofpaloalto.org/civicax/filebank/documents/65978

The Northwest County Recycled Water Strategic Plan identified, summarized and ranked water reuse alternatives or "Concept Options" based on cost and non-cost criteria. The list included non-potable, satellite non-potable, indirect potable, and direct potable reuse options. The GUA was relied upon to assess the indirect potable reuse options.

The plan concluded that multiple water reuse opportunities are feasible for Palo Alto to meet both near-term and long-term water demands. Near-term opportunities, those that could be implemented within five years, include non-potable reuse program expansion projects and satellite treatment for non-potable reuse projects. In contrast, long-term opportunities that could be implemented include indirect potable reuse within 10-20 years and direct potable reuse implementation within 20-40 years. The opportunities are not all explicitly distinct from each other.

The satellite non-potable reuse project was found to be cost-prohibitive. Indirect potable reuse and large-scale direct potable reuse in Palo Alto are not compatible with the Partnership Agreement because the reduced effluent availability will render those projects infeasible. However, a number of non-potable projects and small-scale direct potable reuse were found to be compatible with the Partnership Agreement described below and will be considered as part of a "One Water Plan" in 2021.

The potential uses in Palo Alto for recycled water are shown in Table 9below. The table shows current use continuing for 2020. The potential landscape use increase starting in 2025 in Table 9reflects the possibility of the Phase 3 recycled water system expansion.

Table 9: Potential Future Use of Recycled Water in Palo Alto- AFY

Treatment	Type of Use	2020 (Actual)	2025	2030	2035	2040	2045
Tertiary treatment plus additional disinfection (Title 22 unrestricted use standard)	Agriculture	0	0	0	0	0	0
	Landscape (no golf courses)	42	1,142	1,142	1,142	1,142	1,142
	Golf Course	250	250	250	250	250	250
	Industrial	-	-	-	-	-	-
	Groundwater Recharge	-	-	-	-	-	-
	Palo Alto Duck Pond	25	25	25	25	25	25
	Total	316	1,416	1,416	1,416	1,416	1,416

Regional Collaboration

The Partnership Agreement, approved by Palo Alto's council on November 18, 2019, addresses multiple objectives including diverting treated wastewater discharge from the Bay, increasing the use of treated wastewater from the RWQCP, and displacing potable imported water where appropriate and feasible. The Partnership Agreement is comprised of three main elements:

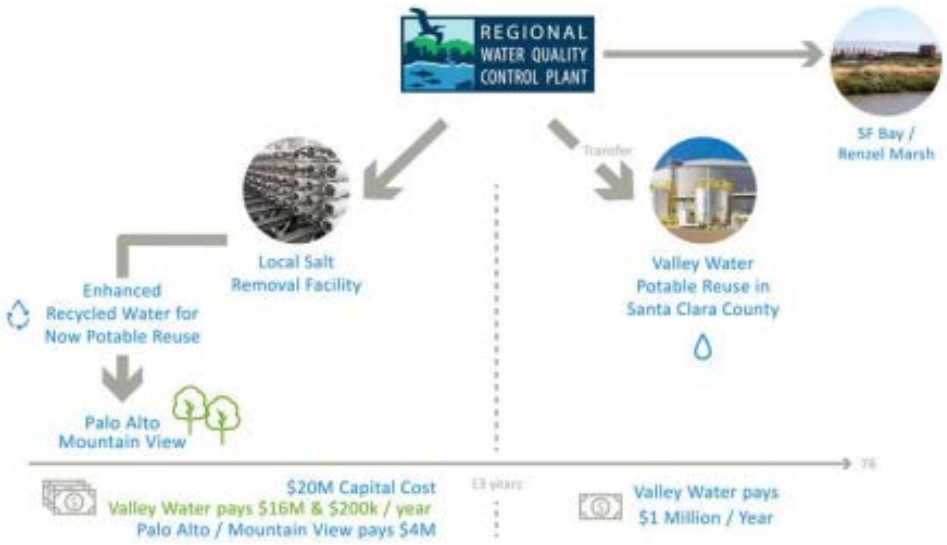
1. Valley Water will contribute $16 million, of an approximately $20 million total cost, to design and construct a small salt removal facility at the RWQCP in Palo Alto to improve the quality of non-potable recycled water used in Palo Alto and Mountain View. The

improved water will be better for salt-sensitive plants and will, in the short-term, enable Mountain View to connect around 60 new customers to the distribution system;

2. About half the treated wastewater produced by the RWQCP will be transferred to Valley Water for use in the county south of Mountain View. Valley Water will pay $1 million per year to be allocated between all the wastewater agencies that commit treated effluent to the transfer; and
3. Palo Alto and Mountain View will have a future option to request a new potable or non-potable water supply from Valley Water if needed. Any new water resource will be supplied by Valley Water at cost.

The first two elements of the Partnership Agreement are shown in the infographic below.

Figure 3: Palo Alto, Mountain View, Valley Water Partnership Agreement



The City has participated in other various regional recycled water planning initiatives.

- The City is a stakeholder in the ABAG-led effort to secure grant funding for a Bay Area Integrated Regional Water Management Plan (IRWMP) and for projects identified in that IRWMP.
- CPAU and the partners of the RWQCP assisted in the funding of a project to build a new recycled water pipeline from the RWQCP to Mountain View. The project was completed in summer 2009. This project does not have new connections to end uses in the City, but the pipeline is sized to accommodate future expansion of recycled water use in the City.
- The City is a member of the California WateReuse Association, which helps promote and implement water recycling in California.

- The City is a member of the Bay Area Recycled Water Coalition, a group of regional recycled water project proponents that advocate for and seek funding from the Federal Bureau of Reclamation under Title 16.
- The City is a member of Bay Area Clean Water Agencies, a group of wastewater treatment plants that advocate and seek funding from State propositions and State Revolving Fund loans.
- The City actively participates on the Valley Water Recycled Water Subcommittee. The Committee is a group of recycled water retailers and wholesalers that meets bimonthly to discuss issues and challenges surrounding the use and promotion of recycled water.
- The City of Palo Alto is currently a member of the Joint Recycled Water Task Force with Valley Water which seeks future recycled water expansion projects.

Encouraging and Optimizing Recycled Water Use

Law

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

The City has engaged in a variety of activities to advance water reuse. Regional coordination as well as state and federal matching funds will be critical to successful implementation.

The City encourages Recycled Water usage in the following ways:

- Participating in the Integrated Regional Water Management Plan process
- Encouraging businesses and City departments to utilize the existing recycled water capability within the City
- Participating as an active member of the WateReuse Association, including hosting meetings of the Northern California Chapter of the Association
- Offering recycled water for free to users willing to pick it up at the RWQCP by truck
- Adoption of the Recycled water Mandatory Use Ordinance
- Adoption of the Salinity Reduction Policy

In May 2008, the City approved a Mandatory Use Ordinance to require customers to prepare for recycled water delivery in the future[39]. In 2019, the City updated the Green Building Ordinance[40]. The threshold for dual plumbing in new construction was lowered from 100,000 sf (square feet) to 50,000 sf or 50 or more toilets and urinals (formerly 100 toilets and urinals). Compliance with the ordinance is administered through the permit process with the Building Department. CPAU provides plan review services of landscape and irrigation design plans, in order to ensure compliance with outdoor water efficiency and recycled water requirements.

The Northwest County Recycled Water Strategic Plan identified several non-potable alternatives. If the Phase 3 recycled water expansion project with an extension up to Foothills Park is approved by City Council and constructed, the recycled water use in the City would increase by approximately 1,100 AF per year.

The City Council approved a Salinity Reduction Policy[41] in January 2010 to address the elevated salinity levels in the recycled water. The policy identified inflow and infiltration as a likely contributor to the elevated salinity levels, and provided a target salinity level based on minimum inflow and infiltration into the wastewater collection system. As a result, several steps were implemented to lower the TDS levels in the recycled water:

- The RWQCP continues to monitor potential saltwater intrusion "hotspots" and communicate the results to the RWQCP partners;
- The RWQCP tracks salinity data and perform other investigative work to support the effort;
- CPAU coordinated implementation of the Sanitary Sewer Management Plan to manage the Palo Alto wastewater collection system and identify inflow and infiltration reduction actions; and
- The RWQCP developed a plan to coordinate salinity reduction activities with the RWQCP partners and prepare for expanded recycled water application. This plan[42] was coordinated with the Valley Water, which has jurisdiction over the groundwater basins in Santa Clara County.

Customer concerns regarding potential negative effects of recycled water on redwood trees and other sensitive plants led the City to identify several mitigation measures in the Phase 3 EIR if the City is unable to meet the goal for a TDS of 650 mg/l by project start-up:

- The City may utilize its existing Recycled Water Ordinance exemption process to exempt redwood trees and/or other salt sensitive species from the use of recycled water;
- The City may blend recycled water and other lower salinity water prior to application; and/or

[39] City of Palo Alto Municipal Code, Title 16, Chapter 16.12. The Ordinance applies to non-residential customers. The City has no plans to provide recycled water to residential customers.
[40] See PAMC section 16.14: https://codelibrary.amlegal.com/?o=1
[41] City Council Resolution 9035: http://www.cityofpaloalto.org/civicax/filebank/documents/21246
[42] The Valley Water updated its groundwater management plan in 2012

- The City may treat recycled water to reduce TDS prior to application, or shortly thereafter.

A key component of the Partnership Agreement is Valley Water funding for a salt removal facility at the RWQCP. The Advanced Water Purification System (AWPS) will improved the quality of recycled water produced at the RWQCP enabling increased use in Mountain View and addressing water quality concerns regarding the potential Phase 3 expansion to the Stanford Research Park and other customers. Design of the project is underway with construction completion anticipated by 2022.

Desalinated Water

Law

> 10631 A plan shall be adopted . . . that shall do all of the following:
>
> (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.

Development of desalinated water is not feasible at this time. In its Long Term Reliable Water Supply Strategy, BAWSCA considered a wide range of desalination projects, ranging in size from 1 MGD to 20 MGD, and ranging in type from brackish groundwater to an ocean water open intake. Two types of projects were included in the final report: 1) a project that produces 15 MGD of water sourced from an open intake in San Francisco Bay; and 2) a project that produces up to 6.5 MGD from brackish water sourced from either shallow vertical brackish groundwater wells or horizontal directionally drilled (HDD) wells extracting higher salinity brackish groundwater from under the Bay. BAWSCA is committed to facilitating desalination partnerships and pursuing outside funding for related studies.

The City is currently aware of one regional collaborative effort between different water agencies to evalua12%12%te a large scale Bay Area desalination project, The Bay Area Regional Desalination Project. The Bay Area Regional Desalination Project is a collaboration between the East Bay Municipal Utility District, Valley Water, the SFPUC, Contra Costa Water District, and Zone 7 Water Agency to jointly explore developing the feasibility of a regional desalination facility that could directly or indirectly benefit 5.4 million San Francisco Bay Area residents and businesses served by these agencies. The SFPUC is considering the project in combination with the Los Vaqueros Reservoir expansion project.

Energy Intensity

Law

> 10631.2 (a) …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.

The RWS is mostly gravity-fed, and therefore, has relatively low energy intensity. More information is provided in SFPUC's 2020 UWMP

The City's local distribution system operates mostly by taking advantage of the gravity-fed RWS with two exceptions: water pumped to storage and customers in the foothills and the production of recycled water. An estimated 775,000 kwh per year is required to produce the City's 1,000 AFY recycled water supply making the energy intensity 775 kwh/AF. Moving water to the foothills requires approximately 1,500,000 kwh per year. Spreading the energy use over Palo Alto's total potable demand of 12,000 AF yields an energy intensity of 125 kwh/AF. However, since 2013 the City's electric supply has been carbon neutral[43], making the greenhouse gas footprint negligible.

[43] Palo Alto Carbon neutral Plan: https://www.cityofpaloalto.org/civicax/filebank/documents/33220

Section 4 – Water Demand

Law

10631 A plan shall be adopted in accordance with this chapter that shall do all of the following:

(d) (1) 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, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

(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; and (J) Distribution system water loss.

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

(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.

10631.1 (a) The water use projections shall include projected water use for single-family and multi-family residential housing for lower income households, as identified in the housing element of any City, County, or City and County in the service area of the supplier.

10608.4 Provide baseline daily per capita water use target, interim urban water use target, and compliance daily per capita water use, along with the basis for determining those estimates.

Water Usage

Lay Description

Although the City has experienced several drought periods since 1975, the recent drought of 2014 to 2016 has had a particularly profound effect on City and customer attitudes regarding water. The state-mandated water use reductions in the recent drought resulted in large numbers of landscape conversion projects as well as a dramatic shift in customer behavior regarding water use. In addition, new construction in every sector is subject to increasingly stringent regulations regarding water-using appliances and fixtures.

Demand Projections

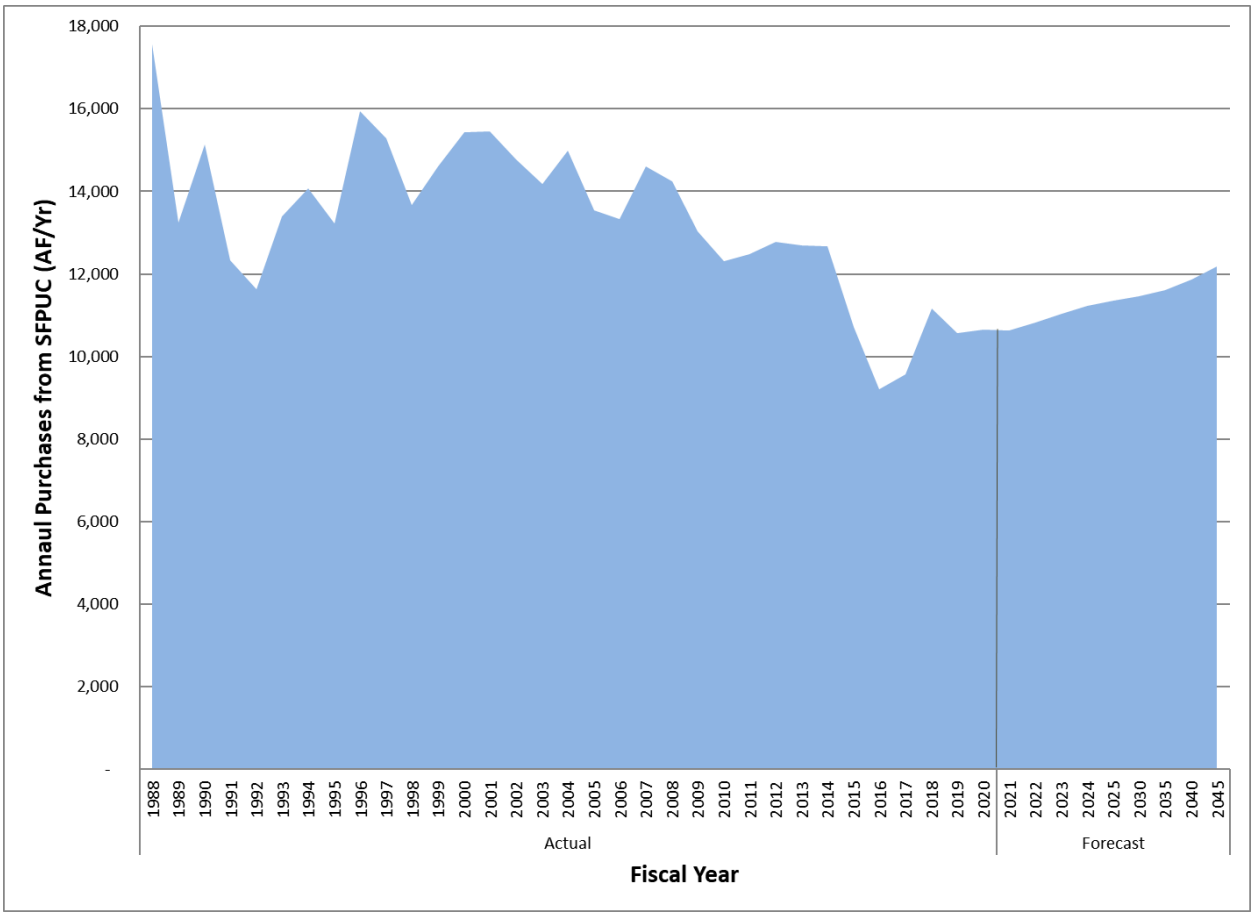
Incorporating the profound effects of the recent drought and state-imposed mandatory potable water use reductions presented an additional challenge when developing the water demand projections for this UWMP. The City used a model developed by BAWSCA to forecast SFPUC purchases assuming the continuation of the City's existing Demand Management Measures (DMMs). The City used the same BAWSCA model to project water savings from future DMMs, which is discussed in detail in Section 5 of this plan.

The BAWSCA model uses a Demand Side Management Least Cost Planning Decision Support System (DSS Model) in combination with an Econometric Model to determine demand projections. The Econometric Model projected short-term demands through 2025 based upon historical water use patterns through 2019 and the projected future rebound in water demand associated with forecasts for drought recovery. The DSS model projected long-term demand for each end-use customer class (through 2045) based upon expected service area growth for both population and employment. The DSS model considers unemployment rates and projects demand assuming a normal economy. Age of buildings is also considered with regard to end uses as a result of plumbing code changes and assumed fixture replacement rates.

Figure 4: below shows the City's potable water use since 1988 and a projection of water supplies through 2045. Water consumption in the recent drought reached its lowest level in more than 25-years. The reduction in water consumption was the result of state mandated water reductions combined with permanent water conservation measures.

During the drought of 2014 to 2016, the SWRCB required the City to reduce potable water use by 24% for the period June 2015 through October 2016 compared to usage in 2013. The City met that reduction target. Because many permanent water use changes including landscape conversion occurred as a result of rebate programs and public outreach, and because the City detects a shift in the community's attitude regarding water use, the City forecasts water consumption to remain relatively stable in the future, with slight increases due to a post-drought rebound and continued increases in economic development and population. By 2025, the City projects that the overall trend of decreasing per capita water use will resume.

Figure 4: Water Supply Purchases – Actual and Forecast



Water Sales

Total water sales decreased by 11%, from 11,375 AF/Y to 10,177 AF/Y between FY 2010 and FY 2015 during the drought. Water sales rebounded from FY 2015 to FY 2020 by 5% up to 10,722 AF/Y. Table 10 shows historical and projected sales by customer type before and after incorporating the impact of planned DMMs discussed in Section 5 – Demand Management Measures. Planned DMMs are included as an estimate, however, actual conservation programs are subject to approval by Palo Alto's City Council. Table 11 shows the number of accounts in each category, and Table 12 shows the sales per account for each customer type. The City does not have sales to other agencies, agricultural use, or saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.

Table 10: Historical and Projected Water Sales – by Customer Type (Fiscal Years)

AF/Y	2015	2020	2025	2030	2035	2040	2045
Single Family	4,554	4,967	4,796	4,905	5,019	5,163	5,308
Multifamily	1,530	1,797	1,837	1,852	1,876	1,913	1,954
Commercial	1,911	1,628	1,763	1,753	1,750	1,753	1,760
Industrial	397	295	313	321	328	336	343
Institutional	357	435	417	435	453	472	490
Other	3	3	2	2	2	2	2
Landscape	1,163	1,278	1,252	1,282	1,313	1,343	1,374
Government	263	319	300	313	326	340	353
Total Water Sales	10,177	10,722	10,681	10,864	11,067	11,322	11,585
Future DMM			184	267	329	348	320
Net Water Sales	10,177	10,722	10,497	10,597	10,738	10,975	11,265

Table 11: Historical and Projected Water Accounts – by Customer Type (Fiscal Years)

	2015	2020	2025	2030	2035	2040	2045
Single Family	15,029	15,026	16,049	16,754	17,430	18,161	18,869
Multifamily	1,923	2,162	2,329	2,431	2,529	2,635	2,738
Commercial	1,494	1,352	1,363	1,396	1,429	1,462	1,495
Industrial	91	62	70	72	73	75	77
Institutional	50	47	51	54	56	58	61
Other	669	707	729	761	792	825	857
Landscape	371	433	426	437	447	458	468
Government	236	228	239	249	259	270	280
Total Water Acounts	19,863	20,016	21,256	22,153	23,015	23,944	24,845

Table 12: Historical and Projected Water Sales per Account (AF) (Fiscal Years)

	2015	2020	2025	2030	2035	2040	2045
Single Family	0.303	0.331	0.293	0.287	0.280	0.276	0.273
Multifamily	0.795	0.831	0.784	0.753	0.729	0.713	0.700
Commercial	1.279	1.204	1.288	1.242	1.204	1.176	1.151
Industrial	4.348	4.749	4.464	4.437	4.412	4.403	4.393
Institutional	7.148	9.214	8.095	8.087	8.081	8.081	8.081
Other	0.004	0.004	0.003	0.003	0.003	0.003	0.003
Landscape	3.132	2.956	2.779	2.655	2.652	2.663	2.773
Government	1.115	1.401	1.258	1.257	1.256	1.256	1.256
Total Use per Account	0.512	0.536	0.494	0.478	0.467	0.458	0.453

Use per account rebounded from FY 2015 to FY 2020 in most customer categories as California emerged from a drought. Overall water use per account increased by 5%. During this period, water use per account increased by 9% for single family residences, 5% for multifamily, 9% for industrial, 29% for public facilities, and 26% for City facilities. Water use per account decreased 6% for commercial, and 6% for landscape irrigation customers.

Share of Total Consumption by Customer Type

In FY 2020 single-family and multi-family water sales were responsible for 63% of total water consumption in the City. The business sectors including commercial and industrial customers consume 18%, while irrigation customers consumed 12%. Public and City facilities consume the

remaining 7%. The relative share of water consumed by residential customers has increased since FY 2015 by 3% while the share of water consumed by business sectors (other than irrigation) has increased decreased by 5% since FY 2015. Figure 5 and Figure 6 below show the breakdown of consumption by customer type for FY 2015 and FY 2020.

Figure 5: FY 2015 Water Sales by Customer Class

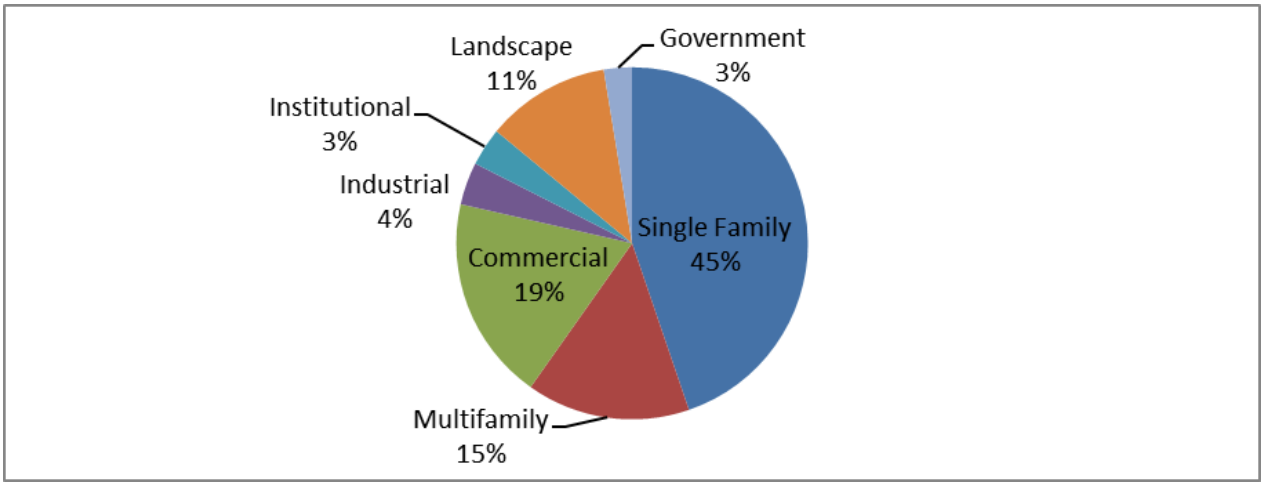
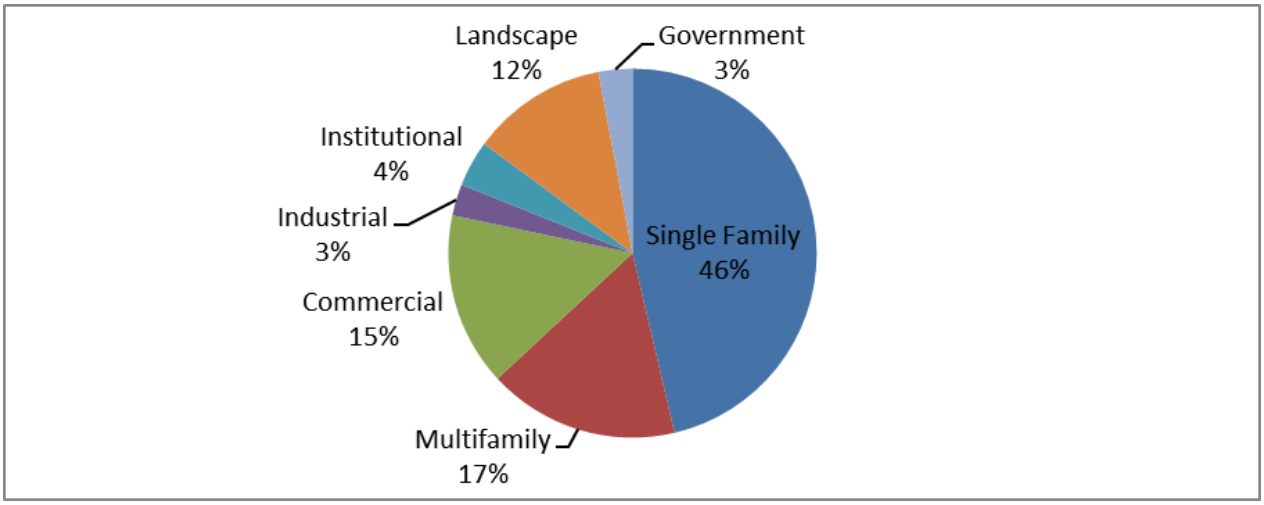


Figure 6: FY 2020 Water Sales by Customer Class



Sales to Other Agencies

The City has not, and does not plan to, sell water supplies to other agencies.

Additional Water Uses - Recycled Water Use

Recycled water use is discussed in Section 3, "System Supplies," under the heading "Water Recycling." Past use and future recycled water use projections are presented in Table 13 below. Although the City is exploring an expansion of its recycled water system, the Council has not made a commitment to expand the use of recycled water in the City and, therefore, the table reflects no increase in the use of recycled water in the future. The 2015 UWMP projected

future recycled water use to be 850 AF/Y. That projection inadvertently included industrial process water used at the RWQCP. Recycled water use at the municipal golf course increased due to changes made to the landscaping which allowed for more high salinity water to be applied. Actual use in 2020 was 316 AF.

Table 13: Recycled Water Use (AFY)

Treatment	Type of Use	2015 (Actual)	2020 (Actual)	2025	2030	2035	2040	2045
Tertiary treatment plus additional disinfection (Title 22 unrestricted use standard)	Agriculture	0	0	0	0	0	0	0
	Landscape (no golf courses)	63	42	42	42	42	42	42
	Golf Course	166	250	250	250	250	250	250
	Industrial	0	0	0	0	0	0	0
	Groundwater Recharge	0	0	0	0	0	0	0
	Palo Alto Duck Pond	29	25	25	25	25	25	25
	Total	258	316	316	316	316	316	316

Non-Revenue Water/Water Loss

Non-Revenue water, or unaccounted-for water, is the difference between the amount of water purchased and the amount sold to customers. Non-revenue water typically amounts to about 7% of total purchases. From CY 2005 to 2008, the City's non-revenue water volumes significantly increased, with a peak in CY 2006 of 12.45%. In response, the City initiated a comprehensive leak detection, meter locating and meter calibration program. As of 2009, the non-revenue water volumes returned to expected levels. Appendix C contains the water loss audit report for the most recent year to date, 2019. Real losses in that year, as per the audit, were 123 AF.

Table 14 presents the historical and projected non-revenue water volumes for the City's water system.

Table 14: Non-Revenue Water (AFY)

AFY	2020	2025	2030	2035	2040	2045
Non-Revenue Water	199	790	798	808	826	848

Total Water Use

Table 15 shows total water use in the City.

Table 15: Total Water Use (AFY)

	2020	2025	2030	2035	2040	2045
Retail Sales	10,722	10,497	10,597	10,738	10,975	11,265
Non-Revenue Water	199	790	798	808	826	848
Recycled Water	316	316	316	316	316	316
Total	11,237	11,603	11,710	11,862	12,117	12,429

Projected Low to Moderate Income Water Use

Palo Alto was one of the first jurisdictions in California to establish an official low to moderate income housing requirement in 1974. The Below Market Rate (BMR)[44] program now requires developers of projects with five or more residential units to comply with the City's BMR requirements. The BMR program objective is to obtain actual housing units within each development rather than off-site units or in-lieu payments. At least 15% of the housing units developed in a project involving fewer than five acres of land must be provided as BMR units. Projects involving the development of five or more acres must provide at least 20% of all units developed as BMR units. (Projects that cause the loss of existing rental housing may need to provide a 25 percent BMR component). The BMR units must be comparable to the market rate units in the development.

Due to the BMR requirements and the cost of housing in Palo Alto, the City has few single-family BMR units and does not anticipate this will change in the future. Approximately 2,192 units in the City meet lower income levels as defined in Section 50079.5 of the California Health and Safety code[45]. Of these, 599 rental and ownership units, or 28% of the total housing units were produced through the BMR program. The remaining 1,593 units, or 72% of total housing units, are subsidized housing.[46]

For purposes of the current lower income projections, the 2020 UWMP assumes:

- 2,192 units out of the total housing stock in 2020 are considered affordable housing as determined by the classification of very low to moderate incomes.
- Affordable housing units in Palo Alto are categorized as multi-family.
- An average of 2.03[47] individuals per multi-family unit. This is approximately 5,000 individuals or 7% of the total population in 2020.
- Multi-family usage in Palo Alto is projected to average approximately 49 GPCD in 2025 declining to 44 GPCD in 2045 (from the DSS model).
- An additional of 46 units will be added for each 5-year increment in the planning horizon.[48]

Table 16: Projected Low Income Water Demands (AF)

	2020	2025	2030	2035	2040	2045
Single-family Residential	0	0	0	0	0	0
Multi-family Residential	235	267	281	296	312	329
Total	235	267	281	296	312	329

[44] City of Palo Alto Comprehensive Plan, Chapter 4 – Housing Element

[45] The difference between the total BMR units and the units that meet the requirements in the UWMP Act is due to the inclusion of additional units that meet 81% to 120% of the Average Median Income in Santa Clara County. The City provides these additional units in recognition of high cost of housing in Palo Alto.

[46] Current figures provided by the City of Palo Alto Planning Department.

[47] U.S. Census Bureau, American Community Survey (ACS) 2018 5yr Data , assumes an average of 2.03 persons per multi-family dwelling unit.

[48] 15% BMR requirement applied to Council housing goal of 300 units

The City anticipates the current BMR program requirements will remain in effect in its current form for the foreseeable future. Future housing and population projections inherently assume that increases in housing stock will include growth in lower income households through the BMR program. Based on future projected demand forecasts shown in Table 10, the City expects to have ample water supplies to meet all customers' demands during a normal year. During a drought, the City will follow the steps outlined in Section 8 (Water Shortage Contingency Plan). The WSCP addresses the City's response depending on the severity of the drought. The City will implement measures to maximize potential savings while at the same time minimizing the impact to the wellbeing of the citizens and businesses in Palo Alto. As part of this process, the City Council will have an opportunity to balance the needs of different customer classes with the need to achieve meaningful reductions[49].

Water Conservation Bill of 2009

The Water Conservation Bill of 2009 (SBx7-7) was enacted in November 2009. It requires water suppliers to reduce the statewide average per capita daily water consumption by 20% by December 31, 2020. To monitor the progress towards achieving the 20% by 2020 target, the bill also required urban retail water providers to reduce per capita water consumption 10% by 2015. Water agencies that are not in compliance with the provisions of the bill could be ineligible for State grants and/or a low cost financing program.

Water suppliers have some flexibility in setting and revising water use targets leading up to the 2020 compliance period, including:

- A water supplier may set its water use target and comply individually, or as part of a regional[50] alliance. The City is in discussions with BAWSCA and Valley Water regarding a potential future alliance with other water agencies.
- A water supplier may revise its water use target in its 2015 or 2020 UMWP or in an amended plan.
- A water supplier may change the method it uses to set its water use target and report through an amendment to the 2010 plan or in its 2015 UMWP.
- Urban water suppliers are not permitted to change target methods after they have submitted their 2015 UMWP.

SBx7-7 provided four potential compliance methods that are summarized below:

1. 80% of the urban water user's baseline gallons per capita per day (GPCD) water use;

[49] Water Utilities typically do not possess income information for their customers and are limited in their ability to offer differential rate treatment for low income customers due to Proposition 218 restrictions. During a drought, it is more common for water utilities to differentiate between customers in a Class based on water usage patterns and relative efficiency. For example, accounts with extremely low water use could be exempted from penalty rate treatment.

[50] SBx7-7 allows entities to comply individually or as a group. The intent of this provision is to ensure there is equity among small agencies and large water agencies or districts that serve large areas that may span different socioeconomic and evapotranspiration zones.

2. The per capita daily water use that is estimated using several performance measures, subdivided between different customer classes;
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); or
4. A method that was identified and developed by the department, through a public process, and released on December 31, 2010. The fourth method uses a combination of metered sales data and achieved water use reductions across the different customer classes.

The City Council, by Resolution 9174, adopted a compliance methodology based on the first option, or 80% of an urban water user's baseline GPCD. Under this methodology, the City is required to prepare the following calculations for compliance purposes:

- *Baseline daily per capita water use* — The City must determine for baseline purposes how much water is used within an urban water supplier's distribution system area on a per capita basis. It is determined using water use and population estimates from a defined range of years. For the City, the range selected is from fiscal year 1995 to 2004 (Table 17).
- *Urban water use target* — The value is equal to 80% of the baseline daily per capita water use value.
- *Interim urban water use target* — The planned daily per capita water use in 2015 is halfway between the baseline daily per capita water use and the urban water use target.
- *Compliance daily per capita water use* – The gross water use during the final year of the reporting period, reported in gallons per capita per day. This value will be adjusted during the 2015 and 2020 compliance period based on actual usage data.

Table 17 illustrates the methodology to calculate the 10-year average baseline per capita[51] water use.

Table 17: Baseline Daily Per Capita Water Use for 10-year period (1995 through 2004)

Fiscal Year	Distribution System Population	Daily System Gross Water Use (MG)
1995	56,647	203.8
1996	56,885	220.8
1997	57,420	203.8
1998	57,868	203.8
1999	58,136	198.2
2000	58,467	203.7
2001	59,334	199.6
2002	60,028	209.1
2003	59,930	202.5
2004	59,894	251.1
Baseline Daily Per Capita Water Use		**225.3**

[51] US Census

Based on future water use and population growth projections, Table 18 summarizes Palo Alto's 2010 UWMP SBx7-7 target and compliance goals.

Table 18: 2015 UWMP SBx7-7 Performance Metrics (gallons per capita per day)

	2015	2020
Baseline GPCD	225.3	225.3
Target GPCD	202.8	180.3
Actual GPCD	142.0	141.7

The City met the 2020 SBx7-7 target and the 2015 target. The City did not adjust the compliance original target.

Measures, Programs and Policies that Achieved SBx7-7 Water Targets

The City is committed to promoting all cost-effective conservation programs that meet both the City's water reduction goals and community interest. Palo Alto shifts emphasis between different conservation programs depending on various factors, including community acceptance.

Economic Impacts of SBx7-7 Compliance

There were no incremental economic impacts associated with SBx7-7 compliance. Implementation of conservation measures was not driven by SBx7-7. Palo Alto deploys all measures that are cost effective compared to the incremental cost of purchasing additional water supplies from the SFPUC system[52].

[52] DMMs discussed in Section 5

Section 5 – Demand Management Measures

Law

> 10631 (f) 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.
>
> 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.

The City is committed to support conservation and efficient use of its water supply. It is the goal of the City to continue to look for opportunities, innovative technologies, and cost-effective programs that best utilize the City's water conservation budget. The City works with BAWSCA and Valley Water to implement Best Management Practices water conservation programs.

The California Water Code Section 10631 (e) requires that an urban retail water supplier provide descriptions that addresses the nature and extent of the following DMMs that have been implemented over the past five years and/or will be implemented to achieve its water use target pursuant to SBx7-7:

A. Water waste prevention ordinance;
B. Metering;
C. Conservation pricing;
D. Public education and outreach;
E. Programs to asses and manage distribution system real loss;
F. Water conservation program coordination and staff support; and
G. 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.

In addition, the DMMs described below are water management tools and options used by the City that maximize resources and minimize the need to import water from other regions.

Water Waste Prevention Ordinance

The City has enforced water waste prevention as part of the City's Municipal Code since 1989 (Palo Alto Municipal Code Chapter 12.32). Enforcement includes written warning notices to violators and may result in fines and installation of a flow restrictor on the service connection of the customer or purchaser of water whose service connection was used in the violations observed or established, and billing the costs of such installation to said customer or purchaser.

Green Building Ordinance and Model Efficient Landscape Ordinance

In 2015, Palo Alto City Council approved an updated Green Building Ordinance (Palo Alto Municipal Code Chapter 16.14) that incorporates the state's 2013 Green Building Standards Code (CALGreen), which sets permit requirements for water efficiency design, including irrigation systems, in new development. In addition to the CALGreen standards, the City requires the installation of a "laundry to landscape ready" irrigation system for all residential new construction projects. Also, the City's Green Building Ordinance has a lower square footage trigger for irrigation efficiency than the state's Model Water Efficient Landscape Ordinance (MWELO). The 2019 Green Building Ordinance[53] update lowered the threshold for dual plumbing in new commercial construction to 50,000 sf and 50 toilets or urinals.

For non-residential projects, MWELO requires compliance for landscapes of any size associated with new construction and landscapes of 1,000 square feet for renovation projects. Under the City's current Green Building Ordinance, compliance with MWELO is required for landscapes of any size on all non-residential construction projects, as well as for landscaped areas of 1,000 square feet or more for residential projects. Palo Alto adopted the State Water Efficient Landscape Ordinance per Governor Brown's Drought Executive Order EO-29-15. The new ordinance went into effect February 1, 2016.

Metering

The City has approximately 20,000 water service connections in its service territory. In 2020, irrigation meters accounted for 2% of the total installed meters, whereas water consumption from irrigation meters accounted for 10% of the City's total metered water consumption. Non-revenue water (NRW) usage currently accounts for less than 7% of the City's water consumption (by comparison, the 2020 national average of NRW was 16%.)

Palo Alto is planning on installing advanced metering infrastructure (AMI) for electric, water and gas meters. When fully implemented in 2024-25, the system will be capable of detecting water leaks at customer premises and alerting them. City plans to leverage this technology to reduce water leaks at customer premises and help lower bills.

[53] See Green Building Ordinance:
https://www.cityofpaloalto.org/civicax/filebank/blobdload.aspx?t=44495.2&BlobID=74776

Since 2012, the City has been replacing aging water meters with digital water meters that register water usage down to increments of 0.01 CCF (or hundred cubic feet). Traditional water meters can only register water usage in increments of 1 CCF. The smaller incremental water usage readings help to facilitate water leak detection.

Conservation Pricing

Since 1976, the City has implemented conservation-based pricing for water usage, within an overall cost-based rate structure. For residential customers, water usage is billed as a two-tiered volumetric charge that increases as monthly water consumption exceeds a threshold level. For non-residential customers, water usage is billed on a uniform volumetric charge. All customers are also billed a monthly service charge that varies depending on the meter size.

The City conducted a water cost of service and rate study[54] in 2019 with the assistance of an independent consultant, to ensure continued compliance with the California Constitution's cost of service requirements for water rates. As a result, the water rate structure was evaluated and updated. On an annual basis, City staff reviews and updates the City's water rates for both residential and nonresidential water customers.

Public Education and Outreach

Since 2006, the City has partnered with BAWSCA to offer free workshops on water efficient landscaping, irrigation and water conservation. Workshop topics include Creating a Water-Efficient Sustainable Garden, Laundry to Landscape Graywater Systems, Irrigation Basics for Homeowners, Water Conservation 101, Rainwater Harvesting, etc. In addition to public workshops, City of Palo Alto Utilities (CPAU) staff attends community, corporate and school events to promote water conservation programs and practices, in addition to energy efficiency, waste reduction and other sustainability practices. During shelter-in-place, workshops continued to be offered via live and recorded webinars[55].

The City carries out various seasonal and general water conservation campaigns via the use of television, online, social media and print advertisements. Palo Alto also regularly updates the City's website on water conservation programs and public workshops. The City utilizes utility bill inserts, brochures and email newsletters to customers as part of its outreach efforts.

In the fall of 2014, due to the drought, the City implemented a web and mobile application known as PaloAlto311 to allow residents and businesses to report incidents of leaks or other water waste issues.

[54] See consultant memo:
https://www.cityofpaloalto.org/civicax/filebank/blobdload.aspx?t=48180.98&BlobID=71405
[55] https://bawsca.org/conserve/programs/classes

In response to prolonged drought conditions, on January 31, 2014 the SFPUC asked its Retail and Wholesale Customers to voluntarily reduce system-wide water consumption by 10 percent. That summer, BAWSCA, in partnership with the SFPUC, launched a regional drought education campaign to heighten awareness and encourage water conservation. The regional campaign drew upon the SFPUC's "Water Conservation is Smart and Sexy" citywide campaign. The regional campaign appeared in the form of billboards, BART station ads, movie theater ads, and online video advertisements.

Following Governor Brown's Drought Executive Order on April 1, 2015 and conservation regulations mandating a statewide 25 percent reduction in potable urban water use, the SFPUC continued its call for a system-wide 10 percent reduction in water use. The SFPUC and BAWSCA partnered again to launch a new drought campaign for the summer of 2015 to remind customers to keep up their water conservation efforts, focusing in particular on outdoor water savings. Regional messaging was included in the form of billboards, BART station ads, television ads, newspaper ads, and a video campaign.

During shelter-in-place, The City continued to engage in public outreach including a family-friendly e-newsletter, one issue of which focused on water conservation[56].

Programs to Assess and Manage Distribution Systems Real Loss

For over two decades, the City has pursued an aggressive Water Main Replacement Capital Improvement Program. This program identifies seismically vulnerable and structurally deficient water mains and appurtenances that are undersized, corroded, and/or subject to breaks and leaks, and replaces them with jointless high-density polyethylene (HDPE) NSF 61 piping material. Trenchless construction methods are utilized, where it is cost effective. Through this program, approximately 10,000 linear feet of water mains are replaced every other year, which has significantly reduced water leaks throughout the system. The City maintains a 24-hour response program to fix water leaks.

In addition, the City also maintains a Water Meter Replacement Program that replaces 500 to 1,000 meters per year in accordance with American Water Works Association (AWWA) standards. In the last 5-years meter replacement has been at a rate of about 200 meters per year in anticipation of the AMI program that will replace about 11,000 meters by 2024. In 2012 through 2014, a "Large Water Meter Testing, Calibration, Repair & Replacement" Program was undertaken that involved a total of 257 large water meters. Of these meters, 136 meters have been tested, repaired, removed, or replaced, thereby improving the accuracy and reliability of these meters. Meters are tested on a 10-year cycle in accordance with industry-standard best management practices. Depending on the test results the 20-year meter replacement cycle may be adjusted to address meters outside the AWWA specifications.

[56] See Sustainability Newsletter for kids: https://content.govdelivery.com/accounts/CAPALO/bulletins/2a6f131

Coupled with the aforementioned AMI project, these capital improvement programs further enhance the City's ability to track volume of water entering and leaving the distribution system, reducing NRW and aligning the Utility's meter testing and replacement cycles.

Water Conservation Program Coordination and Staffing Support

To achieve the water conservation and efficiency objectives of state and local mandates, Palo Alto partners with agencies, such as Valley Water and BAWSCA, to offer many conservation programs and services to Palo Alto residential and commercial water customers. City Council has adopted several policies that support increased goals for energy and water efficiency efforts as well as sustainability goals for the City.

Water Conservation Programs
For over a decade Palo Alto has partnered with Valley Water to administer water efficiency programs to meet the City's water reduction goals. This partnership between Valley Water and the City is currently formalized through a Memorandum of Understanding[57] (MOU), under which Valley Water and the City co-fund various programs and partner to promote residential and commercial sanitary fixtures, free conservation devices, indoor and outdoor water efficiency surveys, irrigation hardware upgrades, and residential educational workshops. Over time, the water efficiency programs provided under the MOU have evolved or expanded concurrent with advancements in water-saving technologies and best practices for water efficient program delivery.

The most innovative technologies and cost-effective programs are implemented to best utilize the annual water conservation operating budget. These programs include free indoor and outdoor water audits, as well as rebates for upgrading a wide range of water-using fixtures to high efficiency models, including laundry to landscape graywater systems, high water-using landscapes, irrigation hardware, commercial food service and other process equipment. Toilets, urinals and clothes washer rebates are not currently available but may be again in the future. Water conservation resources available to Palo Alto customers can be found on the City's website[58] and Valley Water's website[59].

Water Wise Survey Program
In partnership with Valley Water, the City offers the Water Wise Survey Program. This two-part program provides help to customers on how to use less water for their landscape and home.

Do-it-Yourself Water Wise Indoor Survey Kits enable customers to independently check their homes for leaks and efficiency improvement opportunities. Kits include a step-by-step guide to

[57] See Staff Report #11295 https://www.cityofpaloalto.org/civicax/filebank/documents/77209
[58] See website: https://www.cityofpaloalto.org/gov/depts/utl/residents/save_energy_n_water/resources/efficiency_tips/water_saving_tips.asp
[59] See Valley Water's website: https://www.valleywater.org/water-conservation-programs

evaluate water use (in Chinese, English, Spanish, and Vietnamese), a flow rate bag for testing shower and sink flow rates, and dye tablets for testing toilets for leaks. Digital versions of the step-by-step guide in multiple languages are also available. Customers who complete the survey can request free water conservation items for their homes, such as low flow faucet aerators and showerheads and toilet flappers.

During the **Water Wise Outdoor Survey** customers receive a free, comprehensive, consultation from a trained irrigation professional. The consultation includes an irrigation system evaluation to flag issues onsite, identify rebate programs a customer could qualify for, and create a custom report detailing the survey findings. The service is offered to single family and small multi-family sites (under 1/2 acre of landscape area) in Palo Alto with a working irrigation system.

Landscape Rebate Program

The Landscape Rebate Program (LRP) provides rebates for Palo Alto residents and businesses to convert approved high water-using landscapes (i.e. irrigated turf or functional swimming pools) with a qualifying low water-using landscape as well as to retrofit existing irrigation equipment with approved high efficiency irrigation equipment (including rain sensors, high efficiency nozzles, dedicated landscape meters, and weather-based irrigation controllers), and rainwater capture incentives such as rain gardens, rain barrels, and cisterns. To participate in the LRP, a Palo Alto customer must complete a pre-inspection and submit an application for approval before beginning any work on their project.

As part of the LRP, the City partners with Valley Water to provide Rainwater Capture Rebates for customers who wish to install a qualifying rain barrel or cisterns to collect rainwater from existing downspouts or installing a rain garden to collect roof water runoff.

Home Water Report Program

In late 2013, the City began delivering quarterly Home Water Reports to single family households in Palo Alto. Approximately 13,000 residential customers received the reports. The Home Water Report compares a household's water usage to neighbors with similar lot sizes, landscape area, and family demographics. The reports rank a household for how water efficient it is compared to homes with similar demographics, in an attempt to encourage more water efficient behaviors and participation in conservation programs. Annual water savings from this program are estimated at approximately 1.9% for households receiving the reports. The Home Water Report program ended in 2015. However, Palo Alto plans to re-launch a similar program in 2021.

Water Efficient Technology Rebate Program

Through Valley Water, the City offers the Water Efficient Technology (WET) Rebate Program. Commercial, industrial, and institutional customers such as schools and hospitals may receive a rebate to replace or update equipment with WET that results in measurable water reduction.

Submeter Rebate Program
Through Valley Water, the City offers the Submeter Rebate Program that can help mobile home parks, apartments and condominium complexes in Palo Alto to convert from a master water meter to individual water submeters.

Water Conservation Coordinator
The City has maintained a full-time Water Conservation Coordinator position for more than 20 years and expects to maintain the position indefinitely. Duties of the Water Conservation Coordinator includes water conservation program planning, implementation, management, reporting, and representing Palo Alto at various water conservation committees and meetings. The current Water Conservation Coordinator is Kevin Carley (Kevin.Carley@CityofPaloAlto.org)

Water Waste Coordinator
The City created a Water Waste Coordinator position in 2014. The Water Waste Coordinator performs a wide range of functions associated with the City's drought response program, including investigating incidents of water waste, enforcing the City's water use restrictions, and responding to customer inquiries about drought regulations and water conservation programs. The current coordinator is Shelby Sinkler, Program Assistance.

Large Landscape Survey and Water Budget Program
Through Valley Water, the City offers a program that provides landscape irrigation surveys, water budgets and customized water usage reports for commercial, industrial, institutional, and multi-family complex customers with over 1/2 acre of landscape area within Palo Alto. These customers may be eligible for a free landscape field survey. Professional irrigation auditors perform free site evaluations to provide recommendations for improving system efficiency. The water budget for each landscape site is calculated based on the area of irrigated landscape, type of plants, irrigation system and real-time weather monitoring. Monthly reports documenting a site's irrigation performance are distributed to site managers, landscapers, homeowners association board members and other relevant parties, as approved by utility account holders. Through a web portal, customers can access site-specific recommendations, view trends in water use, verify water budget assumptions and request a free landscape field survey from an irrigation expert. This program has been in place since 2012 and to date, there are 132 large landscape sites covered under this program.

BAWSCA Conservation Programs

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.

Section 6 – Water Supply Reliability

Law

10631 A plan shall be adopted in accordance with this chapter that shall do all of the following:

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments, including:
(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.

(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.

(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).

Water Supply Reliability

The City's potable water supply is dependent upon the reliability of SFPUC's RWS. The SFPUC defines reliability by the amount and frequency of water delivery reductions (deficiencies) required to balance customer demands with available supplies in droughts. This section discusses these potential system-wide deficiencies.

Reliability of the Regional Water System

In 2008, the SFPUC adopted Level of Service (LOS) Goals and Objectives in conjunction with the adoption of the Water System Improvement Project (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 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"[60] 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

[60] "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.)

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 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.[61]

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
- 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

[61] 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/.

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 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[62], 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.

- **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.

[62] 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.

- **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 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.

- **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.

Coordinated Efforts Between BAWSCA and the SFPUC to Develop of Alternative Water Supplies

With the adoption of the Bay Delta Plan Phase 1 by the SWRCB 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 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 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.

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 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

Vulnerability Areas	General Overview of Vulnerabilities
	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

Vulnerability Areas	General Overview of Vulnerabilities
	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, 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.

Vulnerability Areas	General Overview of Vulnerabilities
	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 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 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.

Local Plans to Ensure a Reliable Water Supply

The City has been a leader in combating climate change while recognizing that its impact will not be avoided and mitigation measures will be needed. To that end, the City adopted a Sea Level Rise Adaptation Policy in March 2019[63]. The City has begun a vulnerability assessment which will include an evaluation of the impact of sea level rise on wastewater treatment and utilities facilities and infrastructure. The vulnerability assessment will be followed by an implementation plan.

The City has completed several studies and projects regarding water supply reliability. Of note, the City completed the Emergency Water Supply and Storage Project and certified the Project EIR for Phase 3 of the recycled water project. In addition, the City is continuing to evaluate other water supply alternatives as part of a One Water plan. This analysis will include the impact of long-term water supply shortage on the total water supply.

[63] See Palo Alto's Seas Level Rise Adaptation Policy:
https://www.cityofpaloalto.org/civicax/filebank/blobdload.aspx?t=71340.78&BlobID=70115

Section 7 – Water Shortage Contingency Plan

Law

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:

(2) The procedures used in conducting an annual water supply and demand assessment.

(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.

(4) Shortage response actions that align with the defined shortage levels…

(5) Communication protocols and procedures to inform customers, the public, interested parties, and local, regional, and state governments…

(6) For an urban retail water supplier, customer compliance, enforcement, appeal, and exemption procedures for triggered shortage response actions…

(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.

(8) A description of the financial consequences of, and responses for, drought conditions…

(9) For an urban retail water supplier, monitoring and reporting requirements and procedures…

(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.

Background

Except for recycled water, the City does not currently produce any of its own water supplies, but is dependent upon its suppliers. The City's primary supplier is the SFPUC. The SFPUC is the only supplier in normal years. The City's five older wells have been refurbished and the City completed construction of three new wells to remain in standby for use during emergencies and potentially to supplement the SFPUC supply during a severe drought. The Valley Water manages the county's groundwater and levies a groundwater extraction fee for all water produced by the wells within its jurisdictions. The City has also approved and signed a mutual

aid agreement for emergency water supplies with California's Water Agency Response Network (Coastal group) that has over 75 signatories.

To meet the requirements of the Urban Water Management Planning Act and for the purposes of this document, a distinction will be made between a catastrophic interruption of water supplies and a water shortage due to drought. A catastrophic interruption of water supplies may occur due to natural disaster such as an earthquake or due to a sudden problem with water quality, or because of sabotage or terrorism. A water shortage due to drought is the more likely occurrence. The City has experienced three drought water shortages in the past 35 years, in l976-77, from l987 to l993, and 2014-2016 drought.

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).

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; and
- Pilot plant trailer (Mobile Pilot Plan O&M Plan)

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 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.

Power Outage Preparedness and Response

The SFPUC's water transmission system is primarily gravity fed. 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 Valley Water, which also has back-up generators in place; and
- The WSIP includes projects that expand the SFPUC's ability to remain in operation during power outages and other emergency situations.

Seismic Risk Assessment and Mitigation Plan

As part of the Facilities Reliability Program and the 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 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).

Local Distribution System Reliability

The City has improved its emergency supply preparedness by rehabilitating five existing wells, drilling three new wells, and building an additional water storage reservoir. The well system can now support a minimum of eight hours of normal water use at the maximum day demand level and four hours of fire suppression at the design fire duration level.

The City also maintains several critical interconnections with neighboring water utilities as shown in Table 19. These interties can be activated during critical events to ensure water supplies are not impacted and also to provide mutual aid to neighboring communities.

Table 19: Interties with other Agencies

Name	Number	Diameter (inches)
East Palo Alto	1	6
Mountain	2	6
Stanford	2	8
Purissima Hills WD	2	8,12

Emergency Response Plan

Response to a catastrophic interruption of supply is handled through a series of interconnected plans. All Disaster or Act of War Plans, from the state to local levels, use the Federal Civil Defense and Emergency Planning systems as role models with additions that take into consideration any unique conditions or situations that may exist within their jurisdictions.

At the national level, the Federal Emergency Management Agency (FEMA) controls all functions of Civil Defense or Emergency Planning for the Federal Government. FEMA will not assume control of an emergency until the President declares a State of Emergency or an Act of War occurs. At that point FEMA will assume control through the State of California Office of Emergency Services (State OES) and make available all of its resources.

At the state level, the State OES will control any disaster within the state and make its resources available after a State of Disaster has been declared by the governor. The State OES further controls the Master Mutual Aid Agreement that can also be used in a local disaster (the City is a member of California's Water Agency Response Network, Region 2, a mutual aid system for water utilities, in accordance with State requirements).

At the county level, the Santa Clara County OES will control the unincorporated areas of the County. It will coordinate mutual aid within the County and act as an intermediary between local governments or utilities and the State mutual aid office.

On the city level, the City will control all emergencies according to its Emergency Response Plan. The Mayor, City Council or City Manager may declare an emergency at which time representatives of all City departments will report to the Emergency Operations Center.

The City's Emergency Response Plan incorporates the CPAU Water, Gas and Wastewater Operations Emergency Response Plan (the UER Plan), which covers any emergency curtailment of water supplies. The UER Plan is a detailed outline of actions to be taken and procedures to be followed by utility personnel in event of a water emergency. This plan is maintained in the office of Water, Gas and Wastewater Operations and must be updated every 12 months.

The UER Plan is designed as both an outline and a procedures manual. It covers the following primary functions:

1) Notification Procedures;

2) Water Mutual Aid Agreement;
3) Radio/Telephone /Communications;
4) Water Receiving Station and Reservoir Check List;
5) Boil Water Notifications;
6) Highest Water Use Customer Load Reduction List;
7) Water Interconnect Locations; and
8) Disinfecting of Water Mains.

All CPAU personnel whose duties include work on the system through maintenance or construction operations, or as Utilities Dispatchers, are highly trained and experienced in performing their normal or "common emergency" duties. If a disaster or Act of War were to occur, the City's construction standards may have to be lowered to make temporary repairs to expedite the restoration of the system, but the procedures and safety rules by which the work would be accomplished will not change. These temporary repairs would be upgraded and made permanent or replaced, as necessary, at a later date. The City's primary concern is the safety of the general public and all City personnel.

To that end, CPAU continues to maintain three diesel emergency generators in order to enhance the water system response reliability during a catastrophic seismic event causing severance from the City's primary supply source, and is investigating additional purchases or leases. Lease acquisition of these emergency generators will fulfill this reliability goal for the medium- and the long-term. At the same time, given the uncertainty of the future, acquisition through lease agreements for these emergency gen sets will reduce the City's risk of generator inoperability. Generators would enable continued operation of water facilities during a transmission grid failure.

Water Supply and Demand Assessment

Law

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.

Decision-Making Process to Determine Water Supply Availability

In June 2020, Palo Alto provided an example of an annual Water Supply and Demand Assessment (WSDA) report to support DWR in the development of guidelines for AB 1668 and SB 606 implementation. To support this process, Palo Alto worked with the SFPUC and BAWSCA to review existing water supply report processes and evaluate options to meet the requirements of the legislation.

Palo Alto receives approximately 93% of its total water supply and 100% of its potable water supply from SFPUC. The WSA between SFPUC and its Wholesale Customers requires SFPUC to provide its Wholesale Customers with an initial assessment of water supply availability in each February, followed by an update in March and a final assessment by April 15th of each calendar year. These letters document whether SFPUC can provide full supplies for the coming water year or whether rationing will be implemented. The determination of projected available water supply considers, 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.

To evaluate water supply availability for the current year and one dry year, Palo Alto will utilize the BAWSCA Regional Reliability Model. The Regional Reliability Model aggregates hydrologic data and operational rules from SFPUC and other sources to evaluate overall water supply reliability. Table 20 describes the key data inputs and assumptions for modeling supply availability to prepare an assessment report.

Table 20: Key Input for the Water Supply and Demand Assessment

Input	Description
Current Year Unconstrained Demand	Total Water Production for the fiscal year
Current Year Available Supply	SFPUC Water Supply Availability Estimate for SFPUC supplies U.S. Geological Survey (USGS) real-time gages FY 1987-88 hydrologic conditions (selected for statistical similarity to current year's hydrologic conditions) Groundwater availability assumed based on information and correspondence from agencies who manage the basins Expected groundwater and treated water availability from sources managed by Valley Water
One Additional Dry Year Available Supply	FY 1976-77 hydrologic conditions (consistent with UWMP single dry year assumptions)
Existing Infrastructure Capabilities and Plausible Constraints	Modeling implicitly considers infrastructure and storage constraints; Calaveras Dam operations "hold point' for slow refill is represented in this analysis.

Data and Methodologies

Because Palo Alto relies on only one potable water supply source, SFPUC RWS water, the Annual Assessment will rely on key data inputs from the SFPUC.

1. Evaluation Criteria
   In April of each year, the SFPUC provides an assessment of the water supply situation and alerts the Wholesale Customers of any voluntary or mandatory water use reduction requirements. The SFPUC's assessment of the water supply situation will serve as the City's evaluation criteria.

2. Water Supply
   Palo Alto relies on RWS water for 100% of its potable water supply. Recycled water is used on a limited basis for irrigation and industrial uses and cannot replace potable water supplies in any significant way. Groundwater may be available to supplement potable water needs in extreme circumstances.

3. Unconstrained Customer Demand

Palo Alto will utilize the end-use model described in Section 4 with updated historical water use to determine unconstrained demand. If significant land use or customer water use changes have occurred, the model will be updated to reflect those changes.

4. Planned Water Use for Current Year Considering Dry Subsequent Year
   Evaluation of how anticipated supplies for the particular coming year will be used, while anticipating that the following year will be dry. Each year's assessment is informed by the characterizations in Chapter 6 and other current pertinent factors and considerations.

5. Infrastructure Considerations
   Any local Palo Alto capital projects that may impact delivery capacity such as main replacements or emergency groundwater well work will be considered. The SFPUC's water supply assessment will take capacity constraints on the RWS into consideration.

6. Other factors
   Because groundwater in Santa Clara County is managed by Valley Water, Palo Alto will take into consideration any water use reductions anticipated to be implemented by Valley Water for the coming year when deciding whether or not to incorporate groundwater into the City's supply for the following year.

Approval Process

The following are the functional steps to formally approve the Annual Drought Risk Assessment (Annual Assessment).

1. Review by the Utilities Advisory Commission (UAC)
   The Annual Assessment will be presented and discussed at a UAC meeting. The report and presentation will include a request that the UAC recommend City Council approval of the document and information regarding any specific WSCP response actions triggered by the Annual Assessment results.
2. Adoption by City Council agenda
   Upon UAC action, the City Council will adopt the Annual Assessment and will be notified of any specific WSCP response actions triggered.

SFPUC 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. SFPUC's annual 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.

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.

Demand Assessment

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.

Supply Assessment

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 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.

Table 21 shows the availability of RWS supplies for Retail Customers and Wholesale Customers in normal years. Table 22 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 WSA 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 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[64]

Table 21: RWS 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.

64 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 22: RWS 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.

Infrastructure Considerations

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.

System Modeling

To proactively plan for conditions that would result in a shortage of water supplies, the SFPUC models conditions using a hypothetical drought that is more severe than what the RWS has historically experienced. This drought sequence is referred to as the "design drought" and serves as the basis for planning and modeling of future scenarios. The design drought consists of an 8.5-year sequence of dry conditions.

In applying its water supply planning methodology, the SFPUC performs an initial model simulation of the system for the design drought sequence and then reviews the ability of the system to deliver water to the service area through the entire design drought sequence. If the projected water supply runs out before the end of the design drought sequence in the initial model run, system-wide water 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.

Decision-Making Process

Regardless of the expectation of shortage conditions, as part of the normal course of business, the SFPUC provides a water supply condition update to its executive team every two weeks throughout the year. 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.

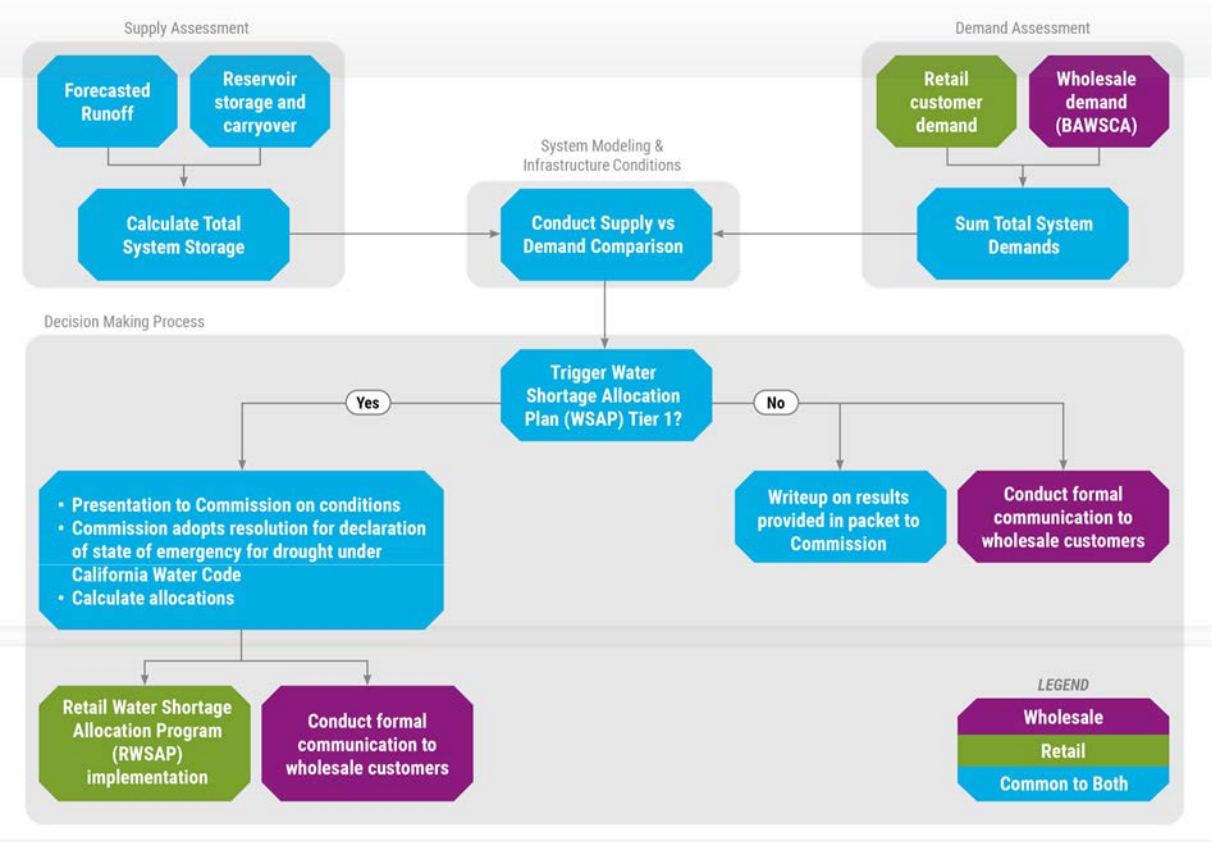
If the RWS appears incapable of meeting system-wide demand due to drought, the SFPUC is expected to declare a water shortage by March 31 of that drought year. The General Manager, or designee, is responsible for declaring such a shortage. A presentation would be made to the Commission as part of the 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 8**.** 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 shown in Figure 7.

Figure 7: SFPUC WSDA Process



Water Shortage Contingency Plan

Law

10632.(a) Every urban water supplier shall prepare and adopt a water shortage contingency plan as part of its urban water management plan…

(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.

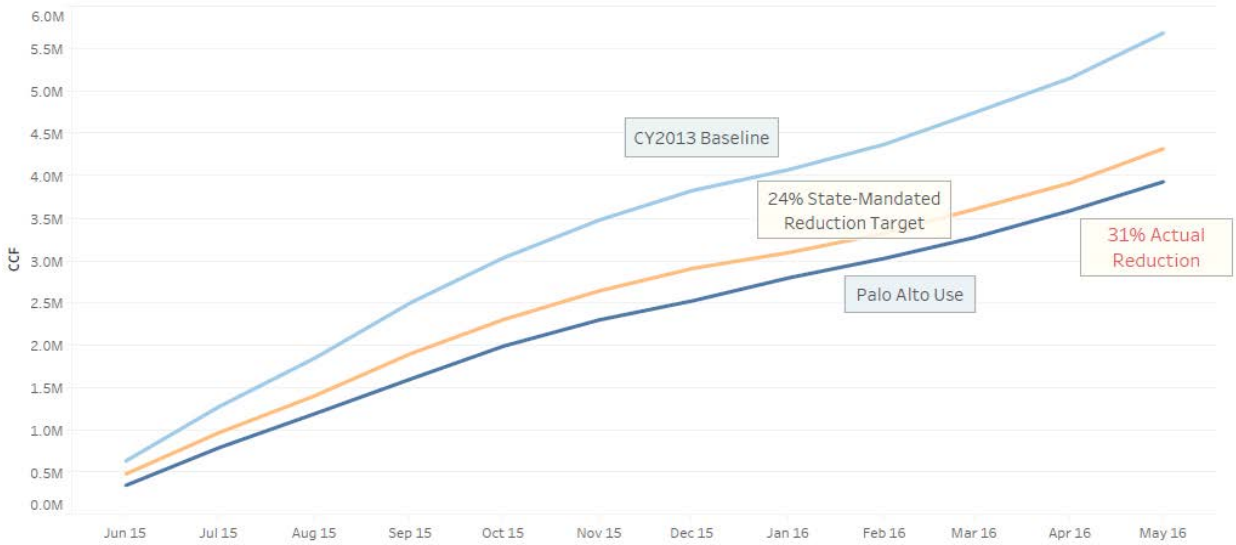
(4) Shortage response actions that align with the defined shortage levels and include, at a minimum, all of the following: (A) Locally appropriate supply augmentation actions, (B) Locally appropriate demand reduction actions to adequately respond to shortages, (C) Locally appropriate operational changes, (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.

Palo Alto's Experience with Drought Management

The City has had considerable experience implementing action plans during a period of water shortage, such as a drought. The City has always been able to comply with any rationing requirement imposed by SFPUC. During the 1976/77 drought period, the City achieved reductions in citywide consumption of 16% in FY 1977 and 37% in FY 1978 compared to consumption in FY 1976. In the 1987-1993 drought period, the City's consumption was lower than consumption in 1987, the year just before SFPUC instituted mandatory rationing, by from 19% (in FY 1989) to over 35% (in FY 1992). In response to the voluntary 10% call for rationing in 2008-2009, the City responded with reductions of approximately 18% relative to 2004 consumption.

In 2015, the City responded to state-mandated potable water use reductions by implementing the water restrictions in Stage II of its WSCP. The City exceeded the 24% cumulative reduction target for the June 1, 2015 through May 31, 2016 compliance period compared to calendar year 2013; the City's usage was 31% below usage during the same period in 2013 as shown in Figure 8.

Figure 8: Palo Alto Water use Reductions Compared to State-Mandated Target



The community has responded exceedingly well to requests to use water in the most efficient way possible. As a result of experiencing these drought-time water supply shortages, many residents and businesses have implemented permanent improvements in water use efficiency.

During a water shortage period, the Director of Utilities is responsible for executing the WSCP. Representatives from appropriate City Departments and Utilities Divisions are involved to oversee outreach and monitoring efforts. Additional resources are dedicated to this effort both for internal and external execution of the plan.

A key element to developing WSCPs for the City is close coordination and cooperation with SFPUC, BAWSCA, and the Valley Water. It is critical to develop a coherent and coordinated regional response to water shortages in order to provide a consistent message to customers.

Regional Interim Water Shortage Allocation Plan

Tier One Drought Allocations

In July 2009, as part of the WSA, the Wholesale Customers and San Francisco adopted a Water Shortage Allocation Plan (WSAP) to allocate water from the RWS to Retail and Wholesale Customers during system-wide shortages of 20% or less (the "Tier One Plan")[65]. The Tier One Plan allows for voluntary transfers of shortage allocations between the SFPUC and any Wholesale Customer and between Wholesale Customers themselves. In addition, water "banked" by a Wholesale Customer, through reductions in usage greater than required, may also be transferred.

[65] The previous water shortage allocation plan expired in 2009 with the termination of the previous Water Supply Agreement with the SFPUC. Details of the previous allocation plan are provided in the 2005 UWMP.

In 2019, through an amendment to the WSA, the Tier I allocation formula was modified to ensure that, in the event of a shortage, San Francisco Retail Customers will need to reduce consumption by a minimum of 5%. Under the new formula, more water would be available to Wholesale Customers like Palo Alto during a shortage than was available under the former formula, and the amendment also provided that some of the water conserved by San Francisco Retail Customers will remain in storage for use in subsequent dry years.

The Tier One Plan, which allocates water between San Francisco and the Wholesale Customers collectively, distributes water based on the level of shortage as shown in Table 23:

Table 23: SFPUC and Wholesale Customer Share of Available Water

Level of System Wide Reduction in Water Use Required	Share of Available Water	
	SFPUC Share	Wholesale Customer 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 will expire at the end of the term of the WSA on June 30, 2034, unless extended by San Francisco and the Wholesale Customers.

Tier Two Drought Allocations

In 2011, the Wholesale Customers negotiated and adopted the Tier Two Drought Implementation Plan (Tier Two Plan), which allocates the collective Wholesale Customer share among each of the 26 Wholesale Customers. This Tier Two Plan allocation is 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 supplies made available from the SFPUC will be allocated to the individual Wholesale Customers 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 fixed Wholesale Customer's Individual Supply Guarantee as stated in the WSA. The second component is the Base/Seasonal Component, which is variable and is calculated using each Wholesale Customers total monthly water use from all available water supplies during the three consecutive years prior to the onset of the drought. The second component is accorded twice the weight of the first 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 minimum level of supply to meet health and safety needs for certain Wholesale Customers.

Each Wholesale Customer's Allocation Factor, which represents its percentage allocation of the total available water supplies, is calculated from its proportionate share of the total of all Wholesale Customers' Allocation Bases. 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.

For long-term planning purposes, each Wholesale Customer has been provided with the Tier Two Allocation Factors calculated by BAWSCA based upon the most recent normal year to determine its share of available RWS supplies. However, actual allocations to each Wholesale Customer during a future shortage event will be calculated in accordance with the Tier Two plan at the onset of the shortage.

Water Shortage Mitigation Options

Water shortage mitigation options can be classified under two categories: Supply Side Options and Demand Side Options. This section provides descriptions of many different actions and activities that are possible in reaction to a water supply shortage situation. The City's response to drought-time shortages depends upon the severity of the shortage. Following this section, specific actions are outlined for the various stages of a potential shortage.

Supply Side Options

The City's options to increase its short-term water supply are limited. The City's long-term supply options are discussed in Section 3, "System Supplies." The section below discusses short-term alternatives to increase supply in the event of a water supply shortage.

City Wells

The status of the City's emergency wells is discussed in the Groundwater area of Section 3, "System Supplies." During a drought period, it may be possible to use some water from the wells to supplement the supply from the SFPUC, depending on the groundwater situation in the Santa Clara Basin. Valley Water, the groundwater manager in Santa Clara County, may place restrictions on that resource as well.

Recycled Water

During a drought or a short-term water emergency, recycled water would be available to the City, however, a wide distribution of recycled water would require substantial infrastructure

that would be difficult to construct in a short period of time. The City or private companies with tanker trucks can obtain permits to utilize recycled water from the RWQCP. These companies can pick up recycled water and deliver it to customers who will pay for this service. During the summer of 2015, the City increased the use of water trucks to irrigate City trees on City-owned medians and several private companies utilized recycled water to deliver water to private citizens. Public awareness is enhanced by greater publicity of the availability of this alternative to customers. Trucking recycled water may displace about 1% of potable water demand.

Recycled water is available except in a catastrophic disaster (severe earthquake) that severs all sources of water (SFPUC, wells and storage) to the system thereby eliminating the source of water to the RWQCP. However, in the event of a severe earthquake the delivery of recycled water will be a low priority.

Water Purchases from Other Suppliers

The City could conceivably purchase water from a new supplier in an extreme water supply shortage situation. However, any such purchase would have to be consistent with the requirements specified in the WSA[66] and be coordinated with all other jurisdictions between the source and the City to ensure the supply meets deliverability requirements. The SFPUC has made such purchases of water from various suppliers in times of water shortages. The City and all other BAWSCA member agencies have received this water through the SFPUC delivery systems. It is unlikely that the City could negotiate a better deal than the SFPUC or BAWSCA in these extremely complicated short-term arrangements, and therefore it is unlikely that the City would seek to purchase water on its own.

The City is a participant in several regional efforts to evaluate and develop new supply sources, including purchasing water from other sources. Additionally, the effluent transfer agreement with Valley Water and the City of Mountain View enables the City to request Valley Water to develop and offer water supplies to Palo Alto at cost.

The SFPUC system has several interties with adjacent water agencies, including EBMUD and the Valley Water. These interties could be used to “wheel” water that is purchased from other sources or agencies.

Demand Side Options

In droughts, the City expects to achieve significant amounts of demand reduction through its use of DMMs, as that term is used in the California Water Code. (See, for example, §§ 371, 10631.) These options include a combination of information outreach programs, drought rate schedules, demand side programs and water use restrictions.

Defining Water Features

The City owns and operates several un-metered water features including two recirculating fountains and one recreational water feature. A small number of commercial customers have

[66] WSA, Section 3.12

recirculating fountains. The City's Water Use Restrictions ordinance prohibits non-recirculating fountains. The City is not aware of any non-recirculating, privately-owned water features.

Baronda Lake, which uses about 250 AF over the 5 month period from mid-May through mid-October, is used for recreation and education and is habitat for several species of fish, other aquatic life and birds. The lake is also a water source for many different types of mammals.

Demand Side Management Programs:
Demand side management programs can be offered using many different program design options and delivery mechanisms. Some examples are listed below.

Home Water Use Reports
Home Water Reports will be used to encourage customers to save water. The Home Water Report compares a household's water usage to neighbors with similar lot sizes, landscape area, and family demographics. The reports rank a household for how water efficient it is compared to homes with similar demographics, in an attempt to encourage more water efficient behaviors and participation in conservation programs.

Information Outreach Programs
Customers will be provided with information on ways to achieve needed water use reductions. The City will communicate to the customers how best to prioritize their water use needs and how to implement alternative ways to receive the same level of service while using less water.

Information and public outreach programs include utility bill inserts, information on CPAU's website, local print media campaigns, a social media presence, commercial targeted mailings, workshops and demonstrations, fact sheets on conservation technologies and practices, and coordination with product manufacturers and suppliers.

Incentive-based Demand Side Management Programs
In a persistent water shortage or required water use reduction, most customers will take the quick and easy actions first. More complex and expensive incentive programs to provide demand side management may be needed to achieve additional results. Although incentive programs require time to develop and promote, significant water savings can be achieved. Depending upon market saturation, some programs such as delivery of relatively inexpensive hardware (e.g. low-flow faucet aerators and showerheads) and services such as leak detection and irrigation system audits can offer quick drought-time savings. Other programs may include a toilet rebate program or incentives to replace high water use landscapes with water efficient landscape designs and installation of efficient irrigation hardware.

Customer Water Use Audit Programs
Water audits are provided as an informational service to customers and typically include an individualized, one-on-one analysis and site-specific recommendations for both indoor and outdoor water efficiency improvements. Audits can be enhanced by the delivery of relevant, action-oriented information the customer can use to change behavioral practices or participate

in additional audit or rebate programs. In a water emergency or shortage, additional staff may be needed to provide water audits, rebate program administration, and outreach assistance to residential and commercial customers.

Drought Rate Schedules

Pricing is one of the most powerful tools that a utility can use to promote its conservation goals. The overarching criteria for constitutionally compliant water rate structures—for use in droughts or not—is that all rates must be based on the cost to serve customers. Both tiered water rates and volumetric-based rates can provide an incentive to conserve. CPAU has had tiered water rates for some time, and the bulk of water revenues are from volumetric rates and not the fixed monthly meter charge. This rate design encourages efficient use of water whether in a drought or not. However, when water use declines in droughts, revenue recovery may become a problem.

In September 2015, drought surcharges were developed so that, upon Council action, additional charges could be applied to ensure the financial health of the Water Fund. The drought surcharges were imposed effective September 1, 2015 to recover (via a tiered volumetric charge) the cost of operating the distribution system. The drought surcharge may be re-instated in response to future water supply shortages.

Other Potential Rate Schedules and Structures

Customer Class Targets

In many water shortage situations, no rationing of water is required – ample communication of the water shortage coupled with drought surcharges, if needed, have been sufficient to meet the City's water reduction targets in the prior and current drought. If rationing of water is required to meet a water reduction requirement in a drought, customer class targets should mirror the required indoor/outdoor water reduction goals that may be established during a drought. Whether there will be different rate schedules (consistent with the cost of service requirement) for each customer class will be determined by: (a) the severity of the water shortage, and (b) the capabilities and limitations of the utility billing system. Experience has shown that separating the single- family residential customers—which are more homogeneous than any other customer group—from all other customer groups is generally the only distinction needed.

Allocation Methods

Any allocation plan would take into consideration the criteria listed in Appendix G. These criteria will be a guide to selecting the most efficient and effective water use reduction method under the particular circumstances of a specific drought situation.

1. Allocations Based on Percentage of Past Use

Plans that base a customer's allocation on a percentage of past use are sometimes perceived as fair and easy to administer. However, these plans have three significant shortcomings. First, selection of a base year is problematic. It is difficult to pick a base year unaffected by shortage year programs on the one hand, or gradually increasing water use after a drought (the

"rebound effect") on the other. The second problem is that each year the turnover of new accounts is approximately 20 to 30% (mostly multi-family residents). In addition, many businesses have changed their practices to some extent over the years. Therefore to use this plan in 2020 and beyond would mean that a large percentage of water customers would have an allocation based on a previous occupant's usage, a previous operation, or some alternative situation. 2020 poses the additional challenge of the shelter-in-place impacts on residential and commercial water use. Handling the large volume of such cases can create administrative difficulties and perceptions of inequities as revised or new allocations are assigned to these customers. The third major flaw in the "percent of past use" concept is that, regardless of base year selected, historically conservation-minded customers may feel penalized for their past efforts while profligate users may have too large an allocation.

2. Equal Allocation for Each Home (for single-family residential)

This plan would set an identical allocation for each home designed to meet the target reduction for the class. The first tier in the rate structure[67] would be set at this target amount. The second tier would be a "buffer" tier designed to accommodate seasonal water needs. The third and last tier would be a penalty rate block price considerably higher than the first two tiers.

All homes would be treated the same under this plan. In addition, it would be inexpensive to administer and easy to understand and implement. However, it could be perceived as unfair by relatively large families or customers with large lots.

Under this plan, hardship exemptions would be limited to those who require more water for health or safety reasons. No additional allowances would be provided for the number of persons living in the household or the landscaping requirements of the particular size lot. Enforcement of this plan would involve installing a flow restrictor on those customers who continue to exceed the allocation beyond a two-month period.

3. Complete Per Capita Allocation Plan (for single-family residential)

Under this plan each person would be allocated a certain amount of water per month. In addition, each household would be allotted a certain amount of water per month for other essential needs, including a base minimum amount for outdoor watering of shrubs and trees. Per capita information would be based on information supplied by the customers through a special mailing. The strength of this plan is that it would probably be more acceptable to the community than the equal allocation per household plan because it takes into account the relationship between water usage and the number of persons living in a household. Its weaknesses are the inability of the current Utilities billing system to record or manage "per capita" data and verification of per capita information. This method is consistent with the state's Making Conservation a California Way of Life Principles.

[67] Any rate design must be consistent with "cost of service" principles embedded within the California constitution.

4. Default Per Capita Allocation Plan (for single-family residential)

Under this plan each household would receive an allocation sufficient for families of a default size. For households over that size, an additional amount would be allocated per month for the number of people over the default size. This plan is easier to administer than a complete per capita plan since the number of data entries is significantly reduced. The plan's weakness is its lack of detail or fine-tuning for households under the default size, which may be perceived as unfair by larger households.

Mandatory Water Rationing Plans Applicable to Multi-Family Accounts, Business, and City Departments

Due to the differences between customer classes, it is difficult to construct rationing plans that meet all the criteria listed in Appendix G. During the 1987-1993 drought period, the City introduced Baseline Consumption Allowances (BCAs) for all customer classes except single-family residential accounts. This includes multi-family residential, commercial, industrial, institutional, and city facilities accounts. The BCA was intended to represent the indoor consumption of each customer.

It is important for any allocation plan to take into account the specific needs of these customer classes because of their diversity and unique requirements. The BCA does this. Rate structures using the BCAs can be constructed as appropriate to meet the reduction targets required and to provide the economic incentive necessary to prompt customer action. And, the targets and the associated rate block prices could be changed as the reduction requirement changes. Weaknesses of this method are that it may not accurately represent indoor water use. For example, exemptions would have to be considered for customers with cooling towers, since lack of water for cooling towers would effectively end the customers' ability to cool their building interiors, resulting in possible health and safety impacts of employees. Another alternative in extreme cases (Stage 3 or higher) could be an allocation per fixture plus a cooling tower credit, which is similar to the per capita method for residences.

Excessive Use Penalties for All Allocation Methods

Penalties for excessive use are expected to vary according to the customer class. For single-family residential customers exceeding percent-of-past-use, equal-allocation-per-home, or per capita water use, the penalty could be installation of a flow restrictor when usage continued to exceed the allocation beyond a 2-month period. Enforcement of this penalty would only occur after customers were notified and any reasonable appeals had been processed.

For customers under a BCA (all classes except single family residential), the primary penalty is in the rate structure itself.

Water Use Prohibitions, Mandatory Restrictions

Adopting water use restrictions is another way to manage how customers use a limited resource. Restrictions can be classified as those preventing water waste, those "setting a tone", and those that prohibit low priority use in times of severe shortages.

In the case of a system-wide water shortage, close coordination with SFPUC is necessary. One of the considerations for selecting which water use restriction ordinances to adopt is what the City's suppliers recommend for the region. Both the SFPUC and Valley Water provide recommendations, and the City will attempt to follow those recommendations so that regional consistency is achieved.

The City's ability to enforce restrictions is also a critical variable in the selection of water use regulations. For restrictions to be credible and obeyed they must be enforceable and enforced. Therefore certain restrictions, such as limits on indoor uses such as showering, are not practical.

Water use restrictions are achieved by using the methods, prohibitions and penalties described in the sections below. Appendix H lists permanent water use restrictions that the City currently has in place and those that may be adopted on an emergency basis in times of state-mandated reductions or water shortage[68].

[68] Section 12.32.015 of the Palo Alto Municipal Code, pertaining to emergency water use regulations, previously codified and containing portions of Ordinance Nos. 3960, 3984 and 4038, was suspended, but specifically not repealed, by Ordinance No. 4150, § 2. In pertinent part, Section 2 of Ordinance No. 4150 states that Section 12.32.015 is "suspended until such time as water shortage emergency conditions shall be subsequently found, determined, and declared by the Council to exist."

Water Shortage Contingency Plan Stages of Action

Actions to be taken in response to a water shortage or state-mandated reduction depend on the severity of the shortage or the magnitude of the required reduction. The staged responses (Stage I to Stage IV) depend to some extent upon the local conditions and the length of time that customers have had to focus their attention on the water shortage. For each stage noted below, activity levels in several key areas are described. Appendix H, the Water Shortage Contingency Plan, details the planned water use restrictions for each reduction level. Reduction targets will be based on the most recent non-drought year. If a different base year were to be selected, the programs might require modification. In all stages, action will be taken to ensure City facility water use is reduced by the appropriate amount.

Some factors which influence the effectiveness of any water management plan include: (1) the customer's behavior and perception of the need to conserve; (2) weather; (3) the duration of the shortage or mandate; (4) the customer's economic situation; (5) the extent to which the City achieves its utility revenue targets; (6) the percentage of exemptions or variances granted; (7) the role of the media; and (8) the customer's acceptance of the need for water use reduction.

Because each water shortage situation is unique in duration, in breadth and in involvement by the state, there is a need for some flexibility in selecting the exact response strategy. Even with the same reduction target, the strategy in the first year of a drought may be different than that recommended for an additional year of a long running drought. It is very important early in a drought period to develop outreach messages and policy directions using a longer-term perspective. In this way, communications with customers throughout the drought period will be consistent and appropriate.

STAGE I – Minimum Water Supply Shortage: Up to 10% target water savings
The SFPUC requested voluntary reductions in this range in 1987, 2009, 2014, and 2016 which the City was able to achieve.

<u>Information Outreach and Audit Programs</u>
The City provides ongoing informational outreach and audit programs. At this water shortage stage, the focus of these programs would be on water saving information. A low level media information campaign would begin with the emphasis on reducing waste. As water consumption is monitored, the level of emphasis would be adjusted in order to meet the reduction goal.

The City has permanent ordinances in place that prohibit the waste of water. These ordinances are sufficient for this stage of water shortage. Enforcement would be on an "as reported" basis and mostly via reminder notices.

Incentive-based Demand Side Management Programs

Programs designed to assist customers in demand side management would be continued and augmented, to the extent necessary to provide the savings required. These programs may include rebate programs for indoor fixtures or incentives to remove lawn turf for less water-thirsty landscaping or to install advanced irrigation controllers. The City would continue to monitor programs being developed by other utilities in order to take advantage of regional momentum and shorten internal development time.

Drought Rate Structures

No special drought rate structure is needed at this water shortage stage. The City's standard single-family rate structure already encourages conservation by having a relatively small fixed charge and tiered rates.

STAGE II – Moderate Water Supply Shortage: 10% to 20% target water savings

The City was able to achieve this level of water reduction (19.1%) when rationing was imposed by the SFPUC in FY 1989. The program used at that time is similar to the one outlined below.

Information Outreach and Audit Programs

The frequency of advertising and events comprising the information campaign would be increased. Water kits with low-cost conservation devices will be available to customers.

Incentive-based Demand Side Management Programs

Programs designed to assist customers in demand side management would be continued and augmented to the extent necessary to provide the savings required. These programs may include incentives for replacing high water using fixtures such as toilets, clothes washers, and irrigation devices, as well as incentives to retrofit landscapes for a low water use, drought tolerant design. The City would continue to monitor programs being developed by other utilities in order to take advantage of regional momentum and shorten internal development time.

Drought Rate Structures

In response to water shortage conditions in the 1987-1992 drought, the City established separate drought rate schedules for single-family residential and all other customers and increased the price difference between lower and higher consumption tiers. For all customers except single- family residential customers, the consumption tiers were based on a Baseline Consumption Allowance (BCA) concept. This concept is described in the section, Water Shortage Mitigation Options, as applicable to multi-family, commercial, industrial, public facilities and City facilities accounts.

Water Use Restrictions

The City would actively enforce the water use restrictions with an emphasis on education. A system of warnings leading to possible fines and installation of a flow restrictor would be followed. During the summer of 2015, the City developed a mobile application (311) for

members of the community to report wasted water. This technology allowed for much wider enforcement by City staff. A small number of emergency water use restrictions would be added.

Drought Rate Structures
Drought surcharges may be imposed.

If reduction goals were not being met, reduction targets may need to be developed for each customer class. Potential strategies for allocation plans are discussed above.
The exact rates and rate structures would be established upon receipt of information regarding both the reduction requirement and applicable penalties and based on the utility's overall revenue requirements.

STAGE III – Severe Water Supply Shortage: 20% to 30% target water savings
The state-mandated water use reduction for Palo Alto in 2015/2016 was 24% which the City exceeded. The program outlined below was implemented to achieve those results. The water use restrictions for this stage have been modified slightly to accommodate the increase in the number of stages in the proposed 2020 WSCP.

Information Outreach and Audit Programs
All activities from Stage II would continue at escalated levels. In addition, emphasis would be put on targeted outreach to high water users and special categories of water users (e.g., car washes, restaurants, etc.).

Incentive-based Demand Side Management Programs
Existing demand side management programs would be continued. Staff would continue to closely monitor overall water savings in order to determine if additional levels of rebate amounts would provide additional savings, or whether other programs would be necessary.

Drought Rate Structures
Drought surcharges may be imposed.

If reduction goals were not being met, reduction targets may need to be developed for each customer class. Potential strategies for allocation plans are discussed above.
The exact rates and rate structures would be established upon receipt of information regarding both the reduction requirement and applicable penalties and based on the utility's overall revenue requirements.

Water Use Restrictions
Additional "emergency" water use restrictions would be added to the existing permanent restrictions including restrictions of the number of days per week irrigation is permitted. Alternative Irrigation Plans will be established for golf courses, parks, and schools with specific water use reduction targets.

The amount of staff time dedicated to enforcement would be increased with an emphasis on education.

STAGE IV – Severe to Critical Water Supply Shortage: 30% to 40% target water savings
The City achieved usage reductions of 31.5%, 35.4%, and 32.7% in FY 1991, FY 1992, FY 1993 respectively, in response to SFPUC water rationing. In response to the state-mandated water use reductions in 2015/2016, the City achieved a 31% water use reduction. The program outlined below was implemented to achieve those results. The water use restrictions for this stage have been modified slightly to accommodate the increase in the number of stages in the proposed 2020 WSCP.

Information Outreach and Audit Programs
All activities from Stage III would continue at escalated levels. In addition, emphasis would be put on targeted outreach to high water users and special categories of water users (e.g., car washes, restaurants, etc.).

Incentive-based Demand Side Management Programs
Existing demand side management programs would be continued. Staff would continue to closely monitor overall water savings in order to determine if additional levels of rebate amounts would provide additional savings, or whether other programs would be necessary.

Drought Rate Structures
To achieve these reduction goals in past droughts, rationing was not implemented. Instead, along with an extensive information outreach effort, drought surcharges may be imposed.

The exact rates and rate structures would be established upon receipt of information regarding both the reduction requirement and applicable penalties and based on the utility's overall revenue requirements.

Water Use Restrictions
Additional "emergency" water use restrictions would be added to the existing permanent restrictions including further restrictions on the number of days per week irrigation is permitted. Alternative Irrigation Plans will be established for gold courses, parks, and schools with specific water use reduction targets.

The amount of staff time dedicated to enforcement would be increased with an increase in levying fines.

STAGE V – Critical Water Supply Shortage: 40% to 50% target water savings
A program to meet this level of water use reduction has not yet been implemented in the City. However, in the spring of 1991, the SFPUC adopted a program calling for reductions in this range. Although ultimately replaced with a less restrictive program, the City discussed what

actions would be taken to meet the critical reduction targets. The program below outlines the major components of the plan to meet such a target.

Information Outreach and Audit Programs
All activities from Stage IV would continue at further escalated levels. A greater focus will be placed on survival strategies and prioritization assistance for all customer classes.

Incentive-based Demand Side Management Programs
Depending on what programs have been implemented prior to this stage, or current market saturations for certain devices, a selected number of indoor conservation incentives will be offered. These may include rebates for and/or free distribution of showerheads and faucet aerators, toilet modifications or retrofits, process water use modifications and use of recycled water.

Drought Rate Structures
At this level of reduction, an allocation method would be considered for each customer. The allocations would be sufficient for the most critical, high priority uses of water and the availability of water for outside use would be dramatically reduced. Various allocation methods are discussed in the previous section, Allocation Methods.

Water Use Restrictions
Severe "emergency" water use restrictions, many of which will supersede less stringent restrictions imposed in a less critical phase, will be added. Enforcement will be more rigorous in terms of hours of enforcement, number of staff involved, and the speed with which penalties are applied.

STAGE VI – Water Emergency: Greater than 50% target water savings
A program to meet this level of water use reduction will have major economic and aesthetic impacts on the City. Water use will be restricted to health and safety needs, possibly with some allocation for the tree canopy maintenance.

Information Outreach and Audit Programs
All activities from Stage V would continue at further escalated levels. A greater focus will be placed on survival strategies and prioritization assistance for all customer classes.

Incentive-based Demand Side Management Programs
Depending on what programs have been implemented prior to this stage, or current market saturations for certain devices, a selected number of indoor conservation incentives will be offered. These may include rebates for and/or free distribution of showerheads and faucet aerators, toilet modifications or retrofits, process water use modifications and use of recycled water.

Drought Rate Structures

At this level of reduction, an allotment method would be considered for each customer. The allocations would be sufficient for health and safety and the availability of water for outside use would be eliminated with some exception for keeping the tree canopy alive. Various allotment methods are discussed in the previous section, Allocation Methods.

Water Use Restrictions

Severe “emergency” water use restrictions, many of which will supersede less stringent restrictions imposed in a less critical phase, will be added. Enforcement will be at the highest possible level terms of hours of enforcement, number of staff involved, and the speed with which penalties are applied.

Table 24 summarizes the WSCP.

Table 24: WSCP Summary

	Stage I	Stage II	Stage III	Stage IV	Stage V	Stage VI
Target Water Savings	Up to 10%	10% -20%	20% -30%	30% - 40%	40%- 50%	Above 50%
Information Outreach and Audit Program	Low level outreach	Increase advertising, social media campaigns and direct communication with customers targeting highest users and increasing water use auditing			Escalate outreach efforts and media campaign with focus on water use prioritization	Highest outreach effort level with focus on health and safety
Demand-Side Management Programs	Continuation of existing programs, evaluation of new programs	Augment programs and incentive levels as necessary to achieve reduction targets				
Rate Structures	Standard rates already encourage conservation	Drought rate structures may be implemented to secure needed revenue			Water allocations or allotments may be implemented	
Water Use Restrictions	Only permanent water use ordinance – no new restrictions apply	Water use restrictions become more severe with each stage and enforcement is enacted more strongly with each stage. With each stage, efforts made to ensure tree canopy is protected as much as possible.				
Recycled Water Use	Business as usual use	Water use restrictions require use of recycled water for specific purposes, advertise availability of recycled water for trucked delivery, use recycled water for City facilities and street trees as much as possible.				

Alternative Water Supplies During a Water Shortage

Recycled Water Use

Recycled water offers an alternative source of water to those customers with valuable landscaping. The availability of contractors who can haul recycled water will be advertised. In addition, the City may rent tanker trucks to irrigate valuable City landscaping and street trees that will undoubtedly be stressed by a long-term drought, the likely precursor to this stage of a water shortage. The City used trucked recycled water in this manner during the recent drought. Some customers have continued to use local contractors to irrigate with recycled water.

Groundwater

The City's eight emergency groundwater wells are permitted for an annual production of 1,500 AFY. Staff will evaluate required wellhead treatment modifications needed to safely blend groundwater with SFPUC water and will potentially update the WSCP incorporating groundwater as an additional supply during severe droughts or water emergencies. The volume of groundwater available may be subject to pumping restrictions determined by Valley Water, the Groundwater Manager in Santa Clara County. In the event of a severe water supply shortage, Valley Water will work with stakeholders to determine the best use for groundwater resources.

Revenue and Expenditure Impacts and Measures to Overcome Impacts

Law

> 10632.(a) Every urban water supplier shall prepare and adopt a water shortage contingency plan as part of its urban water management plan…
>
> (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…
> (B) A description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions...
> (C) A description of the cost of compliance…

Revenue Reductions, Expense Increases, and Cost of Compliance

Water utility expenditures can be generally categorized as fixed or variable expenses. The variable costs are almost entirely related to the costs of purchasing water supplies. Although the SFPUC supply costs are expressed as a variable commodity rate, the SFPUC system, like many water delivery systems, is almost exclusively a fixed cost conveyance and treatment system. Therefore, during a water supply shortage, the City's cost of purchasing water from the SFPUC may go down in the short-term, but SFPUC rates will be raised to make up for the revenue shortfall in the long-term.

As a retail provider, the City's fixed costs primarily relate to the cost of operating and maintaining the City's distribution system. Due to the City's volumetric rate structure, the decline in sales revenue will exceed the decline in expenses. For each stage in the WSCP and assuming 2020 rate schedules, the revenue shortfall, net of the decline in expenses and based on FY 2020 costs and revenues, is anticipated to be:

Stage 1: Up to 10% target water savings results in $1.9 million shortfall
Stage 2: 10% - 20% target water savings results in $3.8 million shortfall
Stage 3: 20% - 30% target water savings results in $5.6 million shortfall
Stage 4: 30% - 40% target water savings results in $9.9 million shortfall

Stage 5: 40% - 50% target water savings results in $13.3 million shortfall
Stage 6: Greater than 50% target water savings results in greater than $13.3 million shortfall

Implementation cost for the informational outreach programs, monitoring, and reporting during a water shortage increases during periods of voluntary and mandatory water use reductions. The 2015 state-mandated potable water use reductions cost the City an estimated $400,000. Estimates for those costs are $30,000 to $50,000 per year for voluntary programs. For mandatory programs, estimated costs are $400,000 to $600,000.

Excessive use penalties may be associated with certain drought rate structures described above. Additional staff resources would be needed to monitor customer use and install flow restrictors on excessive water users.

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 SFPUC 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.

Mitigation Actions

From a utility perspective, there is a downside to water conservation: the erosion of sales revenue. As consumers reduce their usage in response to the drought, the utility will

experience a decline in sales. Both the magnitude of the water use reduction and the duration of such reductions will influence which mitigation measures are needed.

An approach for short-term revenue shortfalls caused by decreased revenue and increased expenses is to draw upon the utility's cash reserves, if they are sufficient, to cover the financial obligations of the utility. Other options include short-term borrowing, financing long-term capital projects through revenue bonds rather than through current rates, or the implementation of drought surcharges to address the loss in sales revenue. Each of these approaches has its advantages and disadvantages. The appropriate response will depend upon the specific circumstances facing the utility.

Monitoring Customer Compliance and Reporting

Law

> 10632. (a) The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier:
>
> (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.

Under normal water supply conditions, the amount of water coming into the City from the SFPUC regional supply line is metered at the Arastradero, California, Page Mill, Sand Hill and Lytton turnouts. The daily meter readings are maintained at the Utility Control Center. Totals are reported monthly to CPAU for comparison to the billing amounts from the SFPUC.

In water shortage periods, the mechanism for determining actual reductions in water use remains largely the same. The Director of Utilities would form an ad hoc Water Committee with representatives of all divisions to oversee outreach and monitoring efforts. During curtailment stages in a water shortage, supply figures are reported a daily basis. The Water Committee would provide timely reports to the City Council on the shortage and success of measures taken. Such a committee was formed during the 2015-2016 drought.

If curtailment reaches Stage III or higher, daily supply figures are reported to the Director of Utilities and the Water Committee. The Water Committee would report monthly to City Council or as frequently as information is requested by the City Council.

If Alternative Irrigation Plans are put in place for golf courses, schools, and parks, usage reports will be generated at the close of each monthly billing cycle to monitor compliance. The City will work closely with those customers through the Utilities Key Account Customer Representatives, to ensure compliance and collaborate on any operational adjustments needed to achieve the targeted reductions.

Water Shortage Contingency Legal Authority

Law

> 10632. (a) The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier:
>
> (7) (A) A description of the legal authorities that empower the urban water supplier to implement and enforce its shortage response actions... 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…
> (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.

The City has experienced four instances of water shortage due to drought in the last 35 years. A shorter duration drought occurred in l976-77, a water supply deficit occurred between l987 and l993, and 2015-2016 brought unprecedented state-mandated reductions.

Under Water Code Section 350, the Council may declare a water shortage emergency condition to prevail within the City's service territory, whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection. The City will declare a water shortage if the SFPUC or the state declares a water shortage. The City will coordinate such a declaration with Valley Water and Santa Clara County.

Appendix F provides a draft model ordinance that could be implemented during a water shortage emergency.

Reevaluation and Improvement of Procedures

Law

> 10632. (a) The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier:
>
> (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.

At the end of each water shortage period, the City will conduct a review and evaluation of savings achieved, expenditures, revenue losses and other impacts on the water customers and on the City as a whole. Adjustments to the WSCP will be proposed and recommended for Council approval as needed.

Section 8 – Supply and Demand Comparison Provisions

Law

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 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.

Supply and Demand Comparison

Normal Year Supply and Demand

Since the City's primary water supply is from the SFPUC, it is useful to examine the supply-demand comparison for the entire SFPUC system. SFPUC, in their 2020 UWMP, provides more detail regarding available water supply for normal and drought scenarios.

Table 25 illustrates total system deliveries for both the Retail and Wholesale SFPUC customers. Table 25 indicates that during normal precipitation years, the SFPUC has adequate supplies to meet its contractual obligation to the Wholesale Customers of 184 MGD or 206.243 AFY.

Table 25: SFPUC System Supply and Wholesale Customer Supply and Demand (AFY)[69]

Year	2020	2025	2030	2035	2040	2045
RWS Supply (AFY)	222,608	238,973	241,439	247,155	254,217	265,090
Wholesale Supply (AFY)	148,069	163,649	165,779	170,263	175,195	182,480
Wholesale Demand (AFY)	148,069	163,649	165,779	170,263	175,195	182,480

The City has an ISG of 16.575 MGD (or 18,579 AFY) and projects demands will remain below the City's ISG through the 2020 UWMP planning horizon. Table 26 represents the City's Supply and Demand balance for the 2020 planning horizon based on the City's contractual entitlement with the SFPUC and normal precipitation.

Table 26: City of Palo Alto Supply/Demand Balance (AFY)

	2020	2025	2030	2035	2040	2045
Palo Alto Demand for SFPUC Water	10,921	11,287	11,394	11,546	11,801	12,113
Individual Supply Guarantee	18,579	18,579	18,579	18,579	18,579	18,579
Difference	*7,658*	*7,292*	*7,185*	*7,033*	*6,778*	*6,466*

As previously discussed, SFPUC's WSIP is nearly complete. For this 2020 UWMP, the WSIP-related water supply sources assumed to be available are summarized in Table 27.

[69] Letter from Paula Kehoe, SFPUC Director of Water Resources, to Danielle McPherson, BAWSCA, dated March 31, 2021.

Table 27: SFPUC Water Supply Improvement Program 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	

Dry Year Scenarios

Palo Alto's recycled water supply is 100% reliable to meet the City's demand for non-potable water. The dry-year analysis that follows pertains only to potable water purchased from the SFPUC.

For water shortages up to 20%, the Tier One water shortage plan will be applied. The formula included in the Tier One plan indicates that the cutback for the City will be similar to the system-wide cutback, but less than the average BAWSCA cutback. The Tier One plan does not apply to system-wide shortages greater than 20%. Implementing water use reduction greater than 20% requires the SFPUC to meet and discuss with Wholesale Customers a strategy for meeting incremental reductions above the Tier One plan. The SFPUC has the authority to make final allocation decision for the portion above 20%, though the Wholesale Customers have the contractual right to challenge the proposed approach.[70] This analysis assumes the relative split of available water between SFPUC Retail and Wholesale Customers will be the same for shortages greater than 20% as shortages of 20%.

This analysis assumes full implementation of the Bay Delta Plan in 2023. Should a voluntary settlement agreement be reached and adopted, the impacts on water supply availability will be lessened. The following assumptions regarding the SFPUC's WSIP apply to all normal and dry year water availability forecasts.

Under the condition of multiple dry years in a row and assuming implementation of the Bay Delta Plan in 2023 using a base year of 2025, available supply is greatly reduced as shown in Table 28. The analysis assumes projected Wholesale Customer demand. SFPUC will provide an

[70] WSA, Section 3.11 (c)(3)

appendix to their 2020 UWMP showing supply availability projections using the 184 MGD Supply Assurance.

Table 28: Projected Multiple Dry Years Wholesale Supply from RWS, Bay Delta Plan in 2023

AFY	2025	2030	2035	2040	2045
First Year	104,579	105,588	108,166	111,192	99,423
Second Year	89,671	90,568	92,697	95,387	99,423
Third Year	89,671	90,568	92,697	95,387	99,423
Fourth Year	89,671	90,568	92,697	84,179	84,515
Fifth Year	89,671	90,568	84,963	84,179	84,515

The potable water supply shortfall for Palo Alto from a single dry year and for multiple dry years is shown below in Table 29 and Table 30. Under these conditions, Palo Altans will be asked to reduce water usage by approximately 35%.

Table 29: Single Dry Year Potable Water Supply Shortfall for Palo Alto

	2025	2030	2035	2040
Supply Totals	7,213	7,257	7,335	7,490
Demand Totals	11,287	11,394	11,546	11,801
Difference	(4,074)	(4,137)	(4,211)	(4,311)

Table 30: Projected Potable Water Use Reductions in Multiple Dry year Scenario

AFY	2025	2030	2035	2040	2045
First Year	36.1%	36.3%	36.5%	36.5%	45.5%
Second Year	45.2%	45.4%	45.6%	45.6%	45.5%
Third Year	45.2%	45.4%	45.6%	45.6%	45.5%
Fourth Year	45.2%	45.4%	45.6%	52.0%	53.7%
Fifth Year	45.2%	45.4%	50.1%	52.0%	53.7%

A single dry year followed by 5 more consecutive dry years yields available water supply as shown in Table 31 and Table 32 below using base years of 2020 and 2025 respectively.

Table 31: Water Supply Available to Wholesale Customers in Consecutive Dry Years; 2020

Year Type	Base Year	RWS Volume Available (AFY)	% of Average Supply	Wholesale Volume Available (AFY)	Notes on Calculation of Wholesale Supply
Average Year	2020	222,608	100%	148,069	
Single Dry year		222,608	100%	148,069	
Consecutive 1st Dry year		222,608	100%	148,069	
Consecutive 2nd Dry year		222,608	100%	148,069	
Consecutive 3rd Dry year		133,610	60%	83,506	Wholesale allocation assumed to be 62.5% for shortages 20% or greater
Consecutive 4th Dry year		133,610	60%	83,506	Same as above
Consecutive 5th Dry year		133,610	60%	83,506	Same as above

Table 32: Water Supply Available to Wholesale Customers in Consecutive Dry Years; 2025

Year Type	Base Year	RWS Volume Available (AFY)	% of Average Supply	Wholesale Volume Available (AFY)	Notes on Calculation of Wholesale Supply
Average Year	2025	238,973	100%	163,649	
Single Dry year		167,236	70%	104,579	Wholesale allocation assumed to be 62.5% for 20% or less shortages
Consecutive 1st Dry year		167,236	70%	104,579	Same as above
Consecutive 2nd Dry year		143,361	60%	89,671	Same as above
Consecutive 3rd Dry year		143,361	60%	89,671	Same as above
Consecutive 4th Dry year		143,361	60%	89,671	Same as above
Consecutive 5th Dry year		143,361	60%	89,671	Same as above

For Palo Alto, the consecutive dry year scenario using base year 2020 results in a 40% shortfall by the 3rd consecutive dry year as shown in Table 33. Table 34 shows the same analysis using a base year of 2025, two years after the assumed implementation of the Bay Delta Plan. Under these conditions, a 30% shortfall exists in the first dry year.

Table 33: Water Supply Available to Palo Alto in Consecutive Dry Years; 2020

Year Type	Base Year	RWS Volume Available (AFY)	% of Average Supply	Water Use Reductions
Average Year	2020	10,921	100%	0.0%
Single Dry year		10,921	100%	0.0%
Consecutive 1st Dry year		10,921	100%	0.0%
Consecutive 2nd Dry year		10,921	100%	0.0%
Consecutive 3rd Dry year		6,555	60%	40.0%
Consecutive 4th Dry year		6,555	60%	40.0%
Consecutive 5th Dry year		6,555	60%	40.0%

Table 34: Water Supply Available to Palo Alto in Consecutive Dry Years; 2025

Year Type	Base Year	RWS Volume Available (AFY)	% of Average Supply	Water Use Reductions
Average Year	2025	11,287	100%	0.0%
Single Dry year		7,898	70%	30.0%
Consecutive 1st Dry year		7,898	70%	30.0%
Consecutive 2nd Dry year		6,771	60%	40.0%
Consecutive 3rd Dry year		6,771	60%	40.0%
Consecutive 4th Dry year		6,771	60%	40.0%
Consecutive 5th Dry year		6,771	60%	40.0%

The five-year drought assessment also assumes the Bay Delta Plan will be implemented in 2023. Table 36 shows the amount of water projected to be available to the RWS Wholesale

Customers if the next five years are dry, and Table 36 shows the available water to Palo Alto. The data shows water use reductions in the range of 40%-50% starting in 2023.

Table 35: Projected RWS Supply for 5-Year Drought Assessment (AFY)

Year	2021	2022	2023	2024	2025
RWS Supply (AFY)	222,608	222,608	133,610	133,610	133,610
Wholesale Supply (AFY)	148,069	148,069	83,506	83,506	83,506

Table 36: Projected RWS Supply Available to Palo Alto for 5-year Drought Assessment (AFY)

Year	2021	2022	2023	2024	2025
Palo Alto Demand	10,565	10,776	10,982	11,182	11,287
Cutback	0.0%	0.0%	43.6%	43.6%	49.0%
Available Supply	10,565	10,776	6,194	6,306	5,759

While the SFPUC has an adopted Level of Service goal of no more than a 20% system-wide shortfall, implementation of the Bay Delta Plan is projected to result in greater water supply reductions if and until alternative supplies are developed. These anticipated dry-year supply reductions will be considered as Palo Alto plans for additional housing development.

In response to a severe drought the City will work with residents and businesses to significantly reduce water use by implementing the WSCP. The WSCP contains provisions for shortages of the magnitude shown in the tables in this section, however, the City does not have actual experience in reducing water use to those levels.

In the most recent drought, the City was able to achieve water use reductions of about 30%, but there were significant impacts to the tree canopy. The average number of street trees removed each year in Palo Alto is about 225. It is estimated that an additional 393 street trees were removed due to the 2014-2016 drought (the actual number of trees is likely to be much higher including trees on private property). Adjustments to the WSCP have been made to better protect trees during the next drought; this objective will become significantly more difficult under drastic water reduction targets. Deeper cutbacks will likely have aesthetic, environmental, and economic implications throughout the City.

Groundwater from City wells may be a supplemental resource, but it is probable that Valley Water, the groundwater manager in Santa Clara County, will also require water use reductions, and the wells are not permitted for sustained long-term use. The City's wells are restricted to 1,500 AFY, pumping for a maximum of five consecutive days and a maximum of 15 days per year.

Work to address the potential need for water supply in dry years in the long term is taking place on three fronts. First, the SFPUC is evaluating alternative water supplies. Second, BAWSCA is seeking water supplies and solutions for dry year events. Third, the City of Palo Alto has formed

partnerships such as the one with Valley Water and is embarking on a One Water plan which will have dry year water supply reliability as a central tenet. All three efforts are discussed in detail earlier in this report.

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APPENDIX A - Resolutions Adopting Urban Water Management Plan and Water Shortage Contingency Plan

Resolution No. 9964
Resolution of the Council of the City of Palo Alto Adopting the 2020 Urban Water Management Plan to be Submitted to the California Department of Water Resources

RECITALS

A. The California Legislature has enacted the Urban Water Management Planning Act, California Water Code Sections 10610 -10656 and 10608, as amended, which requires every urban water supplier providing water to more than 3,000 customers or supplying more than 3,000 acre -feet of water annually to prepare an urban water management plan ("Plan") that has as its primary objective the conservation and efficient use of water.

B. The City of Palo Alto ("City"), a municipal utility and chartered city, is an urban water supplier providing water to a population over 60,000.

C. The Plan must be reviewed at least once every five years by the City, which must amend the Plan, as necessary, after it has conducted a review.

D. The preparation of the updated Plan has been coordinated with other public agencies to the extent practicable, and staff has encouraged the active involvement of diverse social, cultural and economic sectors of the population within the City's retail water service area during preparation of the Plan.

E. The Plan must be adopted by July 1, 2021, after it is first made available for public inspection and a public hearing is noticed and held, and it must be filed with the California Department of Water Resources within thirty days of adoption.

F. After reviewing a draft Plan at their May 12, 2021 meeting, the Utilities Advisory Commission recommended that the Council adopt the Plan as presented; and

G. A noticed public hearing on the draft Plan was held by the City Council on June 7, 2021, at which time public comments were heard and considered.

NOW, THEREFORE, the Council of the City of Palo Alto RESOLVES as follows:

SECTION 1. The Council hereby adopts the 2020 Urban Water Management Plan of the City of Palo Alto, which shall be filed with the City Clerk. The City Manager is hereby authorized and directed to file the 2020 Urban Water Management Plan of the City of Palo Alto with the California Department of Water Resources and the State Library.
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SECTION 2. The Council finds and determines that, under the California Water Code Section 10652, the adoption of the Plan and the WSCP and this resolution does not constitute a project under the California Environmental Quality Act, and no environmental assessment is required.

INTRODUCED AND PASSED: June 7, 2021

AYES: BURT, CORMACK, DUBOIS, FILSETH, KOU, STONE, TANAKA

NOES:

ABSENT:

ABSTENTIONS:

ATTEST:

DocuSigned by:
Beth Minor
City Clerk

DocuSigned by:
Mayor

APPROVED AS TO FORM:

DocuSigned by:
Amy Bartell
Assistant City Attorney

APPROVED:

DocuSigned by:
Ed Shikada
City Manager

DocuSigned by:
Dean Batchelor
Director of Utilities

DocuSigned by:
Director of Administrative Services

Resolution No. 9965
Resolution of the Council of the City of Palo Alto Adopting the 2020 Water Shortage Contingency Plan Included in the Urban Water Management Plan to be Submitted to the California Department of Water Resources

RECITALS

A. The California Legislature has enacted the Urban Water Management Planning Act, California Water Code Sections 10610 -10656 and 10608, as amended, which requires every urban water supplier providing water to more than 3,000 customers or supplying more than 3,000 acre -feet of water annually to prepare an urban water management plan ("UWMP") that has as its primary objective the conservation and efficient use of water.

B. The California Water Code requires urban water suppliers to prepare a Water Shortage Contingency Plan (WSCP) to be included in its UWMP.

C. The WSCP must be adopted, along with the UWMP, by July 1, 2021, after it is first made available for public inspection and a public hearing is noticed and held, and it must be filed with the California Department of Water Resources within thirty days of adoption.

D. After reviewing a draft WSCP, which is included in the UWMP, at their May 12, 2021 meeting, the Utilities Advisory Commission recommended that the Council adopt the WSCP as presented; and

E. A noticed public hearing on the WSCP, included in the UWMP, was held by the City Council on June 7, 2021, at which time public comments were heard and considered.

NOW, THEREFORE, the Council of the City of Palo Alto RESOLVES as follows:

SECTION 1. The Council hereby adopts the 2020 Water Shortage Contingency Plan of the City of Palo Alto, included in its UWMP, which shall be filed with the City Clerk. The City Manager is hereby authorized and directed to file the 2020 Water Shortage Contingency Plan of the City of Palo Alto, included in the UWMP, with the California Department of Water Resources and the State Library.

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SECTION 2. The Council finds and determines that, under the California Water Code Section 10652, the adoption of the Plan and the WSCP and this resolution does not constitute a project under the California Environmental Quality Act, and no environmental assessment is required.

INTRODUCED AND PASSED: June 7, 2021

AYES: BURT, CORMACK, DUBOIS, FILSETH, KOU, STONE, TANAKA

NOES:

ABSENT:

ABSTENTIONS:

ATTEST:

DocuSigned by:
Beth Minor

City Clerk

DocuSigned by:

Mayor

APPROVED AS TO FORM:

DocuSigned by:
Amy Bartell

Assistant City Attorney

APPROVED:

DocuSigned by:
Ed Shikada

City Manager

DocuSigned by:
Dean Batchelor

Director of Utilities

DocuSigned by:
Kelly L. Nau

Director of Administrative Services

APPENDIX B - Public Participation Notices

NOTICE OF PUBLIC HEARING
(*FOR PUBLICATION ONCE A WEEK FOR TWO SUCCESSIVE WEEKS)*

CITY OF PALO ALTO

NOTICE OF PUBLIC HEARING

NOTICE IS GIVEN, that the City Council of the City of Palo Alto will conduct a Public Hearing at its meeting on Monday, June 7, 2021, at 5:00 p.m., or as soon thereafter as possible, via virtual teleconference to consider: Update of the Urban Water Management Plan (UWMP) for 2020-2025 and the Water Shortage Contingency Plan (WSCP). If you have any questions about Palo Alto's UWMP or WSCP, please contact Karla Dailey, Sr. Resource Planner, at Karla.Dailey@CityofPaloAlto.org.

The City of Palo Alto's Draft 2020 UWMP and WSCP can be viewed at:
<https://www.cityofpaloalto.org/files/assets/public/agendas-minutes-reports/reports/city-manager-reports-cmrs/attachments/05-12-2021-id-12049-attachment-c-2020-plan.pdf>

BETH D. MINOR
City Clerk

PUBLISH ON:
May 28 and June 4, 2021

APPENDIX C - Water Loss Report

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

Click to access definition
Click to add a comment

Water Audit Report for: City of Palo Alto (CA4310009)
Reporting Year: 2019 1/2019 - 12/2019

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

All volumes to be entered as: ACRE-FEET 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' ------>

Master Meter and Supply Error Adjustments

WATER SUPPLIED		Grading			Pcnt:	Value:	
Volume from own sources:		n/a		acre-ft/yr			acre-ft/yr
Water imported:		5	10,747.264	acre-ft/yr	5	52.000	acre-ft/yr
Water exported:		n/a		acre-ft/yr			acre-ft/yr
WATER SUPPLIED:			**10,695.264**	acre-ft/yr			

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION		Grading			Pcnt:	Value:	
Billed metered:		7	10,387.854	acre-ft/yr			
Billed unmetered:		n/a		acre-ft/yr			
Unbilled metered:		n/a		acre-ft/yr			
Unbilled unmetered:		5	26.738	acre-ft/yr		26.738	acre-ft/yr
AUTHORIZED CONSUMPTION:			**10,414.592**	acre-ft/yr			

Click here: for help using option buttons below

Use buttons to select percentage of water supplied OR value

WATER LOSSES (Water Supplied - Authorized Consumption)							
			280.672	acre-ft/yr			
Apparent Losses					Pcnt:	Value:	
Unauthorized consumption:			26.738	acre-ft/yr	0.25%		acre-ft/yr
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed							
Customer metering inaccuracies:		3	104.928	acre-ft/yr	1.00%		acre-ft/yr
Systematic data handling errors:			25.970	acre-ft/yr	0.25%		acre-ft/yr
Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed							
Apparent Losses:			**157.636**	acre-ft/yr			
Real Losses (Current Annual Real Losses or CARL)							
Real Losses = Water Losses - Apparent Losses:			**123.036**	acre-ft/yr			
WATER LOSSES:			**280.672**	acre-ft/yr			

NON-REVENUE WATER				
NON-REVENUE WATER:			**307.410**	acre-ft/yr
= Water Losses + Unbilled Metered + Unbilled Unmetered				

SYSTEM DATA				
Length of mains:		9	242.4	miles
Number of active AND inactive service connections:		9	23,928	
Service connection density:			99	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 length of customer service line has been set to zero and a data grading score of 10 has been applied				
Average operating pressure:		5	72.5	psi

COST DATA					
Total annual cost of operating water system:		10	$43,711,111	$/Year	
Customer retail unit cost (applied to Apparent Losses):		9	$8.20	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):		10	$1,829.07	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 65 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: Water imported
2: Customer metering inaccuracies
3: Billed metered

APPENDIX D – DWR Standardized Tables

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			
CA4310009	City of Palo Alto	20,016	10,722
	TOTAL	20,016	10,722
**** Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES:			

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:	

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
San Francisco Public Utilities Commission
NOTES:

Submittal Table 3-1 Retail: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	68,819	71,667	74,815	77,963	81,111	84,259
NOTES: Table 12 in UWMP; Fiscal years						

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	4,967
Multi-Family		Drinking Water	1,797
Commercial		Drinking Water	1,628
Industrial		Drinking Water	295
Institutional/Governmental		Drinking Water	754
Landscape		Drinking Water	1,278
Losses		Drinking Water	199
Other Potable		Drinking Water	3
		TOTAL	10,921

[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:

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		4,796	4,905	5,019	5,163	5,308
Multi-Family		1,837	1,852	1,876	1,913	1,954
Commercial		1,763	1,753	1,750	1,753	1,760
Industrial		313	321	328	336	343
Institutional/Governmental		717	748	779	812	843
Landscape		1,252	1,282	1,313	1,343	1,374
Losses		790	798	808	826	848
Other Potable		2	2	2	2	2
TOTAL		11,471	11,661	11,875	12,148	12,433

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.*
Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.

[2]

NOTES: Table 10 in UWMP

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*	10,921	11,471	11,661	11,875	12,148	12,433
Recycled Water Demand[1] *From Table 6-4*	316	316	316	316	316	316
Optional Deduction of Recycled Water Put Into Long-Term Storage[2]						
TOTAL WATER USE	11,237	11,787	11,977	12,191	12,464	12,749

[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: Future DMM not included above, total water sales shown in UWMP Table 10 plus non-revenue water shown in UWMP Table 14

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]
01/2015	414.56
01/2016	631.75
01/2017	577.766
01/2018	432.045
01/2019	280.672
[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.	Section 5
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes
NOTES: Future water savings not included in Submittal Table 4-2 or 4-3; Future water savings included in UWMP Table 10.	

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	*1995*	*2004*	*225*	*180*
5 Year	*2003*	*2007*	*208*	
**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:				

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)*		
142	*0*	*142*	*180*	*YES*
**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:				

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						
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.
	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? *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*
City of Palo Alto	Metered	19,324	City of Palo Alto	Regional Water Quality Control Plant	Yes	No
Total Wastewater Collected from Service Area in 2020:		19,324				

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

NOTES:

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]				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
Regional Water	San Francisco			Bay or	Yes	Tertiary	18,281	17,523	316	442	
Regional Water	Bay via Emily			Wetlands	Yes	Tertiary	1,043	1,043			
						Total	19,324	18,566	316	442	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 6-4 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:	
Name of Supplier Operating the Recycled Water Distribution System:	
Supplemental Water Added in 2020 (volume) *Include units*	
Source of 2020 Supplemental Water	

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)
Agricultural irrigation										
Landscape irrigation (exc golf courses)	Parks	1137.6		Tertiary	37	37	37	37	37	37
Golf course irrigation	Palo Alto	249.6		Tertiary	250	250	250	250	250	250
Commercial use										
Industrial use										
Geothermal and other energy production										
Seawater intrusion barrier										
Recreational impoundment										
Wetlands or wildlife habitat	Palo Alto Duck Pond	24.8		Tertiary	25	25	25	25	25	25
Groundwater recharge (IPR)										
Reservoir water augmentation (IPR)										
Direct potable reuse										
Other (Description Required)	Water Trucks	4		Tertiary	4	4	4	4	4	4
				Total:	316	316	316	316	316	316
				2020 Internal Reuse						

[1] ***Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Page 34 of UWMP

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)	175	37
Golf course irrigation	166	250
Commercial use		
Industrial use	448	
Geothermal and other energy production		
Seawater intrusion barrier		
Recreational impoundment		
Wetlands or wildlife habitat	29	25
Groundwater recharge (IPR)		
Reservoir water augmentation (IPR)		
Direct potable reuse		
Other (Description Required)		4
Total	818	316

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.

NOTE: Other - Water Trucks

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.		
	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			
		Total	0

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

NOTES: Supplier is evaluating recycled water expansion projects. No projects are currently approved.

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.					
	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						

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

NOTES: Supplier is embarking on a One Water planning process which will include evaluating alternative water supply projects.

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				
Purchased or Imported Water	SFPUC Regional Water Supply System	10,921	Drinking Water	
Recycled Water	Recycled Water from the Regional Water Quality Control Plant	316	Recycled Water	
Total		11,237		0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES: Table 5 in UWMP				

Submittal Table 6-9 Retail: Water Supplies — Projected											
Water Supply	Additional Detail on Water Supply	Projected Water Supply * Report To the Extent Practicable									
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		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)
Add additional rows as needed											
Purchased or Imported Water	SFPUC Regional Water System	16,334		16,334		16,334		16,334		16,334	
Recycled Water	Recycled water from Regional Water Quality Control Plant	316		316		316		316		316	
Total		16,650	0	16,650	0	16,650	0	16,650	0	16,650	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 _____	
		☑	Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available *		**% of Average Supply**
Average Year	2025		11603	100%
Single-Dry Year	2025		8214	71%
Consecutive Dry Years 1st Year	2025		8214	71%
Consecutive Dry Years 2nd Year	2025		7087	61%
Consecutive Dry Years 3rd Year	2025		7087	61%
Consecutive Dry Years 4th Year	2025		7087	61%
Consecutive Dry Years 5th Year	2025		7087	61%

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: Assumes Bay Delta Plan comes into effect in 2023

OPTIONAL Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment) - Potable			
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 _____
		☑	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available *	**% of Average Supply**
Average Year	2025	11287	100%
Single-Dry Year	2025	7898	70%
Consecutive Dry Years 1st Year	2025	7898	70%
Consecutive Dry Years 2nd Year	2025	6771	60%
Consecutive Dry Years 3rd Year	2025	6771	60%
Consecutive Dry Years 4th Year	2025	6771	60%
Consecutive Dry Years 5th Year	2025	6771	60%
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: Table 35 in UWMP			

OPTIONAL Table 7-1 Retail: Basis of Water Year Data (Reliability Assessment) - Non-Potable			
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 _____
		☑	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available *	**% of Average Supply**
Average Year	2025	316	100%
Single-Dry Year	2025	316	100%
Consecutive Dry Years 1st Year	2025	316	100%
Consecutive Dry Years 2nd Year	2025	316	100%
Consecutive Dry Years 3rd Year	2025	316	100%
Consecutive Dry Years 4th Year	2025	316	100%
Consecutive Dry Years 5th Year	2025	316	100%

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 7-2 Retail: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	16,650	16,650	16,650	16,650	16,650
Demand totals *(autofill from Table 4-3)*	11,787	11,977	12,191	12,464	12,749
Difference	4,863	4,673	4,459	4,186	3,901

NOTES: Future DMM not included above, total water sales shown in UWMP Table 10 plus non-revenue water shown in UWMP Table 14

Submittal Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 (Opt)
Supply totals*	7,529	7,573	7,651	7,806	
Demand totals*	11,603	11,710	11,862	12,117	
Difference	(4,074)	(4,137)	(4,211)	(4,311)	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: Assumes Bay Delta Plan comes into effect in 2023; DMM included in Demand totals above					

OPTIONAL Table 7-3 Retail: Single Dry Year Supply and Demand Comparison - Potable					
	2025	2030	2035	2040	2045 (Opt)
Supply totals*	7,213	7,257	7,335	7,490	
Demand totals*	11,287	11,394	11,546	11,801	
Difference	(4,074)	(4,137)	(4,211)	(4,311)	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: Table 30 in UWMP					

OPTIONAL Table 7-3 Retail: Single Dry Year Supply and Demand Comparison - Non-Potable					
	2025	2030	2035	2040	2045 (Opt)
Supply totals*	316	316	316	316	
Demand totals*	316	316	316	316	
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:					

Submittal Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	7,529	7,573	7,651	7,806	
	Demand totals	11,603	11,710	11,862	12,117	
	Difference	(4,074)	(4,137)	(4,211)	(4,311)	0
Second year	Supply totals	6,500	6,541	6,602	6,741	
	Demand totals	11,603	11,710	11,862	12,117	
	Difference	(5,102)	(5,169)	(5,260)	(5,376)	0
Third year	Supply totals	6,500	6,541	6,602	6,741	
	Demand totals	11,603	11,710	11,862	12,117	
	Difference	(5,102)	(5,169)	(5,260)	(5,376)	0
Fourth year	Supply totals	6,500	6,541	6,602	5,986	
	Demand totals	11,603	11,710	11,862	12,117	
	Difference	(5,102)	(5,169)	(5,260)	(6,131)	0
Fifth year	Supply totals	6,500	6,541	6,077	5,986	
	Demand totals	11,603	11,710	11,862	12,117	
	Difference	(5,102)	(5,169)	(5,784)	(6,131)	0
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: Assumes Bay Delta Plan comes into effect in 2023						

Submittal Table 7-5: Five-Year Drought Risk Assessment Tables to address Water Code Section 10635(b)	
2021	**Total**
Total Water Use	10,881
Total Supplies	10,881
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	11,092
Total Supplies	11,092
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	0
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use	11,298
Total Supplies	6,510
Surplus/Shortfall w/o WSCP Action	(4,788)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	4,788
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	42%

2024	Total
Total Water Use	11,498
Total Supplies	6,622
Surplus/Shortfall w/o WSCP Action	(4,876)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	4,876
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	42%

2025	Total
Total Water Use	11,603
Total Supplies	6,075
Surplus/Shortfall w/o WSCP Action	(5,528)
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	5,528
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	48%

Submittal Table 8-1 Water Shortage Contingency Plan Levels		
Shortage Level	**Percent Shortage Range**	**Shortage Response Actions** (*Narrative description)*
1	Up to 10%	Minimum Water Shortage
2	Up to 20%	Moderate Water Shortage
3	Up to 30%	Severe Water Shortage
4	Up to 40%	Severe - Critical Water Shortage
5	Up to 50%	Critical Water Shortage
6	>50%	Water Emergency
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				
Stage I (Up to 10%)	Expand Public Information Campaign	3%-5%	Focus of the informational outreach and audit programs would be on water saving information.	No
Stage I (Up to 10%)	Other	2%-5%	Permanent Ordinances Prohibiting Water Waste	No
Stage I (Up to 10%)	Other	5%-10%	Incentive-Based Demand Side Management Programs, as appropriate	No
Stage II (10%-20%)	Expand Public Information Campaign	3%-5%	Increase advertising, social media campaigns and direct communication with customers targeting highest users and increasing water use auditing	No
Stage II (10%-20%)	Other	5%-10%	Incentive-Based Demand Side Management Programs, as appropriate	No
Stage II (10%-20%)	Implement or Modify Drought Rate Structure or Surcharge	5%-10%	If reduction goals are not being met, reduction targets may need to be developed for each customer class.	No
Stage II (10%-20%)	Landscape - Limit landscape irrigation to specific times	3-5%	Irrigation with potable water during and within 48 hours after a measurable rainfall prohibited.	Yes
Stage II (10%-20%)	Landscape - Restrict or prohibit runoff from landscape irrigation	3-5%	Application of potable water to driveways and sidewalks is prohibited, with exceptions.	Yes
Stage II (10%-20%)	Other	2-5%	Permanent Ordinances Prohibiting Water Waste; water use restrictions become more severe with each stage and enforcement is enacted more strongly with each stage. Efforts made at each stage to ensure tree canopy is protected as much as possible.	Yes
Stage III (20%-30%)	Expand Public Information Campaign	5%-10%	Increase advertising, social media campaigns and direct communication with customers targeting highest users and increasing water use auditing	No
Stage III (20%-30%)	Other	5%-10%	Incentive-Based Demand Side Management Programs, as appropriate	No
Stage III (20%-30%)	Implement or Modify Drought Rate Structure or Surcharge	5%-10%	Drought rate structures may be implemented	No
Stage III (20%-30%)	Landscape - Limit landscape irrigation to specific days	10-15%	Restrictions on the number of days per week irrigation is permitted; alternative irrigation plans established for golf courses, parks and schools with specific water use reduction targets.	Yes
Stage III (20%-30%)	Other	5-10%	Additional emergency water use restrictions added to permanent restrictions	Yes
Stage IV (30%-40%)	Expand Public Information Campaign	5%-15%	Increase advertising, social media campaigns and direct communication with customers targeting highest users and increasing water use auditing	No
Stage IV (30%-40%)	Other	5%-15%	Incentive-Based Demand Side Management Programs, as appropriate	No
Stage IV (30%-40%)	Implement or Modify Drought Rate Structure or Surcharge	5%-10%	Drought rate structures may be implemented	No
Stage IV (30%-40%)	Landscape - Limit landscape irrigation to specific days	10% to 20%	Further restrictions on the number of days per week irrigation is permitted; alternative irrigation plans established for golf courses, parks and schools with specific water use reduction targets	Yes
Stage IV (30%-40%)	Other	5-10%	Additional emergency water use restrictions added to permanent restrictions	Yes
Stage V (40%-50%)	Moratorium or Net Zero Demand Increase on New Connections	1-5%	No new water service connections unless the customer pays for sufficient conservation measures elsewhere in the city to offset water use.	Yes
Stage V (40%-50%)	Expand Public Information Campaign	5-15%	Escalate outreach efforts and media campaign with focus on water use prioritization	No
Stage V (40%-50%)	Other	5-15%	Incentive-Based Demand Side Management Programs, as appropriate	No
Stage V (40%-50%)	Implement or Modify Drought Rate Structure or Surcharge	10-15%	Water allocations or allotments may be implemented	No
Stage V (40%-50%)	Landscape - Prohibit certain types of landscape irrigation	15-25%	Outdoor water use restrictions, possibly with some allocation for the tree canopy maintenance, ornamental landscape and turf irrigation prohibited.	Yes
Stage V (40%-50%)	Other	5-10%	Additional emergency water use restrictions added to permanent restrictions	Yes
Stage VI (>50%)	Expand Public Information Campaign	5-15%	Highest outreach effort level with focus on health and safety	No
Stage VI (>50%)	Other	5-15%	Incentive-Based Demand Side Management Programs, as appropriate	No
Stage VI (>50%)	Implement or Modify Drought Rate Structure or Surcharge	10-15%	Water allocations or allotments may be implemented	No
Stage VI (>50%)	Landscape - Prohibit all landscape irrigation	25-35%	Water use restricted to health and safety needs, possibly with some allocation for the tree canopy maintenance.	Yes
Stage VI (>50%)	Other	5-10%	Additional emergency water use restrictions added to permanent restrictions	Yes

NOTES: Implementation of individual restrictions within each stage shall be carried out at the direction of the City Council, in response to its assessment of local water supply conditions, feasibility, and consumption trends. Water use restrictions are maintained from one stage to the next: Stage III has all the water use restrictions for Stage II as well as the restrictions listed for Stage III, Stage IV has all the water use restrictions for Stages II and III as well as the restrictions listed for Stage IV; Stage V has all the water use restrictions for Stages II, III, and IV as well as the restrictions listed for Stage V, and Stage VI has all the water use restrictions for Stages II, III, IV and V as well as the restrictions listed for Stage VI. Stages II through V will include Alternative Irrigation Plans with specific water use reduction targets for high-value landscapes such as playing fields and golf courses.

Submittal Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Brisbane	Yes	Yes
Burlingame	Yes	Yes
Daly City	Yes	Yes
East Palo Alto	Yes	Yes
Foster City	Yes	Yes
Hayward	Yes	Yes
Hillsborough	Yes	Yes
Menlo Park	Yes	Yes
Millbrae	Yes	Yes
Milpitas	Yes	Yes
Mountain View	Yes	Yes
Redwood City	Yes	Yes
San Bruno	Yes	Yes
San Jose	Yes	Yes
Santa Clara	Yes	Yes
Sunnyvale	Yes	Yes
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Santa Clara County	Yes	Yes
NOTES:		

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	*AF*	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process (volume unit)		*10921*	*0*	*10921*
Energy Consumed (kWh)		*1500000*	*0*	*1500000*
Energy Intensity (kWh/vol. converted to MG)		*421.5*	*#DIV/0!*	*421.5*

Quantity of Self-Generated Renewable Energy

kWh

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

Combination of Estimates and Metered Data

Data Quality Narrative:

Narrative:

Since 2013, the City's electric supply has been carbon neutral, making the greenhouse gas footprint negligible.

SB X7-7 Table 0: Units of Measure Used in UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent with 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:	

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	68,819
NOTES: Fiscal year	

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.*	
	10,921			-		-	**10,921**

* **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 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	San Francisco Public Utilities Commission
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
	10,921	-	10,921

[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

SB X7-7 Table 4-C.1: 2020 Process Water Deduction Eligibility

(For use only by agencies that are deducting process water using Criteria 1)

Criteria 1

Industrial water use is equal to or greater than 12% of gross water use

2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction	2020 Industrial Water Use	Percent Industrial Water	**Eligible for Exclusion Y/N**
	10,921		0%	NO

NOTES:

SB X7-7 Table 4-C.2: 2020 Process Water Deduction Eligibility

(For use only by agencies that are deducting process water using Criteria 2)

Criteria 2

Industrial water use is equal to or greater than 15 GPCD

2020 Compliance Year	2020 Industrial Water Use	2020 Population	2020 Industrial GPCD	**Eligible for Exclusion Y/N**
		68,819	-	NO

NOTES:

SB X7-7 Table 4-C.3: 2020 Process Water Deduction Eligibility *(For use only by agencies that are deducting process water using Criteria 3)*						
Criteria 3 Non-industrial use is equal to or less than 120 GPCD						
2020 Compliance Year	2020 Gross Water Use Without Process Water Deduction *Fm SB X7-7 Table 4*	2020 Industrial Water Use	2020 Non-industrial Water Use	2020 Population *Fm SB X7-7 Table 3*	Non-Industrial GPCD	**Eligible for Exclusion Y/N**
	10,921		10,921	68,819	142	NO
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**
10,921	68,819	**142**
NOTES:		

SB X7-7 Table 9: 2020 Compliance							
	Optional Adjustments to 2020 GPCD						
	Enter "0" if Adjustment Not Used						
Actual 2020 GPCD[1]	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?**
142	-	-	-	-	142	180	**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:							

APPENDIX E – City of Palo Alto Resolution Approving Water Shortage Allocation Plan (w/attachments)

Resolution No. 9141

Resolution of the Council of the City of Palo Alto Approving a New Water Shortage Allocation Plan Pursuant to Section 3.11(C) of the 2009 Water Supply Agreement with San Francisco

WHEREAS, the City of Palo Alto is one of 26 agencies in San Mateo, Santa Clara and Alameda Counties which purchase water from the City and County of San Francisco (San Francisco) pursuant to a Water Supply Agreement entered into in 2009 (Agreement). Collectively these 26 agencies are referred to in the Agreement as Wholesale Customers.

WHEREAS, Section 3.11 of the Agreement addresses times when insufficient water is available in the San Francisco Regional Water System to meet the full demands of all users. Section 3.11(C) provides that during periods of water shortage caused by drought, the San Francisco Public Utilities Commission (SFPUC) will allocate available water between its retail customers and the Wholesale Customers collectively, in accordance with a schedule contained in the Water Shortage Allocation Plan set forth in Attachment H to the Agreement (Tier 1 Plan).

WHEREAS, Section 3.11(C) authorizes the Wholesale Customers to adopt an additional Water Shortage Allocation Plan, including a methodology for allocating the water which is collectively available to the 26 Wholesale Customers among each individual Wholesale Customer (Tier 2 Plan). It also commits the SFPUC to honor allocations of water unanimously agreed to by all Wholesale Customers or, if unanimous agreement cannot be achieved, water allocations that have been adopted by the Board of Directors of the Bay Area Water Supply and Conservation Agency (BAWSCA). The Agreement also provides that the SFPUC can allocate water supplies as necessary during a water shortage emergency if no agreed upon plan for water allocation has been adopted by the 26 Wholesale Customers or the BAWSCA Board of Directors.

WHEREAS, commencing in October 2009, representatives appointed by the managers of each of the Wholesale Customers have been meeting to develop a set of principles to serve as guidelines for an equitable allocation methodology, as well as formulas and procedures, to implement those principles. These discussions, and supporting technical analyses, have been conducted with the assistance of BAWSCA staff.

WHEREAS, the Tier 2 Plan, attached to this resolution as Exhibit A, has been endorsed by all of the Wholesale Customer representatives who participated in the formulation process and they have committed to recommend that it be formally adopted by the governing body of their respective agencies.

WHEREAS, the Tier 2 Plan allocates the collective Wholesale Customer share among each of the 26 wholesale customers through December 31, 2018 to coincide with San Francisco's deferral of decisions about additional water supply until at least 2018.

NOW, THEREFORE, the Council of the City of Palo Alto does hereby RESOLVE as follows:

EXHIBIT A

TIER 2 DROUGHT IMPLEMENTATION PLAN
AMONG WHOLESALE CUSTOMERS

This Tier 2 Drought Implementation (Plan) describes the method for allocating the water made available by the San Francisco Public Utilities Commission (SFPUC) among the Wholesale Customers during shortages caused by drought. This Plan is adopted pursuant to Section 3.11.C of the July 2009 Water Supply Agreement between the City and County of San Francisco and the Wholesale Customers (Agreement).

SECTION 1. APPLICABILITY AND INTEGRATION

Section 1.1 **Applicability**. This Plan applies when, and only when, the SFPUC determines that a system-wide water shortage of 20 percent or less exists, as set forth in a declaration of water shortage emergency adopted by the SFPUC pursuant to California Water Code Sections 350 *et seq.* This Plan applies only to water acquired and distributed by the SFPUC to the Wholesale Customers and has no effect on water obtained by a Wholesale Customer from any source other than the SFPUC.

Section 1.2 **Integration with Tier 1 Water Shortage Allocation Plan**. The Agreement contains, in Attachment H, a Water Shortage Allocation Plan which, among other things, (a) provides for the allocation by the SFPUC of water between Direct City Water Users (e.g., retail water customers within the City and County of San Francisco) and the Wholesale Customers collectively during system-wide water shortages of 20 percent or less, (b) contemplates the adoption by the Wholesale Customers of this Plan for allocation of the water made available to Wholesale Customers collectively among the 26 individual Wholesale Customers, (c) commits the SFPUC to implement this Plan, and (d) provides for the transfer of both banked water and shortage allocations between and among the Wholesale Customers and commits the SFPUC to implement such transfers. That plan is referred to as the Tier 1 Plan.

The Tier 1 Plan also provides the methodology for determining the Overall Average Wholesale Customer Reduction, expressed as a percentage cutback from prior year's normal SFPUC purchases, and Overall Wholesale Customer Allocation, in million gallons per day, both of which are used in determining the Final Allocation Factor for each Wholesale Customer. The Overall Average Wholesale Customer Reduction is determined by dividing the volume of water available to the Wholesale Customers (the Overall Wholesale Customer Allocation), shown as a share of available water in Section 2 of the Tier 1 Plan, by the prior year's normal total Wholesale Customers SFPUC purchases and subtracting that value from one.

This Plan is referred to in the Agreement as the Tier 2 Plan. It is intended to be integrated with the Tier 1 Plan described in the preceding paragraph. Terms used in this Plan are intended to have the same meaning as such terms have in the Tier 1 Plan.

APPENDIX F - Water Shortage Contingency Plan Draft Ordinance

DRAFT
WATER SHORTAGE CONTINGENCY ORDINANCE

Ordinance No._____
Ordinance of the Council of the City of Palo Alto Declaring a Water Shortage Emergency [And Reinstating Sections 12.32.015 And 12.32.030 of the Palo Alto Municipal Code Establishing Emergency Water Use Regulations And Maximum Monthly Water Use]

The Council of the City of Palo Alto finds and determines as follows:

A. The City of Palo Alto is the distributor of a public water supply within its boundaries.

B. The City faces a water supply shortage.

C. The Palo Alto Municipal Code and Urban Water Management Plan (adopted by the Council via Resolution ____ on _____, 2016), include a Water Shortage Contingency Plan and other tools to responsibly manage the City's water resources.

D. Under Water Code Section 350, the Council may declare a water shortage emergency condition to prevail within the City's service territory, whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection.

E. The City Council has held a public hearing on the proposed adoption of this ordinance, the City Clerk having first duly given notice of the hearing as required by Government Code Section 6061.

NOW, THEREFORE, the Council of the City of Palo Alto does ORDAIN as follows:

SECTION 1. The City Council of the City of Palo Alto finds and determines that:

1. Due to _____, there is a significant shortage of water reserves.

2. The wholesale supplier for the City of Palo Alto has cut the annual deliveries of water for the period from _____to _____ by _____percent.

3. Normal demands and requirements of water consumers cannot be satisfied without depleting the water supply of the City to the extent that there would be insufficient water for human consumption, sanitation and fire protection.

APPENDIX G - Water Shortage Contingency Plan Evaluation Criteria

CRITERIA TO EVALUATE WATER SHORTAGE RESPONSE PLAN

This appendix lists criteria expected to guide the selection of allocation/allotment strategies whenever water use reductions are needed. Not all of them may be applicable to every strategy but customer perception of equity is important in achieving the necessary reductions.

1. Reduce overall City consumption by reduction target required – this is the effective goal of any plan. To accomplish this goal the percentage reduction for the various customer classes will necessarily vary because their ratios of indoor/outdoor use varies.

2. Sufficient water available for personal use – the most important use of water is for basic drinking, health, and sanitary uses, and therefore, this is given the highest priority of use. This prioritization will drive both rate schedules and water use restrictions. However, within allowed limits (i.e., water use restriction ordinances), customers will be able to choose how they use their allotment between indoor and outdoor uses.

3. Acceptance by the community – many people tend to evaluate or accept a particular water- rationing plan in terms of how it would directly affect them. It is this aspect which makes it difficult to gain a popular consensus on any one plan. However, any plan must be generally accepted by the community to be successful. One important aspect of acceptance is the public's understanding of the program; thus, it is viewed as important to make the plan as uncomplicated as possible.

4. Minimize unemployment or business loss – water is extensively used in both commercial and industrial functions. If water is severely limited to these consumers, increased unemployment and business losses could result. Staff intends that, wherever possible, this should be avoided. Still, outside water use must be sacrificed greatly if only minimal indoor reductions are required. Cooling tower use for air conditioning must also be considered.

5. Landscaping investment losses – in cases of critical or severe shortage of water, it is expected that significant landscaping losses may arise. The use of recycled water should be encouraged for certain applications. In some cases, using the City's well system to augment the SFPUC supply will be an option to provide a minimum amount of water for landscaping. In this case, the goal should be to keep valuable and mature trees and plantings alive. Shrubs and lawns will be considered a lower priority.

6. Workable plan – the plan must be workable in order to accomplish its goal. It must take the following factors into account:

    a. Cost - the cost of any water plan to the public should be minimized.
    b. Enforcement - enforcement is viewed as a key component of any plan. Those plans requiring fewer resources for enforcement would be preferable. However, the success

of a plan is contingent upon effective enforcement and the utility must be provided the resources to meet the enforcement objective. The current staff can only absorb a certain level of additional responsibilities without unreasonably impacting service to the customer.

c. The plan must be practical and feasible from a data processing viewpoint and not subject to erroneous results due to incomplete or inaccurate databases. A realistic timeframe must be allowed to perform any necessary data entry or customer programming functions.

9. Flexibility – the water shortage is a dynamic situation and may get better or worse. Thus, it is necessary that any plan be adaptable to changes in targets or adjustable if original expectations are not being met.

10. Allowance for new services – some provision must be made in any plan to serve new establishments or those under construction.

12. Recover penalties applied by suppliers – revenue should be collected to the extent necessary to recover any penalties that may be charged by suppliers.

APPENDIX H - Water Shortage Contingency Plan Use Restrictions

WATER USE RESTRICTIONS

Water use restrictions will depend on local conditions and on the length of the water shortage or drought. The City's Water Shortage Contingency Plan identifies measures appropriate for various stages of action, based on reduction targets for each stage. Section A of this Appendix describes the City's existing water use regulations. The restrictions in Section B are additional restrictions that could be applied in various stages or a drought or other water supply shortage. These staged restrictions are intended to serve as tools within the broader framework of the Urban Water Shortage Contingency Plan, to help the City reduce potable water consumption.

Implementation of individual restrictions within each stage shall be carried out at the direction of the City Council, in response to its assessment of local water supply conditions, feasibility, and consumption trends. The Council may, in its discretion, opt to revise, delete or include different elements than those described below, so long as the restrictions implemented serve the overall purpose of reducing local consumption.

A. Permanent Water Use Regulations (*See* Palo Alto Municipal Code Section 12.32.010)

1. Flooding or runoff of potable water into gutters, driveways, sidewalks, streets or other unlandscaped areas is prohibited.
2. An operating shut-off valve is required for hoses used to wash cars, boats, trailers, buses or other vehicles, or to wash sidewalks, building structures, other hard-surfaced areas or parts thereof. Use of a hose for such purposes should be avoided whenever possible.
3. Potable water for consolidation of backfill and other nondomestic uses in construction shall not be used if other water sources, such as reclaimed water, are available, as determined by the Director of Utilities or his or her designee. Applicants for hydrant permits from the city of Palo Alto shall be deemed to have consented to restrictions on water use which may be imposed by the Director of Utilities or his or her designee.
4. Any broken or defective plumbing, sprinklers, watering or irrigation systems which permit the escape or leakage of water shall be repaired or replaced as soon as possible, but no later than the date established by the Director of Utilities, or his or her designee, as reasonable after observation of the broken or defective system.
5. Ornamental landscape[1] or turf irrigation with potable water shall not be allowed between 10:00 a.m. and 6:00 p.m., except via hand watering with a bucket or a hose with an operating shut-off valve.
6. The use of potable water in a fountain or other decorative water feature is prohibited, except where the water is part of a recirculating system.
7. The use of potable water for street sweepers/washers is prohibited if non-potable water is available, as determined by the Director of Utilities, or his or her designee.
8. Commercial car washes must use recycled water systems, if economically feasible.

B. Additional Restrictions Available for Council's Consideration in Droughts or Other Water Supply Shortages

Stage I – Minimum Water Supply Shortage: Up to 10% Target Water Savings
No additional restrictions

Stage II – Moderate Water Supply Shortage: 10% - 20% Target Water Savings

1. Irrigation with potable water during and within 48 hours after a measurable rainfall, as determined by the Director of Utilities, or his or her designee, and posted on the Palo Alto website, is prohibited.
2. The application of potable water to driveways and sidewalks is prohibited, except where necessary to address an immediate health and safety need or to comply with a term or condition in a permit issued by a state or federal agency.
3. Restaurants and other food service operations shall serve water to customers only upon request.
4. 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 guestroom using clear and easily understood language.

Stage III – Severe Water Supply Shortage: 20% - 30% Target Water Savings
All water use restrictions for Stage II, and the following:

1. The irrigation of ornamental landscapes[1] or turf with potable water more than three days per week is prohibited during the months of April through October.[2]
2. The irrigation of ornamental landscapes[1] or turf with potable water more than one day per week is prohibited during the months of November through March.[2]
3. The filling of newly constructed pools, spas and hot tubs is prohibited.
4. Water allocations may be imposed.
4. Golf courses, schools, and parks have the option to be placed on Alternative Irrigation Plans with targets established by the Director of Utilities.

Stage IV – Severe to Critical Water Supply Shortage: 30% - 40% Target Water Savings
All water use restrictions for Stages II, and III, and the following:

1. The irrigation of ornamental landscapes[1] or turf with potable water more than two days per week is prohibited during the months of April through October.[2]
2. Water allocations may be imposed.
3. Drought tolerant landscaping that minimizes irrigation and runoff is required at new construction sites, and non-drought tolerant landscaping is prohibited.
4. Golf courses, schools, and parks have the option to be placed on Alternative Irrigation Plans with targets established by the Director of Utilities.

Stage V – Critical Water Supply Shortage: 40% - 50% Target Water Savings
All water use restrictions for Stages II, III and IV, and the following:

1. No new water service connections are permitted unless the customer pays for sufficient conservation measures to be applied elsewhere in the City, to offset anticipated water use at the site to be served by the new water service, as determined by the City of Palo Alto.
2. Ornamental landscape and turf irrigation with potable water is prohibited.
3. The washing of all vehicles is prohibited except for at commercial washing facility that recirculates its water or uses recycled water.
4. Sprinkler irrigation is prohibited.

Stage VI – Water Emergency: Greater than 50% Target Water Savings

All water use restrictions for Stages II, III, IV, and V and the following:

1. All outdoor water use is prohibited except to maintain health and safety.
2. Some targeted water use to keep trees alive may be permitted.

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[1] "Ornamental landscapes" serve purely decorative purposes, and are distinguished from trees, edible gardens or landscapes that provide more than a purely aesthetic function.

[2] Customers with a public or private non-residential facility containing ornamental landscapes or turf which supports a demonstrable business necessity or public benefit may apply for City approval of an alternative irrigation schedule.