Appendix H

Water Supply and Demand Information for Analysis

Appendix H.1: Recycled Water Project Production Water Years 1995–2014 and Rainfall Data

Appendix H.2: Potable Water Demand Estimates

Appendix H.3: Carmel River, Seaside Basin Withdrawals and Cumulative Monterey Peninsula Water Supply and Demand Estimates

H.1

Recycled Water Project Production Water Years 1995–2014 and Rainfall Data

Appendix H.1

Recycled Water Project Production Water Years 1995 – 2014 and Rainfall Data

Summary

The proposed project will create demand for potable water. The Applicant proposes to use a portion of its existing water entitlement to supply the project and also has been selling a part of its water entitlement for use by third parties. The water entitlement was derived due to the Applicant's funding of the Recycled Water Plant.

In order to understand the impact of the project's demand (as well as the demand of purchasers of part of the Applicant's water entitlement) in combination with the effect of the Recycled Water Project overall on water supply conditions, the production capacity of the CAWD/PBCSD Recycled Water Project must be understood and quantified.

Table H.1-1 presents Recycled Water Project Annual Production Averages, rainfall, and dry season (April-October) rainfall data for Water Years 1995 to 2014.

Table H.1-2 presents Rainfall Averages for the Monterey Peninsula near the DMF/PDP Project Area from 1950 to 2014.

References

Carmel Area Wastewater District/Pebble Beach Community Services District. 1995 – 2014. CAWD/PBCSD Production Reports for the Recycled Water Project, 1995 to 2014.

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Table H.1-1
CAWD/PBCSD Recycled Water Project
Water Production Annual Average, Water Years 1995 - 2014

Water Year	Recycled	Potable	Total	%Recycled	Rainfall	Rainfall Year Type
1995	615	178	792	78%	28.4	Wet
1996	552	384	936	59%	21.0	Average
1997	782	327	1109	71%	21.7	Average
1998	590	111	701	84%	47.4	Wet
1999	667	235	902	74%	20.1	Average
2000	769	299	1068	72%	21.0	Average
2001	599	373	972	62%	19.2	Average
2002	734	303	1037	71%	15.6	Dry
2003	721	308	1030	70%	18.4	Average
2004	791	435	1226	65%	16.4	Dry
2005	674	207	881	77%	30.5	Wet
2006	768	152	920	83%	24.8	Wet
2007	918	160	1078	85%	14.1	Critically Dry
2008	1023	110	1133	90%	14.4	Critically Dry
2009	991	64	1055	94%	17.5	Average
2010	903	0	903	100%	23.9	Wet
2011	843	0	843	100%	24.5	Wet
2012	984	0	984	100%	13.5	Critically Dry
2013	936	0	936	100%	13.1	Critically Dry
2014	976	0	976	100%	8.9	Critically Dry
1995 to 2014 Average	792	182	974	82%	20.7	
2010 - 2014 Average	928	0	928	100%	16.8	
1950 to 2014 Average Rainfall					19.1	

Source: CAWD/PBCSD Production Reports, 1995 - 2014.
Rainfall data from sources in Table H.1-2

Table H.1-2
Monterey Peninsula Rainfall Near DMF/PDP Project Area 1950 - 2010 (inches)

Water Year	Total	Water Year	Total
1950	14.3	1983	40.3
1951	7.2	1984	14.5
1952	29.7	1985	16.9
1953	14.1	1986	21.2
1954	16.4	1987	12.1
1955	14.8	1988	12.1
1956	23.0	1989	15.3
1957	16.2	1990	14.1
1958	28.9	1991	13.9
1959	15.6	1992	17.8
1960	11.6	1993	30.1
1961	10.9	1994	14.0
1962	14.4	1995	28.4
1963	13.8	1996	21.0
1964	13.7	1997	21.7
1965	19.4	1998	47.4
1966	18.1	1999	20.1
1967	29.6	2000	21.0
1968	13.3	2001	19.2
1969	28.2	2002	15.6
1970	16.0	2003	18.4
1971	18.0	2004	16.4
1972	10.5	2005	30.5
1973	27.6	2006	24.8
1974	24.0	2007	14.1
1975	16.2	2008	14.4
1976	10.7	2009	17.5
1977	9.8	2010	23.9
1978	29.2	2011	24.5
1979	18.8	2012	13.5
1980	24.3	2013	13.1
1981	16.0	2014	8.9
1982	29.9		
Average 1950 to 2014			19.1
Average 1995 to 2014			20.7

Note: For Water Years. Precipitation 1950 - 1994 from Hopkins Marine Station, Monterey Weather Station #5795; ; Precip. 1995- 2010 from National Weather Service Climatological Station, Monterey, California 93940 (elevation 385'), accessed via web at: www.weather.nps.navy.mil/renard_wx.

H.2

Potable Water Demand Estimates

Appendix H.2

Potable Water Demand Estimates

Introduction

The Proposed Project will create demand for potable water. Potable water would be used for project development uses.

Spreadsheets in this appendix present the estimated potable demand used for the impact analysis in Section 3.12, "Water Supply and Demand."

Scenarios Evaluated

A total of four water year types were evaluated to examine water demand. The results of this analysis are shown in tables described below and also described in Appendix H.3.

- **Wet Year.** This scenario was designed to be representative of a wet year in which rainfall is less than that in an average year and thus that water demand is also less than an average year. For estimating recycled water production for wet water year types, Water Years 1995, 1998, 2005, 2006, 2010 and 2011 were selected for this scenario as these years had rainfall totals 15% or more than the 1950 to 2014 average. For potable water demand, it was assumed that wet year demand was 5% less than average year demand.
- **Average Year.** This scenario was designed to be representative of an average year in which rainfall is average and thus that water demands are also average. For estimating recycled water production for average water year types, Water Years 1996, 1997, 1999, 2000, 2001, 2003, and 2009 were used. Cumulative potable water demand was adjusted by 2.6% to reflect that the 1995 to 2014 was relatively wetter than the 1950 to 2014 average using the MPWMD adjustment factor used to estimate existing demand for the regional water supply project (MPWMD 2006). Project Potable water demand was also estimated using the factors described below for Table H.2-2B.
- **Dry Year** This scenario was designed to be representative of a dry year in which rainfall is drier than in an average year and thus that water demands are higher than an average year. For estimating recycled water production, Years 2002 and 2004 were selected for this analysis as these years had rainfall 15% to 25% less than the 1950 to 2014 average. For potable water demand, it was assumed that dry year demand was 5.2% greater than average year demand based on the dry year adjustment made by MPWMD in estimating water demands for the regional water supply project (MPWMD 2006).

- **Critically Dry Year** This scenario was designed to be representative of a very dry year in which rainfall is much drier than in an average year and thus water demands are much higher than an average year. For estimating recycled water project production in this scenario, Water Years 2007 and 2008 and Water Years 2012 to 2014 were selected for this analysis as these years had rainfall more than 25% less than the 1950 to 2014 average. For potable water demand, it was assumed that demand was 7.8% greater than average year demand based on the critically dry year adjustment made by MPWMD in estimating water demands for the regional project (MPWMD 2006).

Analysis Results

The results of the analysis of potable water demand are presented in the following summary tables and are based on the subsequent tables discussed and presented below.

Table H.2-1A summarizes project increases in potable water use for different water year types.

Table H.2-1B summarizes project increases in potable water use combined with the demand from other use of the remaining Applicant's entitlement for different water year types.

Direct Potable Water Demand Estimates

Potable water demand estimates are based on assumptions by ICF, factors from MPWMD, and other sources cited in text.

Table H.2-2A summarizes potable water use of the Proposed Project and other entitlement demand.

Table H.2-2B presents the estimate of project potable water use, including for both interior and exterior use.

Table H.2-2C presents the estimate of project landscape water demand.

Table H.2-2D summarizes potential use of the applicant's entitlement by other residential users including information about the remaining entitlement outside of the project for other residential use and for other use by PBC.

References

Monterey Peninsula Water Management District (MPWMD). 2015. Monthly Entitlement Report for January 2015. February. Available: http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2015/20150218/22/Item%2022_Exhibit%2022-B.pdf

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MWELO (California Model Water Efficient Landscape Ordinance). 2009. (California Code of Regulations, Title 23, Water, Division 2, Department of Water Resources, Chapter 2.7, Model Water Efficient Landscape Ordinance). September 10, 2009.

WUCOLS (Water Use Classifications of Landscape Species). 2000. University of California Cooperative Extension and California Department of Water Resources. 2000. A Guide to Estimating Irrigation Water Needs of Landscape Plants in California: The Landscape Coefficient Methods and WUCOLS III. August. Available: http://www.water.ca.gov/wateruseefficiency/docs/wucols00.pdf

Table H.2-1A With Project Increases in Water Use	
	Acre-Feet
Low Use (Wet Year)	
Project Direct Potable Use	6
Average Use (Average Rainfall Year)	
Project Direct Potable Use	6
High Use (Dry Year)	
Project Direct Potable Use	7
Very High Use (Critically Dry Year)	
Project Direct Potable Use	7
Source: Table H.2-2B	

Table H.2-1B Project Demand Plus Other Entitlement Demand (in Acre-Feet)	
Low Use (Wet Year)	
Project Direct Demand	6
Other Entitlement Demand	294
Total Demand	300
Average Use (Average Rainfall Year)	
Project Direct Demand	6
Other Entitlement Demand	310
Total Demand	316
High Use (Dry Year)	
Project Direct Demand	7
Other Entitlement Demand	326
Total Demand	332
Very High Use (Critically Dry Year)	
Project Direct Demand	7
Other Entitlement Demand	334
Total Demand	341
Source: Tables H.2-2B and H.2-2D	

Table H.2-2A
Summary of Potable Water Use of Proposed Project and Other Entitlement Demand (In Acre-Feet/Year)

Proposed Development	Use
24 Inclusionary Housing Units	6.31
Water Year Type	**Total**
Wet Year	5.99
Average Year	6.31
Dry Year	6.63
Critically Dry Year	6.80
Summary of Other Entitlement Demand Water Use (in Acre-Feet/Year)	
Water Year Type	**Demand**
Wet Year	294
Average Year	310
Dry Year	326
Critically Dry Year	334
Source: Tables H.2-2B and H.2-2D.	

Table H.2-2B
Water Demand Inclusionary Housing at Area D

		Inclusionary Housing (3 BR)		Inclusionary Housing (2 BR)		Totals
	FU Value	**No.**	**FU Count**	**No.**	**FU Count**	
Wash Basins (lavatory sink) each	1.0	3	3.0	2	2.0	
Two washbasins in Master Bathroom	1.0					
Toilet (ULF, 1.6 gpf)	1.8					
Toilet (ULF, 1.3 gpf)	1.3	3	3.9	2	2.6	
Toilet (ULF, 0.8 gpf)	0.8					
Masterbath (Tub, sep. shower)	3.0					
Large bathtub (w/ showerhead)	3.0					
Standard bathtub (w/ showerhead)	2.0	3	6.0	2	4.0	
Shower, separate stall	2.0					
Kitchen sink and dishwasher	2.0	1	2.0	1	2.0	
Kitchen sink and UL dishwasher	1.5					
Laundry/utility sink	2.0					
Washing Machine	2.0	1	2.0	1	2.0	
Washing Machine (UL, 18 gpc)	1.0					
Washing Machine (UL, 28 gpc)	1.5					
Bidet	2.0					
Bar sink	1.0					
Entertainment sink	1.0					
Vegetable sink	1.0					
Subtotal Interior Fixture Units			*16.9*		*12.6*	
Swimming Pools (per 100 SF)	1.0					
Fixture Unit Count			*16.9*		*12.6*	
Acre-Feet/Unit (0.01 AF/FU)			*0.17*		*0.13*	
Units			*16*		*8*	
Interior Water Demand Subtotal			*2.70*		*1.01*	3.71
Irrigation using MAWA Calculations (Table H.2-2C)						1.21
Subtotal						4.92
Treatment Loss (10%) and System (7%) Loss						1.39
TOTAL						**6.31**
Per unit (with treatment and system loss)						*0.26*
Wet year (95% of avg.)						*5.99*
Dry year (105.2% of avg.)						*6.63*
Very Dry year (107.8% of avg.)						*6.80*

Prepared by ICF using MPWMD Fixture Unit Methodology and MAWA methodology from MPWMD 2006a and California Model Water Efficiency Landscape Ordinance (MWELO). Dry year and Very dry year adjusted using factors from MPWMD 2006b See Table H.2-2C for calculation of MAWA.
All Assumptions by ICF

Table H.2-2C: Estimated Landscape Water Demand Using MPWMD MAWA methodology

Maximum Applied Water Allowance (MAWA)

	Turf	Droght Tolerant	Xeriscape	Notes
Evapotranspitation (inches) (ETo)	46.3	46.3	46.3	
Target ET Adjust Factor (ETAF) = KL/IE or Turf crop Coefficient	0.80	0.70	0.42	MWELO (1), WUCOLS (2)
Landscaped Area (LA, in SF)	*3,336*	*19,037*	*26,122*	*Assumptions*
Conversion Factor gallons	0.62	0.62	0.62	Factor
Gallons per Acre Foot	325,851	325,851	325,851	Factor
MAWA = (ETo X ETAF X LA X 0.623)/325,851 (MPWMD, 2006d)	0.24	1.18	0.97	AF

1. Landscape Plan includes 1,690 SF turf and 1,646 of private/tenant garden area (assumed high use = turf). ETAF for turf = 0.8 (WUCOLS)
2. Landscape Plan includes 19,037 of drough tolerant ornamental shrubs defined as medium water. ETAF - 0.7 from below)
3. Landscape plan includes 36,122 SF of xeriscape. ETAF for xeriscape = 0.42 (ET adjusted as shown below)

	Low	Moderate	High
KL (Plant Factor) from MWELO (1)	0 to 0.3	0.4 - 0.6	0.7 to 1.0
Turf crop coefficient, WUCOLS (2), Cool season species			0.8
	Xeriscape (Low)	Moderate	High
KL (Plant Factor)	0.3	0.5	1.0
IE (Irrigation efficiency, from MWELO)	0.71	0.71	0.71
ET adj (ETAF, calculated	0.42	0.70	1.41

Sources:

MPWMD, 2006b. Water Budget Requirements (Used for MAWA equation)

MWELO = California Model Water Efficient Landscape Ordinance, 2009. (California Code of Regulations, Title 23, Water, Division 2, Department of Water Resources, Chapter 2.7, Model Water Efficient Landscape Ordinance).

WUCOLS. 2000. University of California Cooperative Extension and California Department of Water Resources. A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California: The Landscape Coefficient Methods and WUCOLS III. August

Table H.2-2D
Other Entitlement Demand

	Number of Units	Use factor (AFY/unit)	Demand (AFY)	Factor (AFY/unit)	Notes
Existing Vacant Lots					
Future SFD Development	96 (1)	0.8	76.8	0.8	DMF Average based on pre-2001 non-rationing year use (2). Approximately the same as average actual use of McComber Estates (2).
Area X and Y					
Future SFD Development	9 (1)	0.8	7.2	0.8	DMF Average based on pre-2001 non-rationing year use (2). Approximately the same as average actual use of McComber Estates (2).
Visitor-Serving Units					
Lodge at Pebble Beach and Inn at Spanish Bay	45	0.21	9.5	0.21	Additional VSC units allowed by proposed LCP Amendment beyond the VSC units included in the 2012 buildout project. Factor is MPWMD water use factor from Table H.2-2B in PBC 2012 FEIR.
Total			93.5		Assumed that such properties would either purchase PBC entitlement or would have to be served by future expansions of the regional water supply project (or its equivalent).
PBC Entitlement Allocations					
Total entitlement			365		
Amount sold to others or dedicated for PBC use as of 2014			279		(11.572 AF for PBC pre-buildout project dedications + 145 AF for buildout +122.83 for others) (3)
Remaining entitlement available for PBC use			86		Total Entitlement - amount dedicated
Entitlement used for project			7		Based on critically dry year estimate (Table H.2-2B)
Remaining unsold entitlement outside of project for other residential use			52		MPWMD Ordinance 109 allows up to 175 AF to be sold to DMF benefitted properties. As of January 2015, PBC had sold 122.83 AF, leaving 52 AF more that could be sold.(3)
Unreserve entitlement beyond that available to other residential use.			27		Remaining entitlement minus amount to be used for project minus remaining amount that can be used for DMF benefited properties.
Other Entitlement Demand					
Amount of entitlement allowed to be transferred to others			175		MPWMD Ordinance 109 allows up to 175 AF to be sold to DMF benefitted properties. (3)
Amount of entitlement actually used by others in 2014			37		Benefitted Properties - 37.415 AF(3)
Remaining amount that can be used by others			***138***		
Total entitlement			365		
Amount that is in use as of 2014			49		PBC use - 11.572 AF; Benefitted Properties - 37.415 AF(3)
Total Future Entitlement Use			**316**		Amount that can be used by current and future entitlement holders and PBC that is not used as of January 2015 (including project)

Sources
1) DMF residential development calculations - ICF estimated vacant lots and buildout of X and Y based on Table 3-2 in Chapter 3 of the PBC Buildout Project 2012 EIR.
2) DMF Average from DEIR for the DMF/PDP (Monterey County, 2005). McComber Estates average actual use from Revised Water Demand Analysis for the September Ranch Project (Monterey County, 2009)
3) Entitlement information: MPWMD, 2015, Monthly Entitlement Report, February, 2014 (for January 2015).

H.3

Carmel River, Seaside Basin Withdrawals and Cumulative Monterey Peninsula Water Supply and Demand Estimates

Appendix H.3

Carmel River, Seaside Basin Withdrawals and Cumulative Monterey Peninsula Water Supply and Demand Estimates

Introduction

This appendix presents the following

- Historical data on withdrawals of water from the Carmel River the California-American Water Company (Cal-Am) and its predecessors and from the Seaside Coastal Basin by Cal-Am.
- Projections of the impact of project demand and other water entitlement demand on Carmel withdrawals
- Estimates of future (2017, 2020 and 2030) Monterey Peninsula water supply and demand.

Scenarios Evaluated for Water Supply and Demand

A total of four water year types were evaluated to examine water demand. The results of this analysis are shown in tables described below and also described in Appendix H.3.

- **Wet Year.** This scenario was designed to be representative of a wet year in which rainfall is less than that in an average year and thus that water demand is also less than an average year. For estimating recycled water production for wet water year types, Water Years 1995, 1998, 2005, 2006, 2010 and 2011 were selected for this scenario as these years had rainfall totals 15% or more than the 1950 to 2014 average. For potable water demand, it was assumed that wet year demand was 5% less than average year demand.
- **Average Year.** This scenario was designed to be representative of an average year in which rainfall is average and thus that water demands are also average. For estimating recycled water production for average water year types, Water Years 1996, 1997, 1999, 2000, 2001, 2003, and 2009 were used. Cumulative potable water demand was adjusted by 2.6% to reflect that the 1995 to 2014 was relatively wetter than the 1950 to 2014 average using the MPWMD adjustment factor used to estimate existing demand for the regional water supply project (MPWMD 2006). Project Potable water demand was also estimated using the factors described below for Table H.2-2B.
- **Dry Year** This scenario was designed to be representative of a dry year in which rainfall is drier than in an average year and thus that water demands are higher than an average year. For estimating

recycled water production, Years 2002 and 2004 were selected for this analysis as these years had rainfall 15% to 25% less than the 1950 to 2014 average. For potable water demand, it was assumed that dry year demand was 5.2% greater than average year demand based on the dry year adjustment made by MPWMD in estimating water demands for the regional water supply project (MPWMD 2006).

- **Critically Dry Year** This scenario was designed to be representative of a very dry year in which rainfall is much drier than in an average year and thus water demands are much higher than an average year. For estimating recycled water project production in this scenario, Water Years 2007 and 2008 and Water Years 2012 to 2014 were selected for this analysis as these years had rainfall more than 25% less than the 1950 to 2014 average. For potable water demand, it was assumed that demand was 7.8% greater than average year demand based on the critically dry year adjustment made by MPWMD in estimating water demands for the regional project (MPWMD 2006).

A total of four scenarios were evaluated to examine project demand in future years. Each scenario was analyzed for the four water year types described above. The results of this analysis are shown in tables described below.

- **1995 - 2014 Existing Conditions.** Existing conditions are defined in terms of the current level of withdrawals from the Carmel River and the Seaside Aquifer and the current level of water demand served by Cal-Am. Non-Cal-Am water users are presumed to derive their water from the Carmel River, Seaside Aquifer, or other sources but are not included in the analysis as they are not presumed to be served by Cal-Am who would supply water to the proposed project.
- **2017 Scenario A (Delay in Enforcement of WR2009-060 Limit on Cal-Am Withdrawals from the Carmel River Aquifer)**. This scenario evaluates water supply and demand conditions in 2017, presuming SWRCB delays full enforcement of Order WR2009-0060 based on reasonable progress toward regional water supply project completion by 2020. Under this scenario, Cal-Am would continue withdrawals above its legal limit from 2017 until presumed completion of a regional water supply project in 2020. However, the progressive reduction schedule of reduction included in WR 2009-060 would continue.
- **2017 Scenario B (Enforcement of WR2009-060 Limits on Cal-Am Withdrawals from the Carmel River).** This scenario evaluates water supply and demand conditions in 2017, presuming that SWRCB fully enforces Cal-Am withdrawal limitations in Order WR2009-0060 including the 3,376 AFY limit of Cal-Am's legal rights. Under this scenario, Cal-Am withdrawals above its legal limits would cease on December 31, 2016.
- **2020 Scenario C (Alternative to Regional Water Supply Project).** This scenario evaluates water supply and demand conditions in 2020, presuming that a regional water supply project is completed by 2020 including water for the project allowing Cal-Am full compliance with Order WR 2009-0060 limitations on Cal-Am withdrawals. Under this scenario, as of 2020, Cal-Am withdrawals above its legal limit would cease upon completion of a regional water supply project providing sufficient replacement water, including for the project.
- **2030 Scenario.** This scenario evaluates water supply and demand conditions in 2030. Existing and new water demands are included in the analysis. The scenario evaluates conditions with completion of the MPWSP (or an equivalent). Under this scenario, the proposed project would be supplied by water from either the Carmel River or the regional water supply project.

Historical Withdrawals

Table H.3-1 presents a summary of withdrawals from the Carmel River (both surface and groundwater) and the Seaside Basin by Cal-Am and its predecessors from 1916 to 2010.

Figure H.3-1 presents a summary of withdrawals from the Carmel River (both surface and groundwater) and the Seaside Basin by Cal-Am and its predecessors from 1916 to 2014.

Projections of Project Withdrawals

The estimates of project demand in Appendix H.2 were used to estimate what project withdrawals from the Carmel River with the project and with other entitlement demand.

Table H.3-2 shows what the Cal-Am Carmel River withdrawals would have been between 1995 and 2014 without the Recycled Water Project.

Figure H.3-2 presents annual withdrawal data from the Carmel River by Cal-Am from 1995 to 2014 and shows what the withdrawals would have been without the Recycled Water Project.

Table H.3-3 shows Cal-Am Carmel River withdrawals and defines 2014 Existing Conditions for different water year types using the definitions and adjustments noted above.

Figure H.3-3 graphically shows the Carmel River withdrawals in 2017 for different water year types compared to 1995 – 2014 Average Conditions for 2017 Scenario A.

Table H.3-4 shows the Carmel River withdrawals in 2017 for different water year types under 2017 Scenario A, presuming a delay in enforcement of the Cal-Am legal limit of 3,376 AFY. Changes with project and other entitlement demand are compared to 1995-2014 average conditions, 2014 allowable withdrawals per WR 2009-060, and 2017 without project conditions.

Table H.3-5 shows the Carmel River withdrawals in 2017 for different water year types under 2017 Scenario B, presuming full enforcement of the Cal-Am legal limit of 3,376 AFY. Changes with project and other entitlement demand are compared to 1995-2014 average conditions, 2014 allowable withdrawals per WR 2009-060, and 2017 without project conditions.

Table H.3-6 shows the Carmel River withdrawals in 2020 for different water year types under 2020 Scenario C, presuming completion of a regional water supply project and full enforcement of the Cal-Am legal limit of 3,376 AFY. Changes with project and other entitlement demand are compared to 1995-2014 average conditions, 2014 allowable withdrawals per WR 2009-060, and 2020 without project conditions.

Table H.3-7 shows the water demand and supply conditions for 2017, 2020 and for 2030 taking into account existing and future cumulative demands, new supply scenarios, and the project and other entitlement demand.

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Table H.3-1
Production History of Cal-Am and its Predecessors
(Acre-Feet)

Water	Seaside Coastal Basin	Carmel River Basin			Total
Year	Ground Water	Ground Water	Surface Water	Subtotal	
1916	0	0	507	507	507
1917	0	0	547	547	547
1918	0	0	627	627	627
1919	0	0	667	667	667
1920	0	0	756	756	756
1921	0	0	760	760	760
1922	0	0	745	745	745
1923	0	0	888	888	888
1924	0	0	1,007	1,007	1,007
1925	0	0	1,026	1,026	1,026
1926	0	0	4,094	4,094	4,094
1927	0	0	4,538	4,538	4,538
1928	0	0	4,467	4,467	4,467
1929	0	0	4,869	4,869	4,869
1930	0	0	4,431	4,431	4,431
1931	0	0	3,558	3,558	3,558
1932	0	0	4,269	4,269	4,269
1933	0	0	3,761	3,761	3,761
1934	0	0	4,377	4,377	4,377
1935	0	0	4,053	4,053	4,053
1936	0	0	4,072	4,072	4,072
1937	0	0	3,843	3,843	3,843
1938	0	0	4,144	4,144	4,144
1939	0	0	5,258	5,258	5,258
1940	0	15	4,632	4,647	4,647
1941	0	0	5,159	5,159	5,159
1942	0	0	4,529	4,529	4,529
1943	0	0	5,117	5,117	5,117
1944	0	0	5,245	5,245	5,245
1945	0	95	5,367	5,462	5,462
1946	0	424	5,443	5,867	5,867
1947	0	758	5,196	5,954	5,954
1948	0	980	5,329	6,310	6,310
1949	0	114	6,623	6,737	6,737
1950	0	57	6,875	6,931	6,931
1951	0	34	6,967	7,001	7,001
1952	0	0	6,967	6,967	6,967
1953	0	0	7,726	7,726	7,726
1954	0	0	7,953	7,953	7,953
1955	198	0	7,910	7,910	8,108
1956	207	0	8,523	8,523	8,730
1957	244	0	8,455	8,455	8,699
1958	302	0	8,830	8,830	9,132
1959	663	823	8,892	9,715	10,378
1960	743	1,012	8,432	9,443	10,186
1961	968	2,444	7,599	10,043	11,011
1962	797	990	9,053	10,043	10,840
1963	717	620	9,213	9,833	10,550
1964	972	1,090	9,649	10,739	11,711
1965	921	1,365	9,831	11,195	12,116
1966	2,700	2,845	9,082	11,927	14,627
1967	2,638	931	9,546	10,477	13,115
1968	3,482	3,221	7,731	10,952	14,434
1969	2,622	2,765	8,473	11,238	13,860
1970	3,809	3,127	8,552	11,679	15,488

Table H.3-1
Production History of Cal-Am and its Predecessors
(Acre-Feet)

Water	Seaside Coastal Basin	Carmel River Basin			Total
Year	Ground Water	Ground Water	Surface Water	Subtotal	
1971	4,309	4,031	7,307	11,338	15,647
1972	4,700	4,519	6,982	11,501	16,201
1973	3,976	3,021	8,690	11,711	15,687
1974	3,591	2,656	8,821	11,477	15,068
1975	3,400	2,819	9,084	11,903	15,303
1976	4,229	5,632	6,185	11,817	16,046
1977	2,693	3,129	2,706	5,835	8,528
1978	1,719	3,210	7,018	10,228	11,947
1979	1,333	4,966	7,721	12,687	14,020
1980	2,187	3,558	8,953	12,511	14,698
1981	2,219	5,106	9,091	14,197	16,416
1982	1,221	5,156	9,226	14,382	15,603
1983	1,733	4,963	8,915	13,878	15,611
1984	1,594	6,019	9,103	15,122	16,716
1985	1,901	6,460	8,945	15,405	17,306
1986	3,254	7,395	7,008	14,403	17,657
1987	3,465	9,059	5,593	14,652	18,117
1988	3,083	9,445	4,526	13,971	17,054
1989	3,288	6,156	3,888	10,044	13,332
1990	3,336	6,026	2,862	8,888	12,224
1991	2,880	7,120	2,118	9,238	12,118
1992	2,032	8,581	3,013	11,594	13,626
1993	2,144	7,297	4,146	11,443	13,587
1994	2,434	10,245	2,662	12,907	15,341
1995	3,794	5,874	4,162	10,036	13,830
1996	4,319	8,174	3,527	11,701	16,020
1997	4,025	9,688	3,159	12,847	16,872
1998	3,910	8,597	1,557	10,154	14,064
1999	3,982	9,195	1,385	10,580	14,562
2000	3,754	11,092	258	11,350	15,104
2001	3,444	10,700	98	10,798	14,242
2002	3,521	10,893	175	11,068	14,589
2003	3,507	11,299	242	11,541	15,048
2004	3,918	11,282	0	11,282	15,200
2005	3,002	11,036	0	11,036	14,039
2006	3,264	10,954	0	10,954	14,218
2007	3,626	10,486	0	10,486	14,112
2008	3,390	10,835	0	10,835	14,225
2009	2,631	10,286	0	10,286	12,917
2010	3,284	9,786	0	9,786	13,069
2011	3,034	8,565	0	8,565	11,599
2012	2,811	7,646	0	7,646	10,457
2013	2,700	8,008	0	8,008	10,708
2014	2,871	7,744	0	7,744	10,615

Note: Production values for post -WY 1998 are recorded values and include for water produced from CRB for injection into SGB but ASR withdrawals from SGB are not included to avoid double counting.

Sources:
(1) Data for 1916 to 2002 are from MPWMD, 2006a.
http://www.mpwmd.dst.ca.us/asd/board/boardpacket/2006/20060323/01/item1_exh1e.htm
(2) Data for Water Years 2003 to 2014 from MPWMD Production Reports for Water Years 2003- 2014..

Table H.3-2
Carmel River Cal-Am Withdrawals With and Without the Recycled Water Project (RWP) (acre-feet)

Year	Type	Cal-Am Carmel River Withdrawals	RWP Historic Reductions	Carmel River Cal-Am Withdrawals without the RWP
1995	Wet	10,036	615	10,651
1996	Average	11,701	552	12,253
1997	Average	12,847	782	13,629
1998	Wet	10,154	590	10,744
1999	Average	10,580	667	11,247
2000	Average	11,350	769	12,119
2001	Average	10,798	599	11,397
2002	Dry	11,068	734	11,802
2003	Average	11,541	721	12,262
2004	Dry	11,282	791	12,073
2005	Wet	11,036	674	11,710
2006	Wet	10,954	768	11,722
2007	Critically Dry	10,486	918	11,404
2008	Critically Dry	10,835	1023	11,858
2009	Average	10,286	991	11,277
2010	Wet	9,786	903	10,689
2011	Wet	8,565	843	9,408
2012	Critically Dry	7,646	984	8,630
2013	Critically Dry	8,008	936	8,944
2014	Critically Dry	7,744	976	8,720
Avg.	All	10,335	792	11,127
Condition	Wet		732	
Condition	Avg.		726	
Condition	Dry		763	
Condition	Critically Dry		967	

Sources: Cal-Am Carmel River Withdrawals from Table H.3-1. RWP data from Appendix H.1 and represent amount of recycled water used instead of Carmel River water.

Table H.3-3
Existing 2014 Conditions Based on 1995 to 2014 Averages by Water Type
(in Acre-Feet)

Year	Water Year Type	Historic Withdrawals
1995	Wet	10,036
1996	Average	11,701
1997	Average	12,847
1998	Wet	10,154
1999	Average	10,580
2000	Average	11,350
2001	Average	10,798
2002	Dry	11,068
2003	Average	11,541
2004	Dry	11,282
2005	Wet	11,036
2006	Wet	10,954
2007	Critically Dry	10,486
2008	Critically Dry	10,835
2009	Average	10,286
2010	Wet	9,786
2011	Wet	8,565
2012	Critically Dry	7,646
2013	Critically Dry	8,008
2014	Critically Dry	7,744
1995 to 2014	**Annual Average**	**10,335**
	Water Year Type	**2014 Existing Conditions (1)**
	Wet (2)	*10,088*
	Average (3)	*10,604*
	Dry (4)	*10,873*
	Critically Dry (5)	*11,141*

Notes:
(1) 2014 Existing Conditions = Carmel River withdrawals based on Table H.3-1.
(2) Wet Year = Water Years 1994, 1998, 2005, 2006, 2010 and 2011.
(3) Average = Average of 1995 to 2014, adjusted by 2.6% to reflect relative wetter conditions than long-term averages. 2.6% adjustment is the factor used by MPWMD (2006b) to adjust 1996 to 2006 conditions to estimate baseline demand estimates for the regional water supply project due to relatively wetter conditions than long-term averages. The period 1996 to 2006 was slightly wetter (average rainfall of 23.2 inches on the Monterey Peninsula) than the period 1995 to 2010, so the use of the MPWMD factor is conservative.
(4) Dry = Average of 1995 to 2014, adjusted by 5.2%, which is MPWMD (2006b) factor used for dry condition adjustment for the 1996 - 2006 period.
(5) Critically Dry = Average of 1995 to 2014 conditions, adjusted by 7.8%, which is the MPWMD (2006b) factor used for critically dry conditions.

Table H.3-4
Cal-Am Withdrawals from the Carmel River
Scenario A: Delay in Enforcement of Cal-Am 3,376 AFY Limit
(in Acre-Feet)

Water Year Type	Wet	Average	Dry	Critically Dry
1995 - 2014 Average Conditions	10,088	10,604	10,873	11,141
2014 Allowable Cal-Am withdrawals per WR 2009-060 (1)	9,887	9,887	9,887	9,887
Project Demand	6	6	7	7
Future Other Entitlement Demand	294	310	326	334
2017 Allowable Cal-Am withdrawals per WR 2009-060 excluding 3,376 AFY limit (2)	8,261	8,261	8,261	8,261
2017 Cal-Am withdrawals with Project	8,267	8,267	8,268	8,268
2017 Cal-Am withdrawals with Project and Other Entitlement Demand	8,561	8,577	8,593	8,602
Change with Project Compared to 1995-2014 Average Conditions	**-1,821**	**-2,336**	**-2,605**	**-2,873**
Change with Project and Other Entitlement Demand compared to 1995-2014 Conditions	*-1,527*	*-2,027*	*-2,279*	*-2,540*
Change with Project Compared to 2014 Allowable Withdrawals	**-1,620**	**-1,620**	**-1,619**	**-1,619**
Change with Project and Other Entitlement Demand compared to 2014 Allowable Withdrawals	*-1,326*	*-1,310*	*-1,294*	*-1,285*
Change with Project compared with 2017 without Project	**6**	**6**	**7**	**7**
Change with Project and Other Entitlement Demand compared to 2017 Without Project	*300*	*316*	*332*	*341*

Sources: Project Demand and Future Other Entitlement Data based on data in Appendix H.2.
(1) Based on MPWMD Cal-Am reporting for 2011. Base = 10,978 AF - mandatory reduction of 912 AF - ASR yield of 0 AF - Sand City Desal yield of 179 AF.
(2) Based on WR 2009-060 requirements. Base = 10,978 AF - mandatory reduction of 1,759 AF - ASR yield of 920 AF - Sand City Desal yield of 300 AF.

Table H.3-5
Cal-Am Withdrawals from the Carmel River
2017 Scenario B: Enforcement of Cal-Am 3,376 AFY Limit
(in Acre-Feet)

	Wet	Average	Dry	Critically Dry
1995 - 2014 Average Conditions	10,088	10,604	10,873	11,141
2014 Allowable Cal-Am withdrawals per WR 2009-060 (1)	9,887	9,887	9,887	9,887
2017 Cal-Am Withdrawal Limit per SWRCB Order 2009-0060	3,376	3,376	3,376	3,376
2017 Project Demand at 70% rationing	2	2	2	2
2017 Future Other Entitlement Demand at 70% rationing	88	93	98	100
Change with Project Compared to 1995-2014 Average Conditions	**-6,712**	**-7,228**	**-7,497**	**-7,765**
Change with Project and Other Entitlement Demand compared to 1995-2014 Conditions	*-6,712*	*-7,228*	*-7,497*	*-7,765*
Change with Project Compared to 2014 Allowable Withdrawals	**-6,511**	**-6,511**	**-6,511**	**-6,511**
Change with Project and Other Entitlement Demand compared to 2014 Allowable Withdrawals	*-6,511*	*-6,511*	*-6,511*	*-6,511*
Change compared to 2017 Without Project	**0**	**0**	**0**	**0**
Change with Project and Other Entitlement Demand compared to 2017 Without Project	*0*	*0*	*0*	*0*
2017 Reduction in Service to Existing Demand Due to Project	**2**	**2**	**2**	**2**
2017 Reduction in Service to Existing Demand Due to Project and Other Entitlement Demand	*90*	*95*	*100*	*102*

Sources: Project Demand and Future Other Entitlement Data based on data in Appendix H.2.
(1) Based on MPWMD Cal-Am reporting for 2011. Base = 10,978 AF - mandatory reduction of 912 AF - ASR yield of 0 AF - Sand City Desal yield of 179 AF.

Table H.3-6
Cal-Am Withdrawals from the Carmel River
2020 Scenario C: Assumed Completion of a Regional Water Supply Project
(in Acre-Feet)

	Wet	Average	Dry	Critically Dry
1995 - 2014 Average Conditions	10,088	10,604	10,873	11,141
2014 Allowable Cal-Am withdrawals per WR 2009-060 (1)	9,887	9,887	9,887	9,887
Project Demand	6	6	7	7
Future Other Entitlement Demand	294	310	326	334
2020 Cal-Am Withdrawal Limit per SWRCB Order 2009-0060	3,376	3,376	3,376	3,376
Change with Project Compared to 1995-2014 Average Conditions	**-6,712**	**-6,712**	**-6,712**	**-6,712**
Change with Project and Other Entitlement Demand compared to 1995-2014 Conditions	*-6,712*	*-6,712*	*-6,712*	*-6,712*
Change with Project Compared to 2014 Allowable Withdrawals	**-6,511**	**-6,511**	**-6,511**	**-6,511**
Change with Project and Other Entitlement Demand compared to 2014 Allowable Withdrawals	*-6,511*	*-6,511*	*-6,511*	*-6,511*
Change with Project compared with 2017 without Project	**0**	**0**	**0**	**0**
Change with Project and Other Entitlement Demand compared to 2017 Without Project	*0*	*0*	*0*	*0*
Additional Project Demand for Regional Water Supply Project	**6**	**6**	**7**	**7**
Additional Project Demand and Other Entitlement Demand for Regional Water Supply Project	*300*	*316*	*332*	*341*

Sources: Project Demand and Future Other Entitlement Data based on data in Appendix H.2.
(1) Based on MPWMD Cal-Am reporting for 2011. Base = 10,978 AF - mandatory reduction of 912 AF - ASR yield of 0 AF - Sand City Desal yield of 179 AF.

Table H.3-7
Water Supply and Demand
Monterey Peninsula in Cal-Am Service Area (1)

	2014	2017	2020 with MPWSP	2030 with MPWSP	Sources and Notes
Water Demand					
Existing demand from Carmel River served by Cal-Am	7,744	11,015	11,015	11,015	Actual amount for 2014. CPUC 2009: Average year demand for 2017, 2017, and 2030
Existing demand from Seaside Aquifer served by Cal-Am	2,871	3,695	3,695	3,695	Actual amount for 2014. CPUC 2009: Average year demand for 2017, 2017, and 2030
Future Potential Monterey Peninsula Growth		455	909	4,545	Future demand estimates for 2030 based on CPUC 2009; 2017 estimated as 10% of 2030; 2020 estimated as 20% of 2030 (2)
Proposed Project Demand	6	6	6	6	Average year demand.
Future other PBC Entitlement Demand	310	310	310	310	Average year demand.
Total Demand	***10,931***	***15,481***	***15,935***	***19,571***	
Water Supply					
Carmel River (Cal-am water rights)	3,376	3,376	3,376	3,376	Limit in WR 95-10
Carmel River (Cal-am interim limit over water rights)	4,368	0	0	0	Actual amount for 2014. Eliminated for others
Seaside Aquifer (Cal-Am withdrawals)	3,233	1,474	1,474	1,474	Actual Amount for 2014; Adjudication limit for others
Seaside Aquifer Storage and Recovery (ASR)	0	920	920	920	Actual amount for 2014. CPUC 2012 for others
Sand City Desalination	179	300	300	300	Actual amount for 2014. Target of 300 AF for others
Subtotal Existing Sources	*11,156*	*6,070*	*6,070*	*6,070*	
MPWSP: Desalination	0	0	9,066	9,066	CPUC 2012
MPWSP: Seaside ASR Expansion		0	1,000	1,000	CPUC 2012
Total Additional Supply	*0*	*0*	*10,066*	*10,066*	
Total Supply	***11,156***	***6,070***	***16,136***	***16,136***	
Supply/ Demand Balance (Excluding Future Growth)		***-8,956***	***1,110***	***1,110***	Only including existing, project, and other entitlement
Supply/ Demand Balance (All Demands)	**225**	**-9,411**	**201**	**-3,435**	

MPWSP = Monterey Peninsula Water Supply Project. As described in text, the MWRPCA's Groundwater Replenishment Project may supply up to 3,500 AFY which may lower the desal plant size and production by a corresponding amount.

Notes:

(1) Does not include existing non-Cal-Am demand or supply. Other existing users not supplied by Cal-Am are presumed to derive water from the Carmel River and the Seaside Aquifer or other sources per their existing rights.
(2) Due to current moratorium on most new connections, only limited new hookups are allowed (including pursuant to the entitlement from the PBCSD Recycled Water Project and the Sand City Desalination project and certain areas in the Laguna Seca Subareas). 10% of 2030 new demand was assumed for the 2017 scenario and 20% of 2030 new demand was assumed for the 2020 scenario assuming that mosf of the growth potential will not occur until a regional water supply with adequate water for growth is actually provided. these assumptions for 2017 and 2020 are not forecasts, they are merely illustrative only.
(3) Although a nominal surplus is shown for 2020 (with MPWSP) the water demand shown is normal-year demand and does not account for dry or critically dry -year demands. Thus, this should not be considered a true surplus in toto but rather, mostly a reserve for use during critical years.

Sources:

(1) CPUC, 2009. Final EIR, Coastal Water Project, Chapters 2 and 5.
(2) Project Demand and Other Entitlement Demand from Appendix H.2
(3) MPWMD. 2014. Cal-Am Production Summary for WY 2014.
(4) CPUC. 2012. NOP for the MPWSP.

Figure H.3-1
Cal-Am Water Production by Source: 1916-2014

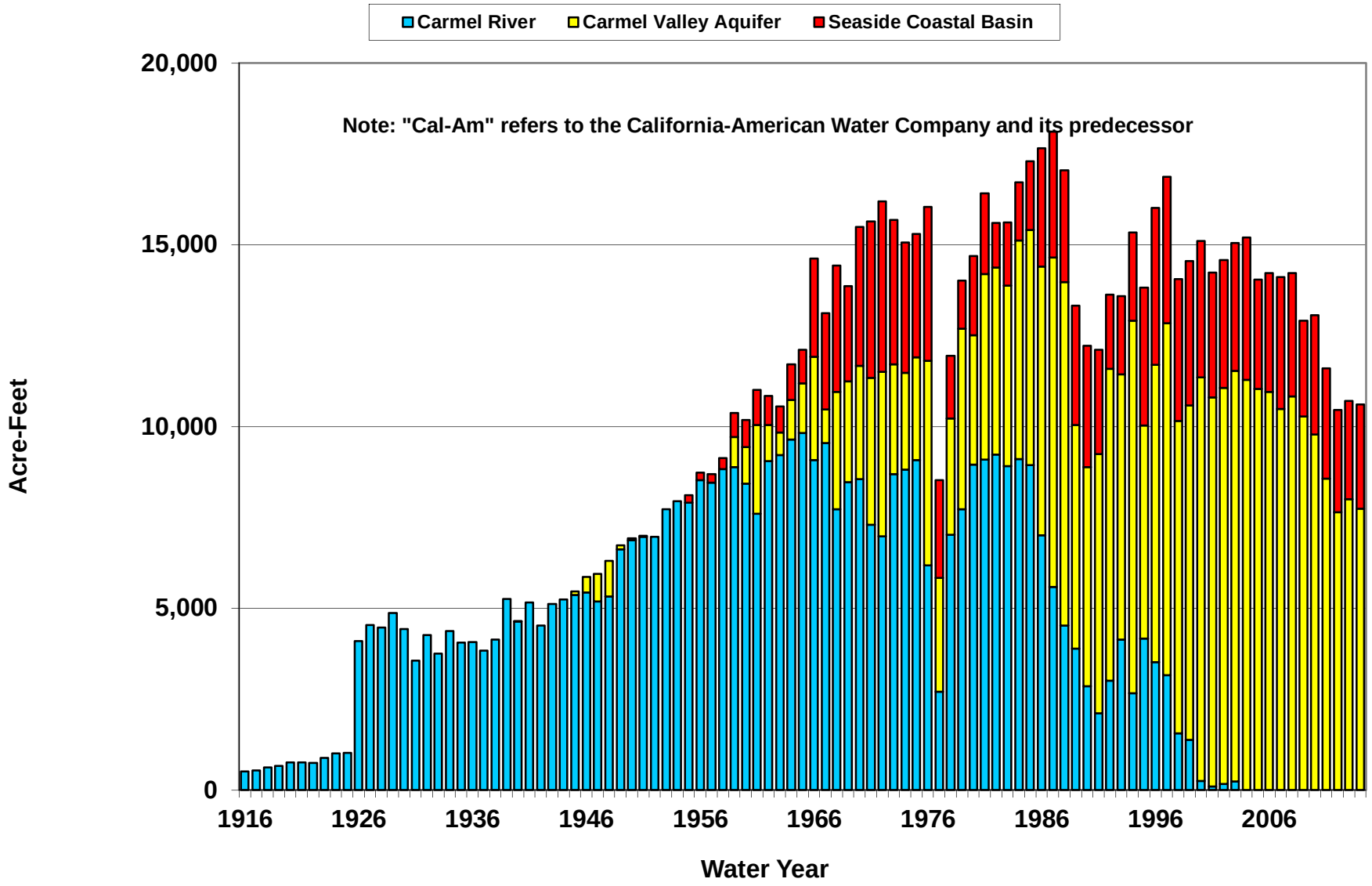

Figure H.3-2: Cal-Am Carmel River Withdrawals with and without the Recycled Water Project, 1995 - 2014 (acre-feet)

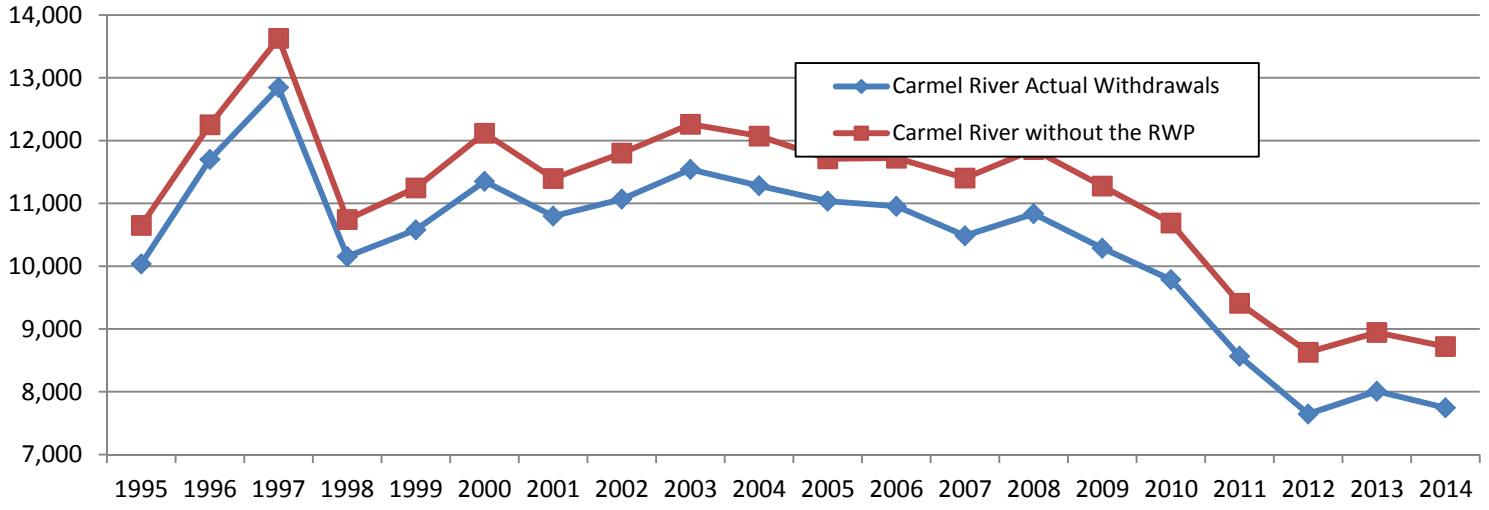

Figure H.3-3:
Cal-Am Carmel River Withdrawals in 2017 with Project
(Assuming delay in SWRCB enforcement of 3,376 AFY limit)