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EXHIBITS

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Exhibit 14: Methodology for Identifying Communities of Concern

The term "communities of concern" refers to low-income communities, communities of color, and other populations with higher exposure and/or sensitivity to adverse project impacts due to historical marginalization, discriminatory land use practices, and/or less capacity to mitigate adverse impacts. Qualitative and quantitative information about socioeconomic characteristics, demographics, and exposure to existing pollution were used to identify any communities of concern that may be affected by the proposed project. Staff obtained qualitative information from in-person and phone meetings with community stakeholders from Marina, Castroville, and Seaside. Quantitative indicators used to identify communities of concern in areas affected by the project include percentage of low-income households, housing burdened low-income households, population of color, and linguistically isolated households. Staff also used the SB 535[1] disadvantaged community metric by CalEPA, which are census tracts in the top 25 percent of the CalEnviroScreen 3.0 index with multiple sources of existing pollution and a population with high sensitivity to pollution. The remainder of this Appendix discusses the selection of these quantitative indicators.

Various definitions are used to identify low-income populations. At the federal level, the poverty level is a commonly used indicator to identify low-income households. However, the regional cost of living in California is comparatively high to the rest of the country, and the federal poverty level is not geographically adjusted to capture variations in cost of living across the country. Thus, staff analyzed two indicators to identify low-income populations.

The first indicator is the population in the area living below 200 percent of the federal poverty level. Several low-income assistance programs, including Cal Am's Lower Income Rate Payer Assistance (LIRA) program, consider whether household income is below 200 percent of the federal poverty level guideline to determine eligibility.[2] The second indicator is whether the household median income is at or below 80% of the statewide median household income or at or below the threshold designated as "low-income" by the Department of Housing and Community Development's (HCD) State Income Limits.[3] This indicator considers regional variations in median household income at the state and county levels. It is also one of the methods used to calculate low-income households pursuant to AB 1550, which identifies low-income households as "those with household incomes at or below 80 percent of the statewide median income or with household incomes at or below the threshold designated as low-income by the Department of Housing and Community Development."[4]

According to HCD, in 2020, if the median household income for a family of 3 in Monterey County is at or below $69,750, they would be considered low-income.[5] A household would also be considered low-income if it had a household income at or below 80% of the state median

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[1] SB 535 (De Leon) Chapter 830, Statutes of 2012, required that 25% of available monies from the Greenhouse Gas Reduction Fund be allocated to disadvantaged communities, as defined.
[2] Kahlon, R. et al. 2018. A Case Study of Low-Income Discount Programs for Water Utilities in California. California Public Utilities Commission: http://liob.cpuc.ca.gov/Docs/LIOB%20Meeting%20030619/Item%2011b.%20Water_Utility_Low_Income_Paper_CPUC_Kahlon.pdf
[3] 2020 State Income Limits https://www.hcd.ca.gov/grants-funding/income-limits/state-and-federal-income-limits/docs/Income-Limits-2020.pdf
[4] This definition of low-income households is from AB 1550 (Gomez) Chapter 369, Statutes of 2016. Current maps produced to inform AB 1550 use Census data and State Income Limits from 2016. Staff chose the most recent Census data and State Income Limits from 2020 to analyze these thresholds.
[5] Since the average household size in Monterey County is 3.3, staff used the thresholds for a household of three. https://www.census.gov/quickfacts/fact/table/montereycountycalifornia/PST045219

household income for California, which is $56,982 based on the state median household income from most recently available data presented in Table X.1. However, staff used HCD's 2020 State Income Limits since they provide a more regionally specific assessment of median household income and was more recent.

All of the jurisdictions in the service area have individuals living under 200 percent of the federal poverty level, but the jurisdictions of Castroville, Seaside, Sand City, and Marina all have a higher proportion of their population living under this poverty threshold (see Table 1). These four jurisdictions also have median household incomes below the HCD estimate of $69,750 for a family of three.

Staff also evaluated the housing burden among low-income households, which is the percentage of households in a census tract that is both low income (making less than 80% of the HUD area median income) and paying greater than 50% of their income to housing costs.[6] Cost burden looks at monthly housing costs, including utilities, and is considered "severe" when the housing costs exceed 50% of monthly income.[7] Thus, increasing utility costs would exacerbate existing cost burdens. Several low-income households in Marina, Seaside, and Monterey already pay greater than 50% of their household income toward housing (Table X.1). Castroville and Sand City also have a higher percentage of low-income households experiencing cost burdens, but a fewer number of households overall compared to the other cities due to the smaller size of these jurisdictions.

Table X.1 Housing Burden among Low-Income Households

Geography	Total households	Income <80% Area median household income & cost burden >50%	Percent of households with income and cost burden
Cal-Am Service Area			
Carmel-by-the-Sea	1,695	195	12%
Del Monte Forest CDP	1,810	220	12%
Del Rey Oaks	645	65	10%
Monterey (City)	11,915	1,980	17%
Pacific Grove	6,830	835	12%
Sand City	140	44	31%
Seaside	10,130	2,355	23%
Other Geographies			
Marina	7,500	1,405	19%
Castroville CDP	1,510	285	19%
Monterey County	125,915	20,985	17%
State of California	12,807,385	2,371,145	19%

Source: U.S. Census Bureau 2012-2016 American Community Survey Data, 5-year estimate and Comprehensive Affordability Housing Strategy

[6] Staff used methodology and definitions from CalEnviroScreen 3.0 to identify housing burdened low-income households, which includes both owners and renters. The most recent set of data that was available on the Comprehensive Housing Affordability Strategy Data Portal (2012-2016 ACS).

[7] Comprehensive Housing Affordability Strategy Background: https://www.huduser.gov/portal/datasets/cp/CHAS/bg_chas.html

To identify communities of color affected by the project, staff evaluated two other metrics. The first indicator is the proportion of population of color, which includes anyone who identifies as a race other than white or ethnicity as Hispanic (including individuals who identify as Hispanic, white, see Table 3). The second indicator evaluated is the linguistically isolated population, which is measured by people living in a household where all members age 14 years and over speak a non-English language and also speak English less than "very well." Over half the population in Castroville, Marina, and Seaside identifies as an individual of color, and in Castroville a large portion of the population does not speak English very well (see Findings, Section II.N, Table 3).

In addition to socioeconomic and demographic indicators, staff reviewed the composite indicator developed by CalEPA pursuant to SB 535 to identify "disadvantaged communities." Although the focus of SB 535 was to ensure the equitable distribution of GGRF investments, the criteria used to determine the location of these communities is instructive for the purposes of this analysis. Unlike other indicators, the SB 535 definition of a disadvantaged community identifies communities that already have a disproportionate environmental pollution burden with populations less able to mitigate adverse impacts.

According to CalEnviroScreen 3.0, Marina has one census tract with a population of 2,259, designated as an SB 535 Disadvantaged Community. This community experiences a higher level of poverty, linguistic isolation, unemployment and housing burden compared to the rest of California. This community also has a pollution burden higher than 71% of other census tracts in the state (see Table 4 and discussion in Section II.N, Environmental Justice).

Other census tracts affected by the project area, including in Castroville and Seaside do not meet the standards qualifying them as SB 535 Disadvantaged Communities. However, census tracts in these jurisdictions do qualify as disadvantaged according to the Department of Water Resources methodology, which identifies disadvantaged communities as a community with an annual median household income that is less than 80 percent of the statewide annual median household income.[8] Staff did not include this method in the analysis because the indicators chosen to identify low-income populations already include these areas. Instead staff chose to only use the SB 535 disadvantaged communities' definition because it factors existing pollution burden into its analysis.

[8] The Department of Water Resources follows the definition of a disadvantaged community defined pursuant to Water Code §79702(j) which refers to Water Code §79505.5. See Appendix E of 019 Integrated Regional Water Management Grant Guidelines https://water.ca.gov/-/media/DWR-Website/Web-Pages/Work-With-Us/Grants-And-Loans/IRWM-Grants/Files/P1-Guidelines/2019-IRWM-Grant-Program-Guidelines122319ay19.pdf?la=en&hash=731812CDA4515E09FA7A3A614D6F240DC9147260

EXHIBIT 15

MPWMD

2019 UPDATE

EXHIBIT 9-A

Supply and Demand for Water on the Monterey Peninsula

Prepared by David J. Stoldt, General Manager
Monterey Peninsula Water Management District
September 2019

With the approval of the Monterey Peninsula Water Supply Project (MPWSP) and the continued environmental work on Pure Water Monterey (PWM) expansion as a back-up option, it is an opportune time to examine available supplies and their ability to meet current and long-term demand. This memorandum will also look at the changing nature of demand on the Monterey Peninsula, the underlying assumptions in the sizing of the water supply portfolio, and indicators of the market's ability to absorb new demand.

Supply

Available sources of supply are shown in Table 1 below and are described in the discussion that follows. Despite the California Supreme Court's decision to not hear the two petitions for writ of review, there remains the risk of additional legal challenges and not all permits have been issued for California American Water's (Cal-Am) MPWSP desalination plant. For these reasons, supply has been shown with both desalination and with PWM expansion.

Table 1
Monterey Peninsula Available Supply
(Acre-Feet Annually)

Supply Source	w/ Desalination	w/ PWM Expansion
MPWSP Desalination Plant	6,252	0
Pure Water Monterey	3,500	3,500
PWM Expansion	0	2,250
Carmel River	3,376	3,376
Seaside Basin	774	774
Aquifer Storage & Recovery (ASR)	1,300	1,300
Sand City Desalination Plant	94	94
Total Available Supply	**15,296**	**11,294**
Other Available Supplies	406	406
Total Available Supply w/Other	**15,702**	**11,700**

Desalination: The 6.4 million gallon per day (MGD) MPWSP desalination plant is expected to deliver 6,252 acre-feet annually (AFA).[1] It is likely to begin deliveries in early 2022, considering

[1] CPUC Decision 18-09-017, September 13, 2018, page 70; Amended Application of California-American Water Company (U210W), Attachment H, March 14, 2016

final permits in November 2019, a 21-month construction period, and 6-month commissioning and start-up window.[2]

Pure Water Monterey: Monterey One Water's (M1W) project is expected to come online in late 2019 and begin deliveries of 3,500 AFA to Cal-Am in early 2020. It is over 90% complete.

Pure Water Monterey Expansion: The expansion of Pure Water Monterey is expected to yield 2,250 AFA.[3] The Notice of Preparation indicates source waters for the expansion are secure: *"No new source water diversion and storage sites are necessary to achieve the Expanded PWM/GWR Project's recycled water yield objective of an additional 2,250 AFY of replacement supplies. The Expanded PWM/GWR Project is designed to utilize existing M1W contractual rights to source waters and wastewaters."* There are several different configurations of source waters that could be utilized for the expansion, but one proposed alternative is 81% contractual rights to wastewater and excess secondary effluent and 19% of Blanco Drain and Reclamation Ditch waters. This project could come online by January 2022.

Carmel River: Cal-Am has legal rights to 3,376 AFA from the Carmel River comprised of 2,179 AFA from License 11866, 1,137 AFA of pre-1914 appropriative rights, and 60 AFA of riparian rights. This does not include what is referred to as Table 13 rights, discussed under "*Other Available Supplies*" below.

Seaside Basin: The 2006 Seaside Groundwater Basin adjudication imposed triennial reductions in operating yield for Standard Producers such as Cal-Am until the basin's Natural Safe Yield is achieved. The last reduction will occur in 2021 and Cal-Am will have rights to 1,474 AFA. However, with the delivery of a long-term permanent water supply, the company would like to begin replacing its accumulated deficit of over-pumping by in-lieu recharge by leaving 700 AFA of its production right in the basin for 25 years. Hence, only 774 AFA is reflected as long-term supply available, although the additional 700 AF becomes available again in the future.

Aquifer Storage & Recovery: There are two water rights that support ASR. Permit 20808A allows maximum diversion of 2,426 AFA and Permit 20808C allows up to 2,900 AFA for a total of 5,326 AFA. However, these are maximums that may only be close to being achieved in the wettest of years. Based on long-term historical precipitation and streamflow data, ASR is designed to produce 1,920 AFA on average. The MPWSP assumes a lesser amount of 1,300 AFA to be conservative.

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[2] www.watersupplyproject.org/schedule

[3] Notice of Preparation of a Supplemental Environmental Impact Report and Public Scoping Meeting Notice, page 4, May 15, 2019

Sand City Desalination Plant: The Sand City plant was designed to produce a nominal 300 AFA, but has failed to achieve more than the 276 AF in 2011. Due to source water quality issues and discharge permit requirements the plant has averaged 199 AFA the past three years and appears on course for approximately 140 AF in Water Year 2019. The intakes will likely be augmented and production increased (see "*Other Available Supplies*", below.) Here only the 94 AFA of long-term production legally committed to offset Carmel River pumping is included.

Other Available Supplies: In 2013, Cal-Am received Permit 21330 from the State Water Board for 1,488 AFA from the Carmel River. However, the permit is seasonally limited to December 1 through May 31 each year and subject to instream flow requirements. As a result, actual production will vary by water year. Here, we have assumed 300 AFA on average. For the Sand City desalination plant the amount produced in excess of 94 AFA is available for general Cal-Am use and eventually to serve growth in Sand City. With new intakes, we have assumed average production of 200 AFA or 106 AFA of other available supply. There is also available unused capacity in the Seaside Basin which annually is reallocated to the Standard Producers such as Cal-Am as "Carryover Credit" under the adjudication decision. While not insignificant, Carryover Credit has not been included in the "Other Available Supplies". Total "Other" is 406 AFA.

Historical Water Demand for which MPWSP Desalination Plant is Sized

The MPWSP was initially sized solely as a replacement supply[4] for current customer demand, but this has changed slightly over time as described below. Consideration was also given to peak month and peak day. Additional demand was recognized to accommodate legal lots of record, a request by the hospitality industry to anticipate a return to occupancy rates similar to that which existed prior to the World Trade Center tragedy, and to shift the buildout of Pebble Beach off the river.[5] Table 2 below shows the demand assumptions used in sizing the MPWSP. Each component is discussed below.

Table 2
Water Demand Assumed in Sizing the MPWSP
(Acre-Feet Annually)

Demand Component	Acre-Feet Annually
Average Current Customer Demand	13,290
Legal Lots of Record	1,181
Tourism Bounce-Back	500
Pebble Beach Buildout	325
Total Water Demand	**15,296**

[4] Direct Testimony of Richard C. Svindland, April 23, 2012, pages 4,5,7
[5] Supplemental Testimony of Richard C. Svindland, January 11, 2013, pages 4-5

Average Current Customer Demand: The Application of Cal-Am to the California Public Utilities Commission (CPUC) in April 2012 utilized 13,290 AFA which was the 5-year average demand for 2007-2011.[6] As stated earlier, this was to be replacement supply and the Application stated *"At this point future demands of the Monterey System have not been included in the sizing of the plant."*[7] At that time, the 5-year average maximum month was 1,388 AF and the highest month was 1,532 AF.[8]

In a January 2013 CPUC filing, average demand was reiterated by Cal-Am to be 13,290 AFA but Cal-Am added that the plant would need to be increased larger by approximately 700 acre-feet per year for the in-lieu recharge of the Seaside Basin.[5] However, as can be seen in comparing Tables 1 and 2 above, supply equals demand at 15,296 AFA without changing the size of the plant from the initial Application.

In a 2016 update to the CPUC, Cal-Am recognized that average demand had declined in the intervening three years.[9] The 5-year average had declined to 10,966 AFA and the maximum month declined to 1,250 AF. At the time of the 2016 update, Cal-Am suggested that it should size the plant based on the backward-looking 10-year average demand and maximum month, instead of the 5-year average in the original Application, as well as several alternate assumptions about return of water to the Salinas Valley. They concluded *"we do not believe the size of the plants should be changed."*[10]

In a September 2017 filing to the CPUC, Cal-Am acknowledged continuing declines in demand, but indicated that the plant sizing remained appropriate saying *"We anticipate demand to rebound over time after these new water supplies are available, the drought conditions continue to subside, the moratorium on new service connections is lifted, and strict conservation and water use restrictions are eased."*[11] The company also for the first time introduced the use of future population and demand as a way to "normalize" the average demand used in sizing, a departure from the "replacement supply" basis under the initial Application in 2012.[12] This resulted in average "current" system demand of 12,350 AFA. This amount, combined with the same lots of record, tourism bounce-back, and Pebble Beach buildout results in demand of 14,355 AFA – a reduction from the initial Application – but the company asserted that the plant need not be resized because this would allow it to run at 86% capacity, a more reasonable operating rate compared to the 95% posed in the original Application.

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[6] Direct Testimony of Richard C. Svindland, April 23, 2012, page 21
[7] Direct Testimony of Richard C. Svindland, April 23, 2012, page 36
[8] Direct Testimony of Richard C. Svindland, April 23, 2012, page 22
[9] Supplemental Testimony of Richard C. Svindland, April 14, 2016 (Errata), pages 7-11
[10] Supplemental Testimony of Richard C. Svindland, April 14, 2016 (Errata), page 9
[11] Direct Testimony of Ian Crooks Errata Version, September 27, 2017, page 10
[12] Direct Testimony of Ian Crooks Errata Version, September 27, 2017, pages 11-13

The CPUC, in its September 2018 Decision, determined that Cal-Am's overall future water demand will be approximately 14,000 AFA[13] and therefore the 6.4 MGD desalination plant is warranted.

Legal Lots of Record: The 2012 Application to the CPUC also included 1,181 AFA for Legal Lots of Record.[14, 5] Legal lots of record are defined as lots resulting from a subdivision of property in which the final map has been recorded in cities and towns, or in which the parcel map has been recorded in Parcels and Maps or Record of Surveys. Lots of record may include vacant lots on vacant parcels, vacant lots on improved parcels, and also included remodels on existing improved, non-vacant parcels. Ultimately, not all legal lots are buildable. While the District is the source of the 1,181 AFA estimated demands for the lots of record, the number was lifted from the 2009 Coastal Water Project environmental impact report.

Tourism Bounce-Back: The 500 AFA for economic recovery was originally proffered by the hospitality industry to handle a recovery of occupancy rates in the tourist industry in a post-World Trade Center tragedy setting.[15, 5] The industry felt that their most successful occupancy rates were in the three years prior to September 11, 2001 and felt 500 AFA would provide a buffer for a return to that level.

Pebble Beach Buildout: Ever since the State Water Board issued Order 95-10 and the Cease and Desist Order (CDO) it has recognized the Pebble Beach Company's investment in the Reclamation Project and the Company's right to serve its entitlements from the Carmel River. However, the State Water Board has stated a desire to have the Pebble Beach entitlements shifted away from the river and be satisfied by a new supply. At the time of the 2012 Application, the Pebble Beach company had approximately 325 AF of entitlements still available.

Current Water Demand Assumptions

The original MPWSP desalination project plant sizing was done over seven years ago in 2012. With the passage of time and the opportunity to perform deeper research, it is possible to revisit the assumptions about consumer demand for water in the current context.

Average Current Customer Demand: Figure 1 on the next page shows water production for customer service, a proxy for customer demand, for the past twenty-year period. As can be seen, demand has been in decline. For water year 2019 to date, demand remains 110 AF below 2018 levels, so this trend has not reversed.

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[13] CPUC Decision 18-09-017, September 13, 2018, page 68
[14] Direct Testimony of Richard C. Svindland, April 23, 2012, pages 22, 37.
[15] Direct Testimony of Richard C. Svindland, April 23, 2012, page 37

Figure 1
Annual Water Production for Customer Service (Demand)
Last 20 Years
(Acre-Feet)

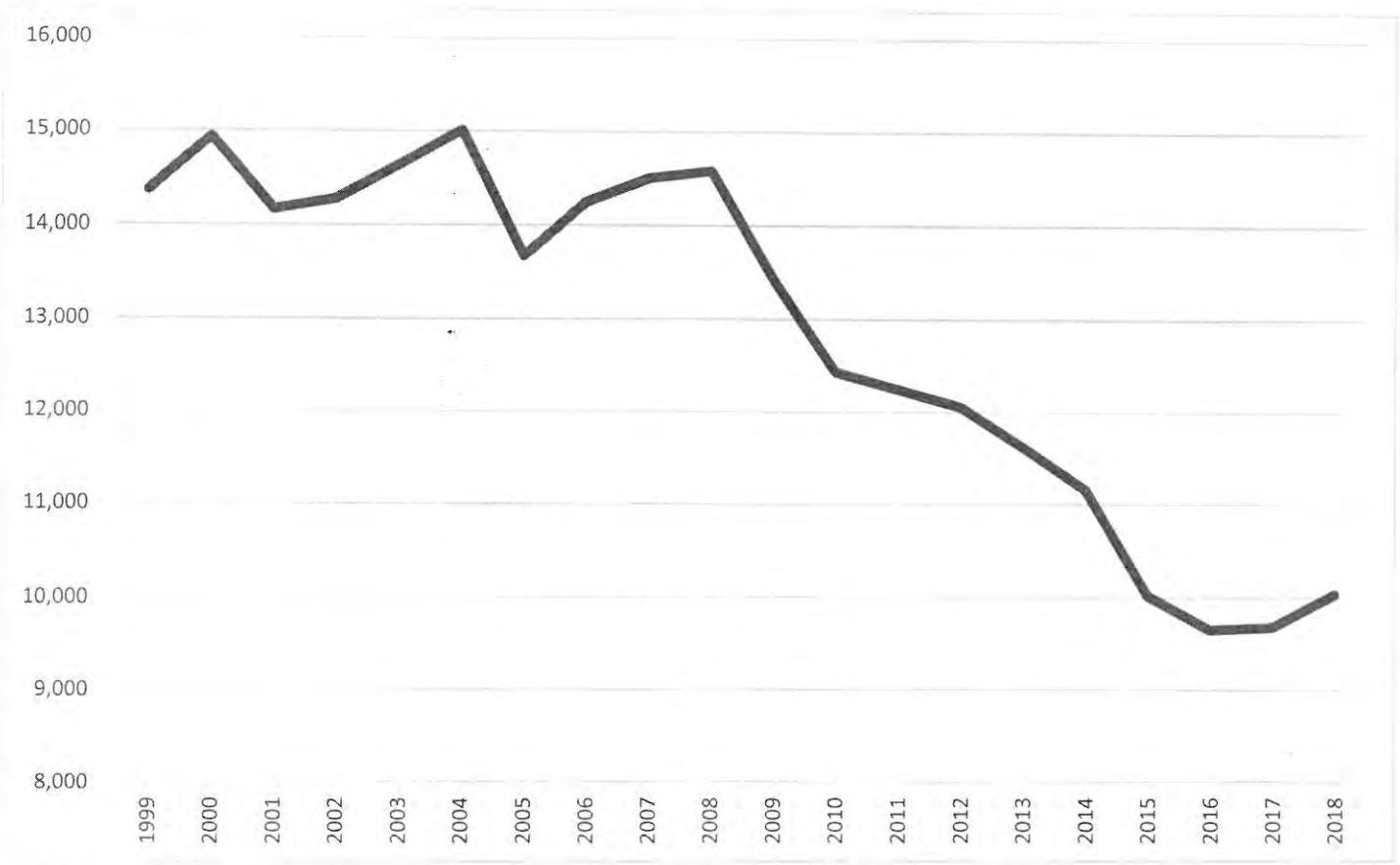


Table 3 shows how the 10-, 5-, and 3-year average demand compares to Cal-Am's most recent 12,350 AFA assumption.

Table 3
Alternate Average Customer Demand Assumptions
(Acre-Feet)

Period	Amount	Difference to Cal-Am #
Cal-Am Assumption	12,350	
10-Year Average - Actual	11,232	1,118
5-Year Average - Actual	10,109	2,241
3-Year Average - Actual	9,788	2,562

The trend is similar for peak month demand: 10-year maximum month through 2018 was 1,111 AF, the 5-year max was 966 AF, and the 3-year max was 950 AF, requiring approximately 15 MGD of firm capacity. By comparison, the maximum month at the time the plant was first sized was 1,532 AF. The proposed desalination plant, in conjunction with the other production facilities can meet peak month/peak day requirements. Pure Water Monterey expansion adds 4 new extraction wells, two for production and two for redundancy. Preliminary analysis shows that peak month/peak day can be met with both supply alternatives.

Hence, the case could be made that the average customer demand assumption in the sizing of the MPWSP should be 9,788 to 11,232 AFA.

Legal Lots of Record: The 1,181 number is derived from the October 2009 Coastal Water Project Final Environmental Impact Report and references a 2001 District analysis as the source. It was actually sourced from a Land Systems Group Phase II February 2002 interim draft report that used the number 1,181.438 AF. A calculation error was corrected and the report was subsequently updated in June 2002 and the number was revised to 1,210.964. However, the earlier number seems to have been used going forward. Both versions did not include vacant lots on improved parcels in the unincorporated County. Table 4 shows how the corrected number was calculated.

Table 4
Legal Lots of Record Estimates (2002)
Unincorporated County Not Included
(Acre-Feet)

Type of Parcel	Amount
Vacant Lots on Vacant Parcels	729.9
Vacant Lots on Improved Parcels	288.2
Anticipated Remodels (10 years)	192.8
Total	**1,210.9**

Table 5
Assumptions Driving the Legal Lots of Record Conclusions

Category	Units on Vacant Parcels	Units on Improved Parcels	Estimated Number of Remodels	Water Use Factor	Total Water Usage
Single Family Dwellings	688	152		0.286 AF	240.2
Multi-Family Dwellings	846	204		0.134 AF	140.7
Commercial/Industrial	556	288		0.755 AF	637.2
Residential Remodels			3765	0.029 AF	109.2
Commercial Remodels			513	0.163 AF	83.6
	2,091	**789**	**4,278**		**1,210.9**

Since the study, the District's conservation programs have resulted in reductions in the average water use factors. For example, with single-family water use at 0.2 AFA, multifamily use at 1.2 AFA, and commercial customer connections averaging 0.66 AFA (2016 data), these changes alone would reduce the total above by 167.1 AF. Further, some of these lots may have been built upon, others determined unbuildable. Many of the remodels have likely occurred. General plans have been rewritten and housing elements recalculated. These factors taken together could result in another 150 AF reduction in the assumption.

Compared to the 1,890 units from the 2002 Land Systems Group study shown above, going forward, AMBAG's 2014 Regional Growth Forecast showed 2,231 additional housing units expected in the 6 cities between 2020 and 2035. Assuming another 120 in the unincorporated county, and 2/3rds single-family and 1/3rd multifamily, with single-family water use at 0.2 AFA and multifamily use at 1.2 AFA, this equates to 407 AFA over a 15-year period. Most of AMBAG's projected growth occurs in Seaside and Del Rey Oaks, which if slated for the former Fort Ord would not be served by Cal-Am. Unfortunately, it is not possible to accurately distinguish the Cal-Am served housing growth from the non-Cal-Am housing growth, but the 407 AFA likely overstates the Cal-Am growth. The AMBAG assumptions appear consistent with the Land Systems Group estimates.

Hence, the case could be made that the legal lots of record demand assumption in the sizing of the MPWSP should be 864 to 1,014 AFA.

Tourism Bounce-Back: As stated earlier, the 500 AFA for economic recovery was originally suggested by the hospitality industry to account for a recovery of occupancy rates in the tourist industry in a post-World Trade Center tragedy setting.[5, 15] Representatives of the Coalition of Peninsula Businesses indicated in testimony that the hospitality industry was hurt by the recent recession and that occupancy rates needs to increase by 12 to 15 percent to re-attain the levels of decades ago.[16] It is true that the Salinas-Monterey market was one of five California markets, out of 22, to experience double digit declines after the events of 2001, from 71.8% in 2000 to 63.0% in 2001.[17] It is also true that the decline persisted and was still down when the MPWSP desalination plant was sized, with occupancy rates of 62.8% in 2011-12 and 64.1% in 2012-13.[18] However, occupancy rates have since recovered with no notable increase in water demand. Hotel occupancy locally is back at approximately 72% and is estimated by Smith Travel Research to be higher for better quality properties on the Monterey Peninsula.[19, 20] The commercial sector water demand is shown below in Table 6 for the year prior to the World

[16] Testimony of John Narigi (to CPUC), September 29, 2017, page 5
[17] HVS San Francisco, August 19, 2003
[18] Monterey County Convention and Visitors Bureau Annual Report 2012-13, page ii
[19] Fiscal Analysis of the Proposed Hotel Bella Project, Applied Development Economics, April 6, 2016
[20] Cannery Row Company, January 9, 2019

Trade Center tragedy, the year of the MPWSP plant sizing, and the most recent year. As can be seen, commercial demand, which is heavily influenced by the hospitality industry remains in decline, despite the already absorbed "bounce-back" in occupancy rates.

Table 6
Commercial Sector Water Demand
Selected Years
(Acre-Feet)

Year	Demand
2001	3,387
2012	2,770
2018	2,442

There is a secular change in commercial demand that is due to permanent demand reductions resulting from targeted rebate programs, conservation standards for the visitor-serving sector since 2002, mandatory conservation standards for other commercial businesses instituted in 2013, and commercial inspection/enforcement by the District. A "bounce-back" of 500 AFY would represent an increase in water use demand of 20% in the entire commercial sector, not just the hospitality industry. The District does not view this as likely in the near-term, nor due to a return to higher occupancy rates.

Hence, the case could be made that the tourism bounce-back demand assumption in the sizing of the MPWSP should be 100 to 250 AFA.

Pebble Beach Buildout: As cited earlier, at the time of the 2012 Application, the Pebble Beach company had approximately 325 AF of entitlements still available and that number was added to the MPWSP sizing needs. However, the final environmental impact report certified in 2012 envisioned 145 AFA for the buildout projects and 154 AFA in other entitlement demand.[21]

The other entitlement demand goes away when a new water supply comes online because homeowners will have no reason to pay $250,000 per AF for an entitlement when connecting directly to Cal-Am is possible when the moratorium on new service connections is lifted. In the ten years since the CDO was imposed, Pebble Beach entitlement water demand has averaged 4.9 AF added each year. It is reasonable to assume only another 15 AFA during the next three years before a permanent water supply is online.

The project buildout is 145 AFA not 325 AFA used in project sizing. Further, the buildout number includes estimated water use that may never materialize in decades, if ever. Table 7 shows the elements that comprise the Pebble Beach buildout.

[21] Pebble Beach Final Environmental Impact report (FEIR), April 2012, Appendix H "Water Supply and Demand Information for Analysis"

Table 7
Components of Pebble Beach Buildout
(Acre-Feet)

Project	Demand
Lodge	13.11
Inn at Spanish Bay	12.85
Spyglass Hotel	30.59
Area M Residential	10.00
Other Residential	77.00
Driving Range	0.33
Roundabout	0.70
Total	144.58

Two elements of the project warrant greater discussion: "Other Residential" includes 66 single family residences at 1.0 AF each and 24 residences at 0.50 AF each (and a decrement of 1 AF in the total calculation for other reasons.) District research in 2006 determined the average large lot Pebble Beach home utilized 0.42 AFA. Building conservation standards have increased since then. Many of the proposed homes are not utilized year-round. The estimate could be overstated by one-third or more. Spyglass Hotel is not currently being pursued and there are no plans to do so in the near-term. The project could be a decade or two away, if ever.

Hence, the case could be made that the Pebble Beach buildout demand assumption in the sizing of the MPWSP should be 103 to 160 AFA.

Summary of Demand v. Supply

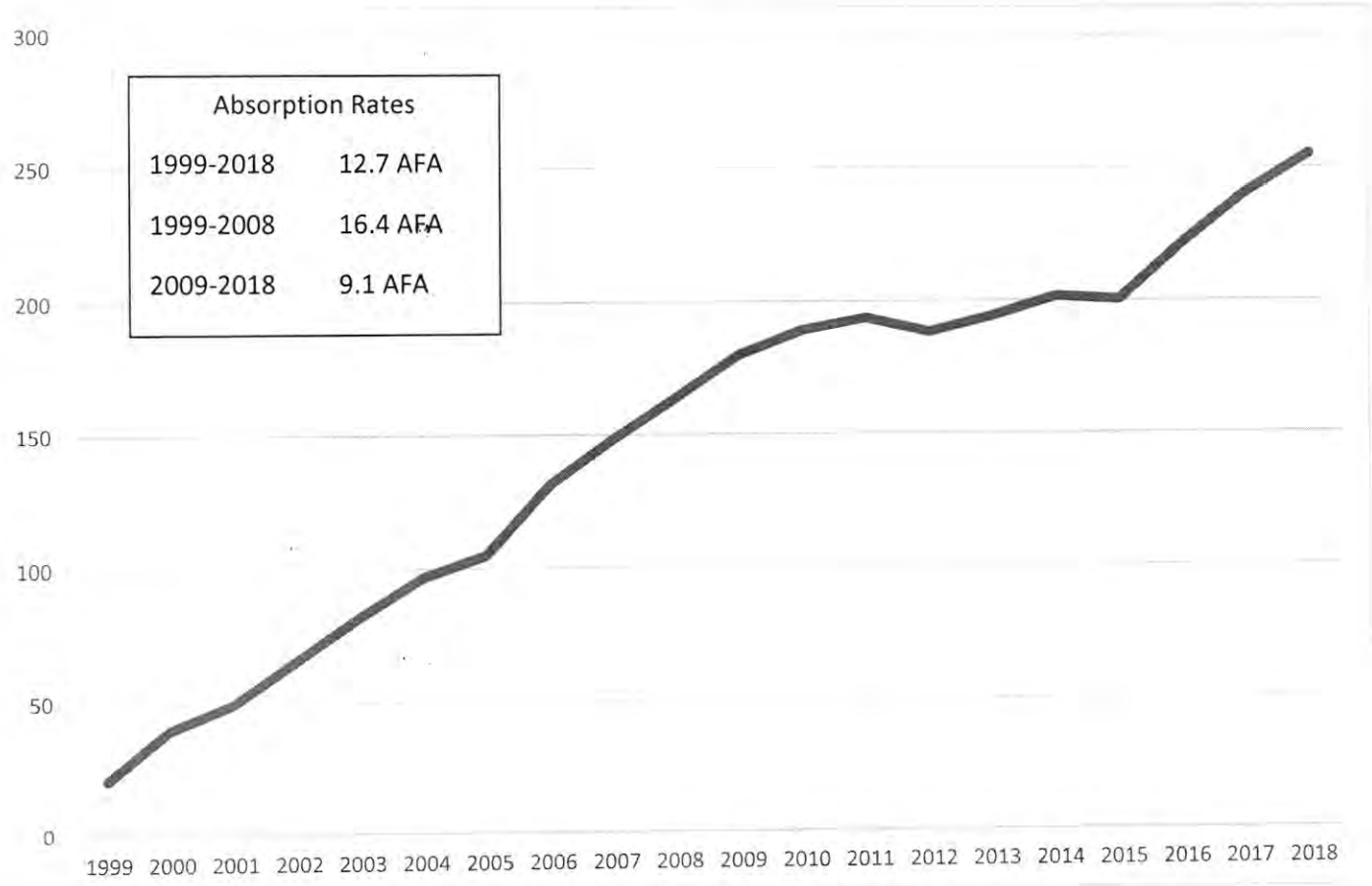
Table 8 shows the range of demand estimates that have been established in the foregoing analysis. These long-term demand estimates can be compared to existing current demand to determine how much water supply is needed.

Table 8
Range of Potential Demand Scenarios in MPWSP Sizing
(Acre-Feet)

Demand Component	Current Project	Revised High	Revised Low
Average Current Customer Demand	13,290	11,232	9,788
Legal Lots of Record	1,181	1,014	864
Tourism Bounce-Back	500	250	100
Pebble Beach Buildout	325	160	103
Total Water Demand	**15,296**	**12,656**	**10,855**

However, the ability of the Monterey Peninsula to generate or "absorb" the housing and commercial growth will help determine when such water supply is needed. Figure 2 shows the past 20 years of market absorption of water demand based on water permits issued. The average growth or absorption in water use was 12.7 AF per year. The first decade preceded the CDO and was a period of relative economic stability, available property, no moratorium on new service connections, and lower water rates resulting in 16.4 AF per year of absorption. The second decade was after the CDO and moratorium on service connections and understandably had a lower absorption rate of 9.1 AF per year.

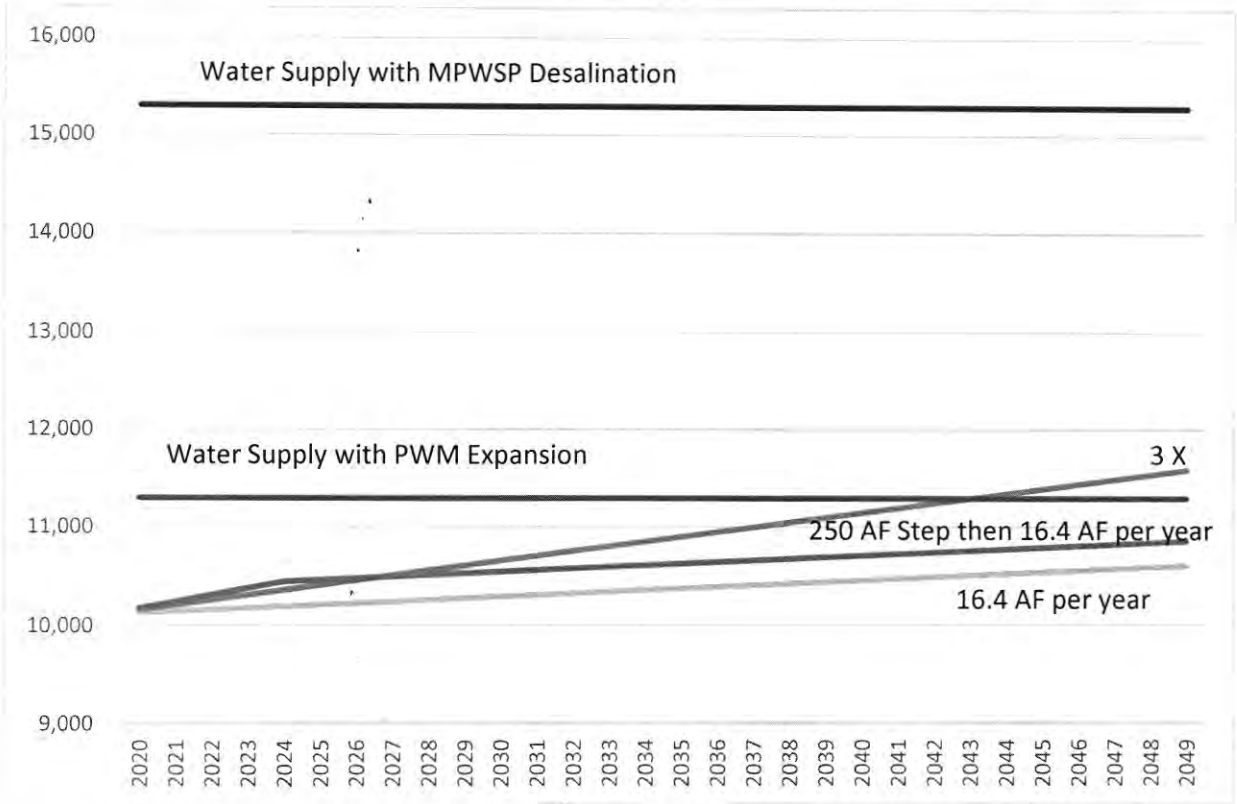
Figure 2
Market Absorption of Water Demand
Last 20 Years
(Acre-Feet)



By adopting assumptions about current demand and market absorption rates, it can be determined the sufficiency of certain supply alternatives over time. In Figure 3, the current demand assumption of 10,109 AF (most recent 5-year average) is shown with three market absorption rates: (a) 16.4 AF per year (pre-CDO decade rate), (b) three times that rate, and (c)

250 AF over the first five years on top of the pre-CDO rate. These are also compared to the two supply alternatives in Table 1.

Figure 3
Market Absorption of Water Demand Compared to Water Supply
Current Demand at 5-Year Average
(Acre-Feet)

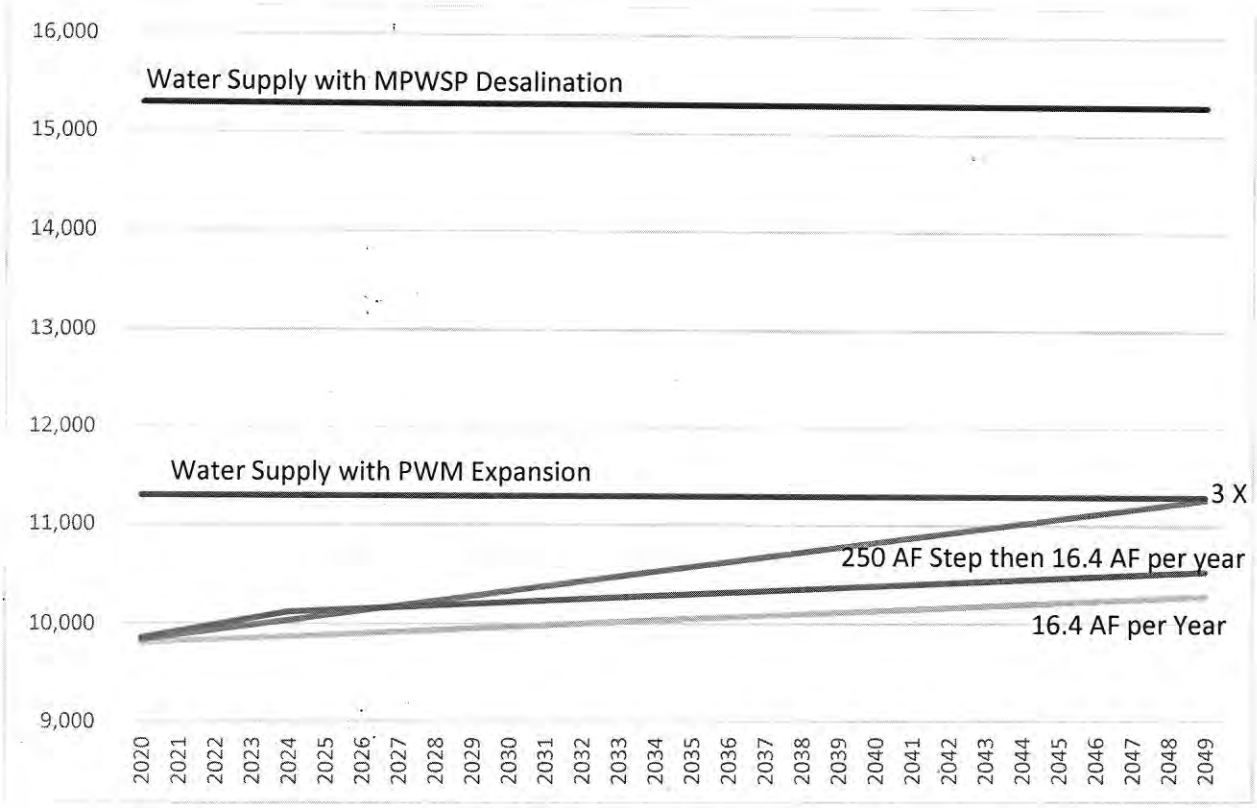


This chart shows that, assuming a starting current demand at the 5-year average, both water supply alternatives meet 30-year market absorption at the historical rate and 250 AF in the first 5 years on top of the historical rate, and Pure Water Monterey expansion is sufficient until 2043 at 3-times the historical absorption rate.

Figure 4 below shows a current starting demand at the 3-year average and shows both supply alternatives meet all three absorption rates.

In both cases, one can assume higher market absorption or one or two large scale developments in the first 5 years, but the general conclusions are not significantly changed.

Figure 4
Market Absorption of Water Demand Compared to Water Supply
Current Demand at 3-Year Average
(Acre-Feet)



Additional Factors Affecting Future Demand

Cost: The future water supply will significantly impact rates. It is expected that the combined cost of new water supply and regular annual rate increases will almost double a residential ratepayer's water bill by 2023. Rules of price elasticity suggest the cost of water might dampen demand. The cost of each major component of supply is shown below:

Desalination Plant	$6,094 per acre-foot[22]
Carmel River:	$271 per acre-foot[23]
Seaside Basin:	$130 per acre-foot[24]

[22] Attachment C-3 California American Water Company Advice Letter 1220 "Total Yr 1 Cost to Customer" $38.1 million, divided by 6,252 acre-feet per year
[23] MPWSP Model- V 2.1 submitted to CPUC; February 2018 and October 2017 versions, 6.4 MGD scenario, "Avoided Costs" worksheet
[24] MPWSP Model- V 2.1 submitted to CPUC; February 2018 and October 2017 versions, 6.4 MGD scenario, "Avoided Costs" worksheet

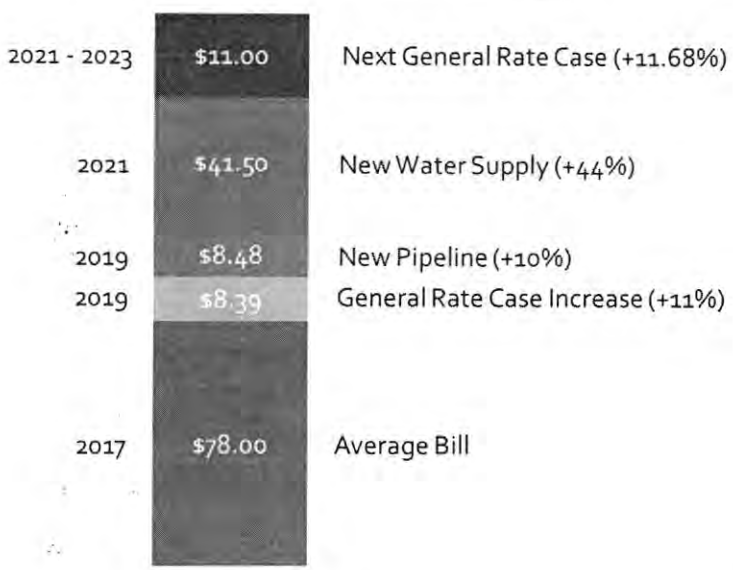
Pure Water Monterey:	$1,976 per acre-foot[25]
PWM with Expansion:	$2,077 per acre-foot[25]

Further, if the desalination plant capacity is not fully utilized, the cost per acre-foot rises due to the fixed costs, as shown below.

Production by Desal Plant – AF	6,252	5,000	4,300
Variable Cost ($ Million)	7.8	6.2	5.4
Fixed Cost ($ Million)	30.3	30.3	30.3
Total Annual Cost to Customer	38.1	36.5	35.7
Cost per Acre-Foot	$6,094	$7,308	$8,294

The rate impact can be seen in Figure 5, below, which is calculated based on full utilization of the desalination plant.

Figure 5
Ratepayer Impacts of New Water Supply[26]



Legislation: On May 31, 2018, Governor Brown signed two bills which build on the ongoing efforts to "make water conservation a California way of life." SB 606 (Hertzberg) and AB 1668 (Friedman) reflect the work of many water suppliers, environmental organizations, and members of the Legislature. The mandates will fall on urban water suppliers – not customers.

[25] Presentation by Monterey One Water at June 27, 2019 Monterey Peninsula Regional Water Authority meeting
[26] "Your Rates Are Changing" California American Water mailer, April 2019 and "Notice of General Rate Case Application filed" July 2019

Specifically, the bills call for creation of new urban efficiency standards for indoor use, outdoor use, and water lost to leaks, as well as any appropriate variances for unique local conditions. Each urban retail water agency will annually, beginning November 2023, calculate its own *objective*, based on the water needed in its service area for efficient indoor residential water use, outdoor residential water use, commercial, industrial and institutional (CII) irrigation with dedicated meters, and reasonable amounts of system water loss, along with consideration of other unique local uses (i.e., variances) and "bonus incentive," or credit, for potable water reuse, using the standards adopted by the State Water Board.

The indoor water use standard will be 55 gallons per person per day (gallons per capita daily, or GPCD) until January 2025; the standard will become stronger over time, decreasing to 50 GPCD in January 2030. For the water use objective, the indoor use is aggregated across population in an urban water supplier's service area, not each household. Presently, the average June 2014-May 2019 gallons per capita per day for the Cal-Am Monterey system is 57 gpcd. Hence, existing users are unlikely to increase their water consumption with the availability of new water supply.

Principal Conclusions

- Either supply option can meet the long-term needs of the Monterey Peninsula
- Either supply option is sufficient to lift the CDO
- The long-term needs of the Monterey Peninsula may be less than previously thought
- Several factors will contribute to pressure on decreasing per capita water use

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EXHIBIT 16

MPWMD 2020
UPDATE

Supply and Demand for Water on the Monterey Peninsula

Prepared by David J. Stoldt, General Manager
Monterey Peninsula Water Management District
FINAL
March 13, 2020

Introduction

With the approval of the Monterey Peninsula Water Supply Project (MPWSP) in September 2018 and the continued environmental work on Pure Water Monterey (PWM) expansion as a back-up option, it is an opportune time to examine available supplies and their ability to meet current and long-term demand. This memorandum will also look at the changing nature of demand on the Monterey Peninsula, the underlying assumptions in the sizing of the water supply portfolio, and indicators of the market's ability to absorb new demand.

At its September 16, 2019 meeting, the District Board accepted a report titled *"Supply and Demand for Water on the Monterey Peninsula"*, which was Exhibit 9-A of the Board packet. The report was reviewed by members of the public, local organizations, and state agencies. While publicly vetted, only three sets of comments were received: (a) California American Water provided a comment letter October 15, 2019, and (b) The Coalition of Peninsula Businesses provided letters September 15, 2019 and September 24, 2019. All three comment letters argued that the findings in the report contradict those of the California Public Utilities Commission, but the letters did not provide any substantive alternate assumptions or facts. The District's General Manager has encouraged the parties to provide their own forecast of growth and/or market absorption of water demand, but they have failed to do so.

At the November 14, 2019 Coastal Commission hearing former Pacific Grove mayor Bill Kampe did raise two substantive issues regarding the report: (a) pre-Cease and Desist Order (CDO) market absorption of water demand may have been constrained in some jurisdictions due to a lack of water allocation, and (b) new statewide focus on housing will require water.

Additionally, subsequent to the release of the initial report the 2019 water year was completed, providing an additional data point on current customer demand. The report was revised December 3, 2019 to address three items: (i) What is average current demand with the additional water year in the data? (ii) What water will be required to meet future housing needs? And (iii) What might be the market absorption of water based on an objective third-party growth forecast – the Association of Monterey Bay Area Governments (AMBAG) 2018 Growth Forecast? The revisions were presented to the District's Water Demand Committee December 17, 2019 and a revised report was distributed to the Peninsula's six city managers in January.

On January 22, 2020 Hazen & Sawyer, a consultant to Cal-Am, issued an analysis of the District's report, to which the District responded on March 6, 2020.

This FINAL version of the supply and demand report responds to comments made by the public, the city managers, Hazen & Sawyer, and incorporates an additional growth forecast.

Supply

Available sources of supply are shown in Table 1 below and are described in the discussion that follows. Despite the California Supreme Court's decision to not hear the two petitions for writ of review, there remains the risk of additional legal challenges and not all permits have been issued for California American Water's (Cal-Am) MPWSP desalination plant. For these reasons, supply has been shown with both desalination and with PWM expansion as a back-up.

Table 1
Monterey Peninsula Available Supply
(Acre-Feet Annually)

Supply Source	w/ Desalination	w/ PWM Expansion
MPWSP Desalination Plant	6,252	0
Pure Water Monterey	3,500	3,500
PWM Expansion	0	2,250
Carmel River	3,376	3,376
Seaside Basin	774	774
Aquifer Storage & Recovery (ASR)	1,300	1,300
Sand City Desalination Plant	94	94
Total Available Supply	**15,296**	**11,294**

There also exists approximately 406 additional acre-feet of other available supplies as discussed below.

Desalination: The 6.4 million gallon per day (MGD) MPWSP desalination plant is expected to deliver 6,252 acre-feet annually (AFA).[1] It is likely to begin deliveries in late-2023, considering final permits in mid-2020, a 21-month construction period, and 6-month commissioning and start-up window.[2]

[1] CPUC Decision 18-09-017, September 13, 2018, page 70; Amended Application of California-American Water Company (U210W), Attachment H, March 14, 2016
[2] www.watersupplyproject.org/schedule

Pure Water Monterey: Monterey One Water's (M1W) project came online in February 2020 and should begin deliveries for customer service of 3,500 AFA to Cal-Am in mid-2020.

Pure Water Monterey Expansion: The expansion of Pure Water Monterey is expected to yield 2,250 AFA.[3] The source waters for the expansion are secure: In multiple presentations by the staff of Monterey One Water (M1W)[4] it has been shown that none of the source water for expansion of Pure Water Monterey is speculative, nor comes from Salinas valley sources for which M1W doesn't already have rights. In one example, source water for the expansion would come from ocean discharge from the Regional Treatment Plant (54%), the Reclamation Ditch (5%), Blanco Drain (10%), wastewater outside the prior M1W boundaries (30%), and summer water rights from the County Water Resource Agency (1%). This project could come online by late 2022.

Carmel River: Cal-Am has legal rights to 3,376 AFA from the Carmel River comprised of 2,179 AFA from License 11866, 1,137 AFA of pre-1914 appropriative rights, and 60 AFA of riparian rights. This does not include what is referred to as Table 13 rights, discussed under "*Other Available Supplies*" below.

Seaside Basin: The 2006 Seaside Groundwater Basin adjudication imposed triennial reductions in operating yield for Standard Producers such as Cal-Am until the basin's Natural Safe Yield is achieved. The last reduction will occur in 2021 and Cal-Am will have rights to 1,474 AFA. However, with the delivery of a long-term permanent water supply, the company would like to begin replacing its accumulated deficit of over-pumping through in-lieu recharge by leaving 700 AFA of its production right in the basin for 25 years. Hence, only 774 AFA is reflected as long-term supply available, although the additional 700 AF becomes available again in the future.

Aquifer Storage & Recovery: There are two water rights that support ASR. Permit 20808A allows maximum diversion of 2,426 AFA and Permit 20808C allows up to 2,900 AFA for a total of 5,326 AFA. However, these are maximums that may only be close to being achieved in the wettest of years. Based on long-term historical precipitation and streamflow data, ASR is designed to produce 1,920 AFA on average. The MPWSP assumes a lesser amount of 1,300 AFA to be conservative.

Sand City Desalination Plant: The Sand City plant was designed to produce a nominal 300 AFA, but has failed to achieve more than the 276 AF in 2011. Due to source water quality issues and discharge permit requirements the plant has averaged 188 AFA the past four years including water year 2019. The intakes will likely be augmented and production increased (see "*Other*

[3] Notice of Preparation of a Supplemental Environmental Impact Report and Public Scoping Meeting Notice, page 4, May 15, 2019

[4] For example, November 12, 2019 M1W presentation to the Monterey County Farm Bureau and the Grower-Shipper Association and the September 30-2019 M1W board meeting

Available Supplies", below.) Here only the 94 AFA of long-term production legally committed to offset Carmel River pumping is included.

Other Available Supplies: In 2013, Cal-Am received Permit 21330 from the State Water Board for 1,488 AFA from the Carmel River. However, the permit is seasonally limited to December 1 through May 31 each year and subject to instream flow requirements. As a result, actual production will vary by water year. Here, we have assumed 300 AFA on average. For the Sand City desalination plant the amount produced in excess of 94 AFA is available for general Cal-Am use and eventually to serve growth in Sand City. With new intakes, we have assumed average production of 200 AFA or 106 AFA of other available supply. There is also available unused capacity in the Seaside Basin which annually is reallocated to the Standard Producers such as Cal-Am as "Carryover Credit" under the adjudication decision. Such Carryover capacity has been on the order of 400 AFA recently. While not insignificant, Carryover Credit has not been included in the 406 AFA of "Other Available Supplies" stated earlier.

Historical Water Demand for which MPWSP Desalination Plant is Sized

The MPWSP was initially sized solely as a replacement supply[5] for current customer demand, but this has changed over time as described below. Consideration was also given to peak month and peak day. Additional demand was recognized to accommodate legal lots of record, a request by the hospitality industry to anticipate a return to occupancy rates similar to that which existed prior to the World Trade Center tragedy, and to shift the buildout of Pebble Beach off the river.[6] Table 2 below shows the demand assumptions originally used in sizing the MPWSP in the April 2012 application to the California Public Utilities Commission (CPUC). Each component is discussed below.

Table 2
Water Demand Assumed in Sizing the MPWSP
(Acre-Feet Annually)

Demand Component	Acre-Feet Annually
Average Current Customer Demand	13,290
Legal Lots of Record	1,181
Tourism Bounce-Back	500
Pebble Beach Buildout	325
Total Water Demand	**15,296**

[5] Direct Testimony of Richard C. Svindland, April 23, 2012, pages 4,5,7
[6] Supplemental Testimony of Richard C. Svindland, January 11, 2013, pages 4-5

Average Current Customer Demand: The Application of Cal-Am to the CPUC in April 2012 utilized 13,290 AFA which was the 5-year average demand for 2007-2011.[7] As stated earlier, this was to be replacement supply and the Application stated *"At this point future demands of the Monterey System have not been included in the sizing of the plant."*[8] At that time, the 5-year average maximum month was 1,388 AF and the highest month was 1,532 AF.[9]

In a January 2013 CPUC filing, average demand was reiterated by Cal-Am to be 13,290 AFA but Cal-Am added that the plant would need to be increased larger by approximately 700 acre-feet per year for the in-lieu recharge of the Seaside Basin.[6] However, as can be seen in comparing Tables 1 and 2 above, supply equals demand at 15,296 AFA without changing the size of the plant from the initial Application.

In a 2016 update to the CPUC, Cal-Am recognized that average demand had declined in the intervening three years.[10] The 5-year average had declined to 10,966 AFA and the maximum month declined to 1,250 AF. At the time of the 2016 update, Cal-Am suggested that it should size the plant based on the backward-looking 10-year average demand and maximum month, instead of the 5-year average in the original Application, as well as several alternate assumptions about return of water to the Salinas Valley. They concluded *"we do not believe the size of the plants should be changed."*[11]

In a September 2017 filing to the CPUC, Cal-Am acknowledged continuing declines in demand, but indicated that the plant sizing remained appropriate saying *"We anticipate demand to rebound over time after these new water supplies are available, the drought conditions continue to subside, the moratorium on new service connections is lifted, and strict conservation and water use restrictions are eased."*[12] The company also for the first time introduced the use of future population and demand as a way to "normalize" the average demand used in sizing, a departure from the "replacement supply" basis under the initial Application in 2012.[13] This resulted in their estimate of average "current" system demand of 12,350 AFA. This amount, combined with the same lots of record, tourism bounce-back, and Pebble Beach buildout results in demand of 14,355 AFA – a reduction from the initial Application – but the company asserted that the plant need not be resized because this would allow it to run at 86% capacity, a more reasonable operating rate compared to the 95% posed in the original Application.

[7] Direct Testimony of Richard C. Svindland, April 23, 2012, page 21
[8] Direct Testimony of Richard C. Svindland, April 23, 2012, page 36
[9] Direct Testimony of Richard C. Svindland, April 23, 2012, page 22
[10] Supplemental Testimony of Richard C. Svindland, April 14, 2016 (Errata), pages 7-11
[11] Supplemental Testimony of Richard C. Svindland, April 14, 2016 (Errata), page 9
[12] Direct Testimony of Ian Crooks Errata Version, September 27, 2017, page 10
[13] Direct Testimony of Ian Crooks Errata Version, September 27, 2017, pages 11-13

The CPUC, in its September 2018 Decision, agreed that "current" demand was 12,350 AFA, therefore the 6.4 MGD desalination plant is warranted. In its Decision D.18-09-017 the CPUC stated *"we are convinced that 12,350 afy represents an appropriate estimate of annual demand to use in assessing the adequacy of Cal-Am's water supply…"*[14] It is important to understand that the CPUC did no original analysis, modeling, or projection of its own. It surveyed testimony provided by others and chose one to support its findings and recommendations. It should not be represented that that the CPUC developed demand numbers on its own.

Legal Lots of Record: The 2012 Application to the CPUC also included 1,181 AFA for Legal Lots of Record.[15, 6] Legal lots of record are defined as lots resulting from a subdivision of property in which the final map has been recorded in cities and towns, or in which the parcel map has been recorded in Parcels and Maps or Record of Surveys. Lots of record may include vacant lots on vacant parcels, vacant lots on improved parcels, and also included remodels on existing improved, non-vacant parcels. Ultimately, not all legal lots are buildable. While the District is the source of the 1,181 AFA estimated demands for the lots of record, the number was lifted from the 2009 Coastal Water Project environmental impact report.

Tourism Bounce-Back: The 500 AFA for economic recovery was originally proffered by the hospitality industry to handle a recovery of occupancy rates in the tourist industry in a post-World Trade Center tragedy setting. [16, 6] The industry felt that their most successful occupancy rates were in the three years prior to September 11, 2001 and felt 500 AFA would provide a buffer for a return to that level.

Pebble Beach Buildout: Ever since the State Water Board issued Order 95-10 and the Cease and Desist Order (CDO) it has recognized the Pebble Beach Company's investment in the Reclamation Project and the Company's right to serve its entitlements from the Carmel River. However, the State Water Board has stated a desire to have the Pebble Beach entitlements shifted away from the river and be satisfied by a new supply. At the time of the 2012 Application, the Pebble Beach company had approximately 325 AF of entitlements still available.

Water Demand Assumptions in 2020

The original MPWSP desalination project plant sizing was done eight years ago in 2012. With the passage of time and the opportunity to perform deeper research, it is possible to revisit the assumptions about consumer demand for water in the current context.

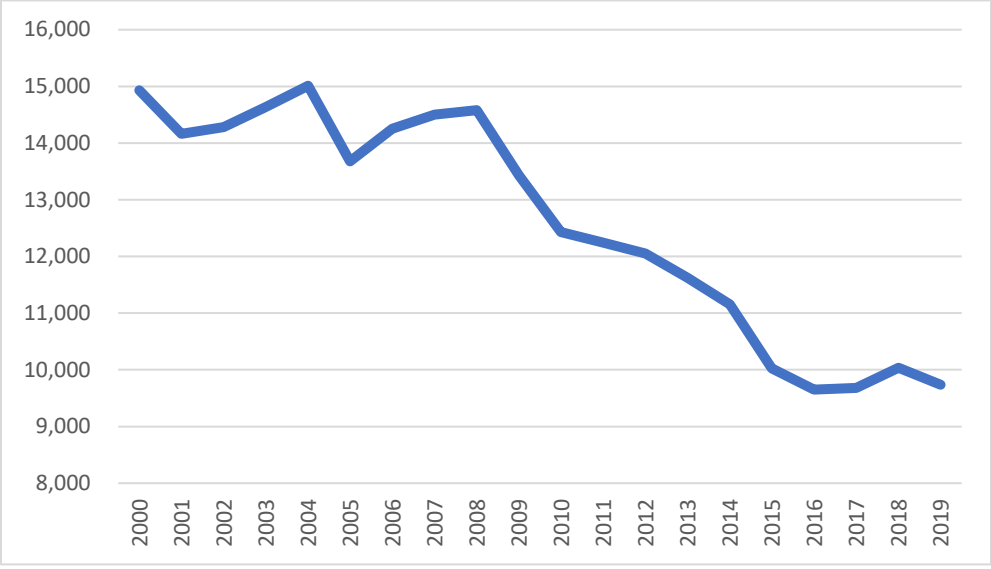
[14] CPUC D.18-09-017, page 49, lines 1-2.
[15] Direct Testimony of Richard C. Svindland, April 23, 2012, pages 22, 37.
[16] Direct Testimony of Richard C. Svindland, April 23, 2012, page 37

It states in Decision 18-09-017 *"The Commission similarly evaluated all of the evidence presented along with arguments of the parties and determines that Cal-Am's future water demand will be approximately 14,000 afy"*[17] However, no evidence was presented to determine if tourism "bounce-back" had already occurred, whether water efficiency gains would reduce the water demand of legal lots of record, or if the Pebble Beach Company could realistically build out its whole entitlement in a reasonable timeframe. Neither the CPUC, Cal-Am, nor Hazen & Sawyer evaluated the market absorption for new demand, which would answer the question: How soon will we get there? This MPWMD report simply takes a deeper look at the data behind these questions: How much will we need in the future? And How soon will we get there?

Average Current Customer Demand: The Cal-Am testimony submitted in support of the 12,350 AFA value used data that ended in 2016 and the company discounted the value of 2016 by incorrectly stating it was a drought year, which it was not on the Monterey Peninsula.[18] Hence, there are now three additional years of data (four if you do not discount 2016) since that used to develop the 12,350 AFA value.

Figure 1 below shows water production for customer service, a proxy for customer demand, for the past twenty-one-year period, updated for 2019 data. As can be seen, demand has been in decline, but somewhat leveled out over the past five years.

Figure 1
Annual Water Production for Customer Service (Demand)
Last 21 Years
(Acre-Feet)



[17] CPUC Decision 18-09-017, page 68, line 1
[18] Direct Testimony of Ian Crooks, Errata Version, in A.12-04-019, September 27, 2107, page 10, at line 22.

Table 3 shows how the 10-, 5-, and 3-year average demand compares to the CPUC and Cal-Am's most recent 12,350 AFA assumption.

Table 3
Alternate Average Current Customer Demand Assumptions
Updated for 2019 Water Year
(Acre-Feet)

Period	Amount	Difference to CPUC/Cal-Am #
CPUC/Cal-Am Assumption	12,350	
10-Year Average - Actual	10,863	1,487
5-Year Average - Actual	9,825	2,525
3-Year Average - Actual	9,817	2,533

Hence, the case could be made that the average customer demand assumption in the sizing of new water supply should be 9,817 to 10,863 AFA.

The trend is similar for peak month demand: 10-year maximum month through 2018 was 1,111 AF, the 5-year max was 966 AF, and the 3-year max was 950 AF. By comparison, the maximum month at the time the plant was first sized was 1,532 AF. The proposed desalination plant, in conjunction with the other production facilities can meet peak month/peak day requirements. Pure Water Monterey expansion adds 4 new extraction wells, two for production and two for redundancy. Preliminary analysis (see Appendix C) shows that peak month/peak day can also be met with Pure Water Monterey expansion.

Cal-Am itself has moved away from the 12,350 AFA number as a measure of current water demand in its current General Rate Case (GRC) application. As shown in the table below, Cal-Am now asserts in the GRC that its total water production for 2021 and 2022 from the Central Division will be 9,789 AFA,[19] which includes the Cal-Am Main System plus its satellites (generally thought to be 4-5% greater in total demand than the Cal-Am Main system.) This validates MPWMD's estimate of current demand. The Cal-Am GRC filing can be seen in Appendix D attached.

In CPUC Decision 16-12-026, the Commission required Class A and B water utilities to propose improved forecast methodologies in their next general rate cases.[20] In the current GRC, Jeffrey Linam, Cal-Am's Vice President of Rates and Regulatory, states in his testimony that Cal-Am *"believes that the testimony demonstrates improved forecasting methodologies that consider*

[19] California-American Water Company's (U-210-W) Update to General Rate Case Application, A.19-07-004, October 14, 2019, Table 3.14 of Results of Operations Model
[20] Direct Testimony of Jeffrey T. Linam (Final Application), in A.19-07-004, July 1, 2019, page 108, at line 14

the consumption trends during and following the drought that began in 2013".[21] Cal-Am *"hired David Mitchell of consulting firm MCubed to provide its sales forecast based on econometric models. The Company believes this is a significant improvement over the prior methods and use of historical averages…"*[22] This augments the testimony of Cal-Am expert witness Bahman Pourtaherian in the GRC who says David Mitchell's company M-Cubed *"has expertise addressing sales forecasting and rate design issues for energy, municipal and investor owned water utilities across the State."*[23]

Mr. Mitchell developed a highly complex econometric model for Cal-Am that in this GRC estimated the following (see Table 4) current demand (2021-2023) for the Cal-Am Main System (which is the system analyzed by MPWMD's supply and demand analysis). His results, presented in the table below, also support MPWMD's estimate of current demand.[24]

Table 4
Cal-Am Estimates of Current Demand
From Current 2019 GRC
(AFA)

	2021	2022	2023
Central Division Forecast Sales Results of Operations Model in A.19-07-004 Table 3.14 (See also Exhibit 2)[19]	9,789	9,789	n/a
Expert Testimony of Cal-Am Witness David Mitchell Cal-Am Main System[24]	9,338	9,478	9,610

The forecasts were created when it was assumed the desalination plant would be online at the end of 2021.

Legal Lots of Record: The 1,181 number is derived from the October 2009 Coastal Water Project Final Environmental Impact Report and references a 2001 District analysis as the source. It was actually sourced from a Land Systems Group Phase II February 2002 interim draft report that used the number 1,181.438 AF. At that time, a calculation error was corrected and the report was subsequently updated in June 2002 and the number was revised to 1,210.964. However, the earlier number seems to have been used going forward. Both versions did not include vacant lots on improved parcels in the unincorporated County. Table 5 shows how the corrected number was calculated.

[21] Direct Testimony of Jeffrey T. Linam (Final Application), in A.19-07-004, July 1, 2019, page 102, at line 25
[22] Direct Testimony of Jeffrey T. Linam (Final Application), in A.19-07-004, July 1, 2019, page 105, at line 6
[23] Direct Testimony of Bahman Pourtaherian (Final Application), in A.19-07-004, July 1, 2019, page 9, at line 21
[24] Direct Testimony of David Mitchell (Final Application), in A.19-07-004, July 1, 2019, Attachment 2, page 32, final line converted to acre-feet from CCF

Table 5
Legal Lots of Record Estimates (2002)
Unincorporated County Not Included
(Acre-Feet)

Type of Parcel	Amount
Vacant Lots on Vacant Parcels	729.9
Vacant Lots on Improved Parcels	288.2
Anticipated Remodels (10 years)	192.8
Total	**1,210.9**

Table 6
Assumptions Driving the Legal Lots of Record Conclusions

Category	Units on Vacant Parcels	Units on Improved Parcels	Estimated Number of Remodels	Water Use Factor	Total Water Usage
Single Family Dwellings	688	152		0.286 AF	240.2
Multi-Family Dwellings	846	204		0.134 AF	140.7
Commercial/Industrial	556	288		0.755 AF	637.2
Residential Remodels			3765	0.029 AF	109.2
Commercial Remodels			513	0.163 AF	83.6
	2,091	**789**	**4,278**		**1,210.9**

However, since the study was done, the District's conservation programs have resulted in reductions in the average water use factors which reduces the water needed for the same lots of record. For example, with single-family water use at 0.2 AFA, multifamily use at 0.12 AFA, and commercial customer connections averaging 0.66 AFA (2016 data), these changes alone would reduce the total above by 167.1 AF. Further, some of these lots may have been built upon, others determined unbuildable. Many of the remodels have likely occurred. General plans have been rewritten and housing elements recalculated. These factors taken together could result in another 150 AF reduction in the assumption.

Compared to the 1,890 units from the 2002 Land Systems Group study shown above, going forward, AMBAG's Regional Housing Needs Allocation (RHNA) Plan: 2014-2023 showed 1,271 additional housing units expected in the 6 cities for a ten-year period. This is shown in Appendix B of this report. Assuming single-family water use at 0.2 AFA and multifamily use at 1.2 AFA, this equates to approximately 395-405 AFA over a 20-year period[25]. Most of AMBAG's

[25] Appendix B of this report

projected growth occurs in Seaside and Monterey, which if slated for the former Fort Ord would not be served by Cal-Am. Unfortunately, it is not possible to accurately distinguish the Cal-Am served housing growth from the non-Cal-Am housing growth, but the 405 AFA likely overstates the Cal-Am growth. The AMBAG assumptions appear consistent with the Land Systems Group estimates. The RHNA is expected to be updated soon and the allocation could change. Instead of focus on a RHNA number, however, the water for housing can be thought of as captured within the population growth component of the third-party growth forecast discussed later in this report and in Appendix A, because houses don't use water – people do.

The case could be made that the legal lots of record demand assumption in the sizing of the MPWSP should be 864 to 1,014 AFA.

Tourism Bounce-Back: As stated earlier, the 500 AFA for economic recovery was originally suggested by the local hospitality industry to account for a recovery of occupancy rates in the tourist industry in a post-World Trade Center tragedy setting.[6, 16] Representatives of the Coalition of Peninsula Businesses indicated in 2017 testimony that the hospitality industry was hurt by the recent recession and that occupancy rates need to increase by 12 to 15 percent to re-attain the levels of decades ago.[26] It is true that the Salinas-Monterey market was one of five California markets, out of 22, to experience significant declines after the events of 2001, from 71.8% in 2000 to 63.0% in 2001.[27] It is also true that the decline persisted and was still down when the MPWSP desalination plant was sized, with occupancy rates of 62.8% in 2011-12 and 64.1% in 2012-13.[28] However, occupancy rates have since recovered with no notable increase in water demand. Hotel occupancy locally is back at approximately 72% and is estimated by Smith Travel Research to be higher for better quality properties on the Monterey Peninsula.[29, 30] The commercial sector water demand is shown below in Table 7 for the year prior to the World Trade Center tragedy, the year of the MPWSP plant sizing, and the most recent year. As can be seen, commercial demand, which is heavily influenced by the hospitality industry remains in decline, despite the already absorbed "bounce-back" in occupancy rates.

Table 7
Commercial Sector Water Demand - Selected Years
(Acre-Feet)

Year	Demand
2001	3,387
2012	2,770
2018	2,442

[26] Testimony of John Narigi (to CPUC), September 29, 2017, page 5
[27] HVS San Francisco, August 19, 2003
[28] Monterey County Convention and Visitors Bureau Annual Report 2012-13, page ii
[29] Fiscal Analysis of the Proposed Hotel Bella Project, Applied Development Economics, April 6, 2016
[30] Cannery Row Company, January 9, 2019

There is a secular change in commercial demand that is due to permanent demand reductions resulting from targeted rebate programs, conservation standards for the visitor-serving sector since 2002, mandatory conservation standards for other commercial businesses instituted in 2013, and commercial inspection/enforcement by the District. A "bounce-back" of 500 AFY would represent an increase in water use demand of 20% in the entire commercial sector, not just the hospitality industry. The District does not view this as likely in the near-term, nor due to a return to higher occupancy rates.

Hence, the case could be made that the tourism bounce-back demand assumption in the sizing of the MPWSP should be 100 to 250 AFA.

Pebble Beach Buildout: As cited earlier, at the time of the 2012 Application, the Pebble Beach company had approximately 325 AF of entitlements still available and that number was added to the MPWSP sizing needs. However, the final environmental impact report certified in 2012 envisioned 145 AFA for the buildout projects and 154 AFA in "other entitlement demand."[31]

However, the "other entitlement demand" is very likely to go away when a new water supply comes online because homeowners will have no reason to pay $250,000 per AF for an entitlement when connecting directly to Cal-Am is possible when the moratorium on new service connections is lifted. In the ten years since the CDO was imposed, Pebble Beach entitlement water demand has averaged 4.9 AF added each year. It is reasonable to assume only another 15 AFA during the next three years before a permanent water supply is online.

The project buildout from the EIR is 145 AFA, not 325 AFA used in MPWSP sizing. Further, the buildout number includes estimated water use that may not materialize in decades, if ever. Table 8 shows the elements that comprise the Pebble Beach buildout.

Table 8
Components of Pebble Beach Buildout in AFA

Project	Demand
Lodge	13.11
Inn at Spanish Bay	12.85
Spyglass Hotel	30.59
Area M Residential	10.00
Other Residential	77.00
Driving Range	0.33
Roundabout	0.70
Total	144.58

[31] Pebble Beach Final Environmental Impact report (FEIR), April 2012, Appendix H "Water Supply and Demand Information for Analysis"

Two elements of the project warrant greater discussion: "Other Residential" includes 66 single family residences at 1.0 AF each and 24 residences at 0.50 AF each (and a decrement of 1 AF in the total calculation for other reasons.) District research in 2006 determined the average large lot Pebble Beach home utilized 0.42 AFA. Building conservation standards have increased since then. Many of the proposed homes are not utilized year-round. Hence, the estimate could be overstated by one-third or more. Spyglass Hotel is not currently being pursued and there are no plans to do so in the near-term. The project could be a decade or two away, if ever.

Hence, the case could be made that the Pebble Beach buildout demand assumption in the sizing of the MPWSP should be 103 to 160 AFA.

Summary of Demand v. Supply

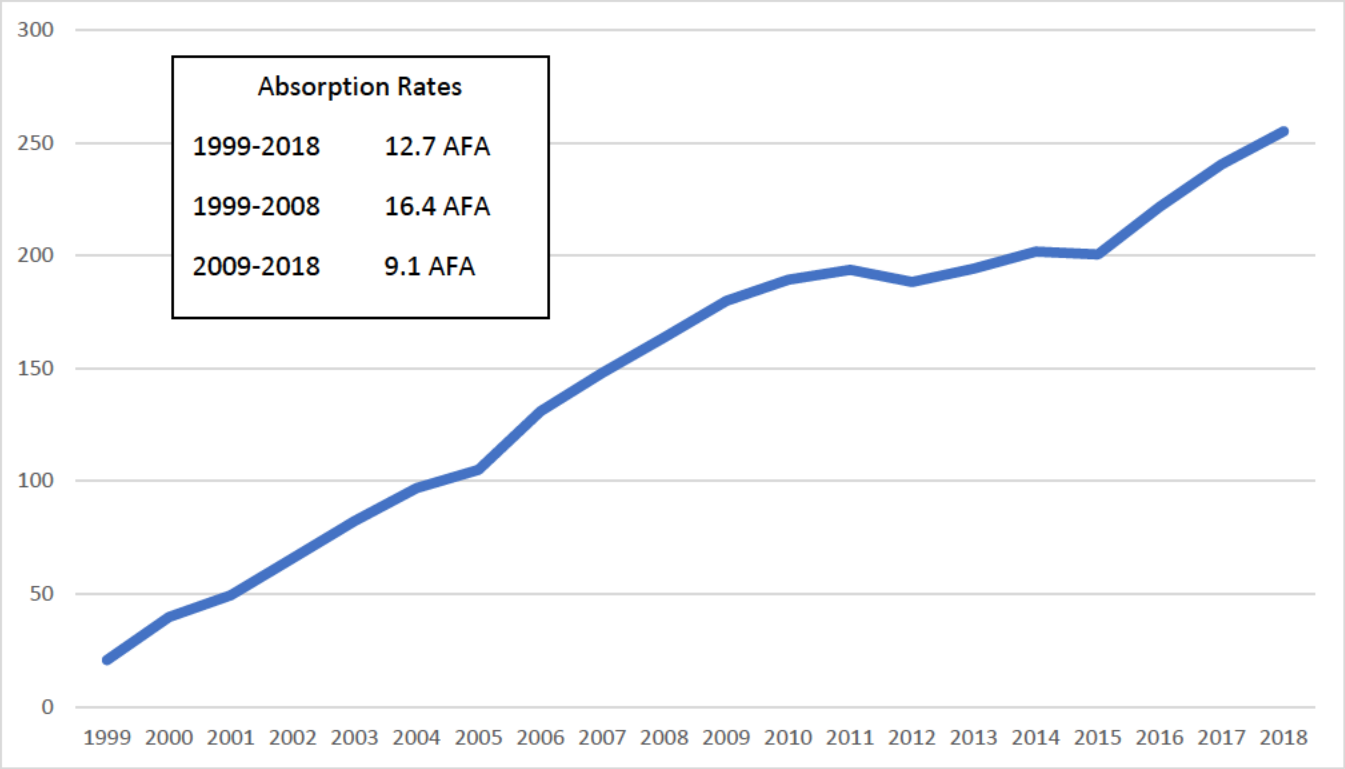
Table 9 shows the range of demand estimates that have been established in the foregoing analysis. These long-term demand estimates can be compared to existing current demand to determine how much water supply is needed.

Table 9
Range of Potential Demand Scenarios in MPWSP Sizing
(Acre-Feet)

Demand Component	Current Project	Revised High	Revised Low
Average Current Customer Demand	13,290	10,863	9,817
Legal Lots of Record	1,181	1,014	864
Tourism Bounce-Back	500	250	100
Pebble Beach Buildout	325	160	103
Total Water Demand	**15,296**	**12,287**	**10,884**

However, the ability of the Monterey Peninsula to generate or "absorb" the housing and commercial growth will help determine when such water supply is needed. Figure 2 shows the past 20 years of market absorption of water demand based on water permits issued. The average growth or absorption in water use was 12.7 AF per year. The first decade preceded the CDO and was a period of relative economic stability, available property, no moratorium on new service connections, and lower water rates resulting in 16.4 AF per year of absorption. The second decade was after the CDO and moratorium on service connections and understandably had a lower absorption rate of 9.1 AF per year.

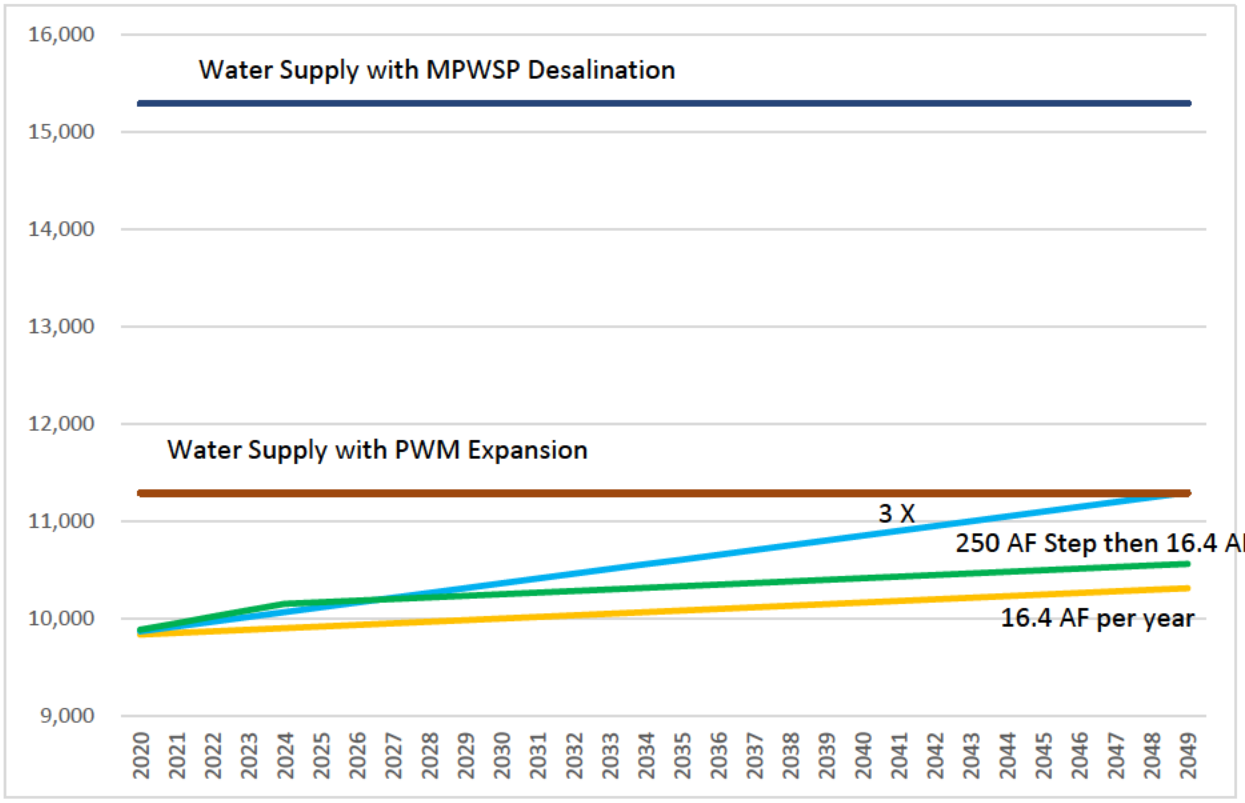
Figure 2
Market Absorption of Water Demand
Last 20 Years
(Acre-Feet)



By adopting assumptions about current demand and market absorption rates, it can be determined the sufficiency of certain supply alternatives over time.

Scenario 1: Supply v Demand Using Pre-CDO Absorption Rate Scenarios: In Figure 3, the current demand assumption of 9,825 AF (most recent 5-year average) is shown with three market absorption rates: (a) 16.4 AF per year (pre-CDO decade rate), (b) three times that rate, and (c) 250 AF over the first five years on top of the pre-CDO rate. These are also compared to the two supply alternatives in Table 1.

Figure 3
Market Absorption of Water Demand Compared to Water Supply
Current Demand at 5-Year Average
Pre-CDO Growth Rate Alternatives
(Acre-Feet)



This chart shows that, assuming a starting current demand at the 5-year average, both water supply alternatives meet 30-year market absorption at the historical rate, 250 AF in the first 5 years on top of the historical rate, and at 3-times the historical absorption rate.

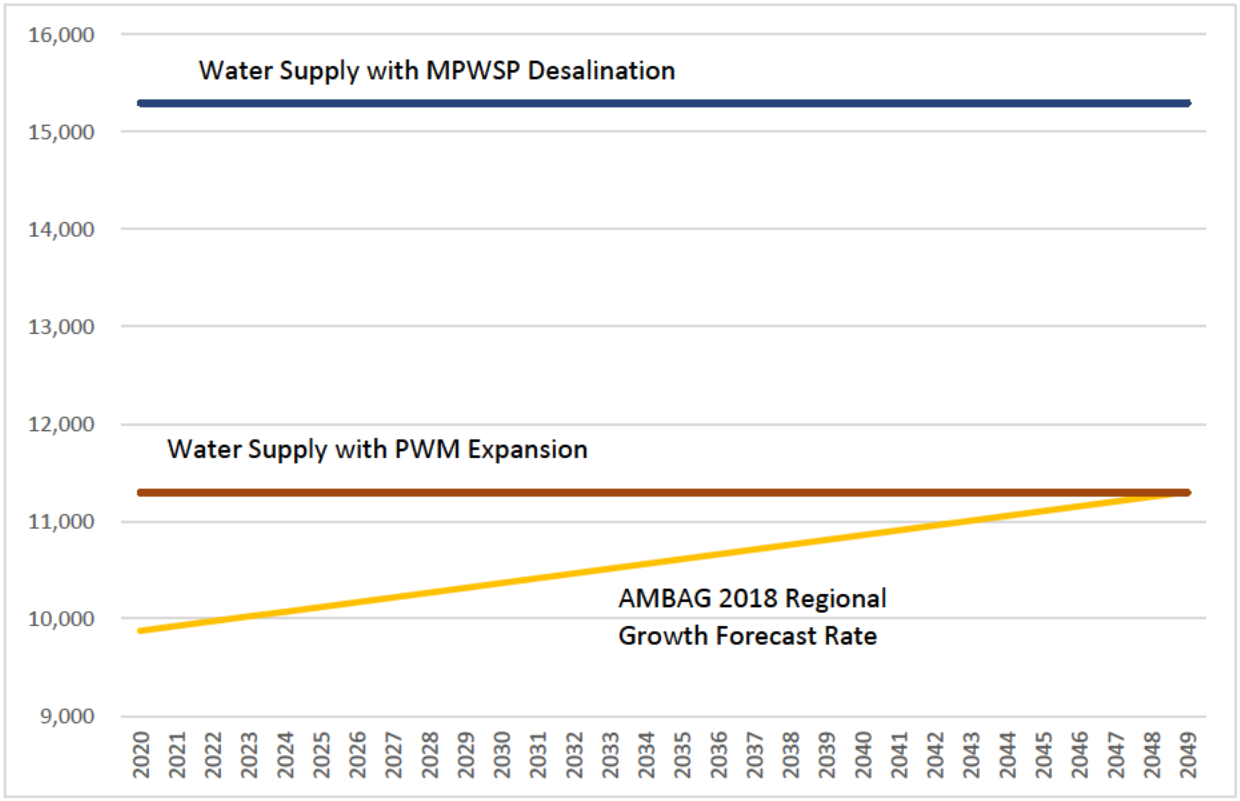
Scenario 2: Supply v Demand Using 3rd-Party Growth Forecast Absorption Rate: Rather than to rely on pre-CDO absorption of water demand or alternative theoretical future demand scenarios, as was done in the September report, it is instructive to instead look at a regional growth forecast by an objective third-party. Here, as shown in Appendix A, we evaluated AMBAG's 2018 Regional Growth Forecast, specifically the subregional population forecast as a proxy for residential water demand, and the subregional employment forecast, using job growth as a proxy for commercial water demand. (Certainly, other factors could be considered.)

AMBAG implemented an employment-driven forecast model for the first time in the 2014 forecast and contracted with the Population Reference Bureau (PRB) to test and apply the

model again for the 2018 Regional Growth Forecast (RGF). To ensure the reliability of the population projections, PRB compared the employment driven model results with results from a cohort-component forecast, a growth trend forecast, and the most recent forecast published by the California Department of Finance (DOF). All four models resulted in similar population growth trends. As a result of these reliability tests, AMBAG and PRB chose to implement the employment-driven model again for the 2018 RGF.[32]

Using this methodology, the total water demand increase in the 20 year study period is 984 AF or 49.2 AFA. Applying the 49.2 AFA linearly across a 30-year horizon results in the demands shown in Figure 4.

Figure 4
Market Absorption of Water Demand Compared to Water Supply
Current Demand at 5-Year Average
AMBAG 2018 Regional Growth Forecast
(Acre-Feet)



This chart shows that, assuming a starting current demand at the 5-year average (inclusive of water year 2019), both water supply alternatives meet 30-year market absorption at the AMBAG 2018 Regional Growth Forecast rate.

[32] 2018 Regional Growth Forecast, Technical Documentation, Association of Monterey Bay Area Governments (AMBAG), June 2018, page 5

Scenario 3: Supply v Demand Using "Pent-Up Demand" Plus AMBAG Growth Forecast Absorption Rate: The Regional Growth Forecast is intended to include new housing starts for increasing population, and new commercial businesses for job formation. However, several cities have approved and unbuilt projects that might happen more quickly once a permanent water supply becomes available and new meters can be set.

Examples of housing projects include Garden Road and Strangio in Monterey, Del Dono in Carmel, South of Tioga in Sand City, and various mixed-use projects and ADUs throughout the service area. Example non-residential projects include almost 120,000 square feet of commercial space at Ocean View Plaza in Monterey, approximately 1,250 rooms across five hotels in Pacific Grove (2) and Sand City (3). Hotels have their own demands and the guests can increase demand at local establishments. There can also be variability in students and service members attending MIIS, MPC, NPS, DLI, or living in the service area attending other institutions.

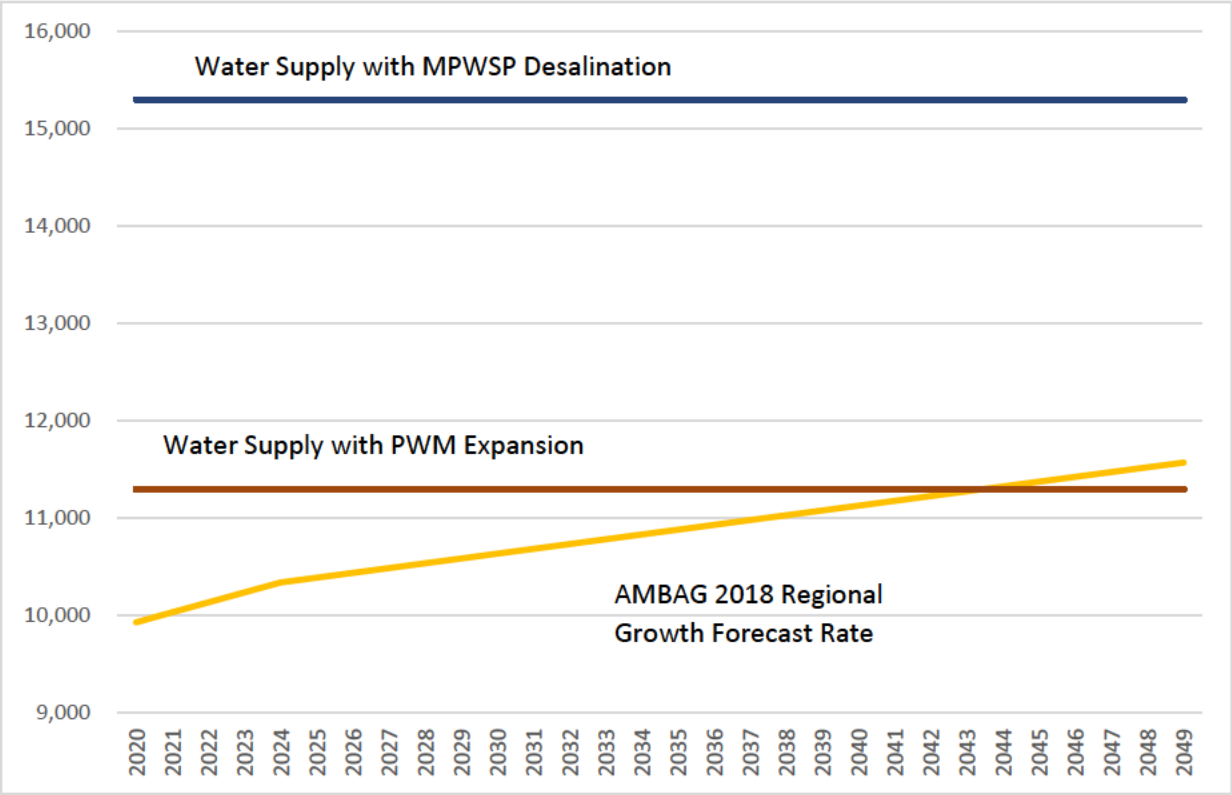
There is little likelihood that the market can absorb all of this quickly, but if it did there might be assumed to be something similar to the following pent-up near-term demand:

Table 10
Potential Near-Term Demand
(Acre-Feet)

Type of Demand	Acre Feet Required
1,250 Hotel Rooms X 0.064 AF/room	80
1.5 guests/room X 1,250 rooms X 75% occupancy X 0.02 AF/restaurant seat	28
200,000 new square feet of commercial space X 0.00007 AF/sq.ft.	14
1,000 new students X 57 gal/day X 260 days/Year	45
Approved but Unbuilt Housing	100
TOTAL Near-Term Demand	267

Figure 5 shows what the supply and demand relationship would be if this 267 AFA is added to the first five years, on top of the AMBAG Growth Forecast. The chart shows that, assuming a starting current demand at the 5-year average (inclusive of water year 2019), Pure Water Monterey Expansion meets 24-year market absorption, and the MPWSP desalination plant exceeds 30-year demands.

Figure 5
Market Absorption of Water Demand Compared to Water Supply
Current Demand at 5-Year Average
"Pent-Up" Demand in first 5 Years plus AMBAG 2018 Regional Growth Forecast
(Acre-Feet)



Additional Factors Affecting Future Demand

Cost: The future water supply will significantly impact rates. It is expected that the combined cost of new water supply and regular annual rate increases will almost double a residential ratepayer's water bill by 2023. Rules of price elasticity suggest the cost of water might dampen demand. The cost of each major component of supply is shown below:

Desalination Plant	$6,094 per acre-foot[33]
Carmel River:	$271 per acre-foot[34]

[33] Attachment C-3 California American Water Company Advice Letter 1220 "Total Yr 1 Cost to Customer" $38.1 million, divided by 6,252 acre-feet per year
[34] MPWSP Model- V 2.1 submitted to CPUC; February 2018 and October 2017 versions, 6.4 MGD scenario, "Avoided Costs" worksheet

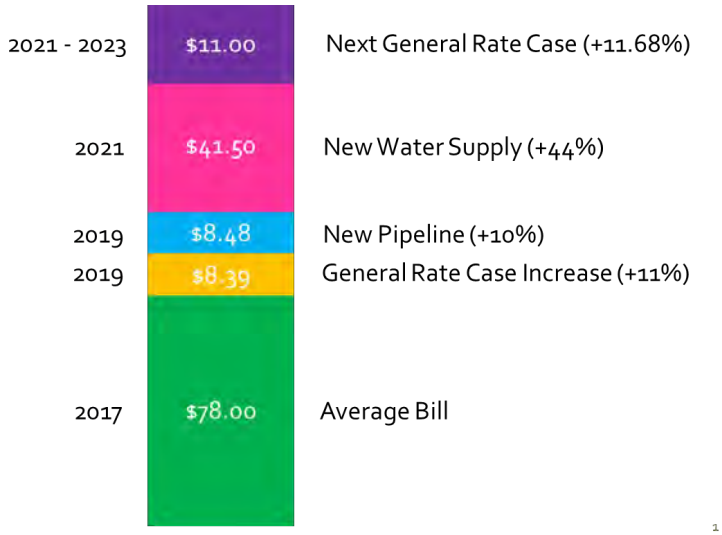
Seaside Basin:	$130 per acre-foot[35]
Pure Water Monterey:	$2,398 per acre-foot[36]
PWM with Expansion:	$2,339 per acre-foot[37]

Further, if the desalination plant capacity is not fully utilized, the cost per acre-foot rises due to the fixed costs, as shown below.

Production by Desal Plant – AF	6,252	5,000	4,300
Variable Cost ($ Million)	7.8	6.2	5.4
Fixed Cost ($ Million)	30.3	30.3	30.3
Total Annual Cost to Customer	38.1	36.5	35.7
Cost per Acre-Foot	$6,094	$7,308	$8,294

The rate impact can be seen in Figure 5 below, which is calculated based on full utilization of the desalination plant.

Figure 5
Ratepayer Impacts of New Water Supply[38]



Legislation: On May 31, 2018, Governor Brown signed two bills which build on the ongoing efforts to "make water conservation a California way of life." SB 606 (Hertzberg) and AB 1668

[35] MPWSP Model- V 2.1 submitted to CPUC; February 2018 and October 2017 versions, 6.4 MGD scenario, "Avoided Costs" worksheet
[36] Recent estimate for 2020-21 fiscal year
[37] Estimate
[38] "Your Rates Are Changing" California American Water mailer, April 2019 and "Notice of General Rate Case Application filed" July 2019

(Friedman) reflect the work of many water suppliers, environmental organizations, and members of the Legislature. The mandates will fall on urban water suppliers – not customers.

Specifically, the bills call for creation of new urban efficiency standards for indoor use, outdoor use, and water lost to leaks, as well as any appropriate variances for unique local conditions. Each urban retail water agency will annually, beginning November 2023, calculate its own *objective*, based on the water needed in its service area for efficient indoor residential water use, outdoor residential water use, commercial, industrial and institutional (CII) irrigation with dedicated meters, and reasonable amounts of system water loss, along with consideration of other unique local uses (i.e., variances) and "bonus incentive," or credit, for potable water reuse, using the standards adopted by the State Water Board.

The indoor water use standard will be 55 gallons per person per day (gallons per capita daily, or GPCD) until January 2025; the standard will become stronger over time, decreasing to 50 GPCD in January 2030. For the water use objective, the indoor use is aggregated across population in an urban water supplier's service area, not each household. Presently, the average June 2014-May 2019 gallons per capita per day for the Cal-Am Monterey system is 57 gpcd. Hence, existing users are unlikely to increase their water consumption with the availability of new water supply.

Principal Conclusions

- Either supply option can meet the long-term needs of the Monterey Peninsula
- Either supply option is sufficient to lift the CDO
- The long-term needs of the Monterey Peninsula may be less than previously thought
- Several factors will contribute to pressure on decreasing per capita water use

Appendix A

Water Required to Meet AMBAG 2018 Regional Growth Forecast

Water Required for Population Growth[39]

	Monterey	Pacific Grove	Carmel-by-the-Sea	Sand City	Seaside	Del Rey Oaks	County[40]	TOTAL
Population in 2020	28,726	15,349	3,833	544	34,301	1,949	7,182	**91,884**
Population in 2040	30,976	16,138	3,876	1,494	37,802	2,987	7,541	**100,814**
Increase	2,250	789	43	950	3,501	1,038	359	**8,930**
GPCD[41]	56.8	56.8	56.8	56.8	56.8	56.8	56.8	**56.8**
Acre-Feet per Year	143 AF	50 AF	3 AF	60 AF	223 AF	66 AF	23 AF	**568 AF**

*: Likely overstates population growth in Cal-Am service area due to some growth attributable to the Fort Ord build-out.

Water Required for Employment Growth[42]

	Monterey	Pacific Grove	Carmel-by-the-Sea	Sand City	Seaside	Del Rey Oaks	County[43]	TOTAL
Jobs in 2020	34,434	5,093	2,998	1,569	10,161	371	4,300	**58,926**
Jobs in 2040	40,173	5,808	3,378	1,810	11,299	432	4,845	**67,745**
Increase	16.7%	14.0%	12.7%	15.4%	11.2%	16.4%	12.7%	
Commercial Consumption In 2019[44]	1,371 AF	248 AF	203 AF	54 AF	282 AF	21 AF	651 AF	**2,830 AF**
Commercial Consumption In 2040[45]	1,600 AF	283 AF	229 AF	62 AF	314 AF	24 AF	734 AF	**3,246 AF**
Increase	229 AF	35 AF	26 AF	8 AF	32 AF	3 AF	83 AF	**416 AF**

Using this methodology, total water demand increase in 20 year period is 984 AF or 49.2 AFY.

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[39] Association of Monterey Bay Area Governments. 2018. "2018 Regional Growth Forecast." Table 8, page 32

[40] Uses Cal-Am service area population reported in SWRCB June 2014 – September 2019 Urban Water Supplier Monthly Reports (Raw Dataset), minus urban areas, escalated at 5%.

[41] SWRCB June 2014 – September 2019 Urban Water Supplier Monthly Reports (Raw Dataset); Average gallons per capita per day for August 2018 – July 2019; www.waterboard.ca.gov

[42] Association of Monterey Bay Area Governments. 2018. "2018 Regional Growth Forecast." Table 7, page 30

[43] California Employment Development Department, Monthly Labor Force Data for Cities and Census Designated Places. November 15, 2019. Sum of Carmel Valley Village CDP and Del Monte Forest CDP. Escalated at same rate as Carmel-by-the-Sea.

[44] Cal-Am. 2019. "Customers and Consumption by Political Jurisdiction"

[45] Assumes escalation at same rate as job growth 2020 to 2040

A Regional Growth Forecast

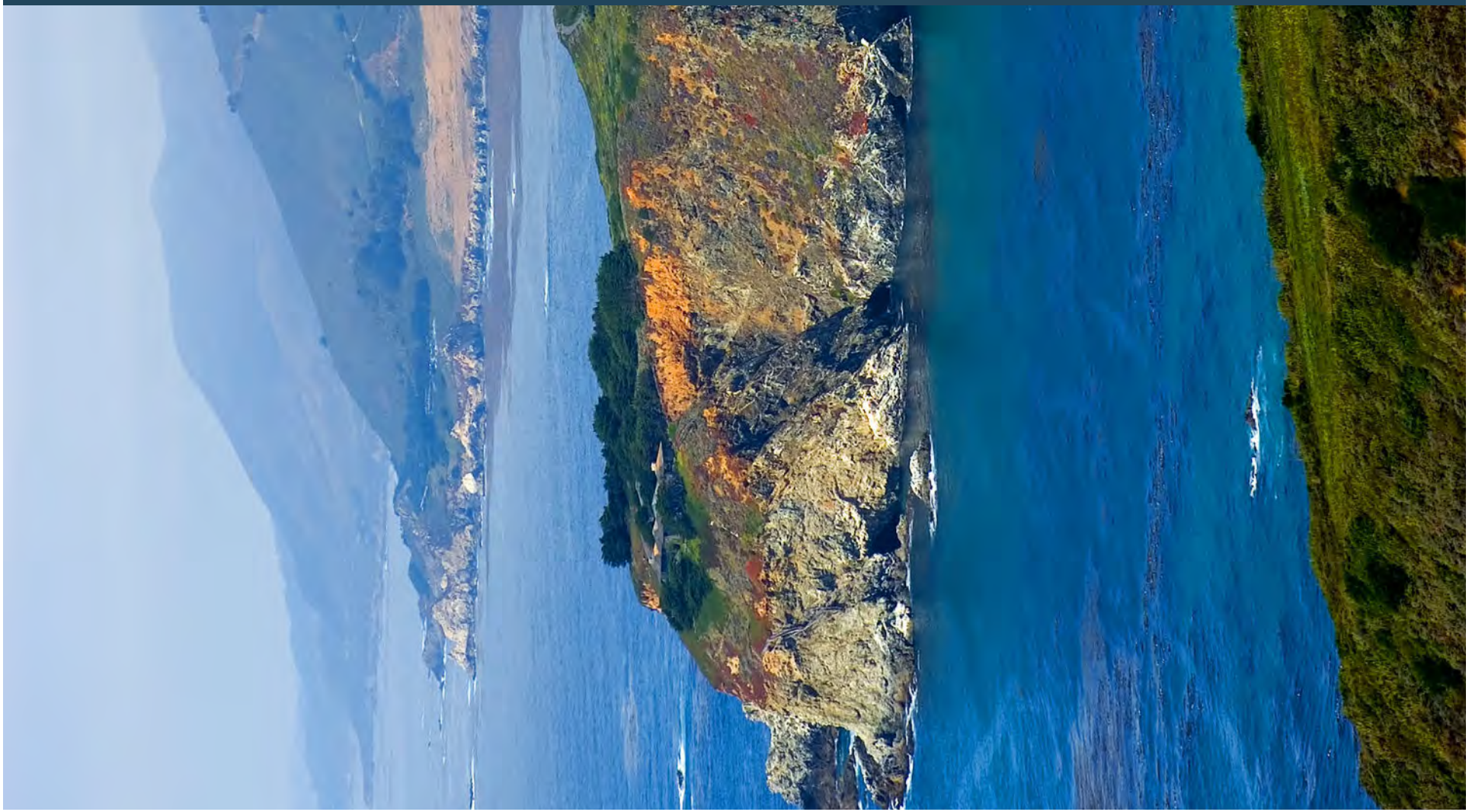


Table 7: Subregional Employment Forecast

Geography	2015	2020	2025	2030	2035	2040	Change 2015-2040 Numeric	Change 2015-2040 Percent
AMBAG Region	337,600	351,800	363,300	374,100	384,800	395,000	57,400	17%
Monterey County	203,550	211,799	218,203	224,207	230,212	235,822	32,272	16%
Carmel-By-The-Sea	2,935	2,998	3,096	3,195	3,289	3,378	443	15%
Del Rey Oaks	359	371	387	404	418	432	73	20%
Gonzales	4,477	4,963	5,064	5,166	5,278	5,371	894	20%
Greenfield	7,024	7,552	7,729	7,813	7,911	7,982	958	14%
King City	4,441	4,692	4,862	5,013	5,154	5,287	846	19%
Marina	6,340	6,649	6,886	7,140	7,373	7,620	1,280	20%
Monterey	34,030	34,434	35,970	37,405	38,814	40,173	6,143	18%
Pacific Grove	5,000	5,093	5,272	5,466	5,637	5,808	808	16%
Salinas	64,396	67,270	69,660	71,958	74,160	76,294	11,898	18%
Sand City	1,517	1,569	1,633	1,698	1,758	1,810	293	19%
Seaside	9,650	10,161	10,455	10,726	11,020	11,299	1,649	17%
Soledad	3,442	3,584	3,694	3,786	3,885	3,978	536	16%
Balance Of County	59,939	62,503	63,497	64,438	65,516	66,390	6,451	11%
San Benito County	18,000	19,240	19,957	20,617	21,264	21,913	3,913	22%
Hollister	13,082	14,035	14,608	15,132	15,650	16,172	3,090	24%
San Juan Bautista	559	591	615	639	662	685	126	23%
Balance Of County	4,359	4,614	4,734	4,846	4,951	5,056	697	16%
Santa Cruz County	116,050	120,761	125,141	129,275	133,324	137,265	21,215	18%
Capitola	7,062	7,199	7,464	7,727	7,979	8,228	1,166	17%
Santa Cruz	40,986	43,090	44,647	46,153	47,616	49,085	8,099	20%
Scotts Valley	7,475	7,612	7,820	8,004	8,180	8,349	874	12%
Watsonville	22,644	23,482	24,382	25,200	26,008	26,772	4,128	18%
Balance Of County	37,883	39,339	40,826	42,191	43,541	44,831	6,948	18%

Sources: Data for 2015 from InfoUSA and the California Employment Development Department. Forecast years were prepared by AMBAG and PRB.

Table 8: Subregional Population Forecast

Geography	2015	2020	2025	2030	2035	2040	Change 2015-2040 Numeric	Change 2015-2040 Percent
AMBAG Region	762,676	791,600	816,900	840,100	862,200	883,300	120,624	16%
Monterey County	432,637	448,211	462,678	476,588	489,451	501,751	69,114	16%
Carmel-By-The-Sea	3,824	3,833	3,843	3,857	3,869	3,876	52	1%
Del Rey Oaks	1,655	1,949	2,268	2,591	2,835	2,987	1,332	80%
Gonzales	8,411	8,827	10,592	13,006	15,942	18,756	10,345	123%
Greenfield	16,947	18,192	19,425	20,424	21,362	22,327	5,380	32%
King City	14,008	14,957	15,574	15,806	15,959	16,063	2,055	15%
Marina	20,496	23,470	26,188	28,515	29,554	30,510	10,014	49%
Marina balance	19,476	20,957	22,205	22,957	23,621	24,202	4,726	24%
CSUMB (portion)	1,020	2,513	3,983	5,558	5,933	6,308	5,288	518%
Monterey	28,576	28,726	29,328	29,881	30,460	30,976	2,400	8%
Monterey balance	24,572	24,722	25,324	25,877	26,456	26,972	2,400	10%
DLI & Naval Postgrad	4,004	4,004	4,004	4,004	4,004	4,004	0	0%
Pacific Grove	15,251	15,349	15,468	15,598	15,808	16,138	887	6%
Salinas	159,486	166,303	170,824	175,442	180,072	184,599	25,113	16%
Sand City	376	544	710	891	1,190	1,494	1,118	297%
Seaside	34,185	34,301	35,242	36,285	37,056	37,802	3,617	11%
Seaside balance	26,799	27,003	27,264	27,632	28,078	28,529	1,730	6%
Fort Ord (portion)	4,450	4,290	4,340	4,490	4,690	4,860	410	9%
CSUMB (portion)	2,936	3,008	3,638	4,163	4,288	4,413	1,477	86%
Soledad	24,809	26,399	27,534	28,285	29,021	29,805	4,996	20%
Soledad balance	16,510	18,100	19,235	19,986	20,722	21,506	4,996	30%
SVSP & CTF	8,299	8,299	8,299	8,299	8,299	8,299	0	0%
Balance Of County	104,613	105,361	105,682	106,007	106,323	106,418	1,805	2%
San Benito County	56,445	62,242	66,522	69,274	72,064	74,668	18,223	32%
Hollister	36,291	39,862	41,685	43,247	44,747	46,222	9,931	27%
San Juan Bautista	1,846	2,020	2,092	2,148	2,201	2,251	405	22%
Balance Of County	18,308	20,360	22,745	23,879	25,116	26,195	7,887	43%
Santa Cruz County	273,594	281,147	287,700	294,238	300,685	306,881	33,287	12%
Capitola	10,087	10,194	10,312	10,451	10,622	10,809	722	7%
Santa Cruz	63,830	68,381	72,091	75,571	79,027	82,266	18,436	29%
Santa Cruz balance	46,554	49,331	51,091	52,571	54,027	55,266	8,712	19%
UCSC	17,276	19,050	21,000	23,000	25,000	27,000	9,724	56%
Scotts Valley	12,073	12,145	12,214	12,282	12,348	12,418	345	3%
Watsonville	52,562	53,536	55,187	56,829	58,332	59,743	7,181	14%
Balance Of County	135,042	136,891	137,896	139,105	140,356	141,645	6,603	5%

Sources: Data for 2015 are from the U.S. Census Bureau and California Department of Finance. Forecast years were prepared by AMBAG and PRB.

Appendix B
Water Required to Meet
Regional Housing Needs Allocation Plan: 2014-2023

2014-2023 RHNA Goals by Local Jurisdiction[46]

	Monterey	Pacific Grove	Carmel-by-the-Sea	Sand City	Seaside	Del Rey Oaks	TOTAL
Total Allocation	**650**	**115**	**31**	**55**	**393**	**27**	**1,271**
Very Low (24.1%)	157	28	7	13	95	7	**307**
Low (15.7%)	102	18	5	9	62	4	**200**
Moderate (18.2%)	119	21	6	10	72	5	**233**
Above Moderate (42%)	272	48	13	23	164	11	**531**

*: Does not include unincorporated Monterey County, which might be 15-25 additional AFY to full build-out

Estimated Water Required to Meet RHNA Goals on the Monterey Peninsula

	TOTAL RHNA GOAL	Water Required (AFY)[47]	Factor Used
Very Low (24.1%)	307	37	0.12 AFA (multi-family)
Low (15.7%)	200	24	0.12 AFA (multi-family)
Moderate (18.2%)	233	37	0.16 (half single family/half multi-family)
Above Moderate (42%)	531	92	0.173 (2/3 single family/1/3 multi-family)
Total Allocation/Water Required	**1,271**	**190**	

Over two similar 10-year periods, total water required for housing calculated with this methodology is 380 AF over twenty years, or 395 – 405 AF including estimate for unincorporated County (footnote above.)

[46] Association of Monterey Bay Area Governments. ND. "Regional Housing Needs Allocation Plan: 2014-2023." Available at: https://ambag.org/sites/default/files/documents/RHNP%202014-2023_Final_revised.pdf.

[47] Calculated based on the RHNA goals for the six cities in the Monterey Peninsula and MPWMD's water use factors for single family units (0.2 AFA) and multi-family units (0.12 AFA).

REGIONAL HOUSING NEEDS ALLOCATION PLAN: 2014 - 2023

ASSOCIATION OF MONTEREY BAY AREA GOVERNMENTS

RHNA Allocation

Geography	Total Allocation	Very Low (24.1%)	Low (15.7%)	Moderate (18.2%)	Above Moderate (42.0%)
AMBAG Region	10,430	2,515	1,640	1,900	4,375
Monterey County	**7,386**	**1,781**	**1,160**	**1,346**	**3,099**
Carmel-By-The-Sea	31	7	5	6	13
Del Rey Oaks	27	7	4	5	11
Gonzales	293	71	46	53	123
Greenfield	363	87	57	66	153
King City	180	43	28	33	76
Marina	1,308	315	205	238	550
Monterey	650	157	102	119	272
Pacific Grove	115	28	18	21	48
Salinas	2,229	538	350	406	935
Sand City	55	13	9	10	23
Seaside	393	95	62	72	164
Soledad	191	46	30	35	80
Balance Of County	1,551	374	244	282	651
Santa Cruz County	**3,044**	**734**	**480**	**554**	**1,276**
Capitola	143	34	23	26	60
Santa Cruz	747	180	118	136	313
Scotts Valley	140	34	22	26	58
Watsonville	700	169	110	127	294
Balance Of County	1,314	317	207	239	551

Appendix C

Pure Water Monterey Expansion
Consistency With Planning Criteria

MPWMD has consistently followed state and federal codes, as well as industry standards, in its analysis of the two supply options in the report. Specifically, any MPWMD conclusions in the report are consistent with the following:

- California Code of Regulations (CCR) section 64554
- California Health and Safety Code (CHSC) section 116555
- California Water Code (CWC) sections 10635 and 10631
- CPUC General Order 103A and other rules; and
- American Water Works Association "Water Resource Planning" guidance M50

CCR section 64554: MPWMD meets the requirements of CCR Title 22 section 64554. This was shown in a document produced and available from MPWMD in September 2019 and later publicly filed by the California Coastal Commission demonstrating MPWMD compliance.[48] With the passage of time, that analysis has been updated and is included in this Appendix C, now assuming a new water supply comes online in the year 2023. It shows that Pure Water Monterey expansion can meet the Maximum Day Demand (MDD) and Peak Hourly Demand (PHD) required under this section of the CCR.

There is no standard in 64554 to look back 10 years to ascertain current or projected future average annual demand. Section (k) which says *"The source capacity of a surface water supply or a spring shall be the lowest anticipated daily yield based on adequately supported and documented data"* by citing "daily yield", still goes to MDD and PHD, not long-term average annual demand. This bears repeating: CCR section 64554 has nothing to with estimating current existing consumer demand or future average annual consumer demand for water.

CHSC section 116555: All that is required under this section of the Code is that a water supplier "provides a reliable and adequate supply of pure, wholesome, healthful, and potable water." Nothing more, nothing less. To assert that either Pure Water Monterey expansion or the proposed desalination plant do not do so would be disingenuous.

CWC sections 10635 and 10631: Section 10635 of the CWC requires that *"every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years.*

[48] See California Coastal Commission agenda, November 14, 2019, Application 9-19-0918 / Appeal A-3-MRA-19-0034 (California American Water Co.) Exhibit 9 staff note attachment

This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the long-term total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and a drought lasting five consecutive water years." MPWMD has done so with respect to both proposed water supply sources and have concluded that they can each meet the challenges of a normal water year, a single dry water year, and a 5-year drought. Drought resilience of Pure Water Monterey and ASR is discussed in more detail below.

We also recognize section 10631 reiterates the above-said requirement in the plan. Section 10631 also requires analysis by the utility of (i) Water waste prevention ordinances; (ii) Metering; (iii) Conservation pricing; (iv) Public education and outreach; (v) Programs to assess and manage distribution system real loss; (vi) Water conservation program coordination and staffing support; and (vii) Other demand management measures. These programs, many of which have been sponsored by MPWMD, have led to the decline in water demand that sets the baseline for future water supply planning.

CPUC General Order 103A and other rules: MPWMD's analysis has met the requirements of CPUC General Order 103A which states all water supplied shall be *"obtained from a source or sources reasonably adequate to provide a reliable supply of water" and "shall have the capacity to meet the source capacity requirements as defined in CCR Title 22, Section 64554".* This has been addressed above.

The CPUC's "Rate Case Plan and Minimum Data Requirements for Class A Water Utilities General Rate Case (GRC) Applications" states utilities should *"forecast customers using a five-year average of the change in number of customers by customer class"* subject to unusual events (such as a meter moratorium here in Monterey). MPWMD has also recognized this regulatory guidance.

American Water Works Association (AWWA) "Water Resource Planning" guidance M50: AWWA recognizes there are 6 traditional forecasting methods.[49] MPWMD's report has incorporated at least three of the accepted methods: "per capita models", "extrapolation models", "disaggregate water use models", and have checked certain estimates using "land-use models" each recognized by AWWA. Further, to the extent MPWMD has analyzed the AMBAG growth forecast and assigned water usage to the population and job forecasts, "multivariate" modeling has been included, also recognized by AWWA. "Several methods of demand forecasting are often combined, even within a single utility."[50]

[49] AWWA, "Water Resources Panning: Manual of Water Supply Practices M50", 3rd Edition, pages 81-84.
[50] AWWA, "Water Resources Panning: Manual of Water Supply Practices M50", 3rd Edition, page 81, paragraph 2.

The out-of-date second edition of AWWA M50 does cite a period of 10 years of historical data be used to develop future forecasts of demand, but the same section also states *"If a simple per capita approach to forecasting is selected, the data requirements could be as easy as securing historical annual water production or sales for 5 to 10 years"* Hence, MPWMD's use of a 5-year period would have been acceptable.[51] However, that edition of M50 was superseded by the third edition published in 2017. The current M50 edition from AWWA does not reference a specific preferred time period for historical data to be used for a future demand forecast. The MPWMD analysis is consistent with the current section of M50. There is nothing wrong, or outside industry standards, with looking at a 5-year average or some other measure to determine "How much water do we use today?"

[51] AWWA, "Water Resources Panning: Manual of Water Supply Practices M50", 2nd Edition, pages 47-48

Drought Resilience of ASR and Pure Water Monterey

ASR: Based on the Benito/Williams technical memorandum modeling assumptions contained in the Pure Water Monterey SEIR appendices, MPWMD concludes that build-up of ASR storage would be sufficient to meet a 5-year drought. The build-up occurs based on historical data including wet, normal, and dry years. If the data is randomized, the same results will occur – ASR acts like a lake behind a dam, building up supplies for use later during a drought. To remove ASR from the resource planning mix is inappropriate and would be inconsistent with industry practice for estimating water supply availability. Even AWWA recognizes ASR in its reliability assessment: *"ASR wells can improve water basin management by storing water underground from periods of excess supply…, and later allowing a portion of the stored water to be extracted during periods of demand or short supply"*[52]

If the Monterey Peninsula were to experience drought during the "buildup period" following the completion of new water supply and the lifting of the CDO, ASR would arguably be delayed in building up a drought reserve, it should not be overlooked that a Pure Water Monterey expansion is new capacity without an immediate offsetting demand. That is, 2,250 AFA from Pure Water Monterey expansion would provide the necessary approximately 800 AFA to offset unlawful Carmel River diversions and lift the CDO and provide a remaining 1,450 AFA for which there is no immediate present-day demand and can instead be delivered for customer service in the early years if ASR's drought reserve has not yet built-up. Just a few years of Pure Water Monterey expansion water could also provide drought-resilience to the Monterey Peninsula.

The District believes the Benito/Williams memo demonstrates ASR is drought-resilient and Pure Water Monterey expansion provides an additional factor of safety against drought impacts to ASR.

Pure Water Monterey: A memorandum dated November 1, 2019 which appears as Appendix I to the Pure Water Monterey Supplemental Environmental Impact Report titled "Source Water Availability, Yield and Use Technical Memorandum", indicates Pure Water Monterey is resilient to drought, in general. Page 1 of the memorandum states the purpose of the memorandum is to summarize the source water availability and yield estimates for proposed modifications to the approved Pure Water Monterey Groundwater Replenishment Project (as modified, the full project is referenced as the Expanded PWM/GWR Project), to explain the seasonal storage yield estimates, and to provide the proposed maximum and typical (or normal) water use estimates for the Proposed Modifications.

[52] AWWA, "Water Resources Panning: Manual of Water Supply Practices M50", 3rd Edition, page 148

Page 10 of the memorandum says *"In the attached scenario tables (Tables 9 through 11), the use of the various sources is reduced to just meet the demands of the AWPF and offset the current CSIP groundwater use in the wet season (October-March). During the dry season (April-September), surface water diversions are shown meeting the monthly AWPF demands and providing extra flow for the CSIP, such that* ***the annual use of new sources exceeds the annual AWPF demands."*** *(emphasis added by MPWMD)*

"*The demand scenarios considered are:*

Table 9: A normal water year while developing a drought reserve (AWPF producing 6,550 AFY)
Table 10: A normal water year with a full drought reserve (AWPF producing 6,350 AFY)
Table 11: A drought year starting with a full reserve (AWPF producing 5,550 AFY) *(emphasis added by MPWMD)*

In the drought year scenario, the stormwater and wastewater availability were reduced. Urban runoff from Salinas was assumed to be one-third of the historic average. Rainfall on the SIWTF ponds used the 2013 rainfall record (critically dry year). The unused secondary treated effluent values from 2013 were used, also the historic low. The CSIP groundwater well use from OCT 2013 to SEP 2014 was used as the CSIP augmentation target. Under this scenario, surface water diversions were required from the Reclamation Ditch, Blanco Drain and Lake El Estero, and the diversions were needed from March through November."

In MPWMD's opinion, this shows that the drought scenario shows all Advanced Water Purification Facility needs are met and there are still residual new supplies available to CSIP. In other words, Pure Water Monterey expansion is reliable in periods of reduced usage or drought years.

EXHIBIT 17

MPWMD ANALYSIS OF MAXIMUM DAILY DEMAND (MDD) AND PEAK HOUR DEMAND (PHD)

MPWMD Analysis of Available Well Capacity for 10-Year Maximum Daily Demand (MDD) and Peak Hour Demand (PHD)

A) Find maximum month demand for 10-year period 2014-2023
August 2014 = 1,023 AF[53]

B) Convert to average daily demand
1,023 AF / 31 days = 33 AF/day

C) Convert to million gallons per day (MGD)
33 AF/day X 325,851 gal/AF divided by 1,000,000 = 10.753 MGD

D) Gross-up for peaking factor of 1.5
10.753 MGD X 1.5 =16.13 MGD = Maximum Daily Demand (MDD)

E) Average hourly flow during MDD is 10.753 MGD divided by 24 hours = 0.448 MGh

F) Gross-Up for peaking factor of 1.5
0.448 MGh X 1.5 = 0.672 million gallons per hour = Peak Hour Demand (PHD)

Hence, new water supply must support a MDD of 16.13 MGD. Table 1 on the next page shows existing and planned system supply capacities under authorized, desired, and firm capacity scenarios. As can be seen, the lowest available capacity is 19.41 MGD which significantly exceeds MDD.

This assumes additional production well capacity currently being analyzed in the Pure Water Monterey Expansion Supplemental EIR are developed and the Forest Lake Pump Station currently requested under the 2019 General Rate Case filing is built. These two projects markedly remove system capacity constraints.

We also recognize that the Plumas, Luzern, Ord Grove, Paralta, and Playa wells are presently unable to deliver to the Monterey Pipeline, serving only Seaside, Sand City, and Old Monterey. This could potentially reduce available capacity throughout the rest of the system on the order of 2 MGD. Even in this instance, operations are sufficient to meet MDD. This issue goes further away if one or more of the wells are also connected to the pipeline, as well as with the continued reduction in MDD in more recent years.

CONCLUSION: Pure Water Monterey expansion provides sufficient capacity to meet MDD and PHD for the Cal-Am Monterey Main System.

[53] Direct testimony of Ian Crooks, Errata version 9-27-17 in A.12.04.019 at California Public Utilities Commission, page 9, Table 3

TABLE 1

Cal-Am Monterey Main Well Capacity Under Authorized and Desired Operations With New Wells being Analyzed in Pure Water Monterey Expansion SEIR							
	Authorized Operations			**Desired Operations**		**Desired Operations Firm Capacity**	
	Capacity (gpm)	**Capacity (MGD)**		**Capacity (gpm)**	**Capacity (MGD)**	**Capacity (gpm)**	**Capacity (MGD)**
Upper Carmel Valley Wells							
Assume n/a in Summer	-	-		-	-	-	-
Lower Carmel Valley Wells							
Rancho Canada	1,150	1.66		1,200	1.73	1,200	1.73
Cypress	1,500	2.16		-	-	-	-
Pearce	1,500	2.16		-	-	-	-
Schulte	1,250	1.80		-	-	-	-
Manor	125	0.18		-	-	-	-
Berwick No 8.	600	0.86		-	-	-	-
Berwick No. 9	985	1.42		-	-	-	-
Subtotal Lower CV	7,110	10.24		1,200	1.73	1,200	1.73
Seaside Wells							
Plumas	192	0.28		192	0.28	192	0.28
Luzern	640	0.92		640	0.92	640	0.92
Ord Grove	1,000	1.44		1,000	1.44	1,000	1.44
Paralta	1,350	1.94		1,350	1.94	1,350	1.94
Playa	350	0.50		350	0.50	350	0.50
Santa Margarita ASR 1 or 2	1,750	2.52		1,750	2.52	1,750	2.52
Middle School ASR 1 or 2	1,750	2.52		1,750	2.52	1,750	2.52
Subtotal Seaside	7,032	10.13		7,032	10.13	7,032	10.13
4 New Wells in Pure Water Expansion SEIR							
New 1	1,750	2.52		1,750	2.52	1,750	2.52
New 2	1,750	2.52		1,750	2.52	1,750	2.52
New 3	1,750	2.52		1,750	2.52	1,750	2.52
New 4	1,750	2.52		1,750	2.52	-	-
Subtotal New	7,000	10.08		7,000	10.08	5,250	7.56
Total Well Capacity	**21,142**	**30.44**		**15,232**	**21.93**	**13,482**	**19.41**
Notes:							
gpm = Gallons per Minute							
MGD = Million Gallons per Day							
AF = Acre-Feet							
Firm Capacity = Without largest producing well							

EXHIBIT 18

PURE WATER
MONTEREY FSEIR
ANALYSIS OF
SOURCE WATER
OPERATIONAL PLAN

Monterey One Water
Providing Cooperative Water Solutions

TECHNICAL MEMORANDUM

To: ***Jennifer Gonzalez, PE, Engineering Manager***
Monterey One Water

From: ***Bob Holden, PE, LS, M.ASCE***
Principal Engineer
Monterey One Water

Alison Imamura, PE, AICP
Associate Engineer
Monterey One Water

Date: **April 11, 2020**

Subject: **Approved Pure Water Monterey (PWM) Project and Proposed Modifications to Expand the PWM Project - Source Water Operational Plan**

INTRODUCTION AND BACKGROUND

The Pure Water Monterey (PWM) Final Environmental Impact Report (EIR) certified in 2015 with addenda and the Draft Supplemental EIR dated 2019 (Draft SEIR) for the Proposed Modifications to expand the PWM Project[1] describe the source water availabilities, water rights, and uses. The EIR and Draft SEIR source waters analyses assumed 2009 to 2013 average flows would be consistent with future flows, plus these analyses assumed that the quantities of Salinas Industrial Wastewater (Ag Wash Water, AWW) would increase in the future. The PWM Project and the Proposed Modifications to expand the PWM Project yield include use of secondary-treated water as influent for the Advanced Water Purification Facility (AWPF) that provides purified water to MCWD for landscape irrigation and to convey for injection into the Seaside Groundwater Basin plus use of additional source water to augment Regional Treatment Plant (RTP) influent for the Salinas Valley Reclamation Project (SVRP) and the Castroville Seawater Intrusion Project (CSIP). The EIR identified that one acre-foot (AF) of AWPF product water requires 1.23 AF of RTP influent water (i.e., for every one AF of product water that is produced at the AWPF, 0.23 AF of reverse osmosis (RO) concentrate is sent into the outfall). Those analyses were not concerned with quantifying screening and membrane filtration (MF) backwashes as the backwash water returns to the RTP headworks and can be reused after primary and secondary treatment.

The purposes of this memorandum are 1) to describe M1W's rights to the AWPF feed water, 2) to describe quantities by month of secondary effluent that are available to use as influent to the AWPF in various conditions, and 3) to show how the AWPF feed water could be adjusted to a specific year's monthly flow. In these analyses, one AF of AWPF product water is assumed to require 1.37 AF water rights in the form

[1] The 2019 – 2020 SEIR addresses expanding the PWM Project for the purpose of providing a Back Up Plan for CalAm to meet the CDO in case the MPWSP desalination plant is delayed beyond milestones established in the State Water Resources Control Board's Cease and Desist Order.

of Ozone Feed Water. Of each one AF of product water, the Ozone Strainer and MF Pre-strainer backwashes removes 0.03 AF which returns to the headworks. Next, 0.11 AF are removed during MF backwash which is also returned to the Headworks. Finally, 0.23 AF of RO concentrate is removed and sent to the outfall. The analyses herein separately quantify the backwash water flows from the AWPF because when those flows return to primary and secondary treatment their water rights change. Water rights consider those rights to RTP secondary effluent prescribed by California Water Code section 1210 and the Amended and Restated Water Recycling Agreement (November 3, 2015, as amended in June 2019, herein referred to as the ARWRA). Volumes of wastewater flowing into the RTP's primary and secondary treatment processes that would be available to use as influent to the AWPF include municipal wastewater to which M1W and MCWD have contractual rights and the "new source waters" as described in the ARWRA. These AWPF source water flows will be determined for the three distinct AWPF uses: MCWD, the approved PWM Project, and the Proposed Modifications. Water sources and yields for the remainder of the PWM Project (SVRP/CSIP) are described in the Schaaf & Wheeler reports published in the Final PWM Project EIR (M1W/DD&A, 2015), Addendum No. 3 to the EIR (M1W/DD&A, October 2017), and in the Final SEIR in Master Response #3 of Chapter 3, and in Appendices I and R (M1W/DD&A, 2019).

COMPOSITION OF MUNICIPAL WASTEWATER FLOWS

Relative contributions of municipal wastewater from M1W's geographic areas that enters the M1W headworks and is metered there include: 51% from the Salinas urban area, 3% from Moss Landing and Castroville, 46% from the Monterey Peninsula, Marina, and Fort Ord areas (Source: M1W Sewer System Management Plan, 2019). Addition of AWW in recent years increases the percentage of flows from the Salinas area by up to 4% (peaking in the summer). These municipal flows are primarily from areas within M1W's 2001 Service Area, but also include some municipal/domestic flows from outside M1W's 2001 Service Area, including the following key geographic locations:[2]

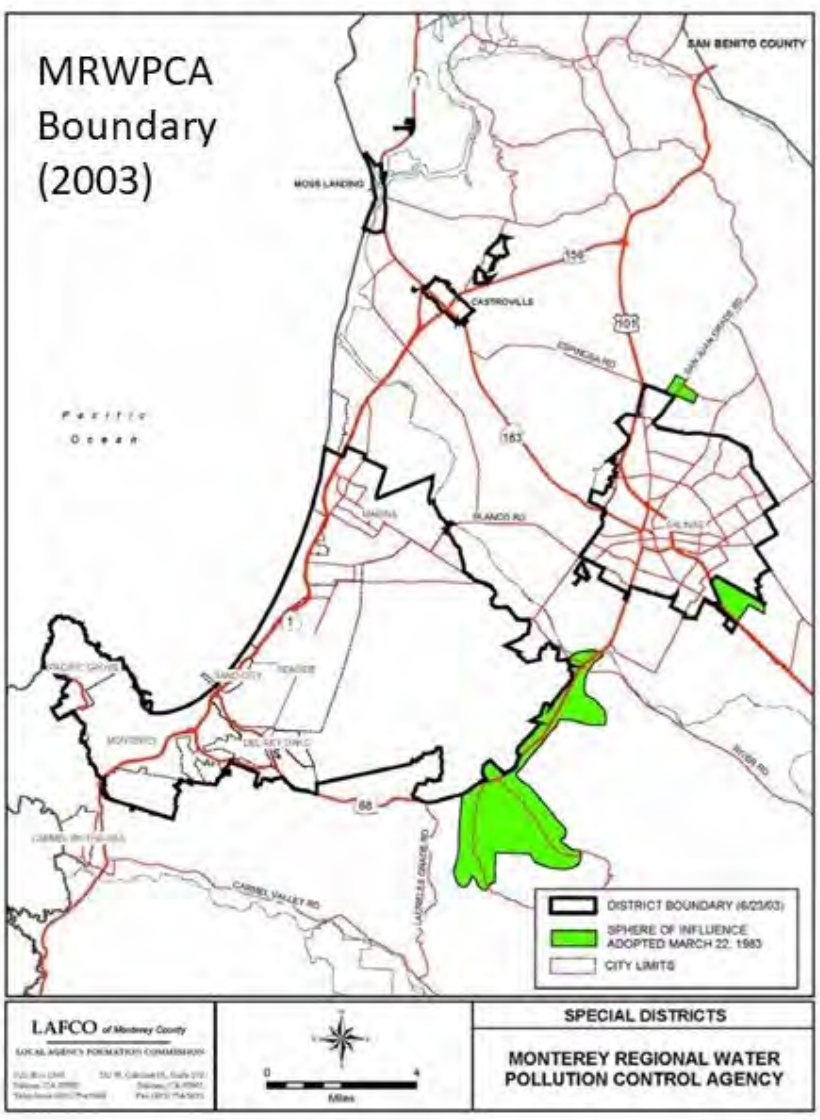
1. North County High School and the southeast portion of Castroville, as shown in Figures 1 and 2,[3]
2. Boronda and areas north and southeast of the City of Salinas, as shown Figures 1 and 2,
3. Starting in 2019, the Farmworker Housing site on Hitchcock Road, southwest of Salinas,
4. Monterey Regional Waste Management District landfill starting in 2016, and
5. M1W Regional Treatment Plant on-site wastewater.

These flows have not previously been individually metered and some flow through the headworks meter, however, monthly volumes throughout the year have been estimated for the analyses in this memorandum based on available pumping operations data, use assumptions, and other metered flow data (flow balance calculations). Because these are also wastewater flows which enter M1W-owned infrastructure, rights to these waters are also governed by California Water Code Section 1210 which provides for the ability for M1W to enter into agreements for assigning those rights to other entities. Currently, the ARWRA and the March 1996 *Annexation Agreement and Groundwater Mitigation Framework for Marina Area Lands* are the main agreements governing the water rights to these flows.

[2] The distinction between municipal flows coming from within and outside of the M1W 2001 Service Area are important for interpreting rights assigned to MCWRA by the Amended and Restated Water Recycling Agreement (November 2015).

[3] Figures 1 and 2 use maps of the M1W (at that time, known as Monterey Regional Water Pollution Control Agency) published by the Monterey County Local Agency Formation Commission in 2003 and 2012 because maps of the service area were not published in 2001, and a newer map has not been published since 2012.

Figure 1. LAFCO Boundary Maps of MRWPCA Service Areas in 2003 and 2012



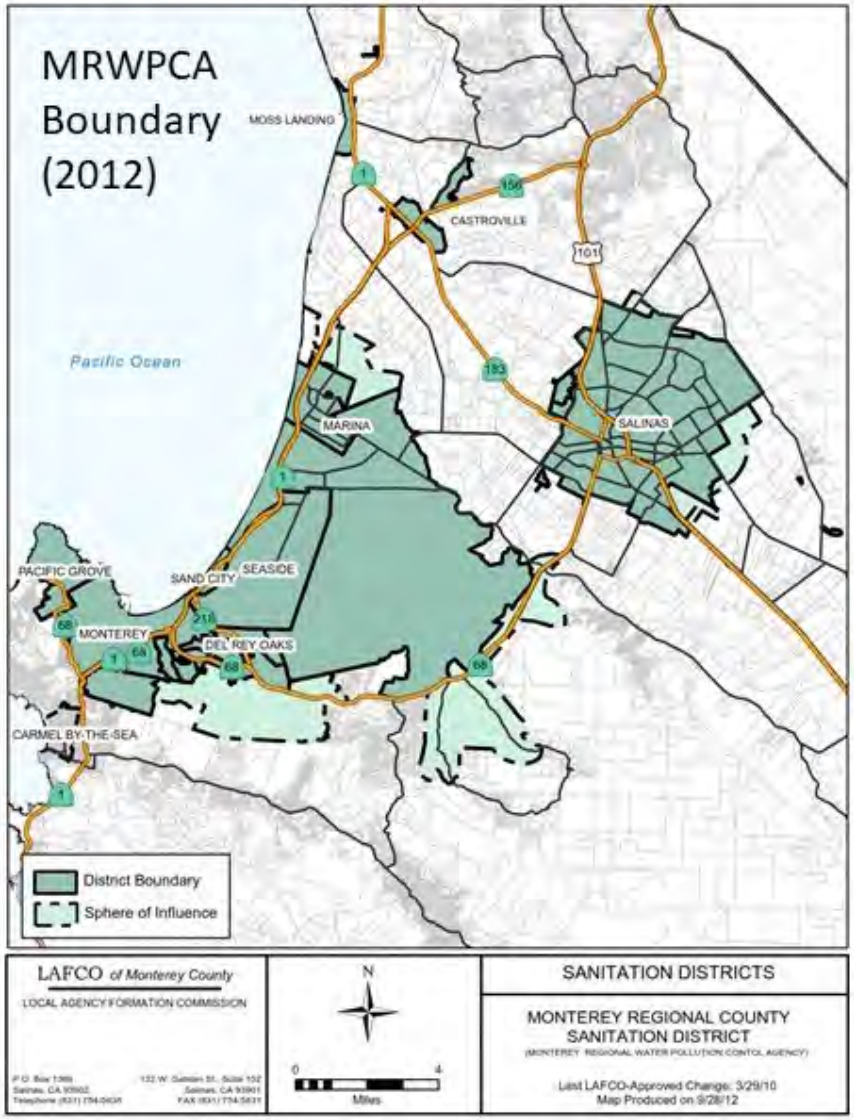
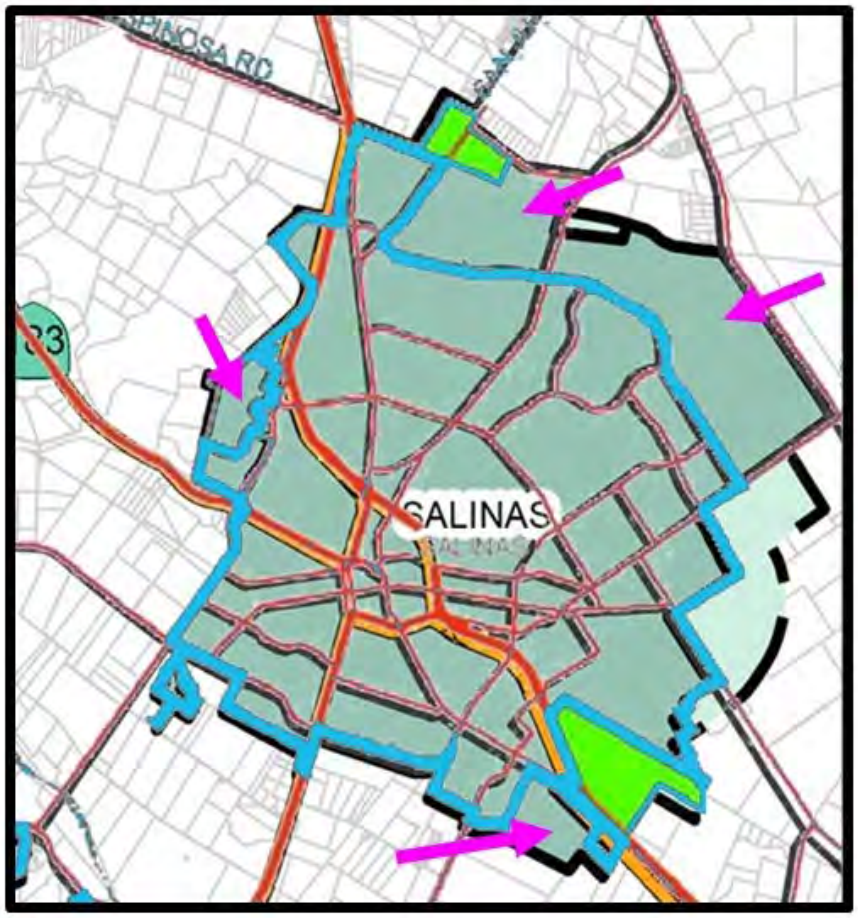


Figure 2. M1W Service Areas (northern & Salinas Area) added after 2003 (Noted with: ➘)



= 2003 LAFCO-published of MRWPCA Service Area Boundary
= Current LAFCO-published M1W Service Area Boundary

= Areas within sphere of influence, but not within service area.

NEW SOURCE WATERS IN ARWRA

As described in the ARWRA, new source waters available for use for recycling include the following:

- **Reclamation Ditch surface water**. M1W can divert this water into the City wastewater collection system by using the recently completed diversion structure near Davis Road (which then flows to the RTP), as allowed by a State Board Water Rights Permit #21377 issued to the MCWRA and discussed by the ARWRA.
- **Blanco Drain surface water**. M1W can divert this water to the RTP headworks using the recently completed diversion structure near the Salinas River, as allowed by a State Board Water Rights Permit #21377 issued to the MCWRA and discussed by the ARWRA.
- **Agricultural Wash Water (Ag Wash Water)**. M1W can divert this water directly from the City of Salinas' separate industrial wastewater collection system to the M1W Salinas Pump Station using M1W's diversion facilities, as allowed by a State Board's Order approving Wastewater Change Petition #WW-0089 issued to the City of Salinas and the City/M1W Agreement for Conveyance and Treatment of Industrial Waste Water (October 27, 2015).

The use of these three categories of source water by M1W is subject to conditions precedent in Section 16.15 of the ARWRA as updated in Amendment No. 1 to the ARWRA. Under Amendment No. 1 to the ARWRA, M1W has rights to immediately use all the Reclamation Ditch and Blanco Drain surface waters and the Ag Wash Water, even before the conditions precedent are met. M1W may choose to use the Ag Wash Water to provide additional influent to the SVRP before the conditions precedent are met. In addition, Section 16.16 provides that if the conditions precedent are not met, then MCWRA would retain rights to the Ag Wash Water and M1W would retain rights to the Blanco Drain and Reclamation Ditch; however, for Section 16.16 to be in effect would require a separate agreement. Therefore, the analyses in this Technical Memorandum conservatively assume that Ag Wash Water:

1. is not available for use at the AWPF if conditions precedent are not met,
2. is only used for the Approved PWM Project during October through May in the scenarios where the conditions precedent are met, and
3. is not used for the Proposed Modifications.

Other new source waters that will be available to divert to the RTP to augment secondary effluent for recycling (and that are listed in the ARWRA) include City of Salinas urban runoff/stormwater that currently flows to the Salinas River, that will be mixed with AWW, conveyed to, and treated and stored in the Salinas Industrial Waste Water Treatment Facility (IWTF) ponds, and then diverted to the RTP from the northwest corner of Pond 3 at the IWTF. The infrastructure to enable this diversion is currently under construction. Currently, M1W does not have the ability to divert that treated water but will upon completion of the Pond 3 pump station. Nevertheless, because a contract with the City of Salinas or a contract amendment would be needed for M1W to use City of Salinas urban runoff/ stormwater, the analyses in this Technical Memorandum conservatively assume that City of Salinas urban runoff mixed with wastewater is not available for use at the AWPF. The ARWRA also lists Lake El Estero waters and SVRP modifications as new source waters, but to date there has been no implementation of this infrastructure due to lack of funding; therefore the analyses in this Technical Memorandum do not assume that these sources are available for use at the AWPF.

OTHER RELEVANT ANALYSES

This memorandum is complementary to the Perkins Coie Report "Water Rights Analysis for Proposed Modification to the Pure Water Monterey Groundwater Replenishment Project" (Perkins Coie Report). That report concluded:

- M1W, MCWD, and MCWRA all have secured rights to use water from the M1W's collection and treatment system.
- M1W has secured rights to divert and use AWW for recycling and delivery to customers, including SVRP treatment then distribution to CSIP plus AWPF treatment then injection to the Seaside Groundwater Basin (Agreement for Conveyance and Treatment of Industrial Waste Water By and Between the City of Salinas and the Monterey Regional Water Pollution Control Agency, dated Oct. 27, 2015).
- M1W needs a contract with the City of Salinas to acquire rights to divert, and treat for reuse, the City of Salinas storm water as enabled by M1W's Salinas Storm Water Projects. Prior agreements could be amended to allow M1W AWW to recycle flows through the SVRP and AWPF from Pond 3 at the City's IWTF to the Regional Treatment Plant (RTP) as enabled by the Salinas Storm Water Phase 1B Project.
- M1W and MCWRA have rights to Reclamation Ditch and Blanco Drain waters through two relevant SWRCB permits and the ARWRA, as amended. According to the ARWRA Section XVI, 16.16, if conditions precedent in Section XVI, 16.15 are not satisfied, M1W would retain the right to divert and use these waters and AWW would be available for MCWRA to use.

Another complementary report was Schaaf & Wheeler's Memorandum "Proposed Modifications to the Pure Water Monterey Groundwater Replenishment Project – Source Water Availability, Yield, and Use" dated November 1, 2019 (S&W Report) which was used to support the findings in the Draft SEIR. The Schaaf & Wheeler Report:

1. Dealt with the whole PWM Project that includes water for the AWPF and water for SVRP/CSIP. It emphasized the calculation of total additional water to flow into the RTP for treatment and reuse (added to existing wastewater flows) and the use of the flows by the AWPF and the SVRP and discharge to the outfall as recycled water or ocean discharge.
2. Used the 2015 EIR baseline data. This assumption was of interest to some stakeholders as the volumes of source water assumed to be available were based on 2009 through 2013 averages and industrial wastewater projections.[4] This Technical Memorandum provides supplemental analyses and results based on a different set of assumptions not reliant on the same baseline data.
3. Modeled flows going into or out of the RTP site and facilities owned by M1W but did not account for the backwash and on-site-generated flows that do not pass through the RTP headworks flow meter. The red box on **Figure 3** represents this flow model boundary as is appropriate for the overall PWM Project.

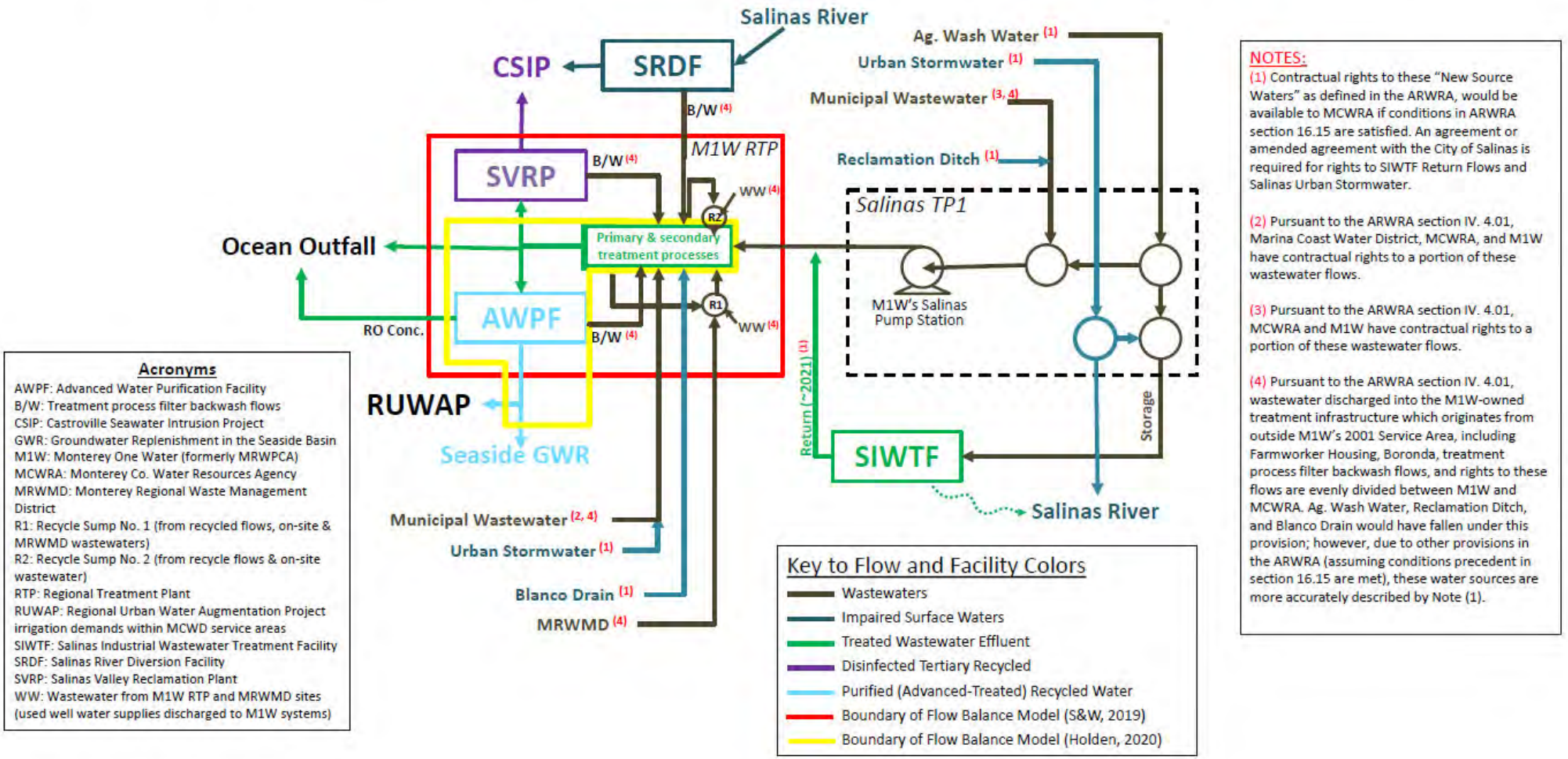
[4] Although some opined that this baseline did not incorporate more current data, this average was used only for the analysis of normal and wet years and included a severe drought year. In addition, wastewater influent volumes over the past three years has flattened and the provision of new water supplies to the Monterey Peninsula to eliminate constraints to growth will increase wastewater flows in the future under the Proposed Modifications. For these reasons, use of a 2009-2013 average for wastewater flows during normal and wet years is adequate.

4. Analyzed use of source waters, RTP inflows, ocean discharges, and recycling yields by month to meet both AWPF and SVRP demands based on the following four potential future scenarios:
    a. normal and wet year with drought reserve less than 1,000 AF,
    b. a normal and wet year with a 1,000 AF drought reserve,
    c. a drought year with a full 1,000 AF drought reserve, and
    d. a maximum diversion year without limiting diversion based on projected recycled demands.

    NOTE: The last scenario formed the basis for the environmental impact report analysis for various water resource topics since it provided a worst-case, conservative analysis of downstream impacts of surface water resources.
5. Ignored the SVRP, and AWPF backwash flows because they do not increase the amount of water at the RTP.
6. Ignored SRDF screening backwash flows because when screening is occurring, this indicates excess water available for meeting CSIP demands and these flows are inconsistent year-to-year.
7. Ignored rain and water in hauled waste (saline and septage) as influent to the RTP (these volumes are negligible).
8. Ignored evaporation and water in biosolids as a flow out of the RTP because these volumes are negligible.
9. Assumed AWW and Salinas Storm Water would be available directly and from Pond 3 IWTF Facility.
10. Assumed that the agencies implement the Lake El Estero Source Water diversion and the winter modifications to the Salinas Valley Reclamation Plant.
11. Estimated the reduced Reclamation Ditch water flow during drought for the drought scenario.
12. Estimated that Blanco Drain flow would not be reduced in drought, given that irrigation practices are consistent in drought and normal years enabled by the diversity of sources of irrigation water (river, groundwater wells, and recycled water -- the latter two of which are available even during drought years).

The Schaaf & Wheeler Report describes and quantifies source waters and uses for the entire PWM Project including SVRP/CSIP whereas this Technical Memorandum addresses use of flows for the AWPF portion of PWM Project.

Figure 3. Conceptual Flow Schematic for the Regional Collection, Treatment, and Recycling



METHODOLOGY AND ASSUMPTIONS

The volumes of the municipal wastewater and new source waters for recycling for each M1W customer are described, quantified, and prioritized herein considering California Water Code section 1210, treated wastewater rights assigned by M1W with agreements, environmental benefits (reducing discharge of secondary effluent), operational needs (including efficiency of treatment and regulatory compliance), and cost considerations. The new source waters would preferentially be used for the Approved PWM Project as described by the ARWRA (Reclamation Ditch, Blanco Drain, and AWW if conditions precedent are met and just the Reclamation Ditch and Blanco Drain if conditions precedent are not met). The new source waters conservatively are not assumed to be available for the Proposed Modifications, regardless whether the conditions precedent are met. Flows from outside M1W's 2001 Service Area are prioritized to be used for the Proposed Modifications to avoid use of Salinas area drainage waters (Reclamation Ditch and Blanco Drain) and AWW. This strategy minimizes ocean discharges, optimizes water treatment efficiency, and keeps costs for recycling as low as possible. The analyses in this memorandum use updated source water flow rates and monthly volumes compared to the baseline data used previously in the EIR documents. Two scenarios are evaluated and presented representing two sets of assumptions about water availability and use for recycling:

- *A normal or wet water year while building a Drought Reserve (or Operating Reserve) in the Seaside Basin.* For these analyses, municipal wastewater and AWW flows are assumed to be the same as actual calendar year 2018 flows, which provide values for a representative (typical wet or normal) year.
- *A drought year starting with a full (1,000 AF) drought reserve.* Municipal wastewater and AWW flows for this scenario are assumed to be the same as in calendar year 2015, which had the lowest effluent flow to the ocean and the highest SVRP recorded use. The SVRP backwash flows are estimated assuming CSIP is optimized to maximize days of SVRP water production.

This memorandum looks at the source water use assuming scenarios in which MCWRA does or does not complete the "Conditions Precedent for New Source Water Facilities" from Section XVI, 16.15 of the ARWRA. According to the terms of the ARWRA, the Reclamation Ditch, Blanco Drain, and AWW water may be used by M1W at the AWPF if conditions precedent are met. This analysis conservatively assumes no New Source Waters (as defined by the ARWRA) are used for the Proposed Modifications regardless of whether conditions precedent are met. If conditions precedent are not met, AWW would be used to increase influent to the SVRP pending a new agreement pursuant to Section 16.16 of the ARWRA. In addition, if conditions precedent are not met, there would be no drought reserve and the Approved PWM Project would produce 3,500 AFY to 3,700 AFY in wet, normal, and drought years.

The analyses documented in this memorandum support responses to concerns about the quantity of water (as influent to the RTP) that would be available for recycling and advanced treatment at the AWPF (landscape irrigation and groundwater injection) portion of the approved PWM Project and Proposed Modifications to the PWM Project under an updated set of assumptions. The assumptions herein represent newer information and reflect how source waters might be used, depending upon whether conditions precedent are met or not, for specific types of water years noting that water source quantities differ each year so the quantity of water treated each month will differ each year.[5] These assumptions include the following:

[5] This analysis does not consider that the ARWRA would be revoked or rescinded as this scenario would mean that M1W would hold all rights to wastewater flows entering its collection and treatment system per California Water Code section 1210 less that water already allocated to MCWD by agreements.

1. Separately accounts for all flows going into or out of the primary and secondary processes at the RTP, the SVRP, and the AWPF, such as the recycle flows that do not pass through the RTP meter at the headworks. The yellow polygon on **Figure 3** represents this flow model boundary.
2. Considers recycle flow such as screening and MF backwash losses from the AWPF. Thus, the source water needs for the approved and expanded PWM Projects are assumed to be larger than the source water needs identified in the 2015 EIR, the 2019 Draft SEIR, and in the S&W Report. Screening and backwash flows, since they return to the RTP Headworks for retreatment do not change the overall amount of water available for the PWM Project. However, these losses are a required AWPF flow and for the analyses herein, the losses are assumed to reduce the amount of water to which M1W has rights. Backwash is a necessary part of the process but its return to the RTP primary and secondary treatment process results in the water rights to those flows being split between M1W and MCWRA in accordance with the ARWRA.
3. Identifies MCWD use of municipal wastewater flows from their service area as the source for meeting the RUWAP irrigation system demands for AWPF product water.
4. Assumes the 200 AFY of AWPF product water for building the CSIP drought reserve (if conditions precedent are met) would instead build the CalAm/M1W/MPWMD Water Purchase Agreement Operating Reserve (if conditions precedent have not been met).
5. Assumes the Farmworker Housing project's additional influent flows (35 AFY estimate) are additive to historic influent volumes (project came on line in 2019).
6. Identifies Boronda area on the western side of Salinas (170 AFY wastewater volume estimate) as the largest developed area that was not in M1W's 2001 Service Area. There are several other areas that would also be considered outside of M1W's 2001 Service Area, but they are smaller, and their flows have not yet been estimated.
7. Assumes Ozone and MF screening recovery is 98% and MF recovery is 92%.
8. Assumes AWPF is operational on average 90% of the time. It is assumed that more maintenance will be performed during April through September so the AWPF will be operational 87% during that period and would be operational 93% of the remainder of the year.
9. Assumes that the SVRP modifications have not been constructed to enable lower daily volumes of SVRP water to be delivered to CSIP directly, through bypassing the SVRP Storage Pond. If built, this would decrease the amount of secondary effluent to the ocean throughout the year, but primarily in the winter, and would increase the volume of SVRP backwash water.
10. Assumes that the extra 200 AF (beyond 3,500 AFY) will be injected every winter, even if the Drought Reserve and Operating Reserves are full, since M1W will not know during the winter if it will be a drought year and adequate excess secondary effluent will be available to meet this production amount in all year types. [6]

Like the Schaaf & Wheeler source water analysis, the analyses herein ignore rain, evaporation, hauled wastes (saline and septage), and the water content of biosolids. These analyses use the same RO recovery rate of 81%. These analyses also exclude SRDF screening backwash flows for the same rationale as the Schaaf & Wheeler analysis. Specifically, when SRDF is operating, this indicates excess water is available for meeting all CSIP demands, and these flows are inconsistent year-to-year.

[6] If a drought year does occur and the drought reserve is full, then the summer injection rate will be reduced to prevent exceeding the permitted annual injection volumes and to enable more secondary-treated RTP effluent to be available for CSIP in peak irrigation months, when demands are high enough.

The analysis presented in this memorandum assumes the following for analyzing the effect of MCWD use of their initial phase demands of 600 AFY AWPF product:

- MCWD demand schedule is in accordance with Section 3.02 (a) of the Pure Water Delivery and Supply Project Agreement Between Monterey Regional Water Pollution Control Agency and Marina Coast Water District (M1W/MCWD Agreement), dated April 8, 2016 which was amended in December 2017.
- MCWD has rights to all wastewater they provide to M1W which was 1,218 AF during 2018 subject to restrictions noted in the schedule discussed in the prior bullet item. Specifically, MCWD annexed portions of the former Fort Ord into their service area which may increase their annual rights to recycled water but limit their use of these water rights in peak irrigation months pursuant to restrictions in the ARWRA.
- MCWD needs 822 AFY of source water for 600 AFY of product water for their irrigation needs, including screening, MF backwash, and RO concentrate losses and MCWD needs 741 AF as shown in the Schaaf & Wheeler source water memorandum referenced above when excluding waste flows returned to the headworks,
- MCWD will utilize their full 300 AFY summer water allocation between April and September each year.
- M1W will utilize 342 AFY of their 650 AFY summer water allocation (ARWRA 4.01 (a)) as needed to supplement MCWD's water supply demand between May and August each year.
- MCWD has rights to the remainder of their rights to return flows during the winter (October through March) plus reallocation of any summer water (April through September) they do not use during those winter months.
- MCWD will utilize 179 AFY of their wastewater rights during October through March each year.
- MCWD has enough water rights that their 600 AFY project can proceed in wet, normal, or drought conditions. During severe droughts, the amount of MCWD's unutilized water rights would be reduced slightly. Because of its special nature, MCWD's portion of the AWPF source water issue is described above and summarized in **Table 1**.

Table 1. Source Waters for MCWD During Wet, Normal or Drought Years (600 AFY)

Source Water	Total (AFY)	April to September (AF)	October to March (AF)
Product Water Demand	600	469	131
Secondary Effluent (Winter)	179	0	179
MCWD Summer Water	300	300	0
M1W ARWRA 4.01 1 (d)	342	342	0
Total Source Water Utilized	822	642	179
Unutilized MCWD Effluent Rights	738	0	738

- MCWD's use of their summer water rights directly plus use of a portion of M1W's ARWRA 4.01 1(d) water rights reduces the amount of water available for SVRP/CSIP by about 642 AF between April and September. The result is that -- independent from the Proposed Modifications -- new source waters may be needed by SVRP/CSIP to meet peak demands if the Salinas River Diversion Facility is not operating and MCWD and M1W use some of, or all, their wastewater rights from April through September. Similarly, about 179 AF of MCWD's winter water rights will be utilized between October and March; however, this use will only reduce the ocean discharge of secondary effluent.

RESULTS

Prioritization of Source Waters (All Scenarios)

The assumed source water prioritization and quantities available to M1W are identified in **Table 2** for the Approved PWM Project and in **Table 3** for the Proposed Modification. This prioritization can and will change based on many factors over the years. These factors include: infrastructure reliability, treatability and efficiencies, changing agreements, regulatory requirements, agricultural and industrial changes, and population/economic growth and recessions If there are no other infrastructure or external restrictions, including changes to agreements, priority will be based on minimizing water cost, including treatability/water quality and energy demands.

Table 2. Source Water Priority for Approved Project AWPF (All Scenarios)

Priority	Source Water	Quantity of Water Available to M1W in a Typical Year (Acre Feet per Year)
1	Secondary Effluent to Ocean Outfall	5,811
2	Reclamation Ditch	808
3	Blanco Drain	2,620
4	AWW**	3,099
5	Recycle Sump #1*	41
6	Recycle Sump #2*	104
7	Approved PWM Project and MCWD AWPF Backwashes*	290
8	Proposed Modifications AWPF Backwashes (only available for Modifications) *	152
9	SVRP Backwash*	515
10	Boronda*	95
11	Farmworker Housing*	18
12	M1W's ARWRA Summer Water (ARWRA Section IV 4.01 1(d))	650
13	SRDF Screening ***	95
14	Salinas IWTF Pond System ***	150
	Total Available for M1W (without AWW, SRDF & Salinas IWTF Pond)	**11,104**

*Values shown are for 2018. Drought year (2015) values are provided in the attachments. *Those source water marked with * are assumed available ½ for M1W to meet the AWPF influent needs for Seaside Groundwater Basin injections and ½ for SVRP influent for CSIP. The values shown above are the M1W portion of the water source. **AWW is only available if conditions precedent are met and are assumed to not be available for the Proposed Modifications for the purpose of this analysis. ***SRDF Screening and Salinas IWTF Pond System waters are assumed to not be available.*

Table 3. Source Water Priority for Proposed Modifications AWPF (All Scenarios)

Priority	Source Water
1	Secondary Effluent to Ocean Outfall
2	Recycle Sump #1
3	Recycle Sump #2
4	Approved PWM Project and MCWD AWPF Backwashes
5	Proposed Modifications AWPF Backwashes (152 AFY additional above Table 2 quantities)
6	SVRP Backwash
7	Boronda
8	Farmworker Housing
9	M1W's ARWRA Summer Water (ARWRA Section IV 4.01 1(d))
Potential water quantities were provided in **Table 2, except as noted.**	

Scenario 1 (N-In): Source Waters for Normal/Wet Year Operation of AWPF While Building a Drought Reserve Assuming Conditions Precedent Are Met

Table 4 shows results of this analysis of water sources/types that would be available for AWPF influent (excluding MCWD which is covered in **Table 1**, above) to achieve the yield of the Approved PWM Project in a normal year of AWPF production (3,700 AFY), which includes Seaside Basin injections to build a reserve, assuming the Conditions Precedent are met. **Table 5** shows the parallel results for the Proposed Modifications to achieve a yield of 2,250 AFY production. **Table 6** shows the volumes of source waters to which M1W has existing water rights that will be left over after use of all of the flows needed for the full normal/wet year operation of an approved PWM Project and Proposed Modifications, including building a reserve and supplying MCWD's RUWAP demands (6,550 AFY total). These results are based on the assumptions listed above. **Figure 4** shows the results of this scenario of use of the various source waters for the Approved PWM Project and for the Proposed Modifications by month. **Attachment 1** provides the spreadsheet showing the detailed month by month use of the various waters.

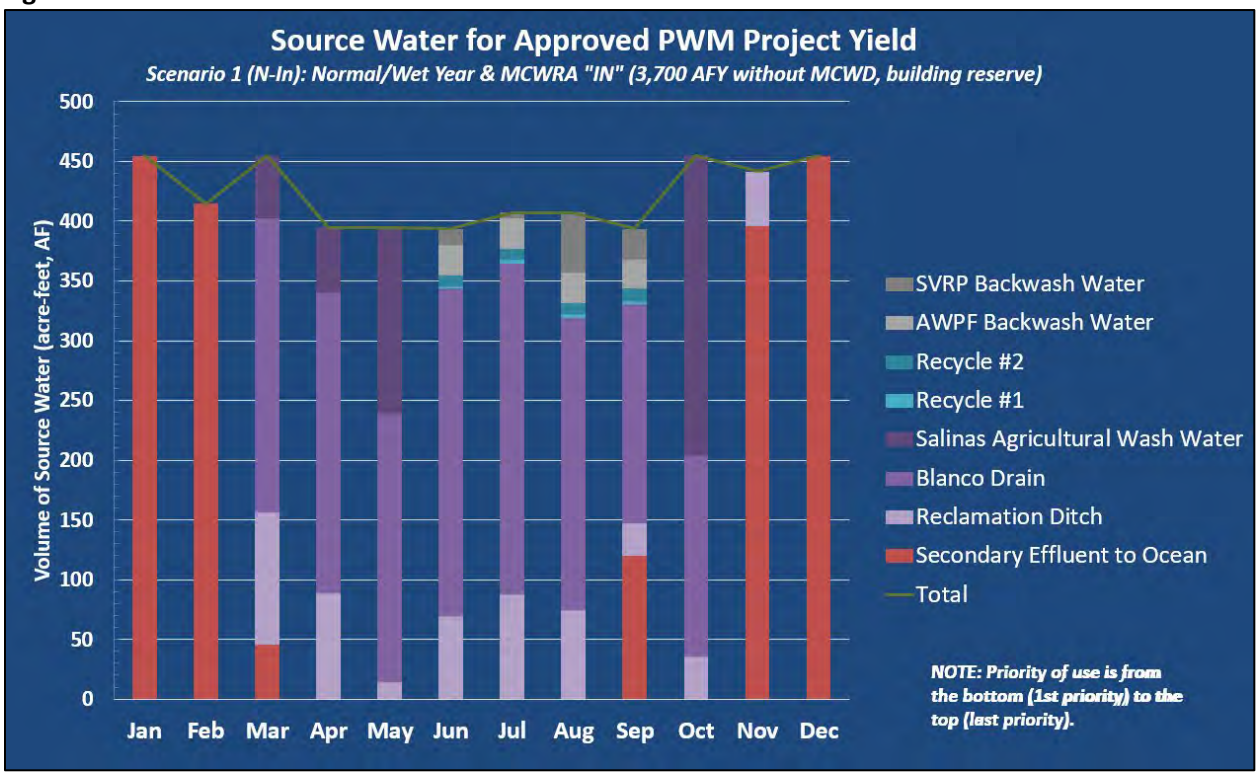
Table 4. Typical Source Waters Utilized for the Approved PWM Project (no MCWD) During Wet or Normal Years (3,700 AFY of AWPF Production) Assuming Conditions Precedent Are Met

Source Water	Total (AFY)	April to September (AF)	October to March (AF)
Excess Secondary Effluent to Outfall	*1,885*	*120*	*1,765*
SVRP Backwash	94	94	0
Boronda	0	0	0
Farmworker Housing	0	0	0
Recycle Sump #1	11	11	0
Recycle Sump #2	38	38	0
Approved PWM Project AWPF Backwash Flows	101	101	0
Reclamation Ditch	555	362	193
Blanco Drain	1,870	1,456	414
Ag Wash Water (October thru May)	**513**	**210**	**303**
Total Source Water	**5,067**	**2,391**	**2,675**
Total Backwash (Screening & MF) Returned to RTP	**499**	**235**	**263**
Total RO Concentrate to Outfall	**868**	**410**	**458**
Total AWPF Product Water	**3,700**	**1,746**	**1,954**

Table 5. Typical Source Waters Utilized for the Proposed Modifications During Wet or Normal Years (2,250 AFY of AWPF Production) Assuming Conditions Precedent Are Met

Source Water	Total (AFY)	April to September (AF)	October to March (AF)
Excess Secondary Effluent to Outfall	*2,595*	*66*	*2,529*
SVRP Backwash	195	195	0
Boronda	32	32	0
Farmworker Housing	5	5	0
Recycle Sump #1	7	7	0
Recycle Sump #2	18	18	0
PWM Project AWPF Backwash Flows	47	47	0
Additional AWPF Backwash Flows w/ Proposed Modifications	22	22	0
Reclamation Ditch	0	0	0
Blanco Drain	0	0	0
M1W ARWRA 4.01 1 (d)	159	159	0
Total Source Water	**3,081**	**551**	**2,530**
Total Backwash (Screening & MF) Returned to RTP	**303**	**54**	**249**
Total RO Concentrate to Outfall	**528**	**94**	**433**
Total AWPF Product Water	**2,250**	**403**	**1,847**

Figure 4. Source Water Use Scenario 1 Charts



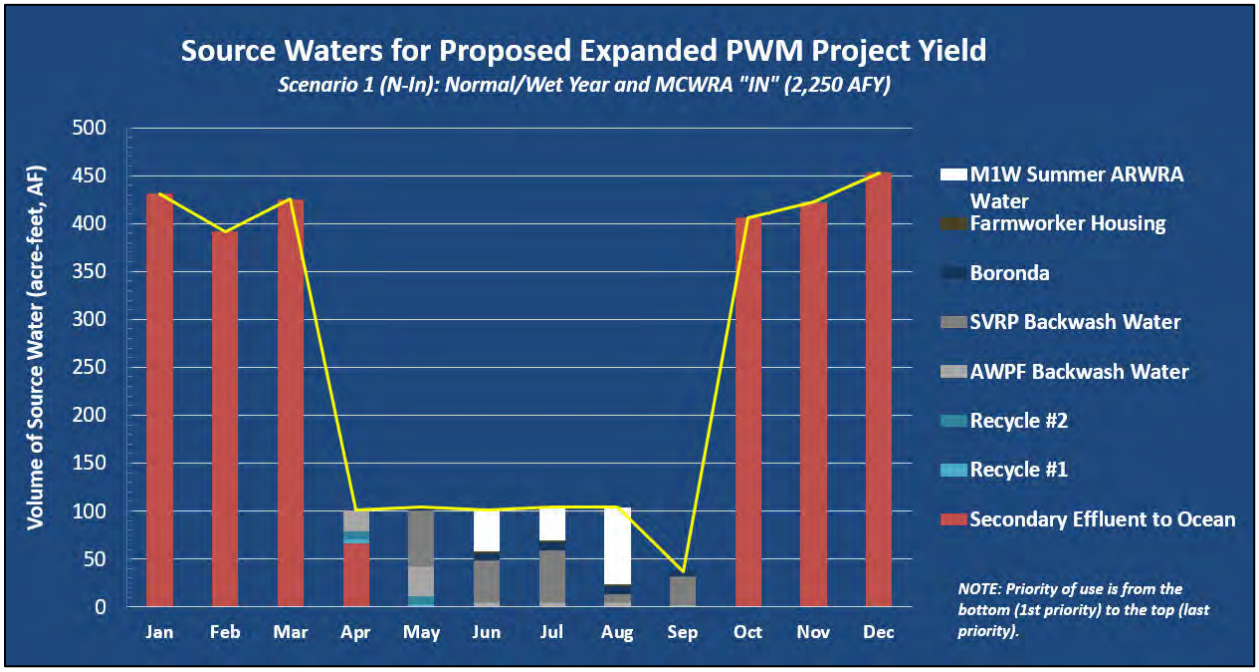


Table 6. Excess Winter Secondary Effluent, New Source Waters, and M1W Water Rights Remaining After Approved PWM Project (including MCWD RUWAP Phase 1) and Proposed Modifications During Wet or Normal Years (AWPF Producing 6,550 AFY, Total) Assuming Conditions Precedent Are Met

Source Water	Total (AFY)	April to September (AF)	October to March (AF)
Excess Unused Secondary Effluent to Outfall	***1,331***	***0***	***1,331***
M1W Source Waters			
SVRP Backwash	226	50	175
Boronda	63	16	47
Farmworker Housing	12	5	7
Recycle Sump #1	23	0	23
Recycle Sump #2	48	0	48
PWM Base Project and MCWD AWPF Backwashes	142	2	140
PWM Expansion Project AWPF Backwashes	129	5	124
Reclamation Ditch	253	0	253
Blanco Drain	750	0	750
M1W ARWRA 4.01 1 (d)	149	149	0
Total Unused Source Waters (excluding *Excess Unused Secondary Effluent to Ocean, above*)	**1,797**	**227**	**1,4570**
Total Unused Source Waters (including *Excess Unused Secondary Effluent to Ocean, above*)	**3,128**	**227**	**2,901**

** The ability to use Salinas Ag Wash Water and Storm Water that goes to the Salinas River would increase water remaining available for recycling by approximately 2,600 AFY, in this case (peaking in the summer).*

Scenario 2 (D-In): Source Waters for Drought Year Operation of AWPF With a Full Drought Reserve Assuming Conditions Precedent Are Met

A drought year, as mentioned above, does not affect MCWD water demands and only minimally their source waters. If conditions precedent in ARWRA Section 16.15 are completed, AWPF production under the approved PWM Project will be reduced to approximately 2,500 AFY during a drought year with a full drought reserve (reduction of 1,200 AFY production (including elimination, for one year, of building the drought reserve) and reducing AWPF influent by over 1,600 AFY) during the irrigation season. If conditions precedent in ARWRA Section 16.15 are not completed, then there would be no requirement for M1W to build a drought reserve for MCWRA and this reduction would not be required. The drought year source water availability estimates for Blanco Drain and Reclamation Ditch are based on Schaaf & Wheeler's report (Appendix I of the Draft SEIR) assuming the 2015 calendar year data (a severe drought condition). The SVRP backwash flow was estimated assuming CSIP optimization to maximize the number of days the SVRP would be producing water. The same source water priorities (**Tables 2 & 3**) will apply in a drought. The expectation is that winter production of purified water would be maximized in all years, such that during the winters of a drought year, flows to the ocean would be decreased further. The analysis in this scenario assumes that the Drought Reserve is available as a tool to provide water to CSIP in dry years.

Table 7 shows the results of this analysis of water sources/types needed for AWPF influent for the Approved PWM Project analysis for a drought year (2,500 AFY of production) starting with a full drought reserve. **Table 8** shows the results of this analysis of source waters to produce an additional 2,250 AFY of purified recycled water in a drought year. **Figure 5** shows the results of this scenario of use of the various

source waters for the Approved PWM Project and for the Proposed Modifications by month. **Table 9** shows the types and amounts of water rights that M1W will retain after satisfying the influent needs for the AWPF with the Approved PWM Project and Proposed Modifications to expand the AWPF capacity (a total of 4,637 AFY, which includes 2,500 AFY for Approved PWM Project injections, 600 AFY for MCWD irrigation, and 1,537 AFY for Proposed Modifications injections) during a drought year. **Attachment 2** provides the detailed analysis of drought year source water uses.

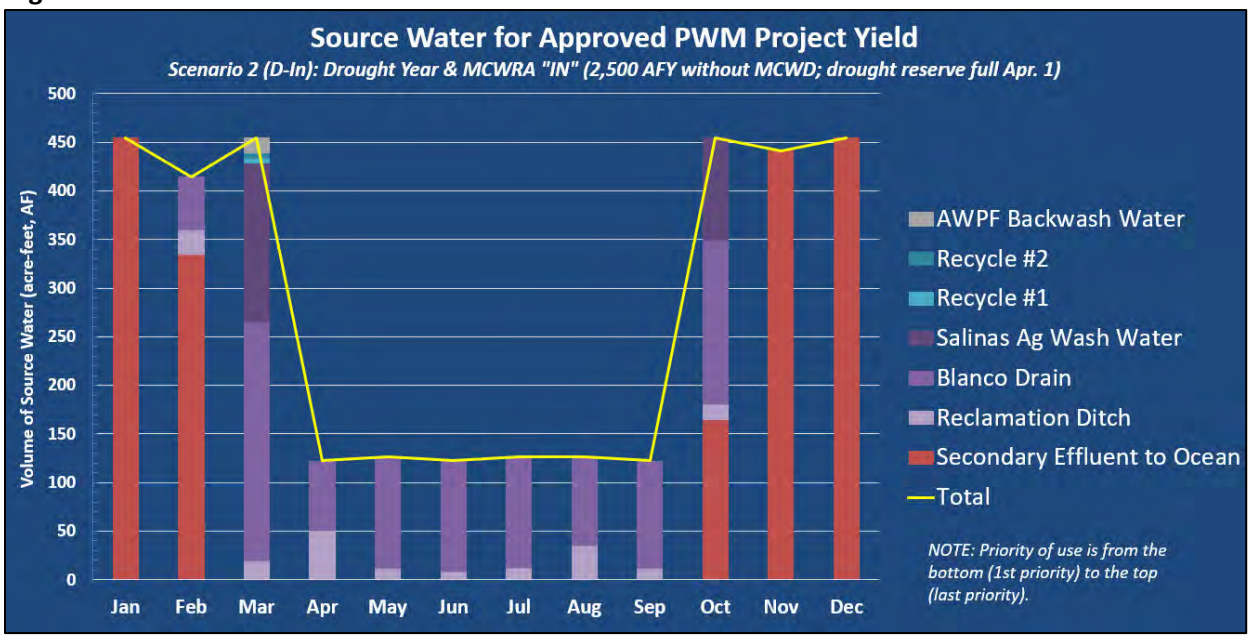
Table 7. Source Waters to be Used for the Approved PWM Project (2,500 AFY of yield, excludes MCWD) During Drought Year with Full Drought Reserve of 1,000 AF Assuming Conditions Precedent Are Met

Source Water	Total (AFY)	April to September (AF)	October to March (AF)
Secondary Effluent to Outfall	*1,850*	*0*	*1,850*
Reclamation Ditch	187	127	60
Blanco Drain	1,090	621	469
AWW (March & October only)	269	0	269
Recycle Sump #1	5	0	5
Recycle Sump #2	5	0	5
PWM Base Project and MCWD AWPF Backwashes	17	0	17
SVRP Backwash	0	0	0
Boronda	0	0	0
Farmworker Housing	0	0	0
M1W ARWRA 4.01 1 (d)	0	0	0
Total Source Water	**3,423**	**748**	**2,675**
Total Backwash (Screening & MF) Returned to RTP	**337**	**74**	**263**
Total RO Concentrate to Outfall	**586**	**128**	**458**
Total AWPF Product Water	**2,500**	**546**	**1,954**

Table 8. Source Waters to be Used for the Proposed Modifications to the PWM Project Yield During Drought Years (2,250 AFY using 133 AF Operating Reserve) Assuming Conditions Precedent Are Met

Source Water	Total (AFY)	April to September (AF)	October to March (AF)
Secondary Effluent to Outfall	*1,779*	*90*	*1,689*
Recycle Sump #1	23	18	5
Recycle Sump #2	72	55	17
PWM Base Project and MCWD AWPF Backwashes	122	68	54
PWM Expansion Project AWPF Backwashes	78	45	33
SVRP Backwash	442	302	139
Boronda	61	38	23
Farmworker Housing	10	7	3
M1W ARWRA 4.01 1 (d)	310	294	16
Reclamation Ditch	0	0	0
Blanco Drain	0	0	0
Total Source Water	**2,898**	**918**	**1,981**
Total Backwash (Screening & MF) Returned to RTP	***285***	***90***	***195***
Total RO Concentrate to Outfall	***496***	***157***	***339***
Total AWPF Product Water	***2,116***	***670***	***1,446***

Figure 5. Source Water Use Scenario 2 Charts



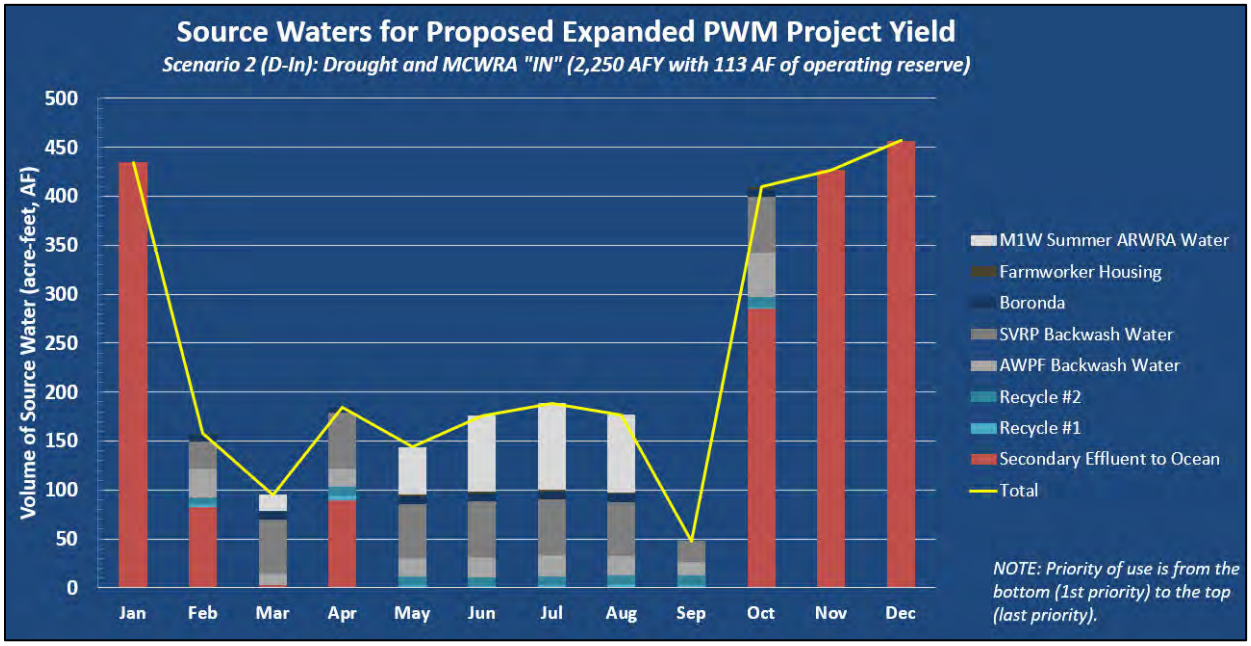


Table 9. Excess Winter Secondary Effluent, New Source Waters, and M1W Water Rights Remaining after Approved PWM Project (including MCWD RUWAP Phase 1), and Proposed Modifications During Wet or Normal Years (AWPF Producing 5,350 AFY) Assuming Conditions Precedent Are Met

Source Water	Total (AFY)	April to September (AF)	October to March (AF)
Secondary Effluent to Outfall	2,023	0	2,023
SVRP Backwash	108	35	73
Boronda	34	10	24
Farmworker Housing	7	3	4
Recycle Sump #1	13	0	13
Recycle Sump #2	26	0	26
PWM Base Project and MCWD AWPF Backwashes	70	0	70
PWM Expansion Project AWPF Backwashes	65	0	65
Reclamation Ditch	205	0	205
Blanco Drain	1,530	835	695
M1W ARWRA 4.01 1 (d)	0	0	0
Total Unused Source Waters (excluding *Excess Unused Secondary Effluent to Ocean, above*)	2,059	884	1,175
Total Unused Source Waters (including *Excess Unused Secondary Effluent to Ocean, above)*	4,082	884	3,198

* Salinas Ag Wash Water and Storm Water that drains from the City of Salinas to the Salinas River, if available to M1W for diversion, would increase secondary effluent remaining available for recycling by approximately 2,700 AFY.

Scenario 3 (N-Out): Source Waters for Normal/Wet Year Operation of AWPF While Building an Operating Reserve Assuming Conditions Precedent Are Not Met

Table 10 shows results of this analysis of water sources/types that would be available for AWPF influent (excluding MCWD which is covered in **Table 1**, above) to achieve the yield of the Approved PWM Project in a normal year of AWPF production (3,700 AFY), which includes Seaside Basin injections to build an Operating Reserve, assuming the Conditions Precedent are not met. **Table 11** shows the parallel results for the Proposed Modifications to achieve a yield of 2,250 AFY production, assuming the Conditions Precedent are not met. The Proposed Modifications would be dependent upon a Water Purchase Agreement (WPA) with California American Water Company. It is assumed, as with the existing WPA that the Operating Reserve would be one-half the average annual production (1,750 AF for the Approved PWM Project plus 1,125 AF for the Proposed Modifications or 2,875 AF total). **Figure 6** shows the results of this scenario of use of the various source waters for the Approved PWM Project and for the Proposed Modifications by month. **Table 12** shows the volumes of source waters to which M1W has existing water rights that will be left over after use of all of the flows needed for the full normal/wet year operation of the approved PWM Project and Proposed Modifications, including building an Operating Reserve and supplying MCWD's RUWAP Phase 1 demands (6,550 AFY total), assuming Conditions Precedent are not met. These results are based on the assumptions listed above. **Attachment 3** provides the spreadsheet showing the detailed month by month usage of the various waters.

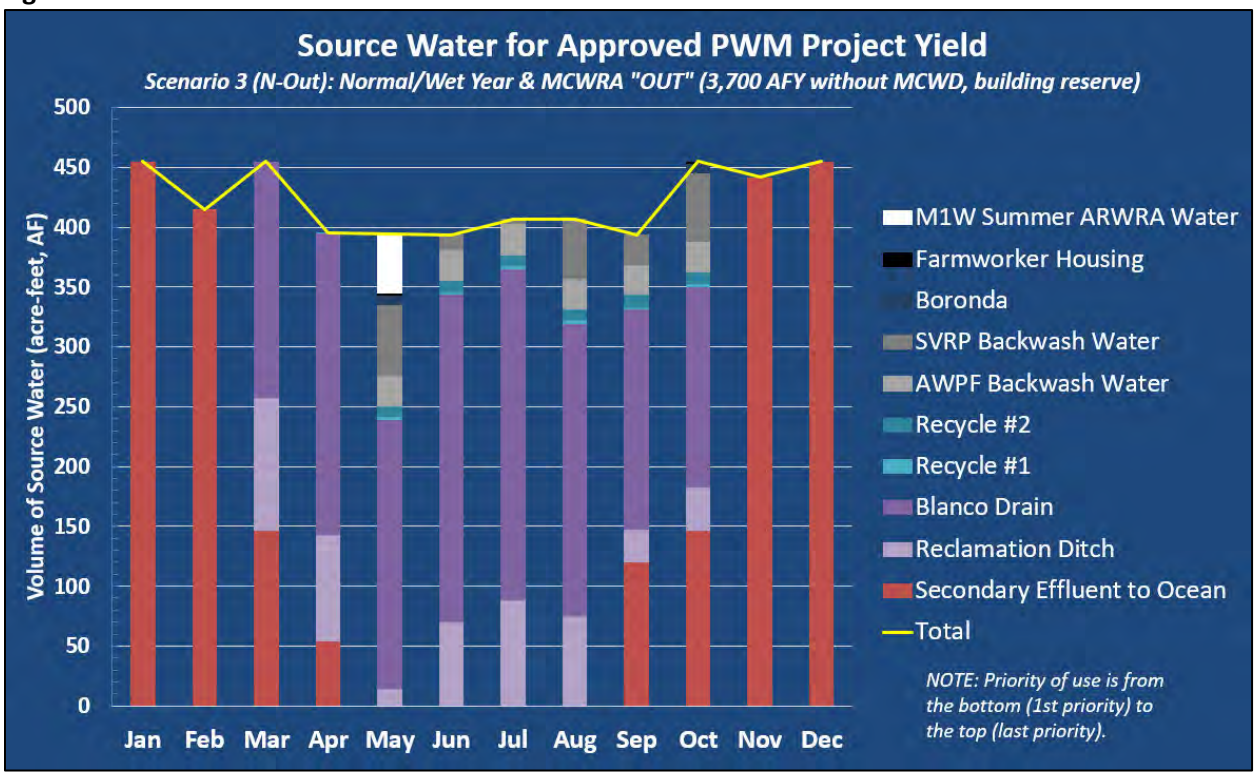
Table 10. Typical Source Waters Utilized for the Approved PWM Project (no MCWD) During Wet or Normal Years While Building an Operating Reserve (3,700 AFY of AWPF Production) Assuming Conditions Precedent Are Not Met

Source Water	Total (AFY)	April to September (AF)	October to March (AF)
Secondary Effluent to Outfall	*2,232*	*174*	*2,059*
Reclamation Ditch	509	362	147
Blanco Drain	1,821	1,456	365
Recycle Sump #1	17	14	3
Recycle Sump #2	56	47	10
Approved PWM Project and MCWD AWPF Backwashes	151	126	25
SVRP Backwash	210	153	57
Boronda	16	8	8
Farmworker Housing	4	2	2
M1W's ARWRA Summer Water (ARWRA §IV 4.01 1(d))	50	50	0
Total Source Water	**5,066**	**2,391**	**2,675**
Total Backwash (Screening & MF) Returned to RTP	***499***	***235***	***263***
Total RO Concentrate to Outfall	***868***	***410***	***458***
Total AWPF Product Water	***3,700***	***1,746***	***1,954***

Table 11. Typical Source Waters Utilized for the Proposed Modifications During Wet or Normal Years (2,250 AFY of AWPF Production) Assuming Conditions Precedent Are Not Met

Source Water	Total (AFY)	April to September (AF)	October to March (AF)
Secondary Effluent to Outfall	*2,358*	*12*	*2,346*
Recycle Sump #1	12	4	8
Recycle Sump #2	24	9	15
Approved PWM Project and MCWD AWPF Backwashes	70	23	47
Proposed Modifications AWPF Backwashes	79	27	52
SVRP Backwash	223	187	36
Boronda	48	40	8
Farmworker Housing	9	9	1
M1W ARWRA 4.01 1 (d)	258	258	0
Reclamation Ditch	0	0	0
Blanco Drain	0	0	0
Total Source Water	**3,081**	**568**	**2,513**
Total Backwash (Screening & MF) Returned to RTP	***303***	***56***	***247***
Total RO Concentrate to Outfall	***528***	***97***	***431***
Total AWPF Product Water	***2,250***	***415***	***1,835***

Figure 6. Source Water Use Scenario 3 Charts



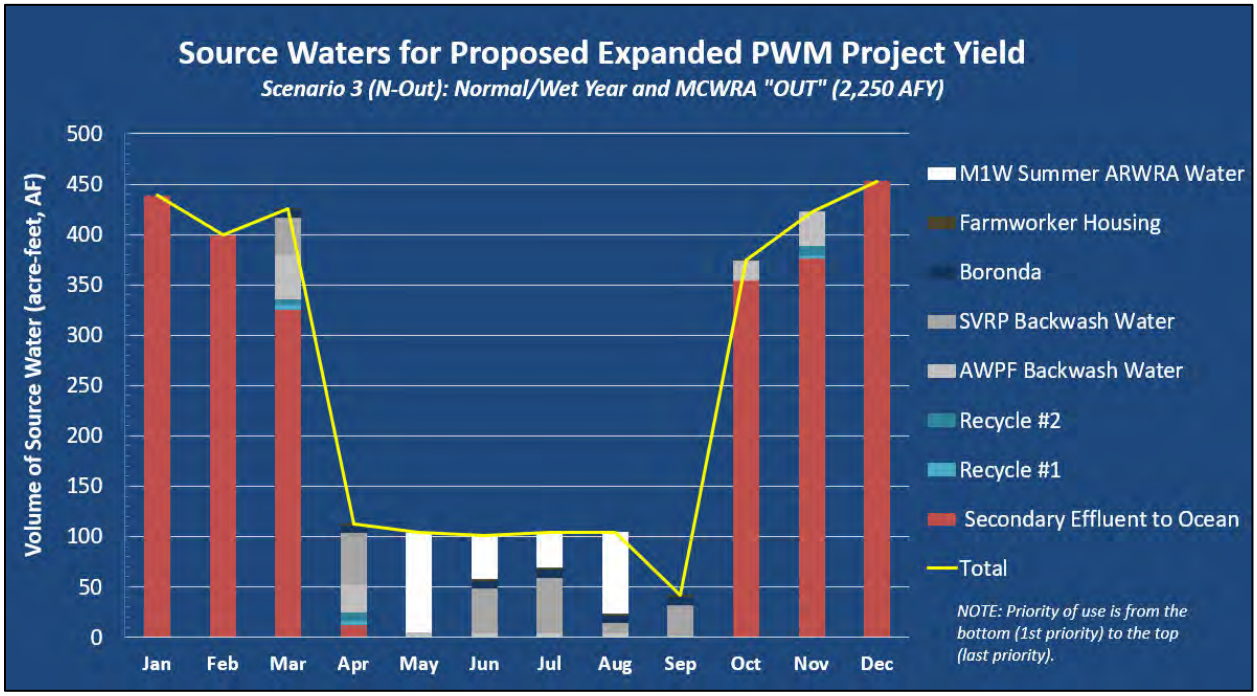


Table 12. Excess Winter Secondary Effluent, New Source Waters, and M1W Water Rights Remaining after the Approved PWM Project (including MCWD RUWAP Phase 1), and Proposed Modifications During Wet or Normal Years (AWPF Producing 6,550 AFY, Total) Assuming Conditions Precedent Are Not Met

Source Water	Total (AFY)	April to September (AF)	October to March (AF)
Secondary Effluent to Outfall	1,221	0	1,221
Recycle Sump #1	13	0	13
Recycle Sump #2	24	0	24
PWM Base Project and MCWD AWPF Backwashes	68	0	68
PWM Expansion Project AWPF Backwashes	72	0	72
SVRP Backwash	82	0	82
Boronda	31	0	31
Farmworker Housing	4	0	4
M1W ARWRA 4.01 1 (d)	0	0	0
Reclamation Ditch	299	0	299
Blanco Drain	799	0	799
Total Unused Source Waters (excluding *Excess Unused Secondary Effluent to Ocean, above*)	***1,393***	***0***	***1,393***
Total Unused Source Waters (including *Excess Unused Secondary Effluent to Ocean, above)*	***2,614***	***0***	***2,614***

Scenario 4 (D-Out): Source Waters for Drought Year Operation of AWPF With a Full Operating Reserve Assuming Conditions Precedent Are Not Met

A drought year, as mentioned above, does not affect MCWD water demands and only minimally their source waters. If conditions precedent in ARWRA Section 16.15 are not met, AWPF production under the approved PWM Project will remain 3,500 AFY during a drought year with a full Operating Reserve. If conditions precedent in ARWRA Section 16.15 are not completed, then there would be no drought reserve and no reduction in AWPF production in a drought. The drought year source water availability estimates for Blanco Drain and Reclamation Ditch are based on Schaaf & Wheeler's report (Appendix I of the Draft SEIR) assuming the 2015 calendar year data (a severe drought condition). The SVRP backwash flow was estimated assuming CSIP optimization to maximize the number of days the SVRP would be producing water. The same source water priorities (**Tables 2 & 3**) will apply in a drought. The expectation is that winter production of purified water would be maximized in all years, such that during the winters of a drought year, flows to the ocean would be decreased further. The analysis in this section assumes that the Operating Reserve is available as a tool to provide water to Cal Am in dry years.

Table 13 shows the results of this analysis of water sources/types needed for AWPF influent for the Approved PWM Project analysis for a drought year (3,500 AFY of production) starting with a full Operating Reserve. **Table 14** shows how 713 AF of the Operating Reserve would be utilized so that only 1,537 AFY of additional purified recycled water would need to be produced in the drought year. **Figure 7** shows the results of this scenario of use of the various source waters for the Approved PWM Project and for the Proposed Modifications by month. **Table 15** shows the types and amounts of water rights that M1W will retain after satisfying the influent needs for the AWPF with the Approved PWM Project and Proposed Modifications to expand the AWPF capacity (a total of 5,637 AFY, which includes 3,500 AFY for Approved PWM Project injections, 600 AFY for MCWD irrigation, and 1,537 AFY for Proposed Modifications injections) during a drought year). **Attachment 4** provides the detailed analysis of drought year source water uses.

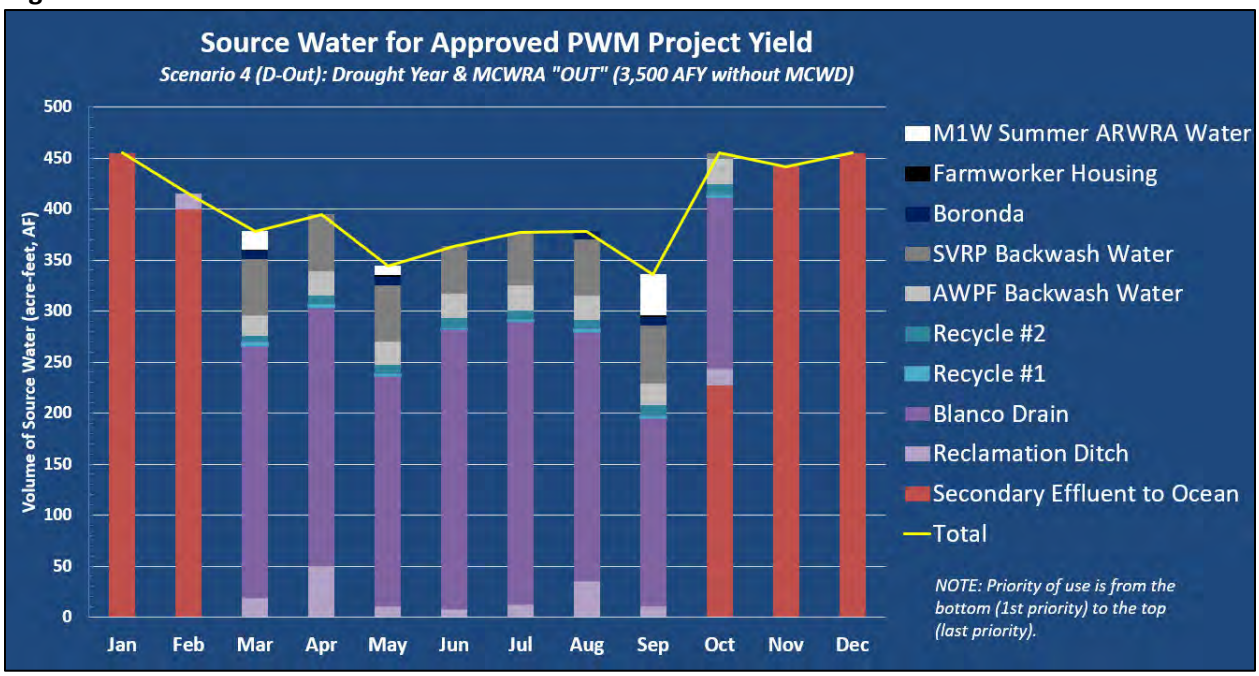
Table 13. Source Waters to be Used for the Approved PWM Project (3,500 AFY of yield, excludes MCWD) During Drought Year with Full Operating Reserve of 1,000 AF Assuming Conditions Precedent Are Not Met

Source Water	Total (AFY)	April to September (AF)	October to March (AF)
Secondary Effluent to Outfall	*1,978*	*0*	*1,978*
Reclamation Ditch	177	127	50
Blanco Drain	1,870	1,456	414
Recycle Sump #1	26	18	8
Recycle Sump #2	70	55	15
Approved PWM Project and MCWD AWPF Backwashes	185	140	46
SVRP Backwash	382	321	61
Boronda	32	24	8
Farmworker Housing	4	4	1
M1W ARWRA 4.01 1 (d)	68	50	19
Total Source Water	**4,793**	**2,194**	**2,599**
Total Backwash (Screening & MF) Returned to RTP	***472***	***216***	***256***
Total RO Concentrate to Outfall	***821***	***376***	***445***
Total AWPF Product Water	***3,500***	***1,602***	***1,898***

Table 14. Source Waters to be Used for the Proposed Modifications to the PWM Project Yield During Drought Years (2,250 AFY using 713 AF of Operating Reserve) Assuming Conditions Precedent Are Not Met

Source Water	Total (AFY)	April to September (AF)	October to March (AF)
Secondary Effluent to Outfall	*1,651*	*90*	*1,651*
Recycle Sump #1	3	0	3
Recycle Sump #2	7	0	7
Approved PWM Project and MCWD AWPF Backwashes	21	0	21
Proposed Modifications AWPF Backwashes	39	19	19
SVRP Backwash	95	16	79
Boronda	39	24	15
Farmworker Housing	9	7	3
M1W ARWRA 4.01 1 (d)	239	239	0
Reclamation Ditch	0	0	0
Blanco Drain	0	0	0
Total Source Water	**2,104**	**395**	**1,709**
Total Backwash (Screening & MF) Returned to RTP	***207***	***39***	***168***
Total RO Concentrate to Outfall	***361***	***68***	***293***
Total AWPF Product Water	***1,537***	***289***	***1,248***

Figure 7. Source Water Use Scenario 4 Charts



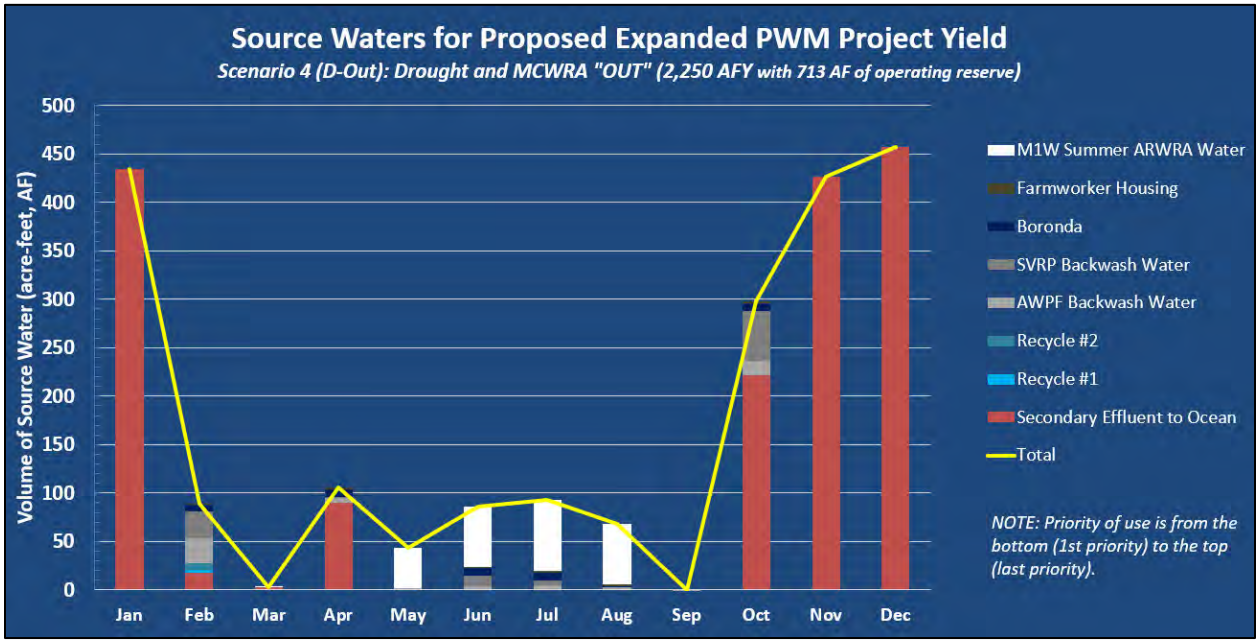


Table 15. Excess Winter Secondary Effluent, New Source Waters, and M1W Water Rights Remaining After Proposed Modifications to PWM Project During Drought Year (5,350 AFY, of AWPF production) Assuming Conditions Precedent Are Not Met

Source Water	Total (AFY)	April to September (AF)	October to March (AF)
Secondary Effluent to Outfall	2,023	0	2,023
SVRP Backwash	73	0	73
Boronda	24	0	24
Farmworker Housing	4	0	4
Recycle Sump #1	13	0	13
Recycle Sump #2	26	0	26
Approved PWM Project and MCWD AWPF Backwashes	70	0	70
Proposed Modifications AWPF Backwashes	65	0	65
Reclamation Ditch	215	0	215
Blanco Drain	750	0	750
M1W ARWRA 4.01 1 (d)	0	0	0
Total Unused Source Waters (excluding *Excess Unused Secondary Effluent to Ocean, above*)	***1,240***	***0***	***1,240***
Total Unused Source Waters (including Excess Unused Secondary Effluent to Ocean, above)	***3,263***	***0***	***3,263***

CONCLUSIONS

As shown above and in Appendix I of the Draft SEIR, the wastewater flows available for M1W to use to meet recycled water demands from the AWPF are substantial No other reasonably foreseeable projects that would increase CSIP demands or other recycled water use of these waters have been proposed or presented to M1W indicating an imminent reduction in availability. Even if the MCWRA takes its full rights to municipal wastewater within the 2001 service area, and the rights given via contract under the ARWRA, M1W would still have sufficient water rights for achieving the yield anticipated for the Proposed Modifications.

If Conditions Precedent are met, secondary effluent otherwise discharged to the ocean, wastewater from outside the 2001 service area, Blanco Drain, Reclamation Ditch, AWW, the Drought Reserve and Operating Reserve (during drought years), and the ARWRA water (4.01 1(d)) provide more than sufficient water for the Approved PWM Project. Secondary effluent otherwise discharged to the ocean, one-half of wastewater from outside the 2001 service area, and the ARWRA water (4.01 1(d)) provide more than sufficient source water for the Proposed Modifications in wet, normal, and drought conditions.

If Conditions Precedent are not met, secondary effluent otherwise discharged to the ocean, wastewater from outside the 2001 service area, Blanco Drain, Reclamation Ditch, the Operating Reserve (during drought year), and the ARWRA water (4.01 1(d)) provide more than sufficient water for the Approved PWM Project. Secondary effluent otherwise discharged to the ocean, one-half of wastewater from outside the 2001 service area, and the ARWRA water (4.01 1(d)), and the Operating Reserve provide more than sufficient source water for the Proposed Modifications in wet, normal, and drought conditions. In the future, City of Salinas IWTF Pond 3 Water and stormwater could also be available.

Attachment 1

Scenario 1 (N-In): Source Water Use During Normal/Wet Years and Conditions Precedent Are Met

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Apr-Sep	Oct-Mar
Source Water for M1W Portion of Base Project (3,700 AFY after removing 600 AFY MCWD's Portion from the 4,300 AFY total, building reserve)															
Source Water Needed for M1W Portion of Base Project (3,700)	455	415	455	395	395	394	407	407	394	455	441	455	**5,067**	2,391	2,675
Secondary Effluent to Ocean used for base project, 1st priority	455	415	46	0	0	0	0	0	120	0	395	455	**1,885**	120	1,765
Secondary Effluent to Ocean Remaining after Base Project	882	474	426	66	0	0	0	0	0	501	422	1155	**3,926**	66	3,860
Feed water needed after ocean flows	0	0	409	395	395	394	407	407	274	455	46	0	**3,182**	2,272	910
Reclamation Ditch used for base project, 2nd priority	0	0	111	89	14	70	88	75	27	36	46	0	**555**	362	193
Reclamation Ditch Flows remaining after Base Project	81	18	0	0	0	0	0	0	0	0	19	136	**253**	0	253
Feed Water needed after Reclamation Ditch	0	0	298	306	381	324	319	332	247	419	0	0	**2,627**	1,909	717
Blanco Drain used for base project, 3rd priority	0	0	246	252	225	274	277	244	184	168	0	0	**1,870**	1,456	414
Blanco Drain Flows after Base Project	209	223	0	0	0	0	0	0	0	0	133	185	**750**	0	750
Feed Water needed after Blanco Drain	0	0	52	54	156	50	42	88	63	251	0	0	**757**	453	303
AWW used for base project, 4th priority	0	0	52	54	156	0	0	0	0	251	0	0	**513**	210	303
AWW Flows remaining after Base Project	184	149	130	206	150	305	318	319	305	82	252	186	**2,585**	1,603	982
Feed Water needed after Reclamation Ditch	0	0	0	0	0	50	42	88	63	0	0	0	**243**	243	0
Recycle #1 used for base project, 5th priority	0	0	0	0	0	2	3	4	2	0	0	0	**11**	11	0
M1W's Portion of Recycle #1 after Base Project	7	3	5	5	3	0	0	0	0	3	3	3	**30**	7	23
Feed Water needed after Recycle #1	0	0	0	0	0	48	40	84	60	0	0	0	**232**	232	0
Recycle #2 used for Base Project, 6th priority	0	0	0	0	0	9	9	9	11	0	0	0	**38**	38	0
M1W's portion of Recycle #2 after base project	9	7	5	9	9	0	0	0	0	10	10	8	**66**	18	49
Feed Water needed after Recycle #2 water	0	0	0	0	0	39	31	75	50	0	0	0	**195**	195	0
PWM Base Project Backwash Water used for Base Project, 7th priority	0	0	0	0	0	25	26	25	24	0	0	0	**101**	101	0
M1W's portion of AWPF Backwash Water from base project after Base Project (1/2)	24	21	24	23	25	0	0	0	0	25	23	23	**189**	49	140
Feed Water needed after AWPF Backwash water	0	0	0	0	0	13	4	50	26	0	0	0	**94**	94	0
SVRP Backwash Water used for base project, 8th priority	0	0	0	0	0	13	4	50	26	0	0	0	**94**	94	0
M1W's portion of SVRP Backwash Water after Base Project	18	13	36	50	59	43	54	9	31	57	45	6	**421**	246	175
Feed Water needed after SVRP Backwash	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
Boronda used for base project, 9th priority	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
M1W's Portion of Boronda after Base Project	8	7	8	8	8	8	8	8	8	8	8	8	**95**	48	47
Feed Water needed after Boronda	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
Farmworker Housing used for Base Project 10th priority	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
M1W's Portion of Farmworker Housing after Base Project	1	1	1	2	2	2	2	2	2	2	2	1	**17**	11	7
Remaining Source Waters needed after Farmworker Housing	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
M1W Summer ARWRA Water used only for Expansion remaining after MCWD Project, 11th prio	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
M1W ARWRA Remaining Summer Water after MCWD, Base & Expansion Projects	0	0	0	0	50	82	93	83	0	0	0	0	**308**	308	0
Remaining Source Waters needed after ARWRA	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0

Source Waters for 2,250 AFY Proposed Expanded PWM/GWR Project--Winter Peaking Flow Scenario	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Apr-Sep	Oct-Mar
Source Waters needed for 2,250 AFY Expansion	431	392	425	101	104	101	104	104	37	406	423	453	**3,081**	551	2,530
Secondary Effluent to Ocean used for Expansion after Base Project, 1st Priority*	431	392	425	66	0	0	0	0	0	406	422	453	**2,595**	66	2,529
Remaining Effluent to Ocean after Base & Expansion Projects	451	83	0	0	0	0	0	0	0	94	0	702	**1,331**	0	1,331
Remaining Source Waters needed for Expansion after Ocean Flows	0	0	0	35	104	101	104	104	37	0	0	0	**486**	485	0
Recycle #1 after base project used for expansion, 2nd priority	0	0	0	5	3	0	0	0	0	0	0	0	**7**	7	0
M1W's Portion of Recycle #1 after Base & Expansion Projects	7	3	5	0	0	0	0	0	0	3	3	3	**23**	0	23
Feed Water needed after Recycle #1	0	0	0	30	102	101	104	104	37	0	0	0	**478**	478	0
Recycle #2 after base project used for Expansion, 3rd priority	0	0	0	9	9	0	0	0	0	0	0	0	**18**	18	0
M1W's portion of Recycle #2 after base & expansion Projects	9	7	5	0	0	0	0	0	0	10	9	8	**48**	0	48
Feed Water needed after Recycle #2 water	0	0	0	22	93	101	104	104	37	0	0	0	**460**	460	0
M1W's portion of PWM Base Backwash Water from Base used for Expansion Project, 4th Priority	0	0	0	22	25	0	0	0	0	0	0	0	**47**	47	0
M1W portion of Base PWM Backwash after Base & Expansion Projects	24	21	24	2	0	0	0	0	0	25	23	23	**142**	2	140
Remaining Source Waters needed after M1W Portion of AWPF Backwash	0	0	0	0	67	101	104	104	37	0	0	0	**413**	413	0
M1W's portion of PWM Expansion Backwash Water used for Expansion Project , 5th priority	0	0	0	0	5	5	5	5	2	0	0	0	**22**	22	0
M1W portion of PWM Expansion Backwash Water after Base & Expansion Projects	21	19	21	5	0	0	0	0	0	20	21	22	**129**	5	124
Feed Water needed after AWPF Expansion Backwash water	0	0	0	0	62	96	99	99	35	0	0	0	**391**	391	0
M1W's portion of SVRP Backwash Water used for expansion after Base Project, 6th Priority	0	0	0	0	59	43	54	9	31	0	0	0	**195**	195	0
M1W's portion of SVRP Backwash after Base & Expansion Projects	18	13	36	50	0	0	0	0	0	57	45	6	**226**	50	175
Remaining Source Waters needed after SVRP Backwash	0	0	0	0	3	53	45	91	5	0	0	0	**196**	196	0
Boronda after base project used for expansion, 7th priority	0	0	0	0	3	8	8	8	5	0	0	0	**32**	32	0
M1W's Portion of Boronda after Base & Expansion Projects	8	7	8	8	5	0	0	0	3	8	8	8	**63**	16	47
Feed Water needed after Boronda	0	0	0	0	0	45	37	82	0	0	0	0	**164**	164	0
Farmworker Housing after Base Project used for Expansion, 8th priority	0	0	0	0	0	2	2	2	0	0	0	0	**5**	5	0
M1W's Portion of Farmworker Housing after Base & Expansion Projects	1	1	1	2	2	0	0	0	2	2	2	1	**12**	5	7
Remaining Source Waters needed after Farmworker Housing	0	0	0	0	0	43	35	81	0	0	0	0	**159**	159	0
M1W Summer ARWRA Water used for Expansion remaining after MCWD Project, 9th priority	0	0	0	0	0	43	35	81	0	0	0	0	**159**	159	0
M1W ARWRA Summer Water Remaining after MCWD, Base & Expanded PWM	0	0	0	0	50	39	58	2	0	0	0	0	**149**	149	0
Remaining Source Waters needed after ARWRA	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0

**Available if otherwise not collected or would be discharged to ocean*

M1W Source Waters Not Used for Approved or Proposed Expanded PWM/GWR Projects	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Apr-Sep	Oct-Mar
Remaining Effluent to Ocean after Base & Expansion Project	451	83	0	0	0	0	0	0	0	94	0	702	**1,331**	0	1,331
M1W's portion of SVRP Backwash after Base & Expansion Projects	18	13	36	50	0	0	0	0	0	57	45	6	**226**	50	175
M1W's Portion of Boronda after Base & Expansion Projects	8	7	8	8	5	0	0	0	3	8	8	8	**63**	16	47
M1W's Portion of Farmworker Housing after Base & Expansion Projects	1	1	1	2	2	0	0	0	2	2	2	1	**12**	5	7
M1W's Portion of Recycle #1 after Base & Expansion Projects	7	3	5	0	0	0	0	0	0	3	3	3	**23**	0	23
M1W's portion of Recycle #2 after base & expansion Projects	9	7	5	0	0	0	0	0	0	10	9	8	**48**	0	48
M1W portion of Base PWM Backwash after Base & Expansion Projects	24	21	24	2	0	0	0	0	0	25	23	23	**142**	2	140
M1W portion of PWM Expansion Backwash Water after Base & Expansion Projects	21	19	21	5	0	0	0	0	0	20	21	22	**129**	5	124
Reclamation Ditch after Base & Expansion Projects	81	18	0	0	0	0	0	0	0	0	19	136	**253**	0	253
Blanco Drain Remaining Water after Base & Expansion Projects	209	223	0	0	0	0	0	0	0	0	133	185	**750**	0	750
M1W ARWRA Summer Water Remaining after MCWD, Base & Expanded PWM	0	0	0	0	50	39	58	2	0	0	0	0	**149**	149	0
M1W's Plus Unused other Source Waters after Base and Expansion Projects (excl. ocean)	378	313	101	66	57	39	58	2	5	125	262	391	**1,797**	227	1,570
M1W's Plus Unused other Source Waters after Base and Expansion Projects (incl. ocean)	829	395	101	66	57	39	58	2	5	219	262	1,094	**3,128**	227	2,901
M1W portion of SRDF Backwash Water	0	0	0	0	6	24	25	25	11	4	0	0	**95**	91	4
Salinas Industrial Wastewater (2018) Remaining	184	149	130	206	150	305	318	319	305	82	252	186	**2,585**	1,603	982
Salinas Pond Recovery Water (2018)*	0	0	0	0	300	0	0	0	0	0	0	0	**300**	300	0

**Flow may be much higher in 2021 when Salinas Pond PS Project Completed*

Attachment 2

Scenario 2 (D-In): Source Water Use During Drought Years and Conditions Precedent Are Met

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Apr-Sep	Oct-Mar
Source Water for M1W Portion of Base Project (2,500 AFY after removing 600 AFY MCWD's Portion from the 3,100 AFY total, drought)															
Source Water Needed for M1W Portion of Base Project (2,500)	455	415	455	123	127	123	127	127	123	455	441	455	**3,423**	748	2,675
Secondary Effluent to Ocean used for base project, 1st priority	455	335	0	0	0	0	0	0	0	165	441	455	**1,850**	0	1,850
Secondary Effluent to Ocean Remaining after Base Project	1,161	83	3	90	0	0	0	0	0	285	1,083	1,097	**3,803**	90	3,713
Feed water needed after ocean flows	0	80	455	122	127	123	127	127	123	290	0	0	**1,573**	748	825
Reclamation Ditch used for base project, 2nd priority	0	25	19	50	11	8	12	35	11	16	0	0	**187**	127	60
Reclamation Ditch Flows remaining after Base Project	0	0	0	0	0	0	0	0	0	0	133	72	**205**	0	205
Feed Water needed after Reclamation Ditch	0	55	436	72	116	115	115	92	112	274	0	0	**1,386**	621	765
Blanco Drain used for base project, 3rd priority	0	55	246	72	116	115	115	92	112	168	0	0	**1,090**	621	469
Blanco Drain Flows after Base Project	209	168	0	180	109	159	162	152	72	0	133	185	**1,530**	835	695
Feed Water needed after Blanco Drain	0	0	190	0	0	0	0	0	0	106	0	0	**296**	0	296
AAW used for base project, 4th priority	0	0	163	0	0	0	0	0	0	106	0	0	**269**	0	269
AWW Flows remaining after Base Project	172	139	0	270	297	302	305	300	288	206	239	154	**2,672**	1,763	910
Feed Water needed after Reclamation Ditch	0	0	27	0	0	0	0	0	0	0	0	0	**27**	0	27
Recycle #1 for expansion, 5th priority	0	0	5	0	0	0	0	0	0	0	0	0	**5**	0	5
M1W's Portion of Recycle #1 after Expansion	7	3	0	5	3	2	3	4	2	3	3	3	**36**	18	18
Feed Water needed after Recycle #1	0	0	22	0	0	0	0	0	0	0	0	0	**22**	0	22
Recycle #2 for Expansion, 6th priority	0	0	5	0	0	0	0	0	0	0	0	0	**5**	0	5
M1W's portion of Recycle #2 after expansion	9	7	0	9	9	9	9	9	11	10	10	8	**99**	55	44
Feed Water needed after Recycle #2 water	0	0	17	0	0	0	0	0	0	0	0	0	**17**	0	17
PWM Base Project Backwash Water used for Base Project, 7th priority	0	0	17	0	0	0	0	0	0	0	0	0	**17**	0	17
M1W's portion of AWPF Backwash Water after Base Project (1/2)	24	21	7	10	12	12	12	11	11	25	23	23	**192**	68	124
Feed Water needed after AWPF Backwash water	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
SVRP Backwash Water used for base project, 8th priority	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
M1W's portion of SVRP Backwash Water after Base Project	18	27	55	57	55	57	57	55	57	57	37	18	**550**	337	213
Feed Water needed after SVRP Backwash	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
Boronda for expansion, 9th priority	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
M1W's Portion of Boronda after Expansion	8	7	8	8	8	8	8	8	8	8	8	8	**95**	48	47
Feed Water needed after Boronda	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
Farmworker Housing for Expansion, 10th priority	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
M1W's Portion of Farmworker Housing after Expansion	1	1	1	2	2	2	2	2	2	2	2	1	**17**	11	7
Remaining Source Waters needed after Farmworker Housing	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
M1W Summer ARWRA Water for Expansion remaining after MCWD Project, 10th priority	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
M1W ARWRA Remaining Summer Water after Expansion	0	0	0	0	50	82	93	83	0	0	0	0	**308**	308	0
Remaining Source Waters needed after ARWRA	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Apr-Sep	Oct-Mar
Source Waters for 2,250 AFY Proposed Expanded PWM/GWR Project--Drought Year Scenario (Source Water = 2,898 AFY and 133 AF Operational Reserve)															
Source Waters needed for 2,250 AFY Expansion	435	157	95	184	144	176	189	177	48	410	427	457	**2,898**	917	1,981
Remaining Secondary Effluent to Ocean for Expansion after Base Project, 1st Priority*	435	83	3	90	0	0	0	0	0	285	427	457	**1,779**	90	1,689
Remaining Effluent to Ocean after Expansion Project	726	0	0	0	0	0	0	0	0	0	657	640	**2,023**	0	2,023
Remaining Source Waters needed for Expansion after Ocean Flows	0	75	92	94	144	176	189	177	48	125	0	0	**1,119**	827	291
Recycle #1 for expansion, 2nd priority	0	3	0	5	3	2	3	4	2	3	0	0	**23**	18	5
M1W's Portion of Recycle #1 after Expansion	7	0	0	0	0	0	0	0	0	0	3	3	**13**	0	13
Feed Water needed after Recycle #1	0	72	92	90	141	174	186	173	45	122	0	0	**1,095**	809	286
Recycle #2 for Expansion, 3rd priority	0	7	0	9	9	9	9	9	11	10	0	0	**72**	55	17
M1W's portion of Recycle #2 after Expansion	9	0	0	0	0	0	0	0	0	0	10	8	**26**	0	26
Feed Water needed after Recycle #2 water	0	65	92	81	132	165	177	164	35	112	0	0	**1,023**	754	269
M1W's portion of PWM Base Backwash Water Remaining from Base Project, 4th Priority	0	21	7	10	12	12	12	11	11	25	0	0	**122**	68	54
M1W portion of Base PWM Backwash after Base & Expansion	24	0	0	0	0	0	0	0	0	0	23	23	**70**	0	70
Remaining Source Waters needed after M1W Portion of AWPF Backwash	0	43	85	71	120	153	165	153	24	87	0	0	**901**	686	215
M1W's portion of PWM Expansion Backwash Water, 5th priority	0	8	5	9	7	9	9	9	2	20	0	0	**78**	45	33
M1W portion of PWM Expansion Backwash Water after Base & Expansion	21	0	0	0	0	0	0	0	0	0	21	22	**65**	0	65
Feed Water needed after AWPF Expansion Backwash water	0	35	80	62	113	144	155	144	22	67	0	0	**823**	641	182
M1W's portion of SVRP Backwash Water after Base Project, 6th Priority	0	27	55	57	55	57	57	55	22	57	0	0	**442**	302	139
M1W's portion of SVRP Backwash after Base & Expansion	18	0	0	0	0	0	0	0	35	0	37	18	**108**	35	73
Remaining Source Waters needed after SVRP Backwash	0	8	25	5	58	87	98	89	0	10	0	0	**381**	338	43
Boronda for expansion, 7th priority	0	7	8	5	8	8	8	8	0	8	0	0	**61**	38	23
M1W's Portion of Boronda after Expansion	8	0	0	2	0	0	0	0	8	0	8	8	**34**	10	24
Feed Water needed after Boronda	0	1	17	0	50	80	90	81	0	2	0	0	**320**	301	20
Farm Worker Housing for Expansion, 8th priority	0	1	1	0	2	2	2	2	0	2	0	0	**10**	7	3
M1W's Portion of Farmworker Housing after Expansion	1	0	0	2	0	0	0	0	2	0	2	1	**7**	3	4
Remaining Source Waters needed after Farmworker Housing	0	0	16	0	48	78	89	79	0	0	0	0	**310**	294	16
M1W Summer ARWRA Water for Expansion remaining after MCWD Project, 9th priority	0	0	16	0	48	78	89	79	0	0	0	0	**310**	294	16
M1W ARWRA Remaining Summer Water after Expansion	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
Remaining Source Waters needed after ARWRA	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0

**Available if otherwise not collected or would be discharged to ocean*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Apr-Sep	Oct-Mar
Source Waters Not Used for Approved or Proposed Expanded PWM/GWR Projects															
Remaining Effluent to Ocean after Expansion Project	726	0	0	0	0	0	0	0	0	0	657	640	**2,023**	0	2,023
M1W's portion of SVRP Backwash after Base & Expansion	18	0	0	0	0	0	0	0	35	0	37	18	**108**	35	73
M1W's Portion of Boronda after Expansion	8	0	0	2	0	0	0	0	8	0	8	8	**34**	10	24
M1W's Portion of Farmworker Housing after Expansion	1	0	0	2	0	0	0	0	2	0	2	1	**7**	3	4
M1W's Portion of Recycle #1 after Expansion	7	0	0	0	0	0	0	0	0	0	3	3	**13**	0	13
M1W's portion of Recycle #2 after Expansion	9	0	0	0	0	0	0	0	0	0	10	8	**26**	0	26
M1W portion of Base PWM Backwash after Base & Expansion	24	0	0	0	0	0	0	0	0	0	23	23	**70**	0	70
M1W portion of PWM Expansion Backwash Water after Base & Expansion	21	0	0	0	0	0	0	0	0	0	21	22	**65**	0	65
Reclamation Ditch after Base & Expansion	0	0	0	0	0	0	0	0	0	0	133	72	**205**	0	205
Blanco Drain Remaining Water after Base & Expansion	209	168	0	180	109	159	162	152	72	0	133	185	**1,530**	835	695
M1W ARWRA Remaining Summer Water after Expansion	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
M1W's Plus Unused other Source Waters after Base and Expansion Projects (exclude ocean)	297	168	0	184	109	160	163	152	117	0	369	340	**2,059**	884	1,175
M1W's Plus Unused other Source Waters after Base and Expansion Projects (exclude ocean)	1,023	168	0	184	109	160	163	152	117	0	1,025	981	**4,082**	884	3,198
M1W portion of SRDF Backwash Water	0	0	0	0	6	24	25	25	11	4	0	0	**95**	91	4
Salinas Industrial Wastewater Flows Remaining	172	139	0	270	297	302	305	300	288	206	239	154	**2,672**	1,763	910
Salinas Pond Recovery Water (2015)*	0	0	0	100	15	0	0	0	0	0	0	0	**115**	115	0

**Flow may be much higher in 2021 when Salinas Pond PS Project Completed*

Attachment 3

Scenario 3 (N-Out): Source Water Use During Normal/Wet Years and Conditions Precedent Are Not Met

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Apr-Sep	Oct-Mar
Source Water for M1W Portion of Base Project (3,700 AFY after removing 600 AFY MCWD's Portion from the 4,300 AFY total, building Operational Reserve)															
Source Water Needed for M1W Portion of Base Project (3,700)	455	415	455	395	395	394	407	407	394	455	441	455	**5,067**	2,391	2,675
Secondary Effluent to Ocean used for base project, 1st priority	455	415	147	54	0	0	0	0	120	146	441	455	**2,232**	174	2,059
Secondary Effluent to Ocean Remaining after Base Project	882	474	325	12	0	0	0	0	0	354	376	1155	**3,579**	12	3,567
Feed water needed after ocean flows	0	0	308	341	395	394	407	407	274	309	0	0	**2,834**	2,218	617
Reclamation Ditch used for base project, 2nd priority	0	0	111	89	14	70	88	75	27	36	0	0	**509**	362	147
Reclamation Ditch Flows remaining after Base Project	81	18	0	0	0	0	0	0	0	0	65	136	**299**	0	299
Feed Water needed after Reclamation Ditch	0	0	197	252	381	324	319	332	247	273	0	0	**2,325**	1,855	470
Blanco Drain used for base project, 3rd priority	0	0	197	252	225	274	277	244	184	168	0	0	**1,821**	1,456	365
Blanco Drain Flows after Base Project	209	223	49	0	0	0	0	0	0	0	133	185	**799**	0	799
Feed Water needed after Blanco Drain	0	0	0	0	156	50	42	88	63	105	0	0	**504**	399	105
Recycle #1 used for base project, 4th priority	0	0	0	0	3	2	3	4	2	3	0	0	**17**	14	3
M1W's Portion of Recycle #1 after Base Project	7	3	5	4	0	0	0	0	0	0	3	3	**25**	4	21
Feed Water needed after Recycle #1	0	0	0	0	153	48	40	84	60	102	0	0	**488**	386	102
Recycle #2 used for Base Project, 5th priority	0	0	0	0	9	9	9	9	11	10	0	0	**56**	47	10
M1W's portion of Recycle #2 after base project	9	7	5	9	0	0	0	0	0	0	10	8	**48**	9	39
Feed Water needed after Recycle #2 water	0	0	0	0	144	39	31	75	50	92	0	0	**431**	339	92
PWM Base Project Backwash Water used for Base Project, 6th priority	0	0	0	0	25	25	26	25	24	25	0	0	**151**	126	25
M1W's portion of AWPF Backwash Water from base project after Base Project (1/2)	24	21	24	23	0	0	0	0	0	0	23	23	**139**	23	115
Feed Water needed after AWPF Backwash water	0	0	0	0	119	13	4	50	26	67	0	0	**280**	213	67
SVRP Backwash Water used for base project, 7th priority	0	0	0	0	59	13	4	50	26	57	0	0	**210**	153	57
M1W's portion of SVRP Backwash Water after Base Project	18	13	36	50	0	43	54	9	31	0	45	6	**305**	187	118
Feed Water needed after SVRP Backwash	0	0	0	0	60	0	0	0	0	10	0	0	**70**	60	10
Boronda used for base project, 8th priority	0	0	0	0	8	0	0	0	0	8	0	0	**16**	8	8
M1W's Portion of Boronda after Base Project	8	7	8	8	0	8	8	8	8	0	8	8	**79**	40	39
Feed Water needed after Boronda	0	0	0	0	52	0	0	0	0	2	0	0	**54**	52	2
Farmworker Housing used for Base Project 9th priority	0	0	0	0	2	0	0	0	0	2	0	0	**4**	2	2
M1W's Portion of Farmworker Housing after Base Project	1	1	1	2	0	2	2	2	2	0	2	1	**14**	9	5
Remaining Source Waters needed after Farmworker Housing	0	0	0	0	50	0	0	0	0	0	0	0	**50**	50	0
M1W Summer ARWRA Water used for Expansion remaining after MCWD Project, 10th priority	0	0	0	0	50	0	0	0	0	0	0	0	**50**	50	0
M1W ARWRA Remaining Summer Water after MCWD, Base & Expansion Projects	0	0	0	0	0	82	93	83	0	0	0	0	**258**	258	0
Remaining Source Waters needed after ARWRA	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0

Source Waters for 2,250 AFY Proposed Expanded PWM/GWR Project--Winter Peaking Flow Scenario	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Apr-Sep	Oct-Mar
Source Waters needed for 2,250 AFY Expansion	439	399	425	113	104	101	104	104	42	374	423	453	**3,081**	568	2,513
Secondary Effluent to Ocean used for Expansion after Base Project, 1st Priority*	439	399	325	12	0	0	0	0	0	354	376	453	**2,358**	12	2,346
Remaining Effluent to Ocean after Base & Expansion Projects	443	75	0	0	0	0	0	0	0	0	0	702	**1,221**	0	1,221
Remaining Source Waters needed for Expansion after Ocean Flows	0	0	101	101	104	101	104	104	42	20	46	0	**723**	556	167
Recycle #1 after base project used for Expansion, 2nd priority	0	0	5	4	0	0	0	0	0	0	3	0	**12**	4	8
M1W's Portion of Recycle #1 after Base & Expansion Projects	7	3	0	0	0	0	0	0	0	0	0	3	**13**	0	13
Feed Water needed after Recycle #1	0	0	95	97	104	101	104	104	42	20	44	0	**711**	552	159
Recycle #2 after base project used for Expansion, 3rd priority	0	0	5	9	0	0	0	0	0	0	10	0	**24**	9	15
M1W's portion of Recycle #2 after base & expansion Projects	9	7	0	0	0	0	0	0	0	0	0	8	**24**	0	24
Feed Water needed after Recycle #2 water	0	0	90	88	104	101	104	104	42	20	34	0	**688**	543	144
M1W's portion of PWM Base Backwash Water from Base used for Expansion Project, 4th Priority	0	0	24	23	0	0	0	0	0	0	23	0	**70**	23	47
M1W portion of Base PWM Backwash after Base & Expansion Projects	24	21	0	0	0	0	0	0	0	0	0	23	**68**	0	68
Remaining Source Waters needed after M1W Portion of AWPF Backwash	0	0	66	65	104	101	104	104	42	20	11	0	**617**	520	97
M1W's portion of PWM Expansion Backwash Water used for Expansion Project , 5th priority	0	0	21	5	5	5	5	5	2	20	11	0	**79**	27	52
M1W portion of PWM Expansion Backwash Water after Base & Expansion Projects	21	19	0	0	0	0	0	0	0	0	10	22	**72**	0	72
Feed Water needed after AWPF Expansion Backwash water	0	0	45	60	99	96	99	99	40	0	0	0	**538**	493	45
M1W's portion of SVRP Backwash Water used for Expansion after Base Project, 6th Priority	0	0	36	50	0	43	54	9	31	0	0	0	**223**	187	36
M1W's portion of SVRP Backwash after Base & Expansion Projects	18	13	0	0	0	0	0	0	0	0	45	6	**82**	0	82
Remaining Source Waters needed after SVRP Backwash	0	0	9	9	99	53	45	91	10	0	0	0	**315**	306	9
Boronda after base project used for Expansion, 7th priority	0	0	8	8	0	8	8	8	8	0	0	0	**48**	40	8
M1W's Portion of Boronda after Base & Expansion Projects	8	7	0	0	0	0	0	0	0	0	8	8	**31**	0	31
Feed Water needed after Boronda	0	0	1	2	99	45	37	82	2	0	0	0	**267**	267	1
Farmworker Housing after Base Project used for Expansion, 8th priority	0	0	1	2	0	2	2	2	2	0	0	0	**9**	9	1
M1W's Portion of Farmworker Housing after Base & Expansion Projects	1	1	0	0	0	0	0	0	0	0	2	1	**4**	0	4
Remaining Source Waters needed after Farmworker Housing	0	0	0	0	99	43	35	81	0	0	0	0	**258**	258	0
M1W Summer ARWRA Water used for Expansion remaining after MCWD Project, 9th priority	0	0	0	0	99	43	35	81	0	0	0	0	**258**	258	0
M1W ARWRA Remaining Summer Water after MCWD, Base & Expansion Projects	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
Remaining Source Waters needed after ARWRA	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0

**Available if otherwise not collected or would be discharged to ocean*

Source Waters Not Used for Approved or Proposed Expanded PWM/GWR Projects	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Apr-Sep	Oct-Mar
Remaining Effluent to Ocean after Base & Expansion Project	443	75	0	0	0	0	0	0	0	0	0	702	**1,221**	0	1,221
M1W's portion of SVRP Backwash after Base & Expansion Projects	18	13	0	0	0	0	0	0	0	0	45	6	**82**	0	82
M1W's Portion of Boronda after Base & Expansion Projects	8	7	0	0	0	0	0	0	0	0	8	8	**31**	0	31
M1W's Portion of Farmworker Housing after Base & Expansion Projects	1	1	0	0	0	0	0	0	0	0	2	1	**4**	0	4
M1W's Portion of Recycle #1 after Base & Expansion Projects	7	3	0	0	0	0	0	0	0	0	0	3	**13**	0	13
M1W's portion of Recycle #2 after base & expansion Projects	9	7	0	0	0	0	0	0	0	0	0	8	**24**	0	24
M1W portion of Base PWM Backwash after Base & Expansion Projects	24	21	0	0	0	0	0	0	0	0	0	23	**68**	0	68
M1W portion of PWM Expansion Backwash Water after Base & Expansion Projects	21	19	0	0	0	0	0	0	0	0	10	22	**72**	0	72
Reclamation Ditch after Base & Expansion Projects	81	18	0	0	0	0	0	0	0	0	65	136	**299**	0	299
Blanco Drain Remaining Water after Base & Expansion Projects	209	223	49	0	0	0	0	0	0	0	133	185	**799**	0	799
M1W ARWRA Remaining Summer Water after MCWD, Base & Expansion Projects	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
M1W's Plus Unused other Source Waters after Base and Expansion Projects (excl. ocean)	378	313	49	0	0	0	0	0	0	0	262	391	**1,393**	0	1,393
M1W's Plus Unused other Source Waters after Base and Expansion Projects (incl. ocean)	821	388	49	0	0	0	0	0	0	0	262	1,094	**2,614**	0	2,614
M1W portion of SRDF Backwash Water	0	0	0	0	6	24	25	25	11	4	0	0	**95**	91	4
Salinas Industrial Wastewater (2018)	184	149	182	261	305	305	318	319	305	333	252	186	**3,099**	1,813	1,285
Salinas Pond Recovery Water (2018)*	0	0	0	0	300	0	0	0	0	0	0	0	**300**	300	0

**Flow may be much higher in 2021 when Salinas Pond PS Project Completed*

Attachment 4

Scenario 4 (D-Out): Source Water Use During Drought Years and Conditions Precedent Are Not Met

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Apr-Sep	Oct-Mar
Source Water for M1W Portion of Base Project (3,500 AFY after removing 600 AFY MCWD's Portion from the 4,300 AFY total, drought)--not filling Operational Reserve															
Source Water Needed for M1W Portion of Base Project (3,700)	455	415	378	395	344	364	377	378	336	455	441	455	**4,793**	2,194	2,599
Secondary Effluent to Ocean used for base project, 1st priority	455	400	0	0	0	0	0	0	0	228	441	455	**1,978**	0	1,978
Secondary Effluent to Ocean Remaining after Base Project	1,161	18	3	90	0	0	0	0	0	222	1,083	1,097	**3,675**	90	3,585
Feed water needed after ocean flows	0	15	379	394	344	364	377	378	336	227	0	0	**2,815**	2,194	621
Reclamation Ditch used for base project, 2nd priority	0	15	19	50	11	8	12	35	11	16	0	0	**177**	127	50
Reclamation Ditch Flows remaining after Base Project	0	10	0	0	0	0	0	0	0	0	133	72	**215**	0	215
Feed Water needed after Reclamation Ditch	0	0	360	344	333	356	365	343	325	211	0	0	**2,638**	2,067	571
Blanco Drain used for base project, 3rd priority	0	0	246	252	225	274	277	244	184	168	0	0	**1,870**	1,456	414
Blanco Drain Flows after Base Project	209	223	0	0	0	0	0	0	0	0	133	185	**750**	0	750
Feed Water needed after Blanco Drain	0	0	114	92	108	82	88	99	141	43	0	0	**768**	611	157
Recycle #1 for base project, 5th priority	0	0	5	5	3	2	3	4	2	3	0	0	**26**	18	8
M1W's Portion of Recycle #1 after Expansion	7	3	0	0	0	0	0	0	0	0	3	3	**15**	0	15
Feed Water needed after Recycle #1	0	0	108	88	106	80	85	95	139	41	0	0	**741**	592	149
Recycle #2 for base project, 6th priority	0	0	5	9	9	9	9	9	11	10	0	0	**70**	55	15
M1W's portion of Recycle #2 after expansion	9	7	0	0	0	0	0	0	0	0	10	8	**34**	0	34
Feed Water needed after Recycle #2 water	0	0	103	79	97	71	76	87	128	31	0	0	**671**	537	134
PWM Base Project Backwash Water used for base project, 7th priority	0	0	20	23	23	24	25	24	21	25	0	0	**185**	140	46
M1W's portion of AWPF Backwash Water after Base Project (1/2)	24	21	0	0	0	0	0	0	0	0	23	23	**91**	0	91
Feed Water needed after AWPF Backwash water	0	0	83	56	74	47	52	63	107	6	0	0	**486**	398	88
SVRP Backwash Water used for base project, 8th priority	0	0	55	56	55	47	52	55	57	6	0	0	**382**	321	61
M1W's portion of SVRP Backwash Water after Base Project	18	27	0	1	0	10	5	0	0	51	37	18	**168**	16	152
Feed Water needed after SVRP Backwash	0	0	28	0	19	0	0	8	50	0	0	0	**104**	77	28
Boronda for base project, 9th priority	0	0	8	0	8	0	0	8	8	0	0	0	**32**	24	8
M1W's Portion of Boronda after Expansion	8	7	0	8	0	8	8	0	0	8	8	8	**63**	24	39
Feed Water needed after Boronda	0	0	20	0	11	0	0	0	42	0	0	0	**73**	53	20
Farmworker Housing for base project, 10th priority	0	0	1	0	2	0	0	0	2	0	0	0	**4**	4	1
M1W's Portion of Farmworker Housing after Expansion	1	1	0	2	0	2	2	2	0	2	2	1	**13**	7	6
Remaining Source Waters needed after Farmworker Housing	0	0	19	0	9	0	0	0	41	0	0	0	**68**	50	19
M1W Summer ARWRA Water for base project remaining after MCWD Project, 10th priority	0	0	19	0	9	0	0	0	41	0	0	0	**68**	50	19
M1W ARWRA Remaining Summer Water after Expansion	0	0	0	0	41	62	73	63	0	0	0	0	**240**	239	0
Remaining Source Waters needed after ARWRA	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Apr-Sep	Oct-Mar
Source Waters for 2,250 AFY Proposed Expanded PWM/GWR Project--Drought Year Scenario (Source Water = 2,105 AFY and 713 AF Operational Reserve)															
Source Waters needed for 2,250 AFY Expansion	435	89	4	105	43	86	93	68	0	298	427	457	**2,105**	395	1,709
Remaining Secondary Effluent to Ocean for Expansion after Base Project, 1st Priority*	435	18	3	90	0	0	0	0	0	222	427	457	**1,651**	90	1,561
Remaining Effluent to Ocean after Expansion Project	726	0	0	0	0	0	0	0	0	0	657	640	**2,023**	0	2,023
Remaining Source Waters needed for Expansion after Ocean Flows	0	71	1	15	43	86	93	68	0	76	0	0	**453**	306	148
Recycle #1 for Expansion, 2nd priority	0	3	0	0	0	0	0	0	0	0	0	0	**3**	0	3
M1W's Portion of Recycle #1 after Expansion	7	0	0	0	0	0	0	0	0	0	3	3	**13**	0	13
Feed Water needed after Recycle #1	0	69	1	15	43	86	93	68	0	76	0	0	**451**	306	145
Recycle #2 for Expansion, 3rd priority	0	7	0	0	0	0	0	0	0	0	0	0	**7**	0	7
M1W's portion of Recycle #2 after expansion	9	0	0	0	0	0	0	0	0	0	10	8	**26**	0	26
Feed Water needed after Recycle #2 water	0	61	1	15	43	86	93	68	0	76	0	0	**443**	306	138
M1W's portion of PWM Base Backwash Water Remaining from Base Project, 4th Priority	0	21	0	0	0	0	0	0	0	0	0	0	**21**	0	21
M1W portion of Base PWM Backwash after Base & Expansion	24	0	0	0	0	0	0	0	0	0	23	23	**70**	0	70
Remaining Source Waters needed after M1W Portion of AWPF Backwash	0	40	1	15	43	86	93	68	0	76	0	0	**422**	306	116
M1W's portion of PWM Expansion Backwash Water , 5th priority	0	4	0	5	2	4	5	3	0	15	0	0	**39**	19	19
M1W portion of PWM Expansion Backwash Water after Base & Expansion	21	0	0	0	0	0	0	0	0	0	21	22	**65**	0	65
Feed Water needed after AWPF Expansion Backwash water	0	35	0	10	41	82	88	65	0	61	0	0	**383**	286	97
M1W's portion of SVRP Backwash Water after Base Project, 6th Priority	0	27	0	1	0	10	5	0	0	51	0	0	**95**	16	79
M1W's portion of SVRP Backwash after Base & Expansion	18	0	0	0	0	0	0	0	0	0	37	18	**73**	0	73
Remaining Source Waters needed after SVRP Backwash	0	8	0	9	41	72	83	65	0	10	0	0	**288**	270	18
Boronda for Expansion, 7th priority	0	7	0	8	0	8	8	0	0	8	0	0	**39**	24	15
M1W's Portion of Boronda after Expansion	8	0	0	0	0	0	0	0	0	0	8	8	**24**	0	24
Feed Water needed after Boronda	0	1	0	2	41	64	75	65	0	2	0	0	**249**	246	3
Farmworker Housing for Expansion, 8th priority	0	1	0	2	0	2	2	2	0	2	0	0	**9**	7	3
M1W's Portion of Farm Worker Housing after Expansion	1	0	0	0	0	0	0	0	0	0	2	1	**4**	0	4
Remaining Source Waters needed after Farmworker Housing	0	0	0	0	41	62	73	63	0	0	0	0	**239**	239	0
M1W Summer ARWRA Water for Expansion remaining after MCWD Project, 9th priority	0	0	0	0	41	62	73	63	0	0	0	0	**239**	239	0
M1W ARWRA Remaining Summer Water after Expansion	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
Remaining Source Waters needed after ARWRA	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0

**Available if otherwise not collected or would be discharged to ocean*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Apr-Sep	Oct-Mar
Source Waters Not Used for Approved or Proposed Expanded PWM/GWR Projects															
Remaining Effluent to Ocean after Expansion Project	726	0	0	0	0	0	0	0	0	0	657	640	**2,023**	0	2,023
M1W's portion of SVRP Backwash after Base & Expansion	18	0	0	0	0	0	0	0	0	0	37	18	**73**	0	73
M1W's Portion of Boronda after Expansion	8	0	0	0	0	0	0	0	0	0	8	8	**24**	0	24
M1W's Portion of Farm Worker Housing after Expansion	1	0	0	0	0	0	0	0	0	0	2	1	**4**	0	4
M1W's Portion of Recycle #1 after Expansion	7	0	0	0	0	0	0	0	0	0	3	3	**13**	0	13
M1W's portion of Recycle #2 after expansion	9	0	0	0	0	0	0	0	0	0	10	8	**26**	0	26
M1W portion of Base PWM Backwash after Base & Expansion	24	0	0	0	0	0	0	0	0	0	23	23	**70**	0	70
M1W portion of PWM Expansion Backwash Water after Base & Expansion	21	0	0	0	0	0	0	0	0	0	21	22	**65**	0	65
Reclamation Ditch after Base & Expansion	0	10	0	0	0	0	0	0	0	0	133	72	**215**	0	215
Blanco Drain Remaining Water after Base & Expansion	209	223	0	0	0	0	0	0	0	0	133	185	**750**	0	750
M1W ARWRA Remaining Summer Water after Expansion	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0	0
M1W's Plus Unused other Source Waters after Base and Expansion Projects (exclude ocean)	297	233	0	0	0	0	0	0	0	0	369	340	**1,240**	1	1,240
M1W's Plus Unused other Source Waters after Base and Expansion Projects (exclude ocean)	1,023	233	0	0	0	0	0	0	0	0	1,025	981	**3,263**	1	3,263
M1W portion of SRDF Backwash Water	0	0	0	0	6	24	25	25	11	4	0	0	**95**	91	4
Salinas Industrial Wastewater (2015)	172	139	163	270	297	302	305	300	288	312	239	154	**2,942**	1,763	1,179
Salinas Pond Recovery Water (2015)*	0	0	0	100	15	0	0	0	0	0	0	0	**115**	115	0

**Flow may be much higher in 2021 when Salinas Pond PS Project Completed*

EXHIBIT 19

PEER REVIEW BY HAZEN AND SAWYER FOR CALIFORNIA AMERICAN WATER WITH MPWMD ANNOTATIONS

March 6, 2020

VIA EMAIL

Mr. Ian C. Crooks
Vice President, Engineering
California American Water
655 West Broadway, Suite 1410
San Diego, CA 92101

Re: California American Water Peer Review of Supply and Demand for Water on the Monterey Peninsula

Dear Mr. Crooks:

Monterey Peninsula Water Management District (MPWMD) has thoroughly reviewed the report *"California American Water Peer Review of Supply and Demand for Water on the Monterey Peninsula"* prepared by Hazen & Sawyer, a consultant to Cal-Am, dated January 22, 2020 and widely distributed by Cal-Am via email on January 23, 2020.

MPWMD's review and analysis is presented here in three sections:

- Section 1 is comprised of the Hazen & Sawyer report annotated to direct the reader to specific numbered "Notes" or analysis prepared by MPWMD;
- Section 2 are MPWMD's explanatory "Notes" themselves; and
- Section 3 contains supporting exhibits

We believe this response establishes that the September 2019 MPWMD report "*Supply and Demand for Water on the Monterey Peninsula"*, which was updated December 3, 2019, does in fact comply with applicable California law and commonly accepted industry practice. MPWMD intends to finalize its report "Supply and Demand for Water on the Monterey Peninsula" in March 2020.

Further, the principal conclusions of the report remain valid: either of the proposed water supply projects – the Monterey Peninsula Water Supply Project desalination plant or Pure Water Monterey expansion – are sufficient to lift the Cease and Desist Order and to meet the water needs of the Monterey Peninsula for decades to come.

Sincerely,

David Stoldt
General Manager
Monterey Peninsula Water Management District

Section 1: Annotated Hazen & Sawyer Report (Shows References to MPWMD “Notes”)

CALIFORNIA AMERICAN WATER
PEER REVIEW OF SUPPLY AND DEMAND FOR WATER ON THE MONTEREY PENINSULA

Prepared by: Kevin Alexander, P.E. and Cindy L. Miller, P.E.
Hazen and Sawyer[1]
January 22, 2020

This memorandum reviews the adequacy of the water supply portfolio on the Monterey Peninsula to meet current and future demands, with consideration of engineering best practices and State regulatory requirements for the establishment of supply and demand projections. This review analyzes the projections recently put forth by Monterey Peninsula Water Management District (MPWMD) staff, specifically the "Supply and Demand Analysis for Water on the Monterey Peninsula" dated September 2019 and the subsequent "Updated Water Demand Forecasts" dated December 17, 2019, and reaches the following key conclusions:

- Established values for supply and demand must meet the requirements of the California Health and Safety Code (CHSC) and the California Code of Regulations (CCR), specifically with regards to the reliability of the supply noted in CHSC Section 116555, and the estimation of demands based upon the highest 10-year maximum daily demand (MDD) required by CCR Title 22 Section 64554. The methodology used by MPWMD staff does not meet these requirements. **SEE NOTE 1**

- The projected demand for Cal-Am's Monterey service area identified by MPWMD staff is incorrect. MPWMD staff used a 5-year average rather than the 10-year MDD requirement. **SEE NOTE 2** As a result, the staff's demand and probable growth projections are underestimated, without clear supporting data. **SEE NOTE 3** MPMWD staff also assumes continued implementation of tiered rates, conservation restrictions, and enforced water use reductions in order to justify these lower demand projections, all of which have the potential to do continuing harm to the area's businesses and residential customers. **SEE NOTE 4**

- The supply projection presented by MPWMD staff incorrectly assumes that each supply source included in the analysis is available at all times at maximum capacity, with no allowance or consideration of the potential shortfall that would occur should one or more sources be reduced or off-line for extended periods. This does not meet engineering best practices for reliability, resiliency, and incorporation of a factor of safety to ensure compliance with the regulations for a "reliable and adequate supply", as required by §116555(a)(3) of CHSC. **SEE NOTE 5**

- The supply portfolio assumption made by Mr. Stoldt would operate at a precarious edge where current Peninsula water demand would need to be met by relying on **all** supply sources operating at **full capacity** at **all times** to meet the regulatory criteria. **SEE NOTE 5** Not only is this assumption

[1] Hazen & Sawyer is recognized worldwide as experts in safe drinking water, and has performed water system supply and new source evaluations for major metropolitan areas such as New York City and Washington, D.C., as well as for many smaller cities, towns and municipalities. Kevin Alexander, P.E., is Vice President and Regional Manager of the Firm's West Region. Cindy Miller, P.E., is Vice President and Operations Manager of the Firm's Irvine, California office. Each of their resumes is attached.

risky, it is unrealistic. As has recently occurred at nearby agencies, if even one source were to be reduced by capacity or water quality issues, the Peninsula supply would fall out of compliance, resulting in new Water Board restrictions, moratoriums, etc.

- Based upon the portfolio of ***reliable*** sources of water supply, the available supply with the Pure Water Monterey Expansion project and without another water source is inadequate to serve the current water demand determined by the CPUC of 12,000 afy, **SEE NOTE 6** as well as the reduced 10-year average demand of 10,863 afy as projected by MPWMD staff. **SEE NOTE 7**

- Based upon the foregoing, the implementation of the proposed MPWSP Desalination Plant is necessary to provide a safe and reliable water supply to meet regional demand, regardless of whether the Pure Water Monterey Expansion project is developed.

PURPOSE AND BACKGROUND

California American Water (Cal-Am) requested Hazen and Sawyer (Hazen) perform an independent engineering peer review of the memorandum entitled "Supply and Demand Analysis for Water on the Monterey Peninsula", prepared September 2019 by MPWMD's General Manager David J. Stoldt, (referred to hereafter as the Stoldt memo). The Stoldt memo re-examined available current and future water supplies, along with current and projected long-term demands and compared its updated values with previous estimates provided by Cal-Am and identified in the September 13, 2018 California Public Utilities Commission (CPUC's) Decision Approving a Modified Monterey Peninsula Water Supply Project (Decision). Cal-Am also requested Hazen review General Manager Stoldt's Updated Water Demand Forecasts presented to the MPWMD Board's Water Demand Committee on December 17, 2019.

A conclusion of the Stoldt memo and subsequent water demand forecast was that long-term water demands could reliably be met if Monterey One Water (M1W) constructs the Pure Water Monterey (PWM) Expansion, which it has been claimed could potentially eliminate the need to construct the MPWSP Desalination Plant that is required by the CPUC's Decision. This conclusion was cited as a major factor in the California Coastal Commission Staff Report issued on October 28, 2019 that recommended denial of Coastal Development Permits for Cal-Am to construct a slant well field, associated transmission pipelines and related infrastructure within the coastal zone to support the proposed MPWSP desalination facility.

This technical memo examines the supply and demand analysis methodology provided in the Stoldt memo, with a focus on whether the methodology used was consistent with the California Water Code, which Cal-Am, as a public water supplier, is required to follow. Specifically, Water Code §10635(a) states:

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

based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier." **SEE NOTE 1**

DEMAND

Sound water demand forecasting is critical to effective water resources planning. In particular, determining a utility's adequacy of supply hinges upon the accuracy of its demand forecasts. CCR §64554(b), establishes the requirements that California water utilities must use to project demands. The procedure requires that the public water system identify the day, month, and year with "the highest water usage during at least the most recent ten years of operation." This methodology is further supported by engineering best practices described in the American Waterworks Association (AWWA)[2] Manual M50 (Water Resources Planning Manual) which states, *"…the utility should forecast using monthly consumption from a period of **at least 10 years**"*, and that *"…data from a **20-year period** are most beneficial if the overall period includes one or more drought crises that must be analyzed to measure their temporary and permanent effects on consumption."* **SEE NOTE 1**

The foregoing regulatory requirements and AWWA guidance form the basis for review of the adequacy of the demand forecasting provided in the Stoldt memo and subsequent demand forecast update.

Current Annual Demand

The Stoldt memo disagrees with the CPUC's determination that current water demand in Cal-Am's service territory is 12,000 afy. **SEE NOTE 6** After reviewing the estimates of multiple parties, including MPWMD, the CPUC determined that an appropriately conservative and reasonable demand for Cal-Am's existing customers is 12,000 afy, based upon the maximum water demand within the 10-year period prior to the anticipated in-service date of the desalination plant (i.e., 2012-2021). The maximum water demand in Cal-Am's service territory over this 10-year period has not changed since the CPUC's determination. **SEE NOTES 8 & 11** The Stoldt memo update, however, presents both a 10-year average annual demand of 10,863 afy and a 5-year average annual demand of 9,825 afy, and bases its supply/ demand balance upon the latter, lower value. **SEE NOTE 2** In light of the State regulations (i.e. CCR §64554(b)) and Engineering Best Practices for demand estimating as described in the AWWA Water Resources Planning Manual, it is unclear why MPWMD considers a 5-year period to be an acceptable method to calculate the demand for the Monterey Peninsula. Moreover, basing capacity determinations on a 5- or 10-year average fails to provide sufficient system capacity to meet peak demands. To our knowledge, using a 5-year period to calculate demands has not been accepted previously by applicable regulatory bodies, including the State Water Board and the CPUC. **SEE NOTES 1, 2, & 8**

Based on review of the documentation provided, Hazen concludes the CPUC-approved demand assumptions meet the CCR requirements and engineering best practices as defined by AWWA, while those outlined in the Stoldt memo *do not*. SEE NOTE 1

[2] The American Water Works Association is an international, nonprofit, scientific and educational society dedicated to providing total water solutions assuring the effective management of water. Founded in 1881, the Association is the largest organization of water supply professionals in the world.

Future Demand Trends

In addition to the 12,000 afy needed to serve existing customer demand, **SEE NOTE 2** the CPUC determined that 2,000 afy of additional water, for a total of 14,000 afy, would be necessary to account for projected growth based upon lots of record, tourism bounce-back, and Pebble Beach buildout. The CPUC's findings were based upon actual numbers of legal lots of record, economic recovery projections, and the actual legal entitlement of Pebble Beach. To calculate future demand trends, the Stoldt memo reanalyzes the CPUC-approved demand estimations for future growth, and recommends reductions in the demand assumptions for each of these growth areas; however, the recommendations appear to be based on anecdotal data to support what-if scenarios rather than any hard data of actual lots and entitlements. **SEE NOTE 9** The lack of concrete evidence does not appear to be sufficient to justify revising the demands already approved by the CPUC.

The Stoldt memo also relies heavily upon the presumption that a general downward trend in water use is guaranteed to continue. **SEE NOTE 4** However, as noted by the CPUC in its Decision,

> *"The assertions by some parties that the downward trend in water use in the District will continue and that only minimal growth will occur in demand after 2021 are not convincing because those assertions fail to consider that maximum month usage increased in 2017 compared to 2016, conservation funding is projected to go down, and the conservation and moratorium measures implemented during the drought will end."*

The conservation and moratorium measures that were implemented in response to drought conditions, including tiered rates, conservation restrictions, and enforced water use reductions, were effective in lowering demand. However, no additional methods are presented in the memo to indicate how further reductions in demands would occur; absent any, it is reasonable to assume everything has already been done on the demand side to reduce levels and further reductions should not be considered in demand forecasting for determining water supply sufficiency. Additionally, continued implementation of these measures over the long term is uncertain and has the potential to do harm to the area's businesses (such as hotels having to ship out laundry services), economic growth, accessory dwelling units (ADU's), affordable housing, existing residential property improvements, and quality of life.

The Stoldt memo presents demand projections based upon market absorption rates and calculates increased demand between 492 and 1,476 afy. Mr. Stoldt then presented newly revised demand projection information to the MPWMD Board's Water Demand Committee on December 17, 2019, which now proposes to use growth projections prepared by the Association of Monterey Bay Area Governments (AMBAG) in its 2018 Regional Growth Forecast. The population forecast is used as a proxy for residential water demand and the employment forecast as a proxy for commercial water demand. While the intent of Mr. Stoldt in presenting this alternative methodology of computing future demand appears to be to provide input from "an objective third-party" as stated in his presentation to the Board, he also notes himself that "certainly, other factors can be considered. " Based on the water demands calculated by Stoldt using the AMBAG forecast, 1,469 afy would be needed to accommodate growth through 2049. This is in contrast to the CPUC-approved value of 2,000 afy noted previously. **SEE NOTE 10** Further, Section 2.5.3.4 of the FEIR for the MPWSP Desalination Plant provides each city's projection of future water supply needs, with a total of 3,526 afy needed to accommodate the projected growth at buildout that each City determined (see Table 2-5 from the FEIR). **SEE NOTE 11**

TABLE 2-5
FUTURE WATER DEMAND – SERVICE AREA JURISDICTIONS
(acre-feet per year)

Jurisdiction	Future Supply Needs (2006 Estimate)[a]	Future Supply Needs (Revised Estimate)
City of Carmel	288	288[b]
City of Del Rey Oaks	48	48
City of Monterey	705	705
City of Pacific Grove	1,264	500[c,d]
City of Sand City	386	180[e]
City of Seaside	582	662[f]
Monterey County (Unincorporated)	1,135	1,005[b,g,h]
Monterey Peninsula Airport District	138	138
Total	**4,545**	**3,526**

Clearly, the difference between Mr. Stoldt's projections and the growth projections of each jurisdiction within Cal-Am's service territory demonstrates that there is a wide variation in growth forecasts. Mr. Stoldt's assumption of 1,469 afy is 531 afy less than the CPUC-approved value of 2,000 afy; **SEE NOTE 10** based on the supply needs of each local jurisdiction presented in the MPWSP FEIR, that could represent entirely dismissing the future supply needs of the Cities of Carmel, Del Rey Oaks, and Sand City. Further, making assumptions which undercut both the CPUC-approved demand projections and the projections of each local jurisdiction becomes even more risky when coupled with other assumptions in the Stoldt memo that exaggerate the available reliable supply, as discussed later in this document.

There is no basis to conclude that AMBAG growth forecasting should be considered any more accurate or helpful than the CPUC-approved demand projection, the growth projections of each local jurisdiction in Cal-Am's service territory, or even Stoldt's prior projections. AMBAG's methodology can be acknowledged as one of several possible means of estimating future demands; however, the selected methodology must first and foremost utilize an acceptable current annual demand value, which is required by the regulations to be the 10-year period maximum demand estimate. SEE NOTE 12

SUPPLY

Existing and future available water supply sources for the Cal-Am service area are presented in Table 5-2 of Cal-Am's 2015 Urban Water Management Plan (UWMP). The UWMP includes the MPWSP desalination plant as a source of supply. The Stoldt Memo presents an alternative portfolio with the PWM expansion as a source of new future supply in lieu of the desalination plant. Aside from the desalination plant or PWM expansion, the balance of the water supply portfolios for both alternatives consist of almost identical supplies from five additional sources. The two supply portfolios are summarized in Table 1 on the following page, with a total available supply of up to 15,296 afy for the desalination plant alternative and up to 11,294 afy for the PWM expansion alternative.

Table 1 - Monterey Peninsula Available Supply
(Acre-Feet per Year)

Supply Source [1]	Per UWMP w/Desalination	Per Stoldt Memo w/PWM Expansion
MPWSP Desalination Plant	6,252	0
Pure Water Monterey	3,500	3,500
PWM Expansion	0	2,250
Carmel River [2]	3,376	3,376
Seaside Basin[3]	774	774
Aquifer Storage & Recovery (ASR)	1,300	1,300
Sand City Desalination Plant[4]	94	94
Total Available Supply	**15,296**	**11,294**
Total *Reliable* Supply (w/o ASR[5])	**13,996**	**9,994**

[1] Other sources of supply in the amount of 406 afy from the Carmel River and Sand City plant may be available; however, they have been noted by Stoldt as not to be included as reliable supplies and are excluded from this summary.
[2] Amount limited to 3,376 afy by Water Order 95-10; may be further declining due to storage limitations caused by sedimentation.
[3] The amount of 794 afy was used in the UWMP, but is revised to 774 afy here to reflect revisions to Cal-Am's Seaside Basin groundwater rights.
[4] Sand City Desalination Plant supply is adjusted from UWMP level to reflect legal commitments to offset Carmel River Pumping.
[5] Reliability of ASR supply discussed further below.

CHSC, §116655, requires "a reliable and adequate supply of pure, wholesome, healthful, and potable water." Evaluation of the reliability and adequacy of the supply portfolios presented in the table must include consideration of source capacity requirements established in Water Code, §10635 and CCR §64554, as well as best practice incorporation of a reasonable factor of safety should a major source of supply be reduced or eliminated such that the ability to meet demands is still maintained. While the table above provides a comprehensive list of all available sources of supply, it does not necessarily follow that each and every supply source can be assumed to be **reliably** available at full capacity and quality at all times. **SEE NOTE 5**

Reliability of Aquifer Storage and Recovery

Of particular concern is the supply from Aquifer Storage and Recovery (ASR). The average ASR yield is estimated in the UWMP at 1,300 afy. However, it is also noted therein that this amount will be reduced during drought conditions. In its October 15, 2019 comment letter to the Stoldt memo, Cal-Am took issue with including the ASR supply as a consistent, reliable source at 1,300 afy, asserting that it cannot be reliably assured to be capable of meeting long-term demand in normal water years, a single dry water year, and during droughts lasting at least five years per Water Code, §10635. Table 6-2 of the UWMP, which analyzes the reliability of each supply source, notes the availability of the ASR supply is reduced to 63% in a single dry year down to 4% in year 3 of multiple dry years, making this supply essentially almost entirely unavailable as a reliable continuous source during a drought. **SEE NOTE 13**

Table 6-2: Monterey County District Supply Reliability-Current Water Use

Water Supply Sources[1]	Average / Normal Water Year Supply	Single Dry Water Year	Multiple Dry Water Year Supply		
			Year 1	Year 2	Year 3
Carmel Valley Aquifer	100%	100%	100%	100%	100%
Seaside Groundwater Basin	100%	100%	100%	100%	100%
Salinas Valley Groundwater Basin	100%	100%	100%	100%	100%
Aquifer Storage and Recovery	100%	63%	74%	17%	4%
Sand City Desalination	100%	100%	100%	100%	100%

The Direct Testimony of Ian Crooks before the CPUC on September 15, 2017 explains Cal-Am's position regarding ASR shortfalls during dry years, which was expected to be made up by desalination supplies. Mr. Crooks stated, "the estimated 1,300 AFY of Carmel River stored in ASR may not be available in dry years or initial years of operation when no carry-over reserve is established. SEE NOTE 13 In this instance, without the 1,300 AFY, the supply surplus of 941 in normal years turns into an estimated deficit of 359 AFY (941 – 1,300) during dry years. The shortfall can be covered by increasing desalination plant output to 100% and peaking other system supplies (Seaside Basin, ASR, Carmel River) depending on operational variables and regulatory availability."

In response to Cal-Am's stated disagreement regarding the adequacy of the ASR supply to meet Water Code §10635 criteria, MPWMD staff provided a purported excerpt of a draft technical memorandum prepared by Pascual Benito and Derrik Williams dated September 30, 2019 (Benito/Williams memo), which used the Seaside Basin predictive model to evaluate water availability for Cal-Am pumping[3].The simulation assumes no ASR water is stored until Cal-Am satisfies the Cease and Desist Order (CDO), which is estimated to occur in year 2020 for the simulation. Once the CDO is met, the predictive model unreasonably assumed all water Cal-Am is permitted to pump from the Carmel River is injected into the Basin, and that ASR extraction is capped by ASR well capacity. SEE NOTE 14

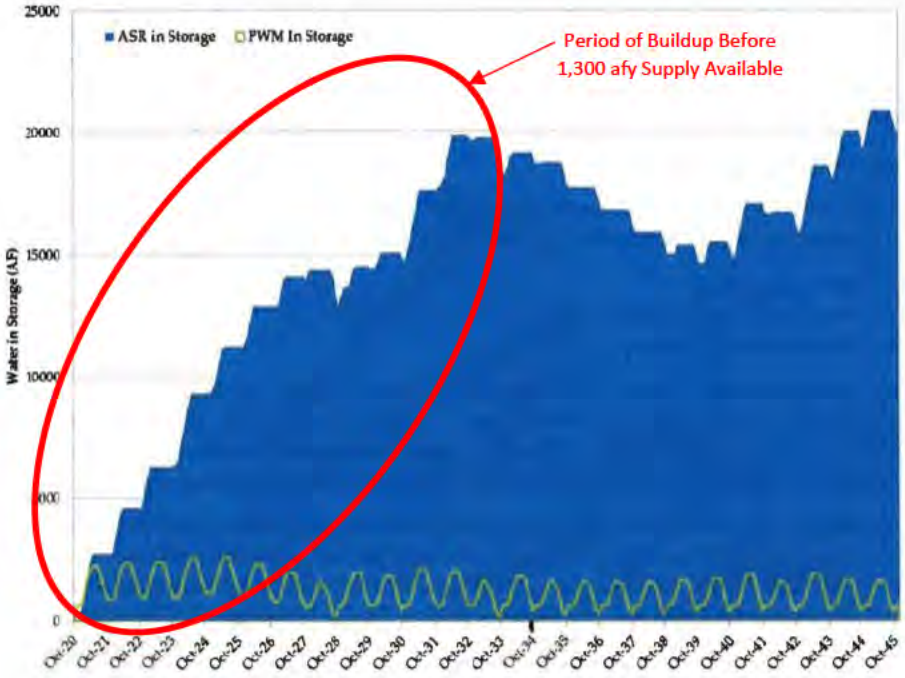
The predictive model also uses an initial annual demand of 10,400 AFY for year 2020, and a linear increase in demand over the following 25 years, to develop an ultimate annual demand of 11,325 AF in the year 2045, which was developed based upon an incorrect demand estimation methodology as previously discussed (note the 10-yr average presented by Mr. Stoldt was even lower at 11,232 afy). The initial and ultimate demand assumptions used for the model simulation are lower than the Peninsula's current estimated annual water demand of 12,000 AFY, as determined by the CPUC, for the initial period, and projected 14,000 AFY future demand also as determined by the CPUC. As previously discussed, the 12,000 current annual water demand is based upon historical data over a 10-year period, and projections from Cal-Am's 2015 Urban Water Management Plan. SEE NOTE 2

The conclusion drawn in the Benito/Williams memo is that buildup of ASR storage would be sufficient to meet a 4-year drought, SEE NOTE 15 and likely longer, beginning in the year 2034. Note that this is predicated on the lower demand assumption refuted earlier in the demand discussion of this memorandum and relies upon the unreasonable assumption of 14 to 15 years of full ASR storage, SEE NOTE 15 which would require a significant wet period, no drought (highly unlikely for this extended period), and full availability of

[3] It should be noted that only an excerpt of the memo was provided, that the purpose of the overall memo was to perform groundwater modeling and not evaluate supply, and that conclusions drawn by Mr. Stoldt in relation to adequacy of supply were his conclusions and not those of the memo's authors.

Carmel river pumping. Nonetheless, during the period of buildup of ASR storage from year 2020 through 2034, it can be deduced that sufficient reserves to meet drought conditions will *not* be available during that period. Likewise, if any prolonged drought condition were to occur during the buildup period, the reserves would be depleted, requiring a new "buildup period" during which ASR supply would again not be considered to be drought proof. **SEE NOTE 15** Additionally, the Benito/Williams memo states that "the actual amount of ASR water stored during the project may be less than what is shown by the blue area on Figure 7 because some water may flow out to the ocean or to adjoining basins." This potential water loss is not quantified nor is its potential impact to annual ASR capacity quantified or the potential delay in the 2034 date noted above.

Figure 7.



In addition to the concerns with the quantity of reliably available ASR supply, there is no data presented in the memo to analyze the potential water quality concerns associated with ASR. It does not consider the uncertainties of this supply due to the potential that water extracted may not (now or at some point) meet the MCL for one or more constituents. Confirmation testing should be provided to make sure there are no issues such as Iron, Manganese, Arsenic, Silica, hardness, volatile organics and since some of the areas are near an old base, whether there are PFOA/PFOS concerns. **SEE NOTE 16**

Based upon the foregoing, it is Hazen's opinion that ASR supply does not meet the requirements of the CHSC for consideration as a permanent reliable water supply source, but should be treated as an alternative or backup supply, thus reducing the listed "Available Supply" in the Stoldt memo by 1,300 AFY. SEE NOTE 15 Further, as discussed later in this document, without ASR as a reliable source, the supply cannot meet the 10-yr average assumed by Mr. Stoldt, or even Mr. Stoldt's 5-yr demand average when growth is considered.

Reliability of Pure Water Monterey Expansion

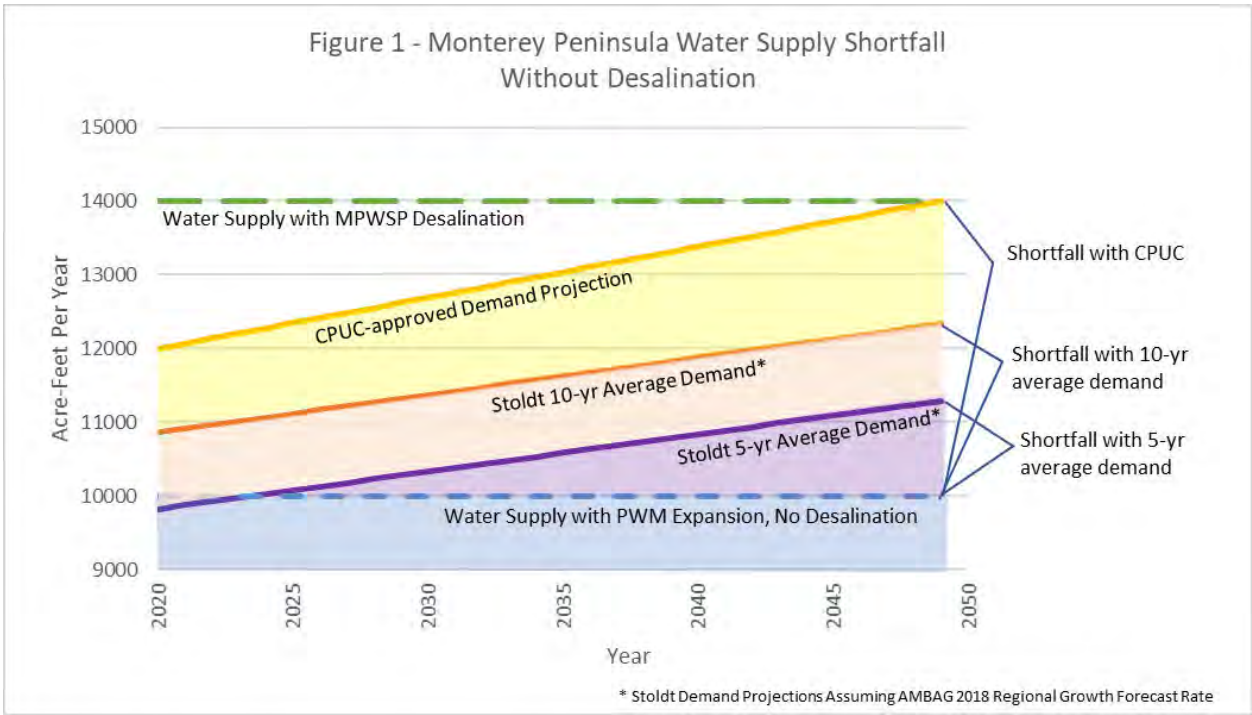
Also of significant concern is the reliability of the PWM Expansion at the full capacity of 2,250 afy, particularly in the context of the Stoldt memo's assumption that the PWM Expansion project replaces the need for the desalination supply. **SEE NOTE 17** Without the MPWSP desalination plant and the ASR, the need to rely on the full production capacity of the Expansion project becomes critical. However, the assumed availability of the supply provided by the Expansion project as reflected in the Stoldt memo does not appear to consider the reliability of the sources of supply to the Expansion project (wastewater, irrigation runoff) during reduced usage or drought years, **SEE NOTE 18** to consider impacts to water quality that may occur as the availability of the individual sources vary, and the potential shortfall of supply should the plant not operate at full capacity.

There have been disagreements between the parties regarding key water rights and source water issues, including access to Salinas-area wastewater sources, and claims that the Salinas Valley and its agricultural industry also have a need for the source water that is planned for the Expansion project. **SEE NOTE 19** There are also concerns regarding the water quality variability and treatability of the wastewater. M1W's general manager told The Herald newspaper that the wastewater is more challenging to treat during certain times and contains chemicals that upset the treatment plant's processes, and that the agency will monitor the source water for those contaminants and shut off the water when those are present.

Given the PWM Expansion project would represent approximately 60% of supplies on an annual basis and even more during peak summer demand, this supply is critically important in the absence of the MPWSP Desalination Plant , and the reliability aspect of the PWM Expansion project's source water supply needs to be validated and proven before it can be considered a verified supply source such that the Expansion project could provide its estimated full capacity of 2,250 afy. The absence of such information means that the projected supply from PWM Expansion is speculative. SEE NOTE 19 If the Expansion project cannot reliably meet its full capacity of 2,250 afy, there will be an even larger water supply deficit within Cal-Am's service territory. Further, even if PWM Expansion was proven reliable, the total water supply portfolio available barely meets today's demands and provides no buffering or contingency, and certainly not enough to permit additional or new water use. SEE NOTE 2

SUMMARY OF DEMAND VERSUS SUPPLY

Based upon the foregoing discussion of demand and supply, a projection can be made to forecast the ability to meet demands within Cal-Am's service territory for the next 30 years with and without the proposed desalination plant. Based upon the ***reliable*** supply portfolio presented in Table 1 herein, Figure 1 on the following page presents the water supply under two conditions: 1) after the CDO with PWM Expansion of 9,994 afy, and 2) water supply after the CDO with MPWSP Desalination of 13,996 afy. The projected water demand through 2049 is overlaid on the graph to evaluate the adequacy of the supplies. **SEE NOTE 20**



Stoldt provided a similar analysis in his December 17, 2019 presentation based upon the 5-yr average starting demand and the AMBAG growth projections, and based upon his assumptions, the supply is purported to meet the demand requirements. However, correction of the initial demand projection and of the portfolio of reliable supply sources fundamentally change those conclusions when analyzed as follows:

- Three demand projections are included in Figure 1, based upon the following criteria:

Source	Initial Demand (afy)	Growth Projection
CPUC-approved	12,000	Per CPUC-approved ultimate demand of 14,000 afy
Stoldt 10-yr average	10,863	Per Stoldt estimates using AMBAG growth projection
Stoldt 5-yr average	9,825	Per Stoldt estimates using AMBAG growth projection

- The available supplies illustrated in Figure 1 exclude ASR based upon the assumption that at least one of the sources is reduced or offline. **SEE NOTE 20** This is critical because even if the supply and demand appears to balance exactly on paper as per the Stoldt memo, the risk of operating at this precarious edge can be illustrated by two recently-issued compliance orders by the State Water Board's Division of Drinking Water – to Sheep Creek Water Company[4] and the City of San

[4] See SWRCB Compliance Order No. 05-13-18R-002, available at https://www.waterboards.ca.gov/drinking_water/programs/documents/ddwem/dwp%20enforcement%20actions/San%20Bernardino/2018/05_13_18R_002_3610109_WW.pdf.

Juan Bautista[5] – for failure to meet the requirements of CHSC §116655 for a reliable and adequate supply. In each of these two cases, the water systems relied upon all of their supply sources to be available at full capacity at all times to meet the regulatory criteria. However, when capacity or water quality issues resulted in reduction or loss of one or more sources, they fell out of compliance. The supply portfolio assumption made by Mr. Stoldt risks this same outcome for the Monterey Peninsula, particularly in its reliance on the reliability of ASR.

As illustrated in Figure 1, without ASR, the only water supply portfolio that meets any of the three demand projections is the water supply with MPWSP Desalination. The water supply portfolio with the PWM expansion does not meet the CPUC-approved demand nor the demand under the Stoldt 10-yr demand methodology, and only meets Stoldt's 5-yr demand estimate for approximately 3 years before falling out of compliance. Therefore, a reasonable conclusion is the Desalination plant is a vital part of the water supply portfolio for a reliable and adequate supply. **SEE NOTE 20**

Additional concerns may be considered when attempting to operate at an exact balance of supply and demand as proposed in the Stoldt memo:

- In considering the balance of supply and demand, it is unclear whether the analysis presented in the memo has taken into account potential impacts of climate change. For example, California's Fourth Climate Change Assessment report published by State of California on September 28, 2018, predicts that in the next 50 years annual average maximum temperatures in Monterey may increase approximately 4 degrees, and average number of days with maximum temperature above a threshold will increase by 10 days a year. Potential impacts to water usage are unknown, but present an added variable suggesting that operating right on the limit of the supply/demand balance would present risk that warrants further analysis if only the Expansion project is pursued.

- It is unclear if the supply portfolio presented by MPWMD staff would pass the required Risk and Resilience Assessment as defined within America's Water Infrastructure Act (AWIA) enacted on October 23, 2018, since even if the significant reductions in demand projections are accepted, the proposed non-desal supply option barely meets the current demand and if any supply source was reduced or eliminated due to malevolent acts, drought, or other natural hazards, even current demands would not be able to be met.

CONCLUSIONS

This peer review finds the following in regard to water supply and demand on the Monterey Peninsula, and the specific assertions presented in the Stoldt memo:

- Established values for supply and demand must meet the requirements of the California Health and Safety Code (CHSC) and the California Code of Regulations (CCR), specifically with regards to the reliability of the supply noted in CHSC Section 116555, and the estimation of demands

[5] See SWRCB Compliance Order No. 02-05-16R-004, available at https://www.waterboards.ca.gov/drinking_water/programs/documents/ddwem/dwp%20enforcement%20actions/San%20Benito/2016/02_05_16R_004_3510002_WW.pdf.

based upon the highest 10-year maximum daily demand (MDD) required in CCR Section 64554. The methodology used in the Stoldt memo does not meet these requirements. **SEE NOTE 1**

- The demand identified in the Stoldt memo is incorrect. Stoldt used a 5-year average rather than a 10-year MDD requirement. **SEE NOTES 2 & 8** As a result, demand and probable growth projections in the memo are underestimated, without clear supporting data. MPMWD staff also assumes continued implementation of tiered rates, conservation restrictions, and enforced water use reductions in order to justify lower demand projections, all of which have the potential to do continuing harm to the area's businesses and residential customers. **SEE NOTE 4**

- The supply projection presented in the Stoldt memo incorrectly assumes that each supply source included in the analysis is available at all times at maximum capacity, with no allowance or consideration of the potential shortfall that would occur should one or more sources be reduced or off-line for extended periods. This does not meet engineering best practices for reliability, resiliency, and incorporation of a factor of safety to ensure compliance with the regulations for a "reliable and adequate supply", as required by §116555(a)(3) of CHSC. **SEE NOTES 1, 5, & 7**

- The supply portfolio assumption made by Mr. Stoldt would operate at a precarious edge where current Peninsula water demand would need to be met by relying on **all** supply sources operating at **full capacity** at **all times** to meet the regulatory criteria. Not only is this assumption risky, it is unrealistic. As has recently occurred at nearby agencies, if even one source were to be reduced by capacity or water quality issues, the Peninsula supply would fall out of compliance, resulting in new Water Board restrictions, moratoriums, etc. **SEE NOTES 1, 5, & 7**

- Based upon the portfolio of ***reliable*** sources of supply, the supply without MPWSP Desalination is inadequate to serve the CPUC's determined demand of 12,000 afy, **SEE NOTE 6** as well as the reduced 10-year average demand of 10,863 afy as projected by MPWMD staff.

- The implementation of the proposed MPWSP Desalination Plant is necessary to provide a safe and reliable water supply to meet regional demand, regardless of whether the Pure Water Monterey Expansion project is developed. **SEE NOTE 21**

Additionally, the Stoldt memo provides four principal conclusions, each of which is listed below, followed by the findings of this peer review based upon the supply and demand discussions already presented.

- *Either supply option can meet the long-term needs of the Monterey Peninsula*
  This has not been demonstrated because the supply analysis in the Stoldt memo has neither followed the applicable statutes **SEE NOTE 1** nor has it adequately addressed the limitations on supply that would occur during drought years. **SEE NOTES 15 & 18**

- *Either supply option is sufficient to lift the CDO*
  This conclusion has not considered impacts of risk and resiliency that may interrupt one or more of the water supply sources, as a result of the four main categories for risk and resiliency of a water system (i.e. security, hazards, assets, and enterprise) as defined by the American Water

Infrastructure Act (AWIA) of 2018. Without ASR as a consistent reliable source, **SEE NOTE 15** the supply portfolio with the PWM Expansion cannot achieve the Stoldt memo's 10-yr demand average (or even the memo's 5-yr demand average when growth is considered), and it is reasonable to assume that CDO requirements (moratorium) would continue. **SEE NOTE 21** The current CDO imposes a moratorium on new service connections and increased use at existing connections, and the State Board would have the authority to impose continued moratoria based on a failure to comply with CCR §64554, as noted in CHSC §116655, which states in relevant part:

> *"(a) Whenever the state board determines that any person has violated or is violating this chapter, or any order, permit, regulation, or standard issued or adopted pursuant to this chapter, the state board may issue an order doing any of the following . . .*
> *(b) An order issued pursuant to this section may include, but shall not be limited to, any or all of the following requirements:*
> *. . .*
> *(4) That no additional service connection be made to the system."*

- *The long-term needs of the Monterey Peninsula may be less than previously thought*
  This assumes that per capita usage will remain at current low levels without consideration of possible effects of availability of secure supply and ongoing impacts to businesses of excessive conservation (such as having to ship out laundry services), as well as assuming that the CDO requirements preventing new connections coupled with steeply tiered rates to penalize higher water users and drive conservation will have to stay in place. The water supply portfolio presented under the Stoldt memo results in "water poverty" for the peninsula, with limited reliability and resiliency and steep rates and restrictions on usage and growth now and into the future. **SEE NOTE 21**

- *Several factors will contribute to pressure on decreasing per capita water use*
  While the Stoldt memo discusses potential impacts of increased water cost and recent conservation legislation signed by the Governor, it does not provide any evidence as to the actual impacts to per capita water use. The Governor's conservation bills are not statutory and are therefore not enforced by any regulatory agency; rather they are tools for agencies to calculate their own objectives. The data does show that rate-related conservation measures already in place, such as tiered rates, have driven per capita usage downward. No additional methods are presented in the memo to reduce demands; absent any, it is reasonable to assume everything has already been done on demand side to reduce levels and further reduction is not expected. Indeed, after a secure water supply is provided, it may be reasonable to assume the opposite, that an increase in demand is equally likely. A secure supply may provide some relief of the intense pressure on businesses to reduce usage, and coupled with projected tourism rebound and growth, suggests that it is not necessarily true that per capita usage will remain at current levels or continue to decrease.

Section 2: MPWMD Analysis "Notes" in Response to the Hazen & Sawyer Report

NOTE 1: MPWMD has consistently followed state and federal codes, as well as industry standards, in its analysis of the two supply options in the report. Hazen & Sawyer repeatedly misinterpret the same codes and standards, or mistakenly assert that MPWMD ignores them.

Specifically, any MPWMD conclusions in the report are consistent with the following:

- California Code of Regulations (CCR) section 64554
- California Health and Safety Code (CHSC) section 116555
- California Water Code (CWC) sections 10635 and 10631
- CPUC General Order 103A and other rules; and
- American Water Works Association "Water Resource Planning" guidance M50

CCR section 64554: Hazen & Sawyer's assertions of non-compliance are unfounded and misleading. For example, on multiple occasions Hazen & Sawyer asserts that MPWMD does not meet the requirements of CCR Title 22 section 64554. That is not true. Available to Cal-Am and its consultant Hazen & Sawyer, was a document produced and available from MPWMD in September 2019 and later publicly filed by the California Coastal Commission demonstrating MPWMD compliance.[1] With the passage of time, that analysis has been updated and is included here as Exhibit 1, now assuming a new water supply comes online in the year 2023. It shows that Pure Water Monterey expansion can meet the Maximum Day Demand (MDD) and Peak Hourly Demand (PHD) required under this section of the CCR. Ignoring the original document is an error of omission by Cal-Am and Hazen & Sawyer.

Hazen & Sawyer persistently confuses the backward-looking 10-year requirement for peak demand MDD under CCR section 64554 with average annual demand planning for future water supply. There is no such standard in 64554 to look back 10 years to ascertain current or projected future average annual demand. Section (k) which says *"The source capacity of a surface water supply or a spring shall be the lowest anticipated daily yield based on adequately supported and documented data"* by citing "daily yield", still goes to MDD and PHD, not long-term average annual demand. This bears repeating: **CCR section 64554 has nothing to with estimating current existing consumer demand or future average annual consumer demand for water.**

CHSC section 116555: Here too, Hazen & Sawyer misses the mark. All that is required under this section of the Code is that a water supplier "provides a reliable and adequate supply of pure, wholesome, healthful, and potable water." Nothing more, nothing less. To assert that either Pure Water Monterey expansion or the proposed desalination plant do not do so is disingenuous.

CWC sections 10635 and 10631: We agree that section 10635 of the CWC requires that *"every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry,*

[1] See California Coastal Commission agenda, November 14, 2019, Application 9-19-0918 / Appeal A-3-MRA-19-0034 (California American Water Co.) Exhibit 9 staff note attachment

and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the long-term total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and a drought lasting five consecutive water years." MPWMD has done so with respect to both proposed water supply sources and have concluded, Cal-Am and Hazen & Sawyer protests notwithstanding, that they can each meet the challenges of a normal water year, a single dry water year, and a 5-year drought (drought resilience is discussed in more detail later in Notes 15 and 18.)

We also recognize section 10631 reiterates the above-said requirement in the plan. Section 10631 also requires analysis by the utility of (i) Water waste prevention ordinances; (ii) Metering; (iii) Conservation pricing; (iv) Public education and outreach; (v) Programs to assess and manage distribution system real loss; (vi) Water conservation program coordination and staffing support; and (vii) Other demand management measures. These programs, many of which have been sponsored by MPWMD, have led to the decline in water demand that sets the baseline for future water supply planning. We believe that Hazen & Sawyer has done an inadequate job of incorporating these aspects on the Monterey Peninsula into its analysis.

CPUC General Order 103A and other rules: MPWMD's analysis has met the requirements of CPUC General Order 103A which states all water supplied shall be *"obtained from a source or sources reasonably adequate to provide a reliable supply of water" and "shall have the capacity to meet the source capacity requirements as defined in CCR Title 22, Section 64554"*. This has been addressed above.

The CPUC's "Rate Case Plan and Minimum Data Requirements for Class A Water Utilities General Rate Case (GRC) Applications" states utilities should *"forecast customers using a five-year average of the change in number of customers by customer class"* subject to unusual events (such as a meter moratorium here in Monterey). MPWMD has also recognized this regulatory guidance.

American Water Works Association (AWWA) "Water Resource Planning" guidance M50: Hazen & Sawyer incorrectly asserts that MPWMD analysis is inconsistent with industry standards as evidenced by AWWA M50 guidance. AWWA recognizes there are 6 traditional forecasting methods.[2] MPWMD's report has incorporated at least three of the accepted methods: "per capita models", "extrapolation models", "disaggregate water use models", and have checked certain estimates using "land-use models" each recognized by AWWA. Further, to the extent MPWMD has analyzed the AMBAG growth forecast and assigned water usage to the population and job forecasts, "multivariate" modeling has been included, also recognized by AWWA. "Several methods of demand forecasting are often combined, even within a single utility."[3]

[2] AWWA, "Water Resources Panning: Manual of Water Supply Practices M50", 3rd Edition, pages 81-84.
[3] AWWA, "Water Resources Panning: Manual of Water Supply Practices M50", 3rd Edition, page 81, paragraph 2.

Hazen & Sawyer quotes (without a footnote) from the second edition of M50[4], which was superseded by the third edition published in 2017. The current M50 edition from AWWA does not reference a specific preferred time period for historical data to be used for a future demand forecast. The MPWMD analysis is consistent with the current section of M50.

Nevertheless, if the out-of-date second edition of AWWA M50 citing a period of at least 10 years, is used, the same section also states *"If a simple per capita approach to forecasting is selected, the data requirements could be as easy as securing historical annual water production or sales for 5 to 10 years"* Hence, MPWMD's use of a 5-year period would have been acceptable.

NOTE 2: Hazen & Sawyer confuses the concept of current annual demand with MDD calculations based on a 10-year look-back. This was covered under NOTE 1 above, but bears repeating: **CCR section 64554 which looks back 10-years to determine maximum day and peak hour demand has nothing to with estimating current existing consumer demand or future average annual consumer demand for water.** It is entirely up to the water planning agency to determine the following:

- How much water do we use today?
- How much will we need in the future?
- How soon will we get there?

There is no specific guidance in the regulations other than that discussed earlier regarding normal year, dry year, and 5-year drought analysis. For Hazen & Sawyer to suggest otherwise is wrong. The MPWMD report directly addresses each of those three bullet points consistent with AWWA standards.

AWWA does not recommend a specific number of years to establish a historical base line.[5] There is nothing wrong, or outside industry standards, with looking at a 5-year average or some other measure to determine "How much water do we use today?" Also recall from Note 1 the CPUC's approach to future growth in connections is based on a recent 5-year history.

NOTE 3: Hazen & Sawyer did not "connect the dots" on this assertion. They have not demonstrated any probable underestimation.

NOTE 4: Hazen & Sawyer in multiple locations make the false assertion that MPWMD's report assumes continued conservation restrictions and water use reductions to justify lower demand projections.[6] Nowhere in the MPWMD report is this stated as an assumption. On the day of the release of the Hazen & Sawyer report, Hazen & Sawyer and Cal-Am were asked to substantiate this claim and have not done so. The MPWMD

[4] AWWA, "Water Resources Panning: Manual of Water Supply Practices M50", 2nd Edition, pages 47-48
[5] AWWA, "Water Resources Panning: Manual of Water Supply Practices M50", 3rd Edition, pages 86-90
[6] Hazen & Sawyer page 1, paragraph 3; page 4, paragraph 2;

report merely establishes a baseline to answer the question "How much water do we use today?"

NOTE 5: Nowhere in the MPWMD analysis does it assert each supply source "is available at all times at maximum capacity". This is a misinterpretation by Hazen & Sawyer. In fact, the MDD analysis discussed under NOTE 1 above shows "firm capacity" assuming the largest production well is unavailable. As previously noted, the original MDD analysis under NOTE 1 was available to Cal-Am and its consultant.

NOTE 6: Hazen & Sawyer repeatedly cites "current water demand determined by the CPUC of 12,000 afy". They have both mistaken this for the actual Cal-Am and CPUC number of 12,350 afy. In its Decision D.18-09-017 the CPUC stated *"we are convinced that 12,350 afy represents an appropriate estimate of annual demand to use in assessing the adequacy of Cal-Am's water supply…"*[7] It is important to understand that the CPUC did no original analysis, modeling, or projection of its own. It surveyed testimony provided by others and chose one to support its findings and recommendations. It should not be represented that that the CPUC developed demand numbers on its own.

Further, the Cal-Am testimony submitted in support of the 12,350 afy value used data that ended in 2016 and the company discounted the value of 2016 by incorrectly stating it was a drought year, which it was not on the Monterey Peninsula.[8] Hence, there are three additional years of data (four if you do not discount 2016) since that used to develop the 12,350 afy value.

However, Hazen & Sawyer appears unaware that Cal-Am itself has disavowed this 12,350 afy number as a measure of current water demand in its current General Rate Case (GRC) application, as discussed below. This fact undermines every further statement made by Cal-Am or Hazen & Sawyer as it relates to the current demand – **the starting point of all future demand analysis.**

As shown in the table below, Cal-Am now asserts in the GRC that its total water production for 2021 and 2022 from the Central Division is 9,789 afy,[9] which includes the Cal-Am Main System plus its satellites (generally thought to be 4-5% greater in total demand than the Cal-Am Main system.) This validates MPWMD's estimate of current demand. The Cal-Am GRC filing can be seen in Exhibit 2 attached.

In CPUC Decision 16-12-026, the Commission required Class A and B water utilities to propose improved forecast methodologies in their next general rate cases.[10] In the current GRC, Jeffrey Linam, Cal-Am's Vice President of Rates and Regulatory, states in his testimony that Cal-Am *"believes that the testimony demonstrates improved forecasting methodologies that consider the consumption trends during and following the*

[7] CPUC D.18-09-017, page 49, lines 1-2.
[8] Direct Testimony of Ian Crooks, Errata Version, in A.12-04-019, September 27, 2107, page 10, at line 22.
[9] California-American Water Company's (U-210-W) Update to General Rate Case Application, A.19-07-004, October 14, 2019, Table 3.14 of Results of Operations Model
[10] Direct Testimony of Jeffrey T. Linam (Final Application), in A.19-07-004, July 1, 2019, page 108, at line 14

drought that began in 2013".[11] Cal-Am "*hired David Mitchell of consulting firm MCubed to provide its sales forecast based on econometric models. The Company believes this is a significant improvement over the prior methods and use of historical averages…*"[12] This augments the testimony of Cal-Am expert witness Bahman Pourtaherian in the GRC who says David Mitchell's company M-Cubed "*has expertise addressing sales forecasting and rate design issues for energy, municipal and investor owned water utilities across the State.*"[13]

Mr. Mitchell developed a highly complex econometric model for Cal-Am that in this GRC estimated the following (see table) current demand (2021-2023) for the Cal-Am Main System (which is the system analyzed by MPWMD's supply and demand analysis). His results, presented in the table below, also support MPWMD's estimate of current demand.[14]

Cal-Am Estimates of Current Demand
From Current 2019 GRC
(AFY)

	2021	2022	2023
Central Division Forecast Sales Results of Operations Model in A.19-07-004 Table 3.14 (See also Exhibit 2)[9]	9,789	9,789	n/a
Expert Testimony of Cal-Am Witness David Mitchell Cal-Am Main System[14]	9,338	9,478	9,610

The fact that Cal-Am itself has now repudiated the Monterey Main System consumer demand numbers that supported the 2018 CPUC desalination Decision 18-09-017, makes much of the Hazen & Sawyer report moot.

NOTE 7: MPWMD and Hazen & Sawyer have a fundamental disagreement in how "reliable" supply is determined. Pure Water Monterey expansion and desalination both easily meet the 10-year average historical demand and far exceed the most recent 5-year average demand.

NOTE 8: Again, Hazen & Sawyer is confusing peak demand planning with long-term water supply planning. There are no prescribed regulatory standards for what time period may be selected to establish a baseline for existing demand in a system. A 10-year look-back is required for peak planning. A 5-year look-back is more than acceptable to establish an historical baseline of current use. Forecasting methods approved by AWWA do not specify any historical period to inform a future forecast, as discussed previously. As discussed in "Note 1" above, the CPUC itself encourages utilities to "*forecast*

[11] Direct Testimony of Jeffrey T. Linam (Final Application), in A.19-07-004, July 1, 2019, page 102, at line 25
[12] Direct Testimony of Jeffrey T. Linam (Final Application), in A.19-07-004, July 1, 2019, page 105, at line 6
[13] Direct Testimony of Bahman Pourtaherian (Final Application), in A.19-07-004, July 1, 2019, page 9, at line 21
[14] Direct Testimony of David Mitchell (Final Application), in A.19-07-004, July 1, 2019, Attachment 2, page 32, final line converted to acre-feet from CCF

customers using a five-year average of the change in the number of customers by customer class"[15] [16]

NOTE 9: It is important to reiterate that the CPUC did no original analysis, modeling, or projection of demand on its own. It surveyed testimony provided by others and chose one to support its findings and recommendations. It should not be represented that that the CPUC developed demand numbers on its own. It states in Decision 18-09-017 *"The Commission similarly evaluated all of the evidence presented along with arguments of the parties and determines that Cal-Am's future water demand will be approximately 14,000 afy"*[17] However, no evidence was presented to determine if tourism "bounce-back" had already occurred, whether water efficiency gains would reduce the water demand of legal lots of record, or if the Pebble Beach Company could realistically build out its whole entitlement in a reasonable timeframe. Neither the CPUC, Cal-Am, nor Hazen & Sawyer evaluated the market absorption for new demand, which would answer the question: How soon will we get there? The MPWMD report simply took a deeper look at the data behind those questions: How much will we need in the future? And How soon will we get there?

NOTE 10: 14,000 minus 12,350 equals 1,650 afy, not 2,000

NOTE 11: Column two of Table 2-5 was prepared by MPWMD in 2006. MPWMD is well aware of the future supply needs reflected in the table. The table does not indicate by when the future supplies are needed or how quickly the needs can be absorbed in the marketplace.

NOTE 12: AMBAG implemented an employment-driven forecast model for the first time in the 2014 forecast and contracted with the Population Reference Bureau (PRB) to test and apply the model again for the 2018 Regional Growth Forecast (RGF). To ensure the reliability of the population projections, PRB compared the employment driven model results with results from a cohort-component forecast, a growth trend forecast and the most recent forecast published by the California Department of Finance (DOF). All four models resulted in similar population growth trends. As a result of these reliability tests, AMBAG and PRB chose to implement the employment-driven model again for the 2018 RGF.[18] The CPUC did no original analysis, modeling, or projection of its own. It surveyed testimony provided by others and chose one to support its findings and recommendations.

NOTE 13: The Cal-Am Urban Water Management Plan (UWMP) was developed during a period when Aquifer Storage and Recovery (ASR) water was mandated to be recovered in the same year in which it is injected. That is not the case after a new water supply is

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[15] Rate Case Plan and Minimum Data Requirements for Class A Water Utilities General Rate Case (GRC) Applications, Appendix A to CPUC D.07-05-062

[16] Report and Recommendations on Revenues, Rate Design, and Special Requests, CPUC Public Advocates Office, February 14, 2020, page2-5, line 5

[17] CPUC Decision 18-09-017, page 68, line 1

[18] 2018 Regional Growth Forecast, Technical Documentation, Association of Monterey Bay Area Governments (AMBAG), June 2018, page 5

developed and the Cease and Desist Order (CDO) has been lifted. Hence, the Hazen & Sawyer analysis of the UWMP is meaningless.

Once the CDO is lifted as a result of either new proposed water supply, ASR is to function more like a reservoir, establishing a reserve that is carried over year-to-year.

NOTE 14: The Benito/Williams modeling assumptions were reviewed and approved by Cal-Am.

NOTE 15: MPWMD subsequently revised its conclusion that build-up of ASR storage would be sufficient to meet a 5-year drought. The build-up occurs based on historical data including wet, normal, and dry years. If the data is randomized, the same results will occur – ASR acts like a lake behind a dam, building up supplies for use later during a drought. To remove ASR from the resource planning mix as Hazen & Sawyer does on page 6 of its report would be akin to telling the Sonoma County Water Agency to remove Lake Mendocino from its supply planning, or any of the hundreds of urban water providers to discount one of its reservoirs. This is inconsistent with industry practice for estimating water supply availability. Even AWWA recognizes ASR in its reliability assessment: *"ASR wells can improve water basin management by storing water underground from periods of excess supply…, and later allowing a portion of the stored water to be extracted during periods of demand or short supply"*[19]

If the Monterey Peninsula were to experience drought during the "buildup period" following the completion of new water supply and the lifting of the CDO, ASR would arguably be delayed in building up a drought reserve, however Hazen & Sawyer have completely overlooked that a Pure Water Monterey expansion is new capacity without an immediate offsetting demand. That is, 2,250 afy from Pure Water Monterey expansion would provide the necessary approximately 800 afy to offset unlawful Carmel River diversions and lift the CDO and provide a remaining 1,450 afy for which there is no immediate present-day demand and can instead be delivered for customer service in the early years if ASR's drought reserve has not yet built-up. Just a few years of Pure Water Monterey expansion water could also provide drought-resilience to the Monterey Peninsula.

The Benito/Williams memo demonstrates, ASR is drought-resilient and Pure Water Monterey expansion provides an additional factor of safety against drought impacts to ASR.

NOTE 16: The use of water quality concerns is applicable to any water injected in the Seaside Basin. Presently, it is intended that desalinated water, Pure Water Monterey water, and ASR river water will be injected to the basin. The water quality issue Hazen & Sawyer raises is equally relevant or irrelevant to all three.

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[19] AWWA, "Water Resources Panning: Manual of Water Supply Practices M50", 3rd Edition, page 148

NOTE 17: The MPWMD report does not make the "assumption that the PWM Expansion project replaces the need for the desalination supply." Hazen & Sawyer may have inferred such, but it is not stated in the MPWMD report.

NOTE 18: A memorandum dated November 1, 2019 which appears as Appendix I to the Pure Water Monterey Supplemental Environmental Impact Report titled "Source Water Availability, Yield and Use Technical Memorandum", indicates Pure Water Monterey is resilient to drought, in general. Page 1 of the memorandum states the purpose of the memorandum is to summarize the source water availability and yield estimates for proposed modifications to the approved Pure Water Monterey Groundwater Replenishment Project (as modified, the full project is referenced as the Expanded PWM/GWR Project), to explain the seasonal storage yield estimates, and to provide the proposed maximum and typical (or normal) water use estimates for the Proposed Modifications.

Page 10 of the memorandum says *"In the attached scenario tables (Tables 9 through 11), the use of the various sources is reduced to just meet the demands of the AWPF and offset the current CSIP groundwater use in the wet season (October-March). During the dry season (April-September), surface water diversions are shown meeting the monthly AWPF demands and providing extra flow for the CSIP, such that* ***the annual use of new sources exceeds the annual AWPF demands.''*** *(emphasis added by MPWMD)*

"*The demand scenarios considered are:*

> *Table 9: A normal water year while developing a drought reserve (AWPF producing 6,550 AFY)*
> *Table 10: A normal water year with a full drought reserve (AWPF producing 6,350 AFY)*
> ***Table 11: A drought year starting with a full reserve (AWPF producing 5,550 AFY)*** *(emphasis added by MPWMD)*

In the drought year scenario, the stormwater and wastewater availability were reduced. Urban runoff from Salinas was assumed to be one-third of the historic average. Rainfall on the SIWTF ponds used the 2013 rainfall record (critically dry year). The unused secondary treated effluent values from 2013 were used, also the historic low. The CSIP groundwater well use from OCT 2013 to SEP 2014 was used as the CSIP augmentation target. Under this scenario, surface water diversions were required from the Reclamation Ditch, Blanco Drain and Lake El Estero, and the diversions were needed from March through November."

In MPWMD's opinion, this shows that the drought scenario shows all Advanced Water Purification Facility needs are met and there are still residual new supplies available to CSIP. In other words, Pure Water Monterey expansion is reliable in periods of reduced usage or drought years.

NOTE 19: In multiple presentations by the staff of Monterey One Water (M1W)[20] it has been shown that none of the source water for expansion of Pure Water Monterey is speculative, nor comes from Salinas-area wastewater or Salinas valley sources for which M1W doesn't already have rights. In one example, source water for the expansion would come from ocean discharge from the Regional Treatment Plant (54%), the Reclamation Ditch (5%), Blanco Drain (10%), wastewater outside the prior M1W boundaries (30%), and summer water rights from the County Water Resource Agency (1%).

NOTE 20: The Hazen & Sawyer charts on page 10 of its report incorrectly eliminate ASR from the supplies, inconsistent with industry practice. See Note 15.

NOTE 21: The MPWMD report considered all aspects of risk and resiliency in the two proposed supply alternatives. The MPWMD has gone further than any other parties to examine the factors influencing current customer demand, future customer demand, and the pace at which demand is incrementally added. MPWMD stands by the conclusions of its supply and demand analysis.

(Additional note: MPWMD intends to finalize its report "Supply and Demand for Water on the Monterey Peninsula" in March 2020)

[20] For example, November 12, 2019 M1W presentation to the Monterey County Farm Bureau and the Grower-Shipper Association and the September 30-2019 M1W board meeting

EXHIBIT 20

MAYER -- WATER SUPPLY AND DEMAND REPORT AND RECOMMENDATIONS FOR MARIN COAST WATER DISTRICT, APRIL 21, 2020 AND SUPPLEMENTAL REPORT JULY 1, 2020

Expert Report and Recommendations of

Peter Mayer, P.E.

Regarding Water Supply and Demand in the California American Water Company's Monterey Main System

Prepared for:

The Marina Coast Water District

April 21, 2020

WaterDM
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INTRODUCTION

My name is Peter Mayer. I am the Principal of Water Demand Management, LLC (WaterDM) based in Boulder, Colorado.

WaterDM is a water consulting firm providing expertise and services in the following areas:

- Municipal and industrial water use, research, and analysis
- Water conservation and demand management planning and implementation
- Integrated water resources planning
- Water loss control
- Analysis of municipal water rates and rate structures
- Drought preparedness and response
- Demand forecasting
- Evaluation of changes in demand
- Statistical analysis of water demand and modeling
- Meter technology implementation
- Meter and service line sizing

I have a Master of Science in Engineering (1995) from the University of Colorado, Boulder and a Bachelor of Arts (1986) from Oberlin College. I am a registered and licensed Professional Engineer in Colorado.

I am a civil engineer and the focus of my career for over 25 years has been on urban water systems and demand management including conservation planning and implementation, rate analysis, water demand research, demand forecasting, drought preparation, utility metering, and water loss control.

Since 1995, I have served as a consultant and researcher to urban water providers, US EPA, the Water Research Foundation, the Alliance for Water Efficiency, state governments, and municipal and industrial water users in the US and Canada.

Over my 25 -year engineering and consulting career, I have worked with and advised hundreds of water providers and organizations such as the California Department of Water Resources; Tucson Water; New York City Water Board; the Colorado Water Conservation Board; Hilton Head, SC; Denver, CO; Scottsdale, AZ; San Antonio, TX; Metropolitan Water District of Southern California; US EPA; the US Department of Justice; the Alliance for Water Efficiency and many others. I have served as the principal investigator and lead or co-author of numerous national and state-level water demand research studies including: Residential End Uses of Water (2016, 1999); Assessing Water Demand Patterns to Improve Sizing of Water Meters and Service Lines (2020); Peak Demand Management (2018); Colorado Water Plan and Update (2010, 2018); National Submetering and Allocation Billing Program Study (2004); Water Budgets and Rate Structures (2008); Commercial and Institutional End Uses of Water (2000); and many others.

I was Chair of the subcommittee and lead author of the American Water Works Association (AWWA) M22 Sizing Water Service Lines and Meters 3rd. ed. (2014). I am co-author of the AWWA G480 Water Conservation Standard and co-author of the Colorado Best Practices Guidebook for Municipal Water Conservation (2010). I served as Trustee of the AWWA Water Conservation Division from 2001-2007 during which time I worked with EPA to create the WaterSense™ program and helped establish the Alliance for Water Efficiency. I have been a Senior Technical Advisor to the Alliance for Water Efficiency since 2007. I am a member of the American Water Works Association, the Alliance for Water Efficiency, the American Water Resources Association, the American Society of Civil Engineers (ASCE) and the Colorado River Water Users Association.

In 2016, I testified as an expert witness on municipal and industrial water use at the US Supreme Court (FL v. GA, 142 Original) on behalf of the State of Georgia.

A copy of my curriculum vitae is attached to this report.

SCOPE OF INVESTIGATION

I was retained by the Marina Coast Water District to review and respond to the recommendations in the staff report of the California Coastal Commission related to Application 9-19-0918 / Appeal A-3-MRA-19-0034 (California American Water Co.). Specifically, I was asked to investigate if the California-American Water Company ("Cal-Am") has a feasible, reasonable, and reliable alternative to its proposed Monterey Peninsula Water Supply Project ("MPWSP") desalination project that will allow it to reduce its water withdrawals from the Carmel River in accordance with provisions of a cease-and-desist order from the State Water Resources Control Board. I was also asked to respond to the analyses and opinions contained in reports prepared by the Monterey Peninsula Water Management District (MPWMD) and a peer review report prepared by Hazen and Sawyer as they relate to future water supply and water demand of the Cal-Am Monterey Main system.

My opinions are based on my understanding of the information available as of the date of this report and my experience evaluating municipal and industrial water supplies and demands and conservation measures. In forming my opinions, I also considered the documents, testimony, and other materials listed in Appendix A. Should additional information become available to me, I reserve the right to supplement this report based on any additional work that I may conduct based on my review of such materials.

SUMMARY OF OPINIONS AND CONCLUSIONS

I have reviewed the following reports and documents:

- *Staff Report: Recommendation on Appeal Substantial Issue & De Novo Hearing and Consolidated Coastal Development Permit, California Coastal Commission, Application 9-19-0918 / Appeal A-3-MRA-19-0034 (California American Water Co.).* (Staff Report) (10-28-2020)

- *Supply and Demand for Water on the Monterey Peninsula prepared by David Stoldt, General Manager, MPWMD.* (MPWMD Report) (3-13-2020, 12-3-2019, and 9-16-2019)

- *California American Water Peer Review of Supply and Demand for Water on the Monterey Peninsula prepared by Kevin Alexander and Cindy Miller, Hazen and Sawyer* (Hazen Report) (1-22-2020)

- *MPWMD's March 6 response to the Hazen Report including supporting exhibits prepared by David Stoldt (*MPWMD Response) (3-6-2020)

As result of my review of these and other related and relevant documents and reports, my own independent analysis, and my expertise in municipal and industrial water use, water management, and engineering, I offer the following opinions and conclusions:

a) California Coastal Commission staff have correctly concluded that the Pure Water Monterey Expansion project provides an available, feasible[1] water supply alternative for Cal-Am.

The Staff Report concludes, *"the Commission finds that there is a feasible and less environmentally damaging alternative that would meet all or most of the proposed project's objectives in a timely manner*." I concur with this finding as it relates to the feasibility of the Pure Water Monterey Expansion project and the forecast adequacy of the future water supply provided by the combination of sources available to Cal-Am. I offer no opinion on the environmental components of the Staff Report.

I conducted an analysis of the historic demand trends in the Cal-Am service area and forecast growth in the service area. I developed an independent demand forecast based on the Associated Monterey Bay Area Governments (AMBAG) 2018 forecast of future population growth for the Cal-Am service area. My analysis supports the conclusions in the Staff Report projecting 2040 demands in the Cal-Am service area to be much lower than the California Public Utility Commissions (CPUC) certificating decision.

[1] Coastal Act Section 30108 states "'Feasible' means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors.".

With the addition of the Pure Water Monterey Expansion project providing an additional 2,250 acre-feet per year of supply to Cal-Am, the combination of Cal-Am's available and reliable water resources provides sufficient supply potential to meet annual future demand in 2040 by more than 1,200 acre-feet (an 11.9% surplus).

The CPUC, in its September 2018 Decision accepted that Cal-Am's "current" demand was 12,350 acre-feet per year and the future demand in 2040 will be approximately 14,000 acre-feet per year.[2] This appears outdated and therefore unreasonably high based on my analysis, the MPWMD Report, and Cal Am's own most recent forecasts. Over the most recent five-year period, 2015 – 2019, water demand in the Monterey Main service area averaged 9,885 AF per year. Cal-Am, in its most recent General Rate Case Application, forecast demand for 2021 and 2022 at 9,789 acre-feet per year.[3] Thus Cal Am's own most recent forecast estimates 2022 demand to be 20% lower than "current" demand in the CPUC decision. Independent estimates of demand developed for the MPWMD Report and developed separately for this report, align closely with Cal Am's recent rate case forecast.

My analyses show that the staff of the California Coastal Commission correctly utilized more recent information on available future water supplies and likely future demands in its analysis. I agree with the staff findings that concluded there exists an available, feasible water supply alternative to Cal-Am's proposed desalination project.

b) Cal-Am's per capita use is likely to decrease between now and 2040 due to ongoing conservation program implementation, conservation pricing, and statewide policy directives to reduce indoor and outdoor use and improve utility water loss control measures.

The Monterey region has been regarded as a model for water conservation programs for many years. The Monterey Peninsula Water Management District implements an array of effective demand management policies and programs that are likely to extend water efficiency gains.[4] Cal-Am implements an active water conservation program including a steeply inclining block rate pricing structure and customer incentives for installing drought tolerant landscapes and high-efficiency fixtures and appliances. Cal-Am also implements a rigorous utility-scale water loss control program aimed at reducing real losses in its distribution system. Regional development regulations ensure that all new and remodeled buildings are equipped with high-efficiency fixtures.

Cal-Am acknowledged the level of effort, significance, and impact of this conservation program in recent testimony. "California American Water has expended significant effort and resources

[2] CPUC Decision 18-09-017, September 13, 2018

[3] California-American Water Company. 2019. (U-210-W) Update to General Rate Case Application, A.19-07-004.

[4] California-American Water Company. 2019. (U-210-W) Update to General Rate Case Application, A.19-07-004. Direct Testimony of Stephanie Locke. (pp.7-8)

to encourage conservation in the Monterey County District through a variety of methods. Most important has been the tiered rate design, which features steeply inclining block rates to encourage efficient water use." – Direct Testimony of Christopher Cook, July 1, 2019.[5]

Mr. Cook's testimony is backed up by testimony from Stephanie Locke, Water Demand Manager for the Monterey Peninsula Water Management District, and the significant financial resources Cal-Am continues to apply toward water conservation in the region. In its most recent General Rate Case, Cal-Am proposed a $1.845 million three-year budget ($615,132 per year) to fund water conservation programs in the Monterey service area.[6] Locke's testimony notes that many of the conservation programs budgeted in the General Rate Case and in the prior Cal-Am rate filings focus on reductions in outdoor water use, on reductions in demand areas that have not previously been extensively targeted, and on maintaining the current low water use fixtures that have been installed to date.[7]

Cal-Am's local efforts are in parallel to broader policy measures at the state level, designed to further increase efficiency. The State of California has implemented a series of laws and directives to ensure future water efficiency across the state including Assembly Bill 1668 and Senate Bill 60 which effectively mandate an ongoing reduction in per capita use. Cal-Am's continued compliance with these regulations and its active efforts to reduce customer water demand in the future are likely to gradually further decrease per capita water use across the service area.

I have prepared two demand forecasts for the Cal-Am Monterey Main service area with growth rates based on AMBAG's anticipated population increase in 2040 and the water usage of each sector – residential, commercial, public and re-sale and non-revenue water. In each forecast, demand in each of Cal-Am's sectors is increased each year proportionally to the increase in population. The "Current gpcd" forecast assumes the current rate of daily per person water usage (based on annual production which includes residential, commercial, water loss, irrigation, etc.) continues into the future, without any increases in efficiency or conservation reductions. The "Continued efficiency" forecast includes the impacts of ongoing efficiency improvements by applying an indoor reduction factor.

Under both forecasts, the "Current gpcd" and "Continued efficiency", Cal-Am will have sufficient and reliable water supplies to meet 2040 demand with the Pure Water Monterey Expansion. Even in the highly unlikely event that Cal-Am achieves no additional water efficiency reductions over the next 20 years, my analysis shows the portfolio of available reliable supplies will exceed demand.

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[5] California-American Water Company. 2019. (U-210-W) Update to General Rate Case Application, A.19-07-004. Direct Testimony of Christopher Cook. (p.10)

[6] California-American Water Company. 2019. (U-210-W) Update to General Rate Case Application, A.19-07-004. Direct Testimony of Stephanie Locke. (p.9)

[7] California-American Water Company. 2019. (U-210-W) Update to General Rate Case Application, A.19-07-004. Direct Testimony of Stephanie Locke. (p.10)

c) Cal-Am's existing peak capacity is sufficient to meet anticipated future maximum daily demand (MDD) and peak hour demand (PHD) and Cal-Am has yet to avail itself of low/no-cost peak demand management measures that could reduce future peaks, if necessary.

Peak capacity planning is typically based on metered measurements of peak day and peak hour production maintained by the water provider. To my knowledge, Cal-Am does not publicly report its actual peak day or peak hour demands for the Monterey system. Rather than producing actual measurements, Cal-Am relies on a calculated approach to estimate future peak day usage. This approach was described and carried out in both the MPWMD Report and the MPWMD response, using slightly different assumptions.

Analyses in the MPWMD Report and MPWMD Response show that Cal-Am has the ability to produce 19.41 million gallons per day and 0.81 million gallons per hour. Calculations of future Maximum Daily Demand (MDD) and Peak Hour Demand (PHD) show that Cal-Am must support an MDD of 19.01 MG/day and a PHD of 0.792 MG/hour (based on a July 2012 maximum month demand). Revised analysis in the MPWMD Response using slightly different demand data showed that Cal-Am must support an MDD of 16.13 MG/day and a PHD of 0.672 MG/hour (based on an August 2014 maximum month demand). Under either demand assumption, from an infrastructure standpoint alone, Cal-Am has sufficient capacity to meet future peak day and peak hour demands even under the highly conservative assumptions embedded in the calculated approach.

If managing the peak day or peak hour becomes an issue in the future, Cal-Am has several options it has yet to implement. From an infrastructure standpoint, Cal-Cam could increase pumping capacity and add finished water storage. Cal-Am could also choose to implement low-cost peak day and peak hour demand management measures such as prohibiting automatic irrigation at certain times or on certain days or by re-assigning irrigation days of the week to distribute the summertime peak. Sophisticated approaches using smart irrigation controllers could also be employed to ensure optimal irrigation scheduling (Mayer et. al. 2018).

d) The Hazen Report contains numerous errors, mischaracterizations, and incorrect conclusions regarding Cal-Am's likely demand in 2040 and the availability and reliability of future water supply sources.

The Hazen & Sawyer peer review report is rife with misleading statements leading to incorrect conclusions regarding California codes, Cal-Am's likely water demand in 2040, and the availability and reliability of future water supply sources. MPWMD's March 6 response to the Hazen Report identifies line by line these errors and misleading statements. In this report I focus on the following problems:

- The Hazen Report repeatedly confuses and conflates peak demand and annual demand planning requirements and offers numerous misleading statements about California codes and standards and AWWA water planning guidance.

- The Hazen Report makes incorrect statements about water conservation programs and planning without offering data or analysis and states that per capita water use will increase substantially, despite Cal-Am's demand management efforts and prevailing state policy and regulations.

- The Hazen Report asserts that "current" demand in the Cal-Am Main System must be assumed to be 12,350 acre-feet per year. This is far higher than actual current demand and contradicts Cal-Am's own most recent General Rate Case filing which forecasts 2022 demand to be 9,789 acre-feet per year.

- The Hazen Report mischaracterizes the likely future reliability of water supplies available to Cal-Am and in particular the beneficial impacts of the ASR system over time.

- The Hazen Report reaches erroneous conclusions regarding the reliability of future water supplies based on inflated hypothetical demands, misleading statements about planning requirements, and inaccurate characterization of future water supply reliability.

Analysis and Recommendations

Overview

California-American Water Company proposes to construct and operate the Monterey Peninsula Water Supply Project to provide potable water from desalinated water for customers in its service area in the Monterey Peninsula region. One of the main project purposes is to provide an alternative water supply for Cal-Am that will allow it to reduce its water withdrawals from the Carmel River system in accordance with provisions of a cease-and-desist order from the State Water Resources Control Board.[8]

The California Public Utilities Commission has regulatory authority over Cal-Am and its infrastructure. In 2018 the CPUC approved Cal-Am's application to construct and operate the desalination project. The CPUC approved a smaller overall project than Cal-Am had initially proposed, because of the availability of water from another project – the Pure Water Monterey recycling and aquifer storage and recovery project. The CPUC found the two projects together could produce more than enough water to meet Cal-Am's expected water demands.

The California Coastal Commission also must review and approve the proposed desalination project under the California Coastal Act because portions of the project are within the coastal zone with the potential to impact environmentally sensitive habitat and other resources. The desalination plant itself would be located outside the coastal zone at a site about two miles inland within the jurisdiction of Monterey County, but components extend through the coastal zone to the Pacific Ocean and the project cannot be constructed without a Coastal Commission approved coastal development permit.[9]

The November 2019 California Coastal Commission staff review considered new information about water supplies and demands that were not available at the time of the 2018 CPUC decision. The Coastal Commission staff found that there is less need for water from new sources than previously determined. Significantly, another project alternative – the expansion of the above-referenced Pure Water Monterey project – has progressed from being too "speculative" for the CPUC to consider as a viable alternative, to now being a feasible, well-developed alternative. This Pure Water Monterey Expansion would occur entirely outside of the coastal zone and would cause far fewer environmental impacts than Cal-Am's proposed project.

[8] The original order, issued in 1995, determined that Cal-Am was extracting over 14,000 acre-feet per year from the river when it had a legal right to 3,376 acre-feet. The Board determined that these excess withdrawals were adversely affecting the river's population of federally-threatened Central Coast steelhead. The Board ordered Cal-Am to develop or purchase alternative water supplies so it could end its excess withdrawals. Subsequent orders issued by the Board have included additional requirements, with Cal-Am currently required to end its excess withdrawals and be able to rely on a new source of water by December 2021.

[9] California Coastal Act, Sections 30108, 30260

The recently developed Pure Water Monterey Expansion along with revised water supply and demand information were considered and included in the Staff Report[10] of October 28, 2019. The Staff report recommended denying Cal-Am's permit request to construct elements of the desalination project in the coastal zone due to its inconsistency with the Local Coastal Program's habitat protection and hazards policies, its failure of the three tests of Coastal Act Section 30260, and its failure of the alternatives consideration of Section 30233.

The California Coastal Commission has yet to approve or deny Cal-Am's proposal.

Coastal Commission 2019 Staff Report

Cal-Am's proposed desalination project is subject to the Coastal Act and the City of Marina Local Coastal Plan that require the California Coastal Commission to determine among other things, "whether there is a feasible and less environmentally damaging alternative to the proposed project".

The Staff Report provides the Coastal Commission staff's assessment of the proposed project's conformity to the City of Marina Local Coastal Plan (LCP) and Coastal Act's public access and recreation policies for purposes of the Commission's *de novo* review. The report also provides staff's assessment of the project's conformity to relevant Coastal Act provisions for those project components proposed within the Commission's consolidated permit jurisdiction.

Inconsistent Project

The Staff Report recommended that the California Coastal Commission deny both the *de novo* and consolidated permit aspects of the proposed project because the proposed desalination project is inconsistent with the Coastal Act and/or Local Coastal Plan including the following.[11]

1. **Environmentally Sensitive Habitat Areas** (ESHA) - The proposed project could adversely affect up to about 35 acres of ESHA. The project is inconsistent with requirements of both the City LCP and the Coastal Act that allow uses in ESHA only if they are dependent on those habitat resources.
2. **Coastal hazards** - The proposed project's well field would be sited at a location where it could be adversely affected by coastal erosion and the associated inland movement of foredunes that could bury the well heads.
3. **Protection of coastal water quality** - The proposed project would involve placement of fill in coastal waters in the form of new or modified outfall diffusers and monitoring buoys. In this case there is a feasible and less damaging alternative to the proposed fill, so the project would not conform to the alternatives requirement of Section 30233.

[10] Staff Report: Recommendation on Appeal Substantial Issue & De Novo Hearing and Consolidated Coastal Development Permit, California Coastal Commission, Application 9-19-0918 / Appeal A-3-MRA-19-0034 (California American Water Co.). (p 7)

[11] Staff Report (pp. 4-5)

Three-Part Test for an Inconsistent Project

Coastal Act Section 30260, which is incorporated into the Local Coastal Plan, provides that the Coastal Commission may approve a permit for a coastal-dependent facility that is otherwise inconsistent with other Coastal Act Chapter 3 policies if it meets a three-part test. The three test components that must be met are:

1) Alternative locations are infeasible or more environmentally damaging
2) Denial of the permit would not adversely affect the public welfare
3) The project's adverse effects are mitigated to the maximum extent feasible

The Staff Report addresses each of these three tests as outlined below.[12] The Staff Report concluded that the Cal-Am's proposed desalination project failed each test.

Test 1: Are alternative locations infeasible or more environmentally damaging?

The Staff Report states that, "another project, known as the Pure Water Monterey Expansion, would provide enough water to meet Cal-Am's needs for the next twenty years or more and would cause fewer adverse environmental impacts, including few, if any, on coastal resources, since it would be located outside the coastal zone."[13]

The Staff Report recommends the Commission find that Cal-Am's proposed project does not meet this first test of Section 30260, since there is a feasible, less environmentally damaging alternative to the proposed project that could be constructed in a different location.

Test 2: Would denying the project adversely affect the public welfare?

The Staff Report agrees there is a "clear need" for additional water supply to serve the Monterey Peninsula region and concludes that there is a "feasible and less environmentally damaging alternative that can supply sufficient water to allow Cal-Am to meet its legal obligations and to supply its customers for the coming decades."[14]

The Staff Report concluded that the costs of the proposed desalination project are substantially higher than other water sources, including the PWM Expansion, and would be borne by ratepayers and visitors to this coastal area.

From an environmental justice perspective the Staff Report notes, "Several communities of concern would be burdened by Cal-Am's project due to the higher costs for water it would impose or due to expected or potential impacts resulting from the construction and operation of some project components in areas of sensitive habitat or that provide public access to the shoreline."[15]

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[12] Staff Report (pp. 5-6)

[13] Staff Report (p.6)

[14] Staff Report (p.6)

[15] Staff Report (p.6)

The Staff report concluded that Cal-Am's proposed desalination project would "result in adverse effects to coastal resources – for example, sensitive habitat areas – that would diminish the public benefit from those coastal resources. The alternative project would entirely avoid those coastal resource impacts."[16]

Test 3: Are the project impacts mitigated to the maximum extent feasible?

Here the Staff Report concludes that "because the proposed project does not meet either of the first two tests of Section 30260, there is no need to determine whether it meets the third test. Nonetheless, Commission staff have determined that the proposed project's impacts are not mitigated to the maximum extent feasible. For example, the project could adversely affect up to several dozen acres of sensitive habitat, but the mitigation proposed thus far would result in a net loss of that sensitive habitat. Similarly, the proposed project would result in adverse effects to coastal water quality, but those effects, and the measures needed to avoid or minimize them, are not yet known."[17]

Feasible Alternative that Meets All or Most Objectives

The November 2019 California Coastal Commission staff review considered new information about water supplies and demands that were not available for the 2018 CPUC decision. The Coastal Commission staff found that there is less need for water from new sources than previously determined. Significantly, another project alternative – the Pure Water Monterey project – has progressed from being too "speculative" for the CPUC to consider as a viable alternative, to now being a feasible, well-developed alternative. This Pure Water Monterey Expansion would occur entirely outside of the coastal zone and would cause far fewer environmental impacts than Cal-Am's proposed project.

The Pure Water Monterey Expansion along with revised water supply and demand information were considered and included in the Staff Report of October 28, 2019 which concluded based on data and analyses, "that there is a feasible and less environmentally damaging alternative that would meet all or most of the proposed project's objectives in a timely manner."[18]

This conclusion relies on three core components:

1) A feasible alternative exists.[19]
2) The alternative is less environmentally damaging.
3) The alternative would meet all or most of the proposed project's objectives in a timely manner.

[16] Staff Report (p.6)

[17] Staff Report (pp.6-7)

[18] Staff Report (p. 7)

[19] The Coastal Act Section 30108 states "'Feasible' means capable of being accomplished in a successful manner with a reasonable period of time, taking into account economic, environmental, social, and technological factors."

The Staff Report relied on analyses and opinions contained in reports and applications prepared by the Monterey Peninsula Water Management District (MPWMD) as they relate to future water supply and water demand of the Cal-Am on the Monterey Peninsula.

Cal-Am Monterey System

The Cal-Am Monterey water system serves most of the population on the Monterey Peninsula, located along the coast of Central California. The Monterey Main system encompasses greater than 90-percent of the Monterey County District service area and is the area to be served with the proposed desalination plant. The Monterey Main system and includes the incorporated cities of Carmel-by-the-Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, and Seaside as well as unincorporated communities of Pebble Beach, Carmel Valley East and West, Carmel Highlands, and the Presidio of Monterey.[20]

Cal-Am also serves a number of unincorporated satellite systems, including the communities of Hidden Hills, Ryan Ranch, Bishop, Ambler, Ralph Lane, Chualar, Garrapata, and Toro. These satellite systems encompassed an area greater than 7,000 acres and service a total population of 5,313 in 2010. Other than Garrapata, Ralph Lane and Chualar, the satellite systems border the Monterey Main system. By 2022, Hidden Hills, Ryan Ranch, and Bishop will be interconnected to the Monterey Main system.

A map delineating the service area of Cal-Am Monterey prepared by the MPWMD is shown in Figure 1.

[20]Cal-Am 2010 Urban Water Management Plan. 9/7/2012. Water Systems Consulting, Inc.

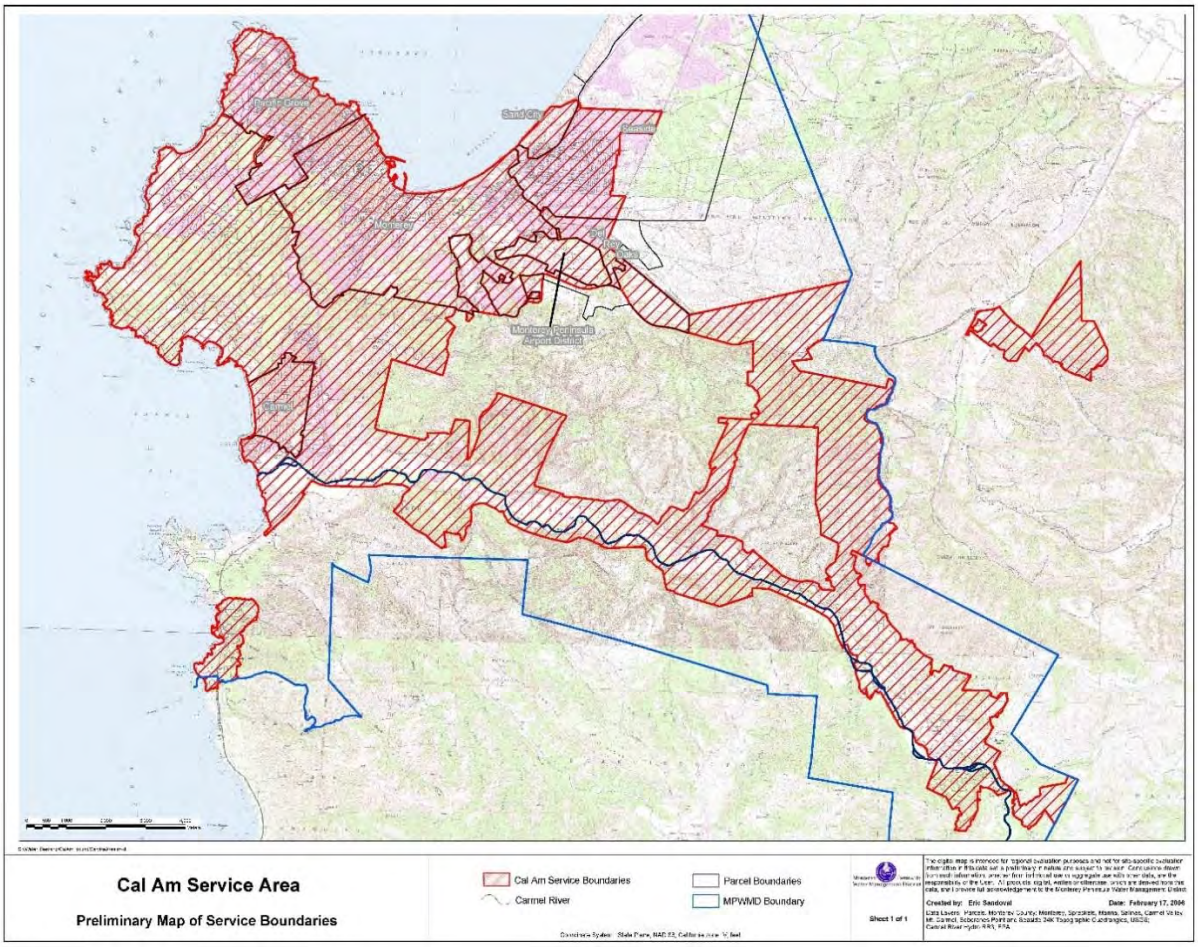

Figure 1: Cal-Am Monterey service area boundaries[21]

Population Served

The Association of Monterey Bay Area Governments (AMBAG) prepares regional population and growth forecasts for the region. The most recently available forecast, the AMBAG 2018 Regional Growth Forecast, estimates the 2020 service area population of the Cal-Am Monterey Main service area to be 91,884.[22] This population is forecast to increase to 100,814 in 2040. These population estimates include Monterey, Pacific Grove, Carmel-by-the-Sea, Sand City, Seaside, Del Rey Oaks, and portions of the unincorporated County.[23] The MPWMD Report notes that the population estimates likely overstates growth to 2040 because portions of the cities of

[21] Monterey Peninsula Water Management District. Map created by Eric Sandoval. 2/17/2006

[22] Association of Monterey Bay Area Governments. 2018 Regional Growth Forecast. Table 8, page 32.

[23] Unincorporated county estimates based on Cal-Am service area population reported to the State Water Resources Control Board June 2014 – September 2019 Urban Water Supplier Monthly Reports (Raw Dataset), minus urban areas, escalated at 5%.

Monterey, Seaside, and Del Rey Oaks within the Fort Ord Buildout will be served water by the Marina Coast Water District.[24]

Water Production and Demand

Annual Production

Annual water production for the Monterey System from 2000 – 2019 are shown in Figure 2 along with shaded periods added to indicate the influence of mandatory drought restrictions and recession. For this purposes of this report, total water production is assumed to be equivalent to the total annual water demand in the system inclusive of all water use, non-revenue water, and treatment losses.

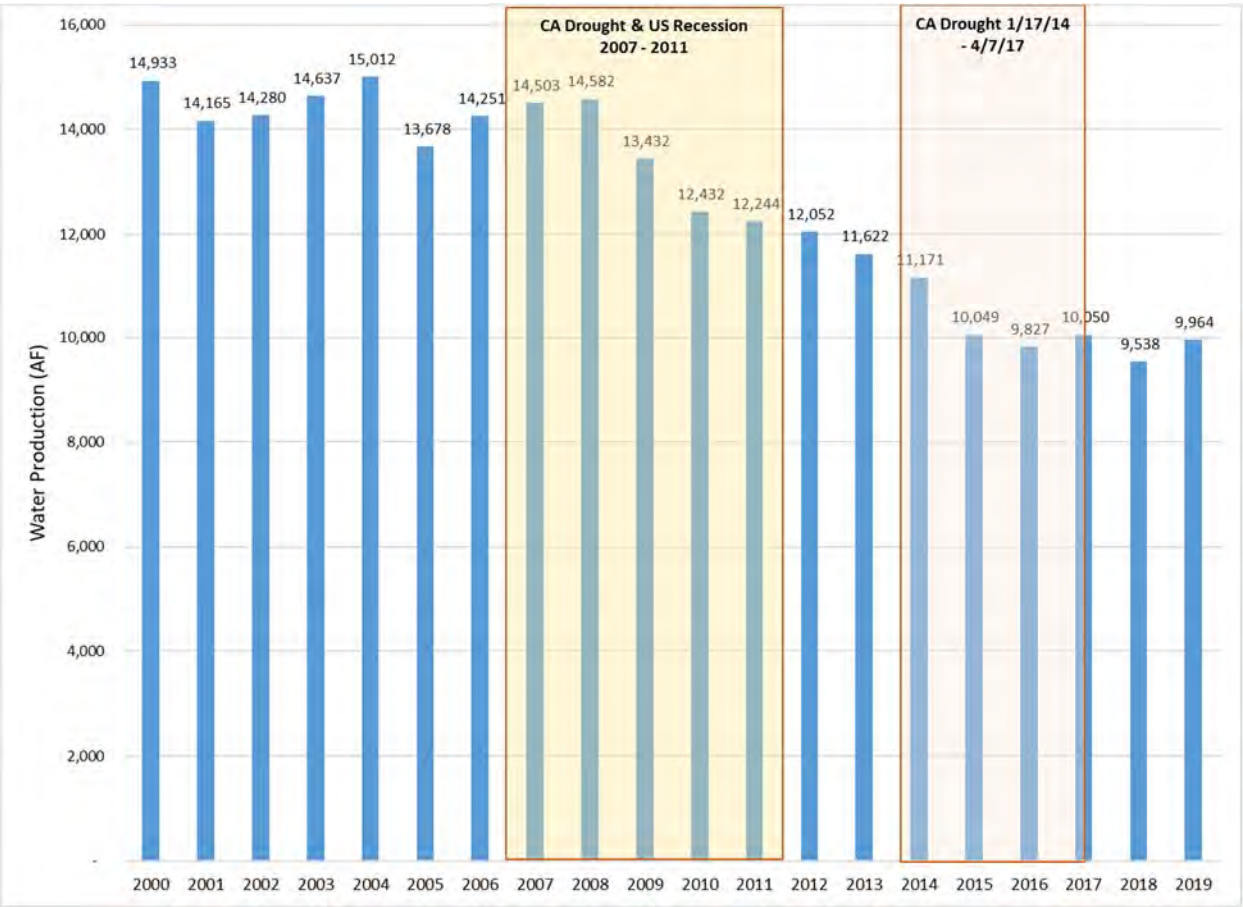

Figure 2: Cal-Am Monterey Main water production, 2000 - 2019[25]

[24] Monterey Peninsula Water Management District. 2020. Supply and Demand for Water on the Monterey Peninsula prepared by David Stoldt, General Manager. Appendix A.

[25] 2017 – 2019 From Cal-Am quarterly reports to the California State Water Resources Control Board. 2000 – 2016 From Monterey Peninsula Water Management District. 2019. Supply and Demand for Water on the Monterey Peninsula prepared by David Stoldt, General Manager. Figure 1.

From Figure 2 it is evident water production in the Monterey System was reasonably steady from 2000 – 2008, with the exception of the steep decline in 2005. In 2009 production began to steadily decrease and the decline didn't stop until 2016. During this 8-year period, steep demand reductions occurred during years when California was in an officially declared drought paired with an economic recession, but production reductions also occurred in 2012 and 2013 which were non-drought and recession influenced years. Over the most recent five-year period, 2015 – 2019, water production in the Monterey Main service area averaged 9,885 AF per year.

Comment on Data Sources

Cal-Am publishes and regularly updates monthly and annual water deliveries for Monterey Main, Hidden Hills, Ryan Ranch & Bishop on its website for the desalination project.[26] Monthly data going back to 2007 are available from the testimony of Ian Crooks (2012)[27]. I compared these published records with the production data set used in the MPWMD Report and (for 2017-19) with Cal-Am's quarterly and annual reports to the California State Water Resources Control Board.

The monthly data published on Cal-Am's website and in Ian Crooks testimony, while very similar was generally lower than the annual values in the MPWMD Report. Production from Cal-Am's quarterly and annual reports to the California State Water Resources Control Board for the three most recent years (2017-2019) was higher than either the delivery values published on Cal-Am's web site or the values in the MPMWD Report.

For the purposes of the demand forecasts prepared in this report, WaterDM used the higher production values reported to the State Water Resources Control Board and the higher production values from the MPMWD Report to establish the starting point for the demand forecast, rather than the lower delivery values from Cal-Am. WaterDM's forecasts are therefore conservative in that they are based on the highest published values of annual water production for the Monterey Main System.

Monthly Deliveries

While not relied upon as the starting point for WaterDM's demand forecasts, Cal-Am's published delivery data were used to analyze the seasonality of demand on the Monterey Main System. Monthly production is shown in Figure 3 with the period of recent drought declaration highlighted. A linear trendline is also added.

[26] https://www.watersupplyproject.org/system-delivery (accessed 3/25/2020)

[27] Direct Testimony of Ian Crooks Before the Public Utilities Commission of the State of California. Application 12-04-019 (Filed April 23, 2012) (p.9)

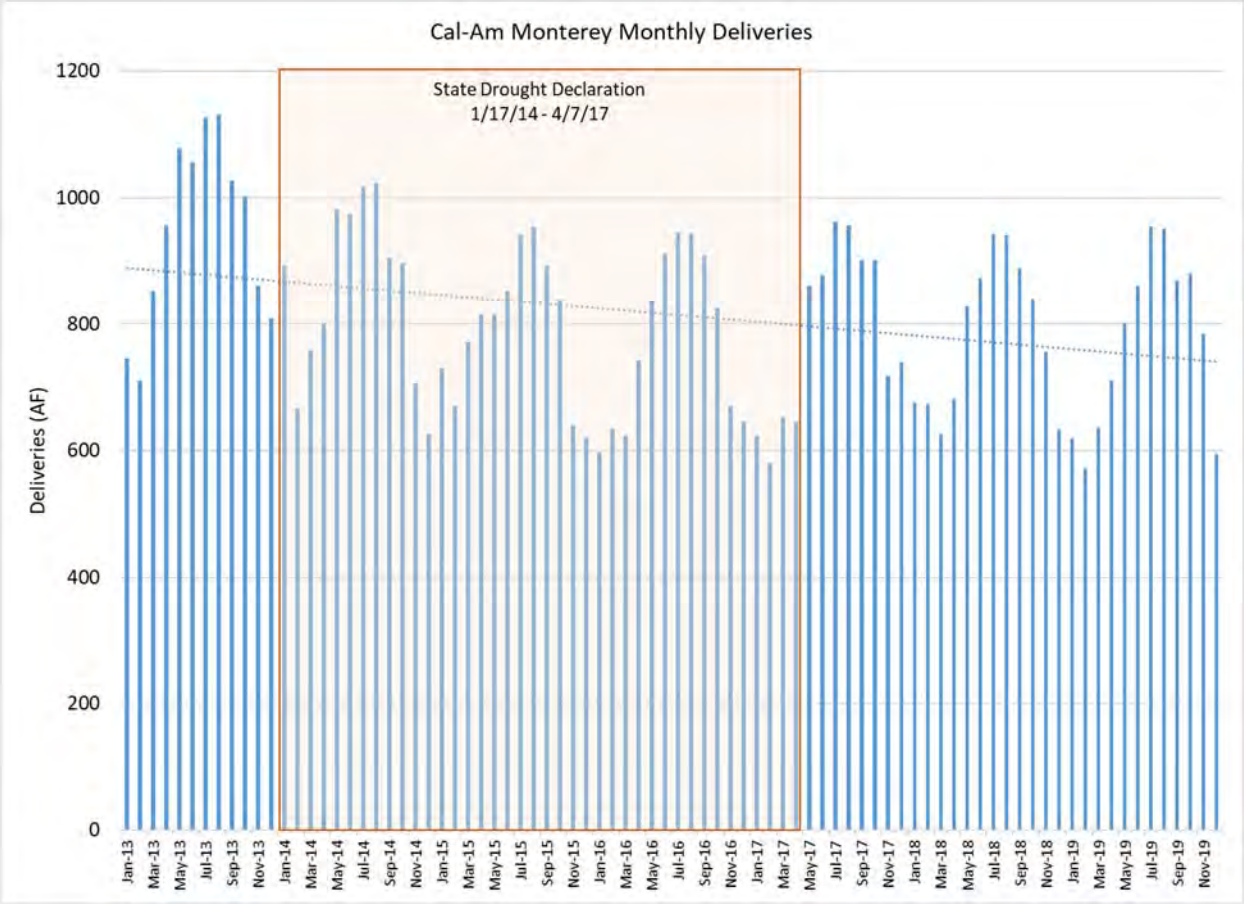

Figure 3: Cal-Am Monterey monthly deliveries

Using these published monthly data, I found the minimum and maximum month of delivery for each year. The average annual non-seasonal (predominantly indoor) deliveries for each year was calculated as the average water use in January, February, November and December multiplied by 12. Seasonal production for each year was calculated by subtracting non-seasonal from total production. These data and results are shown in as a chart in Figure 4 and in Table 1.

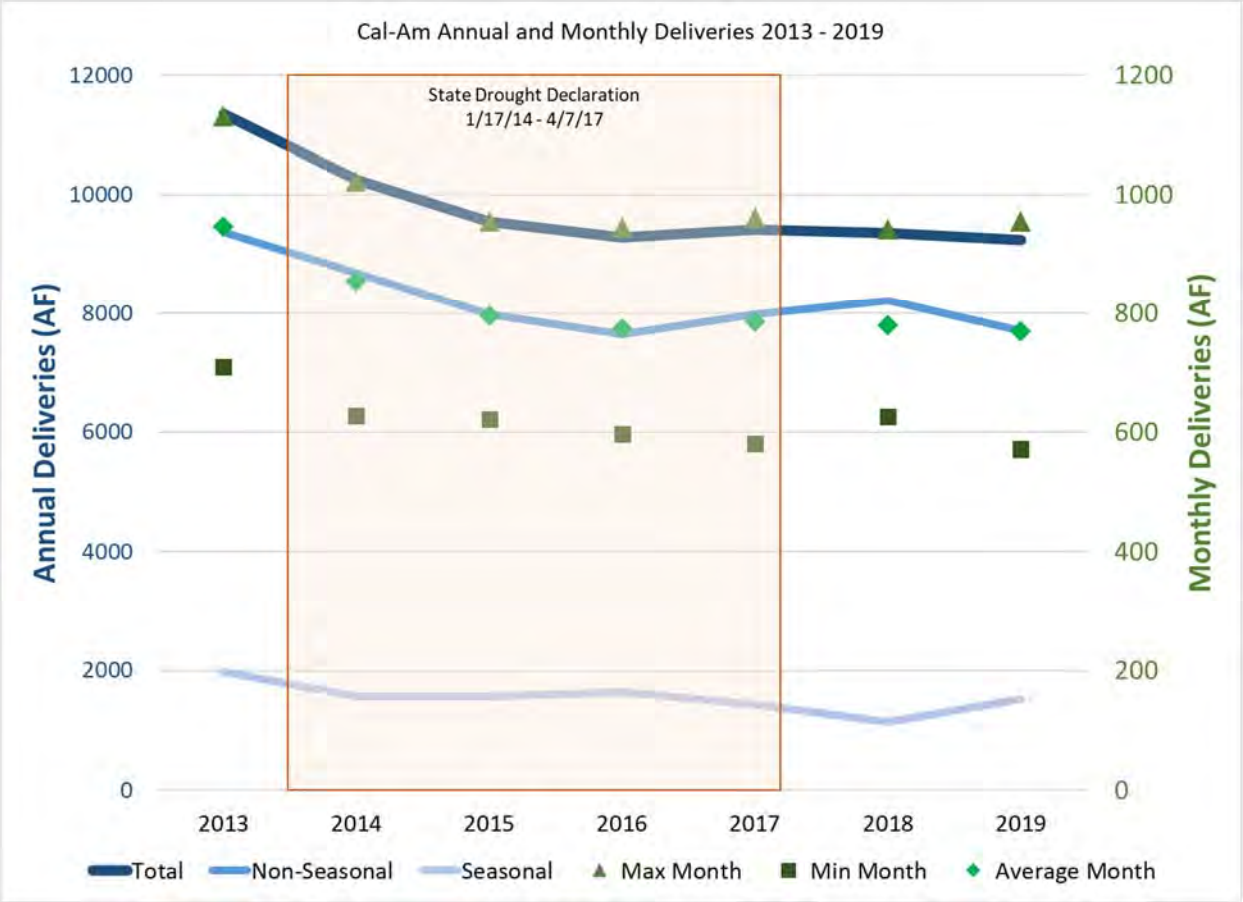

Figure 4: Cal-Am Monterey annual and Monthly Deliveries, 2013 - 2019[28]

Seasonal deliveries provide an estimate of summertime demand including outdoor irrigation and summertime tourism use. Non-seasonal deliveries provide an estimate of baseline indoor use and non-revenue water that occur throughout the year.

On average, seasonal deliveries accounted for 15.8% of Cal-Am's total across these seven years and ranged between 12.3% and 17.7%. Non-seasonal deliveries accounted for between 82.3% and 87.7% of usage from 2013 – 2019.

This analysis shows that the demand reductions achieved from 2013 - 2016 were largely in the non-seasonal (predominantly indoor use) category. Seasonal demand did decline during this period, but not nearly as much as non-seasonal demand.

Both the minimum and the maximum month deliveries for each year has also been declining since 2013. The minimum month of delivery in 2019 was the lowest of any of the past seven years. Notably, 2019 also had the higher annual precipitation in the region than any of the other years shown.

[28] From production data published at: https://www.watersupplyproject.org/system-delivery (accessed 3/25/2020)

Table 1: Cal-Am monthly deliveries and annual statistics[29]

Month	2013	2014	2015	2016	2017	2018	2019	2020
Jan	745	893	730	597	624	676	620	628
Feb	710	667	671	635	581	673	572	650
Mar	853	757	771	623	653	626	636	
Apr	957	800	814	742	645	682	710	
May	1079	982	814	836	861	828	801	
Jun	1056	975	853	912	878	874	861	
Jul	1127	1018	942	946	962	943	955	
Aug	1131	1023	956	944	957	941	951	
Sep	1027	906	893	909	902	889	870	
Oct	1002	897	840	826	901	841	881	
Nov	861	707	640	670	717	756	784	
Dec	809	627	621	646	740	633	594	
Total Annual Deliveries	11,356	10,250	9,545	9,285	9,421	9,362	9,234	
Maximum Month	1131	1023	956	946	962	943	955	
Minimum Month	710	627	621	597	581	626	572	
Average Month	946.4	854.3	795.4	773.8	785.1	780.2	769.6	
Annual Non-Seasonal	9,375	8,682	7,986	7,644	7,986	8,214	7,710	
Annual Seasonal	1,981	1,568	1,559	1,641	1,435	1,148	1,524	
%Seasonal	17.4%	15.3%	16.3%	17.7%	15.2%	12.3%	16.5%	
Total Annual Production (from Figure 2)	11,622	11,171	10,049	9,827	10,050	9,538	9,964	
Difference between Production and Deliveries	266	921	504	542	629	176	730	
% Difference	2.3%	8.2%	5.0%	5.5%	6.3%	1.8%	7.3%	

Note on Data Differences

The volume of water produced by Cal-Am annually as shown in Figure 2 are based on Cal-Am's quarterly and annual reports to the State Water Resources Control Board (2017-2019) and the

[29] From delivery data published at: https://www.watersupplyproject.org/system-delivery (accessed 3/25/2020) Includes: Monterey Main, Hidden Hills, Ryan Ranch & Bishop.

MPWMD Report and are higher than the delivery values reported on Cal-Am's website (Figure 3, Figure 4, and Table 1).

As noted above, for the purposes of forecasting future production reflecting the needs of the community, WaterDM used the higher values reported to the State Water Resource Control Board for 2017, 2018, and 2019. For Years 2000- 2016 WaterDM used the MPWMD Report values (also higher than Cal-Am's monthly reports) so that the highest reported baseline production values were used to consider baseline consumption.

Per Capita Water Use

WaterDM prepared an independent calculation of per capita water use based on the production volumes shown in Figure 2 and population data from AMBAG. System per capita use is calculated as the total volume of water produced at the source divided by the service area population and the number of days in the year. This calculation of system per capita use is based on production and thus inclusive of all water use, non-revenue water, and treatment losses.

System per capita use in the Cal-Am Monterey Main System in 2010 was 127.0 gpcd. This was highest level of gpcd over the past 10 years. In 2019, system per capita use was 97.3 gpcd and in 2018 it was 93.6 gpcd. Ten years of daily system per capita use for the Monterey Main System in shown in Table 2.

Table 2: Per capita water use, 2010 - 2019

Year	Population	Production	Per Capita	Source of Production Data
2010	87,419	12,432	127.0	MPMWD Report
2011	87,866	12,244	124.4	MPMWD Report
2012	88,312	12,052	121.8	MPMWD Report
2013	88,759	11,622	116.9	MPMWD Report
2014	89,205	11,171	111.8	MPMWD Report
2015	89,652	10,049	100.1	MPMWD Report
2016	90,098	9,827	97.4	MPMWD Report
2017	90,545	10,050	99.1	SWRCB Quarterly Reports
2018	90,991	9,538	93.6	SWRCB Quarterly Reports
2019	91,438	9,964	97.3	SWRCB Quarterly Reports

Water Demand by Sector

Cal-Am's 2019 water demand by sector is shown as a pie chart in Figure 5, based on data presented in 2019 testimony.[30] As shown in Figure 2, 2019 was not a drought year nor was it

[30] Direct Testimony of David Mitchell Before the Public Utilities Commission of the State of California. Application 19-07-004 (Filed July 1, 2019)

impacted by economic recession. Residential use including single- and multi-family customers used 58% of the total produced in 2019. Commercial and industrial customers used 30%, the public / other sector used 5%, and non-revenue was 7%. Non-revenue water includes real and apparent water loss as well as authorized and unauthorized uses for which the utility does not collect revenue.[31]

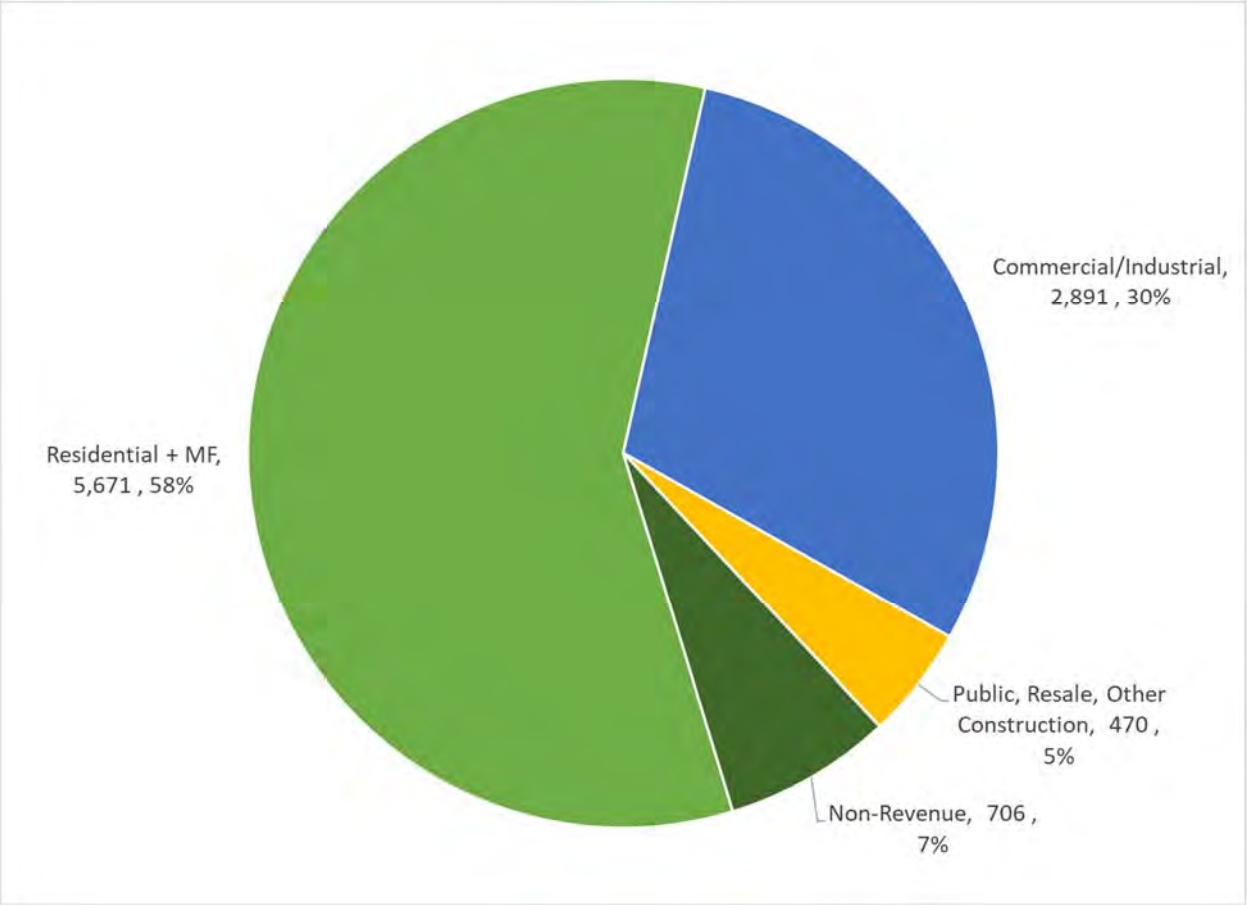

Figure 5: 2019 Cal-Am Monterey Main System demand by sector[32]

[31] In 2009 the residential sector used 59%, commercial/industrial sector 22%, non-revenue 9%, public/other 8%, golf course irrigation 2%.

[32] Direct Testimony of David Mitchell Before the Public Utilities Commission of the State of California. Application 19-07-004 (Filed July 1, 2019)

Water Demand Management

Water demand management includes five core components:[33]

1. **Technical efficiency** - reducing the quantity or quality of water required to accomplish a specific task (e.g. a high-efficiency toilet).
2. **Behavioral efficiency** - Adjusting the nature of the task so it can be accomplished with less water or lower quality water (e.g. take a shorter shower).
3. **Water loss and leakage control** - Reducing losses in movement from source through use to disposal including reducing leakage in the distribution system and customer-side leaks.
4. **Peak management** - Shifting time of use to off-peak periods.
5. **Drought response** - Increasing the ability of the system to operate during droughts.

Both Cal-Am and the Monterey Peninsula Water Management District implement active, far-reaching, and effective water demand management programs that address all five of these core components. The water demand data presented in the previous section of this report and in particular Figure 2 show a steady reduction in water demand in the Cal-Am Monterey Main system which was achieved through the active and intentional water demand management efforts implemented in the region. The reduction in per capita use over the past 10 years shown in Table 2 is further indication of increased water use efficiency.

The Monterey region has been regarded as a model for water conservation programs for many years. Cal-Am and the Monterey Peninsula Water Management District implement an array of effective demand management policies and programs that are likely to extend water efficiency gains. Cal-Am implements an active water conservation program including a steeply inclining five-tier block rate pricing structure and customer incentives for installing drought tolerant landscapes and high-efficiency fixtures and appliances. Cal-Am also implements a rigorous utility-scale water loss control program aimed at reducing real losses in its distribution system. Local development regulations ensure that all new and remodeled buildings are equipped with high-efficiency fixtures and appliances.

Cal-Am acknowledged the level of effort, significance, and impact of this conservation program in recent testimony. “California American Water has expended significant effort and resources to encourage conservation in the Monterey County District through a variety of methods. Most important has been the tiered rate design, which features steeply inclining block rates to encourage efficient water use.” – Direct Testimony of Christopher Cook, July 1, 2019.

Mr. Cook’s testimony is backed up by testimony from Stephanie Locke, Water Demand Manager for the Monterey Peninsula Water Management District, and the significant financial resources Cal-Am continues to apply toward water conservation in the region. In its most

[33] Adapted from Brooks, D.B. 2007. An Operational Definition of Water Demand Management. International Journal of Water Resources Development. Volume 22, 2006 - Issue 4

recent General Rate Case, Cal-Am proposed a $1.845 million three-year budget ($615,132 per year) to fund water conservation programs in the Monterey service area. Locke's testimony notes that many of the conservation programs budgeted in the General Rate Case and in the prior Cal-Am rate filings focus on reductions in outdoor water use, on reductions in demand areas that have not previously been extensively targeted, and on maintaining the current low water use fixtures that have been installed to date.

Cal-Am's local efforts are in parallel to broader policy measures at the state level, designed to further increase efficiency. The State of California has implemented a series of laws and directives to ensure future water efficiency across the state including Assembly Bill 1668 and Senate Bill 60 which effectively mandate an ongoing reduction in per capita use. Cal-Am's continued compliance with these regulations and its active efforts to reduce customer water demand in the future are likely to gradually further decrease per capita water use across the service area.

Peak demand management to shift the timing to off peak periods is already being practiced to some degree in the Cal-Am service area but could be expanded and adjusted if necessary. Peak demand days usually occur during the hot and dry part of the year when outdoor irrigation occurs simultaneously across the service area. Currently Cal-Am restricts outdoor irrigation between 9 a.m. and 5 p.m. on any day. Irrigation is only permitted on two specific days per week (Wednesdays and Saturdays) unless the customer is equipped with a weather-responsive "smart" controller that automatically adjusts irrigation to meet prevailing climate conditions. These are all effective measures but focusing some irrigation demand on Wednesdays and Saturdays could have the unintended impact of creating peaks on those particular days. Cal-Am does not report measured peak day demand data so it was not possible to determine if this is in fact the case.

Should peak demands become a concern, Cal-Am could choose to implement low-cost peak day and peak hour demand management measures such as requiring automatic irrigation to be scheduled at certain times or on certain days by re-assigning irrigation days of the week to distribute the summertime peak. If smart irrigation controllers are widespread, then more sophisticated approaches to irrigation scheduling and timing could also be employed to harmonize demand with water production and finished water storage conditions (Mayer et. al. 2018).

Water Demand Forecasts

WaterDM prepared two forecasts for the Cal-Am Monterey Main System to estimate future average annual production, inclusive of treatment losses and non-revenue water. The growth rate in each forecast is based on AMBAG's anticipated population increase from 2020 to 2040.[34]

[34]This likely over-estimates Cal-Am's future growth because it includes new population in portions of the cities of Monterey, Seaside, and Del Rey Oaks within the Fort Ord Buildout that will be served water by the Marina Coast Water District.

Each component of Cal-Am's demand – residential, commercial, public/other/re-sale, non-revenue water, and treatment losses was increased each year proportionally to the increase in population to produce a forecast of future average annual production, inclusive of treatment losses and non-revenue water.

- The "Current gpcd" forecast assumes the current rate of daily per person water usage continues into the future, without any increases in efficiency or conservation reductions.
- The "Continued efficiency" forecast includes the impacts of ongoing efficiency improvements by applying an indoor reduction factor.

These annual demand projections were built up from the analysis of historical production and deliveries presented above. The year 2020 is the first year of the projection, which then continues for 20-years to produce average annual demands in 2040. Over the most recent five-year period, 2015 – 2019, water production in the Monterey Main service area averaged 9,885 AF per year. This level of production was the starting point for the WaterDM forecasts.

Production was split out by sector and future demand was increased proportionally with population increases to 2040. The four sectors included in the model are:

- Residential (single-family + multi-family)
- Commercial and industrial
- Public, resale, other, construction
- Non-revenue water

The summed annual demand of these four categories equals the estimated water supply requirement under average future conditions. The model allows specific factors to be applied to the non-seasonal or seasonal component of annual demand for each demand category, to simulate the impacts of water efficiency and conservation programs.

The two forecasts prepared by WaterDM – "Current gpcd" and "Continued efficiency" are shown in Figure 6 along with the forecast demands included in Cal-Am's filings provided to the CPUC. Notably, WaterDM's 2020 – 2022 forecasts are higher than the forecasts Cal-Am General Rate Case Application forecast which estimated demand for 2021 and 2022 at 9,789 acre-feet per year.

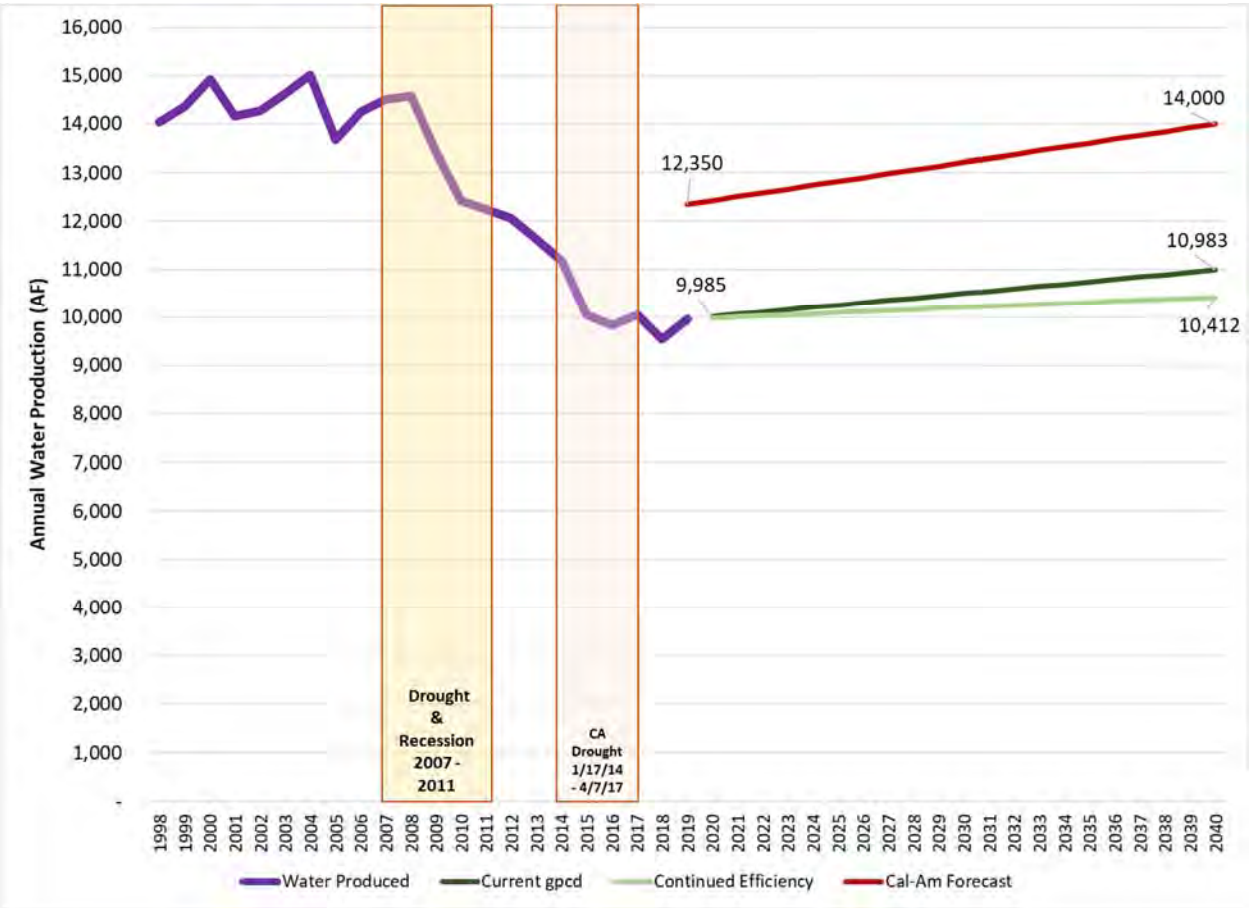

Figure 6: WaterDM forecasts of future average annual production

Current GPCD Forecast

The "Current gpcd" forecast includes ongoing conservation efforts only at levels required to maintain current per-capita water use with no additional savings. This forecast results in a future per-capita water use that is identical to the current level. The 2020 and 2040 statistics for the forecast are shown in Table 3.

Table 3: Current GPCD Forecast

	2020	2040
Population	91,884	100,814
Production Forecast	9,985 AF	10,983 AF
Per Capita Use Forecast	97.3	97.3

Continued Efficiency Forecast

The "Continued efficiency" forecast represents future production assuming slow, steady ongoing demand reductions from existing conservation activities relative to current per-capita use. This forecast results in a per-capita water use in 2040 that is 5.2% lower than current level.

Specifically, the "Continued efficiency" forecast includes the anticipated impacts of continuing the long-term water conservation program measures described in published documents and recent testimony from Cal-Am and MPWMD. It does not assume any drought restrictions or mandatory demand curtailments are applied.

The "Continued efficiency" forecast incorporates a modest level of increased efficiency of about 0.26% per year over 20 years. In my professional judgement, the "Continued efficiency" forecast represents the most likely forecast of future average annual production, inclusive of treatment losses and non-revenue water.

Table 4: Continued Efficiency Forecast

	2020	2040
Population	91,884	100,814
Production Forecast	9,985 AF	10,412 AF
Per Capita Use Forecast	97.3 gpcd	92.2 gpcd

Cal-Am Demand Forecast

The demand forecast provided to the CPUC as part of Cal-Am's application for the proposed desalination plant are included with the AMBAG population forecast and per capita use for comparison. The Cal-Am forecast includes an estimate of "current" demand and a forecast of demand in 2040.

Table 5: Cal-Am Forecast

	2020	2040
Population	91,884	100,814
Production Forecast	12,350 AF	14,000 AF
Per Capita Use Forecast	120.0 gpcd	124.0 gpcd

Water delivery patterns have changed substantially in the region and perhaps as a result, Cal-Am has produced conflicting forecasts. The Cal-Am forecast submitted to the CPUC differs substantially from Cal-Am's own more recent General Rate Case Application forecast which estimated demand for 2021 and 2022 at 9,789 acre-feet per year.[35] The magnitude of the changes in demand and the differences in the forecasts is significant and has implications for water planning. Cal Am's own most recent forecast estimates 2022 demand to be 20% lower than "current" demand in the CPUC decision.

The Cal-Am forecast also results in an inflated value for gpcd. Using the "current" Cal-Am forecast of 12,350 AF and the current AMBAG population results in a calculated current gpcd of

[35] California-American Water Company. 2019. (U-210-W) Update to General Rate Case Application, A.19-07-004.

120.0 which is 23% higher than WaterDM's fully inclusive calculation of Cal-Am Monterey Main system gpcd in 2019 which was 97.3 gpcd. This forecast doesn't square with Cal-Am's stated intent to spend more than $1.8 million over three years on its water conservation programs and with state regulations and policies that incentivize demand reductions. The Cal-Am forecast doubles down on the problem an inflates per capita use up to 124 gpcd in the year 2040.

A 2040 level of 124 gpcd is extremely unlikely and such a dramatic and remarkable reversal in water use efficiency is inconsistent with the state and local directives and contradicts recent sworn testimony from Cal-Am in its current General Rate Case. Customers in the Cal-Am Monterey service area are among the most water efficient in the state. The outdated Cal-Am forecast unreasonably assumes that these customers will go from being the most efficient to becoming among the least water efficient in California over the next 20 years.

Water Supply

Introduction

The November 2019 California Coastal Commission staff analysis considered new information about water supplies (and demands) that were not available for the 2018 CPUC decision. As a result of this new information, the Coastal Commission staff found that there is less need for water from new sources than previously determined and that a project alternative – the expansion of the above-referenced Pure Water Monterey project – had progressed from being too "speculative" for the CPUC to consider as a viable alternative, to being a feasible, well-developed alternative. This Pure Water Monterey Expansion would occur entirely outside of the coastal zone and would cause far fewer environmental impacts than Cal-Am's proposed project.

The recently developed Pure Water Monterey Expansion along with revised water supply and demand information were considered and included in the Staff Report[36] of October 28, 2019 in which the Staff report recommended denying Cal-Am's permit request to construct elements of the desalination project in the coastal zone due to its inconsistencies with the Coastal Act and the Local Coastal Program's habitat protection and hazards policies, its failure of the three tests of Coastal Act Section 30260, and its failure of the alternatives consideration of Section 30233.

I considered the available, reliable water supply sources for Cal-Am Monterey to utilize out to the year 2040 including the existing Pure Water Monterey project and its expansion. Based on this analysis I agree with the conclusions in the 2019 Staff Report. With the addition of the Pure Water Monterey Expansion providing an additional 2,250 acre-feet per year of supply to Cal-Am, the combination of Cal-Am's available and projected water resources total 11,650 acre-feet of reliable supply. This provides sufficient supply potential to meet annual future demand in 2040 by more than 1,200 acre-feet above WaterDM's most-likely "Continued efficiency" forecast.

[36] Staff Report: Recommendation on Appeal Substantial Issue & De Novo Hearing and Consolidated Coastal Development Permit, California Coastal Commission, Application 9-19-0918 / Appeal A-3-MRA-19-0034 (California American Water Co.). (p 7)

Water Supply for the Monterey Main System

Cal-Am delivers water to its Monterey Main system from a diverse collection of water sources. This will remain true into the future, even with the Pure Water Monterey Expansion or the proposed desalination plant. Figure 7 shows historic and projected deliveries in the Monterey Main system including the Pure Water Monterey projects along with the two water demand forecasts prepared by WaterDM. All of the supply sources shown in Figure 7 and are documented in Table 6. The anticipated available reliable water supply in 2040 from each source is included and the total is 11,650 AF. Each source of water and the volume of available reliable supply is described in detail in the sections below.

Cal-Am has historically relied heavily on withdrawals from the Carmel River water and Seaside Basin groundwater to provide water to the Monterey Main system. In the future withdrawals from both sources must be reduced. Cal-Am must carefully manage its supply portfolio in the coming years regardless of the Coastal Commission's ruling regarding the desalination project. Even under the best of circumstances it will be at least 2022 before either the Pure Water Monterey Expansion or the proposed desalination project are online.

The focus of the Coastal Commission staff analysis and recommendations was on the availability of sufficient water supply to meet the community needs twenty years from now in 2040, and less on how Cal-Am will manage the transition from its reliance on the Carmel River in 2022. The water supply analysis summarized in Figure 7 indicates that with the addition of the full Pure Water Monterey project Cal-Am does have available water supply both in the near term (2020 – 2025) and twenty years from now in 2040. In keeping with the Staff Report, the primary focus of the WaterDM analysis was on the determining the volume of reliable supply available in 2040.

The Pure Water Monterey project with the expansion would provide enough available supply to meet the likely 20-year requirements, but it is still reasonable to expect Cal-Am may need to seek to secure additional supplies in the future beyond 2040. Much will depend upon what happens to the local economy and climate over the coming decade. Over-building infrastructure such as desalination (at its current size) would be an expensive error. The future is uncertain and the impact of COVID 19 and other economic unknowns could well be to reduce future demand in the Monterey Main System from current levels, lessening or eliminating the need for securing additional supply.

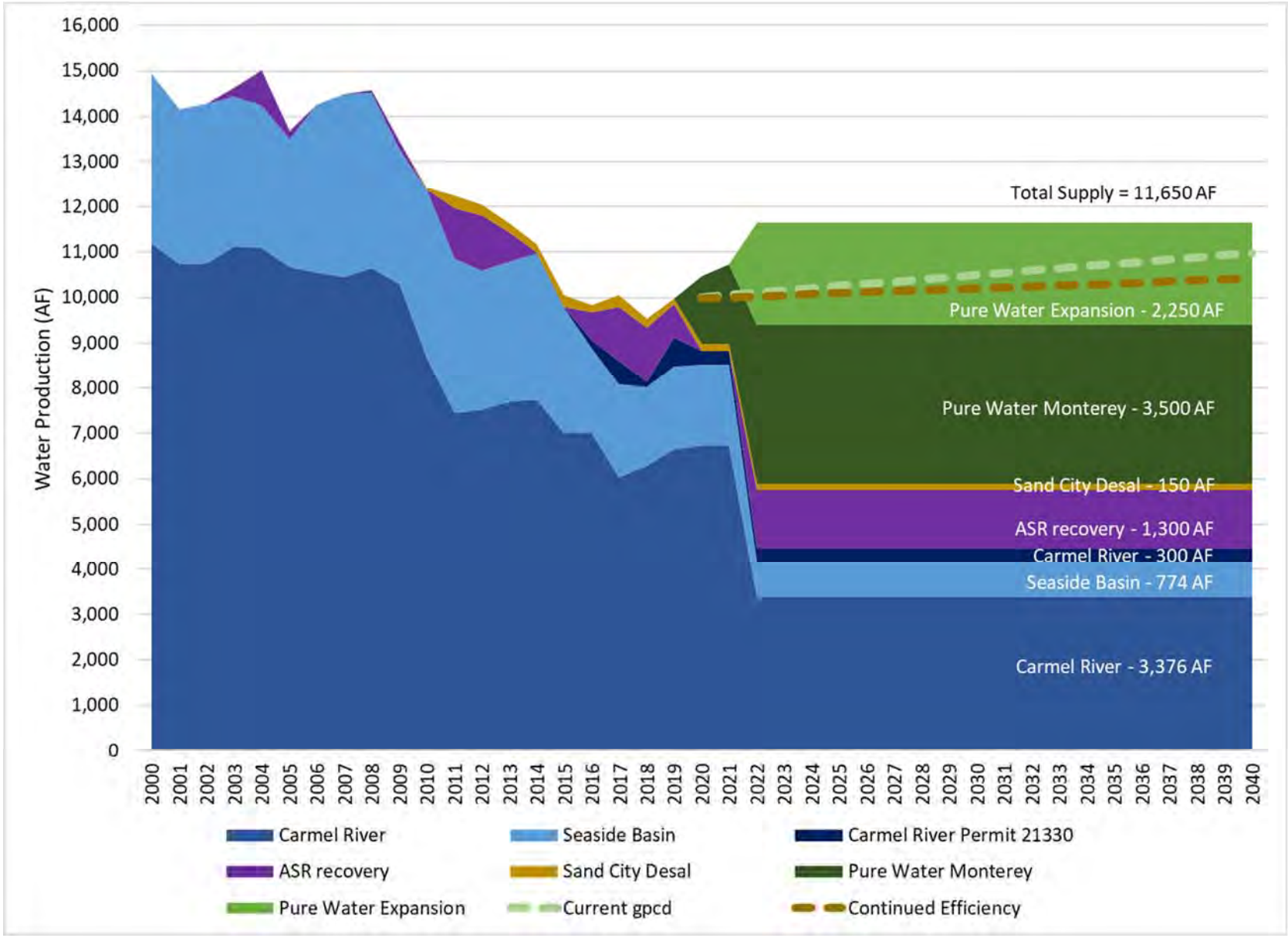

Figure 7: Cal-Am historic water production (2000 – 2019) and future water supply and demand (2020 – 2040)

Table 6: Cal-Am Monterey Main System water supply sources

Water Source	AF/Year	Notes	Regulator	Data Source
Carmel River – Cease and Desist Order	3,376 AF.	2,179 AF from License 11866; 1,137 AF of pre-1914 appropriative rights; and 60 AF of riparian rights.	SWRCB Order 2016-0016	Cal-Am reports to the SWRCB
Carmel River – Permit 21330	300 AF	Only available Dec. – May.	SWRCB	Cal-Am reports to the SWRCB
Seaside Basin Native Groundwater	774 AF	Reflects Cal-Am's 25-year obligation to leave 700 AF of the 1,474 AF it is entitled.	Seaside Basin Watermaster	Watermaster's annual reports.
ASR Recovered Water	1,300 AF	Based on long-term historical precipitation and streamflow, ASR system may be capable of recovering an average of 1,920 AF per year.	SWRCB Water Rights Permits 20808A & C	Cal-Am reports to the SWRCB
Sand City Desalination Plant	150 AF	300 AF capacity. Has averaged 209 AF over life of plant.	SWRCB Order 2016-0016 & Division of Drinking Water	Cal-Am reports to the SWRCB
Pure Water Monterey	3,500 AF	Withdrawals prior to 2022 will reduce Effective Diversion Limit from the Carmel River.	Division of Drinking Water & Seaside Basin Watermaster	TBD
Pure Water Monterey Expansion	2,250 AF		Division of Drinking Water & Seaside Basin Watermaster	TBD
TOTAL	**11,650 AF**			

Carmel River

Withdrawals from the Carmel River, Cal-Am's primary water source, must be reduced in accordance with a cease-and-desist order from the State Water Resources Control Board. The original order, issued in 1995, determined that Cal-Am was extracting over 14,000 acre-feet per year from the river when it had a legal right to 3,376 acre-feet. The State Water Resources Control Board determined that these excess withdrawals were adversely affecting the river's population of federally threatened Central Coast steelhead and riparian habitat. The Board ordered Cal-Am to develop or purchase alternative water supplies so it could end its excess withdrawals. Subsequent orders issued by the Board have included additional requirements, with Cal-Am currently required to end its excess withdrawals and be able to rely on a new source of water by December 2021.

Figure 7 and Table 6 show Carmel River production reducing to the mandated 3,376 AF in 2022. This is the volume to which Cal-Am has a legal right and is comprised of 2,179 AF from License 11866; 1,137 AF of pre-1914 appropriative rights; and 60 AF of riparian rights.[37]

Figure 7 also shows an additional 300 AF of Carmel River supply based on Permit 21330.[38] Cal-Am's annual reports to the State Water Resources Control Board show that it has withdrawn an average of 428 AF per year from 2017-2019 under this permit.

Seaside Groundwater Basin – Native Groundwater

Along with the Carmel River, the withdrawals of native groundwater from the Seaside Groundwater Basin must also be reduced soon which impacts Cal-Am Monterey. The Seaside Basin was over pumped for many years prior to the issuance of the 2006 Seaside Groundwater Basin adjudication which imposed triennial reductions in operating yield until the basin's "Natural Safe Yield" is achieved. For Cal-Am, the last reduction will occur in 2021 and Cal-Am will have rights to 1,474 acre-feet per year.

Figure 7 and Table 6 show 774 AF of supply available from the Seaside Basin from 2022 – 2040. This reflects the agreement with the Watermaster to leave 700 AF per year of the 1,474 AF it is entitled to for at least 25 years as payback for Cal-Am's over-pumping in the Seaside Basin. For the purposes of this analysis it was assumed that this obligation is triggered once Cal-Am obtains a permanent replacement supply of water (e.g. Pure Water Monterey Expansion or the proposed desalination project).

[37] MPWMD Report (p.3)

[38] "In 2013, Cal-Am received Permit 21330 from the State Water Board for 1,488 AFA from the Carmel River. However the permit is seasonally limited to December 1 through May 31 each year and subject to instream flow requirements." MPWMD Report (p.3)

The Seaside Basin Watermaster states Cal-Am's "payback amount is currently estimated to be 18,000 acre-feet", thus 25.7 years of 700 AF per year re-payments would complete the payback.[39]

The Seaside Basin Watermaster's 2019 report to the Court overseeing the groundwater adjudication states that the total usable storage space in the entire Seaside Groundwater Basin is 52,030 AF. The report also describes the current allocation of that usable storage space among the Seaside Basin pumpers and Cal-Am is allocated 28,733 acre-feet.[40] The annual report aligns with the Watermaster's January 2020 letter regarding the Pure Water Monterey Expansion which reiterates the importance of the groundwater payback program. The letter also notes the direct ties between the Seaside Basin and the Pure Water Monterey Expansion project and identifies that "on the order of 25,000 acre-feet of additional storage would need to be injected and left in the Seaside Basin over a period of years in order to achieve protective elevations along the coastline."[41]

After the payback is complete, Cal-Am will be able to produce the full 1,474 AF if needed. During a drought or in the event another supply became impaired, Cal-Am could (with permission from the Seaside Basin Watermaster) utilize its full 1,474 AF in any year or series or years and then extend the payback period.

Aquifer Storage and Recovery

Cal-AM participates in an aquifer storage and recovery (ASR) project that allows for the capture of excess Carmel River winter flows through wells along the river. This river water is then transferred through existing conveyance facilities, including the new Monterey Pipeline and Pump Station, and stored in the Seaside Groundwater Basin for later extraction. This project operates with four ASR well sites capable of both injection and extraction. Ownership and operation of this source water project has various components split between Cal-Am and the Monterey Peninsula Water Management District.[42]

There are two water rights that support the ASR system: Permit 20808A which allows maximum diversion of 2,426 AF and Permit 20808C which allows up to 2,900 AF for a total potential maximum annual diversion of 5,326 AF.[43] But in reality Cal-Am will only be able to divert, inject, and store the maximum permitted volume in the wettest of years.

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[39] Seaside Basin Watermaster Jan. 8, 2020 Letter to Rachel Gaudion. Subject: Draft Supplemental Environmental Impact Report for the Proposed Modifications to the Pure Water Monterey Groundwater Replenishment Project (Draft Supplemental EIR)

[40] Seaside Basin Watermaster Annual Report – 2019, December 5, 2019

[41] Seaside Basin Watermaster Jan. 8, 2020 Letter to Rachel Gaudion.

[42] California-American Water Company. 2019. (U-210-W) Update to General Rate Case Application, A.19-07-004. Direct Testimony of Christopher Cook. (p.7)

[43] MPWMD Report (p.3)

Based on long-term historical precipitation and streamflow data, the ASR system is designed to allow an average of 1,920 AF per year to be recovered. Figure 7 and Table 6 assume a more conservative 1,300 AF of ASR production per year for 2020 – 2030 as does the MPWMD Report. With the addition of the Pure Water Expansion, Cal-Am will have additional opportunity to inject and store water in the Seaside Groundwater Basin which may allow for increased annual recovery over time.

Cal-Am is allocated 28,777 AF of total storage in the Seaside Groundwater Basin.[44] Careful management of the Seaside Groundwater Basin and optimizing the storage opportunities it provides will help ensure a long-term reliable supply for the Cal-Am Monterey service area. Once the storage reserve is established, Cal-Am could withdraw 1,920 AF (or more) on a regular basis.

Sand City Desalination Plant

Cal-Am has an operating agreement for the Sand City Desalination Plant, a small facility designed to produce 300 acre-feet of water per year. Due to source water quality issues and discharge permit requirements to date the Sand City plant has never produced the full 300 AF and the maximum that is has ever produced was 276 AF in 2011. Over the life of the plant it has averaged 209 AF of production per year but it has only averaged 188 AF per year of production from 2016 – 2019.[45] Figure 7 and Table 6 conservatively includes 150 AF per year of production well below the long-term average of 209 AF per year.

Pure Water Monterey

Monterey One Water in partnership with the Monterey Peninsula Water Management District developed the Pure Water Monterey Groundwater Replenishment Project to create a reliable source of water supply to replace existing water supply sources for the Monterey Peninsula.

The primary objective of the Pure Water Monterey Project is to replenish the Seaside Groundwater Basin with 3,500 acre-feet per year of purified recycled water to compose a portion of Cal-Am's water supply and to assist in complying with the State Water Resources Control Board orders. The source water for the Pure Water Monterey Project is wastewater flows from the members of Monterey One Water.

The Pure Water Monterey Project (as initially approved and constructed) includes a 4 million gallon per day capacity water purification facility for treatment and production of purified recycled water that is conveyed and stored in the Basin using a series of shallow and deep injection wells. Project conveyance facilities include ten miles of pipeline from the purification facility to injection wells in the Seaside Groundwater Basin. This pipeline is owned and operated by the Marina Coast Water District.

[44] Seaside Basin Watermaster Annual Report – 2019, December 5, 2019

[45] MPWMD Report

Once injected, the purified recycled water augments existing groundwater supplies and is capable of providing 3,500 acre-feet per year of water for extraction. Pure Water Monterey is operational in 2020 and Figure 7 includes 3,500 AF per year from the Pure Water Monterey project starting in 2022.

Pure Water Monterey Expansion

Monterey One Water and the MPWMD have proposed expansion of the Pure Water Monterey project to increase the capacity available to Cal-Am. The Pure Water Monterey Expansion is expected to provide an additional 2,250 acre-feet per year to augment existing groundwater supplies.

The source water for the Pure Water Monterey Expansion is municipal wastewater and agricultural drainage water. Analysis of the water sources under four conditions including drought concluded that the project can reliably produce water under each circumstance.[46]

The analysis concluded Monterey One Water would have rights to a sufficient quantity of source water to produce the yield in advanced treated, product water that is anticipated to be produced by the Pure Water Monterey Expansion regardless of whether or not the conditions precedent are met and whether or not it is a dry or drought year or a normal or wet year.[47]

The analysis shows that the Pure Water Monterey Expansion can reliably produce water as proposed. Figure 7 includes 2,250 acre-feet per year from the Pure Water Monterey Expansion project becoming available to Cal-Am in 2022.

With the addition of the Pure Water Monterey Expansion project providing an additional 2,250 acre-feet per year of supply to Cal-Am, the combination of Cal-Am's available and projected water resources total 11,650 acre-feet of reliable supply. This provides sufficient supply potential to meet annual future demand in 2040 by more than 1,200 acre-feet than WaterDM's most-likely "Continued efficiency" demand forecast.

Peak Capacity

Peak capacity planning is typically based on metered measurements of peak day and peak hour production maintained by the water provider. To my knowledge, Cal-Am does not publicly report its actual peak day or peak hour demands for the Monterey system. Rather than producing actual measurements, Cal-Am relies on a calculated approach to estimate future peak day usage. This approach was described and carried out in both the MPWMD Report and the MPWMD response, using slightly different assumption.

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[46] April 11, 2020. Source Water Operational Plan Technical Memorandum. Prepared by Bob Holden, PE, and Alison Imamura, PE, Monterey One Water

[47] April 2020. Comments on Water Supply and Source Water Availability. FINAL Supplemental Environmental Impact Report for the Proposed Modifications to the Pure Water Monterey Groundwater Replenishment Project. P 3-8

Analyses in the MPWMD Report and MPWMD Response show that Cal-Am has the ability to produce 19.41 million gallons per day and 0.81 million gallons per hour. Calculations of future Maximum Daily Demand (MDD) and Peak Hour Demand (PHD) show that Cal-Am must support an MDD of 19.01 MG/day and a PHD of 0.792 MG/hour (based on a July 2012 maximum month demand). Revised analysis in the MPWMD Response and Final analysis using slightly different demand data showed that Cal-Am must support an MDD of 16.13 MG/day and a PHD of 0.672 MG/hour (based on an August 2014 maximum month demand). Under either demand assumption, from an infrastructure standpoint alone, Cal-Am has sufficient capacity to meet future peak day and peak hour demands even under the highly conservative assumptions embedded in the calculated approach.

If managing the peak day or peak hour becomes an issue in the future, Cal-Am has several options it has yet to implement. From an infrastructure standpoint, Cal-Cam could increase pumping capacity and add finished water storage. Cal-Am could also choose to implement low-cost peak day and peak hour demand management measures such as prohibiting automatic irrigation at certain times or on certain days or by re-assigning irrigation days of the week to distribute the summertime peak. Sophisticated approaches using smart irrigation controllers could also be employed to ensure optimal irrigation scheduling (Mayer et. al. 2018).

The Hazen Peer Review Report

As part of my investigation I was asked to review and comment on a peer review report prepared by Hazen and Sawyer (Hazen Report) which critiqued the MPWMD Report and the subsequent MPWMD Response.

- *California American Water Peer Review of Supply and Demand for Water on the Monterey Peninsula prepared by Kevin Alexander, P.E. and Cindy Miller, P.E., Hazen and Sawyer (Hazen Report)*
- *MPWMD's March 6 response to the Hazen Report including supporting exhibits prepared by David Stoldt (MPWMD Response)*

The Hazen & Sawyer peer review report is rife with misleading statements leading to incorrect conclusions regarding California codes, Cal-Am's likely water demand in 2040, and the availability and reliability of future water supply sources. MPWMD's March 6 response to the Hazen Report identifies line by line these errors and misleading statements. In this report I focus on the following problems:

Water Planning

The Hazen Report repeatedly confuses and conflates peak demand and annual demand planning requirements and offers numerous misleading statements about California codes and standards and AWWA water planning guidance.

Throughout the Hazen Report the authors confuse and conflate requirements for meeting the peak demand and annual demand planning practices. Planning the infrastructure and treatment capacity requirements for a community to meet the peak day and peak hours of

demand is distinctly different from planning for an adequate long-term water supply for the same community. In my judgement, the MPWPD Report and Response adhered to all applicable codes and industry standards and practices.

I will specifically address the Hazen Report's assertions regarding the following:

- California Code of Regulations (CCR) section 64554
- California Health and Safety Code (CHSC) section 116555
- California Water Code (CWC) sections 10635 and 10631
- American Water Works Association "Water Resource Planning" guidance M50

CCR §64554

On page 3 the Hazen Report states, "CCR §64554(b), establishes the requirements that California water utilities must use to project demands. This regulation requires that the public water system identify the day, month, and year with 'the highest water usage during at least the most recent ten years of operation.'"[48]

CCR §64554 specifically establishes the requirements for "New and Existing Source Capacity" and provides methods for calculating the Maximum Daily Demand (MDD) for a water system. MDD or peak capacity planning is typically based on metered measurements of peak day and peak hour production maintained by the water provider and 64554 states that, "If daily water usage data are available, identify the day with the highest usage during the past ten years to obtain MDD".[49]

To my knowledge, Cal-Am does not publicly report its actual peak day or peak hour demands for the Monterey system. Rather than producing actual measurements, Cal-Am relies on the calculated approach (method 2 in CCR 64554) to estimate future peak day usage. This approach was described and carried out in both the MPWMD Report and the MPWMD Response, using slightly different assumptions. I reviewed these calculations and under both sets of assumptions Cal-Am has sufficient capacity to meet MDD.

If peak day or peak hour demands were to increase in the Cal-Am system over the next 20 years, additional pumping and local storage capacity could be added to the system to meet the requirements of CCR §64554.

The Hazen Report repeatedly confuses the peak capacity calculation of MDD as specified in CCR §64554 with the very different task of planning for an adequate future water supply on an annual basis. CCR 64554 does not make any provisions for estimating current annual demand or future annual demand. The Hazen Report improperly connects 64554 with annual demand

[48] Hazen Report (p. 3).

[49] CCR §64554(b)(1)

planning on page 3 and page 6 and lacks proper specificity when referring to peak vs. annual supply and demand.

CHSC 116555

California Health and Safety Code section 116555 states simply that California water suppliers must provide, "a reliable and adequate supply of pure, wholesome, healthful, and potable water."[50]

The MPWMD Report correctly concluded that either project could provide the reliable water supply for the region. The MPWMD's revised analysis shows that even under conservative, randomized climate assumptions, ASR storage will build up a sufficient reserve to meet a 5-year drought.[51]

CWC Sections 10635 and 10631

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

Section 10631 reiterates this requirement in the plan and also requires analysis by the utility of (i) Water waste prevention ordinances; (ii) Metering; (iii) Conservation pricing; (iv) Public education and outreach; (v) Programs to assess and manage distribution system real loss; (vi) Water conservation program coordination and staffing support; and (vii) Other demand management measures.[52]

The Hazen Report implies that the Pure Water Monterey Expansion is speculative and unproven and suggests it should not be considered "as a permanent reliable water source" and instead should be considered a "backup" supply.[53] There are many problems with this analysis specifically:

i. The Hazen Report notably fails to apply the same scrutiny regarding reliability to the proposed desalination project. Frequently desalination delivers less supply than promised at a higher cost than anticipated.[54]
ii. The Hazen Report considers unrealistic and unsubstantiated current and future demand projections based on outdated demand information.

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[50] CHSC 116555 https://codes.findlaw.com/ca/health-and-safety-code/hsc-sect-116555.html

[51] MPWMD Response (Note 15)

[52] http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=WAT&sectionNum=10631

[53] Hazen Report (p.8)

[54] https://www.voiceofsandiego.org/topics/science-environment/desal-plant-producing-less-water-promised/

iii. Revised analysis from the MPWMD, which I have confirmed, shows that even under conservative, randomized climate assumptions, ASR storage will be built-up and sufficient to deliver forecast volumes through a 5-year drought. If Pure Water Monterey Expansion is completed there will likely be additional water available for injection and carryover storage.

iv. The Hazen Report fails to take into consideration Cal-Am's compliance with Section 10631 and implementation of effective efficiency and conservation measures that have successfully reduced demands and will continue to do so in the future.

American Water Works Association (AWWA)[55] Manual M50, Water Resource Planning

The Hazen Report repeatedly asserts that analysis in the MPWMD Report is inconsistent with "engineering best-practices" published in the AWWA Manual M50 Water Resources. The M50 is planning guidance manual which offers a broad range of approaches and invites utilities to choose the one that best fits their needs, requirements, and available data. As it strains to defend Cal-Am's outdated "current demand" forecast, the Hazen Report manages to mis-represent both the framework and content of the M50 manual. The Hazen Report assertions are incorrect and misleading for the following reasons.

First, the Hazen Report misrepresents the M50 as a set of "engineering best practices."[56] AWWA Manuals are not "best-practices" documents, but rather are "Manuals of Water Supply Practices" which are distinct and different from "best-practices" in that they offer utilities a wide range of solutions rather than a single "best" approach. AWWA Manuals are "consensus documents focused on providing strategies and steps for water system optimization. They are written, reviewed and approved by members of AWWA volunteer committees."[57]

Second, the Hazen Report cites an old and outdated version of the M50. The most current AWWA Manual M50 Water Resources, 3rd edition was published in 2017, but the citations in the Hazen Report are from the discontinued 2nd edition published in 2007.

Third, regardless of the outdated citation, the Hazen Report critically misinterprets and misrepresents identical guidance provided in the both versions of the M50 manual. Both editions of M50 include the same following language regarding the need for a variety of methods to forecast demand:

> *"No single method of forecasting will satisfy the varied needs of all utilities. The forecasting method used and the data needed to correctly apply the method depend on the situation.*

[55] The American Water Works Association (AWWA) is an international non-profit, scientific and educational association founded to improve water quality and supply. Established in 1881, it has a membership (as of 2012) of around 50,000 members worldwide, including the author of this report.

[56] Hazen Report (p.3)

[57] https://www.awwa.org/Publications/Manuals-of-Practice

For example, when a forecast of average annual demand is the primary requirement, a simple per capita approach might be sufficient."[58]

Both versions of the M50 describe the same six approaches to preparing a demand forecast. Based on my review, the MPWMD Report incorporated four of the accepted methods to some degree:

- per capita models
- extrapolation models
- disaggregate water use models
- land-use models

The forecast prepared by WaterDM described earlier in this report also incorporate three of these approaches:

- per capita models
- extrapolation models
- disaggregate water use models

Similar forecasting approaches are regularly employed by Cal-Am as described in sworn Testimony from Ian Crooks.[59]

Finally, the Hazen Report asserts that the M50 manual specifies a 10-year or even 20-year retrospective analysis to establish a demand baseline for a forecast. The Hazen Report then uses this unfounded notion to defend Cal-Am's "current demand" forecast of 12,350 AF submitted to the CPUC in support of the desalination plant application. The quote cited in the Hazen Report in support of this approach[60] appears only in the 2007 edition and was not included in the current edition of M50. Furthermore, the Hazen Report misinterprets the meaning which does not specify a calculation method or planning period, but instead recommends the analysis of 10 years or more of historic data to understand trends and drought impacts.

Water Conservation and Demand Management

The Hazen Report makes incorrect statements about water conservation programs and planning and without offering data or analysis and even suggests that per capita water use will increase substantially despite Cal-Am's demand management efforts and prevailing state policy and regulations.

[58] American Water Works Association (2017, 2007) Manual of Water Supply Practices-M50, Third Edition

[59] Direct Testimony of Ian Crooks Before the Public Utilities Commission of the State of California. Application 12-04-019 (Filed April 23, 2012) (p.7)

[60] Hazen Report (p.3)

Starting on page 1, the Hazen Report makes factually incorrect statements about water conservation programs and policies in California and the Monterey region. The Hazen report states, "MPMWD staff also assumes continued implementation of tiered rates, conservation restrictions, and enforced water use reductions ... all of which have the potential to do continuing harm to the area's businesses and residential customers."[61]

This sentence confuses and conflates on-going water conservation measures such as tiered rates with mandatory curtailment measures that are only implemented when necessary during a declared drought. This error is repeated throughout the Hazen Report.

The MPWMD Report correctly assumed the continuation of tiered water rates and water conservation programs as described earlier in my report. These are ongoing features of the local water supply system and are mandated by California state law. Tiered rates have been implemented by Cal-Am in the Main system and across its other Cal-Am systems (and throughout California) for many years and the Hazen Report presents no evidence in support of the notion that continued implementation of tiered rates will cause "continuing harm" to the community.

The Hazen Report is also incorrect regarding "restrictions" and "enforced reductions". Neither the MPWMD Report or the demand forecasts I prepared for in this report assumed demand restrictions or enforcement beyond the measures Cal-Am already implements during a normal year. Mandatory curtailment is typically only necessary during a declared drought such as 2014 -2017 and was not considered in the WaterDM forecasts or in the MPWMD Report.

On page 4 the Hazen Report repeats the error and includes additional unsupported and incorrect statements:

> *"The conservation and moratorium measures that were implemented in response to drought conditions, including tiered rates, conservation restrictions, and enforced water use reductions, were effective in lowering demand. However, no additional methods are presented in the memo to indicate how further reductions in demands would occur; absent any* ***, it is reasonable to assume everything has already been done on the demand side to reduce levels and further reductions should not be considered in demand forecasting for determining water supply sufficiency****."*[62]

The Hazen Report is again incorrect regarding "restrictions" and "enforced reductions". Neither the MPWMD Report or the demand forecasts I prepared for in this report assumed demand restrictions or enforcement beyond the measures Cal-Am already implements during a normal year. The moratorium on new connections was implemented in response to the cease and desist order. It can be lifted once Cal-Am certifies (and the State Water Resources Control Board concurs) that it has a sufficient permanent replacement supply for its illegal Carmel River diversions.

[61] Hazen Report (p.1)

[62] Hazen Report (p.4) *emphasis added.*

The Hazen Report remarkably ignores the extensive on-going water conservation program being implemented across the Monterey Peninsula and California and the impact these measures are likely to have into the future. Both Cal-Am and the Monterey Peninsula Water Management District implement active, far-reaching, and effective water demand management programs that address all five of these core components outlined earlier in this report. The Monterey region has been regarded as a model for water conservation programs for many years.

Cal-Am acknowledged the level of effort, significance, and impact of this conservation program in recent testimony. "California American Water has expended significant effort and resources to encourage conservation in the Monterey County District through a variety of methods. Most important has been the tiered rate design, which features steeply inclining block rates to encourage efficient water use." – Direct Testimony of Christopher Cook, July 1, 2019.

Mr. Cook's testimony is backed up by testimony from Stephanie Locke, Water Demand Manager for the Monterey Peninsula Water Management District, and the significant financial resources Cal-Am continues to apply toward water conservation in the region. In its most recent General Rate Case, Cal-Am proposed a $1.845 million three-year budget ($615,132 per year) to fund water conservation programs in the Monterey service area. Locke's testimony notes that many of the conservation programs budgeted in the General Rate Case and in the prior Cal-Am rate filings focus on reductions in outdoor water use, on reductions in demand areas that have not previously been extensively targeted, and on maintaining the current low water use fixtures that have been installed to date.

Cal-Am's local efforts are in parallel to broader policy measures at the state level, designed to further increase efficiency. The State of California has implemented a series of laws and directives to ensure future water efficiency across the state including Assembly Bill 1668 and Senate Bill 60. These laws and directives effectively mandate an ongoing reduction in per capita use. Cal-Am's continued compliance with these regulations and its active efforts to reduce customer water demand in the future are likely to gradually further decrease per capita water use across the service area.

Current Annual Demand

The Hazen Report asserts that "current" demand in the Cal-Am Main System must be assumed to be 12,350 acre-feet per year. This is far higher than actual current demand and contradicts Cal-Am's own most recent General Rate Case filing which forecasts 2022 demand to be 9,789 acre-feet per year.

The Hazen Report criticizes the MPWMD Report for developing a demand forecast based on a starting point (aka current annual demand) significantly lower than the value proposed by Cal-

Am to the CPUC.[63] As shown in Figure 6, the Cal-Am "current annual demand" forecast of 12,350 acre-feet is about 2,500 acre-feet higher than Cal-Am's actual annual demand. Based on demand trends in the region 12,350 acre-feet is a gross over-estimate of the actual demand in the Monterey Main System. The authors of the MPWMD Report has good reason to choose a different starting point for the demand forecast and there is nothing incorrect or wrong about their approach.

The "Current Annual Demand" section of the Hazen Report is another place where the authors confuse and conflate requirements for meeting the peak demand and annual demand planning practices as explained earlier in this section. Planning the infrastructure and treatment capacity requirements for a community to meet the peak day and peak hours of demand is distinctly different for planning for an adequate long-term water supply for the same community. In my judgement, the MPWPD Report and Response adhered to all applicable codes and industry standards and practices.

The Hazen Report fails to mention that Cal-Am, in its most recent General Rate Case Application, forecast demand for 2021 and 2022 at 9,789 acre-feet per year.[64] Thus Cal Am's own most recent forecast estimates 2022 demand to be 20% lower than "current" demand in the CPUC decision. Independent estimates of demand developed for the MPWMD Report and developed separately for this report, align closely with Cal Am's recent rate case forecast.

Water Supply Reliability

The Hazen Report mischaracterizes the likely future reliability of water supplies available to Cal-Am and in particular the beneficial impacts of the ASR system over time. The Hazen Report ignores the future reliability (and cost) of desalination

The Hazen Report expresses "concern" about the reliability of the ASR system which it seeks to dismiss as merely "an alternative or backup supply source" and not a reliable long-term supply and it also describes the Pure Water Monterey Expansion as "speculative".[65] The Hazen Report contains inaccuracies and mischaracterizations and notably neglects to apply similar scrutiny to potential reliability issues and construction delays that could be part of the proposed desalination project.

ASR

Cal-AM participates in an aquifer storage and recovery project that allows for the capture of excess Carmel River winter flows through wells along the river. WaterDM assumed a conservative 1,300 AF of ASR production per year for 2020 – 2030 like the MPWMD Report. The system has already proven capable of producing near this volume. Cal-Am chose to recover 1,196 acre-feet from the ASR system in 2017, 1,210 acre-feet in 2018, and 744 AF in 2019. Cal-

[63] Hazen Report (p.3)

[64] California-American Water Company. 2019. (U-210-W) Update to General Rate Case Application, A.19-07-004.

[65] Hazen Report (pp.6-9)

Am ended 2019 with 1,317 acre-feet in ASR storage. With the addition of the Pure Water Monterey Expansion supply in many years Cal-Am will be able to inject and store additional carryover water through this system.

ASR systems, when managed properly, improve groundwater basin management by acting like an underground reservoir where water can be stored during periods of excess supply and withdrawn during periods of short supply.[66] Analysis in the MPWMD Response, confirmed by WaterDM, shows that a build-up of ASR storage based on historical data including wet, normal, and dry years would be sufficient to allow Cal-Am to recover at least 1,300 acre-feet each year during a hypothetical 5-year drought.[67] This analysis is further supported by a Technical Memorandum prepared by Montgomery Associates in late 2019.[68]

During 2020 and 2021 Cal-Am must prepare to wean itself of reliance on the Carmel River and must manage its system differently as it comes to rely on the recently completed Pure Water Monterey supply. The ASR system provides Cal-Am the ability to store excess supply for the future. If the Monterey Peninsula were simultaneously to experience drought during the "buildup period" following the completion of new water supply and assuming the cease and desist order is lifted, ASR might be delayed in building up a drought reserve.[69] However, in reviewing the ASR system, the Hazen Report neglected to consider the impact of the Pure Water Monterey Expansion and the additional water it will make available for injection. Available excess water for injection from the Pure Water Monterey Expansion will enable Cal-Am to store additional water in the Seaside Basin.[70] The proper management of this storage potential and the water supply from the expansion could provide drought-resilience to the Monterey Peninsula for years to come.[71]

Pure Water Monterey Expansion

The sources of water for the Pure Water Monterey Expansion are municipal wastewater and agricultural drainage water which are currently discharged to the ocean. The mix of these sources may vary from year to year thus Monterey One Water prepared examples showing the likely annual mixes of source water. In one example the source water consisted of discharge

[66] American Water Works Association (2017) Manual of Water Supply Practices-M50, Third Edition

[67] MPWMD Response (Note 15)

[68] Montgomery and Associates. 2019. Technical Memorandum. Expanded PWM/GWR Project SEIR: Groundwater Modeling Analysis

[69] MPWMD Response (Note 15)

[70] The Seaside Basin Watermaster's 2019 report to the Court overseeing the groundwater adjudication states that the total usable storage space in the entire Seaside Groundwater Basin is 52,030 AF. The report also describes the current allocation of that usable storage space among the Seaside Basin pumpers and Cal-Am is allocated 28,733 acre-feet.

[71] This finding is confirmed by the Montgomery and Associates 2019 memo which demonstrates, ASR is drought-resilient and Pure Water Monterey Expansion provides an additional factor of safety against drought impacts to ASR.

from the Regional Treatment Plant (54%), the Reclamation Ditch (5%), Blanco Drain (10%), wastewater outside the prior M1W boundaries (30%), and summer water rights from the County Water Resource Agency (1%).[72]

The Hazen Report questions the reliability of the Monterey Pure Water Expansion project and ignores analysis by the staff of Monterey One Water. This analysis shows that none of the source water for expansion of Pure Water Monterey is speculative, nor comes from Salinas-area wastewater or Salinas valley sources for which Monterey One Water doesn't already have rights.[73]

The source water for the Pure Water Monterey Expansion is municipal wastewater and agricultural drainage water. Analysis of the water sources under four conditions including drought concluded that the project can reliably produce water under each circumstance.[74] The analysis concluded Monterey One Water would have rights to a sufficient quantity of source water to produce the yield in advanced treated, product water that is anticipated to be produced by the Pure Water Monterey Expansion regardless of whether or not the conditions precedent are met and whether or not it is a dry or drought year or a normal or wet year.[75]

The Hazen Report was prepared prior to the release of the April Final Supplemental Environmental Impact Statement for the Monterey Pure Water Expansion and thus the authors may not have had accesses to the full analysis of the reliability of supplies available.

Reliability and Cost of Desalination Not Considered

The Hazen Report applies intense scrutiny to the future reliability of the Pure Water Monterey Expansion yet fails to consider the future reliability and cost of the desalination facility Cal-Am has proposed.

Recent desalination projects in California have sometimes failed to produce expected volumes[76] and there many examples world-wide of production problems associated with desalination projects. Cal-Am need look no farther than the local Sand City Desalination plant on which it relies for an example of a facility that has failed to produce at its designed capacity. WaterDM's forecast includes only 150 acre-feet of annual production from the Sand City facility designed to produce 300 acre-feet annually.

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[72] November 12, 2019 M1W presentation to the Monterey County Farm Bureau and the Grower-Shipper Association and the September 30-2019 M1W board meeting

[73] MPWMD Response (Note 19).

[74] April 11, 2020. Source Water Operational Plan Technical Memorandum. Prepared by Bob Holden, PE, and Alison Imamura, PE, Monterey One Water

[75] April 2020. Comments on Water Supply and Source Water Availability. FINAL Supplemental Environmental Impact Report for the Proposed Modifications to the Pure Water Monterey Groundwater Replenishment Project. P 3-8

[76] https://www.voiceofsandiego.org/topics/science-environment/desal-plant-producing-less-water-promised/

Desalination is also the most expensive supply option currently available on the Monterey Peninsula and water from Cal-Am's proposed desalination project would cost at least three times as much as water from the Pure Water Monterey Expansion. The economic track record of desalination is problematic. Desalination plants must be paid for even if they do not produce any water. Victoria Australia's desalination facility, built in response to an intense drought, resulted in ongoing annual service payments of $649 million (Australian dollars), and "annual service payments rise every year, even if no water is ordered."[77]

The Hazen Report chooses to ignore the economic realities of desalination and is disingenuous when it asserts the recycled water proposal is less reliable than the desalination proposal without applying similar levels of scrutiny to both supplies.

Erroneous Findings in the Hazen Report

The Hazen Report reaches erroneous conclusions regarding the reliability of future water supplies based on inflated hypothetical demands, misleading statements about planning requirements, and inaccurate characterization of future water supply reliability.

The Hazen Report includes numerous misleading statements leading to incorrect conclusions regarding California codes, Cal-Am's likely water demand in 2040, and the availability and reliability of future water supply sources. MPWMD's March 6 response to the Hazen Report identifies line by line these errors and misleading statements. In this report I focused on the following problems:

- The Hazen Report repeatedly confuses and conflates peak demand and annual demand planning requirements and offers numerous misleading statements about California codes and standards and AWWA water planning guidance.
- The Hazen Report makes incorrect statements about water conservation programs and planning and without offering data or analysis, and it even suggests that per capita water use will increase substantially despite Cal-Am's demand management efforts and state policy requirements and regulations.
- The Hazen Report asserts that "current" demand in the Cal-Am Main System must be assumed to be 12,350 acre-feet per year. This is far higher than actual current demand and contradicts Cal-Am's own most recent General Rate Case filing which forecasts 2022 demand to be 9,789 acre-feet per year.
- The Hazen Report mischaracterizes the likely future reliability of water supplies available to Cal-Am and in particular the beneficial impacts of the ASR system over time.
- The Hazen Report applies intense scrutiny to the future reliability of the Pure Water Monterey yet fails to consider the future reliability and cost of the desalination facility Cal-Am has proposed.

[77] https://www.dailymail.co.uk/news/article-5749621/Melbourne-desalination-plant-costs-tax-payers-eye-watering-649-million-year-operate.html

Conclusions

WaterDM conducted an analysis of the historic production trends in the Cal-Am service area and forecast growth in the service area. WaterDM developed an independent forecast of future water requirements based on the Associated Monterey Bay Area Governments (AMBAG) 2018 forecast of future population growth for the Cal-Am service area.

The WaterDM analysis supports the conclusions in the Staff Report projecting 2040 demands in the Cal-Am service area to be much lower than the CPUC's certificating decision. California Coastal Commission staff have correctly concluded that the Pure Water Monterey Expansion project provides an available, feasible water supply alternative for Cal-Am.

With the addition of the Pure Water Monterey Expansion project providing an additional 2,250 acre-feet per year of supply to Cal-Am, the combination of Cal-Am's available and projected water resources provides sufficient supply potential to meet annual future requirements in 2040 by more than 1,200 acre-feet (an 11.9% surplus).

The CPUC, in its September 2018 Decision accepted that Cal-Am's "current" demand was 12,350 acre-feet per year and the future demand in 2040 will be approximately 14,000 acre-feet per year. This appears outdated and therefore unreasonably high based on my analysis, the MPWMD Report and Cal Am's most recent forecasts. Cal-Am, in its most recent General Rate Case Application, forecast demand for 2021 and 2022 at 9,789 acre-feet per year. Cal Am's own most recent forecast estimates 2022 demand to be 20% lower than "current" demand in the CPUC decision. Independent estimates of demand developed for the MPWMD Report and developed separately for this report, align closely with Cal Am's recent rate case forecast.

The Pure Water Monterey Expansion provides enough available supply to meet the likely 20-year demands, but it is still reasonable to expect Cal-Am may need to seek to secure additional supplies in the future to meet demand beyond 2040. Much will depend upon what happens to the local economy and climate over the coming decade and over-building infrastructure such as the proposed desalination facility (at its current size) would be an expensive error. The future is uncertain and the impact of COVID 19 and other economic unknowns could well be to reduce future demand in the Monterey Main System from current levels, lessening or eliminating the need for securing additional supply.

Cal-Am's existing peak capacity is sufficient to meet anticipated future maximum daily demand (MDD) and peak hour demand (PHD) and Cal-Am has yet to avail itself of additional low/no-cost peak demand management measures that could reduce future peaks, if necessary.

Analyses in the MPWMD Report and MPWMD Response show that Cal-Am has the ability to produce 19.41 million gallons per day and 0.81 million gallons per hour. Calculations of future Maximum MDD and PHD show that Cal-Am must support an MDD of 19.01 MG/day and a PHD of 0.792 MG/hour (based on a July 2012 maximum month demand). Revised analysis in the

MPWMD Response using slightly different demand data showed that Cal-Am must support an MDD of 16.13 MG/day and a PHD of 0.672 MG/hour (based on an August 2014 maximum month demand). Under either demand assumption, from an infrastructure standpoint alone, Cal-Am has sufficient capacity to meet future peak day and peak hour demands even under the highly conservative assumptions embedded in the calculated approach.

If managing the peak day or peak hour becomes an issue in the future, Cal-Am has several options it has yet to implement. From an infrastructure standpoint, Cal-Cam could increase pumping capacity and add finished water storage. As an option, Cal-Am could also choose to implement low-cost peak day and peak hour demand management measures such as prohibiting automatic irrigation at certain times or on certain days or by re-assigning irrigation days of the week to distribute the summertime peak. Sophisticated approaches using smart irrigation controllers could also be employed to ensure optimal irrigation scheduling (Mayer et. al. 2018).

The Hazen Report contains numerous errors, mischaracterizations, and incorrect conclusions regarding Cal-Am's likely demand in 2040 and the availability and reliability of future water supply sources.

The WaterDM analyses show that the staff of the California Coastal Commission correctly utilized more recent information on available future water supplies and likely future demands in its analysis. Cal-Am's per capita use is likely to decrease between now and 2040 due to ongoing conservation program implementation, conservation pricing, and statewide policy directives to reduce indoor and outdoor use and improve utility water loss control measures. I agree with the staff findings that concluded there exists an available, feasible water supply alternative to Cal-Am's proposed desalination project.

Appendix A – Materials Considered[78]

Literature, Reports & Publicly Available Sources

American Water Works Association. 2017. Manual of Water Supply Practices-M50, Third Edition.

American Water Works Association. 2012. Manual of Water Supply Practices-M50, Second Edition.

American Water Works Association. https://www.awwa.org/Publications/Manuals-of-Practice (Accessed 4/10/2020).

Association of Monterey Bay Area Governments. 2018 Regional Growth Forecast.

Brooks, D.B. 2007. An Operational Definition of Water Demand Management. International Journal of Water Resources Development. Volume 22, 2006 - Issue 4

California Coastal Act Sections 30108, 30260 - https://www.coastal.ca.gov/coastact.pdf

California Coastal Commission Staff Report: Recommendation on Appeal Substantial Issue & De Novo Hearing and Consolidated Coastal Development Permit, California Coastal Commission, Application 9-19-0918 / Appeal A-3-MRA-19-0034 (California American Water Co.). Staff Report Date: 10-28-2019.

California Law. Conservation, Development, and Utilization of State Water Resources. http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=WAT&sectionNum=10631

California Public Utilities Commission. Decision 18-09-017, September 13, 2018

California-American Water Company. 2019. (U-210-W) Update to General Rate Case Application, A.19-07-004. Direct Testimony of Christopher Cook. Direct Testimony of Stephanie Locke.

California-American Water Company. 2012. Urban Water Management Plan. Water Systems Consulting, Inc.

California-American Water Company. 2020. https://www.watersupplyproject.org/system-delivery (accessed 3/25/2020)

California-American Water Company. 2016-2020. Quarterly and Annual Reports, SWRCB Order WR 2016-0016 / WR 2009-0060. https://amwater.com/caaw/customer-service-billing/billing-payment-info/water-rates/monterey-district (accessed at various times)

[78] Materials Considered also includes all materials cited in the footnotes of this Report.

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Direct Testimony of David Mitchell Before the Public Utilities Commission of the State of California. Application 19-07-004(Filed July 1, 2019)

Direct Testimony of Ian Crooks Before the Public Utilities Commission of the State of California. Application 12-04-019 (Filed April 23, 2012)

Hazen and Sawyer. 2020. California American Water Peer Review of Supply and Demand for Water on the Monterey Peninsula prepared by Kevin Alexander and Cindy Miller. (1-22-2020)

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Montgomery and Associates. 2019. Technical Memorandum. Expanded PWM/GWR Project SEIR: Groundwater Modeling Analysis

Monterey One Water. May 28, 2010 Progress Report on Pure Water Monterey Expansion.

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Monterey One Water. April 11, 2020. Source Water Operational Plan Technical Memorandum. Prepared by Bob Holden, PE, and Alison Imamura, PE.

Monterey Peninsula Water Management District. 2020. Supply and Demand for Water on the Monterey Peninsula prepared by David Stoldt. (3-13-2020, 12-3-2019, and 9-16-2019)

Monterey Peninsula Water Management District. 2020. March 6 response to the Hazen Report including supporting exhibits prepared by David Stoldt.

Monterey Peninsula Water Management District. Map created by Eric Sandoval. 2/17/2006.

Seaside Basin Watermaster Annual Report – 2019, December 5, 2019

Seaside Basin Watermaster Jan. 8, 2020 Letter to Rachel Gaudion. Subject: Draft Supplemental Environmental Impact Report for the Proposed Modifications to the Pure Water Monterey Groundwater Replenishment Project (Draft Supplemental EIR)

Voice of San Diego. 8/29/2017. Desal Plant Is Producing Less Water Than Promised. https://www.voiceofsandiego.org/topics/science-environment/desal-plant-producing-less-water-promised/ (Accessed 4/9/2020).

Appendix B - Summary of Qualifications and Experience - Peter Mayer, P.E.

PETER W. MAYER, P.E.
Principal
Water Demand Management
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Boulder, CO 80304
720-318-4232
peter.mayer@waterdm.com

WORK EXPERIENCE

Principal, WaterDM - 2013-present. (Registered Professional Engineer, Colorado, PE 0038126)
- Vice President, Partner, and Senior Project Engineer, Aquacraft, Inc. 1995-2012
- Editor, Calvert Independent, 1988-1990
- Coordinator, University of Wisconsin, College Year in India Program, Madurai, India 1991-92
- Educator-Fellow, Oberlin Shansi Memorial Association, Madurai, India 1986-88
- Station Manager, WOBC-FM, Oberlin, Ohio 1985-86

AFFILIATIONS

American Water Works Association
- Associate Editor AWWA Water Science
- Member– Customer Metering Practices Committee, Distribution and Plant Operations Division
- Chair – M22 manual 3rd and 4th ed. re-write sub-committee
- Member – M6 manual 6th ed. Re-write sub-committee
- Former Trustee – Water Conservation Division

American Water Resources Association
American Society of Civil Engineers
Alliance for Water Efficiency
Colorado River Water Users Association
Colorado Water Wise
Colorado Water Congress

EDUCATION

Master of Science, 1995, Water Resources Engineering, Department of Civil, Environmental and Architectural Engineering, University of Colorado, Boulder.

Bachelor of Arts, 1986, Oberlin College, Oberlin Ohio. Anthropology (Honors).

SELECTED PROJECTS

City of Tucson Water Conservation and Integrated Water Resources Plan (2019-2020)

Peter Mayer is working with Tucson staff to develop a 10-year water conservation implementation plan to integrate this work with the City's long-term integrated water resources plan being conducted by a large consulting team.

California DWR Research and Development of Indoor Residential Water Use Standards (2019-2021)

Peter Mayer is advising the California Department of Water Resources on a series of research projects to investigate indoor residential per capita use for the purpose of reporting to the legislature on future efficiency standards.

Metropolitan Water District of Southern California Demand Management Cost Functional Assignment (2018 – 2019)

Peter Mayer developed an analysis of Metropolitan's demand management and local resources development programs for the purpose of functional cost assignment in the ratemaking process.

New York City Integrated Water Resources Plan (2018 – 22)

Peter Mayer is leading the water conservation task of this five-year planning project awarded to a team lead by Hazen and Sawyer.

Northglenn Colorado Integrated Water Resources Plan (2019-20)

WaterDM is teamed with ELEMENT Water Consulting to prepare an integrated water resources plan for the City of Northglenn, a suburb of Denver.

Northern Water Conservation Program Planning (2017-18)

Peter Mayer worked closely with the Northern Colorado Water Conservancy District to plan for the future of their regional conservation program.

Westminster Rate and Fee Cost of Service Study (2017-18)

Peter Mayer was a member of the Raftelis Consulting team which developed this extensive cost of service analysis for this Colorado utility.

Rachio Water Management Implementation and Research (2016 –18)

Peter Mayer served as an expert advisor and technical consultant to the Rachio irrigation control and technology company. Together, they implemented peak day water management programs.

FL v. GA, 142, Original (2016)

Peter Mayer testified as an expert witness on municipal and industrial water use on behalf of the State of Georgia at the US Supreme Court trial held in November 2016. Peter prepared an expert report, expert testimony, testified at the trial, and was deposed in this case.

Water Resource Foundation #4689 Assessing Water Demand Patterns to Improve Sizing of Water Meters and Service Lines (2016-20)

Peter Mayer was the Principal Investigator for this research study taking place in Colorado and Arizona that closely examined meter and service line sizing.

Austin Water Integrated Water Resources Plan (2016-17)

Peter Mayer was an expert advisor to the CDM/Smith team on water demand and conservation and assisted in preparation of the Austin Integrated Water Resources Plan.

Colorado State Water Supply Initiative (2009-10, 2016-19)
Peter Mayer was part of a team that prepared technical analysis of future water demands and requirements in Colorado as part of the State's ongoing planning efforts.

New York City Water Board Water Demand Management Planning (2014 – 2019)
Peter Mayer was the lead for this project that prepared ten water conservation plans for wholesale customers of the NYC Water Board located in Westchester County and other upstate NY locations.

Outdoor Water Savings Initiative, Alliance for Water Efficiency (2014 – present)
Peter Mayer is the director of research for the Alliance for Water Efficiency's Outdoor Water Savings Initiative. Peter completed a literature review project in 2015, managed the landscape transformation study (2019) and is currently managing the drought response and water savings study (2020).

Residential End Uses of Water Study Update, Water Research Foundation (2010 – 2016)
Peter Mayer was the co-principal investigator of this research study that measured residential water use in 25 cities across he US and Canada. Final report is available from the Water Research Foundation.

Hilton Head PSD Water Demand Management Plan (2015)
Peter Mayer lead a team that prepared a long term water demand management plan for this coastal island community.

City of Arvada Expert Witness Services (2016)
Peter Mayer was hired as an expert witness on municipal and industrial water demands by the City of Arvada. Peter prepared and submitted an expert report in preparation for trial. The report was accepted by both sides and deposition and testimony were not required.

City of Arvada Water Supply and Demand Study (2014 –2016)
Peter Mayer led a team that evaluated future water supply and demands for this Denver suburb, under climate change conditions.

Roaring Fork Regional Water Conservation Planning (2014 - 2015)
Working with ELEMENT Water Consulting, Peter Mayer prepared a series of water conservation plans for Aspen, Basalt, Carbondale, and Glenwood Springs, Colorado and a regional conservation plan for the entire Roaring Fork Valley. An important goal of these plans was to ensure adequate environmental flows in local rivers and creeks.

City of Louisville Water Conservation Plan (2015)

Peter Mayer worked with CH2M to prepare a state approved water conservation plan for the City of Louisville Colorado.

City of Greeley Water Conservation Plan and Avoided Cost Analysis (2014 –2015)
Peter Mayer worked closely with the City of Greeley staff to update their water conservation plan for the next 7 years and to complete an avoided cost analysis that evaluates the impact of Greeley's water efficiency efforts since 1992 on customer water rates.

Senior Technical Advisor, Alliance for Water Efficiency (2007 – 2019)
The Alliance for Water Efficiency is a national NGO focused on promoting water conservation and efficiency. Peter Mayer helped found the organization and now served as a senior technical advisor and the newsletter editor for 12 years.

G480 Water Conservation Program Operation and Management Standard (2011-2013, 2018-19)
The G480 is a voluntary water conservation program operation and management standard approved by AWWA and ASNSI in 2013. Peter Mayer chaired the subcommittee that created the standard and was a key author of the document. He is a member of the subcommittee developing version 2.0.

Eastern Municipal Water District – Water Efficient Guidelines for New Development (2012-13)
Peter Mayer prepared a set of detailed, voluntary water efficiency guidelines for new construction in the Eastern Municipal Water District that go beyond current building codes and standards to increase water use efficiency.

City of Westminster Residential Demand Study and Conservation Plan Preparation (2012)
Peter Mayer and Aquacraft conducted a residential end use study in Westminster, Colorado to determine water use patterns and the level of water efficiency achieved. This information was then used in support of preparation of new water conservation plan for the City.

Northern Water Conservation Survey and Plan Development (2011)
The Northern Colorado Water Conservancy District hired Peter Mayer and Aquacraft to conduct a survey of its' 45 municipal members. The results of the survey were used to update Northern's water conservation plan for the Bureau of Reclamation.

Colorado Water Supply Initiative Municipal and Industrial Conservation Strategies (2010)
In support of the Statewide Water Supply Initiative (SWSI), the Interbasin Compact Committee (IBCC), and other water conservation efforts throughout the state, the CWCB contracted with Peter Mayer and Aquacraft to develop the conservation strategies section of the 2010 SWSI update.

Best Practices Guide for Colorado Water Conservation (2010)

Colorado Water Wise contracted with Peter Mayer and Aquacraft to research and produce a guidebook on water conservation best practices for Colorado. The guide was published in 2010 and is available for free download.

Evaluation of California Weather-Based "Smart" Irrigation Controller Programs (2005-2009)
Smart irrigation controllers that use prevailing weather conditions to adapt water applications to the actual needs of plants represent a significant advancement. Peter Mayer was the principal investigator on this study for the California Department of Water Resources, the California Urban Water Conservation Council, and approximately 30 participating water agencies examined the impact of 3,112 smart controllers on water use in northern and southern California.

Water Conservation: Customer Behavior and Effective Communications (2006 – 2009)
Peter Mayer and Aquacraft subcontracted to ICF International on this AwwaRF research project which examined water conservation social marketing programs and measured the impact of utility outreach efforts on customer behavior. The study examined water conservation communication campaigns in terms of customer recognition, attitudinal changes, behavior modification, and verifiable water use reductions and recommended the most effective methods and techniques for designing and implementing water conservation social marketing campaigns.

Water Budgets and Rate Structures: Innovative Management Tools (2005-2007)
Water budget rate structures are an innovative and increasingly popular tool for water utilities trying to convey an effective water efficiency message. This AwwaRF Tailored Collaboration project co-lead by Aquacraft and A&N Technical Services examined all aspects of water budgets and how they fit into the pantheon of water rate structures.

Water Conservation Plan Development and Demand Forecasting (2006–2010)
The State of Colorado requires that utilities seeking loans file a water conservation plan that includes detailed demand forecasts that incorporate water conservation. Aquacraft has developed conservation plans and demand forecasts for the cities of Aurora, Fort Collins, Glenwood Springs, Westminster, and Greeley, Colorado. In addition, Peter Mayer was contracted by the Colorado Water Conservation Board to review submitted conservation plans for compliance with statute.

Expert Testimony NEORSD Wastewater Case (2008)
Working with the Department of Justice, Peter Mayer developed a detailed research plan for the City of Cleveland to help them determine the contribution of wastewater flows from single-family, multi-family, and non-residential customers.

US EPA National Water Efficiency Market Enhancement Program (2004-2005)
The EPA is interested in starting a water efficiency program comparable the Energy STAR program. This project involves investigating potential product categories and product lines that

improve water efficiency and could be including the EPA program, such as weather-based irrigation control technology.

City of Carnation Water Conservation Demand Analysis (2004-2005)
In late 2004 Peter Mayer worked with the Pacific Institute, Carollo Engineers, and King County, Washington to determine the conservation potential evaluate the cost-effectiveness of water conservation in new and existing homes and businesses in the City of Carnation. Carnation is a small town that is currently not sewered. The County and the City are working together to provide a sanitary sewer system and treatment facility.

National Multiple Family Submetering and Allocation Billing Program Study (2002-2004)
Charging residents in multi-family house separately for water is growing trend in the United States. Peter Mayer was the principal investigator for this study which looked at the entire phenomena of submetering and allocation billing techniques and examined the potential water savings, regulatory issues, utility concerns, water rates, and regulatory climate.

Tampa Retrofit Project (2002-2003)

Colorado Department of Human Services Water Rights Study (2003)

Pinellas County Utilities Water Conservation Opportunities Study, (2002)
Virtual Water Efficient Home Web Site, (2001-2002)

East Bay MUD Conservation Retrofit Study, (2001-02)

CII Demand Assessment and Conservation Plan, Westminster, CO, (2000-01)

Seattle Home Water Conservation Study, Seattle Public Utilities and EPA, (1999-2000)

Commercial and Institutional End Uses of Water, AWWARF, (1998-2000)

Water Conservation Plan, City of Thornton, CO, (1998-2000)

Demand Analysis for the University of Colorado, (2000)

Water Conservation Futures Study, City of Boulder, CO, (1998-1999)

Water Efficiency in Water Wise and Standard New Homes, (1999-2000)

Residential End Uses of Water Study, AWWARF, (1996-1999)

Comparison of Demand Patterns among CI and SF Customers, Westminster, (1997-1998)

Analysis of Southern Nevada Xeriscape Project, (1998-2000)

Westminster, Peak Use Study, (1996)

Westminster Residential Water Use Study, (1995-1996)

PUBLICATIONS AND PRESENTATIONS

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Mayer, P.W., et. al. 2017. Peer Review of the Water Conservation Programs of the Metropolitan Water District of Southern California. Alliance for Water Efficiency. Chicago, IL.

Mayer, P.W. 2017. Water Conservation Keeps Rates Low in Tucson, Arizona. Alliance for Water Efficiency. Chicago, IL.

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Mayer, P.W. 2016. American Water Demand Trends and the Future of Conservation. Keynote Address- Gulf Coast Water Conservation Symposium, Houston, TX.

DeOreo, W.B., P. Mayer, J. Kiefer, and B. Dziegielewski. 2016. Residential End Uses of Water, Version 2. Water Research Foundation. Denver, CO.

Shimabuku, M., D. Stellar, and P. Mayer. 2016. Impact Evaluation of Residential Irrigation Audits on Water Conservation in Colorado. Journal of the American Water Works Association. May 2016, 108:5. Denver, Colorado.

Mayer, P.W., P. Lander, and D. Glenn. 2015. *Outdoor Water Use: Abundant Savings, Scant Research.* Journal of the American Water Works Association. February 2015, 107:2. Denver, Colorado.

Mayer, P.W. 2015. American Water Use Trends 1995-2015 and Future Conservation Potential. WaterSmart Innovations Conference. Las Vegas, NV.

Mayer, P.W. 2015. Introducing AWWA's New M22 Manual - Sizing of Water Service Lines and Meters. Proceedings of the AWWA Annual Conference and Exposition. Anaheim, CA. and North American Water Loss Conference. Atlanta, GA.

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Suero F., P.W. Mayer, and D. Rosenberg. 2012. *Estimating and Verifying United States Households' Potential to Conserve Water*. Journal of Water Resources Planning and Management. 138(3), 299–306.

DeOreo, W., & P.W. Mayer. 2012. *Insights into Declining Single Family Residential Water Demands*. Journal of the American Water Works Association. June 2012. Vol. 104, No. 6.

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Maddaus. M. and P.W. Mayer. 2011. Demand Hardening: Assessing Potential Impacts with End Use Models. WaterSmart Innovations Conference. Las Vegas, NV.

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Mayer, P.W. 2010. Guidebook of Best Practices for Municipal Water Conservation in Colorado. WaterSmart Innovations Conference. Las Vegas, NV.

Mayer, P.W., et. al. 2010. *Improving Urban Irrigation Efficiency By Using Weather-Based "Smart" Controllers.* Journal of the American Water Works Association. February 2010. Vol. 102, No. 2.

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Mayer, P.W. 2009. Benefit-Cost Analysis for Water Conservation Planning. Colorado Water Wise Annual Event. Denver, CO.

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Mayer, P.W., et. al. 2008. *Water Budgets and Rate Structures: Innovative Management Tools*. American Water Works Association Research Foundation. Denver, CO.

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AWARDS

- 2019 AWE Distinguished Service Award – "In Recognition and with Appreciation for His 12 Years as Editor of the Water Efficiency Watch Newsletter 2007 – 2019).
- 2013 AWWA Water Conservation Division Best Paper Award – "Insights into Declining Single Family Residential Water Demands."
- 2013 Quentin Martin Best Research-Oriented Paper Award, ASCE-EWRI Journal of Water Resources Planning and Management, March 2013. Awarded for "Estimating and Verifying United States Households' Potential to Conserve Water" by Franciso J. Suero, A.M.ASCE;

Peter W. Mayer; David E. Rosenberg, A.M.ASCE

- 2010 AWWA Water Conservation Division Best Paper Award – "Improving Urban Irrigation Efficiency by using Weather-Based 'Smart' Irrigation Controllers."
- 2008 AWWA Water Conservation Division Best Paper Award – "Water Budgets and Rate Structures: Innovative Management Tools."
- 2006 AWWA Water Conservation Division Best Paper Award – "Third Party Billing of Multi-family Customers Presents New Challenges to Water Providers"
- 1996 Montgomery-Watson Master's Thesis Award, Second Place
- 1996 American Water Works Association Academic Achievement Award, Honorable Mention

Supplemental
Expert Report and Recommendations of

Peter Mayer, P.E.

Regarding Water Supply and Demand in the California American Water Company's Monterey Main System

Prepared for:

The Marina Coast Water District

July 1, 2020

WaterDM
DEMAND MANAGEMENT

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SCOPE OF INVESTIGATION

I was retained by the Marina Coast Water District to determine the reliable water sources available to the California-American Water Company ("Cal-Am") for the Monterey Main system over the next five to ten years that will allow Cal-Am to reduce its unlawful water diversions from the Carmel River in accordance with provisions of a cease-and-desist order from the State Water Resources Control Board. This report is intended as a supplement to the report WaterDM submitted to the Marina Coast Water District on April 21, 2020 and the supplement utilizes and expands on the research, analysis, and forecasts prepared for the original report. For this supplement, I was specifically asked to consider Cal-Am's available sources excluding the proposed Pure Water Monterey Expansion recycling facility and the proposed Monterey Peninsula Water Supply Project desalination project, neither of which are expected to be on-line before 2022. This report explores how Cal-Am can manage supply and demand until additional supplies become available.

My opinions are based on my understanding of the information available as of the date of this report and my experience evaluating municipal and industrial water supplies and demands and conservation measures. In forming my opinions, I also considered the documents, testimony, and other materials listed in Appendix A. Should additional information become available to me, I reserve the right to supplement this report based on any additional work that I may conduct based on my review of such materials.

SUMMARY OF OPINIONS AND CONCLUSIONS

As result of my review of the items listed in Appendix A and other related and relevant documents and reports, my own independent analysis, and my expertise in municipal and industrial water use, water management, and engineering, I offer the following opinions and conclusions:

With careful management of supplies and demands, Cal-Am can comply with the cease and desist order and reduce its Carmel River diversions by 2022, but current supplies are not sufficient for the long-term and offer limited cushion in the near-term.

In 2022, when Cal-Am must reduce diversions from the Carmel River in compliance with provisions of a cease-and-desist order from the State Water Resources Control Board[1] the combination of available, reliable water supplies for the Monterey Main system totals 10,100 AF. In WaterDM's April 21, 2020 report demand was forecast to be 10,098 AF in 2025 under the most likely scenario.

Cal-Am can address this situation before 2022 by building up reserve storage in the Seaside Basin which provides banked water to draw on if it becomes necessary. This storage will help balance supply to meet variable demands in the coming years, but Cal-Am must also carefully manage demand in the Monterey Main system to ensure that it balances with available supply through all months of the year. Proven demand management tools should also be implemented as quickly as possible.

This is a water supply situation that requires judicious management of Cal-Am's available supplies over the coming few years and increased demand management measures to ensure there is sufficient supply to meet forecasted demands and essential services such as fire protection until additional sources of supply can be brought online.

Cal-Am and its customers are confronted with a situation in the coming years where the expected demand equals the available supply in the Monterey Main system supplemented with a banked storage reserve. Until an additional long-term water supply is realized, options such as leases or purchases could provide water much sooner and at a lower cost.

[1] The original order, issued in 1995, determined that Cal-Am was extracting over 14,000 acre-feet per year from the river when it had a legal right to 3,376 acre-feet. The Board determined that these excess diversions were adversely affecting the river's population of federally-threatened Central Coast steelhead. The Board ordered Cal-Am to develop or purchase alternative water supplies so it could end its excess diversions. Subsequent orders issued by the Board have included additional requirements, with Cal-Am currently required to end its excess diversions and be able to rely on other sources of water by December 2021.

Analysis and Recommendations

Overview

Beginning in January 2022, the California-American Water Company ("Cal-Am") must reduce its water diversions from the Carmel River system in accordance with provisions of a cease-and-desist order from the State Water Resources Control Board. Neither the proposed Pure Water Monterey Expansion water recycling project nor the proposed Monterey Peninsula Water Supply Project desalination project are likely to be completed and on-line by January of 2022 and it is uncertain when additional supplies will be available. The purpose of this supplemental report is to analyze the available sources of water and explore how water service can be reliably supplied during this period of uncertainty.

This report is intended as a supplement to the report WaterDM submitted to the Marina Coast Water District on April 21, 2020 and the supplement utilizes and expands on the research, analysis, and forecasts prepared for the original report.

Water Demand Forecasts

In its April 21, 2020 report, WaterDM prepared two forecasts for the Cal-Am Monterey Main System to estimate future average annual production, inclusive of treatment losses and non-revenue water. The growth rate in each forecast is based on the Association of Monterey Bay Area Governments' 2018 forecast of anticipated population increase from 2020 to 2040.[2]

- The "Current gpcd"[3] forecast assumed the current rate of daily per person water usage continues into the future, without any increases in efficiency or conservation reductions.
- The "Continued efficiency" forecast includes the impacts of ongoing efficiency improvements by applying an indoor reduction factor.

Notably, both of these forecasts are higher than the forecasts Cal-Am itself produced for its most recent General Rate Case Application, which estimated demand for 2021 and 2022 at 9,789 acre-feet per year.[4] WaterDM's "Continued efficiency" forecast for 2021 was 10,008 AF and for 2022 was 10,030 AF as shown in Table 2.

In this supplemental report, only the "Continued efficiency" forecast is used to evaluate supply adequacy over the coming years. The "Continued efficiency" forecast represents future production assuming slow, steady ongoing demand reductions from existing conservation

[2]This likely over-estimates Cal-Am's future growth because it includes new population in portions of the cities of Monterey, Seaside, and Del Rey Oaks within the Fort Ord Buildout that will be served water by the Marina Coast Water District.

[3] gpcd = gallons per capita per day

[4] California-American Water Company. 2019. (U-210-W)

activities relative to current per-capita use. Specifically, the "Continued efficiency" forecast includes the anticipated impacts of continuing the long-term water conservation program measures described in published documents and recent testimony from Cal-Am and Monterey Peninsula Water Management District. It does not assume any drought restrictions or mandatory demand curtailments are applied. In my professional judgement, the "Continued efficiency" forecast represents the most likely forecast of future average annual production, inclusive of treatment losses and non-revenue water. By applying the additional demand management measures discussed in this supplement, Cal-Am could better manage peaks and reduce usage below this forecast level. Thus the "Continued efficiency" forecast used in this report to evaluate the adequacy of water supply over the coming years could be considered a conservative forecast.

Water Supply

Water Supply for the Monterey Main System

Cal-Am delivers water to its Monterey Main system from a diverse collection of water sources. Cal-Am has historically relied heavily on diversions from the Carmel River and Seaside Basin native groundwater to provide water to the Monterey Main system. In the future withdrawals from both sources must be reduced. Even under the best of circumstances it will be at least 2022 and likely later before a new water supply source is online. Cal-Am must carefully manage its supply portfolio in the coming years.

Table 1 presents the water supply sources available to Cal-Am for the coming years and Table 2 shows projected deliveries in the Monterey Main system including the Pure Water Monterey project along with the demand forecast prepared by WaterDM. All of the supply sources shown in Table 2 are documented in Table 1. The anticipated available reliable water supply in 2030 from each source is included and the total is 10,100 AF plus available banked storage. Each source of water and the volume of available reliable supply is described in detail in the sections below.

Carmel River

Diversions from the Carmel River, Cal-Am's primary water source, must be reduced in accordance with a cease-and-desist order from the State Water Resources Control Board. The original order, issued in 1995, determined that Cal-Am was extracting over 14,000 acre-feet per year from the river when it had a legal right to 3,376 acre-feet. The State Water Resources Control Board determined that these excess diversions were adversely affecting the river's population of federally threatened Central Coast steelhead and riparian habitat. The Board ordered Cal-Am to develop or purchase alternative water supplies so it could end its excess diversions.

Table 2 shows Carmel River production reducing to the mandated 3,376 AF in 2022. This is the volume to which Cal-Am has a legal right and is comprised of 2,179 AF from License 11866; 1,137 AF of pre-1914 appropriative rights; and 60 AF of riparian rights.[5]

Table 2 also shows an additional 300 AF of Carmel River supply based on Permit 21330.[6] Cal-Am's annual reports to the State Water Resources Control Board show that it has withdrawn an average of 428 AF per year from 2017-2019 under this permit. To model the impacts of drought, it was assumed that Cal-Am will not divert any water under this permit once every five years, as shown in Table 2.

Also shown are expected deductions to its annual Carmel River Effective Diversion Limit that will be assessed to Cal-Am in 2020 and 2021 pursuant to the Cease and Desist Order.

Through 2021 Cal-Am is permitted to carry over Carmel River water it does not withdraw under its permits as a credit and to draw on this credit as the maximum amount of 750 AF per year. Usage of water in this carryover credit account is also reflected in Table 2. If this carryover credit were continued after 2021, it would provide a valuable source of supply until credits are exhausted.

Seaside Groundwater Basin – Native Groundwater

Along with the Carmel River, the diversions of native groundwater from the Seaside Groundwater Basin must also be reduced which impacts Cal-Am Monterey. The Seaside Basin was over pumped by Cal-Am prior to the issuance of the 2006 Seaside Groundwater Basin adjudication which imposed triennial reductions in operating yield until the basin's "Natural Safe Yield" is achieved. For Cal-Am, the last reduction will occur on October 1, 2021 and Cal-Am will have rights to 1,474 acre-feet per year.

The Seaside Basin Watermaster states Cal-Am's "payback amount is currently estimated to be 18,000 acre-feet", thus 25.7 years of 700 AF per year re-payments would complete the payback.[7] Cal-Am's agreement with the Watermaster requires payback to commence once the desalination project comes online. For the purposes of this analysis it was assumed that this obligation will only be triggered once Cal-Am obtains a permanent additional supply of water. It should be noted that to the extent Cal-Am can bank water in 2020 and 2021, it will benefit the Seaside basin and act as an offset to any delay in the payback.

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[5] Monterey Peninsula Water Management District. 2020. Supply and Demand for Water on the Monterey Peninsula prepared by David Stoldt. (3-13-2020, 12-3-2019, and 9-16-2019) (p.3)

[6] "In 2013, Cal-Am received Permit 21330 from the State Water Board for 1,488 AFA from the Carmel River. However, the permit is seasonally limited to December 1 through May 31 each year and subject to instream flow requirements." MPWMD Report (p.3)

[7] Seaside Basin Watermaster Jan. 8, 2020 Letter to Rachel Gaudion. Subject: Draft Supplemental Environmental Impact Report for the Proposed Modifications to the Pure Water Monterey Groundwater Replenishment Project (Draft Supplemental EIR)

Table 1 and Table 2 show 1,474 AF of supply available from the Seaside Basin from 2020 – 2030. This reflects a full utilization of Cal-Am's rights and a deferral of payback. Table 2 shows Cal-Am pumping 1,734 AF in 2021 as it steps down pumping to Natural Safe Yield of 1,474 AF beginning October 1, 2021.

The Seaside Basin Watermaster's 2019 report to the Court overseeing the groundwater adjudication states that the total usable storage space in the entire Seaside Groundwater Basin is 52,030 AF. The report also describes the current allocation of that usable storage space among the Seaside Basin pumpers with Cal-Am allocated 28,733 acre-feet.[8] This allocation allows Cal-Am to bank water as described in the Seaside Basin Storage Reserve section below. This reserve will be an available supply "cushion" Cal-Am has to meet demand without relying on the Carmel River.

Aquifer Storage and Recovery

Cal-Am participates in an aquifer storage and recovery (ASR) project that allows for the capture of excess Carmel River flows through wells along the river from December through May. This river water is then transferred through existing conveyance facilities and injected into the Seaside Groundwater Basin for later extraction. This project operates with four ASR well sites capable of both injection and extraction. Ownership and operation of this source water project has various components split between Cal-Am and the Monterey Peninsula Water Management District.[9]

There are two water rights that support the ASR system: Permit 20808A which allows maximum diversion of 2,426 AF and Permit 20808C which allows up to 2,900 AF for a total potential maximum annual diversion of 5,326 AF.[10] But in reality Cal-Am will only be able to divert, inject, and store the maximum permitted volume in the wettest of years.

Based on long-term historical precipitation and streamflow data, the ASR system is estimated to divert an average of 1,920 AF per year to storage. Table 1 and Table 2 assume 1,300 AF of ASR injection and recovery per year for 2022 – 2030 and includes the impact of periodic drought hydrology.

Careful management of Cal-Am's storage allocation in the Seaside Groundwater Basin and optimizing the storage opportunities it provides will help ensure a long-term reliable supply for the Cal-Am Monterey service area. Once the storage reserve is established (as shown in Figure 1 and Table 3), Cal-Am could recover more than 1,300 AF when needed.

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[8] Seaside Basin Watermaster Annual Report – 2019, December 5, 2019

[9] California-American Water Company. 2019. (U-210-W) Update to General Rate Case Application, A.19-07-004. Direct Testimony of Christopher Cook. (p.7)

[10] MPWMD Report (p.3)

Sand City Desalination Plant

Cal-Am has an operating agreement for the Sand City Desalination Plant, a small facility designed to produce 300 acre-feet of water per year. Due to discharge permit requirements, to date the Sand City plant has never produced the full 300 AF and the maximum that it has ever produced was 276 AF in 2011. Over the life of the plant it has averaged 209 AF of production per year but it has only averaged 188 AF per year of production from 2016 – 2019.[11] Table 1 and Table 2 conservatively include 150 AF per year of production well below the long-term average of 209 AF per year.

Pure Water Monterey

Monterey One Water in partnership with the Monterey Peninsula Water Management District developed the Pure Water Monterey Groundwater Replenishment Project to create a reliable source of water supply to replace and supplement existing water supply sources for the Monterey Peninsula. The Pure Water Monterey project also makes available advanced treated water to the Marina Coast Water District.

The Pure Water Monterey Project is designed to produce 3,500 acre-feet per year of purified recycled water to compose a portion of Cal-Am's water supply and to assist in complying with the State Water Resources Control Board orders. The source waters for Cal-Am's portion of the Pure Water Monterey Project are agricultural produce wash water and drainage flows from the Blanco Drain and Reclamation Ditch.

The Pure Water Monterey Project includes a 4 million gallon per day capacity water purification facility for treatment and production of purified recycled water that is conveyed and stored in the Basin using paired sets of shallow and deep injection wells. Project conveyance facilities include ten miles of pipeline from the purification facility to injection wells in the Seaside Groundwater Basin. This pipeline is owned and operated by the Marina Coast Water District.

Once injected, the purified recycled water augments existing groundwater supplies and can provide 3,500 acre-feet per year of water to Cal-Am for extraction and direct use. Pure Water Monterey is operational in 2020 and Table 2 includes 3,500 AF per year of recovery from the Pure Water Monterey project starting in 2022. Table 2 also shows that in 2024 and 2029 (once every five years), under drought conditions, Cal-Am will only recover 2,500 AF of Pure Water Monterey supplies. In these and any year where demand exceeds supply, the deficit can be made up from Cal-Am's banked storage reserve.

Prior to 2022, under the cease and desist order, Cal-Am is penalized 1 AF of its Carmel River effective diversion limit for every 1 AF of Pure Water Monterey recovered for use. So during 2020 and 2021, it would be beneficial for Cal-Am to continue using available Carmel River water while banking excess Pure Water Monterey water in the Seaside Basin.

[11] MPWMD Report

Seaside Basin Groundwater Storage Reserve

Cal-Am is allocated 28,733AF of total storage in the Seaside Groundwater Basin.[12] "Cal-Am's report to the State Water Board for the period ending March 31, 2020, showed a Month End ASR Storage Balance of 1,644 AF. Leading up to the cease and desist order deadline at the end of 2021, Cal-Am can continue diversions from the Carmel River while storing and banking excess Pure Water Monterey water in the Seaside Basin as carryover in addition to the 1,000 AF drought reserve and the operating reserve discussed below.

The analysis of Cal-Am's potential storage build up in the Seaside Basin, including the impacts of drawing on this reserve during hypothetical drought years in 2024 and 2029, is presented in Table 3 and Figure 1. During the hypothetical drought years, Table 3 and Figure 1: Potential buildup of Seaside Basin groundwater reserve, 2020-2030 show Cal-Am fully utilizing its ASR carryover by 2028 and then using some of its Pure Water Monterey carryover in 2029. If confronted with this situation during a real drought in the coming years and after obtaining any necessary permission, Cal-Am could chose to draw from any of these available storage accounts. Just one of many possible drought supply options is shown in this analysis.

Under the Water Purchase Agreement, the first 1,000 AF of water produced in the Pure Water Monterey facility is being injected and stored as an operating reserve in the Seaside Basin. This reserve will be banked during 2020, when it is estimated a total of 1,750 AF will be injected. Starting in 2022, when Cal-Am begins withdrawing water from the Pure Water Monterey project, an additional 250 AF per year will be added to the operating reserve until after three years it totals 1,750 AF. The operating reserve is owned by the Monterey Peninsula Water Management District and is available to ensure Cal-Am can recover 3,500 AF per year.

Under the Water Purchase Agreement for Pure Water Monterey, an additional and separate 1,000 AF drought reserve will be built up over five years in increments of 200 AF. In Table 3 and Figure 1 this is shown starting in 2025.

After injection, water in the operating reserve and drought reserve are owned by the Monterey Peninsula Water Management District and maintained for the benefit of Cal-Am. Cal-Am owns the ASR and Pure Water Monterey carryover water.

This banked storage provides a valuable and necessary buffer for Cal-Am to use if drought or higher demand than forecasted should occur. Table 2 shows that in 2024 (assuming a drought year) and in 2026 – 2030 demand is forecast to be higher than projected available supply and withdrawals from banked storage are necessary.

[12] Seaside Basin Watermaster Annual Report – 2019, December 5, 2019

Table 1: Cal-Am Monterey Main System water supply sources 2022 - 2030

Water Source	AF/Year	Notes	Regulator	Data Source
Carmel River – Cease and Desist Order	3,376 AF.	2,179 AF from License 11866; 1,137 AF of pre-1914 appropriative rights; and 60 AF of riparian rights.	SWRCB Order 2016-0016	Cal-Am reports to the SWRCB
Carmel River – Permit 21330	300 AF	Only available Dec. – May.	SWRCB	Cal-Am reports to the SWRCB
Seaside Basin Native Groundwater*	1,474 AF	Reflects a delay in repayment of Cal-Am's 25-year obligation to leave 700 AF of the 1,474 AF it is entitled.	Seaside Basin Watermaster	Watermaster's annual reports.
ASR Recovered Water	1,300 AF	Based on long-term historical precipitation and streamflow, ASR system may be capable of recovering an average of 1,920 AF per year.	SWRCB Water Rights Permits 20808A & C	Cal-Am reports to the SWRCB
Sand City Desalination Plant	150 AF	300 AF capacity. Has averaged 209 AF over life of plant.	SWRCB Order 2016-0016 & Division of Drinking Water	Cal-Am reports to the SWRCB
Pure Water Monterey	3,500 AF	Withdrawals prior to 2022 will reduce Effective Diversion Limit from the Carmel River.	Division of Drinking Water & Seaside Basin Watermaster	TBD
Additional Withdrawal from storage (excluding ASR recovery)*	As needed	Variable volume of additional recoveries from storage taken as required.	SWRCB Water Rights Permits 20808A & C	Cal-Am reports to the SWRCB
TOTAL	**10,100 AF**			

*Adjusted from WaterDM's April 21, 2020 report.

Table 2: Cal-Am Monterey Main System current supply sources and forecast demand, 2020 - 2030

Cal-Am Water Supply (AF)	2020	2021	2022	2023	2024*	2025	2026	2027	2028	2029*	2030
Carmel River	8,310	8,310	3,376	3,376	3,376	3,376	3,376	3,376	3,376	3,376	3,376
Deductions Pursuant to Cease & Desist Order											
Missed milestone	(250)	(1,250)									
ASR Injection Water	(600)	(600)									
Sand City Deduction	(150)	(150)									
Carmel River Carryover Credit	750	750									
Carmel River Permit 21330	250	300	300	300	-	300	300	300	300	-	300
Carmel River Total (net)	8,310	7,360	3,676	3,676	3,376	3,676	3,676	3,676	3,676	3,376	3,676
Seaside Basin	1,820	1,734	1,474	1,474	1,474	1,474	1,474	1,474	1,474	1,474	1,474
ASR recovery		764	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Sand City Desal	150	150	150	150	150	150	150	150	150	150	150
Pure Water Monterey	*1,750 inject*	*3,500 inject*	3,500	3,500	2,500	3,500	3,500	3,500	3,500	2,500	3,500
Withdrawal from Storage Reserve to Meet Demand	-	-	-	-	1,275	-	20	42	64	1,385	107
Total	**10,280**	**10,008**	**10,100**	**10,100**	**10,075**	**10,100**	**10,120**	**10,142**	**10,164**	**10,185**	**10,207**
Continued Efficiency Forecast	9,985	10,008	10,030	10,053	10,075	10,098	10,120	10,142	10,164	10,185	10,207

**Drought year*

Table 3: Potential buildup of Seaside Basin groundwater reserve, 2020-2030

Groundwater Storage (AF)	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
ASR Carryover	1,644	1,644	1,644	1,644	369	369	349	307	243	-	-
PWM Operating Reserve	1,000	1,000	1,250	1,500	1,750	1,750	1,750	1,750	1,750	1,750	1,750
ARWRA Drought Reserve	-	-	-	-	-	200	400	600	800	1,000	1,000
PWM Carryover	750	4,250	4,250	4,250	4,250	4,250	4,250	4,250	4,250	3,108	3,001
End of Year Groundwater Storage	**3,394**	**6,894**	**7,144**	**7,394**	**6,369**	**6,569**	**6,749**	**6,907**	**7,043**	**5,858**	**5,751**

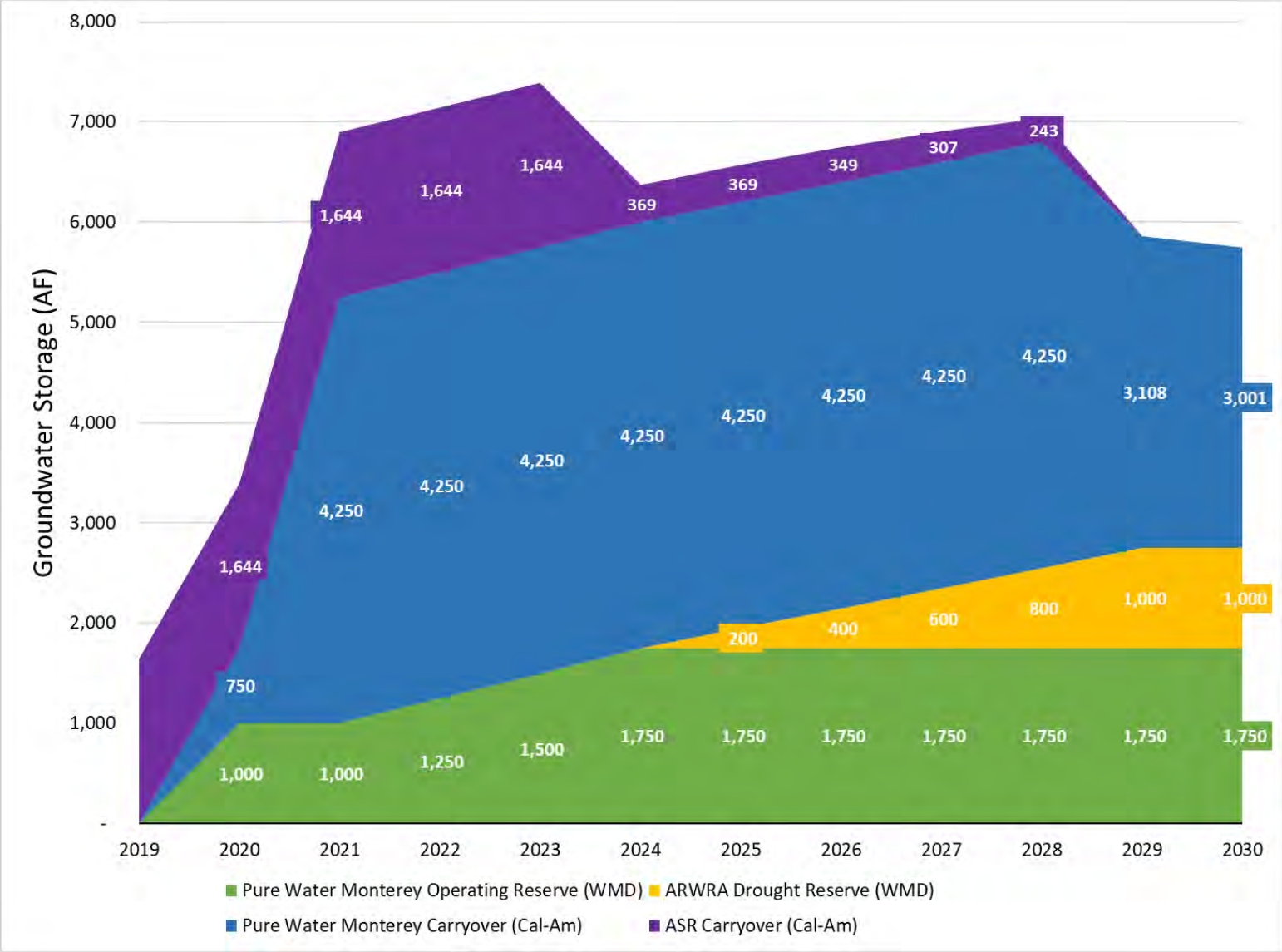

Figure 1: Potential buildup of Seaside Basin groundwater reserve, 2020-2030

Total Supply in 2022 and Beyond

As shown in Table 2, in 2022 and going forward under the assumption of full compliance with reduction of Carmel River diversions under the cease and desist order, Cal-Am will have 10,100 AF per year of water supply plus the buffer of banked storage in the Seaside Basin. Figure 2 shows the combination of the available annual water supply and buildup of banked storage reserve along with the continued efficiency forecast and the impact of two hypothetical droughts in 2024 and 2029. This analysis illustrates how the buildup of storage provides a reserve for Cal-Am to draw upon if necessary.

Even with the storage buffer provided by the Seaside Basin, a situation where supply essentially equals demand is undesirable and problematic over the long-term for Cal -Am's customers from economic, fire protection, water quality, and infrastructure perspectives. While Cal-Am has sufficient resources to meet demand and halt its illegal Carmel River diversions in 2022, the water customers of the Monterey Main system need additional sources of water.

In WaterDM's April 21 report it was noted that with the addition of the Pure Water Monterey Expansion project providing an additional 2,250 acre-feet per year of supply to Cal-Am, the combination of Cal-Am's available and reliable water resources provides sufficient supply potential to meet annual future demand in 2040 by more than 1,200 acre-feet (an 11.9% surplus).

While proposals for new desalination or water recycling once realized will improve the supply situation greatly, leases or purchases could provide water on at least a temporary basis much sooner and at a lower cost. Cal-Am and the Monterey Peninsula Water Management District should consider every option available for supplementing and managing Cal-Am's Monterey Main system supply and demand.

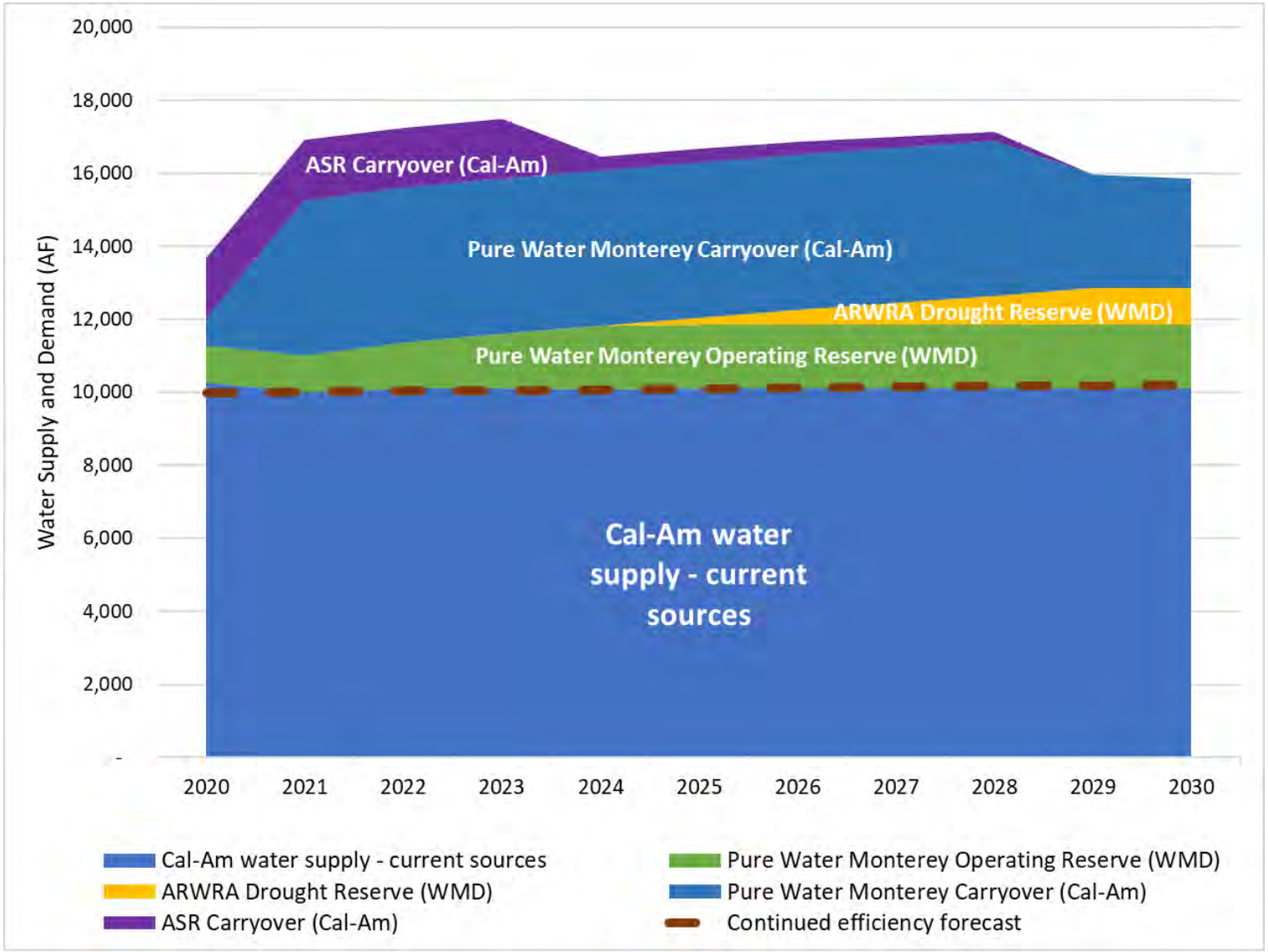

Figure 2: Cal-Am Monterey Main System current supply sources, forecast demand, and potential buildup of Seaside Basin groundwater reserve, 2020-2030

Water Demand Management

WaterDM's April 21 report noted that the Monterey region has been regarded as a model for water conservation programs for many years. Cal-Am and the Monterey Peninsula Water Management District implement an array of effective demand management policies and programs that are likely to extend water efficiency gains. Cal-Am implements an active water conservation program including a steeply inclining five-tier block rate pricing structure and customer incentives for installing drought tolerant landscapes and high-efficiency fixtures and appliances. Cal-Am also implements a rigorous utility-scale water loss control program aimed at reducing real losses in its distribution system. Local development regulations ensure that all new and remodeled buildings are equipped with high-efficiency fixtures and appliances.

Cal-Am's local efforts are in parallel to broader policy measures at the state level, designed to further increase efficiency. The State of California has implemented a series of laws and directives to ensure future water efficiency across the state including Assembly Bill 1668 and Senate Bill 60 which effectively mandate an ongoing reduction in per capita use. Cal-Am's continued compliance with these regulations and its active efforts to reduce customer water demand in the future are likely to gradually further decrease per capita water use across the service area.

All of the measures currently implemented will be extremely helpful in increasing water efficiency in the region, but more can be done to manage demand in the Monterey Main system.

Expand Demand Management with Water Budgets

To halt illegal diversions and comply with the cease and desist order, customers of the Monterey Main system must manage their water use to match an available volumetric target over the coming years. An effective approach for managing demand to match an available supply target is the establishment of customer specific monthly water budgets.

A water budget represents a reasonable volume of usage for each customer, based on the specific needs and requirements of each customer and the available water supply. The water budget is a volumetric target based on the legitimate needs of the customer and the available water supply and provides a customer-specific mechanism for monitoring compliance with demand management measures.[13] Water budgets are a familiar concept in the region with Santa Cruz, Hayward, and Visalia all utilizing water budgets in some form. In Southern California water budgets are utilized by LADWP, Irvine Ranch, Eastern Municipal, and many other urban water providers.

The approach of using water budgets to manage demand was successfully implemented during California's most recent period of drought by the California Water Company in its Visalia District. For the Visalia District, the mandated drought reduction goal was 32% below its 2013

[13] Mayer, P.W. et. al. 2008. Water Budgets and Rate Structures: Innovative Management Tools. Journal of the American Water Works Association. May 2008. Vol. 100, No. 5.

residential per capita water use to be achieved by February 2016. This state-mandated goal served as motivation for the creation of customer level budgets, set at 32% reduction from 2013 usage.[14] Drought surcharges were based on the extent of overuse. Customers using less than their monthly budget could bank savings in that month and use it to offset excess use in a future billing period. The Visalia water budget program was successful in achieving the demand reduction goals.[15]

The water budgets implemented in the Monterey Main system need not be tied to the water rate or penalty structure and can be primarily informational. Even without a connection to the water rate structure, water budgets serve the dual purpose of communicating with customers what is a reasonable and expected volume of use during a time of shortage and informing Cal-Am and/or the Monterey Peninsula Water Management District every time usage exceeds a budgeted amount. This enables the customer to immediately act if their usage exceeds budgeted amounts and it empowers the utility to address any customer with usage that is deemed unreasonable given the supply limitations. This in turn enables demand management across the entire system, tuned to the desired level of consumption to the extent possible.

Other Demand Management Measures

Other measures that Cal-Am should consider for managing demand until additional supply comes online include:

- adjust irrigation schedules – particularly during peak summer months
- strictly enforce water waste ordinances
- eliminate all but essential line flushing and hydrant testing
- limits on all non-essential uses
- leak detection – utilize metering technology like AMI and adaptive technology like home flow monitoring[16] to reduce customer-side leakage

Running out of water is not an acceptable option and an effective demand management plan must be readied in advance so that necessary measures can be implemented when and if they are needed in the coming years.

[14] Exceptions were made if the reduction resulted in a water budget that fell below a specified health-and-safety volume. If this happened, the larger health-and-safety budget was used instead. Visalia also offered an appeals and variance process.

[15] Bamezai, A. L. Maddaus, et. al. 2019. Use and Effectiveness of Municipal Irrigation Restrictions During Drought. Alliance for Water Efficiency. Chicago, IL.

[16] Devices by companies like Flume and Phyn detect customer-side leaks and abnormal usage and provide automatic alerts.

Conclusions and Recommendations

For the April 21 report, WaterDM conducted an analysis of the historic production trends in the Cal-Am service area and forecast growth in the service area. WaterDM developed an independent forecast of future water requirements based on the Associated Monterey Bay Area Governments (AMBAG) 2018 forecast of future population growth for the Cal-Am service area.

For this supplemental report, WaterDM considered Cal-Am's available sources from 2020 – 2030 excluding the proposed Pure Water Monterey Expansion recycling facility and the proposed Monterey Peninsula Water Supply Project desalination project, neither of which are expected to be on-line before 2022. This report explores how Cal-Am can manage supply and demand until such a supplemental supply source becomes available.

With careful management of supplies and demands, Cal-Am can comply with the cease and desist order and reduce its Carmel River diversions by 2022, but current supplies are not sufficient for the long-term and offer limited reserve in the near-term.

In 2022, when Cal-Am must reduce diversions from the Carmel River in compliance with provisions of a cease-and-desist order from the State Water Resources Control Board the combination of available, reliable water supplies for the Monterey Main system totals 10,100 AF. In WaterDM's April 21, 2020 report demand was forecast to be 10,098 AF in 2025 under the most likely scenario.

Cal-Am can address this situation before 2022 by building up reserve storage in the Seaside Basin which provides banked water to draw on if it becomes necessary. This storage will help balance supply to meet variable demands in the coming years, but Cal-Am must also carefully manage demand in the Monterey Main system to ensure that it balances with available supply through all months of the year. Proven demand management tools should also be implemented as quickly as possible.

This is a water supply situation that requires judicious management of Cal-Am's available supplies over the coming few years and increased demand management measures to ensure there is sufficient supply to meet forecasted demands and essential services such as fire protection until additional sources of supply can be brought online.

Cal-Am and its customers are confronted with a situation in the coming years where the expected demand equals the available supply in the Monterey Main system supplemented with a banked storage reserve. Until an additional long-term water supply is realized, options such as leases or purchases could provide water much sooner and at a lower cost.

Appendix A – Materials Considered[17]

Literature, Reports & Publicly Available Sources

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Montgomery and Associates. 2019. Technical Memorandum. Expanded PWM/GWR Project SEIR: Groundwater Modeling Analysis

Monterey One Water. May 28, 2010 Progress Report on Pure Water Monterey Expansion.

Monterey One Water. November 12, 2019 M1W presentation to the Monterey County Farm Bureau and the Grower-Shipper Association and the September 30-2019 M1W board meeting

Monterey One Water. April 2020. FINAL Supplemental Environmental Impact Report for the Proposed Modifications to the Pure Water Monterey Groundwater Replenishment Project.

Monterey One Water. April 11, 2020. Source Water Operational Plan Technical Memorandum. Prepared by Bob Holden, PE, and Alison Imamura, PE.

Monterey Peninsula Water Management District. 2020. Supply and Demand for Water on the Monterey Peninsula prepared by David Stoldt. (3-13-2020, 12-3-2019, and 9-16-2019)

Monterey Peninsula Water Management District. 2020. March 6 response to the Hazen Report including supporting exhibits prepared by David Stoldt.

Monterey Peninsula Water Management District. Map created by Eric Sandoval. 2/17/2006.

Seaside Basin Watermaster Annual Report – 2019, December 5, 2019

Seaside Basin Watermaster Jan. 8, 2020 Letter to Rachel Gaudion. Subject: Draft Supplemental Environmental Impact Report for the Proposed Modifications to the Pure Water Monterey Groundwater Replenishment Project (Draft Supplemental EIR)

Voice of San Diego. 8/29/2017. Desal Plant Is Producing Less Water Than Promised. https://www.voiceofsandiego.org/topics/science-environment/desal-plant-producing-less-water-promised/ (Accessed 4/9/2020).

Appendix B - Summary of Qualifications and Experience - Peter Mayer, P.E.

PETER W. MAYER, P.E.
Principal
Water Demand Management
1339 Hawthorn Ave.
Boulder, CO 80304
720-318-4232
peter.mayer@waterdm.com

WORK EXPERIENCE

Principal, WaterDM - 2013-present. (Registered Professional Engineer, Colorado, PE 0038126)
- Vice President, Partner, and Senior Project Engineer, Aquacraft, Inc. 1995-2012
- Editor, Calvert Independent, 1988-1990
- Coordinator, University of Wisconsin, College Year in India Program, Madurai, India 1991-92
- Educator-Fellow, Oberlin Shansi Memorial Association, Madurai, India 1986-88
- Station Manager, WOBC-FM, Oberlin, Ohio 1985-86

AFFILIATIONS

American Water Works Association
- Associate Editor AWWA Water Science
- Member– Customer Metering Practices Committee, Distribution and Plant Operations Division
- Chair – M22 manual 3rd and 4th ed. re-write sub-committee
- Member – M6 manual 6th ed. Re-write sub-committee
- Former Trustee – Water Conservation Division

American Water Resources Association
American Society of Civil Engineers
Alliance for Water Efficiency
Colorado River Water Users Association
Colorado Water Wise
Colorado Water Congress

EDUCATION

Master of Science, 1995, Water Resources Engineering, Department of Civil, Environmental and Architectural Engineering, University of Colorado, Boulder.

Bachelor of Arts, 1986, Oberlin College, Oberlin Ohio. Anthropology (Honors).

SELECTED PROJECTS

City of Tucson Water Conservation and Integrated Water Resources Plan (2019-2020)

Peter Mayer is working with Tucson staff to develop a 10-year water conservation implementation plan to integrate this work with the City's long-term integrated water resources plan being conducted by a large consulting team.

California DWR Research and Development of Indoor Residential Water Use Standards (2019-2021)

Peter Mayer is advising the California Department of Water Resources on a series of research projects to investigate indoor residential per capita use for the purpose of reporting to the legislature on future efficiency standards.

Metropolitan Water District of Southern California Demand Management Cost Functional Assignment (2018 – 2019)

Peter Mayer developed an analysis of Metropolitan's demand management and local resources development programs for the purpose of functional cost assignment in the ratemaking process.

New York City Integrated Water Resources Plan (2018 – 22)

Peter Mayer is leading the water conservation task of this five-year planning project awarded to a team lead by Hazen and Sawyer.

Northglenn Colorado Integrated Water Resources Plan (2019-20)

WaterDM is teamed with ELEMENT Water Consulting to prepare an integrated water resources plan for the City of Northglenn, a suburb of Denver.

Northern Water Conservation Program Planning (2017-18)

Peter Mayer worked closely with the Northern Colorado Water Conservancy District to plan for the future of their regional conservation program.

Westminster Rate and Fee Cost of Service Study (2017-18)

Peter Mayer was a member of the Raftelis Consulting team which developed this extensive cost of service analysis for this Colorado utility.

Rachio Water Management Implementation and Research (2016 –18)

Peter Mayer served as an expert advisor and technical consultant to the Rachio irrigation control and technology company. Together, they implemented peak day water management programs.

FL v. GA, 142, Original (2016)

Peter Mayer testified as an expert witness on municipal and industrial water use on behalf of the State of Georgia at the US Supreme Court trial held in November 2016. Peter prepared an expert report, expert testimony, testified at the trial, and was deposed in this case.

Water Resource Foundation #4689 Assessing Water Demand Patterns to Improve Sizing of Water Meters and Service Lines (2016-20)

Peter Mayer was the Principal Investigator for this research study taking place in Colorado and Arizona that closely examined meter and service line sizing.

Austin Water Integrated Water Resources Plan (2016-17)

Peter Mayer was an expert advisor to the CDM/Smith team on water demand and conservation and assisted in preparation of the Austin Integrated Water Resources Plan.

Colorado State Water Supply Initiative (2009-10, 2016-19)
Peter Mayer was part of a team that prepared technical analysis of future water demands and requirements in Colorado as part of the State's ongoing planning efforts.

New York City Water Board Water Demand Management Planning (2014 – 2019)
Peter Mayer was the lead for this project that prepared ten water conservation plans for wholesale customers of the NYC Water Board located in Westchester County and other upstate NY locations.

Outdoor Water Savings Initiative, Alliance for Water Efficiency (2014 – present)
Peter Mayer is the director of research for the Alliance for Water Efficiency's Outdoor Water Savings Initiative. Peter completed a literature review project in 2015, managed the landscape transformation study (2019) and is currently managing the drought response and water savings study (2020).

Residential End Uses of Water Study Update, Water Research Foundation (2010 – 2016)
Peter Mayer was the co-principal investigator of this research study that measured residential water use in 25 cities across he US and Canada. Final report is available from the Water Research Foundation.

Hilton Head PSD Water Demand Management Plan (2015)
Peter Mayer lead a team that prepared a long term water demand management plan for this coastal island community.

City of Arvada Expert Witness Services (2016)
Peter Mayer was hired as an expert witness on municipal and industrial water demands by the City of Arvada. Peter prepared and submitted an expert report in preparation for trial. The report was accepted by both sides and deposition and testimony were not required.

City of Arvada Water Supply and Demand Study (2014 –2016)
Peter Mayer led a team that evaluated future water supply and demands for this Denver suburb, under climate change conditions.

Roaring Fork Regional Water Conservation Planning (2014 - 2015)
Working with ELEMENT Water Consulting, Peter Mayer prepared a series of water conservation plans for Aspen, Basalt, Carbondale, and Glenwood Springs, Colorado and a regional conservation plan for the entire Roaring Fork Valley. An important goal of these plans was to ensure adequate environmental flows in local rivers and creeks.

City of Louisville Water Conservation Plan (2015)

Peter Mayer worked with CH2M to prepare a state approved water conservation plan for the City of Louisville Colorado.

City of Greeley Water Conservation Plan and Avoided Cost Analysis (2014 –2015)

Peter Mayer worked closely with the City of Greeley staff to update their water conservation plan for the next 7 years and to complete an avoided cost analysis that evaluates the impact of Greeley's water efficiency efforts since 1992 on customer water rates.

Senior Technical Advisor, Alliance for Water Efficiency (2007 – 2019)

The Alliance for Water Efficiency is a national NGO focused on promoting water conservation and efficiency. Peter Mayer helped found the organization and now served as a senior technical advisor and the newsletter editor for 12 years.

G480 Water Conservation Program Operation and Management Standard (2011-2013, 2018-19)

The G480 is a voluntary water conservation program operation and management standard approved by AWWA and ASNSI in 2013. Peter Mayer chaired the subcommittee that created the standard and was a key author of the document. He is a member of the subcommittee developing version 2.0.

Eastern Municipal Water District – Water Efficient Guidelines for New Development (2012-13)

Peter Mayer prepared a set of detailed, voluntary water efficiency guidelines for new construction in the Eastern Municipal Water District that go beyond current building codes and standards to increase water use efficiency.

City of Westminster Residential Demand Study and Conservation Plan Preparation (2012)

Peter Mayer and Aquacraft conducted a residential end use study in Westminster, Colorado to determine water use patterns and the level of water efficiency achieved. This information was then used in support of preparation of new water conservation plan for the City.

Northern Water Conservation Survey and Plan Development (2011)

The Northern Colorado Water Conservancy District hired Peter Mayer and Aquacraft to conduct a survey of its' 45 municipal members. The results of the survey were used to update Northern's water conservation plan for the Bureau of Reclamation.

Colorado Water Supply Initiative Municipal and Industrial Conservation Strategies (2010)

In support of the Statewide Water Supply Initiative (SWSI), the Interbasin Compact Committee (IBCC), and other water conservation efforts throughout the state, the CWCB contracted with Peter Mayer and Aquacraft to develop the conservation strategies section of the 2010 SWSI update.

Best Practices Guide for Colorado Water Conservation (2010)

Colorado Water Wise contracted with Peter Mayer and Aquacraft to research and produce a guidebook on water conservation best practices for Colorado. The guide was published in 2010 and is available for free download.

Evaluation of California Weather-Based "Smart" Irrigation Controller Programs (2005-2009)
Smart irrigation controllers that use prevailing weather conditions to adapt water applications to the actual needs of plants represent a significant advancement. Peter Mayer was the principal investigator on this study for the California Department of Water Resources, the California Urban Water Conservation Council, and approximately 30 participating water agencies examined the impact of 3,112 smart controllers on water use in northern and southern California.

Water Conservation: Customer Behavior and Effective Communications (2006 – 2009)
Peter Mayer and Aquacraft subcontracted to ICF International on this AwwaRF research project which examined water conservation social marketing programs and measured the impact of utility outreach efforts on customer behavior. The study examined water conservation communication campaigns in terms of customer recognition, attitudinal changes, behavior modification, and verifiable water use reductions and recommended the most effective methods and techniques for designing and implementing water conservation social marketing campaigns.

Water Budgets and Rate Structures: Innovative Management Tools (2005-2007)
Water budget rate structures are an innovative and increasingly popular tool for water utilities trying to convey an effective water efficiency message. This AwwaRF Tailored Collaboration project co-lead by Aquacraft and A&N Technical Services examined all aspects of water budgets and how they fit into the pantheon of water rate structures.

Water Conservation Plan Development and Demand Forecasting (2006–2010)
The State of Colorado requires that utilities seeking loans file a water conservation plan that includes detailed demand forecasts that incorporate water conservation. Aquacraft has developed conservation plans and demand forecasts for the cities of Aurora, Fort Collins, Glenwood Springs, Westminster, and Greeley, Colorado. In addition, Peter Mayer was contracted by the Colorado Water Conservation Board to review submitted conservation plans for compliance with statute.

Expert Testimony NEORSD Wastewater Case (2008)
Working with the Department of Justice, Peter Mayer developed a detailed research plan for the City of Cleveland to help them determine the contribution of wastewater flows from single-family, multi-family, and non-residential customers.

US EPA National Water Efficiency Market Enhancement Program (2004-2005)
The EPA is interested in starting a water efficiency program comparable the Energy STAR program. This project involves investigating potential product categories and product lines that

improve water efficiency and could be including the EPA program, such as weather-based irrigation control technology.

City of Carnation Water Conservation Demand Analysis (2004-2005)
In late 2004 Peter Mayer worked with the Pacific Institute, Carollo Engineers, and King County, Washington to determine the conservation potential evaluate the cost-effectiveness of water conservation in new and existing homes and businesses in the City of Carnation. Carnation is a small town that is currently not sewered. The County and the City are working together to provide a sanitary sewer system and treatment facility.

National Multiple Family Submetering and Allocation Billing Program Study (2002-2004)
Charging residents in multi-family house separately for water is growing trend in the United States. Peter Mayer was the principal investigator for this study which looked at the entire phenomena of submetering and allocation billing techniques and examined the potential water savings, regulatory issues, utility concerns, water rates, and regulatory climate.

Tampa Retrofit Project (2002-2003)

Colorado Department of Human Services Water Rights Study (2003)

Pinellas County Utilities Water Conservation Opportunities Study, (2002)
Virtual Water Efficient Home Web Site, (2001-2002)

East Bay MUD Conservation Retrofit Study, (2001-02)

CII Demand Assessment and Conservation Plan, Westminster, CO, (2000-01)

Seattle Home Water Conservation Study, Seattle Public Utilities and EPA, (1999-2000)

Commercial and Institutional End Uses of Water, AWWARF, (1998-2000)

Water Conservation Plan, City of Thornton, CO, (1998-2000)

Demand Analysis for the University of Colorado, (2000)

Water Conservation Futures Study, City of Boulder, CO, (1998-1999)

Water Efficiency in Water Wise and Standard New Homes, (1999-2000)

Residential End Uses of Water Study, AWWARF, (1996-1999)

Comparison of Demand Patterns among CI and SF Customers, Westminster, (1997-1998)

Analysis of Southern Nevada Xeriscape Project, (1998-2000)

Westminster, Peak Use Study, (1996)

Westminster Residential Water Use Study, (1995-1996)

PUBLICATIONS AND PRESENTATIONS

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DeOreo, W.B., P. Mayer, J. Kiefer, and B. Dziegielewski. 2016. Residential End Uses of Water, Version 2. Water Research Foundation. Denver, CO.

Shimabuku, M., D. Stellar, and P. Mayer. 2016. Impact Evaluation of Residential Irrigation Audits on Water Conservation in Colorado. Journal of the American Water Works Association. May 2016, 108:5. Denver, Colorado.

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AWARDS

- 2019 AWE Distinguished Service Award – "In Recognition and with Appreciation for His 12 Years as Editor of the Water Efficiency Watch Newsletter 2007 – 2019).
- 2013 AWWA Water Conservation Division Best Paper Award – "Insights into Declining Single Family Residential Water Demands."
- 2013 Quentin Martin Best Research-Oriented Paper Award, ASCE-EWRI Journal of Water Resources Planning and Management, March 2013. Awarded for "Estimating and Verifying United States Households' Potential to Conserve Water" by Franciso J. Suero, A.M.ASCE;

Peter W. Mayer; David E. Rosenberg, A.M.ASCE

- 2010 AWWA Water Conservation Division Best Paper Award – "Improving Urban Irrigation Efficiency by using Weather-Based 'Smart' Irrigation Controllers."
- 2008 AWWA Water Conservation Division Best Paper Award – "Water Budgets and Rate Structures: Innovative Management Tools."
- 2006 AWWA Water Conservation Division Best Paper Award – "Third Party Billing of Multi-family Customers Presents New Challenges to Water Providers"
- 1996 Montgomery-Watson Master's Thesis Award, Second Place
- 1996 American Water Works Association Academic Achievement Award, Honorable Mention