CITY OF MOUNTAIN VIEW 2020 URBAN WATER MANAGEMENT PLAN

June 8, 2021

EF/2/PSD/703-05-04-21UWMP

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KEY ACRONYMS AND ABBREVIATIONS

AF—Acre-foot (of water)
AFY—Acre-feet per year
AMI—Advanced Metering Infrastructure
AMR—Automated Meter Reading
AWIA—America Water Infrastructure Act
BAWSCA—Bay Area Water Supply and Conservation Agency
CalWEP—California Water Efficiency Partnership
Cal Water—California Water Service Company
ccf—Hundred cubic feet (of water)
CII—Commercial, institutional, and industrial
CVP—Federal Central Valley Project
DSS model—Demand Side Management Decision Support System
DWR—California Department of Water Resources
EOC—Emergency Operations Center
ET—Evapotranspiration
GSA– Groundwater Sustainability Agency
GPCD—Gallons per capita per day
IRP—Infrastructure Reliability Plan
mgd—Million gallons per day
ppm—Parts per million
psi—Pounds per square inch
Regional System—San Francisco Hetch Hetchy Regional Water System
RWQCP—Palo Alto Regional Water Quality Control Plant
SB X7-7— Senate Bill Seven of the Senate's Seventh Extraordinary Session of 2009
SGMA— Sustainable Groundwater Management Act of 2014
SFPUC—San Francisco Public Utilities Commission
State Water Board—California State Water Resources Control Board
SWP—California State Water Project
TDS—Total dissolved solids
UWMP—Urban Water Management Plan
Water Code—California Water Code
WET—Water-Efficient Technology Rebate
WSO—Water System Optimization
WSIP—SFPUC Water System Improvement Program

EXECUTIVE SUMMARY

CHAPTER 1: INTRODUCTION

The Urban Water Management Plan (UWMP) provides an analysis of the City of Mountain View's available water supply, during normal and dry-year scenarios, compared to current and projected water demand. The UWMP is a link between land use planning and water supply planning, developed to evaluate if sufficient water is available to meet the needs of Mountain View's existing and future water customers. This UWMP update also includes an update to the Water Shortage Contingency Plan. In preparing this UWMP update, staff worked collaboratively with the City's wholesale water suppliers to exchange necessary information. Notice of the preparation and adoption process was posted in local newspapers and emailed to neighborhood and business liaisons, local water agencies, and the County of Santa Clara. Pursuant to State law, water agencies must update their UWMP every five years.

CHAPTER 2: SERVICE AREA

Mountain View's municipal water system serves the majority of businesses and residents within the City limits. A small number of customers are served by the California Water Service Company. The City's service population is currently 79,772, with an employment base of 98,270. Future water demand projections were developed based on a snapshot of approved development and the General Plan growth estimates, including that affiliated with the approved North Bayshore, El Camino Real, East Whisman, and San Antonio Precise Plans, projected linearly to 2045 to meet the UWMP time horizon. Collective growth is estimated to reach 116,900 residents and 126,100 jobs within the municipal water service area by 2045. These land use policies are expected to increase the population by 47% and jobs by 28% from the current levels.

CHAPTER 3: WATER SYSTEM OVERVIEW

The City's municipal water system services three pressure zones and consists of three wholesale water turnouts, four reservoirs, three pump stations, four active groundwater supply wells, and buried pipelines of varying composition, ages, and sizes. Mountain View currently serves 17,543 potable water service connections and 58 active recycled water service connections. Single-family and multi-family homes account for 83% of all connections, with the remaining connections serving commercial, institutional, and industrial accounts and landscape customers.

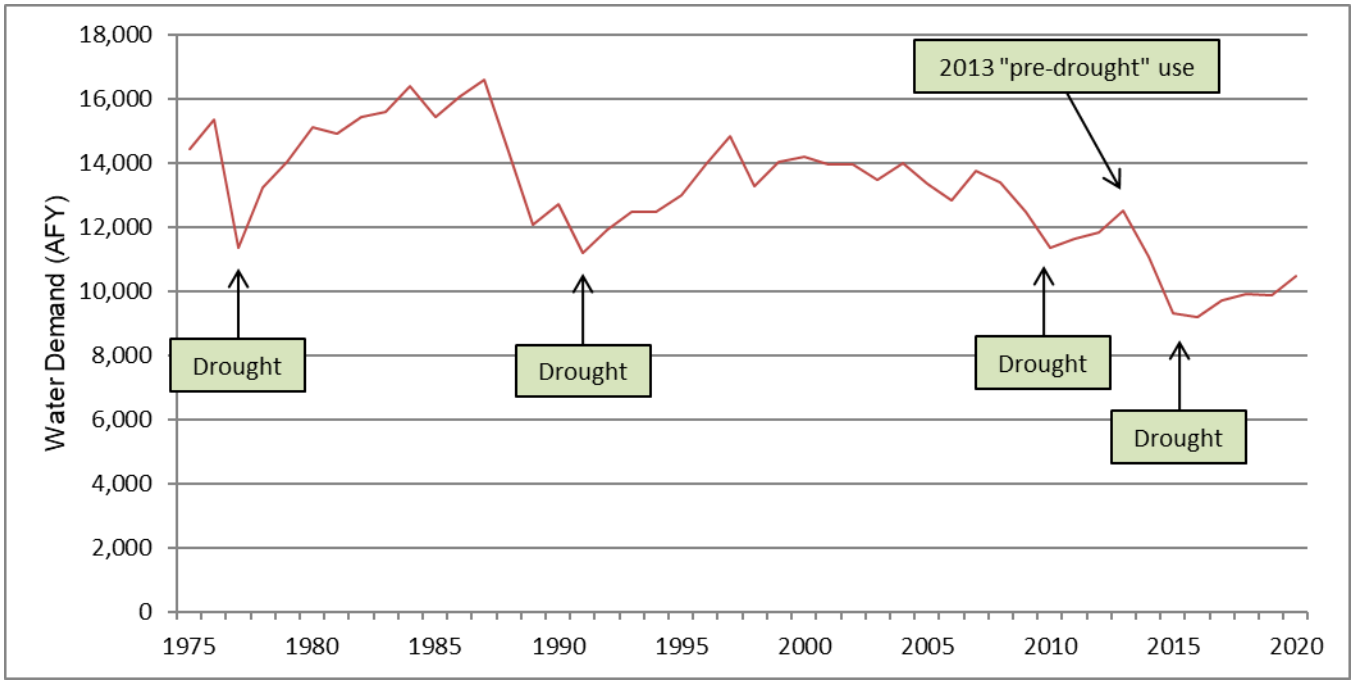
CHAPTER 4: WATER DEMAND

Two notable events have occurred since the last UWMP update in 2016 to influence Mountain View's water demand: (1) California experienced the most severe drought on record resulting in a significant decline in water use followed by a slow and continued rebound; and (2) Mountain View, and the rest of the world, endured challenges from the novel coronavirus (COVID-19) global pandemic, shifting the City's water demand patterns away from businesses and toward homes, as workplaces closed to on-site workers and residents sheltered in-place.

Historical Water Demand

Mountain View's historical water demand is shown in Figure ES-1. This figure shows a general downward trend in water use since the mid-1980s, punctuated by rapid drops in water use coinciding with periods of drought, as customers responded to conservation requests. Since the conclusion of the most recent drought in 2017, the City has seen a steady rebound in usage. Despite this increase, the City's current water demand is 16% below the 2013 predrought baseline of 2013.

Figure ES-1: Historical Water Demand



Compliance with 2020 Urban Water Use Target

The Water Conservation Act of 2009 (also referred to as SB X7-7, for California Senate Bill Extraordinary Session 7-7) requires each urban water retail supplier to develop and meet a water-use target by the year 2020. Mountain View's 2020 urban water use target is 146 gallons per capita per day (GPCD). The City's current water use is 112 GPCD, which is nearly 22 percent below the target water use and, therefore, compliant with the requirements of SB X7-7.

Projected Water Demand

Mountain View's water demand projections were developed based on regional modeling efforts completed over the past several years. Mountain View's water-use model was most recently revised to account for new plumbing code requirements, updated population and employment projections, and the impacts of climate change. Continued rebound from the recent drought and 2008-10 economic recession are also included.

The City's water-use model includes three scenarios to evaluate and forecast Mountain View's water demand through the year 2045. The "base-case" scenario represents a high-end estimate of possible future demand. Two additional scenarios were developed to capture water savings expected from plumbing code efficiencies and increased water conservation measures. Mountain View's model results are shown in Table ES-1 in five-year increments through the year 2045. For the purpose of this UWMP, the scenario, incorporating plumbing code savings (Scenario B), is selected for the City's official demand projections.

Table ES-1: Water Model Results

Water Model Scenario	Projected Water Demand (AFY)				
	2025	2030	2035	2040	2045
Scenario A (Base-Case)	12,679	13,485	14,288	15,091	15,894
Scenario B (Plumbing Codes)	**12,058**	**12,548**	**13,064**	**13,607**	**14,163**
Scenario C (Plumbing Codes and Conservation)	11,825	12,164	12,530	12,929	13,361

CHAPTER 5: WATER SUPPLY SOURCES

The City of Mountain View receives the majority of drinking water from the City and County of San Francisco's Regional Water System (Regional System), operated by the San Francisco Public Utilities Commission (SFPUC). Mountain View is a member of the Bay Area Water Supply and Conservation Agency (BAWSCA), which represents the 26 water agencies that purchase water wholesale from SFPUC. Mountain View also purchases water wholesale from the Santa Clara Valley Water District (now known as Valley Water) and pumps local groundwater from City-owned wells. Mountain View has a recycled water distribution system to meet nonpotable demand in the North Bayshore Area. In 2020, the City's water supply production was 84 percent SFPUC, 10 percent Valley Water, 2 percent groundwater, and 4 percent recycled water. Below is a summary of the City's water supplies:

- **San Francisco:** The Regional System draws an average of 85 percent of their supply from the Tuolumne River, collected in Hetch Hetchy Reservoir in Yosemite National Park. This water feeds into an aqueduct system delivering water 167 miles by gravity to Bay Area reservoirs and customers. The remaining 15 percent of SFPUC's supply is drawn from local surface waters in Alameda County and Peninsula watersheds through the San Antonio, Calaveras, Crystal Springs, Pilarcitos, and San Andreas reservoirs.

- **Valley Water:** Valley Water is an independent special district that provides wholesale water supply, groundwater management, flood protection, and stream stewardship on behalf of Santa Clara County's nearly 2 million residents. Valley Water's service area includes all of Santa Clara County. Sources of supply for Valley Water include local surface water, imported water from the State Water Project and Central Valley Project, groundwater, and recycled and purified water. Valley Water supplies are used to recharge

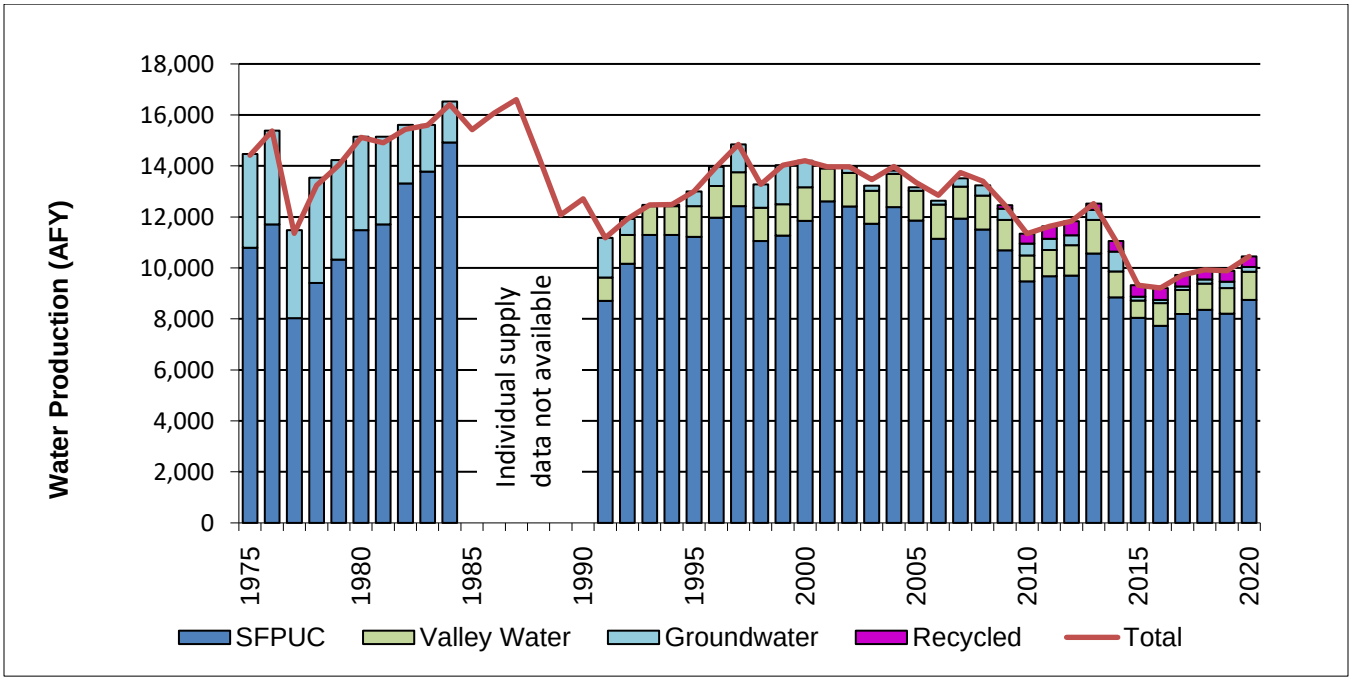
local groundwater basins, released to local creeks to meet environmental needs, and delivered directly to retail water suppliers through Valley Water's treatment plants and distribution system. Potable reuse through groundwater augmentation is a planned future water supply for Valley Water.

- **Local Groundwater:** Mountain View owns and operates water supply wells that extract local groundwater for use as drinking water. City wells pump groundwater from the Santa Clara Basin, which is managed by Valley Water. Approximately two-thirds of all groundwater used in Santa Clara County is recharged by Valley Water from local and imported surface water.

- **Recycled Water:** Mountain View uses recycled water from the Palo Alto Regional Water Quality Control Plant for irrigation and toilet flushing in the North Bayshore Area. The City has utilized recycled water since 1980. There are currently 58 active customer connections to the City's recycled water system, including the Shoreline golf course regional park, Shoreline Amphitheatre, Charleston Park, and various business and roadway landscaping.

Mountain View's historical water supply production is shown in Figure ES-2. A general downward trend is evident over the past 45 years, due mostly to changes in customer base, increased plumbing efficiencies, changes in landscape aesthetics and periodic drought.

Figure ES-2: Historical Water Supply Production



Projected Water Supply Production

Mountain View maintains a robust water supply portfolio to ensure that sufficient water is available for existing and future needs. Production of each water supply changes based on several factors, including demand, water quality, and drought. In order to meet projected demand, Mountain View expects to utilize the City's supplies in the approximate volumes presented in Table ES-2. Actual use of each supply will depend on demand, supply conditions, and operational needs. For conservative planning purposes, demand growth is assumed to be met using SFPUC water; however, the City maintains flexibility to allow for the use of all water supplies, as needed. The City continues to work with the Regional Water Quality Control Plant to improve recycled water quality and is updating the Recycled Water Feasibility Study to evaluate system expansion options. Future investments in recycled water will allow for increased use of this resource.

Table ES-2: Projected Water Supply Production

Supply Source	Projected Water Supply Production (AFY)				
	2025	2030	2035	2040	2045
SFPUC	10,154	10,644	11,160	11,703	12,259
Valley Water	1,176	1,176	1,176	1,176	1,176
Groundwater	280	280	280	280	280
Potable	11,610	12,100	12,616	13,159	13,715
Recycled	448	448	448	448	448
Total Supply	12,058	12,548	13,064	13,607	14,163

CHAPTER 6: WATER SUPPLY RELIABILITY

As part of the UWMP update, the City and the City's wholesale water suppliers have evaluated their ability to meet projected demand during normal and dry years. Several new considerations have arisen since the City's last UWMP update in 2016, most prominently the State Water Board's adoption of the *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (Bay Delta Plan).

Reliability of the SFPUC Regional System

SFPUC projects significant supply shortfalls due to implementation of the Bay Delta Plan and is developing strategies to address these possible shortfalls.

- **Water System Improvement Plan:** To enhance the ability of the Regional System and meet its goals for water quality, seismic reliability, delivery reliability, and water supply, SFPUC approved a $4.8 billion Water System Improvement Plan (WSIP) in 2008. The WSIP included over 30 capital projects related to rehabilitation, construction, replacement, and upgrades to pipelines, reservoirs, dams, treatment facilities, tunnels, and power facilities.

The WSIP authorized the SFPUC to undertake a number of water supply projects to meet dry-year demands with no greater than 20 percent rationing.

- **Bay Delta Plan:** The State Water Board has amended the Bay Delta Plan to establish water quality objectives to maintain the health of the Bay Delta ecosystem. A main goal of the Bay Delta Plan is to increase salmon populations in the Bay Delta and three San Joaquin River tributaries. One of the affected tributaries is the Tuolumne River, which is SFPUC's primary water source. If the Bay Delta Plan is implemented as adopted, the SFPUC will be able to meet system demand in normal years, but the SFPUC would experience supply shortages during dry years ranging from 30 percent to 49 percent. The State Water Board, SFPUC, and others are currently negotiating a voluntary alternative to the Bay Delta Plan. At this time, the final resolution of this process is uncertain.

- **Alternative Water Supply Planning:** SFPUC is increasing and accelerating its efforts to acquire additional water supplies and explore other projects that would improve water resilience. Development of additional water supplies would reduce SFPUC's supply shortfalls that are projected to result from implementation of the Bay Delta Plan. Capital projects under consideration include surface water storage expansion, recycled water expansion, water transfers, desalination, and potable reuse. These projects are in the early feasibility or conceptual planning stages, and SFPUC expects to complete the Alternative Supply Program evaluation by July 2023.

Reliability of Valley Water Managed Supplies

Based on Valley Water's existing and planned sources of supply, Valley Water expects to be able to meet Countywide demands through 2045 under normal and drought conditions.

- **Imported Water Constraints:** Valley Water's imported supplies are subject to a number of constraints, including hydrologic variability, regulatory requirements to protect fish and water quality in the Bay Delta, and conveyance limitations. Imported Bay Delta supplies are at risk from levee failures due to seismic threats and flooding, sea-level rise and climate change, declining populations of protected fish species, and water quality variations. Valley Water's Bay Delta supplies are not impacted by the Bay Delta Plan described above, which addresses tributaries of the San Joaquin River at this time. The State Water Board is also considering amendments that will focus on the Sacramento River and its tributaries. These amendments, referred to as Phase II of the Bay Delta Plan, have not been completed and are, therefore, not contemplated in this UWMP update.

- **Local Surface Water Constraints:** Valley Water's local surface water is vulnerable to hydrologic variability and operational needs. Reservoirs are sized for annual operation and have multiple management considerations. For example, in wet years, Valley Water's ability to capture local surface water is limited by Valley Water's need to provide flood protection. During dry years, Valley Water's groundwater recharge program is limited by

required environmental flows. Dam safety requirements have reduced reservoir storage capacities, which Valley Water is working to address.

- **Groundwater Constraints:** Groundwater supply is largely constrained by hydrologic variability and the operational storage capacity within the subbasins. Inflows to the groundwater subbasins are controlled by Valley Water's managed aquifer recharge program and natural recharge.

Water Service Reliability Assessment

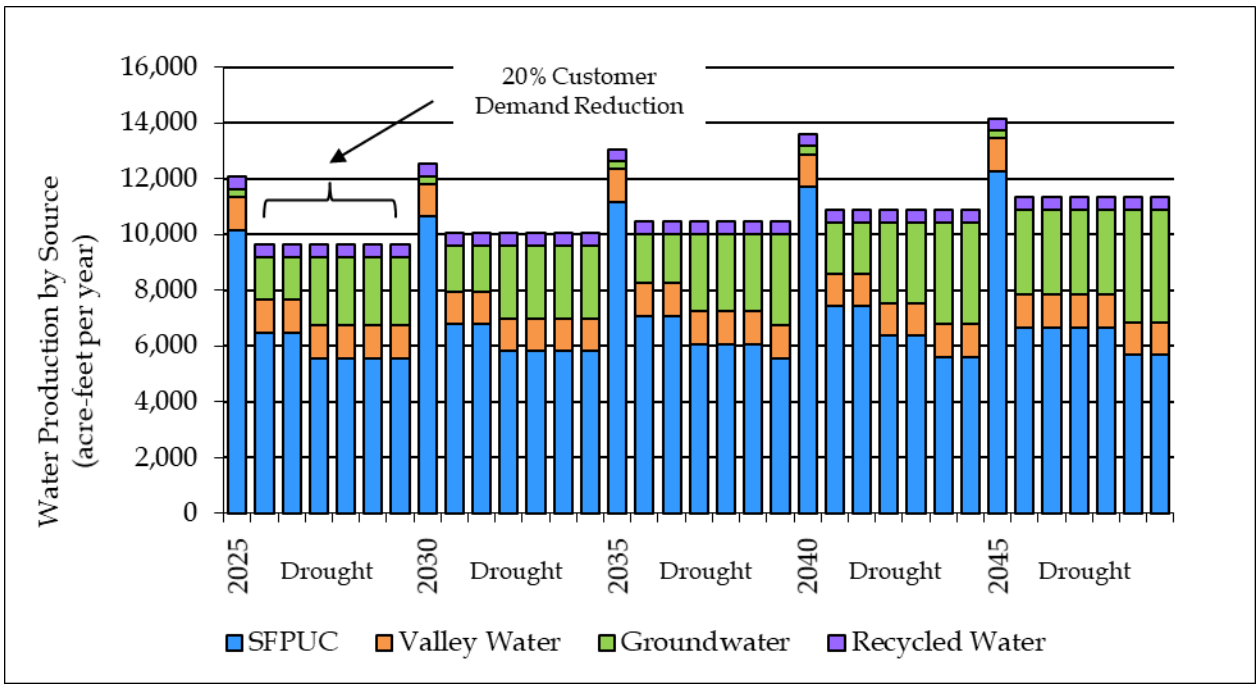
Mountain View plans to meet projected water demand during normal and dry-year scenarios using a combination of existing supplies and demand-reduction measures. Valley Water, local groundwater, and recycled water supplies are projected to be fully available during all year types (normal and dry) through 2045. Based on the information provided by the SFPUC under their Bay Delta Plan scenario, Mountain View will have full SFPUC supply availability during normal years but will experience SFPUC supply shortfalls between 36 percent and 54 percent during dry years.

Water Supply and Demand Assessment

Mountain View uses the information on reliability provided by the City's wholesale suppliers to evaluate the cumulative supply impacts to the City during normal and dry years. Based on the information provided by Valley Water and SFPUC, Mountain View expects to meet current and future water needs during normal years but will experience 20 percent potable water supply shortfalls during dry years (Figure ES-3). These shortfalls would be made up through implementation of demand-reduction strategies, consistent with the City's Water Shortage Contingency Plan.

Central to the City's supply and demand analysis is Mountain View's plan to increase groundwater production to mitigate impacts of SFPUC's possible dry-year supply shortfalls. At this time, however, implementation of the Bay Delta Plan remains uncertain. The City hopes the State Water Board is able to negotiate a voluntary agreement for the Tuolumne River that achieves the Bay Delta Plan water quality goals while providing a reliable water supply for human use. In the meantime, Mountain View is collaborating closely with Valley Water to include the results of this UWMP in Valley Water's upcoming Groundwater Management Plan update.

Figure ES-3: Water Shortage Supply Production



CHAPTER 7: WATER CONSERVATION

Mountain View implements several water conservation measures, in partnership with Valley Water and BAWSCA. Key measures are summarized below:

- **Regulations:** The City has adopted a Water Waste Prevention Ordinance, Water Conservation in Landscaping Regulations, and the Mountain View Green Building Code.

- **Metering and Rates:** Mountain View has metered customer water use since at least 1938. Current metering efforts include conversion to advanced metering (also known as "smart" metering) and requiring that irrigation be metered separate from other uses. Water bills are charged based on the volume of water used.

- **Water Loss Control:** The City tracks system water loss on an annual basis as part of the City's water loss control and prevention program.

- **Customer Programs:** Several programs are available to help customers use water more efficiently. Examples include: home water reports, Water-Wise House Calls, irrigation budget reports, landscape audits, plumbing fixture replacement (toilets, clothes washers, commercial equipment, and submeters), and landscape upgrades.

- **Education and Outreach:** Outreach is promoted through school assemblies, landscape education classes, website and social media postings, utility bill design and messaging, bill inserts, brochure racks, a dedicated phone hotline, and booths for public events.

CHAPTER 8: WATER SHORTAGE CONTINGENCY PLAN

Mountain View's Water Shortage Contingency Plan serves as a flexible framework of planned response measures to mitigate water supply shortages. The Plan describes demand-reduction strategies to meet various stages of shortages, including up to 10 percent, 11 percent to 25 percent, 26 percent to 40 percent, and greater than 40 percent. Each stage includes a set of demand reduction actions that become progressively more stringent as the shortage condition escalates. All of the stages are designed to provide adequate water to protect public health and safety and satisfy the City's fire protection needs. The City's Water System Emergency Response Plan and a Risk and Resilience Assessment evaluate impacts from natural disasters and man-made threats on Mountain View's water supply. SFPUC and Valley Water similarly have prepared studies to evaluate and plan for emergency supply interruptions.

SUMMARY

Mountain View updates the City's UWMP every five years to evaluate the City's ability to meet the City's water needs over the next 25 years. This UWMP considers water demand associated with current customers as well as new customers, arising from implementation of the General Plan and Precise Plans. This growth, combined with continued rebound from recent drought and economic recession, is expected to increase water use by 35 percent between 2020 and 2045. Mountain View will meet these water needs through continued implementation of water conservation measures and use of the City's four water suppliers: SFPUC, Valley Water, groundwater, and recycled water.

Although recent actions by the State Water Board may reduce SFPUC's dry-year supply availability by up to 50 percent, the final impacts are uncertain at this time and negotiations are ongoing. In the meantime, new projects are being studied to ensure SFPUC can meet its contractual obligations and service level goals, and Mountain View's groundwater wells remain available for use, mitigating impacts from a possible temporary reduction in SFPUC supply. Mountain View continues to collaborate with SFPUC, Valley Water, BAWSCA, and others to sustainably manage our water supplies and meet the City's water needs now and in the future.

1. INTRODUCTION

1.1 Overview and Purpose

This Urban Water Management Plan (UWMP) is a long-term analysis for the City of Mountain View (City or Mountain View) that compares available water supply to historical, current, and projected water demand. The UWMP is a link between land use and water supply planning developed to evaluate whether sufficient water is available to meet Mountain View's existing and future water needs. The UWMP is also where Mountain View presents compliance with water conservation requirements of California's Water Conservation Act of 2009 and outlines the City's Water Shortage Contingency Plan (Water Shortage Plan).

1.2 Requirements

The California Water Code (Water Code) requires that urban water suppliers serving more than 3,000 customers (or 3,000 acre-feet of water per year) prepare and adopt a UWMP every five years. Mountain View meets both of these thresholds and is required to prepare a UWMP. The City's 2015 UWMP was adopted in 2016, and the next update is scheduled for 2026.

The various requirements of a UWMP are stated in Water Code Division 6, Part 2.6 (referred to as the Urban Water Management Planning Act)—included as Appendix A. Additional components related to water conservation are required pursuant to the Water Conservation Act of 2009, contained in Water Code Division 6, Part 2.55—included as Appendix B. Included in Chapter 8 of this UWMP is Mountain View's Water Shortage Plan, which outlines how the City will respond to water shortage emergencies.

The California Department of Water Resources (DWR) summarizes requirements for preparation of a UWMP and Water Shortage Plan in their *Guidebook for Urban Water Suppliers* (DWR, 2021). Mountain View's 2020 UWMP and Water Shortage Plan were prepared in accordance with the UWMP Act and following DWR's guidance. Information is presented in a slightly different order than suggested in the DWR Guidebook, based on the unique characteristics of Mountain View's water management challenges. A checklist cross-referencing information to the UWMP Act is provided in Appendix C, followed by the completed DWR Guidebook tables in Appendix D. Documentation showing compliance with the Water Conservation Act of 2009 (e.g., 2020 urban water use target) are provided in Appendix E.

1.3 Report Format

Mountain View's 2020 UWMP is organized as follows.

Chapter 1 Introduction—Overview, requirements, and preparation of the 2020 UWMP and Water Shortage Plan.

Chapter 2	Service Area—Description of Mountain View's population, employment, demographics, and land uses and a summary of local weather patterns.
Chapter 3	Water System Overview—Overview of the water system facilities owned and operated by the City of Mountain View.
Chapter 4	Water Demand—Review of current, historical and projected water demand within the City's water service area, and a summary of Mountain View's compliance with the 2020 urban water use target.
Chapter 5	Water Supply—Description and quantification of the City's available water supply, on a historical, current, and future basis.
Chapter 6	Water Supply Reliability—Discussion of the reliability of Mountain View's water supplies and the ability to meet demand during dry years.
Chapter 7	Water Conservation—Programs for increasing water-use efficiency in Mountain View.
Chapter 8	Water Shortage Contingency—Summary of Mountain View's plan for reducing water use during drought and other water shortages, including catastrophic supply interruption.
Chapter 9	References—List of sources and supporting documentation used during the preparation of this UWMP and Water Shortage Plan.

1.4 Coordination and Outreach

Thorough preparation of a UWMP requires coordination with neighboring agencies, outreach to encourage public comment, and adoption by the urban supplier's governing body, in this case the Mountain View City Council. A description of these actions is provided below. Examples of communications related to coordination, outreach, and adoption are included in Appendix F. Notices were sent to over three dozen representatives of public agencies, residential groups, and local businesses.

1.4.1 Wholesale Water Suppliers

The City of Mountain View worked collaboratively with the City's two wholesale water suppliers, the San Francisco Public Utilities Commission (SFPUC) and the Santa Clara Valley Water District (now known as Valley Water), to exchange information needed to develop each agency's respective UWMP. Information exchanged included current and projected population data, water use and water production estimates, and key water supply reliability information.

As a wholesale purchaser of SFPUC water, the City of Mountain View is a member of the Bay Area Water Supply and Conservation Agency (BAWSCA). City staff coordinated with BAWSCA and BAWSCA's member agencies on various matters related to the 2020 UWMP. To assist member agencies in the preparation of their UWMPs, BAWSCA provided language for

agencies to include in their 2020 UWMPs. This language is incorporated throughout Mountain View's 2020 UWMP.

1.4.2 Wastewater Agencies

Wastewater and recycled water information, discussed in Chapter 5.4, was coordinated with the Palo Alto Regional Water Quality Control Plant (RWQCP) and its partner agencies. All of Mountain View's wastewater flows to the RWQCP treatment facility, in addition to wastewater flows from the City of Palo Alto (Palo Alto), East Palo Alto Sanitary District, the City of Los Altos (Los Altos), the Town of Los Altos Hills, and Stanford University. Each of these partners received notification about the UWMP update process.

1.4.3 Neighboring Land Use and Water Agencies

Neighboring land use and water agencies were also provided an opportunity to comment on Mountain View's 2020 UWMP and Water Shortage Plan. Agencies notified of this UWMP update included the County of Santa Clara, City of Sunnyvale (Sunnyvale), Palo Alto, Los Altos, California Water Service Company (Cal Water), BAWSCA, SFPUC, and Valley Water.

1.4.4 Residents and Businesses

Prior to updating the UWMP and Water Shortage Plan, City staff provided telephone, e-mail, and mailing contact information to the public for submittal of comments and questions about the 2020 UWMP and Water Shortage Plan. To inform the public of the UWMP and Water Shortage Plan update process, the City e-mailed notifications to the following community groups:

- Neighborhood Association presidents
- The Chamber of Commerce
- The Central Business Association
- Various interested businesses

Information about the UWMP is posted online at: *www.mountainview.gov/UWMP.*

1.5 Plan Adoption and Submittal

1.5.1 Public Hearings and Plan Availability

The City of Mountain View held a public hearing prior to adoption of the 2020 UWMP and Water Shortage Plan. Notice of the hearing was published in the *Mountain View Voice* and the *San Jose Post Record* and posted on the City's website and on the City Hall bulletin board. Samples of the public hearing notices are included in Appendix F.

Copies of the draft 2020 UWMP and Water Shortage Plan were made available for public review and comment prior to the May 25, 2021 public hearing. An electronic copy of the 2020 UWMP

(which includes the Water Shortage Plan) was posted on the City's website prior to the public hearing. Due to the COVID-19 pandemic, paper copies were not provided.

1.5.2 Plan Adoption and Submittal

City Council adoption of the 2020 UWMP and Water Shortage Plan occurred on June 8, 2021 following the public hearing on May 25, 2021. Copies of the resolutions adopting the 2020 UWMP and Water Shortage Plan are included as Appendix G. Paper copies are available for review at the Mountain View Public Library and in the City Clerk's Office, and an electronic copy is posted on the City's website. Electronic copies of the final adopted 2020 UWMP and Water Shortage Plan were submitted to DWR and the California State Library, and provided to SFPUC, Valley Water, BAWSCA, and the County of Santa Clara.

2. SERVICE AREA

2.1 Land Use

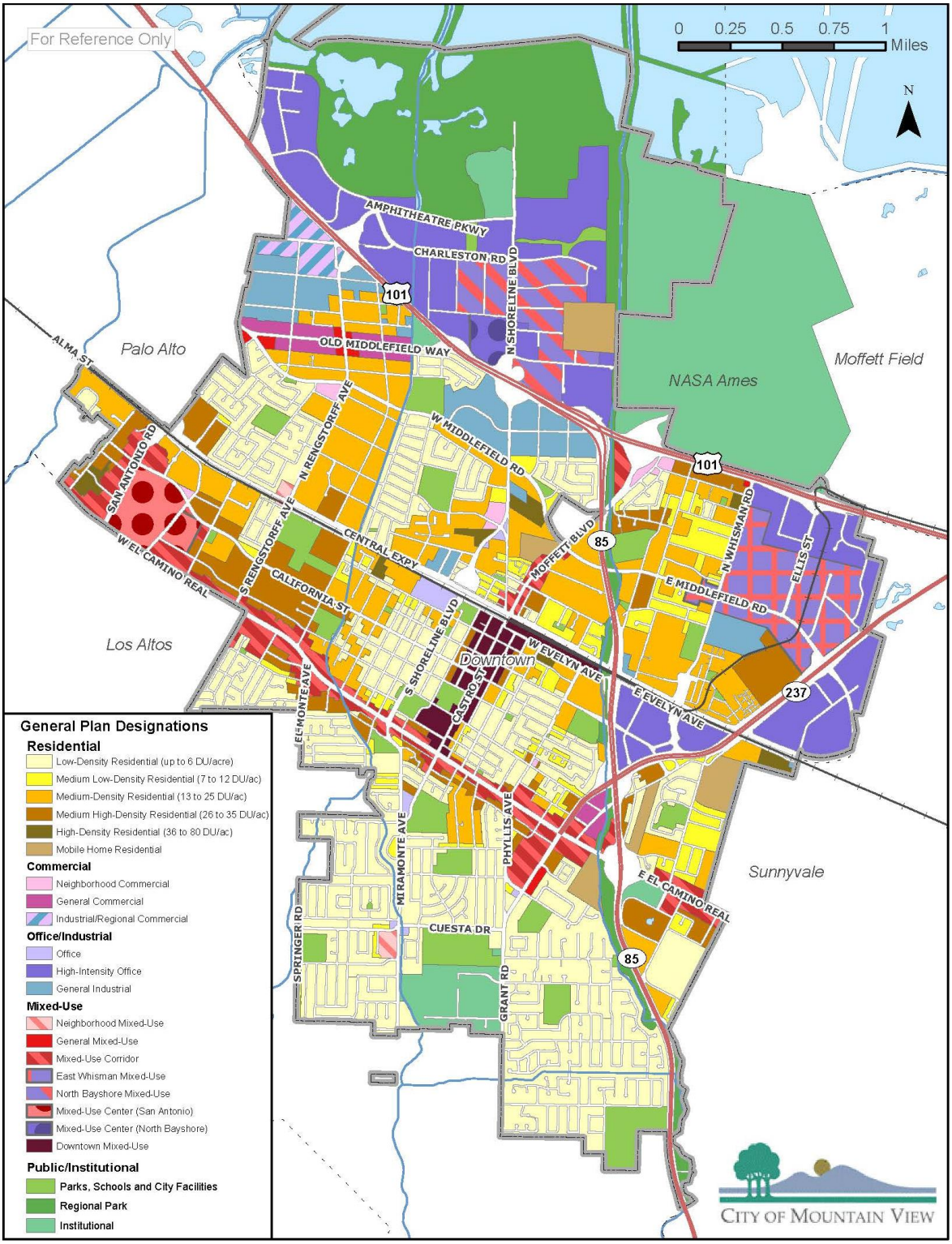
The City of Mountain View is approximately 12 square miles in area and is located about 10 miles north of San Jose and 35 miles south of San Francisco. Mountain View is situated between the Santa Cruz Mountains and the San Francisco Bay (Bay) and is often characterized as a "start-up" community of California's Silicon Valley. While Mountain View is well known for its entrepreneurial culture and a central hub for several global high-tech companies, it is also home to over 80,000 residents, a large outdoor amphitheater, a center for the performing arts, a golf course, a sailing lake, regional medical facilities, and numerous local businesses that provide services to Mountain View and neighboring areas.

Changes to Mountain View's land uses occur pursuant to the City's General Plan. The General Plan identifies several "change areas" within which development will focus during the next several decades. Outside of these change areas, the General Plan aims to preserve the existing uses and intensities of the majority of Mountain View's neighborhoods. Below is a list of the major change areas identified in the General Plan:

- North Bayshore
- East Whisman
- El Camino Real
- San Antonio
- Moffett Boulevard

Future land uses in the change areas focus on innovative and sustainable growth strategies to accommodate a mix of commercial and residential uses. Select areas may include increased density for office buildings, "village centers" with retail, office, and residential uses, and a variety of other land uses, such as entertainment facilities, hotels, and conference centers. Geographical details about Mountain View's land use are shown in Figure 2-1.

Figure 2-1: General Plan Land Use Map[1]



[1] General Plan Land Use Map from City GIS data, 2020.

2.2 Demographics

Mountain View's population has become more diverse over the last few decades. Residents in Mountain View continue to speak more languages and have grown older. About 57 percent of households in the City speak only English, while the remaining 43 percent of households speak other languages. The 2010 U.S. Census Bureau lists Mountain View's race and ethnicity population as 54 percent White, 32 percent Asian, 18 percent Hispanic or Latino, 2 percent Black or African-American, and less than 1 percent Native American, Alaskan, Hawaiian, or Pacific Islander. Mountain View has four commonly spoken languages and provides translated materials for each language: English, Spanish, Chinese, and Russian. More than half of the population is between the ages of 20 and 54. The median age is 34.6 years old.

Considered a center of innovation, Mountain View supports many commercial and industrial companies that expand the field of technology, life sciences, and software industries. Most of the high-intensity office sites are located in northern Mountain View. Located throughout the City are several shopping centers for local and regional customers, where their consumption and exchange of goods contribute economically to the City's tax base.

2.3 Population and Employment

The total population served by Mountain View's municipal water system in 2020 was estimated at 79,772. Mountain View also supplies water to commercial, institutional, and industrial (CII) customers, which are collectively estimated to provide 98,270 jobs within the City's water service area in 2020. Most of the City receives water service from Mountain View's municipal water system. A small number of customers located on former unincorporated areas receive water service from a different water retail agency, California Water Service Company (Cal Water). The estimated current and projected future population of Mountain View's water service area is shown in Table 2-1.

Table 2-1: Current and Projected Population and Employment[2]

	2020	2025	2030	2035	2040	2045
Population	79,772	91,810	98,080	104,350	110,630	116,900
Employment	98,270	104,830	110,150	115,460	120,780	126,100

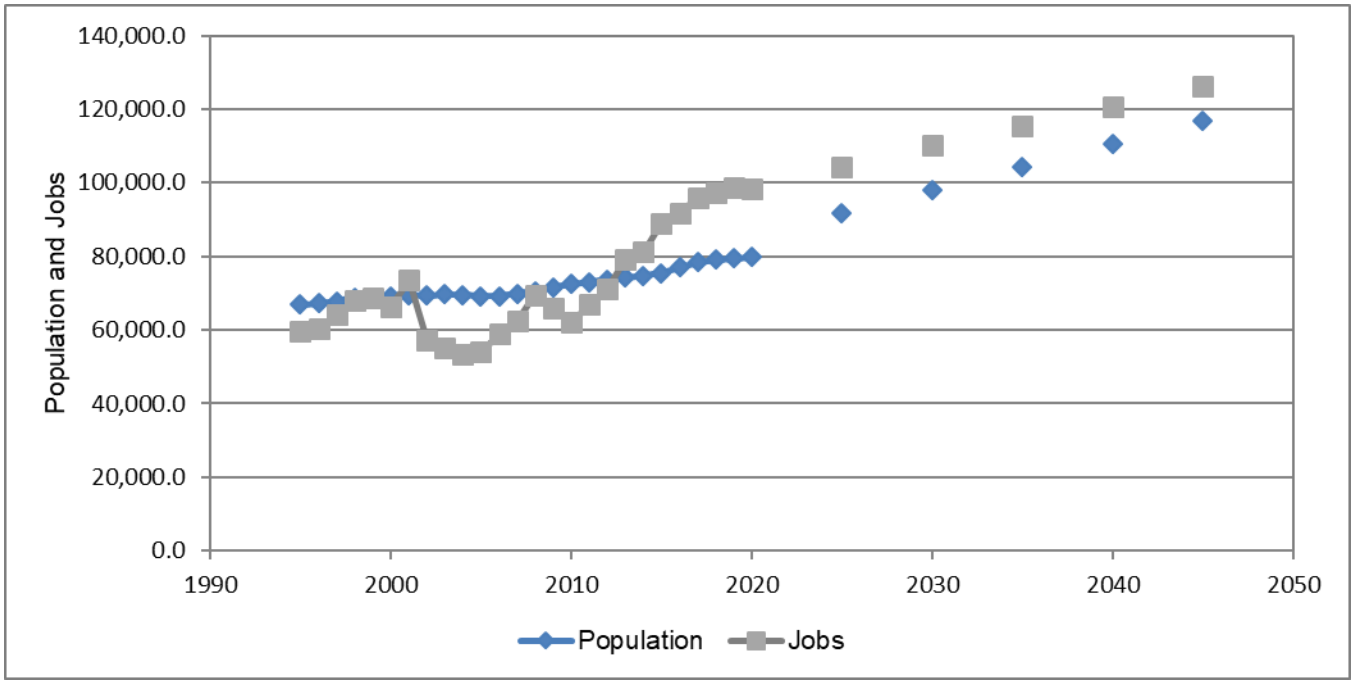
Future population and jobs were developed from Mountain View's General Plan land use strategy, and recent certified Environmental Impact Reports and Precise Plans. This development includes General Plan growth estimates, plus growth affiliated with the North Bayshore, El Camino Real, East Whisman and San Antonio Precise Plans and approved recent Rezoning and General Plan Amendment projects, such as 1001 North Shoreline Boulevard, 777

[2] Current population data is from the 2020 Department of Finance estimates and current employment is based the 2018 American Community Survey data. Future population and jobs were estimated based on the General Plan and associated Precise Plans. Population and employment estimates do not include areas served by Cal Water.

West Middlefield Road, 1720 Villa Street and 555 East Evelyn Avenue. The City's projected population and employment growth are shown in , compared to historical estimates.

Analyses for these plans projects upwards of 116,900 residents and 126,100 jobs within the municipal water system's service area at build-out, which for the purpose of this UWMP is assumed to occur in 2045. The General Plan anticipates approval of about 16,000 additional new units and about 5.4 million square feet of new office and commercial space above those currently built and under construction. Current approved development projects include over 1.5 million square feet of office space, 3,000 new residential units, and 170 additional hotel rooms are assumed to be occupied by 2023 and included in the 2025 estimates. Generally, these near-term projections include major approved projects such as the Rezoning and General Plan Amendment approvals above, as well as zoning-compliant projects such as 1860-2159 Landings Drive, 355-401 East Middlefield Road, 700 East Middlefield Road, 1255 Pear Avenue, and 2580 California Street.

Figure 2-2: Population and Employment



It is worth noting that the 2020 UWMP is based on a snapshot of approved land use plans and policies. The General Plan is a living document and is subject to periodic amendments that can change projected growth. For example, the City is reviewing two major policy documents that are not accounted for in the above projections. One such project is the R3 Update that includes amending the Multiple-Family Residential Zoning District development standards with strategies to incentivize new multi-family residential housing. The R3 Update is anticipated to be completed in 2022 and will likely increase growth above the current projections. Furthermore, the City is updating the Housing Element of the General Plan to accommodate

projected housing needs established by the State through the Regional Housing Needs Assessment (RHNA). The draft RHNA is approximately 11,100 units, which is within the General Plan capacity above, but additional sites may need to be rezoned based on the Housing Element site selection process. The State will issue final RHNA numbers by the end of 2021.

As new projects and policies are proposed, they will be assessed for compatibility with this UWMP. Potential impacts from large projects are evaluated in a Water Supply Assessment (WSA) that is prepared as part of the environmental review process. The UWMP is a foundational document for WSAs. For projects that propose development above what is projected in the General Plan (and therefore outside the scope of this UWMP) the WSA must analyze cumulative impacts from the proposed project in addition to the land use projects and policies included in this UWMP. Many WSAs identify strategies for prioritizing water use efficiency and conservation as a way of limiting potential impacts. Development that is approved after adoption of this UWMP will be included in the City's subsequent UWMP update.

2.4 Climate

Mountain View's semiarid climate is temperate year-round. The annual average temperature is 57°F, with an average low of 47°F and an average high of 68°F (Table 2-2). The mean summer temperature is 64°F.

Table 2-2: Average Climate Data[3]

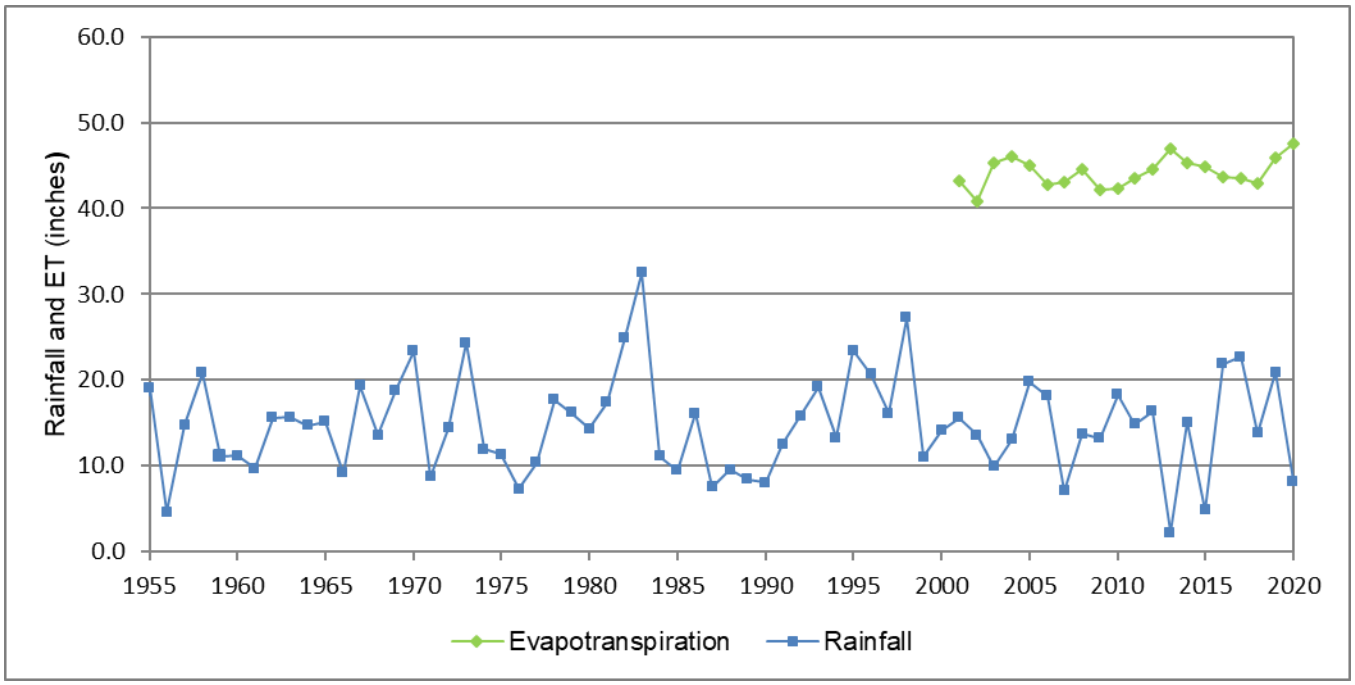
Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
$Temp_{Ave}$ (°F)	46	50	54	56	59	65	65	64	64	60	53	47	57
$Temp_{Min}$ (°F)	39	40	44	47	50	53	56	56	54	49	42	38	47
$Temp_{Max}$ (°F)	59	61	65	67	70	74	76	76	77	73	65	59	68
Rainfall (in)	2.5	2.6	2.5	1.6	0.9	0.1	0.0	0.0	0.1	0.9	1.7	3.5	16
ET (in)	1.4	1.9	3.2	4.4	5.4	6.1	6.3	5.5	4.4	3.1	1.6	1.3	45

Rainfall in Mountain View averages 16 inches per year (in/yr) with most rainfall occurring between November and April. The lack of rainfall and high evapotranspiration during the warmer months contributes to higher water use during the summer. The term "evapotranspiration" (or "ET") is a combination of the words "evaporation" and "transpiration" that represents plant and soil water loss due to wind, heat, humidity, and other factors. ET records indicate an average loss of 45 in/yr, with highs of over 6 inches per month (in/mo) in June and July, and lows of less than 2 in/mo from November to February.

[3] Rainfall, temperature and ET data are from the California Irrigation Management Information System (CIMIS), Union City station (2001 to 2020). In some cases, data may be missing from select days or months.

While these averages are useful in describing the typical climate in Mountain View, they do not demonstrate the variability in weather experienced from one year to the next. Significant shifts in rainfall and ET can directly affect the City's water demand because irrigation often increases during unusually hot or dry years and decreases during years with excess rainfall. This variation in climate is illustrated in Figure 2-3, which plots annual rainfall between 1955 and 2020, and ET from 2001 to 2020. Effects of climate change on the City's projected water demand is discussed in Chapter 4.3.

Figure 2-3: Annual Rainfall and Evapotranspiration[4]



3. WATER SYSTEM OVERVIEW

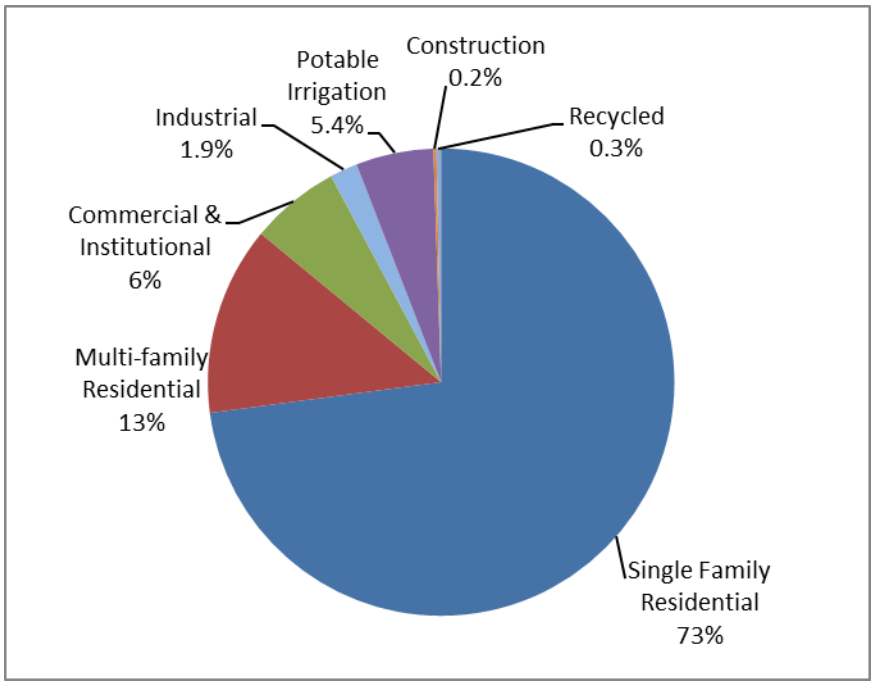
The City of Mountain View owns, operates, and maintains a potable water distribution system that serves water throughout Mountain View. Several small pockets within the City are served by neighboring Cal Water. The City's municipal water system services three pressure zones and consists of three wholesale water turnouts, four reservoirs, three pump stations, four active groundwater supply wells, and buried pipes of varying composition, ages and sizes. A summary of the City's potable water supply system is provided below. Details of Cal Water's potable water system are documented independently by Cal Water. Information about Mountain View's recycled water distribution system is provided in Chapter 5.4.

[4] Rainfall data from 1955 to 2015 is from the Western Regional Climate Center – Palo Alto Station, and from the Union City CIMIS station for 2015 to 2020. ET data is from the Union City CIMIS station.

3.1 Service Connections

Mountain View provides water service to all of businesses and residents within the City limits, except those in the Cal Water service area. Mountain View currently serves 17,543 potable water service connections and 58 active recycled water service connections. Single-family and multi-family homes account for approximately 83 percent of all connections. The remaining connections are distributed between commercial, institutional, and industrial (CII) and landscape accounts. Temporary construction meters and recycled water customers account for less than 1 percent of the City's service accounts (Figure 3-1).

Figure 3-1: Water Service Connections



3.2 Imported Water Turnouts

Mountain View imports more than 90 percent of its water supply. SFPUC is the predominant source Citywide, and water from Valley Water is used within the southern portion of the Mountain View. These wholesale water supplies are delivered through three turnouts, two with SFPUC and one with Valley Water. Each turnout has one or more connection valves ranging in diameter from 8 inches to 14 inches, and ranging in pressure from 48 to 120 pounds per square inch (psi).

3.3 Groundwater Supply Wells

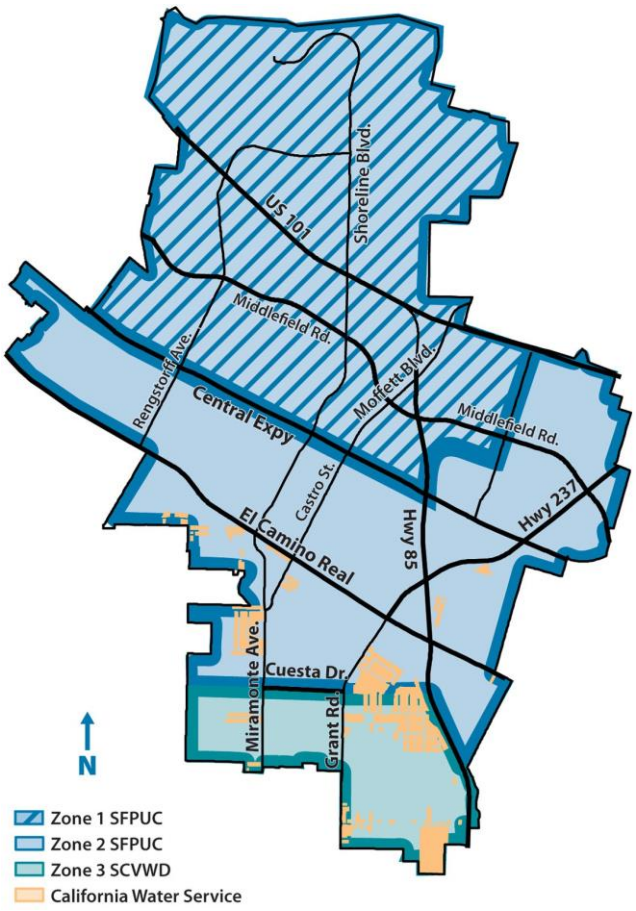
The City owns seven potable groundwater supply wells distributed throughout its water service area. Four wells are currently active; the remaining three wells have reached the end of their useful life. The City is considering adding additional wells in the future to increase groundwater

pumping capacity. Wells range in depth from 520 feet to 686 feet below ground surface. The existing pumping capacity of Mountain View's wells is 5,314 acre-feet per year, however during normal operations groundwater is produced sparingly.

3.4 Pressure Zones and Supply Sources

The topography in Mountain View slopes primarily downward from the foothills to the Bay, with an approximate 180-foot decrease in elevation between the southern and northern City boundaries. The City's water distribution system utilizes three pressure zones to provide customers at varying elevations with water at a reasonable pressure. Pressure zones are isolated by pressure reducing valves, pressure sustaining valves, and a number of normally closed interzonal valves. The area north of Cuesta Drive (Zones 1 and 2) typically receives SFPUC water, combined with local groundwater. Neighborhoods south of Cuesta Drive (Zone 3) receive water from Valley Water, supplemented by water from SFPUC and the City's groundwater wells. Figure 3-2 shows the approximate areas served by each of the City's drinking water supplies, as well as which areas are served by Cal Water through Cal Water's distribution system. Mountain View's operational flexibility allows movement of water between zones, when necessary.

Figure 3-2: Mountain View Water Sources



3.5 Water Storage Facilities

Mountain View has four potable water storage reservoirs with an aggregate operating capacity of 14.3 million gallons (mg). The City's oldest water storage facility, Miramonte Reservoir No. 1, was built in 1945 and has an operating capacity of 0.7 mg. A second reservoir was added at the Miramonte site in 2006, with a capacity of 2.0 mg. Whisman Reservoir was constructed adjacent to the Municipal Operations Center in 1962 and stores up to 5.1 mg of water. The largest storage facility, Graham Reservoir, was constructed in 2007 beneath an artificial turf playing field at Graham Middle School. Graham Reservoir holds 6.5 mg. Miramonte Reservoirs (Nos. 1 and 2) serve Zone 1 and also acts as back-up and emergency storage for Zone 3. Whisman and Graham Reservoirs primarily serve Zone 2.

3.6 Pump Stations and Pipelines

The majority of Mountain View's water is delivered to customers directly from the City's distribution system utilizing pressure from SFPUC and Valley Water's pipelines. Water that enters Mountain View's reservoirs is pumped to the respective designated service pressure zones by three pump stations. The Graham and Whisman reservoirs each have their own pump station, and one pump station is used for both of the Miramonte reservoirs to provide emergency fire supply to Zone 3 and back-up for high demand. Mountain View's water system includes over 188 miles of pipelines ranging in diameter up to 27 inches. The age of the pipes also varies, dating from before the 1940s to the present.

4. WATER DEMAND

This chapter describes current and historical water use trends in Mountain View and projections for future use. Two notable events have occurred over the past few years to influence Mountain View's recent water use:

- California experienced the most severe drought on record resulting in a significant decline in water use followed by a slow and continued rebound.
- Mountain View, and the rest of the world, endured challenges from the novel coronavirus (COVID-19) global pandemic, shifting the City's water demand patterns away from businesses and toward homes, as workplaces closed to on-site workers and residents sheltered-in place.

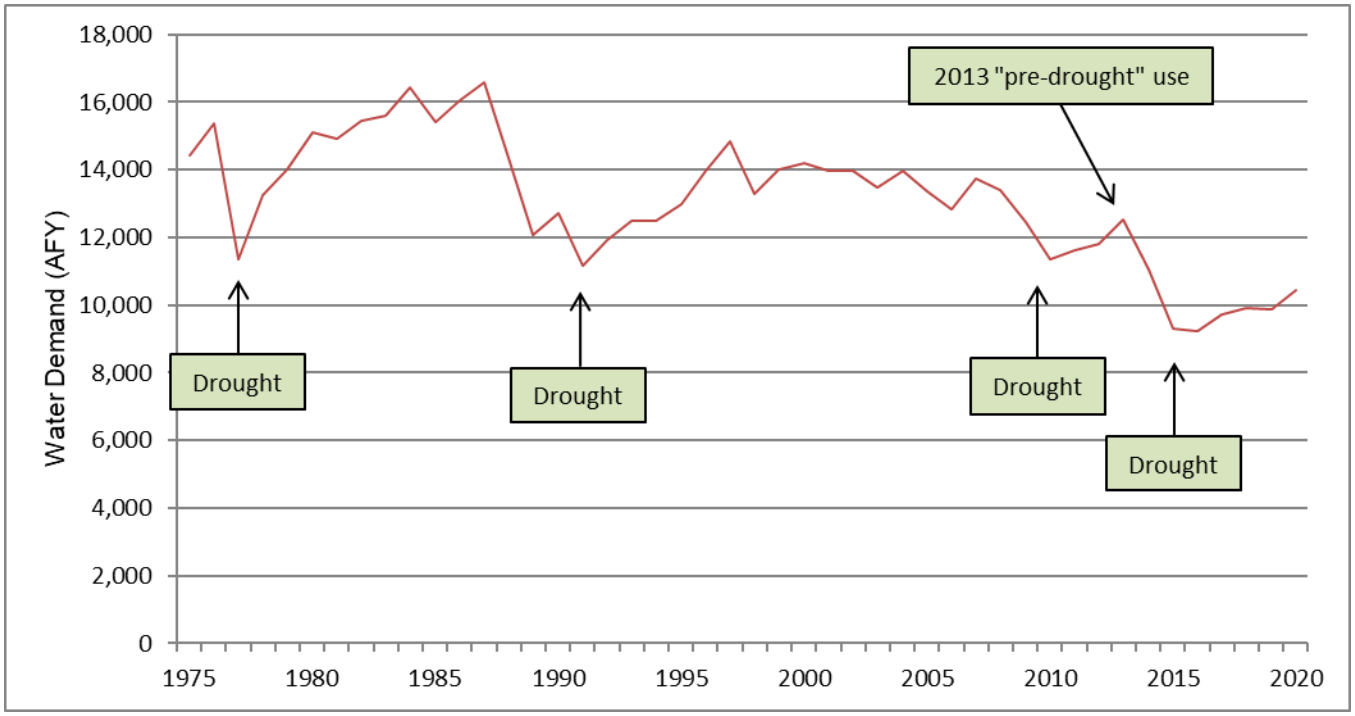
Looking toward the future, the City's land use policies are expected to increase population by 47 percent and jobs by 28 percent from the current levels. Many of the associated development projects have already begun construction and will be occupied within the next few years. Others are farther off on the horizon and may ultimately occur beyond the time period studied in this UWMP. For the purpose of evaluating the City's water supply sufficiency, however, this UWMP assumes full implementation of the General Plan by 2045.

4.1 Historical Water Demand

Mountain View's historical water demand is shown in Figure 4-1. This figure shows a general downward trend in water use since the mid-1980s, punctuated by rapid drops in water use coinciding with periods of drought, as customers responded to requested or mandated conservation. Some factors contributing to the long-term decline in water use include a shift in customer base (e.g., decreased manufacturing and increased office space), increased plumbing efficiencies, changes in landscape aesthetics, and long-term conservation efforts.

Since conclusion of the most recent drought in 2017, the City has seen a steady rebound in usage. Water use peaked near the beginning of the drought in 2013, which is considered representative of "normal" water demand and has been used as the benchmark for measuring drought savings. Following 2013, water use decreased between 2014 and 2016, reaching a maximum of 29 percent reduction compared to predrought levels. Since then, the City has experienced a slow yet continued rebound in water use. Despite this increase, the City's 2020 water demand remained 16 percent below the predrought baseline of 2013.

Figure 4-1: City of Mountain View Water Demand



4.1.1 Customer Sector Water Use Trends

Water use by customer sector is shown in Figure 4-2. This information offers an interesting view of drought response by customer sector and insight into the effects of COVID-19 closures on customer water use. The City's largest water using group is residential customers (58 percent of total use). Large landscape irrigation meters account for 24 percent of total use, and CII

customers 14 percent[5]. Recycled water irrigation accounts for 4 percent of the City's water use. Table 4-1 shows water use by customer section over the past five years.

Figure 4-2: 2020 Water Use by Customer Sector

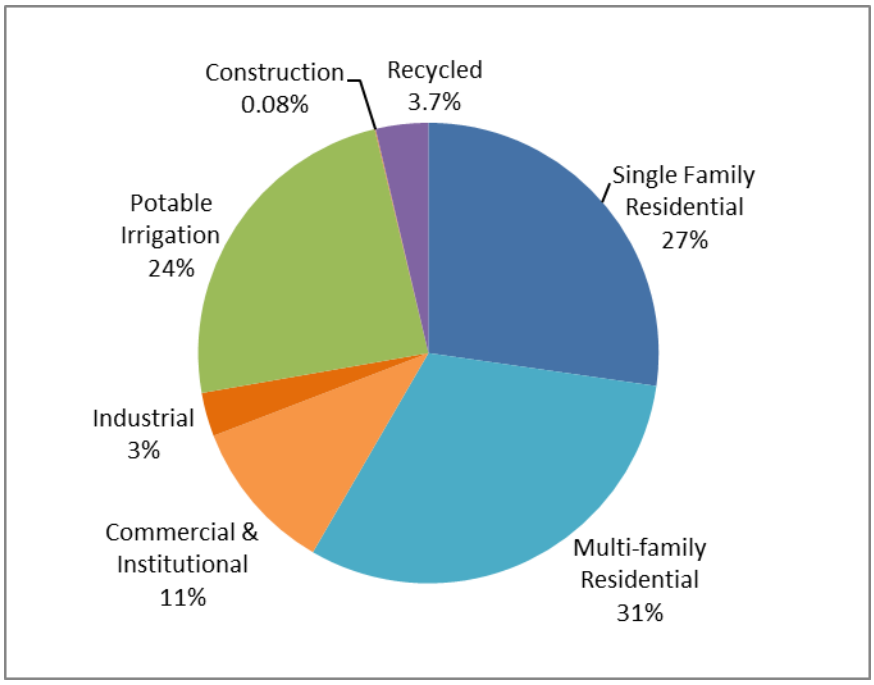


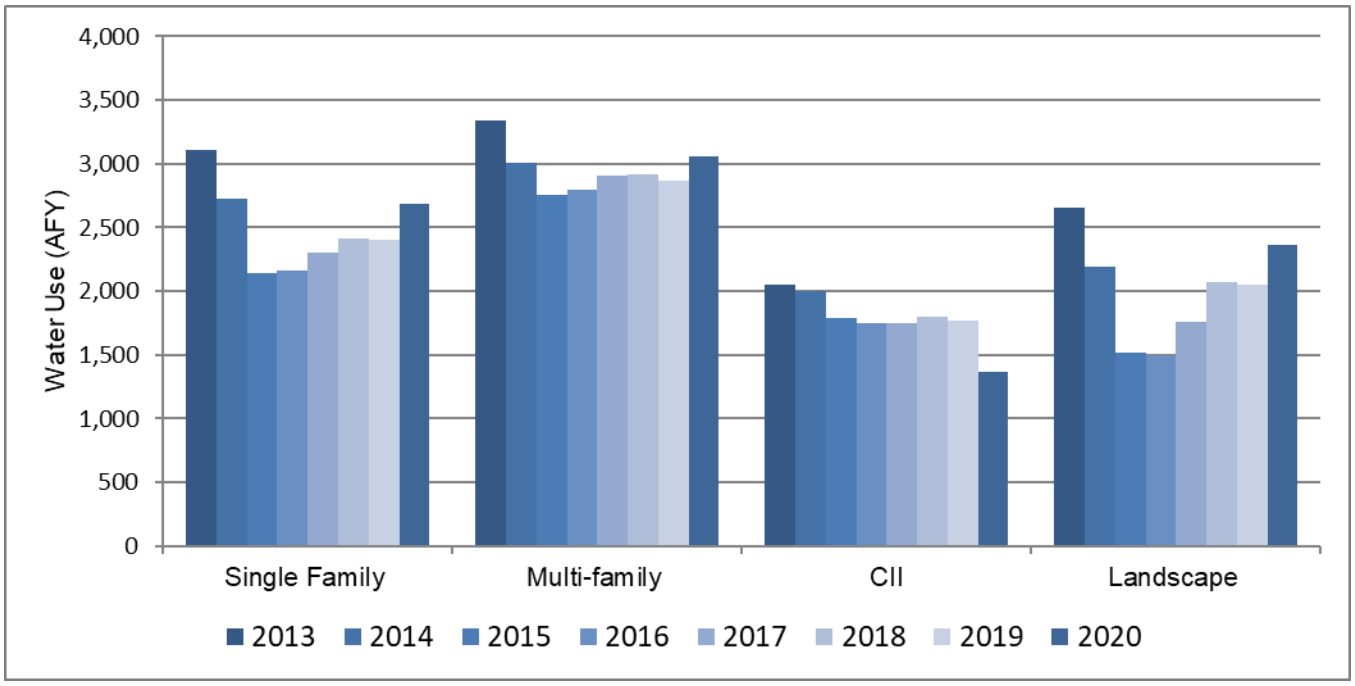
Table 4-1: Historical Water Use by Customer Sector

Customer Sector	Annual Water Use (AFY)				
	2016	2017	2018	2019	2020
Single Family Residential	2,159	2,299	2,414	2,401	2,689
Multi-family Residential	2,798	2,903	2,913	2,864	3,063
Commercial, Industrial, Institutional	1,754	1,750	1,804	1,773	1,365
Landscape Irrigation	1,494	1,763	2,070	2,050	2,367
Construction	3	3	2	3	7
Recycled Commercial	0	4	4	4	3
Recycled Landscape Irrigation	315	391	343	377	363
Recycled Construction	2	1	1	1	1
Total Water Use	8,523	9,113	9,551	9,473	9,856

[5] Large landscape meters are installed at various public, commercial, and multi-family residential sites.

A visual representation of recent water use for the City's largest customer groups is shown in Figure 4-3. This chart demonstrates customer response to the recent drought and current pandemic. The greatest drought reductions were achieved by large landscape accounts and single-family homes. These sectors account for the largest areas of landscape in the City and, therefore, have the greatest ability to conserve during dry years through reduced irrigation. The drought concluded and water use restrictions subsided in 2017, causing "drought rebound," which is the predicted increased water use after a drought ends. During 2020, the COVID-19 pandemic shifted work dynamics and business operations, resulting in increased residential water use and decreased commercial usage.

Figure 4-3: Customer Sector Water Use Trends



4.1.2 Estimated Water Loss

As part of the Water Conservation Act of 2009, Mountain View and other urban water suppliers are required to submit an annual water audit calculating potable water distribution system loss. Water loss is defined as the difference between the volume of water produced and the volume of water used by customers and for other purposes (such as street sweeping and water main flushing). Water loss is comprised of: (1) apparent losses, including measurement and data handling errors, theft or illegal use; and (2) real losses, which include all water physically lost due to distribution system leaks.

Mountain View's water loss is estimated on a fiscal year (FY) basis using the American Water Works Association (AWWA) Free Water Audit Software Version 5.0. These audits are submitted to DWR each year following verification by a certified third-party auditor. Table 4-2

shows the results of Mountain View's potable water system loss for the past five years, which is consistently below 10 percent. System water loss does not include customer-side water loss.

Table 4-2: Distribution System Water Loss Estimates

	Calculated Water Loss (AFY)[6]				
	2016	**2017**	**2018**	**2019**	**2020**
Real Losses	307	683	257	231	150
Apparent Losses	101	105	93	114	122
Total Estimated Losses	408	788	350	345	272

Pursuant to the Water Conservation Act of 2009, DWR is currently developing water loss standards to measure performance for urban water suppliers, including Mountain View. These standards are currently in draft form and DWR has proposed 2028 as the first annual compliance year. An update on Mountain View's performance for meeting its water loss standard will be presented in the City's 2025 UWMP.

4.2 Compliance with 2020 Urban Water Use Target

The Water Conservation Act of 2009 (also referred to as SB X7-7, for California Senate Bill Extraordinary Session 7-7) required each urban water retail supplier to develop and meet a water use target for the year 2020. Mountain View's previous UWMPs covered details regarding development of this target, including calculating the City's baseline consumption, the 2015 interim target, and the 2020 urban water use target. As part of this UWMP, the City is required to demonstrate compliance with its 2020 target.

Mountain View's baseline consumption for the period 1995 to 2004 was calculated as 180 gallons per capita daily (GPCD). Mountain View's 2020 urban water use target is 146 GPCD, which is a 19 percent reduction from the baseline. The City's actual average daily per capita water use in 2020 was 112 GPCD, which is 23 percent below the City's 2020 urban water use target and, therefore, meets the requirements of SB X7-7. DWR's mandatory verification forms are included in Appendix E.

4.3 Projected Water Demand

Mountain View's water demand projections were developed using Maddaus Water Management's Demand Side Management Decision Support System (DSS model). These projections were based on regional water demand and conservation modeling efforts completed over the past several years. Mountain View's DSS model was most recently revised prior to this UWMP update to account for new plumbing code requirements, updated population and

[6] Mountain View conducts its annual water audit on a fiscal year basis. Values presented here are for the fiscal year (e.g., 2016 shows the estimate for Fiscal Year 2015-16).

employment projections, and the impacts of climate change. Continued rebound from the recent drought and 2008-2010 economic recession are also included in the model. A summary of the DSS model is provided below, based on the *Bay Area Water Supply & Conservation Agency's Regional Water Demand and Conservation Projections Report* (BAWSCA, 2020).

4.3.1 Demand Model Overview

The DSS model uses two steps to project water demand: (1) it establishes base-year water demand at the end-use level; and (2) it forecasts future demand based on existing water service accounts and future growth projections. A third step utilizes econometrics to evaluate the statistical relationships between water use and various factors, such as price and temperature.

Establishing base-year water demand at the end-use level is accomplished by analyzing historical water use for each customer sector (single-family, multi-family, commercial, etc.) and assigning use to specific end-uses, such as toilets, faucets, showers, and irrigation. The model uses a base year of 2013 to represent "normal-year" water demand. Customer account growth is estimated for each customer sector and its water end-uses based on population and job projections.

The new econometric analysis, performed in 2014 and updated in 2020, evaluates variables such as price, precipitation, temperature, and unemployment to determine if a statistically significant relationship exists between these variables and water demand. Results from this analysis showed that four variables (of 12 studied) significantly influenced water demand in the BAWSCA service area. These variables include price, unemployment, precipitation and temperature. Adjustment parameters were added to Mountain View's DSS model to account for this relationship (BAWSCA, 2020).

4.3.2 Impacts of Climate Change

Impacts of climate change on the City's future demand are incorporated into the DSS model through increased temperature estimates, which results in higher irrigation demand. The DSS model utilizes temperature estimates from the *California's Fourth Climate Change Assessment San Francisco Bay Area Summary Report* (Bay Area Summary Report) to analyze changes in temperature over the modeling period. According to the Bay Area Summary Report, historical temperature increased 1.7° F between 1950 and 2005. It is predicted that temperatures will increase another one to two degrees in the early 21st century (2006-2039), and an additional 3.3° F in the mid-21st century (2040-2069). Based on this analysis, the DSS model assumes that Mountain View will experience a temperature increase of 1.7° F over the planning horizon of this UWMP, due to climate change.

4.3.3 Demand Model Scenarios and Results

The DSS model includes three scenarios used to evaluate and forecast Mountain View's water demand through the year 2045. The "base-case" scenario represents a high-end estimate of possible future demand, without savings from plumbing code efficiencies or active conservation

measures. These savings are captured by two additional scenarios entitled "plumbing code" and "plumbing code and conservation." Mountain View's DSS model results are shown in Table 4-3 in five-year increments through the year 2045, based on General Plan growth. Impacts from the plumbing code and active conservation are discussed in the subsequent paragraphs.

Table 4-3: Water Model Results

Water Model Scenario	Projected Water Demand (AFY)				
	2025	2030	2035	2040	2045
Scenario A (Base-Case)	12,679	13,485	14,288	15,091	15,894
Scenario B (Plumbing Codes)	12,058	12,548	13,064	13,607	14,163
Scenario C (Plumbing Codes and Conservation)	11,825	12,164	12,530	12,929	13,361

Projected Plumbing Code Savings

Recent updates to the plumbing code are expected to reduce Mountain View's water use by 5 percent in 2025 (621 AFY), up to 11 percent in 2045 (1,731 AFY) compared to the base-case scenario. Toilets and shower heads account for nearly 70 percent of the total projected savings. Improvements in faucets account for 17 percent, and clothes washer replacement accounts for 14 percent of the total estimated savings from plumbing code updates. The vast majority of these water savings are projected to occur in the multi-family residential sector (65 percent), followed by single-family homes (20 percent) and commercial buildings (15 percent). Specific details regarding the DSS model plumbing code assumptions are provided in Appendix H.

Possible Additional Conservation Savings

The DSS model includes a detailed look at various conservation measures that may be implemented to achieve further water savings beyond those expected from the plumbing codes. Out of 25 possible conservation measures analyzed by the DSS model, 10 measures were selected for inclusion in Scenario C (Table 4-3). These measures can be generally categorized as smart meters, site surveys, fixture giveaways, customer usage reports, landscape rebates, education, and leak repair. This UWMP presents results from Scenario C to demonstrate possible water savings from potential future active conservation measures.

Model results estimate that investments in conservation could further reduce the City's future water demand up to 5 percent in 2045 (802 AFY), compared to the base-case scenario. The estimated cost of implementing all measures is approximately $15 million; however, the vast majority of these costs and the associated savings are attributed to smart metering ($12.5 million and 640 AFY). At present, these measures are not fully funded or scheduled, but are included herein to illustrate the possible water savings that could be achieved through implementation of additional conservation programs. Achieving these savings depends on many factors, such as funding and customer participation.

Projected Water Use by Customer Type

Table 4-4 presents projected demand on the City's water system by customer sector in five-year increments through 2045, based on modeling Scenario B ("plumbing code"). For the purpose of this UWMP, Scenario B is selected for the City's official demand projections. Water loss is conservatively estimated at 6.6 percent.

Table 4-4: Projected Water Demand by Customer Sector[7]

Customer Sector	Projected Water Demand (AFY)				
	2025	2030	2035	2040	2045
Single Family Residential	2,632	2,573	2,523	2,482	2,445
Multi-family Residential	3,569	3,873	4,191	4,520	4,854
Commercial, Industrial, Institutional	2,129	2,192	2,261	2,334	2,411
Landscape Irrigation	2,916	3,062	3,207	3,353	3,499
Construction	12	13	14	15	16
Water Loss	801	834	867	903	939
Total Demand	12,058	12,548	13,064	13,607	14,163

4.3.4 Lower-Income Household Water Use

As required by Water Code Section 10631.1(a), water use projections for lower-income households are listed in Table 4-5. These projections assume that approximately 36 percent of households in Mountain View are lower-income, based on information from the U.S. Department of Housing and Urban Development.[8] Water demand for these households was estimated as an equivalent share of the City's total residential water use (36 percent).

Table 4-5: Estimated Water Use for Lower-Income Households

	Projected Water Use (AFY)				
	2025	2030	2035	2040	2045
Lower-Income Households	2,232	2,321	2,417	2,521	2,628

5. WATER SUPPLY SOURCES

The City of Mountain View receives the majority of its drinking water from the City and County of San Francisco's Regional Water System (Regional System), operated by SFPUC. Additional supplies are provided by Valley Water and local groundwater wells. In 2009, Mountain View completed construction of a new recycled water distribution system in the North Bayshore Area to deliver recycled water for nonpotable uses such as irrigation. The City's use of each supply

[7] Projections are based on Scenario B of the DSS model scenarios. Includes both potable and recycled water demand.
[8] Lower-income household estimates were provided by the City of Mountain View Planning Division.

changes from year to year due to operational needs. In 2020, the City's water supply production was 84 percent SFPUC, 10 percent Valley Water, 2 percent groundwater, and 4 percent recycled water. This chapter describes the City's water supply sources and presents historical and projected water production by source.

5.1 San Francisco

The Regional System supplies water from the Tuolumne River watershed and local watersheds to customers in San Francisco, San Mateo, Santa Clara, and Alameda counties. Information in this section is summarized from SFPUC's *2020 Urban Water Management Plan* (SFPUC, 2021).

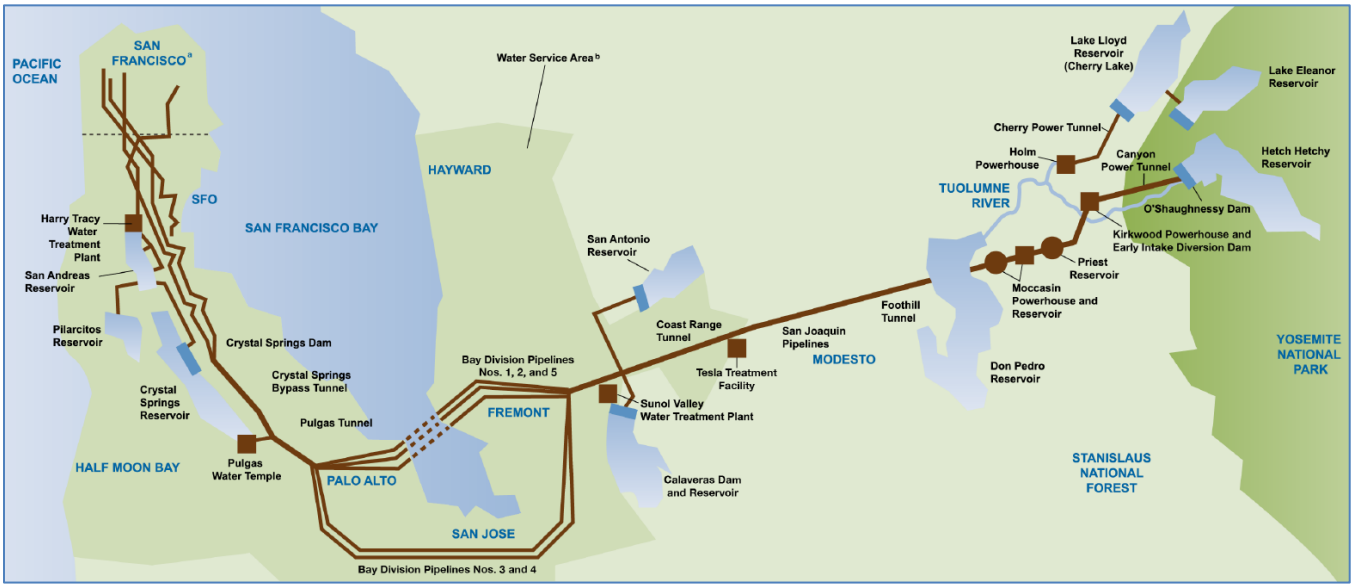
The Regional System evolved through the development of two separate water systems: the Hetch Hetchy Project and the Spring Valley Water Company system (Spring Valley). The Hetch Hetchy Project was authorized by the United States Congress in 1913 through passage of the Raker Act. Construction of the Hetch Hetchy Project (including Hetch Hetchy Reservoir and O'Shaughnessy Dam in Yosemite National Park) began in 1914 and concluded in 1934. Spring Valley was established in 1858 from a spring and several creeks in San Francisco. Over the next few decades, Spring Valley expanded with the construction of four dams on the San Francisco Peninsula and several facilities in Alameda County, including Calaveras Dam and Reservoir. San Francisco acquired Spring Valley in 1930. Since the 1930s, major additions to the Regional System have included the raising of O'Shaughnessy Dam and construction of various reservoirs, pipelines, and treatment facilities (SFPUC, 2021).

5.1.1 Sources of Supply

The Regional System draws an average of 85 percent of its supply from the Tuolumne River, collected in Hetch Hetchy Reservoir in Yosemite National Park. This water feeds into an aqueduct system delivering water 167 miles by gravity to Bay Area reservoirs and customers. The remaining 15 percent of SFPUC's supply is drawn from local surface waters in Alameda County and Peninsula watersheds through the San Antonio, Calaveras, Crystal Springs, Pilarcitos, and San Andreas reservoirs (SFPUC, 2021). Figure 5-1 shows an illustrated schematic of the Regional System.

The Regional System consists of 280 miles of pipelines, 60 miles of tunnels, 11 reservoirs, five pump stations, and two water treatment plants. It includes the Hetch Hetchy Project and Bay Area water system facilities. The Hetch Hetchy Project is comprised of water and hydroelectric facilities from the Hetch Hetchy Valley west to the Alameda East Portal of the Coast Range Tunnel in Sunol Valley. The Bay Area system is comprised of the Alameda System and the Peninsula System—including 63,000-acre Alameda and Peninsula watersheds, storage reservoirs, two water treatment plants, and the transmission system.

Figure 5-1: San Francisco Regional Water System[9]



5.1.2 Bay Area Water Supply and Conservation Agency

BAWSCA was created in 2003 to represent the interests of 26 water agencies in Alameda, Santa Clara, and San Mateo counties that purchase water on a wholesale basis from the San Francisco Regional System, including the City of Mountain View. The BAWSCA member agencies deliver water to over 1.8 million residents and nearly 400,000 commercial, industrial, and institutional accounts. The BAWSCA Board of Directors includes a representative from each of the 26 member agencies.

Through BAWSCA, the wholesale customers work with SFPUC to ensure rehabilitation and maintenance of the Regional System. In addition to representing the wholesale customers in interactions with SFPUC, BAWSCA also has the authority to:

- Coordinate water conservation, supply, and water recycling activities for its agencies.
- Acquire water and make it available to other agencies on a wholesale basis.
- Finance projects, including improvements to the Regional System.
- Build facilities to carry out the agency's purposes.

Mountain View coordinates with BAWSCA regularly at various levels, including through the BAWSCA Board and committees related to water management, water quality and conservation.

[9] From the *2020 Urban Water Management Plan, Public Review Draft* (SFPUC, 2020).

5.1.3 Water Supply Agreement

The business relationship between San Francisco and its 26 wholesale customers (including Mountain View) is defined by the *Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County* (Supply Agreement) entered into in July 2009 and most recently amended and restated in November 2018. The Supply Agreement, which has a 25-year term, addresses water supply availability for the Regional System and the methodology used by SFPUC in setting wholesale water rates.

The Supply Agreement provides 184 mgd to the wholesale customers during normal water years. This volume, referred to as the "Supply Assurance," is subject to reduction during periods of water shortage due to drought, emergencies, or other scenarios. Each wholesale customer's share of the 184 mgd is referred to as their Individual Supply Guarantee (Individual Guarantee). Mountain View's Individual Guarantee is 12.46 mgd (13,957 AFY). In addition to these maximum quantities of water, the Supply Agreement also requires minimum quantities of water for four wholesale customers, including Mountain View. These minimum purchase requirements were created for agencies with secondary imported water supplies to ensure financial stability of the Regional System by preventing source shifting to alternative imported supplies. Mountain View's minimum purchase requirement is 8.93 mgd. Although the Supply Agreement expires in 2034, the Supply Assurance and Individual Guarantees survive in perpetuity.

East Palo Alto Transfer

In 2017, Mountain View transferred 1.0 mgd of its Individual Guarantee to the City of East Palo Alto (East Palo Alto). As described in Chapter 4, Mountain View's water demand has decreased substantially over the past three decades, such that in recent years Mountain View's use of SFPUC water has remained considerably below historical levels. As a result, a significant portion of Mountain View's Individual Guarantee remained unused. In contrast, East Palo Alto had insufficient water to support its land use goals and was facing a moratorium on new development. Following the supply transfer from Mountain View, East Palo Alto also received a 0.5 mgd transfer from Palo Alto in 2018. The combination these new supplies is expected to allow East Palo Alto to meet the future water demand associated with its land use goals.

5.2 Valley Water

Valley Water is an independent special district that provides wholesale water supply, groundwater management, flood protection, and stream stewardship on behalf of Santa Clara County's nearly 2 million residents. Its service area includes all of Santa Clara County, which encompasses approximately 1,300 square miles and includes 15 cities from Palo Alto to the north and Gilroy to the south. Information presented in this section is largely summarized from Valley Water's *2020 Urban Water Management Plan, Retailer Draft* (Valley Water, 2021).

Valley Water was formed as the Santa Clara Valley Water Conservation District in 1929 in response to groundwater overdraft and significant land subsidence. In 1954, it annexed the Central Santa Clara Valley Water District. In 1968, it merged with the Countywide flood control district to form one agency to manage the water supply and flood programs for most of the County. The Gavilan Water District in southern Santa Clara County was annexed in 1987 and today Valley Water provides services for the entire County. Valley Water is governed by an elected seven-member Board of Directors following the Santa Clara Valley Water District Act and its own Board Governance Policies.

5.2.1 Water Supply Contract

Mountain View's treated water supply relationship with Valley Water is governed by a 70-year water supply contract entered in 1984. Pursuant to this agreement, Mountain View submits proposed delivery schedules to Valley Water estimating the volume of treated water needed in three-year periods. In addition to the estimated three-year delivery schedule, retailers also submit anticipated monthly deliveries for the coming year, and information needed for Valley Water to project annual deliveries for the next seven years. Valley Water manages all of its water supplies in an effort to meet the requested treated water deliveries, while balancing other demands on the system—such as groundwater recharge and banking. Mountain View began receiving treated drinking water from Valley Water in 1991.

5.2.2 Sources of Supply

Sources of supply for Valley Water include local surface water, imported water from the State Water Project (SWP) and Central Valley Project (CVP), groundwater, and recycled and purified water. Valley Water supplies are used to recharge the local groundwater basins, released to local creeks to meet environmental needs, and delivered directly to retail water suppliers through Valley Water's treatment plants and distribution system. Potable reuse through groundwater augmentation is a planned future water supply for Valley Water.

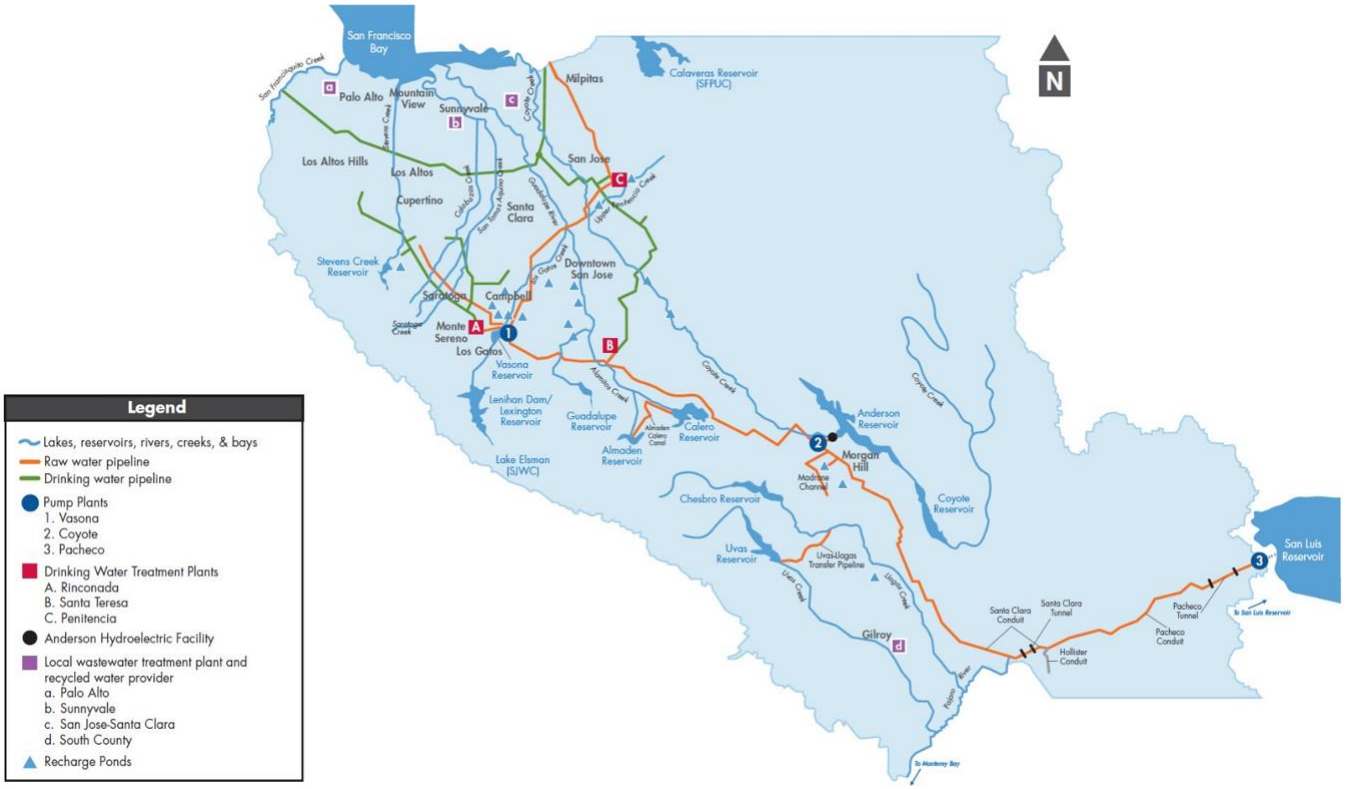
Valley Water's water supply, treatment, and distribution system includes surface water reservoirs, canals, water supply diversions, groundwater recharge ponds, controlled in stream recharge, raw and treated water pipelines, pumping stations, and water treatment plants. Figure 5-2 shows a general schematic of Valley Water's water system. The following paragraphs provide additional details about Valley Water's supply sources.

Local Surface Water

Valley Water currently has 20 appropriative water rights licenses and one permit for local surface water totaling over 227,300 AFY. Rainfall runoff is captured in local reservoirs and diverted downstream for recharge to the groundwater basin or treatment at Valley Water's drinking water treatment plants. The combined storage capacity of Valley Water's reservoirs is about 166,000 AF, though several are operating at restricted capacity due to seismic stability concerns. Most of Valley Water's reservoirs are sized for annual operations, storing water in the

winter for use during the summer and fall. The exception is the Anderson-Coyote reservoir system, which provides carryover of supplies from year to year.

Figure 5-2: Schematic of the Water Supply System for Valley Water[10]



Imported Surface Water

Valley Water's imported water supply is conveyed through the Sacramento-San Joaquin Delta and delivered to the County through the South Bay Aqueduct (SWP water) and the San Felipe Division (CVP water). Valley Water holds contracts for 100,000 AFY from the SWP and 152,500 AFY from the CVP. The actual amount of water delivered is typically less than these contractual amounts and depends on hydrology, conveyance limitations, and environmental regulations. Supplemental imported water is acquired through transfers and exchanges, as needed and available. Imported supplies are delivered to Valley Water's three drinking water treatment plants and used in groundwater recharge facilities. Valley Water also deposits a portion of its imported water supplies into the Semitropic Groundwater Bank in Kern County for withdrawal during dry periods.

Groundwater Conjunctive Use

Groundwater pumping provides up to one-half of the County's water supply during normal years. Valley Water manages the groundwater in Santa Clara County for the benefit of

[10] From the *2020 Urban Water Management Plan, Retailer Draft* (Valley Water, 2021).

groundwater users and the County at-large. Valley Water's strategy since the 1930s has been to maximize conjunctive use, the coordinated management of surface and groundwater supplies to enhance water supply reliability and avoid land subsidence. Conjunctive use helps protect local subbasins from overdraft, land subsidence, and saltwater intrusion and provides critical groundwater storage reserves. Two-thirds of the groundwater Santa Clara County originates as managed recharge from Valley Water's conjunctive use program, while the other one-third comes from natural recharge. The managed recharge program replenishes the County's groundwater aquifers which provide a valuable local water supply and storage, allowing water to be carried over from the wet to dry seasons and even from wet years to dry years. Valley Water does not directly deliver groundwater to customers, although it does have some limited emergency groundwater pumping capacity. The estimated operational storage capacity of the groundwater subbasins is up to 548,000 AF. Valley Water's managed recharge capacity is up to about 144,000 AFY.

Figure 5-3: Historical Groundwater Conditions in Santa Clara County[11]

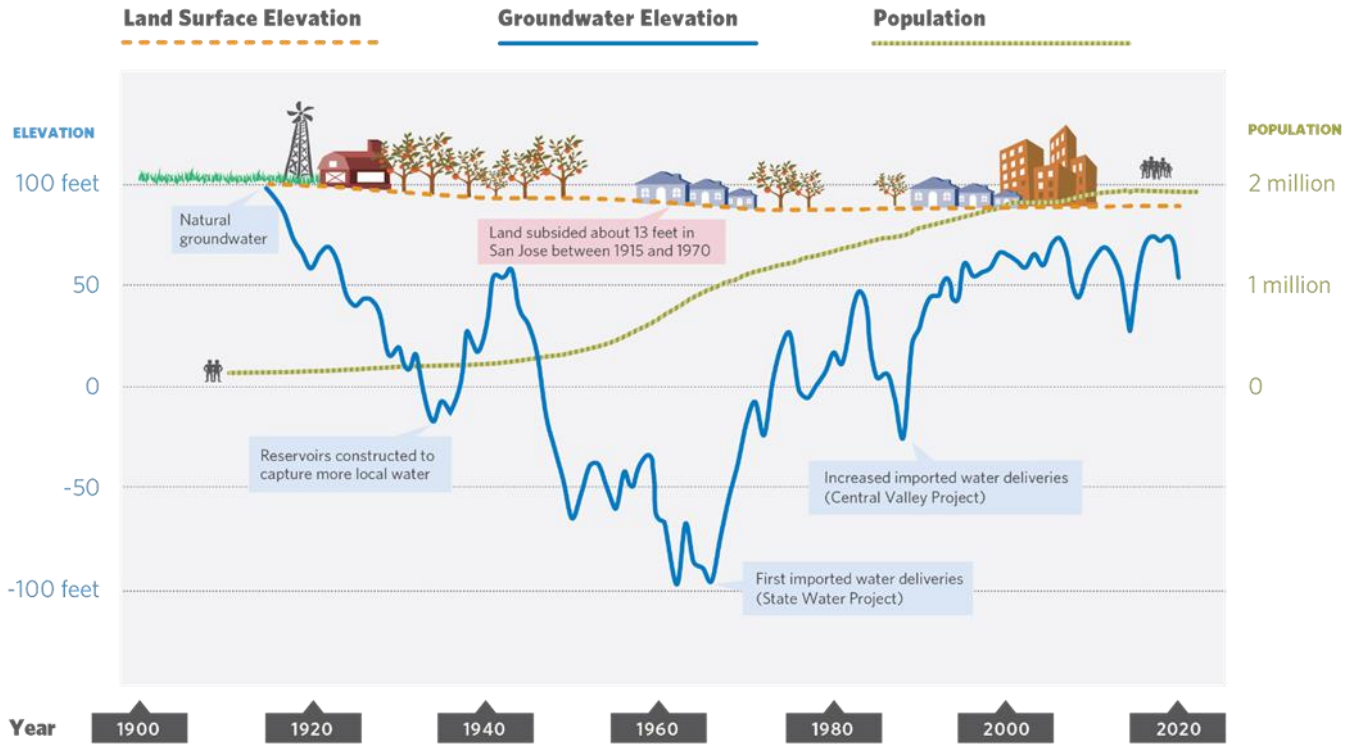


Figure 5-3 illustrates how Valley Water's water management activities have contributed to a sustainable water supply in the County. After its formation to address declining groundwater levels and land subsidence, Valley Water constructed local reservoirs and began importing water from the SWP in 1965 and from the CVP in 1987. These efforts successfully increased groundwater levels that had declined during the 20th century. Additional details regarding the

[11] From the *2020 Urban Water Management Plan, Retailer Draft* (Valley Water, 2021).

groundwater basins in Santa Clara County, and Mountain View in particular, are provided in Chapter 5.3.

Recycled and Purified Water

A growing source of water for Santa Clara County is recycled and purified water. Recycled water is wastewater that is cleaned through multiple levels of treatment for use as a nonpotable supply. Purified water is further cleaned through advanced treatment technologies such as microfiltration, reverse osmosis, and ultra violet light disinfection. Purified water can be used to create new potable water. Recycled and purified water provide a reliable, droughtproof, locally controlled water supply that reduces reliance on imported water and augments existing supplies.

Recycled water is currently about 5 percent (17,000 AFY) of the County's supply and is used for landscape and agricultural irrigation, cooling, and toilet flushing at dual plumbed facilities. Recycled water is produced at four wastewater plants located in Palo Alto, Sunnyvale, San Jose, and Gilroy. Although Valley Water does not own or operate any of the four wastewater treatment plants, it has an interest in developing and accelerating recycled water use.

Potable water reuse will involve using advanced purified water to augment groundwater or surface water supplies. Valley Water's current plan includes production of purified water at new or expanded facilities in northern Santa Clara County for use as groundwater recharge in Los Gatos. Valley Water is currently evaluating a program for 10,000 AFY, with the potential to increase to 14,000 AFY by 2028. To date, Valley Water has secured 10,000 AFY of wastewater effluent for its purified water program and completed a pilot treatment facility in San Jose. Additional approaches are being studied to reach a goal of 24,000 AFY potable reuse supply.

5.3 Local Groundwater

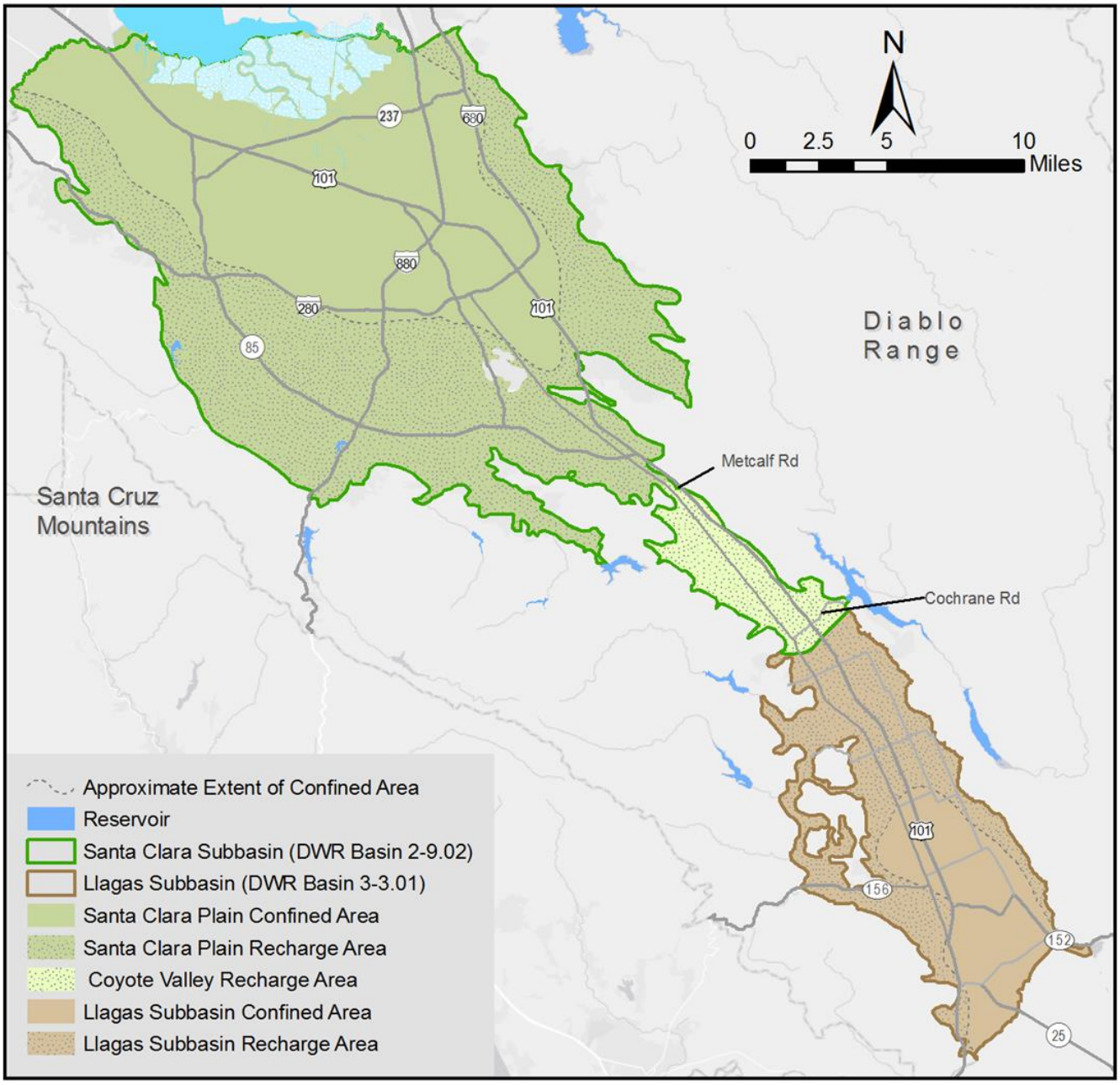
Mountain View owns and operates water supply wells that extract local groundwater for use in Mountain View's drinking water distribution system. This section describes Mountain View's groundwater supply, including groundwater management, water quality, and historical use. Information presented herein is based primarily on Valley Water's *2016 Groundwater Management Plan* (Valley Water, 2016) and *2020 Urban Water Management Plan* (Valley Water, 2021).

5.3.1 Basin Description

As previously mentioned, Valley Water is responsible for groundwater management in Santa Clara County, which overlies portions of two groundwater basins: the Santa Clara Valley Basin and the Gilroy-Hollister Valley Basin. The Santa Clara Basin is divided into two subbasins: the Santa Clara and the Llagas subbasins, which cover a combined surface area of approximately 385 square miles. Due to different land use and management characteristics, the Santa Clara Subbasin is further divided into two management areas: the Santa Clara Plain and the Coyote Valley. Figure 5-4 shows the approximate boundaries of the groundwater subareas managed

by Valley Water. Mountain View's wells extract water from the Santa Clara Plain subarea of the Santa Clara Subbasin (Subbasin 2-9.02).

Figure 5-4: Santa Clara County Groundwater Basins[12]



The Santa Clara Subbasin is bounded by the Diablo Range on the east and by the Santa Cruz Mountains on the west. The subbasin extends from the northern border of Santa Clara County to the groundwater divide near Morgan Hill, and has a surface area of 240 square miles. The

[12] From the *2020 Urban Water Management Plan, Retailer Draft* (Valley Water, 2021).

dominant geohydrologic feature is the Santa Clara Valley, which drains northward to the San Francisco Bay by tributaries such as Coyote Creek, the Guadalupe River, and Los Gatos Creek. The two drainages running through Mountain View's City boundaries include Stevens Creek and Permanente Creek, which flow from the Santa Cruz Mountains to the Bay (DWR, 2003).

Groundwater is pumped from the subbasins by retail water suppliers, agricultural users, and private well owners to support municipal, industrial, agricultural, and domestic uses. Although most of the groundwater originates as managed recharge, natural recharge also occurs from infiltration of rainfall and natural seepage through local creeks and streams.

5.3.2 Coordination

Valley Water coordinates closely with other local agencies and water retailers, including Mountain View, to ensure sustainable management of groundwater supplies. Representatives from Mountain View serve on Valley Water's Water Retailer Committee, and several subcommittees. The Water Retailer Committee receives quarterly updates from each of nine subcommittees: water supply, water quality, recycled water, finance, treated water, conservation, emergency management, groundwater, and communication. Subcommittee members meet bimonthly to discuss a variety of topics. Included in every meeting is a summary of current conditions from Valley Water's monthly Water Tracker, which discusses weather, storage, groundwater, imported water, treated water, conservation, recycled water, and alternative sources. This monthly summary is also posted on Valley Water's website for the general public. Detailed groundwater information is provided in a monthly Groundwater Conditions Report, and also an Annual Groundwater Report. A copy of Valley Water's most recent Groundwater Conditions Report is included as Appendix I.

5.3.3 Sustainable Groundwater Management Act

In 2014, Governor Brown signed the Sustainable Groundwater Management Act (SGMA) to promote the sustainable management of California's groundwater supplies. For basins designated as medium and high priority by the State, SGMA requires local Groundwater Sustainability Agencies (GSAs) to develop and implement Groundwater Sustainability Plans. Valley Water is the designated GSA for the Santa Clara and Llagas subbasins, which are both identified as high-priority basins by DWR based on criteria that include overlying population, projected growth, number of wells, irrigation acreage, groundwater reliance, and groundwater impacts. Neither subbasin has been identified as being critically overdrafted.

SGMA requires that Groundwater Sustainability Plans be completed by 2022. Recognizing that groundwater is already well-managed in many areas, SGMA allows use of an alternative plan in cases where an existing plan meets the functional requirements of SGMA. Valley Water's *2016 Groundwater Management Plan* (Valley Water, 2016) describes groundwater sustainability goals and the strategies, programs, and activities that support these goals in the Santa Clara and Llagas subbasins. This plan was submitted to DWR as an Alternative Groundwater

Sustainability Plan in late 2016. DWR has approved Valley Water's alternative plan, determining that it satisfies the objectives of SGMA; a copy is included as Appendix J.

In their review of Valley Water's alternative plan, DWR proposed five recommended actions: (1) identify groundwater-dependent ecosystems; (2) incorporate climate change analysis; (3) create separate water quality outcome measures for each subbasin; (4) clarify quantifiable outcome measures; and (5) develop a seawater intrusion outcome measure. SGMA requires agencies update their plans every five years, with the first update due January 2022. Valley Water is actively working on updating its plan and will address DWR's recommended actions and describe whether implementation of the plan is meeting the basin sustainability goals. Pursuant to SGMA, Valley Water also publishes an annual groundwater conditions reports in April of each year.

5.3.4 Groundwater Management and Monitoring

Groundwater conditions throughout the County are sustainable, with managed and in-lieu recharge programs maintaining adequate storage to meet annual water supply needs and provide a buffer against drought or other shortages. Valley Water's *2016 Groundwater Management Plan* (Appendix J) identifies the following two basin management objectives:

- Manage groundwater supplies to optimize supply reliability and minimize subsidence.
- Protect groundwater from existing and potential contamination, including saltwater intrusion.

These objectives describe the overall goals of Valley Water's groundwater management program. Basin management strategies are the methods Valley Water will use to meet the identified objectives. Many of Valley Water's strategies have overlapping benefits, such as improving water supply reliability, minimizing subsidence, and protecting or improving groundwater quality. The strategies are listed below.

- Manage groundwater in conjunction with surface water to sustain groundwater supplies and to minimize saltwater intrusion and land subsidence.
- Implement programs to protect or promote groundwater quality.
- Maintain and develop adequate groundwater models and monitoring systems.
- Work with regulatory and land use agencies to protect groundwater recharge areas, promote natural recharge, and prevent groundwater contamination.

Valley Water and local partners have implemented numerous programs to protect groundwater resources and have established comprehensive monitoring programs related to groundwater levels, land subsidence, groundwater quality, recharge water quality, and surface water flow. Although groundwater levels declined during the recent statewide drought, groundwater levels

in the Santa Clara and Llagas subbasins quickly recovered after the drought due to proactive response and comprehensive water management activities. In addition, Valley Water has developed the following outcome measures to gauge performance in meeting the basin management objectives:

- Projected end-of-year groundwater storage is greater than 278,000 AF in the Santa Clara Plain, 5,000 AF in Coyote Valley, and 17,000 AF in the Llagas Subbasin.
- Groundwater levels are above subsidence thresholds at the subsidence index wells.
- At least 95 percent of Countywide supply wells meet primary drinking water standards and at least 90 percent of southern County wells meet Basin Plan agricultural objectives.
- At least 90 percent of wells in both the shallow and principal aquifer zones have stable or decreasing concentrations of nitrate, chloride, and total dissolved solids (TDS).

Valley Water will update its Groundwater Management Plan in 2021 and submit it to DWR by January 2022 to meet the requirements of SGMA.

5.3.5 Groundwater Quality

Groundwater quality in the Santa Clara Subbasin is very good. Areas with somewhat elevated mineral levels, perhaps associated with historical saltwater intrusion, have been observed in the northern subbasin, although not in Mountain View. Some wells with elevated nitrate concentration have been identified in the southern portion of the subbasin, but not in Mountain View (DWR, 2003). Groundwater from Mountain View's water supply wells meet all applicable State and Federal water quality standards (Mountain View, 2020).

Valley Water monitors water quality at wells throughout the County. In addition, Valley Water evaluates data from retail water suppliers to assess regional groundwater quality and identify potential threats so they can be appropriately addressed. Valley Water also monitors the quality of water used for groundwater recharge to ensure groundwater resources are protected.

5.3.6 Source Assessment and Protection

As part of the State Water Board's Drinking Water Source Assessment Protection Program, Mountain View has conducted an assessment of the potential hazards within the capture zone of each groundwater well. This assessment found that groundwater pumped by Mountain View's supply wells is potentially vulnerable to contamination. However, potential impacts are likely to be confined to the upper aquifer and that the physical barriers at the wells were highly effective in preventing migration into the lower aquifer, where the City's wells extract groundwater.

Although the vulnerabilities vary for each well site, some of the concerns identified in the assessment included: known contaminant plumes, leaking underground storage tanks, gas stations, repair and body shops, transportation corridors, dry cleaners, high-density housing,

office buildings, research labs, dental/medical clinics, sewer systems, and storm drain discharge points. Regular monitoring and cleanup activities help to protect Mountain View's groundwater supply.

5.3.7 Mountain View Groundwater Use

Groundwater is an integral part of Mountain View's water management strategy, providing a reliable and local water supply. Annual production varies based on several factors, including operational needs and availability of other supplies. The City operates four active potable groundwater wells with a total production capacity of 5,314 AFY. Most of Mountain View's groundwater is pumped directly into the potable water distribution system; however, a small amount is used for well operation and maintenance. In the past 20 years, Mountain View has produced an average of 315 AFY of groundwater, with a high of 1,000 AFY. Longer-term records show that groundwater historically accounted for up to 25 percent of the City's total supply, or approximately 4,000 AFY (LHI, 1985). The City's groundwater use has decreased in recent years, coinciding with a decline in customer demand and completion of new treated and recycled water supplies. In 2020, the City pumped 190 AF of groundwater. Mountain View's historical groundwater production is presented Chapter 5.5, alongside the City's other supplies. Projected production for each of Mountain View's water supplies, including groundwater, is presented in Chapter 5.6.

5.4 Recycled Water

Mountain View uses tertiary treated recycled water from the RWQCP for irrigation and toilet flushing in the North Bayshore Area. The City has used recycled water since 1980, the early efforts of which are summarized in previous UWMPs and the *Recycled Water Feasibility Study* (Carollo, 2014). Mountain View's recycled water distribution system includes 5.5 miles of recycled water mains, serving areas north of U.S. Route 101 and west of California Route 237 (North Bayshore Area). In 2020 there were 58 active customer connections to the City's recycled water system, including the Shoreline golf course regional park, Shoreline Amphitheatre, Charleston Park, and various business and roadway landscaping.

5.4.1 Wastewater Treatment and Generation

Mountain View's sanitary sewer system includes 159 miles of mains and two pump stations to carry wastewater from the City to the RWQCP in Palo Alto for treatment. In addition to Mountain View's flows, the RWQCP also treats wastewater generated by the communities of Palo Alto, East Palo Alto, Los Altos, Los Altos Hills, Stanford University, and Moffett Field (the latter conveyed through Mountain View's system). Mountain View's 2020 wastewater generation was 6.88 mgd (7,732 AF).

The RWQCP is designed for an average dry-weather wastewater flow capacity of 39 mgd with full tertiary treatment. The RWQCP uses a multi-step process to filter, clean, and disinfect wastewater so that it can safely be discharged to the Bay or used for irrigation and other nonpotable uses. The RWQCP treatment process includes:

- **Primary treatment:** Bar screening and primary sedimentation.
- **Secondary treatment:** Fixed film reactors, activated sludge, clarification, and filtration.
- **Tertiary treatment:** Filtration through a sand and coal filter and disinfection.

All wastewater treated at the RWQCP meets the California Code of Regulations Title 22 tertiary standards for restricted reuse. An additional reclamation facility furthers filters and disinfects up to 4.5 mgd of recycled water to meet tertiary standards for unrestricted reuse. Capacity expansion and advanced treatment to reduce TDS are currently in progress.

5.4.2 Recycled Water Contracts

The RWQCP operates under the terms of a 1968 agreement (Partner's Agreement) in which the cities of Mountain View and Los Altos agreed to retire their treatment plants and partner with Palo Alto to construct a regional treatment plant. The RWQCP provides recycled water pursuant to a 2007 agreement that outlines the cost sharing of system construction and allocates 3.0 mgd of recycled water to Mountain View at no cost through 2035, concurrent with the expiration of the Partner's Agreement. In 2017, the recycled water agreement was amended to:

- Implement and fund facilities rehabilitation and construction.
- Increase system backup and reliability.
- Establish a cost allocation method for generating recycled water.
- Continue salinity reduction efforts.
- Extend the life of the agreement to 2060.

In December 2019, Mountain View and Palo Alto executed an agreement with Valley Water to "Advance Resilient Water Reuse Programs in Santa Clara County". This agreement established funding for the advanced treatment facility to improve recycled water quality. It also provides for 10,000 AFY of treated wastewater for use by Valley Water in its purified water program.

5.4.3 Recycled Water Quality

Although recycled water is actively used for irrigation in Palo Alto and Mountain View, its salt content is above the threshold tolerable for certain salt-sensitive plants such as redwood trees. In an ongoing effort to address recycled water salinity, the RWQCP and partner agencies implemented several strategies. Primary to this effort was the Salinity Reduction Policy, which aimed to identify sources of wastewater salinity and implement actions to reduce recycled water salinity to 600 parts per million (ppm).

Two such efforts included: (1) rehabilitating sanitary sewer mains; and (2) rerouting known saline discharges. Infiltration of saline groundwater to the sanitary sewer is known to cause

high salinity. Sanitary sewer rehabilitation projects performed in Mountain View, Palo Alto, and East Palo Alto for pipe integrity and extended life had the additional benefit of reducing waste stream salinity. As other sources of wastewater stream salinity were identified, RWQCP partner agencies worked to remove high-saline discharges from the wastewater stream. Key locations in Mountain View where high-salinity discharge was rerouted from the sanitary sewer included three groundwater extraction wells affiliated with the landfill monitoring program and a dewatering sump pump located in Shoreline at Mountain View.

Despite these efforts, recycled water TDS remains above the 600 ppm goal. Reduced sewer flows and changes in source water chemistry due to the recent drought exacerbated the problem, however the issue is improving as customer use rebounds back toward predrought levels. To address this problem, the RWQCP has proceeded with plans for an advanced treatment facility for salt removal. Feasibility and predesign are complete, and the design contract was recently awarded. Mountain View expects the advanced treatment facility to be completed in the next few years.

5.4.4 Feasibility Expansion Study

In 2014, Mountain View completed a feasibility study to evaluate expansion of the recycled water system to increase recycled water use and improve system reliability. The study, performed by Carollo Engineers, identified five possible alternatives for expansion based on current and expected recycled water demand throughout the entire City. Each alternative was evaluated for environmental impacts, cost impacts, energy impacts, potable water offset, ease of implementation, and supply reliability. The recommended project, which includes phases from two alternatives presented in the plan, extends from the City's existing recycled water system into the Middlefield-Ellis-Whisman area of Mountain View. Recycled water uses considered in the 2014 study included irrigation, toilet flushing, and cooling towers both inside and outside of the City's water service area where recycled water may be feasible in the future. Estimated cost for this expansion was $28 million (in 2014 dollars). Average day demand for the recommended alternative was 1.5 mgd. The City is currently updating its Recycled Water Feasibility Study to evaluate demands from new development associated with the recently adopted East Whisman Precise Plan, and to consider pipeline alignment options to expand the recycled water system to serve additional areas. This update is expected by the end of 2021.

5.4.5 Current and Projected Recycled Water Use

Recycled water use within Mountain View's water service area was 420 AF in 2020. Mountain View's 2015 UWMP projected 995 AF in-City and 75 AFY out-of-City recycled use in 2020. These projections were based on the 2014 feasibility study and discussions with NASA and Google. In addition to existing and planned uses inside Mountain View's water service area, potential recycled water users were identified for the NASA-Bayview area.[13] Since 2015, delivery of

[13] The NASA-Bayview area is located on City and Federal land bounded on the south by U.S. Route 101, on the west by Mountain View, on the east by Sunnyvale, and on the north by San Francisco Bay.

recycled water to new customers has been delayed for various reasons, including cost and the desire to focus on advanced treatment to improve water quality. As a result, this UWMP does not include increased recycled water use in the City's official projections. If and when expansion projects are funded and scheduled, they will be incorporated into future UWMP projections.

5.4.6 Encouraging Recycled Water Use

Recycled water for irrigation is required in the North Bayshore Area, pursuant to Article V, Chapter 35 of the City Code. Penalties for noncompliance include discontinuance of potable water service and a 50 percent surcharge for the use of potable water. Given the elevated salinity levels in recycled water, the City has granted some temporary adjustments to this requirement, such as delayed conversion and the allowed use of potable water for redwood trees. Dual-plumbing is also required for new commercial buildings over 25,000 square feet, Citywide.

To further incentivize the use of recycled water, the City charges customers less for recycled water than for potable water. In 2020, the recycled water rate $5.00 per hundred cubic foot (ccf), which is 28 percent less than the nonresidential potable water rate of $7.01 per ccf. Perhaps as important, recycled water is not subject to drought restrictions but provides customers with a reliable irrigation supply, even during dry years. All of these actions reflect the City's efforts to optimize recycled water use.

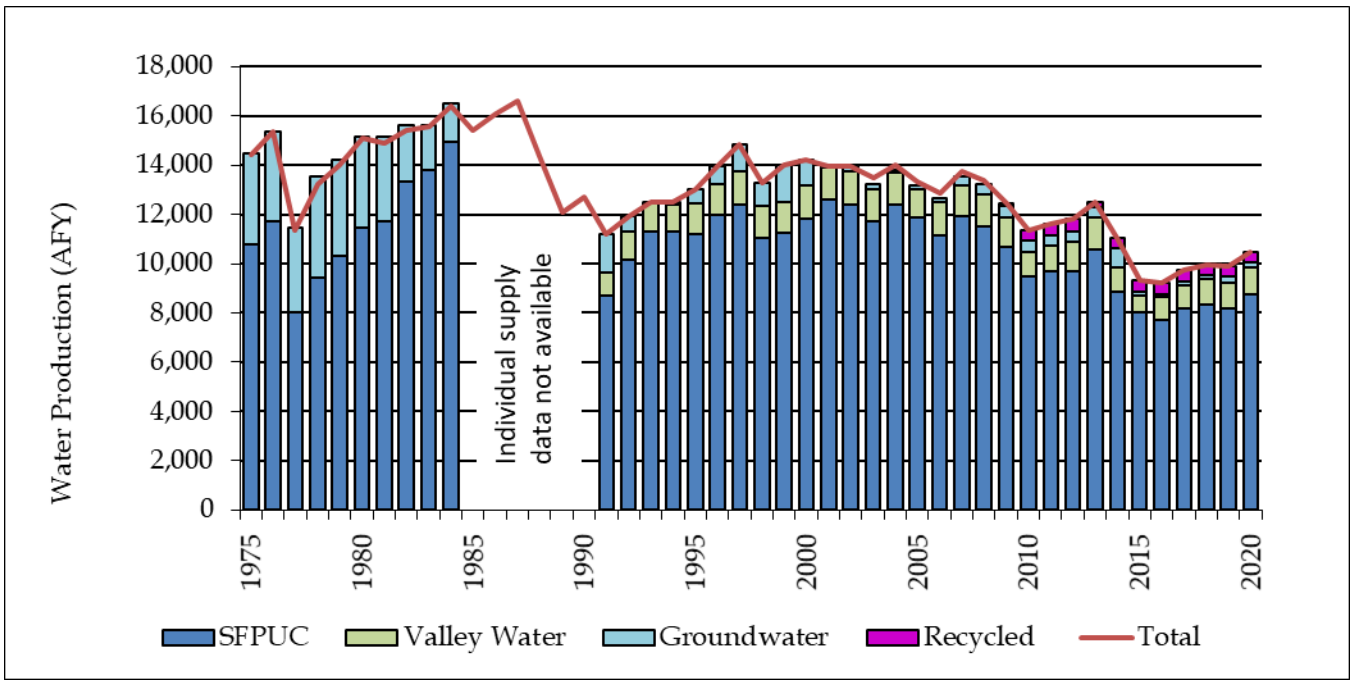
5.5 Historical Water Supply Production

A summary of Mountain View's water supply production over the past five years is provided in Table 5-1. Figure 5-5 shows the City's water production by source back to 1975. A general downward trend is evident over the past 45 years, due mostly to changes in customer base, increased plumbing efficiencies, changes in landscape aesthetics, and periodic drought.

Table 5-1: Historical Water Supply Production

Supply Source	Historical Water Supply Production (AFY)				
	2016	2017	2018	2019	2020
SFPUC	7,731	8,196	8,353	8,203	8,747
Valley Water	893	942	1,032	1,012	1,099
Groundwater	117	138	165	249	190
Potable	8,741	9,276	9,550	9,464	10,036
Recycled	472	454	380	420	420
Total Supply	9,213	9,730	9,931	9,884	10,456

Figure 5-5: Historical Water Supply Production



5.6 Projected Water Supply Production

Mountain View maintains a robust water supply portfolio, to ensure sufficient water is available for existing and future needs. Production of each water supply changes based on several factors, including demand, water quality, and drought. In order to meet the projected demand presented in Chapter 4.3, Mountain View expects to utilize its supplies in the approximate volumes presented in Table 5-2. Actual use of each supply will be adjusted depending on actual demand, future supply conditions, and operational needs. This estimated production does not reflect the total supply available to the City, which is determined by contract, hydrology, and other factors.

Table 5-2: Projected Water Supply Production

Supply Source	Projected Water Supply Production (AFY)				
	2025	2030	2035	2040	2045
SFPUC	10,154	10,644	11,160	11,703	12,259
Valley Water	1,176	1,176	1,176	1,176	1,176
Groundwater	280	280	280	280	280
Total Potable	11,610	12,100	12,616	13,159	13,715
Recycled	448	448	448	448	448
Total Supply	12,058	12,548	13,064	13,607	14,163

5.7 Energy Intensity

Mountain View tracks energy usage in its pump stations, reservoirs, wells, and City buildings adjacent to these facilities. The amount of energy used to store, withdraw and distribute water supplies for the 2019-2020 fiscal year was approximately 2,155,277 kilowatt-hours (kWh). This total includes electricity for several City buildings, such as police, fire, sports pavilion, and operations center, which are metered in conjunction with water distribution facilities. Over 20 percent of electricity demand was provided by City-owned solar. Details about Valley Water's energy consumption at each stage of their water supply process is detailed in their Energy Optimization Plan shown in Valley Water's UWMP in Appendix A. Details regarding the energy intensity estimates for SFPUC's Regional Water System in Appendix I of their UWMP.

6. WATER SUPPLY RELIABILITY

Water supply reliability information was provided by the City's two wholesale water suppliers: SFPUC and Valley Water. The information presented below includes a summary of projects and other events that may increase or decrease the ability of SFPUC and Valley Water to meet the needs of their customers (such as Mountain View). Also included is an evaluation of each wholesaler's supply availability during normal years and periods of drought. In these supply analyses, each of Mountain View's wholesalers reviewed the hydrologic record and evaluated the availability of water supply during single and multiple dry-year periods.

6.1 Reliability of the SFPUC Regional System

The following pages discuss the ability of SFPUC's Regional System to meet system demand, including reliability concerns, measures being evaluated to secure a reliable source of water, and methods for allocating dry-year supply. This information is summarized from SFPUC's *2020 Urban Water Management Plan* (SFPUC, 2021). Several new considerations have arisen since the City's 2015 UWMP, most prominently the State Water Board's adoption of the *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (Bay Delta Plan). If implemented as adopted, this plan will impact SFPUC's dry-year water supply availability. The Bay Delta Plan and other considerations are discussed below. SFPUC models dry-year supply availability using its "design drought," which includes a repeat of the 1988 to 1992 drought, followed by a repeat of the 1977 to 1978 drought.

6.1.1 Water System Improvement Plan

To enhance the ability of the SFPUC Regional System and meet its goals for water quality, seismic reliability, delivery reliability, and water supply, SFPUC approved a $4.8 billion Water System Improvement Plan (WSIP) in 2008. The WSIP included over 30 capital projects related to rehabilitation, construction, replacement, and upgrades to pipelines, reservoirs, dams, treatment facilities, tunnels, and power facilities. Major goals of the WSIP were to:

- Maintain high water quality.

- Reduce vulnerability to earthquakes.
- Increase delivery reliability and improve ability to maintain the system.
- Meet customer water needs in nondrought and drought periods.
- Enhance sustainability in all system activities.
- Achieve a cost-effective, fully operational system.

To date, the WSIP is approximately 96 percent complete.

6.1.2 Level of Service Goals and Objectives

In conjunction with adoption of the WSIP, SFPUC also adopted Level of Service Goals and Objectives (Service Goals). These goals were updated in February 2020 and include the following objectives related to water supply:

- Meet all regulations to support the operation of water system and power facilities.
- Meet average system-wide demand of 265 mgd during nondrought years.
- Limit rationing to 20 percent during extended droughts.
- Diversify water supply options during nondrought and drought periods.
- Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers.

6.1.3 WSIP Dry Year Water Supply Projects

The WSIP authorized SFPUC to undertake a number of water supply projects to meet dry-year demands with no greater than 20 percent rationing. Those projects include:

- **Calaveras Dam Replacement**: Calaveras Dam is located near an active fault zone and was determined to be seismically vulnerable. To address this vulnerability, SFPUC constructed a new dam downstream of the existing dam. Construction occurred between 2011 and 2019, and SFPUC began storing water behind the new dam in 2018.
- **Alameda Creek Recapture**: This project will recapture water lost to instream flow releases and return it to the Regional System through facilities in Sunol Valley. Water that naturally infiltrates from Alameda Creek will be recaptured into an existing quarry pond. 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 will occur from spring 2021 to fall 2022.
- **Lower Crystal Springs Dam Improvements**: The Lower Crystal Springs Dam Improvements were substantially completed in November 2011. Bridge replacement across the dam was completed in January 2019, and a follow-up project for fish habitat

began in April 2019. While the main dam improvements have been completed, environmental permitting for reservoir operation remains significant. Raising the water level back to its original height requires actions to restore endangered plant populations. As a result, it may be several years before preproject storage volumes are restored.

- **Regional Groundwater Storage and Recovery**: The Groundwater Storage and Recovery (GSR) Project is a partnership between SFPUC and three water agencies in San Mateo County to conjunctively operate the south Westside Groundwater Basin. The project manages groundwater and surface water resources to provide supplies during times of drought. During years of normal or heavy rainfall, surface water is provided to the partner agencies in lieu of groundwater. Over time, reduced pumping stores additional water in the basin through natural recharge, making it available for use during dry years. The project's Final Environmental Impact Report was certified in August 2014. Phase 1, which includes construction of 13 wells, is over 99 percent complete. Phase 2 consists of a well station construction. Phase 2 design began in December 2019.
- **Dry-Year Water Transfer**: In 2012, SFPUC proposed a dry-year transfer with Modesto Irrigation District; however, an agreement could not be reached. In 2019, SFPUC discussed a one-year transfer with the Oakdale Irrigation District. No progress was made at that time, but SFPUC will continue to pursue transfers with the irrigation districts.

In order to achieve its target of meeting at least 80 percent of system demand during droughts, SFPUC must successfully implement the dry-year water supply projects included in the WSIP. Additional projects may be necessary to address instream flow requirements, such as those required by the Bay Delta Plan, discussed below.

6.1.4 Bay Delta Plan

In December 2018, the State Water Board adopted amendments to its Bay Delta Plan to establish water quality objectives to maintain the health of the Bay Delta ecosystem. A main goal of the Bay Delta Plan is to increase salmon populations in the Bay Delta and three San Joaquin River tributaries by requiring 30 percent to 50 percent unimpaired flow from February through June. The three affected tributaries are the Stanislaus, Merced, and Tuolumne rivers. As previously mentioned, the Tuolumne River is SFPUC's primary water source and, therefore, also the City of Mountain View's main water supply.

If the Bay Delta Plan is implemented, SFPUC will be able to meet system demand in normal years but would experience supply shortages during dry years. Through its modeling efforts, SFPUC projects that implementation of the Bay Delta Plan would cause rationing of 30 percent to 49 percent during dry years, unless additional supply projects are completed.[14] If the Bay Delta Plan is not implemented, SFPUC will be able to meet system demands in both normal and dry years without the need for rationing until the latter years of a drought starting in 2045.

[14] SFPUC's Bay Delta Plan modeling assumes a required release of 40 percent of unimpaired flow.

At this time, final resolution of the Bay Delta Plan is uncertain. Since its adoption, the State Water Board has continued to negotiate voluntary agreements with water rights holders on the San Joaquin River tributaries. Through regular updates from SFPUC, Mountain View understands a Tuolumne River Voluntary Agreement (TRVA) has been proposed, but its status remains uncertain at this time. Separate from the voluntary agreement negotiations, over a dozen agencies, including SFPUC and BAWSCA, have filed lawsuits against the State Water Board challenging its adoption of the Bay Delta Plan.

Because of the uncertainty surrounding the Bay Delta and a TRVA, SFPUC developed two water supply reliability scenarios for use in this UWMP: (1) a scenario in which the Bay Delta Plan is fully implemented in 2023; and (2) a scenario that considers the SFPUC Regional System reliability without the Bay Delta Plan. The two scenarios provide a bookend for the possible future scenarios regarding Regional System supplies. SFPUC did not provide reliability information associated with implementation of a TRVA for use in this UWMP as it is still being negotiated. Mountain View understands the supply impacts of the proposed TRVA would fall somewhere between the two scenarios provided by SFPUC (with and without the Bay Delta Plan, as adopted). For conservative planning purposes, this UWMP uses SFPUC's full Bay Delta Plan scenario as the basis for Mountain View's reliability assessment, despite its uncertainties.

6.1.5 Future Decisions

In the 2009 Supply Agreement, SFPUC committed to make three decisions before 2018:

- Whether or not to make the cities of San Jose and Santa Clara permanent customers.
- Whether or not to supply additional water to the wholesale customers beyond 2018.
- Whether or not to increase the wholesale customer Supply Assurance above 184 mgd.

As part of the 2018 amended and restated Supply Agreement, these decisions were deferred until 2028.

6.1.6 Alternative Water Supply Planning Program

SFPUC is increasing its efforts to acquire additional water supplies and explore other projects that would improve water resilience through the Alternative Water Supply Planning Program (Alternative Supply Program). The drivers for the program include: (1) adoption of the Bay Delta Plan and the projected dry-year supply shortfalls, (2) supply shortfalls following implementation of WSIP; (3) San Francisco's obligation to supply 184 mgd to the wholesale customers; (4) the adopted Service Goals to limit drought rationing to 20 percent; and (5) the potential need to identify water supplies needed to offer permanent status to the cities of San Jose and Santa Clara. Development of additional water supplies would reduce the projected supply shortfalls. The Alternative Supply Program planning priorities include:

- Offset instream flow needs and meet regulatory requirements.

- Meet existing obligations to existing permanent customers.
- Make interruptible customers permanent.
- Meet increased demands of existing and interruptible customers.

In conjunction with these planning priorities, SFPUC also considers new water supply opportunities in concert with the Service Goals for water supply and sustainability. Key Service Goals relevant to this effort include:

- Limit rationing to 20 percent during extended droughts.
- Diversify water supply options during nondrought and drought periods.
- Improve use of new water sources and drought management (including groundwater, recycled water, conservation, and transfers).
- Meet, at a minimum, legal requirements for protection of fish and wildlife habitat; and
- Maintain operational flexibility.

Together, the planning priorities and Service Goals provide a lens through which SFPUC considers water supply options and opportunities to meet water supply needs. Capital projects under consideration include surface water storage expansion, recycled water expansion, water transfers, desalination, and potable reuse. A summary of these efforts is provided below.

- **Daly City Recycled Water Expansion:** This project would provide recycled water to cemeteries and other smaller irrigation customers, offsetting existing groundwater pumping from the South Westside Groundwater Basin. The Regional System will benefit through additional drinking water supply during droughts. In this way, this project supports the GSR Project, which is under construction.
- **Purified Water Partnership**: This project could provide a new purified water supply utilizing Union Sanitary District's treated wastewater. Purified water produced by advanced water treatment 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 or direct transfer to SFPUC would result in more water for the Regional System.
- **Crystal Springs Purified Water**: The Crystal Springs Purified Water Project would augment existing supplies at Crystal Springs Reservoir. Treated wastewater from Silicon Valley Clean Water and/or the City of San Mateo would undergo advanced treatment to produce purified water, which would be blended with surface water in Crystal Springs.
- **Los Vaqueros Reservoir Expansion:** The Los Vaqueros Reservoir Expansion (LVE) Project is a multi-agency water storage project that will enlarge an existing reservoir

located in northeastern Contra Costa County. While the existing reservoir is owned and operated by Contra Costa Water District (CCWD), the expansion will have regional benefits. CCWD certified the environmental review documents and approved the LVE Project in May 2020. The additional storage capacity would provide a dry-year water supply benefit to SFPUC. SFPUC is evaluating this project in conjunction with the three subprojects listed below, related to conveyance, shared access, and desalination. BAWSCA is working with SFPUC to support BAWSCA's effort on the LVE project.

- **Conveyance Alternatives:** SFPUC is considering two main pathways to move water from storage in a prospective LVE Project to SFPUC's service area, either directly to the Regional System or indirectly via an exchange with partner agencies. SFPUC is currently evaluating potential alignments for conveyance.
- **Bay Area Regional Reliability Shared Water Access Program:** As part of the Bay Area Regional Reliability (BARR) Shared Water Access Program, a consortium of eight Bay Area water utilities are exploring opportunities to move water across the region, particularly during times of drought and other emergencies. The BARR agencies proposed two pilot projects to test conveyance pathways and identify potential hurdles to sharing water. A strategy report identifying opportunities and considerations will accompany these pilot transfers and will be completed in 2021.
- **Bay Area Brackish Water Desalination:** The Bay Area Brackish Water Desalination (Regional Desalination) Project is a partnership between SFPUC, Valley Water, CCWD, and Zone 7 Water Agency. East Bay Municipal Utilities District and ACWD may also participate in the project. The project could provide new drinking water by treating brackish water from the Mallard Slough intake in Contra Costa County. While this project may be developed as an independent water supply project, at present SFPUC is considering it in conjunction with LVE.
- **Calaveras Reservoir Expansion**: Calaveras Reservoir could be expanded to create additional storage during wet and normal years. In addition to reservoir enlargement, the project involves other infrastructure, such as pump stations and transmission mains.
- **Groundwater Banking**: Groundwater banking in the Modesto Irrigation District and Turlock Irrigation District service areas could be used to provide additional water for instream releases in dry years, thus reducing water supply impacts to SFPUC. For example, additional surface water could be provided to irrigators in wet years, which would offset groundwater use, thereby allowing the groundwater to remain in the basin for irrigation use during dry years, 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 TRVA. Progress on this option will depend on the negotiations of the TRVA.
- **Inter-Basin Collaborations**: Inter-basin collaborations could provide water supply benefits in dry years by sharing responsibility for in-stream flows in the San Joaquin River and Bay 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 and Stanislaus rivers, which would allow responsibility for streamflow to be assigned variably based on the annual hydrology. Feasibility of this option is included in the proposed TRVA.

The capital projects under consideration for the Alternative Supply Program 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 affect the amount of water available, water supply from these projects are not currently incorporated into SFPUC's projections of available supply. SFPUC expects to complete Alternative Supply Program evaluation by July 2023. The estimated costs of these projects are expected to be high.

6.1.7 BAWSCA's Long-Term Reliable Water Supply Strategy

BAWSCA's Long-Term Reliable Water Supply Strategy (Strategy) was developed to quantify the water supply reliability needs of the BAWSCA member agencies, identify water supply management projects and programs that could be developed to meet those needs, and prepare an implementation plan for the Strategy's recommendations. Key findings from the Strategy's project evaluation analysis included the following:

- Water transfers represent a high priority element of the Strategy.
- Desalination potentially provides substantial yield, but its high costs and intensive permitting requirements make it a less attractive drought year supply alternative.
- Other potential regional projects provide tangible, though limited, benefit in reducing dry-year shortfalls given the small average yields in drought years.

Since the last UWMP update, 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. Below is a summary of these efforts.

- **Member Agency Water Transfers**: BAWSCA facilitated water supply transfers to East Palo Alto, including 1.0 mgd from Mountain View in 2017 and 0.5 mgd from Palo Alto in 2018. Such transfers benefit all BAWSCA agencies by maximizing use of existing supplies. BAWSCA is currently working on an additional amendment to the Supply Agreement to establish a mechanism for transferring minimum purchase in conjunction with supply. As part of this effort, Mountain View is seeking approval to apply the principles of this amendment to its previous supply transfer with East Palo Alto.
- **External Water Transfers**: In 2019, BAWSCA participated in a pilot water transfer to bring additional water into the Regional System. While ultimately unsuccessful, this pilot generated important lessons learned and produced interagency agreements that will serve as a foundation for future transfers. BAWSCA is also engaged in BARR, a

partnership among eight Bay Area water utilities to identify opportunities to move water across the region, particularly during times of drought and emergencies.

- **Regional Projects**: Since the last UWMP update, 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 in coordination with its member agencies. Strategy implementation will be adaptively managed to account for changing conditions and to ensure its goals are met in an efficient and cost-effective manner. On an annual basis, BAWSCA reevaluates Strategy recommendations and results, in conjunction with its annual work plan. In this way, actions can be modified to accommodate changing conditions and new events.

6.1.8 Drought Allocation Plan

The Supply Agreement includes a Water Shortage Allocation Plan (Allocation Plan) to allocate water from the Regional System between SFPUC and the wholesale customers during systemwide shortages of up to 20 percent. The Allocation Plan has two components: (1) the Tier One Plan, which allocates water between SFPUC 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

SFPUC allocates water under the Tier One Plan when it determines the available water supply is less than projected system demand. The Tier One Plan allocates water between SFPUC and the wholesale customers collectively based on four shortage levels, presented in Table 6-1.

Table 6-1: SFPUC Tier One Drought Allocations[15]

Systemwide Reduction	Share of Available Water (percent of total)	
	SFPUC	Wholesale Customers
5 percent or less	35.5	64.5
6 to 10 percent	36.0	64.0
11 to 15 percent	37.0	63.0
16 to 20 percent	37.5	62.5

The Tier One Plan allows for voluntary transfers of shortage allocations between SFPUC and any wholesale customer and between wholesale customers themselves. In addition, wholesale

[15] The Tier One Plan requires SFPUC to conserve a minimum of 5 percent during droughts.

customer can "bank" and transfer any excess water savings above what is required. Unless mutually extended by San Francisco and the wholesale customers, the Tier One Plan will expire concurrent with the Supply Agreement in 2034.

Tier Two Drought Allocations

The Tier Two Drought Implementation Plan (Tier Two Plan) allocates the collective wholesale customer share of Regional System supply 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 potable water use
- Residential per-capita use

The water supply from SFPUC will be allocated to individual wholesale customers based on their Individual Guarantee and their seasonal water use during the three years prior to the onset of drought. Minor adjustments are made to ensure a minimum and maximum cutback level, and a minimum level of supply to meet health and safety needs.

The Tier Two Plan requires that BAWSCA calculate these allocations each year in preparation for a potential water shortage emergency. As the wholesale customers change their water use (e.g., changes in monthly use patterns, or changes in residential per-capita water use), their allocations also change. The Tier Two Plan initially expired in 2018, but has been extended by the BAWSCA Board every year since. The current extension expires at the end of 2021.

Drought Allocation for Shortages Greater than 20 Percent

Through its modeling efforts, SFPUC has projected dry year supply shortages of greater than 20 percent if the Bay Delta Plan is implemented as adopted by the State Water Board. For the purpose of this UWMP, SFPUC has assumed application of the Tier One Plan even though supply shortfalls are projected to exceed 20 percent. In allocating supply between the wholesale customers, BAWSCA has assumed an equivalent cutback to all agencies. In reality, if rationing levels greater than 20 percent were required, additional discussions would ensue to evaluate options for allocating supply. Central to these discussions would be ensuring minimum health and safety needs for all customers. Given the uncertainty surrounding implementation of the Bay Delta Plan or associated TRVA, Mountain View concurs that negotiating these allocations at this time is premature and, therefore, assumes the same dry-year supply allocation methods as SFPUC and BAWSCA for the purpose of this UWMP.

6.1.9 Effects of Climate Change

Climate change has become an important factor in water resources planning, although the extent and precise effects of climate change remain uncertain. Increasing concentrations of greenhouse

gases have caused and will continue to cause a rise in temperatures around the world, which will result in a wide range of changes in climate patterns. Observational data shows that a warming trend occurred during the latter part of the 20th century and will likely continue through the 21st century. These changes will have a direct effect on water resources in California, and numerous studies have been conducted to determine the potential impacts to water resources. Based on these studies, climate change could result in the following types of water resource impacts, some of which are likely to affect the Tuolumne River watershed and SFPUC's local watersheds:

- Reductions in the average Sierra Nevada annual snowpack and a shift in snowmelt runoff to earlier in the year.
- Changes in the timing, volume, intensity, and variability of precipitation, and an increased proportion of precipitation falling as rain instead of as snow.
- Long-term changes in watershed vegetation and increased incidence of wildfires that could affect water quantity and quality.
- Sea level rise and an increase in saltwater intrusion.
- Increased water temperatures adversely effecting fish and water quality.
- Increases in evaporation and associated increased irrigation need.
- Changes in urban and agricultural water demand.

Both SFPUC and BAWSCA participated in the 2019 update of the *Bay Area Integrated Regional Water Management Plan* (BAIRWMP), which includes an assessment of the potential climate change vulnerabilities of the region's water resources and identifies climate change adaptation strategies. In addition, SFPUC has studied and continues to study the effects of climate change on the Regional System. These works are summarized below.

Bay Area Integrated Regional Water Management Plan

Climate change adaptation was established as an overarching theme for the 2019 BAIRWMP update. As stated in the BAIRWMP, identification of watershed characteristics that could potentially be vulnerable to future climate change is the first step in assessing vulnerabilities of water resources in the Bay Area. A vulnerability assessment was conducted in accordance with DWR's *Climate Change Handbook for Regional Water Planning* and using the most current available science. The vulnerability assessment provides a qualitative assessment of anticipated climate change impacts to demand, supply, water quality, ecosystems, and sea-level rise.

SFPUC Climate Change Studies

Climate change research by SFPUC began in 2009 and continues to be refined. In its report *Sensitivity of Upper Tuolumne River Flow to Climate Change Scenarios* (SFPUC, 2012), 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 included:

- With increases in temperature, the median annual runoff at Hetch Hetchy will decrease by 0.7 percent to 2.1 percent by 2040 and 2.6 percent to 10.2 percent by 2100. Combining this with decreased precipitation, the median annual runoff will decrease by 7.6 percent to 8.6 percent by 2040 and 24.7 percent to 29.4 percent by 2100.
- In critically dry years, reductions in annual runoff would be significantly greater, with runoff decreasing up to 46.5 percent from present-day conditions by 2100.
- In addition to the total change in runoff, annual distribution will shift. Winter and early spring runoff will increase, and late spring and summer runoff will decrease.
- Under all scenarios, snow accumulation will be reduced and snow will melt earlier in the spring, with significant reductions in maximum snow-water-equivalent[16].

Currently, SFPUC is conducting a Long-Term Vulnerability Assessment which assesses the potential effects of climate change on water supply using a wide range of plausible increases in temperature and changes in precipitation to address the wide uncertainty in climate projections over the planning horizon 2020 to 2070. There are many uncertain factors such as climate change, regulations, water quality, growth, and economic cycles that may create vulnerabilities for SFPUC's ability to meet its Service Goals. The degree to which these factors will occur and how much risk they present to the water system are difficult to predict, but nonetheless they need to be considered in SFPUC planning. To address this planning challenge, the assessment uses a vulnerability-based planning approach to explore a range of future conditions to identify vulnerabilities and to assess the associated risks that could lead to developing a flexible and robust adaptation plan. This study is expected to be completed in the summer of 2021.

6.2 Reliability of Valley Water Managed Supplies

Reliability of Valley Water's water supply is summarized below from the *2020 Urban Water Management Plan* (Valley Water, 2021). Based on Valley Water's existing and planned sources of supply, Valley Water expects be able to meet Countywide demands through 2045 under normal, single dry, and five consecutive dry-year conditions. Valley Water conducted its dry-year supply analysis assuming a repeat of the 1988 to 1992 drought, preceded by 1977.

Valley Water's *Water Shortage Contingency Plan* (included in its 2020 UWMP) defines actions and procedures for managing water supply and demand during water shortages. Valley Water uses projected end-of-year groundwater storage as an indicator of potential shortage and a trigger for response actions. Actual availability of each supply depends on hydrology, groundwater recharge operations and conditions, and other factors. In its supply availability analysis, Valley Water assumes that groundwater can be drawn down to the severe stage of the Water Shortage

[16] "Snow-water equivalent" is the volume of liquid water that will be released from the snowpack when it melts.

Contingency Plan. While this does not represent a sustainable long-term groundwater condition, it may be needed to endure a prolonged drought.

During droughts, Valley Water will employ a range of response actions, including water conservation, use of the Semitropic Groundwater Bank, and imported water transfers and exchanges. In the event of severe droughts or other emergency situation, Valley Water considers all available tools for managing available water supplies, including public education and community outreach, supply augmentation, short-term water use requests, and balancing demands for treatment plants and recharge facilities to maximize the use of available supplies. Valley Water communicates closely with the County's municipalities and retail water supplies, such as Mountain View, to provide updates on the current supply situation. Constraints on Valley Waters supplies are summarized below, based on information from the *2020 Urban Water Management Plan* (Valley Water, 2021).

6.2.1 Imported Water Constraints

Valley Water's imported supplies are subject to a number of constraints, including hydrologic variability, regulatory requirements to protect fish and water quality in the Bay Delta, and conveyance limitations. Imported Bay Delta supplies are at risk from levee failures due to seismic threats and flooding, sea level rise and climate change, declining populations of protected fish species, and water quality variations (including algae blooms). Local and out-of-County storage can help mitigate the impacts of hydrologic variability. Water quality variations are addressed by blending sources and/or switching sources to Valley Water's drinking water treatment plants. Algae and disinfection byproduct precursors have been especially challenging during recent droughts. To address some of these constraints, Valley Water continues to evaluate the costs and benefits of participating in the Delta Conveyance Project relative to other water supply options, including developing additional local supplies, optimizing Valley Water's existing water system, and expanding water conservation. Valley Water's Bay Delta supplies are not impacted by the Bay Delta Plan described in Chapter 6.1, which only addresses tributaries of the San Joaquin River at this time. The State Water Board is also considering amendments to the Bay Delta Plan that focus on the Sacramento River and its tributaries. These amendments, referred to as "Phase II" of the Bay Delta Plan, have not been completed and are, therefore, not contemplated in this UWMP or in Valley Water's 2020 UWMP.

6.2.2 Local Surface Water Constraints

Valley Water's local surface water is vulnerable to hydrologic variability and operational needs. Most reservoirs are sized for annual operation and have multiple management considerations. For example, in wet years, Valley Water's ability to capture local surface water is limited by its need to provide flood protection. During dry years, Valley Water's groundwater recharge program is limited by required environmental flows. Additionally, dam safety requirements have reduced reservoir storage capacities, which Valley Water is working to address.

6.2.3 Groundwater Constraints

Groundwater supply is largely constrained by hydrologic variability and the operational storage capacity within the subbasins. Inflows to the groundwater subbasins are controlled by Valley Water's managed aquifer recharge program and natural recharge. Valley Water has 144,000 AFY of managed recharge capacity, including more than 90 miles of in-stream recharge and 102 off-stream recharge ponds. Maintaining Valley Water's managed recharge program requires ongoing operational planning for the: (1) distribution of local and imported water to recharge facilities; (2) maintenance and operation of reservoirs, diversion facilities, distribution systems, and recharge ponds; and (3) the maintenance of water supply contracts, water rights, and relevant environmental clearance.

Groundwater supply can also be constrained by water quality. In general, the Santa Clara and Llagas subbasins have high-quality groundwater, except for nitrate, which is elevated in some wells in the Coyote Valley management area of the Santa Clara Subbasin, and the Llagas Subbasin. However, nitrate concentrations are generally stable or declining and Valley Water has many programs to protect groundwater quality, including several targeted to improve nitrate in groundwater. Nitrate is not a water quality constraint for the Santa Clara management area of the Santa Clara subbasin, where Mountain View's wells are located. Additional details are discussed in Valley Water's *2016 Groundwater Management Plan* (Appendix J).

6.2.4 Future Projects

Valley Water's *Water Supply Master Plan 2040* (Valley Water, 2019) identifies several projects and programs that will increase water supply to meet future Countywide demand. These projects are in the various stages of planning, design, and construction and include dam improvements/seismic retrofits, the Delta Conveyance Project, potable reuse, and the Transfer Bethany Pipeline. The expansion of Pacheco Reservoir in southern Santa Clara County is one of the proposed future projects identified in the Water Supply Master Plan. Pacheco Reservoir would act as a surface bank for Valley Water's existing supplies and diversify its reserve storage by increasing the volume of locally banked reserves. In addition, by increasing locally available storage, Valley Water will be better positioned to respond to future water supply emergencies. Details for these projects are discussed in the Water Supply Master Plan (Valley Water, 2019).

6.2.5 Effects of Climate Change

Climate change impacts such as warming temperatures, shrinking snowpack, increasing weather extremes, and prolonged droughts pose significant challenges in water resources management, potentially including Valley Water's operational flexibility and water supply availability. Already, climate change impacts are being observed across California and the Bay Area, and climate modeling projections indicate that these impacts will continue or become more extreme. Historic data show that average annual maximum temperatures in Santa Clara County have increased by 2.5°F since 1950. According to *California's Fourth Climate Change Assessment*, sea level has risen over 8 inches in the last 100 years, and the 2012 to 2016 drought led to a 1-in-500 year low in Sierra snowpack. The Bay Area will likely see a significant

temperature increase by mid-century. Precipitation will continue to exhibit high year-to year variability, with very wet and very dry years. Average Sierra Nevada snowpack is projected to decline, up to 60 percent in midcentury under a business-as-usual emissions scenario. Future increases in temperature will likely cause longer and more severe droughts (Valley Water, 2021).

Statewide and local changes in precipitation and temperature could significantly impact Valley Water's supplies and operations, the effectiveness of potential water supply investments, and water demand patterns. Specifically, Valley Water's water supply vulnerabilities to climate change include:

- Decreases in the quantity of imported water supplies.
- Decreases in the ability to utilize local surface water supplies.
- Increases in irrigation and cooling water demands.
- Decreases in water quality.
- Increases in the severity and duration of droughts.

Recognizing the challenges posed by climate change to water supply reliability, Valley Water has embarked on a number of efforts to understand and develop mitigation actions for climate change impacts. Valley Water is analyzing climate impacts to quantify the effect on existing and future local supply. In addition, since imported water represents a significant source in Valley Water's portfolio, Valley Water is in the process of developing a climate study that will quantify potential climate change and regulatory impacts to Valley Water's imported water allocations. Valley Water relies on its long-term master planning efforts to continually develop and improve resilient and adaptable water supplies and strategies. Valley Water's Water Supply Master Plan is reviewed annually and updated every five years to adapt to changing conditions. This plan will continue to develop elements that adapt to future climate changes.

Furthermore, to address climate change impacts to ensure it can continue to provide a clean, reliable water supply, natural flood protection, and water resources stewardship in the future, Valley Water developed a *Climate Change Action Plan* (CCAP). The CCAP provides goals, strategies, and actions for each of Valley Water's mission areas, including water supply reliability, flood risk reduction, and water resources stewardship, as well as for emergency response. The goals and strategies developed through the CCAP planning process will guide the implementation of specific actions to address climate change.

6.3 Water Quality Impacts on Supply Reliability

Mountain View provides high-quality water that meets all current State and Federal water quality standards. Staff from SFPUC, Valley Water, and Mountain View regularly collect and test water samples from reservoirs, wells, and designated sampling points to ensure that the water supplied to Mountain View customers meets or exceeds all applicable standards. Based

on the results of drinking water source assessments prepared for each of the City's three potable water supply sources, no long-term water quality impacts are anticipated. Additional information about Mountain View's water quality is reported annually in the Consumer Confidence Report (Mountain View, 2020). Water quality impacts on the City's wholesale water suppliers are described in their respective reliability sections of this UWMP. Water quality impacts to the City's recycled water supply are discussed in Chapter 5.4.

6.4 Potential Future Water Supply Projects

Projects specific to Mountain View's wholesale water suppliers and recycled water system are summarized in previous sections of this UWMP. Mountain View is planning to install one new potable water supply well to serve the City's potable water distribution system. The well siting study has been completed, but construction remains unscheduled. The new well is expected to increase Mountain View's groundwater production capacity by 1.3 mgd (1,456 AFY).

6.5 Transfer and Exchanges

As described previously, the Supply Agreement allows for long-term supply transfers between wholesale customers of SFPUC's Regional System. In 2017, Mountain View transferred 1.0 mgd of supply to the City of East Palo Alto. At present, Mountain View is not pursuing additional long-term supply transfers, but will evaluate proposals if they are deemed beneficial to the City. The Supply Agreement also allows short-term drought transfers within the Regional System. Mountain View may participate in future short-term drought transfers. During system maintenance or in the event of an emergency, Mountain View utilizes direct interties with Sunnyvale and Palo Alto to meet system needs. Hydrants located in Cal Water service areas are also available for use in an emergency. SFPUC and Valley Water independently manage water transfers and exchanges that affect their respective systems. Details of their efforts are summarized in previous sections of this UWMP.

6.6 Desalination

Mountain View is not independently pursuing desalination. Desalination efforts from SFPUC and Valley Water are summarized in their respective sections of this UWMP.

6.7 Water Service Reliability Assessment

Mountain View expects to meet projected water demand during normal and dry-year scenarios using a combination of existing supplies and demand reduction measures. The following paragraphs provide a comparison of projected supply production and water demand during normal, single dry, and multiple dry-year scenarios. This analysis is based on information provided by Mountain View's wholesale suppliers (SFPUC and Valley Water), anticipated groundwater production, and anticipated recycled water use. Demand projections utilized in this analysis are presented in Chapter 4.3, based on population and employment growth envisioned by the General Plan.

6.7.1 Projected Supply Availability

Table 6-2 shows the projected supply availability for three of the City's water supplies: Valley Water treated water, groundwater, and recycled water. These supplies are projected to be fully available during all year types (normal and dry) through 2045.

Table 6-3 shows the projected supply availability for the City's SPUC water supply, with implementation of the adopted Bay Delta Plan. As discussed in Chapter 6.1, SFPUC projects significant supply shortfalls due to the Bay Delta Plan and is developing strategies to address these expected shortfalls. Based on the information provided by SFPUC under their Bay Delta Plan scenario, Mountain View will have full supply availability during normal water years, but will experience rationing between 36 percent and 54 percent during dry years. If the Bay Delta Plan is not implemented as adopted, Mountain View will have full supply availability during normal and dry years through 2045, with the exception of a 10 percent supply shortfall in Years 4 and 5 of a multiple dry year period in 2045. For the purpose of this UWMP, Mountain View has opted to use SFPUC's projections based on implementation of the Bay Delta Plan. These projections will be updated in subsequent UWMPs based on the actual outcome of the Bay Delta Plan, the TRVA, and the results of SFPUC's Alternative Supply Program.

Table 6-2: Supply Availability for Valley Water, Groundwater, Recycled Water

Scenario		Supply Availability					
		2020	2025	2030	2035	2040	2025
Normal		100%	100%	100%	100%	100%	100%
Single Dry		100%	100%	100%	100%	100%	100%
Multiple Dry	1	100%	100%	100%	100%	100%	100%
	2	100%	100%	100%	100%	100%	100%
	3	100%	100%	100%	100%	100%	100%
	4	100%	100%	100%	100%	100%	100%
	5	100%	100%	100%	100%	100%	100%

Table 6-3: Supply Availability for SFPUC Regional System

Scenario		Supply Availability					
		2020	2025	2030	2035	2040	2045
Normal		100%	100%	100%	100%	100%	100%
Single Dry		100%	64%	64%	64%	63%	54%
Multiple Dry	1	100%	64%	64%	64%	63%	54%
	2	100%	55%	55%	54%	54%	54%
	3	56%	55%	55%	54%	54%	54%
	4	56%	55%	55%	54%	48%	46%
	5	56%	55%	55%	50%	48%	46%

SFPUC's modeling projects that the occurrence risk of a shortfall varies from year to year. For example, applying SFPUC's 97-year hydrologic record to projected system-wide demand in 2025 shows that Mountain View's SFPUC supply would be reduced by 34 percent during nine of the 97 years, and reduced by 45 percent during 10 of the 97 years. Because overall Regional System demand is projected to increase over the next 25 years, both the severity and frequency of shortfalls are also projected to increase over time. Based on the hydrologic record, and assuming implementation of the Bay Delta Plan with no additional SFPUC supply projects, Mountain View's SFPUC's supply may be reduced by 46 percent during 20 of the 97-year hydrologic record, and reduced by 54 percent during four of the 97 years.

6.7.2 Water Supply and Demand Assessment

Based on the demand projections presented in Chapter 4.3 and the supply availability projections presented above (including implementation of the Bay Delta Plan), Mountain View expects to meet current and future water needs during normal years through 2045, but will experience 20 percent potable water supply shortfalls during dry years. These shortfalls would be made up through implementation of demand reduction strategies, consistent with the City's Water Shortage Contingency Plan presented in Chapter 8. The results of Mountain View's ability to meet projected demand is presented in Table 6-4 for the years 2025 through 2045.

Central to this analysis is Mountain View's plan to increase groundwater production to mitigate impacts of SFPUC's possible dry-year supply shortfalls. Although implementation of the Bay Delta Plan remains uncertain at this time, and may ultimately be replaced by a TRVA, Mountain View must plan for possible impacts to supply availability. The City hopes the State Water Board is able to negotiate a voluntary agreement for the Tuolumne River that achieves the Bay Delta Plan water quality goals while providing a reliable water supply for human use. In the meantime, Mountain View is collaborating closely with Valley Water to include the results of this UWMP in Valley Water's Groundwater Management Plan update, due January 2022.

Table 6-4: Supply and Demand Comparison

Scenario			Projected Demand (AFY)	Projected Supply Production (AFY)				Shortfall	
				SFPUC	Valley Water	Ground-water	Recycled Water	Potable	Recycled
2025	Normal		12,058	10,154	1,176	280	448	0%	0%
	Single Dry		12,058	6,489	1,176	1,533	448	20%	0%
	Multiple Dry	1	12,058	6,489	1,176	1,533	448	20%	0%
		2	12,058	5,564	1,176	2,458	448	20%	0%
		3	12,058	5,564	1,176	2,458	448	20%	0%
		4	12,058	5,564	1,176	2,458	448	20%	0%
		5	12,058	5,564	1,176	2,458	448	20%	0%
2030	Normal		12,548	10,644	1,176	280	448	0%	0%
	Single Dry		12,548	6,779	1,176	1,635	448	20%	0%
	Multiple Dry	1	12,548	6,779	1,176	1,635	448	20%	0%
		2	12,548	5,815	1,176	2,599	448	20%	0%
		3	12,548	5,815	1,176	2,599	448	20%	0%
		4	12,548	5,815	1,176	2,599	448	20%	0%
		5	12,548	5,815	1,176	2,599	448	20%	0%
2035	Normal		13,064	11,160	1,176	280	448	0%	0%
	Single Dry		13,064	7,090	1,176	1,737	448	20%	0%
	Multiple Dry	1	13,064	7,090	1,176	1,737	448	20%	0%
		2	13,064	6,076	1,176	2,751	448	20%	0%
		3	13,064	6,076	1,176	2,751	448	20%	0%
		4	13,064	6,076	1,176	2,751	448	20%	0%
		5	13,064	5,569	1,176	3,258	448	20%	0%
2040	Normal		13,607	11,703	1,176	280	448	0%	0%
	Single Dry		13,607	7,428	1,176	1,834	448	20%	0%
	Multiple Dry	1	13,607	7,428	1,176	1,834	448	20%	0%
		2	13,607	6,372	1,176	2,890	448	20%	0%
		3	13,607	6,372	1,176	2,890	448	20%	0%
		4	13,607	5,623	1,176	3,639	448	20%	0%
		5	13,607	5,623	1,176	3,639	448	20%	0%
2045	Normal		14,163	12,259	1,176	280	448	0%	0%
	Single Dry		14,163	6,679	1,176	3,027	448	20%	0%
	Multiple Dry	1	14,163	6,679	1,176	3,027	448	20%	0%
		2	14,163	6,679	1,176	3,027	448	20%	0%
		3	14,163	6,681	1,176	3,136	448	20%	0%
		4	14,163	5,678	1,176	4,028	448	20%	0%
		5	14,163	5,678	1,176	4,028	448	20%	0%

6.7.3 Drought Risk Assessment

The UWMP act requires Mountain View to assess water supply availability over the next five years in a current "drought risk assessment." Mountain View has used the information provided by its wholesale suppliers to evaluate the drought risk assessment for the years 2021 through 2025. The results of this analysis are presented in Table 6-5 and show a 20 percent supply shortfall beginning in 2023 if a multiple-year drought were to begin this year. Demand projections used for this analysis are a simple linear interpolation between actual 2020 demand and projected 2025 demand. As mentioned previously, SFPUC'S supply availability assumes implementation of the Bay Delta Plan beginning in 2023. If implemented on this schedule, Mountain View would increase groundwater production to reduce the supply shortfall.

Table 6-5: Drought Risk Assessment

Year	Total Demand	Projected Supply Production (AFY)			Shortfall		
		SFPUC	Valley Water	Ground-water	Recycled Water	Potable	Recycled
2021	10,737	8,833	1,176	280	448	0%	0%
2022	11,067	9,163	1,176	280	448	0%	0%
2023	11,398	5,354	1,176	2,140	448	20%	0%
2024	11,760	5,558	1,176	2,226	448	20%	0%
2025	12,058	5,727	1,176	2,296	448	20%	0%

7. WATER CONSERVATION

This chapter describes the City's current water conservation measures, many of which are implemented in collaboration with Valley Water or BAWSCA. Mountain View is also a member of the California Water Efficiency Partnership (CalWEP), formerly known as the California Urban Water Conservation Council. CalWEP is a partnership of water suppliers, environmental groups, and others interested in conserving California's water resources. The following paragraphs outline the City's effort to promote water use efficiency and conservation.

7.1 Silicon Valley Water Conservation Award

In 2018, the City of Mountain View received the Silicon Valley Water Conservation Award as a leader in water use efficiency and conservation. The City was recognized for its water conservation programs in achieving an estimated savings of over 1.1 billion gallons of water, resulting from tens of thousands of free water-saving devices that were distributed to residents and businesses over nearly two decades.

City facilities were also recognized in achieving substantial water savings. Waterfluence, a leader in large landscape irrigation audits, ranked Mountain View as the most-efficient Parks

Division of all participating agencies in California in 2018. Furthermore, the City's recycled water system has saved over 1.0 billion gallons of potable water.

During the recent drought, Mountain View demonstrated its water conservation innovation through early implementation of home water reports and participation in the Water Research Foundation's updated Residential End Uses of Water Study. Despite a mandated reduction of 16 percent during the height of the recent drought, Mountain View's water use decreased by 29 percent, even as development continued to bring new residents and jobs to the City.

7.2 Regulations

Water Waste Prevention

Mountain View has had a water waste prevention code since at least 1989, set forth in Chapter 35, Article II, Division 3 of the Mountain View City Code. These requirements were most recently updated in 2015 and includes permanent water-use restrictions in effect at all times, including normal water supply conditions, and increasingly restrictive prohibitions according to specific stages of water shortage. Restrictions focus on reducing water use for nonessential purposes, which are defined based on the severity of the water shortage, and generally include discretionary water use (e.g., beyond what is required for public health and basic business operation). The following permanent water-use restrictions in effect at all times include: (1) using water in a manner that results in flooding or runoff; (2) wasting water from broken or defective water systems; (3) using a hose for vehicle washing without a positive shutoff valve; and (4) fixing leaks within 10 days of noticing them. The full list of water-use restrictions is included in Appendix K.

Landscaping Regulations

Mountain View's Water Conservation in Landscaping Regulations (Chapter 36, Article XI, Division 3 of the Mountain View City Code) are designed to increase landscape and irrigation water use efficiency. The regulations promote region-appropriate plants and establish standards for irrigation efficiency. These regulations were originally adopted in 1992 and most recently updated in February 2016. The current regulations apply to projects requiring a Planning-level permit that contain over 500 square feet of new or rehabilitated landscape area.

Mountain View Green Building Code (MVGBC)

The MVGBC was approved by the City Council in March 2011 and amended in 2019, and is included in Mountain View City Code chapters 8, 14, and 24. The code was modeled after the California Green Building Code (CalGreen) and sets standards for improved energy efficiency, water conservation, indoor environmental quality, and waste reduction. Under the MVGBC, new and renovated buildings must use water-efficient plumbing fixtures or demonstrate a 20 percent reduction from a baseline water use.

7.3 Water Rates and Metering

The City meters all water accounts and bills customers based on the volume of water used. Customer water use has been metered since at least 1938, when the City Code was originally adopted (City Code Section 35.16). Meters are installed for every customer water service, including large landscape areas. Individually metering large landscape areas allows sites to monitor irrigation usage separately from indoor usage. To further encourage conservation, Mountain View implements tiered water rates for all residential customers. Commercial and other nonresidential accounts are also billed based on the volume of water used, using a uniform volumetric rate. CalWEP considers both tiered rates and uniform rates conservation-oriented. Recent advancements in the City's water meter program are described below.

Smart Metering

Starting in 2007, the City began installing radio-equipped meters throughout its service area to enable drive-by meter reading. The primary purpose of this project (referred to as "Automated Meter Reading" or "AMR") was to save time and operating costs by eliminating the need to manually read water meters. To date, the City is over 50 percent converted to AMR while the remaining meters continue to be read manually by meter staff on foot.

As the capability to utilize the radio-equipped meters advanced, a newer form of meter reading emerged through "Advanced Metering Infrastructure" or "AMI." The primary advantage held by AMI over AMR is that it eliminates the need for field meter reading (manual or drive-by) and generates valuable real-time water use data. Developments in software "dashboards" enable customers to monitor water use on a real-time basis. Customers can learn how and when they use water, promoting efficiency, and reducing leaks. The City's investigations into AMI are discussed further below in this section.

Leak Detection and Continuous Water Use Notifications

In recent years, the City began investigating the use of its AMR meter technology to develop a new conservation report focusing on leak detection and repair. Mountain View's AMR meters record hourly water use and transmit a flag during the meter reading process to identify meters with 24-hour continuous water use. These periods of continuous water use are marked as possible leaks in Mountain View's billing system. New system programming allows Conservation staff to access these flags for notification purposes. This information serves as the basis for a new Continuous Water Use Notification program, where Conservation staff proactively email or mail notification to single-family homes when their recent meter read shows continuous water use. The new notification process began January 2019, and since then over 2,000 notifications have been delivered. Upon request, Conservation staff will also manually download the hourly data to assist customers with their leak detection efforts.

Along with the mailed notification letter is a toilet dye tablet packet containing two blue tablets to check for a toilet leak, one of the most common household leaks. Both the mailed letter and email contain instructions on how to check for an irrigation leak as well as how to go on the City

of Mountain View website to learn more about leak detection and repair, or request further leak detection items and resources.

AMI Feasibility Study and Pilot Program

In 2016, Mountain View began implementing an AMI feasibility study and pilot program as part of Valley Water's Safe, Clean Water Priority A Grant Program. The City chose three different AMI vendors and installed 50 meters per vendor, evaluating a total of 150 meters over a period of four to six months each. The objectives of the pilot program were to: (1) evaluate performance of each AMI solution; (2) gather cost information about full-scale implementation; (3) identify customer-side leaks; and (4) quantify potential water savings.

The pilot program concluded in May 2019. The City found two primary results from the pilot program: (1) improvements in customer-side leak detection, including early identification and increased resolution; and (2) increase meter reading efficiency by eliminating field-reading (both walking and driving). Although the pilot study was successful in identifying benefits of AMI, there were some technical issues identified during the pilot, such as register programming errors and radio malfunction resulting in loss of hourly water use data. Implementation of an AMI program would require careful planning and oversight to ensure maximum performance. However, the water savings opportunities available with AMI are substantial and the City is considering funding as part of a future Capital Improvement Program.

7.4 Water Loss Control

The City tracks distribution system water loss on an annual basis as part of its water loss control and prevention program. System losses are calculated by comparing the volume of water purchased from wholesalers and pumped from local wells to the volume of water delivered to customers. Mountain View's annual system audits have shown less than 10 percent system water loss, which is consistent with the industry standard. In addition to monitoring water losses, the City maintains an annual water main replacement capital improvement program, as well as ongoing maintenance and repair activities, to maintain the integrity of its water system.

7.5 Customer Reports, Surveys, Rebates, and Free Equipment

The City works with Valley Water and BAWSCA on conservation programs, including customer reports, rebates, surveys, and free equipment giveaways. Rebates are available to all properties in Santa Clara County for upgrading water using fixtures such as irrigation parts and components, and replacing grass landscape for water-efficient plants, shrubs, and permeable materials. Monthly usage reports are provided to single-family homes and other customer accounts. Landscape surveys are available for residential and large landscape customers. Giveaways include items such as faucet aerators, dye tablets for toilet leak detection, replacement flapper valves for toilets, spray nozzles for garden hoses, and literature on water efficiency and sustainable gardening. Table 7-1 provides a list of the implemented conservation measures, which are summarized in more detail below.

Table 7-1: Results of Conservation Measures (2016-2020)

Conservation Measure	Actions
School education program	7,995 students
Landscape education classes	1,463 attendees
Water saving fixture giveaway	1,993 fixtures
Residential water wise survey	876 surveys
High-efficiency toilet/urinal rebate and install	103 installs
High-efficiency clothes washer rebate	252 rebates
Landscape rebate	256 rebates
Landscape water budgets	277 sites
Landscape water audit	42 audits

The following list summarizes the City's conservation programs related to customer reports, surveys, rebates, and free equipment.

- **Home Water Reports:** Starting in 2015, the City began distributing Home Water Reports to single-family residential accounts. These bimonthly reports are in addition to a household water bill and serve as an educational tool. Household water use for the previous billing period is compared to that of other similar homes, based on the number of occupants and yard size. In addition to comparing water use, the reports present personalized water conservation tips to help reduce household water use. This program concluded in 2018, following the end of the recent drought. Customers can still log into their online portal (*www.waterinsight.mountainview.gov*) to access billing and usage history, check for leaks and view water-saving recommendations.
- **Residential Water Wise Survey Program:** Valley Water offers free water-wise surveys to Santa Clara County residents. There are two components to the Water-Wise Survey Program. The first component is the Water-Wise Outdoor Survey Program, available to single-family and smaller multi-family sites (under one-half acre in size). The survey provides a trained irrigation professional to evaluate customer's irrigation system and helps customers understand how to use their irrigation system efficiently. A few services offered in the Water-Wise Outdoor Survey include: making recommendations for repairs, replacements, and upgrades, receiving a personalized irrigation schedule, and a custom, detailed written report for customers to reference any instructions as needed. The second component of the Residential Water Wise Survey Program is the Do-it-Yourself (DIY) Water Wise Indoor Survey Kit. The DIY Water Wise Indoor Survey Kit is available for all residents of Santa Clara County. Inside the DIY Kit is a step-by-step guide to understanding indoor water use, including how to analyze a sink or shower flow rate, how to read a water meter and check for leaks, and how to perform a toilet flapper

leak test. At the end of the guide is an indoor water use efficiency survey where customers can enter the efficiency test results of their toilets, showers, and sink faucets. To increase fixture efficiency, Valley Water will send free faucet aerators, toilet flappers, and high-efficient showerheads to help customers reduce water use and fix leaks.

- **Landscape Water Budget Reports:** In a partnership with Valley Water, Mountain View provides landscape water budget reports to the City's largest dedicated landscape irrigation accounts. Each month, account owners and landscape managers receive a customized report that compares actual irrigation water use to the ideal water use for their site. Water budgets are calculated using individual sites conditions and current weather data. This program helps to connect the individuals paying the water bill with those managing the landscape's irrigation. By the end of 2020, over 300 of Mountain View's potable irrigation sites were receiving monthly water budget reports.
- **Large Landscape Water Audits:** Mountain View encourages eligible landscape water budget recipients to participate in a free landscape water audit. Auditors provide landscape managers with water-use analyses, scheduling information, in-depth irrigation evaluation, and recommendations for affordable irrigation upgrades. Between 2016 and 2020, a total of 32 landscape water audits were conducted in Mountain View.
- **Landscape Rebates:** Customers who install water-efficient irrigation equipment and/or replace turf with low-water-use plantings can receive rebates from Valley Water. Irrigation equipment rebates are available for the installation of dedicated irrigation meters, weather-based controllers with rain sensor, and other high-efficiency irrigation equipment. Landscape rebates are determined by the total area converted from high-water-use turf to low water-use plantings and permeable materials (e.g., mulch and gravel). Since 2015, over 256 customers have received rebates for installing water-efficient irrigation equipment and/or replacing turf with low-water-use plantings.
- **High-Efficiency Toilet (HET) Replacement:** Valley Water discontinued their high-efficiency toilet rebate in 2016 after nearly 25 years. The rebate program, previously available for single-family and multi-family customers, offered $125 per toilet. Mountain View provided over 860 toilet rebates by the end of the program in 2016. Additionally, the free HET direct installation Program for CII and multi-family residences with 3.5 gallons per flush (gpf) toilets was also was discontinued in June 2020. Valley Water is gearing up to launch a new HET Direct Installation Program in 2021.
- **High-Efficiency Clothes Washer (HEW) Upgrades:** The high-efficiency clothes washers (HEW) rebate was discontinued in 2016. Residential customers who purchase qualifying HEW could receive a rebate of up to $150 through Valley Water's residential HEW incentive program. Over 2,000 residential HEWs have been installed in Mountain View. Laundromats and customers with common-area laundry rooms that purchased water-efficient commercial-grade clothes washers were eligible for a rebate of up to $400 per machine through Valley Water's coin-operated commercial washer rebate program. The commercial washer rebate program was also discontinued in 2016. Through this program's availability, 182 HEWs were installed in CII settings in Mountain View.

- **Water-Efficient Technology (WET) Rebate Program:** Businesses or facilities that implement process and equipment changes resulting in significant water savings are eligible for Valley Water's WET Rebate Program. Some eligible water-use efficiency projects for this rebate include improving cooling system efficiency, installing a recirculating car wash system, and utilizing an ozone laundry system. The rebate amount awarded is determined by the actual water savings realized by the project which must be at least 74,000 gallons per year. Valley Water provides a rebate of up to $100,000 per approved water-efficient project.
- **Prerinse Dishwashing Spray Valves:** Low-flow prerinse dishwashing spray valves are available to restaurants with less efficient spray valves. Both Mountain View and Valley Water distribute these devices upon request.
- **Submeter Rebate Program:** Many multi-family complexes share a single water meter and, thus, are unable to bill residents based on their actual water use. It has been shown when residents are accountable and billed for their own water use, apartment complex water use decreases by an average of 25 percent. This rebate program pays up to $150 of the cost of installing a submeter at mobile home parks and apartment complexes.

7.6 Staffing, Education, and Outreach

The City's Water Conservation Section consists of two permanent full-time positions and one permanent part-time position. The Water Resources Manager oversees implementation of the conservation program and various special projects related to the City's water supply. The Water Resources Technician provides technical assistance in the development and implementation of the City's Water Conservation Program. This position also serves as the City representative for community outreach and educational water conservation issues. The Public Services Technician provides customer service for leak detection and water use efficiency such as answering the Water Conservation Hotline and performing water meter leak checks. These staff members work together to implement the education and outreach programs below, and other aspects of the water conservation program.

- **School Education:** Water education assemblies by EarthCapades are available to all public and private elementary and middle schools within Mountain View. The age-appropriate assemblies focus on drought preparedness and teach students the importance of water and how to conserve, protect, and respect water through engaging performances. Valley Water also provides free in-class and online lessons and materials to schools in Santa Clara County for varying grade levels. Lessons fulfill California common core curriculum standards.
- **Landscape Education Classes:** Starting in 2009, Mountain View has hosted six to eight free landscape classes each year through a partnership with BAWSCA. The classes focus on water-efficient gardening principles and techniques and are taught by local landscape professionals. Due to the COVID-19 Pandemic, Mountain View canceled in-person landscape classes for 2020 and provided customers with resources to watch engaging live online classes and pre-recorded classes hosted by BAWSCA member agencies. The City

will continue to partner with BAWSCA and its member agencies to provide this educational resource to the community.

- **Hotline, Website, and Social Media:** Mountain View maintains a dedicated phone line for water conservation-related customer inquiries and to schedule water meter leak checks. The hotline phone number is 650-903-6216. The Water Conservation Program maintains a website that serves as a repository of information about Mountain View's conservation programs and offerings and useful resources. In coordination with the City Manager's Office, regular water conservation updates are posted on Facebook, Twitter, LinkedIn and Nextdoor.
- **Utility Bill Design, Messaging, and Inserts**: Space on customer utility bills is used on an annual basis for water efficiency messaging and to promote incentive programs. Bill inserts are used to publicize events such as the Landscape Education Classes or to notify customers of water-use restrictions and resources for water efficiency. Additional information provided on every bill includes: usage by rate tier, usage in gallons per day, and a chart showing usage by bill period for the current and prior year.
- **Brochure Racks:** The City provides educational and program material in brochure racks in buildings throughout the City. Brochure racks are located at Mountain View City Hall, Mountain View Public Library, Mountain View Senior Center, YMCA, and Mountain View Community Center. Brochure racks have not been refilled as of March 2020 due to the COVID-19 pandemic.
- **Events Water:** Conservation staff distributes education materials, program information, and free low-flow fixtures at community and corporate events such as the City's "Thursday Night Live," Public Works Week, Arbor Day, Council Neighborhoods Committee meetings, and Earth Day celebrations. Unfortunately, in-person events that were scheduled in 2020 had been cancelled due to the COVID-19 pandemic.

8. WATER SHORTAGE CONTINGENCY PLAN

This chapter contains Mountain View's Water Shortage Plan, developed to serve as a flexible framework of planned response measures to mitigate water supply shortages. Mountain View's Water Shortage Plan was prepared in accordance with the following guiding principles:

- **Shared contribution:** All customers will share the burden of reducing water use in order to meet necessary reduction goals during water shortages.
- **Meet basic health and safety needs:** The plan gives the highest priority to essential health and safety uses.
- **Prioritize reducing nonessential water uses:** The plan concentrates on the elimination of nonessential water uses and on outdoor reductions.

- **Minimize economic impacts to businesses:** The plan minimizes actions that would have substantial impact on the community's economy and prioritizes job-related water use over residential and landscape water use.
- **Communication at every stage:** Public outreach and communication at every level of shortage is essential for customer response and will instill confidence in the City's ability to respond to water shortages.

The City's Water Shortage Plan is implemented through the water use restrictions codified as Section 35.28.1 *et seq.* of the City Code (Appendix K). These restrictions were updated in May 2015 in response to the drought, and were implemented between 2014 and 2017 to address mandates from the State Water Board and Governor. Mountain View also works with its wholesale suppliers to ensure proper planning in cases of catastrophic supply interruption. These plans and efforts are described in the following pages.

8.1 Decision-Making Process

The City consults with its wholesale suppliers on a monthly basis to discuss water supply forecasts, estimates and conditions. The water supply estimates begin annually starting February 1. Snow surveys are a critical component to water supply forecasting. The last snow survey of the season is scheduled to take place at the start of April. Mountain View receives water supply estimates shortly after the last snow survey, typically by mid-April, to determine water supply availability for the coming year.

After the last snow survey, SFPUC determines if their system can support demand based on availability or prospective drought conditions. If SFPUC is incapable of supporting demand, a water shortage will be declared. Depending on the severity of drought or level of water shortage, SFPUC may adopt a resolution declaring a water shortage emergency under the Water Code, or request lesser actions such as a voluntary call for conservation (SFPUC, 2021).

Valley Water begins annual water supply operations in September for the upcoming year. Water shortage planning for the upcoming year involves water year analyses from wet to very dry, including water storage, supply contracts, water rights, imported water, transfers, and other environmental factors. A detailed water supply and demand assessment is established annually and reviewed by the Valley Water Board of Directors. Based on the water forecasts provided in the assessment, Valley Water decides if water shortage actions are necessary.

Based on the information provided by SFPUC and Valley Water, Mountain View determines the level of demand reduction necessary for the coming water year. Based on the target demand reduction level, the City may call for voluntary conservation and/or declare a water shortage emergency pursuant to California Water Code Section 350 if mandatory actions are required.

8.2 Stages of Action

Implementation of action stages are necessary when drought, disaster, or another emergency reduces the volume of Mountain View's water supply. Mountain View's Stages of Action are designed to achieve target demand reductions and eliminate the gap between supply and demand. The volume of this gap will dependent on actual water use at the time the water shortage emergency occurs.

Mountain View's current Water Shortage Plan identifies four stages of action in response to a water supply shortage (Stages 1 through 4). The City updated these stages most recently during the last drought, which concluded in May 2017. At that time, the community responded overwhelmingly to the requested conservation, saving much more than the targeted amount. For example, in 2016 the City requested 20 percent demand reduction but the community achieved 29 percent, compared to predrought levels.

To meet the new UWMP Act requirement of six standard water shortage levels (Levels 1 through 6), Mountain View has cross-referenced its existing four stages to match the new levels and will continue use of the existing Stages of Action that proved successful during the recent drought. Table 8-1 shows Mountain View's Stages of Action and how each stage cross-references with the six standard water shortage levels from the UWMP Act.

Mountain View will implement each Stage of Action when the available water supply is insufficient to meet demand. The overall concept of this approach is that water shortages of different magnitudes require different measures to overcome the supply deficiency. As explained in further detail below, each stage includes a set of demand reduction measures that become progressively more stringent as the shortage condition escalates. All of the stages are designed for adequate water to protect public health and safety and satisfy the fire protection needs of the City.

Table 8-1: Water Shortage Stage Cross-Reference

Standard Level	Shortage Level	Mountain View Stage Cross-Reference (%)	Shortage Response Action Comparisons
Level 1	Up to 10%	Stage 1 Up to 10%	Level 1 and Stage 1 include voluntary water shortage actions and increasing water conservation outreach to achieve demand reductions.
Level 2	Up to 20%	Stage 2 11% to 25%	Level 2 and Stage 2 initiate mandatory water use restrictions and requirements, focusing on limiting outdoor water use, fixing leaks within 5 days, and requiring water-conserving devices such as restaurant dishwashing spray valves.

Standard Level	Shortage Level	Mountain View Stage Cross-Reference (%)	Shortage Response Action Comparisons
Level 3	Up to 30%	Stage 3 26% to 40%	Level 3 and Stage 3 require further restrictions, including enforcement of filling swimming pools with potable water, require commercial car washes to recirculate water, and require leaks to be fixed within three days.
Level 4	Up to 40%	Stage 3 26% to 40%	Level 4 corresponds with the City's Stage 3. Refer to the description above provided for Stage 3.
Level 5	Up to 50%	Stage 4 greater than 40%	Level 5 and Stage 4 restrict all outdoor irrigation use, except for special cases (such as fire prevention) and maintenance of public spaces. Water leaks must be repaired within 24 hours.
Level 6	Above 50%	Stage 4 40% and Greater	Level 6 corresponds with the City's Stage 4. Refer to the description above provided for Stage 4. The City may consider modifying the City Code to intensify or add new water use restrictions if warranted.

8.3 Demand Reduction

The following paragraphs describe the actions Mountain View will take to reduce potable water demand in response to water shortages. The City's four Stages of Action include: up to 10 percent, 11 percent to 25 percent, 26 percent to 40 percent, and greater than 40 percent required potable demand reduction. Mountain View's recycled water is considered a droughtproof supply and is not affected by the Stages of Action.

Normal Supply Conditions

Under all water supply conditions, Mountain View enforces six nonessential use prohibitions and implements conservation measures. The existing potable water use prohibitions are listed below, summarized from Mountain View's City Code Section 35.28 (Appendix K).

- Wasting water from broken or defective water systems. Repair time allowed is 10 days.
- Using water in a manner that results in flooding or runoff into the gutter.
- Cleaning hard-surfaced areas with a hose unless equipped with a shutoff valve.
- Washing vehicles with a hose unless equipped with a shutoff valve.
- Serving water in restaurants, except on request.
- Operating single-pass cooling systems.

In addition to the water waste prohibitions, Mountain View encourages water conservation through ongoing implementation of the conservation measures described in Chapter 7.

Stage 1: Up to 10 Percent Water Shortage

When potable demand reduction of up to 10 percent is required, the City will expand existing efforts to promote conservation and will intensify public information and outreach programs, notifying customers of a water shortage and the need to voluntarily conserve.

Stage 2: 11 Percent to 25 Percent Water Shortage

Stage 2 initiates several mandatory water use restrictions and requirements that affect a broad range of activities:

- Washing paved or hard surfaces is prohibited, except by bucket or for health and safety.
- At-home vehicle washing is prohibited, except by bucket.
- Watering or irrigating landscapes is prohibited:
  - Between 9:00 a.m. and 5:00 p.m. (except by bucket, hose, or for system repair).
  - More than one to three days per week as posted by the City (except for system repair).
  - More than 15 minutes per day (except for drip irrigation or for system repair).
  - Watering or irrigating lawn with potable water during a rain event.
- Filling decorative water features is prohibited, except to sustain aquatic life.
- Constructing or installing and operating new commercial car washes and commercial laundry systems that do not use water-recirculating technologies is prohibited.
- Using potable water for construction is prohibited when recycled water is available.
- Water-conserving restaurant dishwashing spray valves are required.
- Hotels must offer guests the option to reuse sheets and towels.

As an alternative to the restrictions limiting irrigation days and duration, large landscape customers may instead limit irrigation to a set percentage of their irrigation budget, as determined by the City based on the severity of the water shortage. Additionally, the time allowed to repair broken or defective water systems is reduced to 5 days during a Stage 2 shortage (compared to 10 days under normal conditions).

Stage 3: 26 Percent to 40 Percent Water Shortage

During a Stage 3 shortage, the City will further restrict water used in swimming pools and commercial car washes, and limit repair time to three days. Operating commercial car washes that do not use water-recirculating technologies and using potable water to full pools and spas are further prohibited.

Stage 4: Greater than 40 Percent Water Shortage

Under supply reductions of 40 percent or greater, all of the previous restrictions apply and the City will further restrict the use of potable water for landscape irrigation except for:

- Fire prevention, erosion control, environmental mitigation projects, and maintenance of rare or essential plant materials.
- Maintenance of public parks, playing fields, day-care centers, golf course greens, or school grounds (which are allowed one day of irrigation per week).

The time allowed to repair broken or defective water systems is reduced to 24 hours.

8.4 Publicity and Communication

Even before formal declaration of a water shortage, a public information program will be activated to provide customers with as much advance notice as possible. Following Council action declaring a shortage, residents and businesses would need to be provided notice of water shortage rules and regulations via a variety of media and communications methods. Coordination between City departments and with other public agencies can begin prior to formal declaration of a water shortage and can be accomplished through regular meetings, email group updates, and presentations.

In a regional water shortage scenario, the City would utilize public outreach resources and materials provided by Valley Water and BAWSCA. In addition to these materials, the City may develop its own materials and use the following methods to communicate with customers:

- City of Mountain View website.
- *The View* (a Citywide newsletter).
- Utility bill messaging and inserts.
- Television public service announcements.
- Brochure racks distributed throughout the City.
- Newspaper ads (e.g., the *Mountain View Voice*).
- Water Conservation phone hotline.
- Booths at community and corporate events.

8.5 Water Use Monitoring

Staff monitors water use through daily analyses of wholesale water purchases, well production data, and recycled water use. Irrigation use for the City's largest landscapes is monitored monthly through the Landscape Water Budget Program. During a water supply shortage, staff

will continue to monitor water use on a regular basis to determine the effectiveness of the Water Shortage Plan's water use restrictions.

8.6 Operational Changes

Mountain View's water distribution system allows for operational flexibility when necessary due to maintenance, drought or other emergency. Mountain View periodically adjusts its operations to move water between Pressure Zones. This operational flexibility was utilized multiple times during the last drought, when the City shut down its SFPUC and Valley Water turnouts in response to water quality concerns.

8.7 Supply Augmentation

Mountain View has not identified any new supplies for use during water shortages. Management of the City's existing water supplies will be adjusted based on availability. Recycled water distribution via tanker trucks is available throughout the City for construction, landscape irrigation, and other nonpotable water uses. The current hydrant program has designated two purple hydrants as public truck fill stations. Additional stations could be added if necessary. Customers can also obtain recycled water directly from the RWQCP.

8.8 Revenue Impacts

Mountain View's water rates are designed to fully fund ongoing annual costs such as wholesale water purchases and water system operation, a base level of annual capital improvement projects, and maintain an adequate Water Fund reserve. Water rates are composed of a flat fee and a per-unit fee for water consumed. Under Mountain View's three-tiered rate structure, residential customers' per-unit fee increases as the quantity of water used increases. Nonresidential customers pay a uniform rate for each volume of water used. The City's Finance and Administrative Services Department balances Water Fund revenues and expenditures each year during the budget process and recommends rate adjustments as appropriate.

Reduced water consumption during a water shortage will cause Water Fund operating revenues to decline. Over one-half of Water Fund expenditures is used to purchase the water itself (a volumetric expense), while the remaining is for operational and maintenance costs (a largely fixed expense). Water Fund revenues are approximately 80 percent volumetric and 20 percent fixed. This relationship can cause revenues to be insufficient during periods of reduced consumption due to water shortage actions, requiring either the use of reserves or generation of additional revenues (e.g., through drought surcharges or rate increases).

During a water shortage, City staff evaluates options for addressing revenue shortfalls. The City may consider several mitigation actions, including increasing water rates, adjusting the water rate structure, implementing a one-time water use surcharge, reallocating staff resources, and reassessing capital improvement project expenditures (Table 8-2).

Table 8-2: Possible Cost Recovery Measures

Possible Measure	Stage of Action			
	1	2	3	4
Add additional rate tiers	X	X	X	X
Change rate structure; increase higher consumption tiers		X	X	X
Reevaluate fixed charge component to ensure fixed costs are captured	X	X	X	X
Reevaluate staffing levels, reassigning as needed or applicable		X	X	X
Penalty assessment for noncompliant customers		X	X	X
Reassess capital improvement project expenditures			X	X
Implement a one-time emergency surcharge			X	X

8.9 Legal Authority

When deemed necessary, the City will declare a water shortage emergency in accordance with Water Code Chapter 3, Section 350 of Division 1 (general provision regarding water shortage emergencies). Water Code Sections 350 et seq. and 375 et seq., and Chapter 35 Article II, Division 3 of the Mountain View City Code give the City Council legal authority to reduce or prohibit nonessential use of water upon declaration of a water shortage emergency condition.

8.10 Enforcement, Penalties, and Exceptions

Enforcement of Mountain View's water conservation regulations is focused on soliciting cooperation from water customers who are unaware of the restrictions or have failed to comply with the requirements. If discussions with the customer are unsuccessful in obtaining compliance, the City may use enforcement mechanisms to enforce compliance with shortage response actions. Procedures regarding enforcement actions and penalties for noncompliance are listed below (summarized from Appendix K):

- Upon the receipt of reliable information confirming an alleged violation of this division, the City may issue a written warning to the suspected violator. After one or more written warnings, a flow-restricting device may be used. (City Code Section 35.28.6.1).
- Continued water use in violation of any of the provisions in the water shortage response actions, after written warning and installation of flow-restricting devices, may result in the discontinuation of water service (City Code Section 35.28.7).
- Any violation of this division may be remedied by an enforcement action brought by the City, including, but not limited to, administrative or traditional nuisance abatement proceedings, civil or criminal code enforcement proceedings and suits for injunctive relief (City Code Section 35.28.8).

City employees and members of the public may register water-waste complaints in person or by telephone, email, or through the City's online *AskMountainView* tool (*www.mountainview.gov/AskMV*). Upon confirmation of a violation, Mountain View's policy is to contact the customer via telephone and provide two courtesy notices plus one violation notice left at the property of concern. These actions are followed by a mailed violation notice and referral to the City Code Enforcement Section, if necessary.

Customers can request an exception to the water shortage provisions in writing to the Public Works Director (City Code Section 35.28.5.1). Valid reasons for an exception include: (1) previous adoption of conservation measures; (2) emergency conditions affecting health, sanitation, fire protection or safety; and (3) undue hardship. Decisions may be appealed to the City Manager (City Code Section 35.28.5.2)

8.11 Water Shortage Plan Termination

A water supply shortage ends when available wholesale deliveries improve to the point where the water system is once again capable of supporting normal water use and any special water use rules and regulations in effect at the time are officially rescinded by City Council and public notice is given that the water shortage is over. The Public Works Director would then oversee any remaining termination and plan review activities. These activities could include:

- Publicize gratitude for the community's cooperation.
- Restore water utility operations, organization, and services to preevent levels.
- Document the event and response and compile applicable records for future reference.
- Collect cost accounting information, assess revenue losses and financial impact, and review deferred projects or programs.
- Debrief staff to review effectiveness of actions, to identify the lessons learned, and to enhance response and recovery efforts in the future.
- Update the Water Shortage Contingency Plan as needed.

8.12 Reevaluation and Improvement Procedures

The City considers the Water Shortage Plan a living document that is subject to reevaluation and improvement as needed to ensure the City's water shortage response actions produce effective results. As described previously, demand reduction during the last drought far exceeded that requested by the City. As a result, no changes have been made to the City's Water Shortage Plan as part of this UWMP update. Future water shortage response actions will continue to be monitored for effectiveness and required improvements will be proposed to the Mountain View City Council for update in the City Code.

8.13 Catastrophic Supply Interruption Planning

In compliance with the Federal Bioterrorism Act and Department of Homeland Security guidelines, the City prepared a Water System Emergency Response Plan (ERP) to mitigate the effects of natural disasters and man-made threats on Mountain View's water supply. This confidential document:

- Identifies the types of emergencies to which Mountain View may need to respond, including power outages, floods, and earthquakes.
- Describes the roles and responsibilities of City personnel during an emergency response.
- Outlines the processes and procedures for responding to different threats and emergencies.

Based on the type and severity of the emergency, the City will implement corrective measures which may include isolating water storage reservoirs, isolating portions of the water system, and deploying emergency generators to operate groundwater wells. In the event of a sudden supply interruption, the City will maintain the ability to provide a minimum amount of water to customers for life safety and sanitary provisions.

Mountain View Seismic Risk Assessment and Mitigation Plan

Pursuant to the UWMP Act, the City's 2020 UWMP update must include a seismic risk assessment and mitigation plan. This requirement can be met by including a copy of the most recently adopted local hazard mitigation plan. Appendix L include a weblink to Volume 1 of the *Santa Clara County Operational Area Hazard Mitigation Plan* (County of Santa Clara, 2017). This plan addresses disaster risks in Santa Clara County, including water infrastructure failure, drought, earthquake, flooding, landslide, severe weather, and wildfire.

Additionally, in 2020, the City completed a Water System Risk and Resilience Assessment (RRA) as required by the America's Water Infrastructure Act (AWIA). The City's ERP is currently being revised to address the findings of the recently completed RRA. Per AWIA requirements, this revision will update the existing ERP to include action plans for emergency scenarios identified in the RRA, measures to improve the resilience of the system and strategies that can be used to aid in the detection of malevolent acts or natural hazards that threaten the security or resilience of the water system. Completion of the updated ERP is expected June 2021.

SFPUC Regional System

SFPUC maintains various planning documents that collectively address its emergency preparedness and planned response in the event of a catastrophic interruption of water supplies due to power outages, earthquakes, or other disasters. The plans described below include the Emergency Preparedness Plan, Emergency Drinking Water Planning, Power Outage

Preparedness and Response, and SFPUC's Seismic Risk and Mitigation Plan. The information below was written in coordination with SFPUC.

- **Emergency Operations Plan:** Following the 1989 Loma Prieta Earthquake, SFPUC created an Emergency Operations Plan (EOP). The EOP was originally released in 1992 and has been updated as necessary. The EOP addresses a broad range of potential emergency situations that may affect SFPUC and that supplements other plans prepared by the San Francisco Department of Emergency Management. Specifically, the purpose of SFPUC EOP is to describe the department's emergency management organization, roles and responsibilities, and emergency policies and procedures. The EOP is supplemented by Division EOPs for divisions within SFPUC that clarify specific roles for each branch of the Department.
- **Water System Emergency Response Plan:** SFPUC developed a Water System Emergency Response Plan (Water ERP) to comply with the 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 the SFPUC Emergency Operations Plan (EOP).
- **Power Outage Preparedness and Response:** SFPUC's water transmission system is primarily gravity-fed from Hetch Hetchy Reservoir. Although water conveyance throughout the Regional System would not be greatly impacted by power outages because it is gravity-fed, SFPUC has prepared for potential regional power outages as listed below. The WSIP also includes projects which will expand SFPUC's ability to remain in operation during power outages and other emergency situations.
    - The Tesla disinfection facility, the Sunol Valley Water Treatment Plant, and the San Antonio Pump Station have back-up power in the form of generators or diesel-powered pumps. Additionally, both the Sunol Treatment Plant and the San Antonio Pump Station would not be impacted by a failure of the regional power grid because they run off of SFPUC hydro-power generated by the Regional System.
    - Both the Harry Tracy Water Treatment Plant and the Baden Pump Station have back-up generators in place.
    - SFPUC has an emergency water supply connection with Valley Water, which also has back-up generators in place.
- **Seismic Risk Assessment and Mitigation Plan**: As part of the Facilities Reliability Program and the WSIP, SFPUC performed an extensive 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. To date, 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. 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. The City of San Francisco also has a Hazard Mitigation Plan which was last updated in June 2014 and includes sections describing earthquake hazards and mitigation for assets within the City's boundary, including State-regulated reservoirs.

Valley Water System

The information below was provided by Valley Water in their 2020 UWMP (Valley Water, 2021).

- **Infrastructure Reliability Project**: Valley Water completed its first Water Utility Infrastructure Reliability Plan (IRP) in 2005 and updated it in 2016. This IRP measured the baseline performance of critical Valley Water facilities in emergency events and identified system vulnerabilities. Previously, the IRP concluded that Valley Water's water supply system could suffer up to a 60-day outage if a major event, such as a 7.9 magnitude earthquake on the San Andreas Fault, were to occur. The updated IRP concludes that Valley Water should be able to restore treated water deliveries to meet the equivalent of a winter month's demand within 30 days after a major disaster event such as the same magnitude 7.9 earthquake on the San Andreas Fault. Modeling and analyses estimated service restoration time of Valley Water's existing system for minimum winter demands in each of the outage scenarios. In the Delta outage scenario, modeling demonstrated Valley Water can continue limited service (at an assumed 20 percent demand reduction) for a 24-month period with no imported water supplies if it occurred in a normal hydrologic year and started with normal groundwater supplies. In a regional power outage, Valley Water can operate facilities on backup fuel storage for an estimated 3 to 10 days, or longer given regular external fuel deliveries. Valley Water and retailers determined that targeting specific vulnerable areas for improvement will effectively address identified reliability needs. A total of 20 projects are identified in the IRP to improve reliability in these specific areas. Some projects were identified for retailer implementation, some for Valley Water implementation, and others for joint implementation. Valley Water has been working to complete these projects since 2016.
- **Emergency Operations Center:** Valley Water's Emergency Services and Security Unit (ESSU) coordinates emergency response and recovery for Valley Water. During any emergency, Valley Water continues the primary missions of providing clean, safe water and flood protection to the people of Santa Clara County. ESSU maintains a full-time professional emergency management staff trained and equipped to respond quickly to support Valley Water's Emergency Operations Center (EOC) and field responders. The ESSU ensures that critical services are maintained, and emergency response is centralized. The EOC is connected to other agencies and jurisdictions by an array of telecommunications, two-way radio, satellite telephone, and wireless messaging systems. In addition, two response vehicles with many of the same communications capabilities

of the EOC enable staff to establish mobile emergency command posts where field operations may require. Valley Water's EOC maintains communications with local, State, and national emergency management organizations and allied disaster preparedness and response agencies.

- **Delta-Conveyed Supply Interruption:** A strategy was developed by DWR, the Army Corps of Engineers, Bureau of Reclamation, California Office of Emergency Services, and the State Water Contractors to provide water supply protections that would enable resumption of at least partial deliveries from the Delta in less than six months in the event of an outage. Valley Water analyzed the impacts of a six-month Delta outage to determine the effect on service. The analysis assumed that all local infrastructure remains intact, as an earthquake or flood in the Delta is unlikely to badly damage local infrastructure. The analysis also assumed normal hydrologic conditions and starting storage conditions, rather than stacking disaster upon disaster (i.e., earthquake plus drought, etc.), access to SFPUC supplies, and implementation of water use reductions of 20 percent. The impacts of such an outage are largely operational as retailers would be required to use groundwater instead of their usual treated water supplies and Valley Water would actively manage the groundwater recharge program to meet Countywide needs. Even with increased pumping, groundwater storage is estimated to remain in the normal (Stage 1) range, concluding that the impacts of a six-month Delta outage are manageable assuming a normal starting position. Valley Water would potentially need to call for more aggressive water use reductions if a Delta outage were to occur during or immediately following a drought.
- **Delta Flood Emergency Management Plan:** The *Delta Flood Emergency Management Plan* (DWR, 2018) provides strategies for responses to Delta levee failures, including earthquake-induced numerous levee failures during dry conditions with multiple flooded islands and extensive saltwater intrusion, resulting in curtailment of export operations. Under these severe conditions, an emergency freshwater pathway would be established from the central Delta along Middle River and Victoria Canal to the export pumps in the south Delta. The plan includes the prepositioning of emergency construction materials at stockpile and warehouse sites in the Delta, and development of tactical modeling tools to predict levee repair logistics, timelines of levee repair, and suitable water quality to restore exports. Using prepositioned materials, multiple earthquake-generated levee breaches and levee slumping along the freshwater pathway can be repaired in less than six months. Significant improvements to the central and south Delta levee systems along the emergency freshwater pathway began in 2010 and are continuing. Continued efforts under analysis strive to mitigate not only flood and earthquake risk but also meet future sea level rise risk.
- **Local Hazard Mitigation Plan:** Valley Water's 2017 Local Hazard Mitigation Plan identifies capabilities, resources, information, and strategies for building resilience and reducing physical and social vulnerabilities to disasters. It also coordinates mitigation actions, providing essential guidance for Valley Water to reduce its vulnerability to disasters. Valley Water developed this plan to be consistent with current legislation,

conditions, and best available science. This ensures that hazards are accurately profiled; policies are consistent with current Valley Water standards and relevant Federal, State, or regional regulations; and Valley Water has an updated plan consistent with FEMA's Emergency Response Plan requirements. The Local Hazard Mitigation Plan also includes strategies to reduce vulnerability to disaster through education and outreach programs, foster the development of partnerships, and implement risk reduction activities.

9. REFERENCES

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