Appendix A 2010 Demand Forecast Method

APPENDIX A: LEGACY EDU-BASED DEMAND FORECASTING APPROACH

At the time of the 2010 IWMP, the District estimated the number of lots by lot type served within the district area boundary. Estimated water per lot (divided into lots by type) then became an allocation of water for the District service area. Land use based forecasts are useful as they are tied to the potential land uses and typical water use per land use type (single family residential lots, etc.). There are other less detailed or sophisticated approaches; for example, a more basic approach using water use estimates based on growth factors (e.g., estimates of future population growth per household and an estimate number of households, and water use per person).

History of Equivalent Dwelling Units

Brown and Caldwell was directed to apply a "equivalent dwelling unit" or "EDU" method. This a common practice, where a typical single family home size and associated water use is determined by looking at the historical water use. The District had determined a "demand factor" by reviewing historical water demand data for a typical larger estate lot at the water use level of 750 gallons per account per day. As quoted from the 2010 IWMP, Section 2.1:

"The District projects water service demand using 750 gallons per day (gpd) per EDU as a conservative water demand factor for planning purposes. EDU is a unit measure for demand. It is used by water purveyors to equalize demand for various land use classifications and structure types. As shown in Table 2-1, various types of lots or user classes are assigned a ratio that converts a lot size or user class to an EDU value. For example, a large estate lot greater than 12,000 square feet is expected to have greater water demand than a smaller townhouse lot. A large estate lot is assigned a ratio of 1.0 EDU (750 GPD/unit) while the smaller townhouse lot is assigned ratio of 0.5 EDU (375 gpd/unit). The EDU value is used to project demands between development units in various types of lots and user classes. Commercial EDUs are derived by taking the total commercial connections' annualized water use and dividing by 750 gpd."

As different types of land uses have different types of water use, there is a ratio applied based on the 750 gallons per day, based on an EDU conversion factor, as shown in the 2010 IWMP Table 2-1 below:

Appendix Table 1 - 2010 IWMP Table 2-1

Table 2-1. Summary of 2010 Service Connections and EDUs				
Lot or User Class	**Planning Assumption for Use (gpd/DU)[1]**	**EDU Conversion Ratio [2]**	**Number of Connections[3]**	**Number of EDUs[4]**
Residential Units				
Estate > 12,000 sf	750	1.0	729	729
Estate < 12,000 sf	750	0.9	555	500
Circle	750	0.7	440	308
Cottage	750	0.7	274	192
Halfplex	750	0.5	59	30
Townhouse	750	0.5	256	128
Mobile Home	750	0.3	189	57
		Subtotal	**2,502**	**1,943**
Non-Residential Units				
Commercial/Industrial	750	NA[5]	97	272
Parks	750	NA	5	54
School	750	NA	0	0
		Total	**2,604**	**2,269**

[1] Gallons per day (gpd) per dwelling unit (DU) based on planning assumptions of 750 gpd/EDU. The 5-year average demand from 2005 to 2009 was 685 gpd/EDU

[2] Rounded to the nearest tenth.

[3] As of July 2010, there are 2502 occupied lots (units) and 45 vacant lot and 620 new approved lots and 50 EDU of connections yet to be constructed.

[4] Equivalent dwelling unit (EDU). Equal to the product of the EDU conversion and the number of lots based on data as of July 2010.

[5] Conversion ratio is not applicable for non-residential units given the actual demand is divided by the planning assumption of 750gpd/EDU to determine the number of equivalent dwelling units.

An estimated number of Residential and Non-Residential Units/EDUs are shown below as taken from 2010 IWMP Table 3-1 for the existing service connections at time of analysis. Additional analysis was completed for three potential growth levels (low, medium, and high) based on estimated future planned connections (e.g., assumed counts of lots of certain lot sizes).

Appendix Table 2 - 2010 IWMP Table 3-1

Table 3-1. Existing and Projected Number of Connections and EDUs at Buildout[1]								
Lot or User Class	Existing Service Area[2]		Low Growth Scenario		Medium Growth Scenarios[3]		High Growth Scenario	
	Number of Units (Connections)	Number of EDUs (EDUs)	Number of Units (Connections)	Number of EDUs (EDUs)	Number of Units (Connections)	Number of EDUs (EDUs)	Number of Units (Connections)	Number of EDUs (EDUs)
Residential Units								
Estate >12,000	729	729	1,453	1,453	1,953	1,953	2,796	2,796
Estate <12,000	555	500	1,091	982	1,091	982	1,091	982
Circle	440	308	440	308	440	308	440	308
Cottage	274	192	274	192	274	192	274	192
Halfplex	59	30	59	30	59	30	59	30
Townhouse	256	128	340	170	340	170	340	170
Mobile Home	189	57	189	57	189	57	189	57
Subtotal	**2,502**	**1,943**	**3,846**	**3,191**	**4,346**	**3,691**	**5,189**	**4,534**
Non-residential Units								
Commercial	97	272	120	372	120	372	120	372
Park	5	54	8	269	8	269	8	269
School	0	0	24	24	24	24	24	24
Subtotal	**102**	**326**	**152**	**665**	**152**	**665**	**152**	**665**
Total	**2,604**	**2,269**	**3,998**	**3,856**	**4,498**	**4,356**	**5,341**	**5,199**

[1] *For planning purposes, the 45 vacant are included as large estate lots in each of the three build out scenarios.*

[2] *Existing Service Connections based on 2009 data and assumed no development until 2015.*

[3] *Base scenario. Buildout projected timeframe is estimated in year 2030.*

Source: 2010 IWMP, Brown and Caldwell

The next step is to multiply planning assumption of the 750 gpd per EDUs by the appropriate conversion ratio (essentially scale from the large lot type down the smaller lot types) by the number of EDUs for each lot type (or user category). The results are then summarized by adding up lot type water use to provide an estimated total water needs for the existing conditions and then each of the growth. The District's buildout planning assumption was the medium growth scenario of 4,551 acre-ft per year. An acre foot is the amount of water volume to cover one acre in one foot depth of water, like the size of a large swimming pool (1 acre-foot per year is equal to 325,851 gallons per day multiplied by 365 days per year).

Appendix Table 3 - 2010 IWMP Table 3-2

Table 3-2. Estimated Treated and Raw Water Needs				
Raw Water Demand Component	Existing Conditions (acre-ft per year)	Projected Buildout Scenarios (acre-ft per year)		
		Low Growth	Medium Growth	High Growth
Residential and Non-residential Demands	1,906	3,239	3,659[1]	4,368
System Losses (10%)	190	324	366	436
Estimated Treated Water Production	**2,096**	**3,563**	**4,025**	**4,804**
Direct Rainfall and Runoff[2]	(287)	(287)	(287)	(287)
Reservoir Losses[2]	813	813	813	813
Total Estimated Water Supply Need	**2,622**	**4,089**	**4,551[1]**	**5,330**

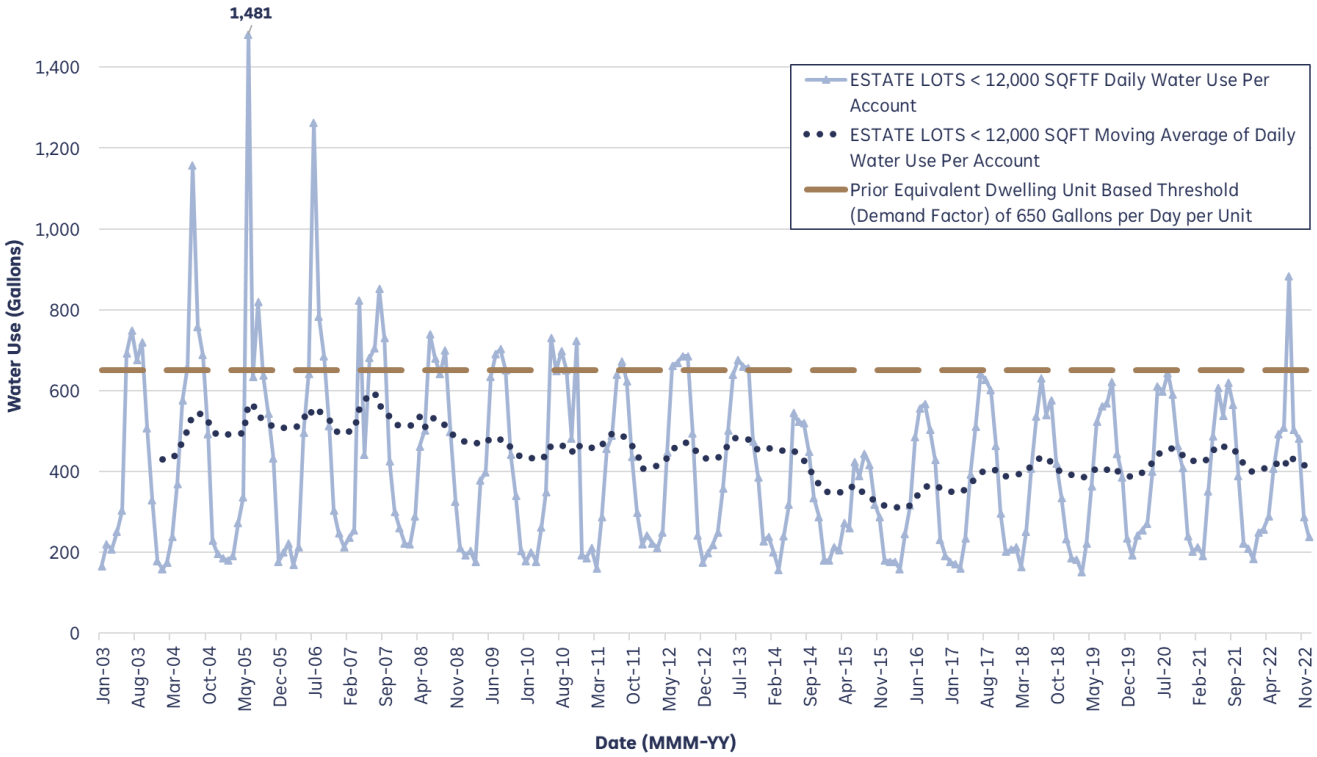
[1] *When assuming SB7 compliance will be achieved, raw water supply deliveries to the water treatment plant may lower by 20 percent on the order of 2,957 acre-ft/yr from the original estimate of 3,659 acre-ft/yr at buildout (medium growth scenario). The total estimated water supply need may also be reduced to 3,640 acre-ft/yr from 4,551 acre-ft/yr.*

[2] *Evaporation and seepage losses are dependent on storage volumes and surface area of each reservoir. Storage volume to surface area curves were developed using regression analysis for the 2006 IWMP based on historical data for each reservoir. These equations were reviewed and retained use for the 2010 IWMP Update. The minimum amount of total losses is experienced under extreme drought event when storage volumes and surface area is in critically low condition or at dead storage volumes. Total losses for the extreme drought event using 1977 hydrology was estimated at 492 acre-ft in both the 2006 IWMP and 2010 IWMP Update. .*

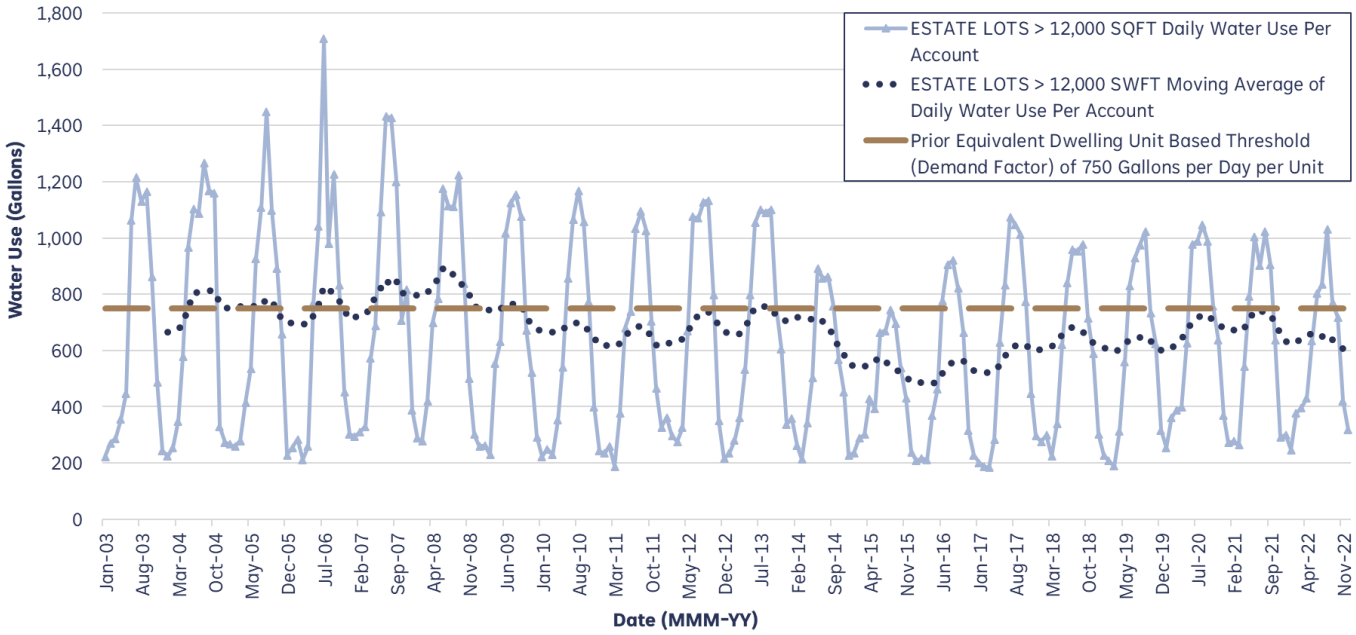
Source: 2010 IWMP, Brown and Caldwell

Appendix B Historic Demands by Lot Type

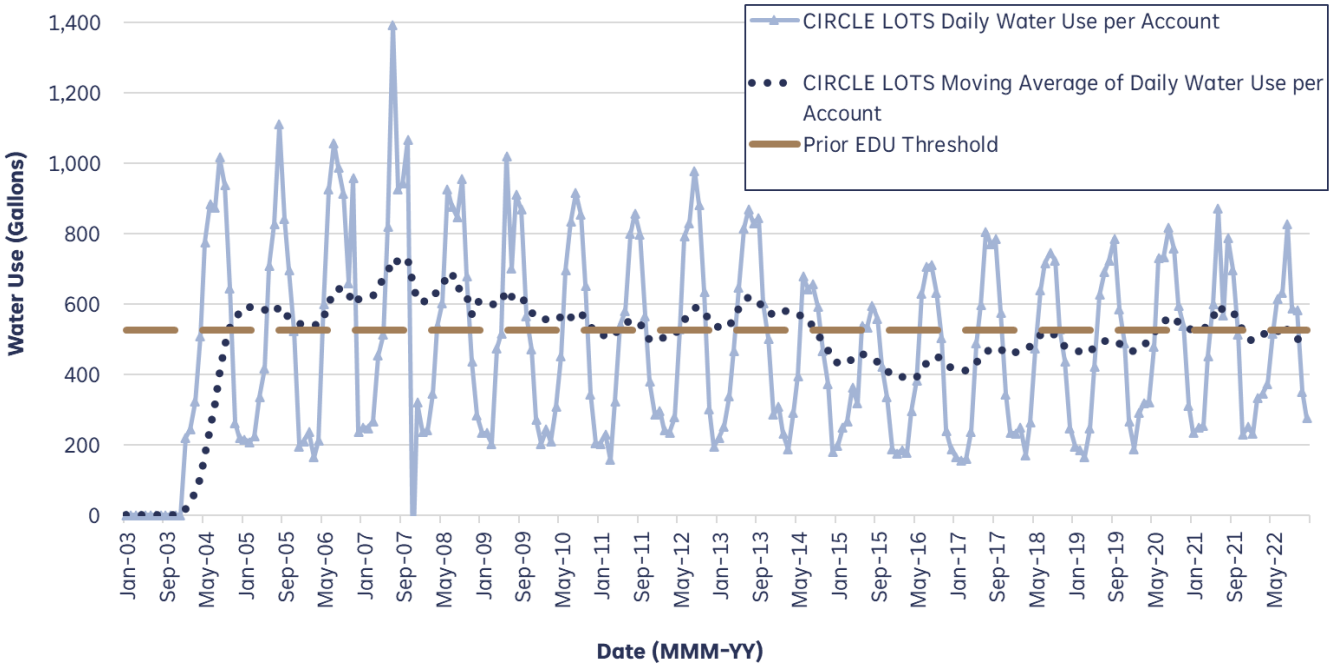
Daily Water Use Per Account, Moving Average of Daily Water Use Per Account, and Prior Equivalent Dwelling Unit Based Water Use Threshold for Estate Lots < 12,000 SQFT 2003 - 2022



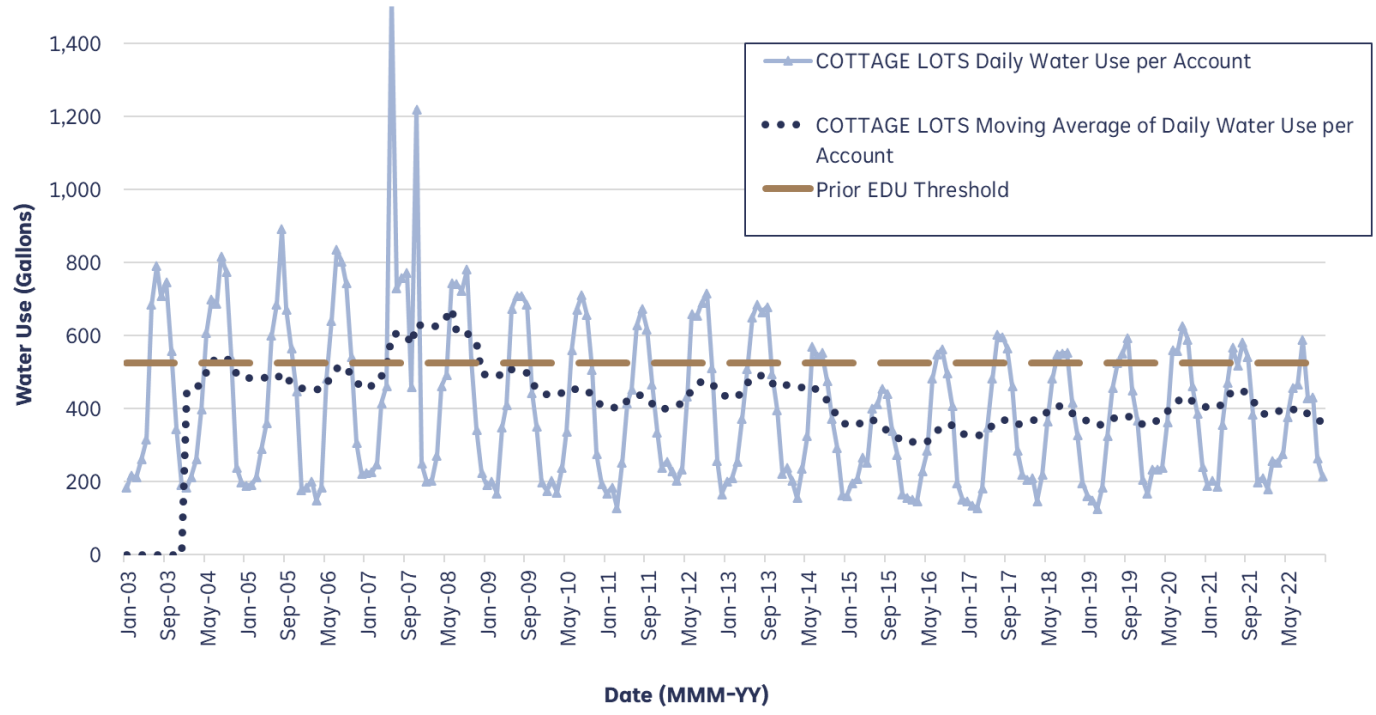
Daily Water Use Per Account, Moving Average of Daily Water Use Per Account, and Prior Equivalent Dwelling Unit Based Water Use Threshold for Estate Lots > 12,000 SQFT 2003 - 2022



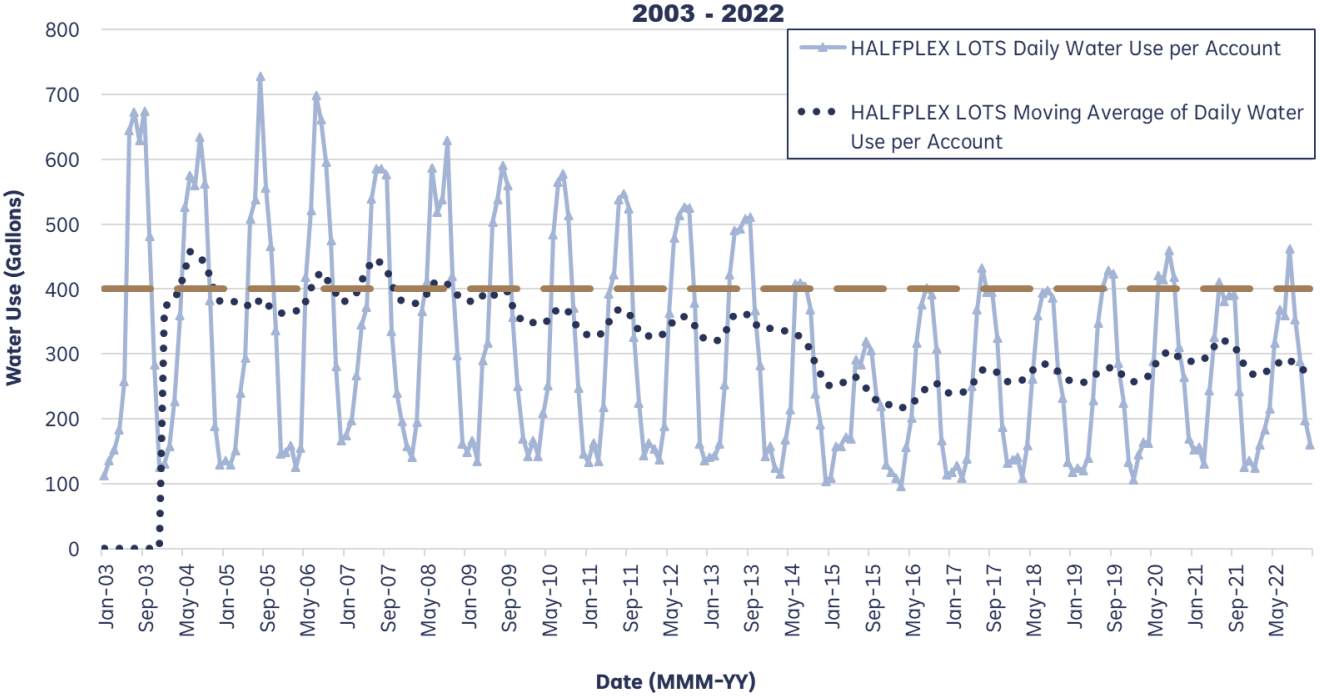
Daily Water Use Per Account, Moving Average of Daily Water Use Per Account, and Prior Equivalent Dwelling Unit Based Water Use Threshold for Circle Lots 2003 - 2022



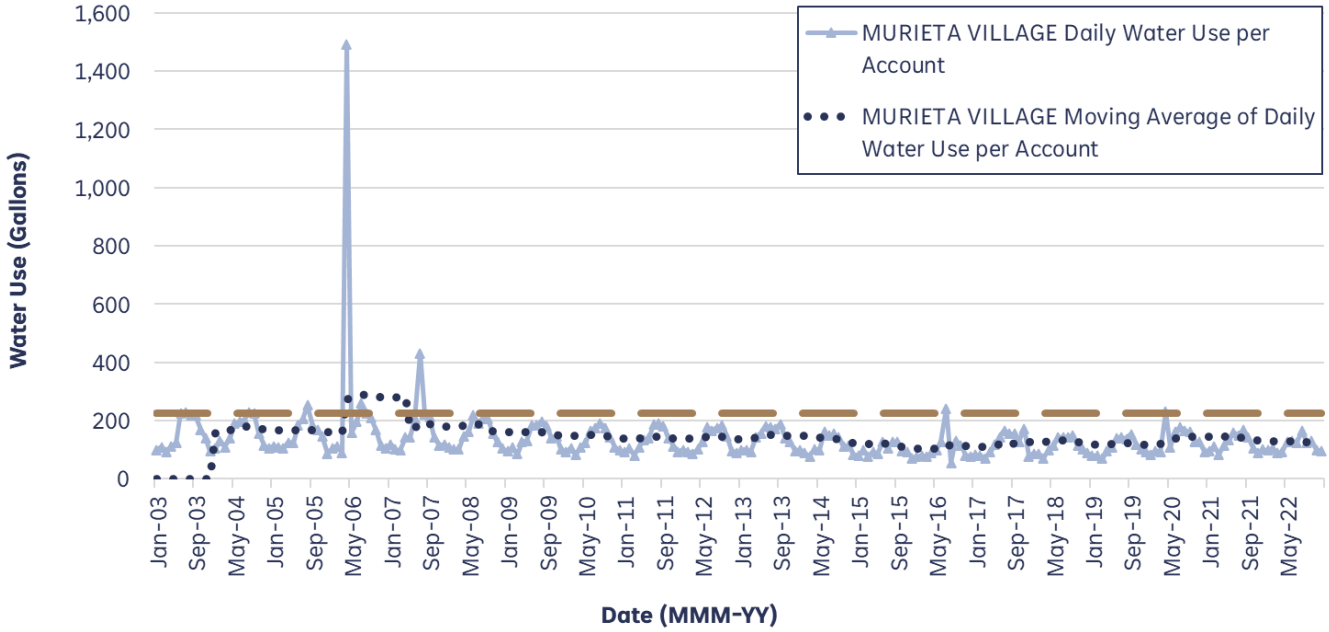
Daily Water Use Per Account, Moving Average of Daily Water Use Per Account, and Prior Equivalent Dwelling Unit Based Water Use Threshold for Cottage Lots 2003 - 2022

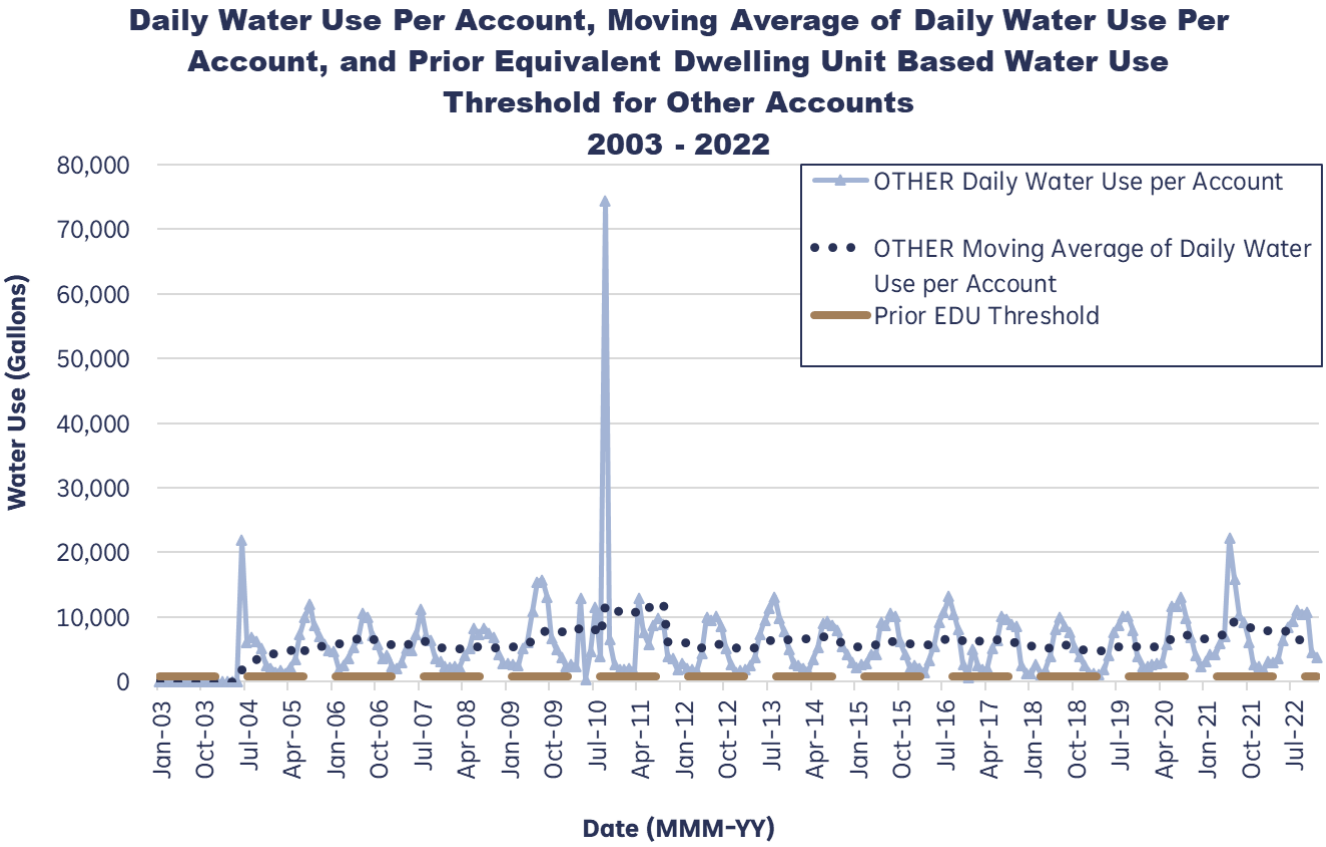


Daily Water Use Per Account, Moving Average of Daily Water Use Per Account, and Prior Equivalent Dwelling Unit Based Water Use Threshold for Halfplex Lots
2003 - 2022

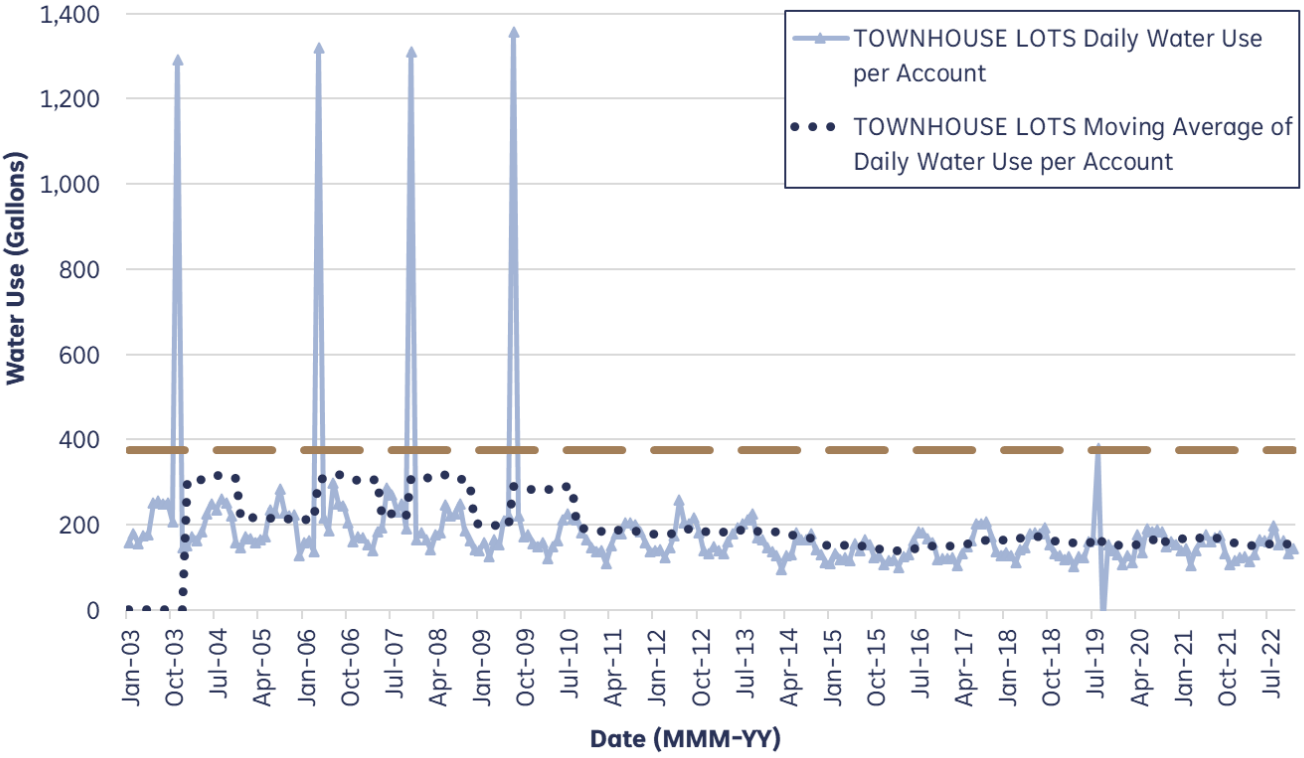


Daily Water Use Per Account, Moving Average of Daily Water Use Per Account, and Prior Equivalent Dwelling Unit Based Water Use Threshold for Murieta Village
2003 - 2022

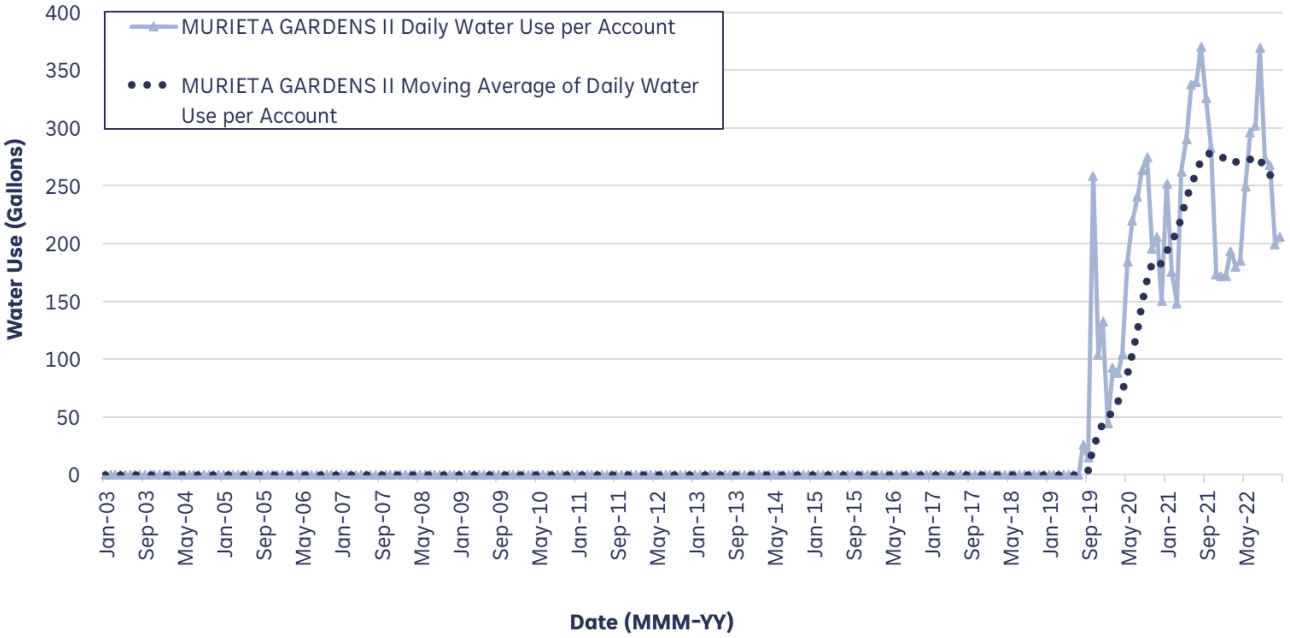


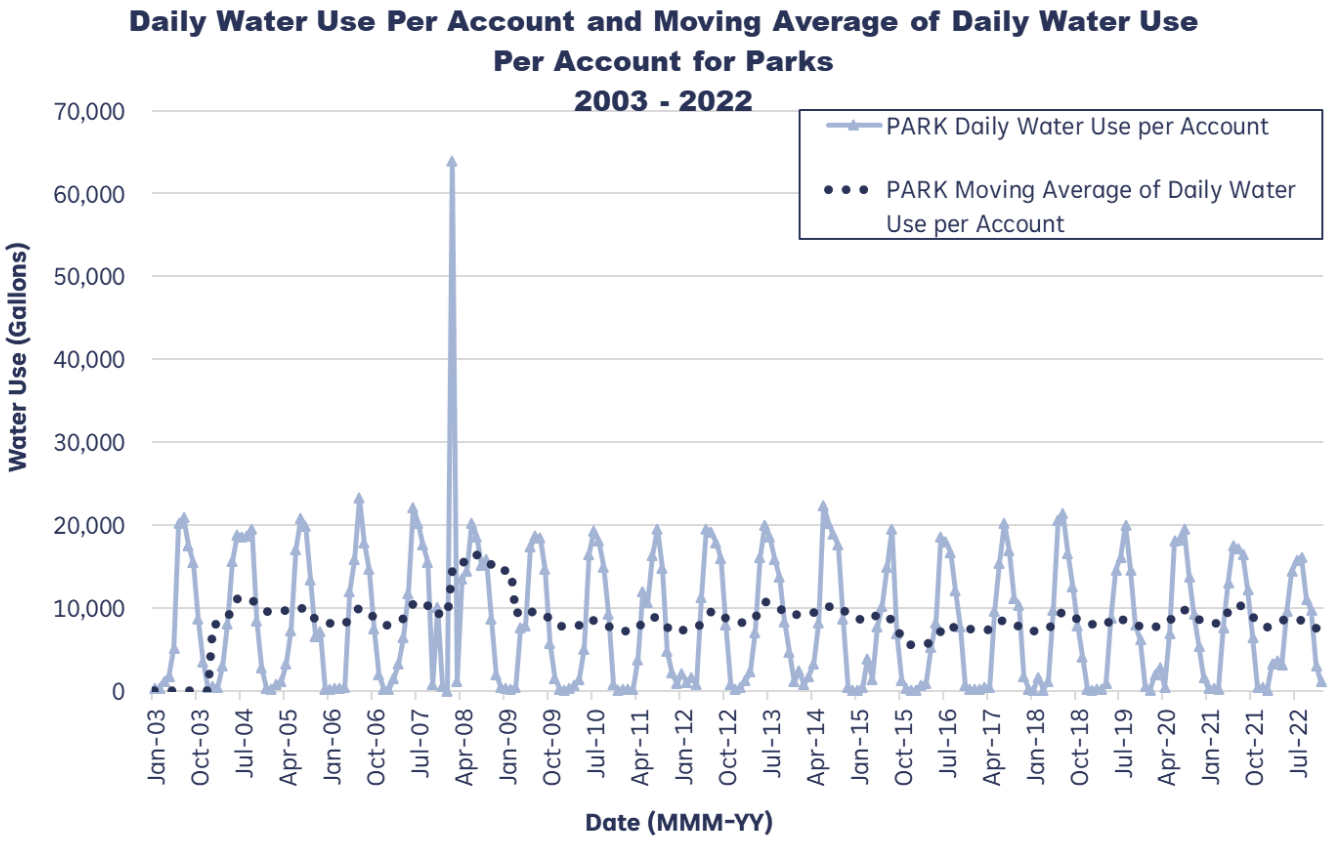

Daily Water Use Per Account, Moving Average of Daily Water Use Per Account, and Prior Equivalent Dwelling Unit Based Water Use Threshold for Other Accounts
2003 - 2022
Water Use (Gallons)
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
OTHER Daily Water Use per Account
OTHER Moving Average of Daily Water Use per Account
Prior EDU Threshold
Jan-03
Oct-03
Jul-04
Apr-05
Jan-06
Oct-06
Jul-07
Apr-08
Jan-09
Oct-09
Jul-10
Apr-11
Jan-12
Oct-12
Jul-13
Apr-14
Jan-15
Oct-15
Jul-16
Apr-17
Jan-18
Oct-18
Jul-19
Apr-20
Jan-21
Oct-21
Jul-22
Date (MMM-YY)

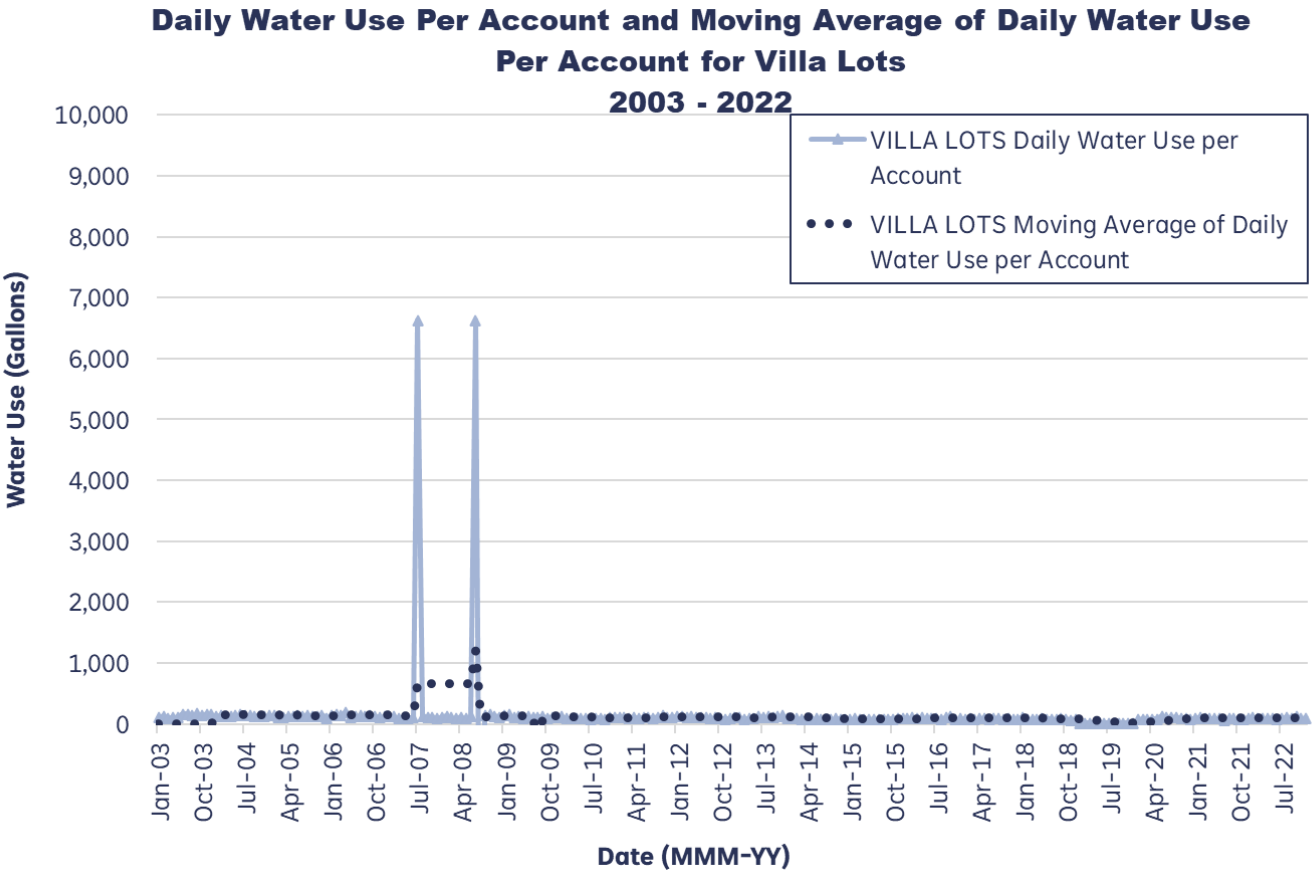
Daily Water Use Per Account, Moving Average of Daily Water Use Per Account, and Prior Equivalent Dwelling Unit Based Water Use Threshold for Townhouse Lots
2003 - 2022

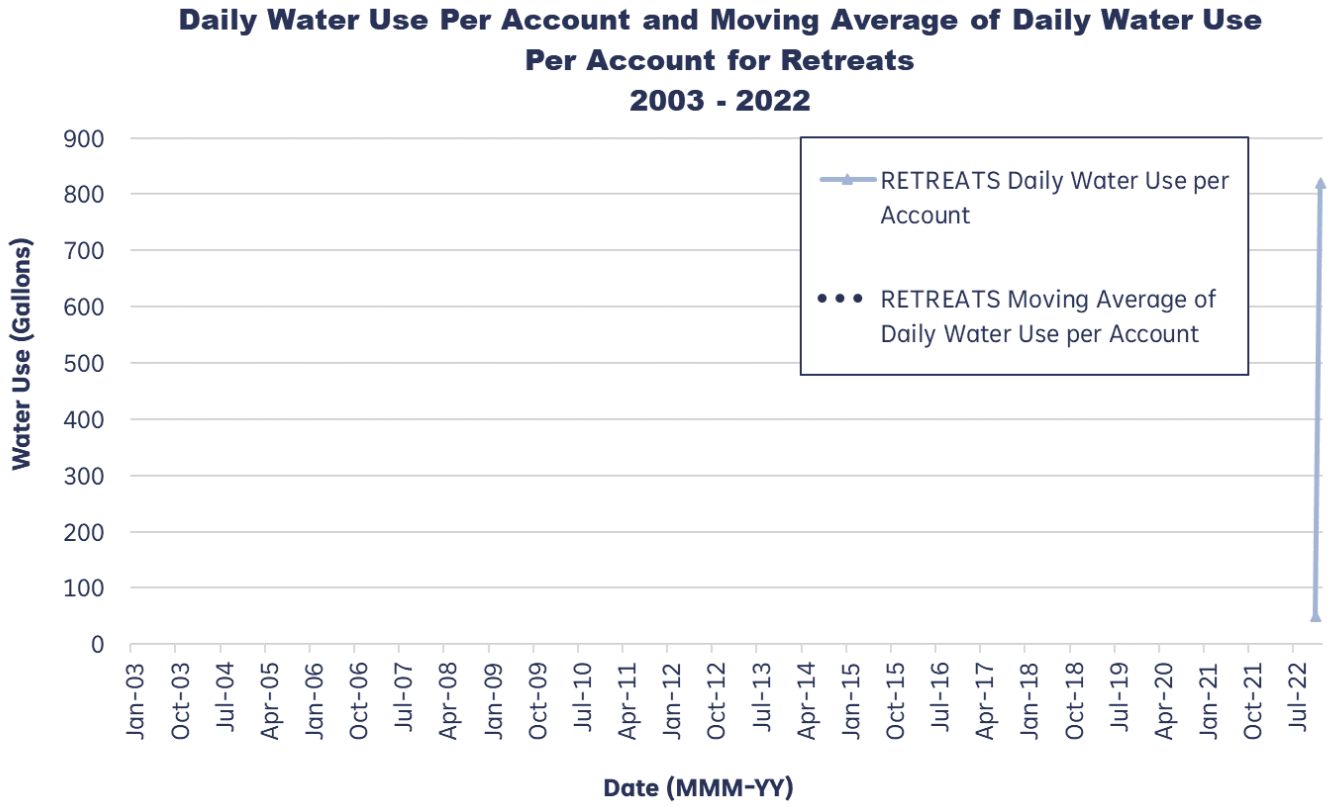


Daily Water Use Per Account and Moving Average of Daily Water Use Per Account for Murieta Gardens
2003 - 2022

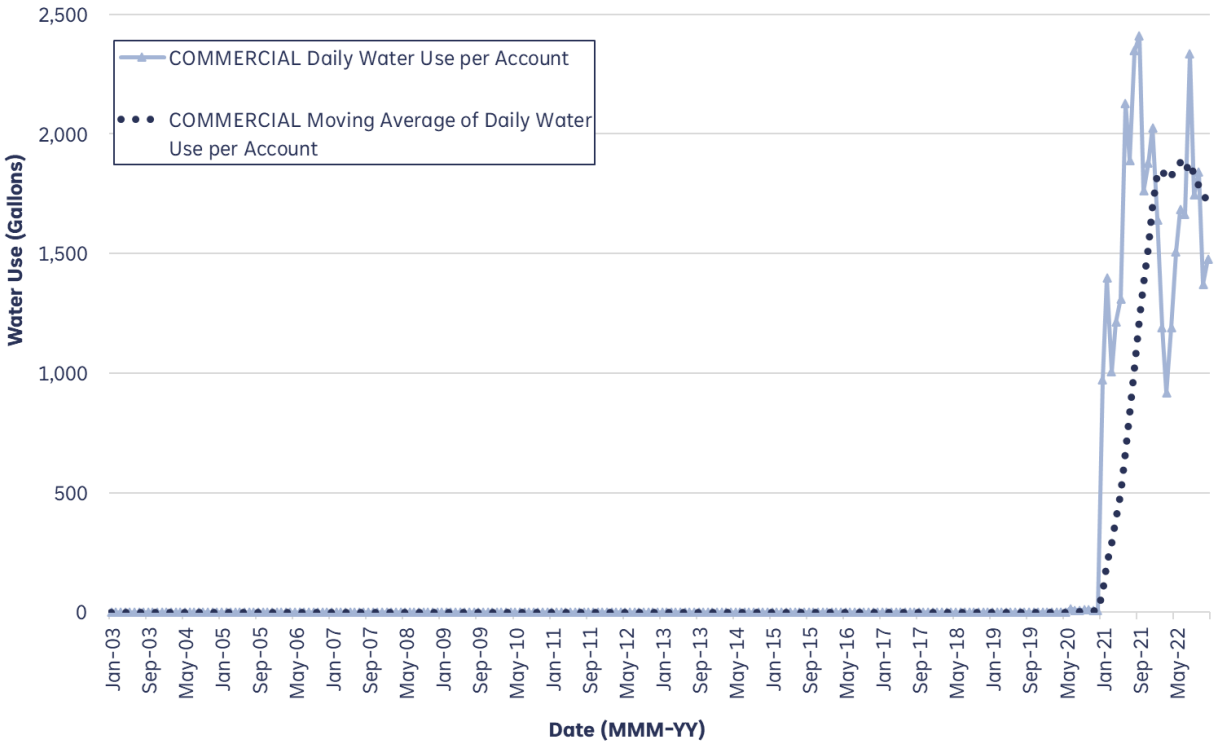



Daily Water Use Per Account and Moving Average of Daily Water Use Per Account for Parks
2003 - 2022
PARK Daily Water Use per Account
PARK Moving Average of Daily Water Use per Account
Water Use (Gallons)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Jan-03
Oct-03
Jul-04
Apr-05
Jan-06
Oct-06
Jul-07
Apr-08
Jan-09
Oct-09
Jul-10
Apr-11
Jan-12
Oct-12
Jul-13
Apr-14
Jan-15
Oct-15
Jul-16
Apr-17
Jan-18
Oct-18
Jul-19
Apr-20
Jan-21
Oct-21
Jul-22
Date (MMM-YY)

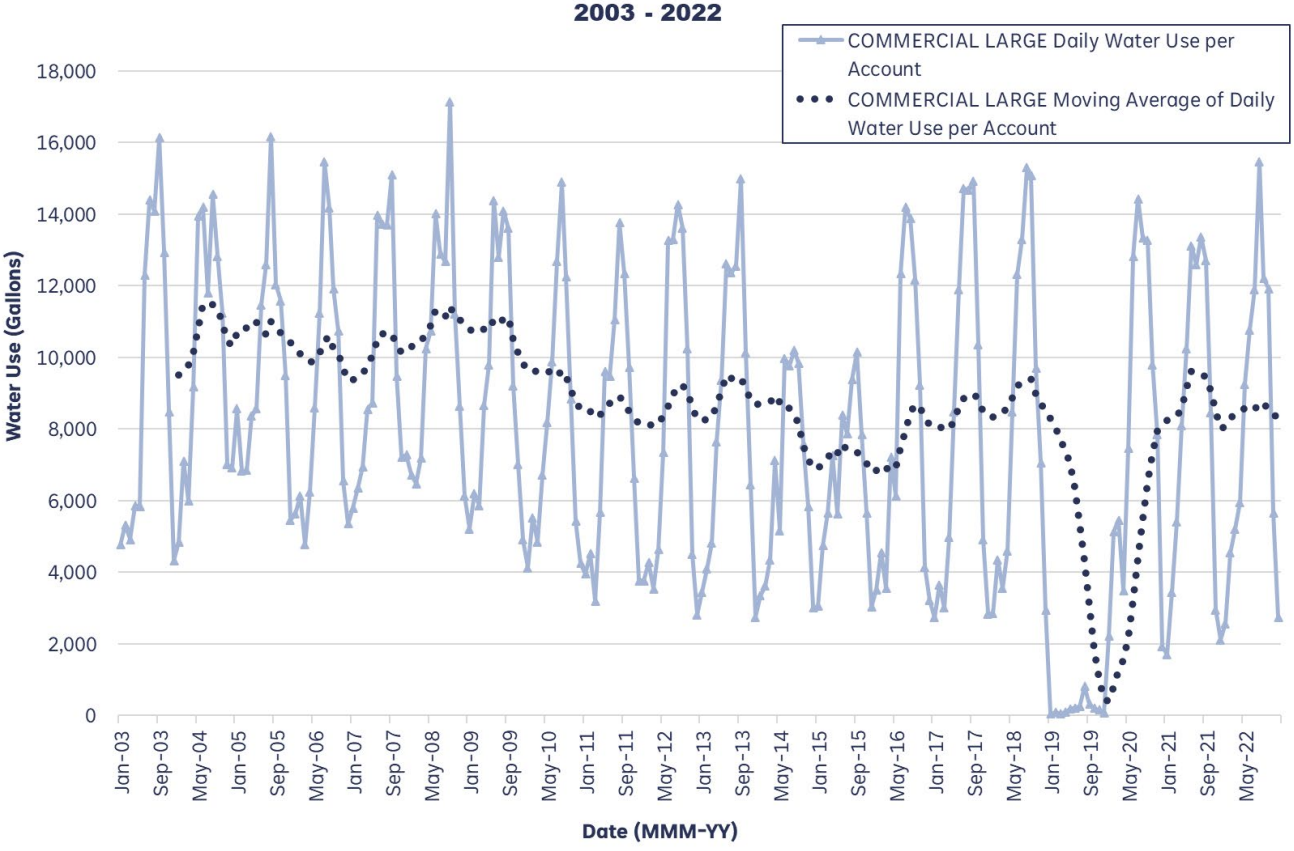

Daily Water Use Per Account and Moving Average of Daily Water Use Per Account for Villa Lots
2003 - 2022
Water Use (Gallons)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
VILLA LOTS Daily Water Use per Account
VILLA LOTS Moving Average of Daily Water Use per Account
Jan-03
Oct-03
Jul-04
Apr-05
Jan-06
Oct-06
Jul-07
Apr-08
Jan-09
Oct-09
Jul-10
Apr-11
Jan-12
Oct-12
Jul-13
Apr-14
Jan-15
Oct-15
Jul-16
Apr-17
Jan-18
Oct-18
Jul-19
Apr-20
Jan-21
Oct-21
Jul-22
Date (MMM-YY)


Daily Water Use Per Account and Moving Average of Daily Water Use Per Account for Retreats
2003 - 2022
Water Use (Gallons)
900
800
700
600
500
400
300
200
100
0
RETREATS Daily Water Use per Account
RETREATS Moving Average of Daily Water Use per Account
Jan-03
Oct-03
Jul-04
Apr-05
Jan-06
Oct-06
Jul-07
Apr-08
Jan-09
Oct-09
Jul-10
Apr-11
Jan-12
Oct-12
Jul-13
Apr-14
Jan-15
Oct-15
Jul-16
Apr-17
Jan-18
Oct-18
Jul-19
Apr-20
Jan-21
Oct-21
Jul-22
Date (MMM-YY)

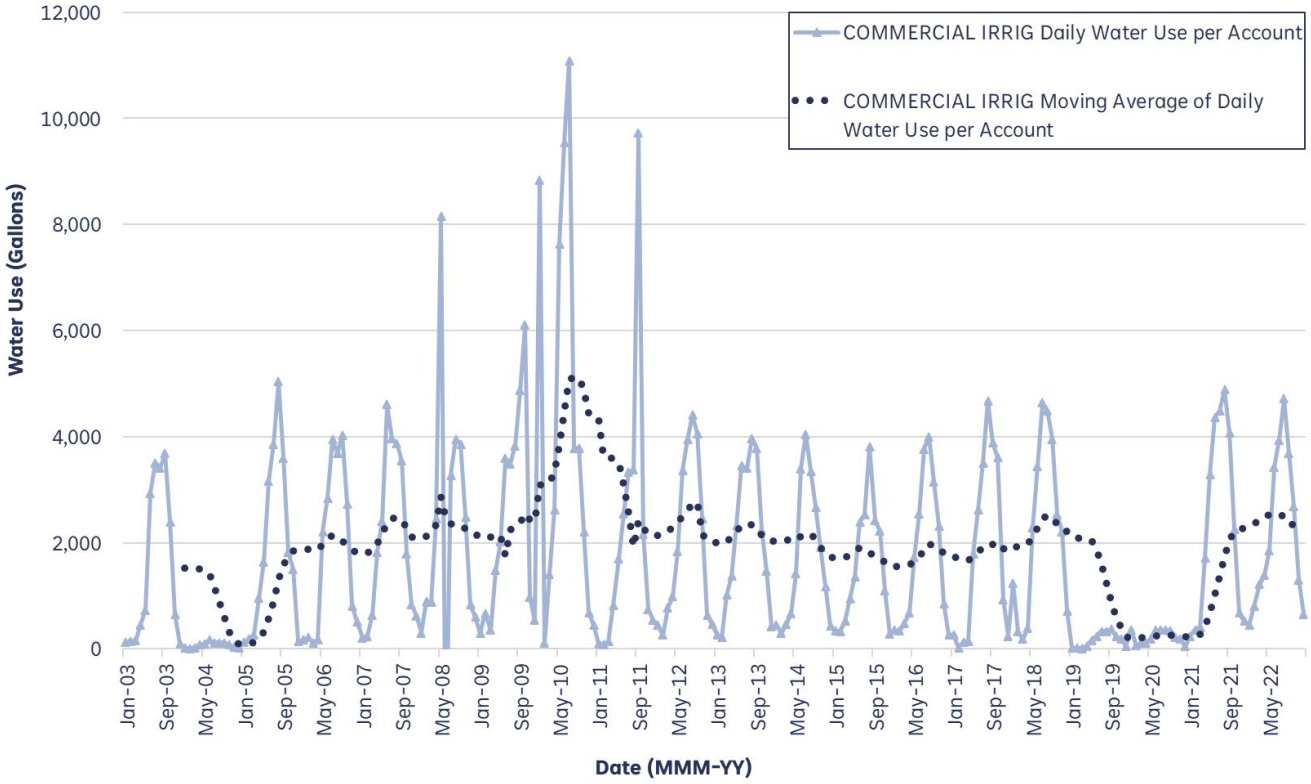
Daily Water Use Per Account and Moving Average of Daily Water Use Per Account for Commercial Accounts 2003 - 2022



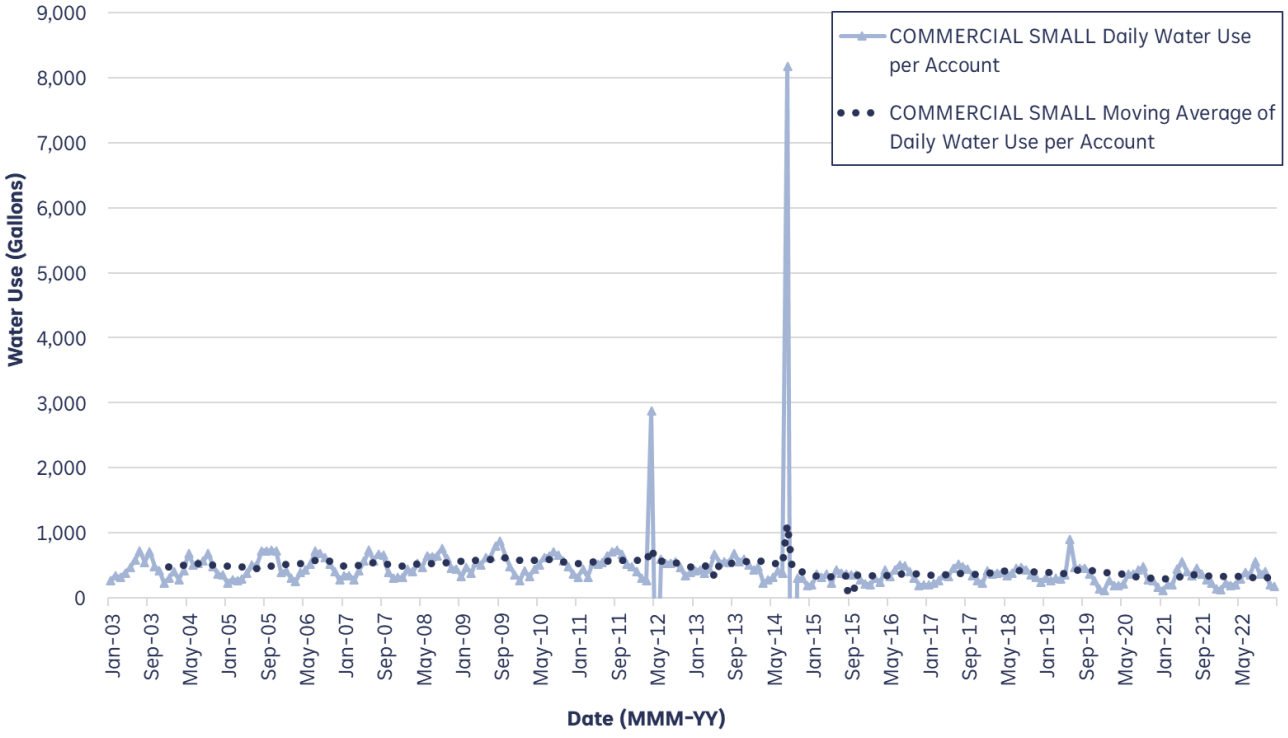
Daily Water Use Per Account and Moving Average of Daily Water Use Per Account for Commercial Large Accounts 2003 - 2022

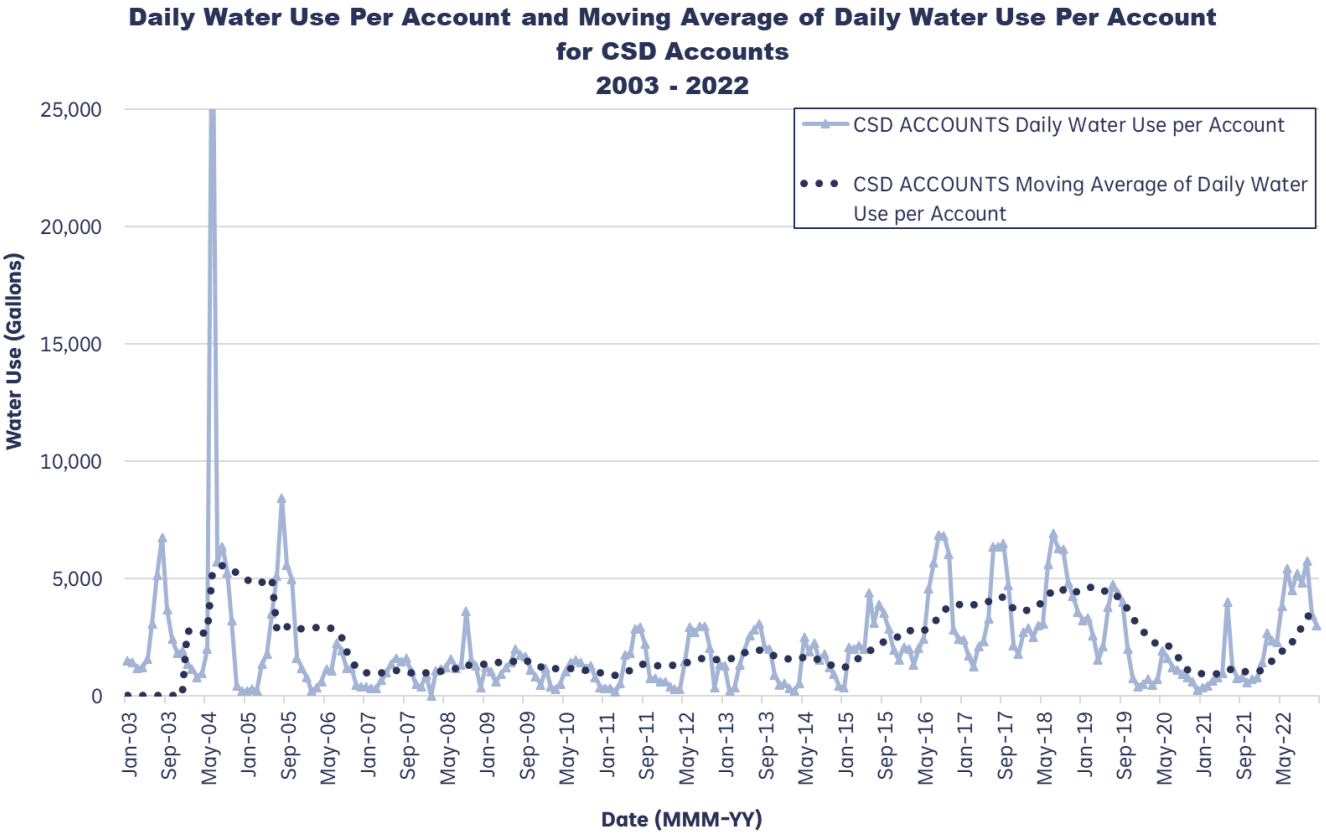


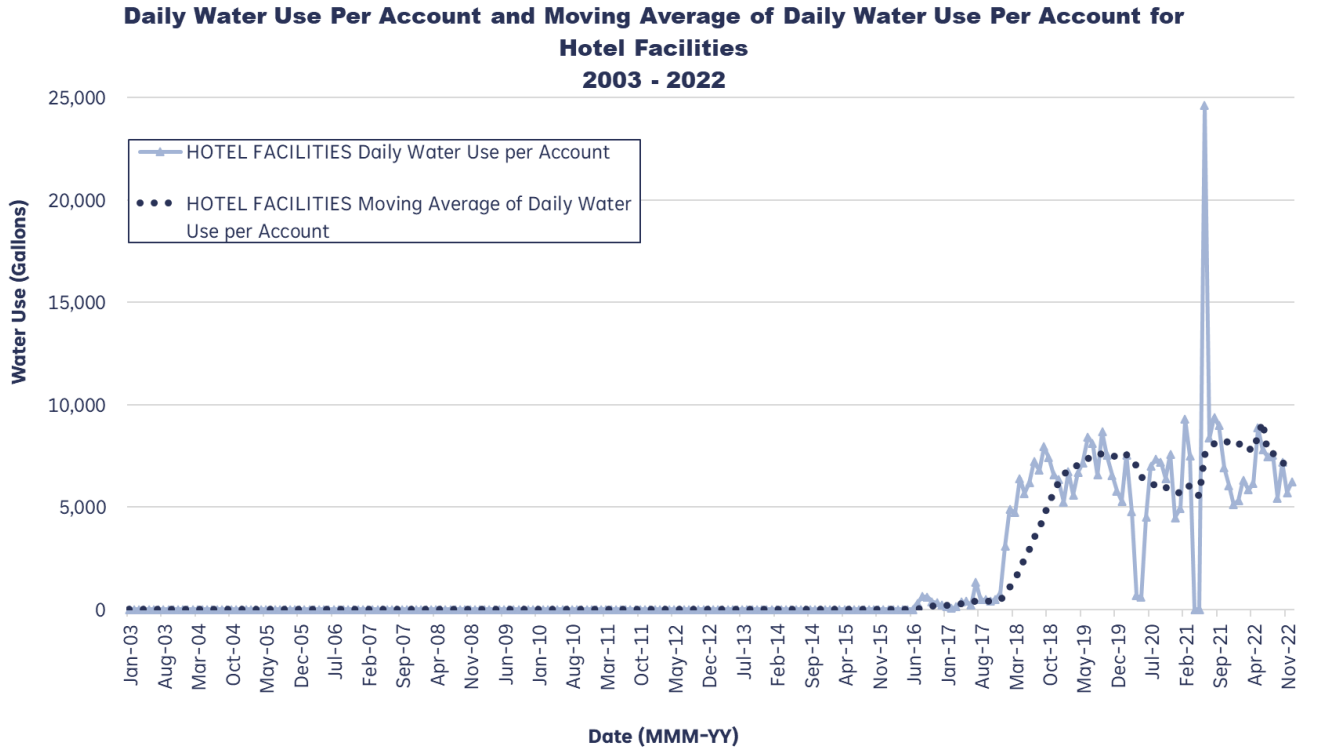
Daily Water Use Per Account and Moving Average of Daily Water Use Per Account for Commercial Irrigation Accounts 2003 - 2022



Daily Water Use Per Account and Moving Average of Daily Water Use Per Account for Commercial Small Accounts 2003 - 2022




Daily Water Use Per Account and Moving Average of Daily Water Use Per Account for CSD Accounts 2003 - 2022
CSD ACCOUNTS Daily Water Use per Account
CSD ACCOUNTS Moving Average of Daily Water Use per Account
Water Use (Gallons)
25,000
20,000
15,000
10,000
5,000
0
Jan-03
Sep-03
May-04
Jan-05
Sep-05
May-06
Jan-07
Sep-07
May-08
Jan-09
Sep-09
May-10
Jan-11
Sep-11
May-12
Jan-13
Sep-13
May-14
Jan-15
Sep-15
May-16
Jan-17
Sep-17
May-18
Jan-19
Sep-19
May-20
Jan-21
Sep-21
May-22
Date (MMM-YY)


Daily Water Use Per Account and Moving Average of Daily Water Use Per Account for Hotel Facilities 2003 - 2022
HOTEL FACILITIES Daily Water Use per Account
HOTEL FACILITIES Moving Average of Daily Water Use per Account
Water Use (Gallons)
25,000
20,000
15,000
10,000
5,000
0
Jan-03
Aug-03
Mar-04
Oct-04
May-05
Dec-05
Jul-06
Feb-07
Sep-07
Apr-08
Nov-08
Jun-09
Jan-10
Aug-10
Mar-11
Oct-11
May-12
Dec-12
Jul-13
Feb-14
Sep-14
Apr-15
Nov-15
Jun-16
Jan-17
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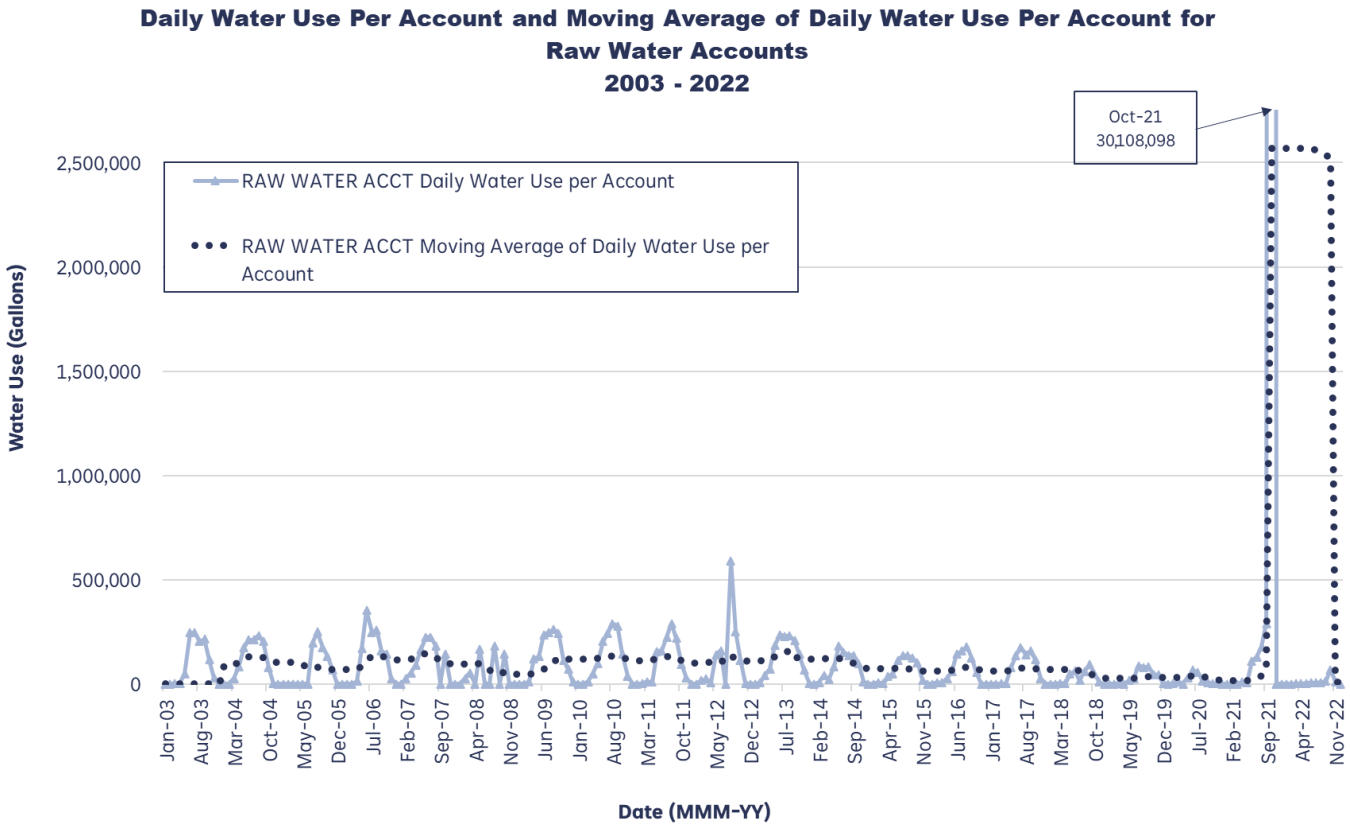
Feb-21
Sep-21
Apr-22
Nov-22
Date (MMM-YY)


Daily Water Use Per Account and Moving Average of Daily Water Use Per Account for Raw Water Accounts
2003 - 2022
Oct-21
30,108,098
RAW WATER ACCT Daily Water Use per Account
RAW WATER ACCT Moving Average of Daily Water Use per Account
Water Use (Gallons)
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
Jan-03
Aug-03
Mar-04
Oct-04
May-05
Dec-05
Jul-06
Feb-07
Sep-07
Apr-08
Nov-08
Jun-09
Jan-10
Aug-10
Mar-11
Oct-11
May-12
Dec-12
Jul-13
Feb-14
Sep-14
Apr-15
Nov-15
Jun-16
Jan-17
Aug-17
Mar-18
Oct-18
May-19
Dec-19
Jul-20
Feb-21
Sep-21
Apr-22
Nov-22
Date (MMM-YY)

Appendix C Reclaimed Water Balance

Scenario 1: 100-Year Maximum Precipitation (35 inches)

Physical System Data												
RMCC Lakes Water Surface Area	11.2	acres	ADWF (Buildout)	0.840	MGD	Pan Evaporation Coefficient	0.75	unitless	Reservoir Watershed Area	40	acres	Maximum Storage of Reservoirs	859.9	AF
RMCC Lakes Contributing Watershed	15	acres	Beginning Water Volume in Res.	65	AF	WWRP Site Area	7.5	acres	Reservoir Run-off Coeff	0.9	unitless	Volume of Reservoirs w/ 2ft FB	728.2	AF
RMCC Lakes Run-off Coefficient	0.2	unitless	WWRP Pond Area Total	10.7	acres	Run-off Coefficient for WWRP	0.9	unitless	Proportion in Reservoir #1	81%				

Precip and I/I Inputs			Irrigation Inputs			Results		
Average I/I in Percent of Inflow	9.06%		Residential/Commercial	359	AF	Total RW Available	1124	AF
Scenario I/I in Percent of Inflow	15.10%		Golf Courses	550	AF	Max Volume in Reservoirs	670	AF
Scenario I/I Volume, Annual	46.34	MG	Van Vleck	215	AF	Res/Comm Available w/Van Vleck	359	AF
Scenario Precip Modifier	167%		Res/Comm Demand	440	AF	Res/Comm Available w/o Van Vleck	574	AF

Inflows
Outflows

Climate Inputs	Units	October	November	December	January	February	March	April	May	June	July	August	September	Annual Totals
Precipitation (Average)	in	1.26	3.36	2.94	4.41	3.36	3.15	1.47	0.42	0.21	0.00	0.00	0.42	21.00
Scenario Precipitation	in	2.10	5.60	4.90	7.35	5.60	5.25	2.45	0.70	0.35	0.00	0.00	0.70	35.00
Pan Evaporation	in	4.09	1.65	1.41	1.23	1.88	2.48	3.87	5.89	6.27	8.44	7.65	6.29	51.14
Effective Lake Evaporation	in	3.07	1.24	1.05	0.93	1.41	1.86	2.90	4.42	4.70	6.33	5.74	4.72	38.36
RMCSD WWRP														
# Days in Month	days	31	30	31	31	28	31	30	31	30	31	31	30	365
Wastewater Influent	MG	26.05	25.21	26.05	26.05	23.53	26.05	25.21	26.05	25.21	26.05	26.05	25.21	306.69
Wastewater Influent	AF	79.94	77.36	79.94	79.94	72.21	79.94	77.36	79.94	77.36	79.94	79.94	77.36	941.27
I/I Estimate (Average)	AF	7.24	7.01	7.24	7.24	6.54	7.24	7.01	7.24	7.01	7.24	7.24	7.01	85.28
Scenario I/I Estimate	AF	12.07	11.68	12.07	12.07	10.90	12.07	11.68	12.07	11.68	12.07	12.07	11.68	142.13
Site Run-off	AF	1.18	3.15	2.76	4.13	3.15	2.95	1.38	0.39	0.20	0.00	0.00	0.39	19.69
Pond Precipitation (direct)	AF	1.87	4.99	4.37	6.55	4.99	4.68	2.18	0.62	0.31	0.00	0.00	0.62	31.21
Pond Evaporation	AF	-2.74	-1.10	-0.94	-0.82	-1.26	-1.66	-2.59	-3.94	-4.19	-5.64	-5.11	-4.21	-34.20
RMCSD Secondary Storage Reservoirs														
Reservoir # 1 Vol	AF	52.65	55.54	138.61	232.88	337.47	424.55	508.56	543.00	512.16	412.61	267.18	130.43	
Reservoir # 1 Surface Area	acre	18.74	18.84	20.46	22.21	23.94	25.17	26.27	26.67	26.33	25.04	22.81	20.36	
Reservoir #2 Vol	AF	12.35	3.02	20.06	25.92	29.46	26.02	24.65	12.76	-4.81	-24.26	-38.72	-39.43	
Reservoir # 2 Surface Area	acre	3.32	3.80	4.60	5.40	6.20	6.70	7.20	7.40	7.30	6.70	5.40	4.10	
Total Water Surface Area	acre	22.05	22.64	25.06	27.61	30.14	31.87	33.47	34.07	33.63	31.74	28.21	24.46	
Contributing Water Shed Area	acre	17.95	17.36	14.94	12.39	9.86	8.13	6.53	5.93	6.37	8.26	11.79	15.54	
Reservoir Run-off	AF	2.83	7.29	5.49	6.83	4.14	3.20	1.20	0.31	0.17	0.00	0.00	0.82	32.28
Reservoir Precip (direct)	AF	3.86	10.57	10.23	16.91	14.06	13.94	6.83	1.99	0.98	0.00	0.00	1.43	80.80
Reservoir Evaporation	AF	-5.64	-2.33	-2.20	-2.13	-3.54	-4.94	-8.09	-12.55	-13.17	-16.74	-13.48	-9.62	-94.43
RMCC Irrigation Lakes														
Lake Water Shed Run-off	AF	0.52	1.40	1.22	1.84	1.40	1.31	0.61	0.17	0.09	0.00	0.00	0.17	8.75
Lake Precipitation (direct)	AF	1.96	5.23	4.57	6.86	5.23	4.90	2.29	0.65	0.33	0.00	0.00	0.65	32.67
Irrig. Lake Evaporation	AF	-2.87	-1.15	-0.98	-0.86	-1.32	-1.74	-2.71	-4.12	-4.39	-5.91	-5.35	-4.40	-35.80
Disposal														
Percent of Annual Total	%	8%	1%	0%	0%	0%	1%	4%	10%	17%	22%	21%	15%	
Residential Irrigation	AF	-28.58	-4.64	-0.05	-0.70	-0.79	-3.50	-15.23	-36.32	-61.46	-77.75	-75.72	-54.64	-359
Golf Course	AF	-43.74	-7.11	-0.08	-1.07	-1.21	-5.36	-23.30	-55.58	-94.05	-119.00	-115.88	-83.62	-550
Van Vleck Ranch Demand	AF	-17.10	-2.78	-0.03	-0.42	-0.47	-2.09	-9.11	-21.73	-36.77	-46.52	-45.30	-32.69	-215
Effluent Storage														
Beginning Water Volume in Res.	AF	65	68.6	171.1	287.5	416.6	524.1	627.8	670.4	632.3	509.4	329.9	161.0	
Change in Water Volume	AF	3.6	102.6	116.4	129.1	107.5	103.7	42.5	-38.1	-122.9	-179.5	-168.8	-96.0	0.0
Final Water Volume in Reservoirs	AF	68.6	171.1	287.5	416.6	524.1	627.8	670.4	632.3	509.4	329.9	161.0	65.0	

Scenario 2: Average Year Precipitation (21 inches)

Physical System Data												
RMCC Lakes Water Surface Area	11.2	acres	ADWF (Buildout)	0.840	MGD	Pan Evaporation Coefficient	0.75	unitless	Reservoir Watershed Area	40	acres	Maximum Storage of Reservoirs	859.9	AF
RMCC Lakes Contributing Watershed	15	acres	Beginning Water Volume in Res.	65	AF	WWRP Site Area	7.5	acres	Reservoir Run-off Coeff	0.9	unitless	Volume of Reservoirs w/ 2ft FB	728.2	AF
RMCC Lakes Run-off Coefficient	0.2	unitless	WWRP Pond Area Total	10.7	acres	Run-off Coefficient for WWRP	0.9	unitless	Proportion in Reservoir #1	81%				

Precip and I/I Inputs			Irrigation Inputs			Results		
Average I/I in Percent of Inflow	9.06%		Residential/Commercial	99	AF	Total RW Available	987	AF
Scenario I/I in Percent of Inflow	9.06%		Golf Courses	673	AF	Max Volume in Reservoirs	580	AF
Scenario I/I Volume, Annual	27.81	MG	Van Vleck	215	AF	Res/Comm Available w/Van Vleck	99	AF
Scenario Precip Modifier	100%		Res/Comm Demand	440	AF	Res/Comm Available w/o Van Vleck	314	AF

Inflows
Outflows

Climate Inputs	Units	October	November	December	January	February	March	April	May	June	July	August	September	Annual Totals
Precipitation (Average)	in	1.26	3.36	2.94	4.41	3.36	3.15	1.47	0.42	0.21	0.00	0.00	0.42	21.00
Scenario Precipitation	in	1.26	3.36	2.94	4.41	3.36	3.15	1.47	0.42	0.21	0.00	0.00	0.42	21.00
Pan Evaporation	in	4.09	1.65	1.41	1.23	1.88	2.48	3.87	5.89	6.27	8.44	7.65	6.29	51.14
Effective Lake Evaporation	in	3.07	1.24	1.05	0.93	1.41	1.86	2.90	4.42	4.70	6.33	5.74	4.72	38.36
RMCSD WWRP														
# Days in Month	days	31	30	31	31	28	31	30	31	30	31	31	30	365
Wastewater Influent	MG	26.05	25.21	26.05	26.05	23.53	26.05	25.21	26.05	25.21	26.05	26.05	25.21	306.69
Wastewater Influent	AF	79.94	77.36	79.94	79.94	72.21	79.94	77.36	79.94	77.36	79.94	79.94	77.36	941.27
I/I Estimate (Average)	AF	7.24	7.01	7.24	7.24	6.54	7.24	7.01	7.24	7.01	7.24	7.24	7.01	85.28
Scenario I/I Estimate	AF	7.24	7.01	7.24	7.24	6.54	7.24	7.01	7.24	7.01	7.24	7.24	7.01	85.28
Site Run-off	AF	0.71	1.89	1.65	2.48	1.89	1.77	0.83	0.24	0.12	0.00	0.00	0.24	11.81
Pond Precipitation (direct)	AF	1.12	3.00	2.62	3.93	3.00	2.81	1.31	0.37	0.19	0.00	0.00	0.37	18.73
Pond Evaporation	AF	-2.74	-1.10	-0.94	-0.82	-1.26	-1.66	-2.59	-3.94	-4.19	-5.64	-5.11	-4.21	-34.20
RMCSD Secondary Storage Reservoirs														
Reservoir # 1 Vol	AF	52.65	56.51	126.66	207.76	294.70	367.86	439.08	469.91	445.32	360.58	235.59	118.55	
Reservoir # 1 Surface Area	acre	18.74	18.84	20.26	21.77	23.22	24.39	25.38	25.77	25.51	24.32	22.30	20.07	
Reservoir #2 Vol	AF	12.35	3.25	17.07	22.27	24.62	21.84	20.86	11.20	-3.64	-20.57	-33.23	-33.77	
Reservoir # 2 Surface Area	acre	3.32	3.80	4.60	5.40	6.20	6.70	7.20	7.40	7.30	6.70	5.40	4.10	
Total Water Surface Area	acre	22.05	22.64	24.86	27.17	29.42	31.09	32.58	33.17	32.81	31.02	27.70	24.17	
Contributing Water Shed Area	acre	17.95	17.36	15.14	12.83	10.58	8.91	7.42	6.83	7.19	8.98	12.30	15.83	
Reservoir Run-off	AF	1.70	4.37	3.34	4.24	2.67	2.10	0.82	0.22	0.11	0.00	0.00	0.50	20.07
Reservoir Precip (direct)	AF	2.32	6.34	6.09	9.98	8.24	8.16	3.99	1.16	0.57	0.00	0.00	0.85	47.70
Reservoir Evaporation	AF	-5.64	-2.33	-2.18	-2.09	-3.46	-4.82	-7.87	-12.21	-12.85	-16.36	-13.24	-9.50	-92.56
RMCC Irrigation Lakes														
Lake Water Shed Run-off	AF	0.32	0.84	0.74	1.10	0.84	0.79	0.37	0.11	0.05	0.00	0.00	0.11	5.25
Lake Precipitation (direct)	AF	1.18	3.14	2.74	4.12	3.14	2.94	1.37	0.39	0.20	0.00	0.00	0.39	19.60
Irrig. Lake Evaporation	AF	-2.87	-1.15	-0.98	-0.86	-1.32	-1.74	-2.71	-4.12	-4.39	-5.91	-5.35	-4.40	-35.80
Disposal														
Percent of Annual Total	%	8%	1%	0%	0%	0%	1%	4%	10%	17%	22%	21%	15%	
Residential Irrigation	AF	-7.89	-1.28	-0.01	-0.19	-0.22	-0.97	-4.20	-10.02	-16.96	-21.45	-20.89	-15.07	-99
Golf Course	AF	-53.53	-8.70	-0.10	-1.31	-1.48	-6.55	-28.51	-68.01	-115.09	-145.61	-141.79	-102.32	-673
Van Vleck Ranch Demand	AF	-17.10	-2.78	-0.03	-0.42	-0.47	-2.09	-9.11	-21.73	-36.77	-46.52	-45.30	-32.69	-215
Effluent Storage														
Beginning Water Volume in Res.	AF	65	69.8	156.4	256.5	363.8	454.1	542.1	580.1	549.8	445.2	290.9	146.4	
Change in Water Volume	AF	4.8	86.6	100.1	107.3	90.3	87.9	38.1	-30.4	-104.6	-154.3	-144.5	-81.4	0.0
Final Water Volume in Reservoirs	AF	69.8	156.4	256.5	363.8	454.1	542.1	580.1	549.8	445.2	290.9	146.4	65.0	

Scenario 3: 2013-14 Drought Precipitation (13 inches)

Physical System Data												
RMCC Lakes Water Surface Area	11.2	acres	ADWF (Buildout)	0.840	MGD	Pan Evaporation Coefficient	0.75	unitless	Reservoir Watershed Area	40	acres	Maximum Storage of Reservoirs	859.9	AF
RMCC Lakes Contributing Watershed	15	acres	Beginning Water Volume in Res.	65	AF	WWRP Site Area	7.5	acres	Reservoir Run-off Coeff	0.9	unitless	Volume of Reservoirs w/ 2ft FB	728.2	AF
RMCC Lakes Run-off Coefficient	0.2	unitless	WWRP Pond Area Total	10.7	acres	Run-off Coefficient for WWRP	0.9	unitless	Proportion in Reservoir #1	81%				

Precip and I/I Inputs			Irrigation Inputs			Results		
Average I/I in Percent of Inflow	9.06%		Residential/Commercial	22	AF	Total RW Available	910	AF
Scenario I/I in Percent of Inflow	5.68%		Golf Courses	673	AF	Max Volume in Reservoirs	530	AF
Scenario I/I Volume, Annual	17.43	MG	Van Vleck	215	AF	Res/Comm Available w/Van Vleck	22	AF
Scenario Precip Modifier	63%		Res/Comm Demand	440	AF	Res/Comm Available w/o Van Vleck	237	AF

Inflows
Outflows

Climate Inputs	Units	October	November	December	January	February	March	April	May	June	July	August	September	Annual Totals
Precipitation (Average)	in	1.26	3.36	2.94	4.41	3.36	3.15	1.47	0.42	0.21	0.00	0.00	0.42	21.00
Scenario Precipitation	in	0.79	2.11	1.84	2.77	2.11	1.98	0.92	0.26	0.13	0.00	0.00	0.26	13.17
Pan Evaporation	in	4.09	1.65	1.41	1.23	1.88	2.48	3.87	5.89	6.27	8.44	7.65	6.29	51.14
Effective Lake Evaporation	in	3.07	1.24	1.05	0.93	1.41	1.86	2.90	4.42	4.70	6.33	5.74	4.72	38.36
RMCSD WWRP														
# Days in Month	days	31	30	31	31	28	31	30	31	30	31	31	30	365
Wastewater Influent	MG	26.05	25.21	26.05	26.05	23.53	26.05	25.21	26.05	25.21	26.05	26.05	25.21	306.69
Wastewater Influent	AF	79.94	77.36	79.94	79.94	72.21	79.94	77.36	79.94	77.36	79.94	79.94	77.36	941.27
I/I Estimate (Average)	AF	7.24	7.01	7.24	7.24	6.54	7.24	7.01	7.24	7.01	7.24	7.24	7.01	85.28
Scenario I/I Estimate	AF	4.54	4.39	4.54	4.54	4.10	4.54	4.39	4.54	4.39	4.54	4.54	4.39	53.47
Site Run-off	AF	0.44	1.19	1.04	1.56	1.19	1.11	0.52	0.15	0.07	0.00	0.00	0.15	7.41
Pond Precipitation (direct)	AF	0.70	1.88	1.64	2.47	1.88	1.76	0.82	0.23	0.12	0.00	0.00	0.23	11.74
Pond Evaporation	AF	-2.74	-1.10	-0.94	-0.82	-1.26	-1.66	-2.59	-3.94	-4.19	-5.64	-5.11	-4.21	-34.20
RMCSD Secondary Storage Reservoirs														
Reservoir # 1 Vol	AF	52.65	57.04	119.97	193.70	270.78	336.15	400.22	429.04	407.94	331.50	217.95	111.94	
Reservoir # 1 Surface Area	acre	18.74	18.84	20.07	21.49	22.89	23.94	24.90	25.24	24.97	23.86	21.95	19.97	
Reservoir #2 Vol	AF	12.35	3.38	15.40	20.22	21.92	19.50	18.74	10.32	-2.99	-18.50	-30.15	-30.60	
Reservoir # 2 Surface Area	acre	3.32	3.80	4.60	5.40	6.20	6.70	7.20	7.40	7.30	6.70	5.40	4.10	
Total Water Surface Area	acre	22.05	22.64	24.67	26.89	29.09	30.64	32.10	32.64	32.27	30.56	27.35	24.07	
Contributing Water Shed Area	acre	17.95	17.36	15.33	13.11	10.91	9.36	7.90	7.36	7.73	9.44	12.65	15.93	
Reservoir Run-off	AF	1.06	2.74	2.12	2.72	1.72	1.39	0.55	0.15	0.08	0.00	0.00	0.31	12.84
Reservoir Precip (direct)	AF	1.45	3.97	3.79	6.20	5.11	5.04	2.47	0.72	0.35	0.00	0.00	0.53	29.63
Reservoir Evaporation	AF	-5.64	-2.33	-2.17	-2.07	-3.42	-4.75	-7.76	-12.02	-12.63	-16.12	-13.07	-9.46	-91.44
RMCC Irrigation Lakes														
Lake Water Shed Run-off	AF	0.20	0.53	0.46	0.69	0.53	0.49	0.23	0.07	0.03	0.00	0.00	0.07	3.29
Lake Precipitation (direct)	AF	0.74	1.97	1.72	2.58	1.97	1.84	0.86	0.25	0.12	0.00	0.00	0.25	12.29
Irrig. Lake Evaporation	AF	-2.87	-1.15	-0.98	-0.86	-1.32	-1.74	-2.71	-4.12	-4.39	-5.91	-5.35	-4.40	-35.80
Disposal														
Percent of Annual Total	%	8%	1%	0%	0%	0%	1%	4%	10%	17%	22%	21%	15%	
Residential Irrigation	AF	-1.79	-0.29	0.00	-0.04	-0.05	-0.22	-0.95	-2.27	-3.85	-4.87	-4.74	-3.42	-22
Golf Course	AF	-53.53	-8.70	-0.10	-1.31	-1.48	-6.55	-28.51	-68.01	-115.09	-145.61	-141.79	-102.32	-673
Van Vleck Ranch Demand	AF	-17.10	-2.78	-0.03	-0.42	-0.47	-2.09	-9.11	-21.73	-36.77	-46.52	-45.30	-32.69	-215
Effluent Storage														
Beginning Water Volume in Res.	AF	65	70.4	148.1	239.1	334.3	415.0	494.1	529.7	503.6	409.3	269.1	138.2	
Change in Water Volume	AF	5.4	77.7	91.0	95.2	80.7	79.1	35.6	-26.1	-94.4	-140.2	-130.9	-73.2	0.0
Final Water Volume in Reservoirs	AF	70.4	148.1	239.1	334.3	415.0	494.1	529.7	503.6	409.3	269.1	138.2	65.0	

Scenario 4: 1976-77 Drought Precipitation (8 inches)

Physical System Data												
RMCC Lakes Water Surface Area	11.2	acres	ADWF (Buildout)	0.840	MGD	Pan Evaporation Coefficient	0.75	unitless	Reservoir Watershed Area	40	acres	Maximum Storage of Reservoirs	859.9	AF
RMCC Lakes Contributing Watershed	15	acres	Beginning Water Volume in Res.	65	AF	WWRP Site Area	7.5	acres	Reservoir Run-off Coeff	0.9	unitless	Volume of Reservoirs w/ 2ft FB	728.2	AF
RMCC Lakes Run-off Coefficient	0.2	unitless	WWRP Pond Area Total	10.7	acres	Run-off Coefficient for WWRP	0.9	unitless	Proportion in Reservoir #1	81%				

Precip and I/I Inputs			Irrigation Inputs			Results		
Average I/I in Percent of Inflow	9.06%		Residential/Commercial	-30	AF	Total RW Available	858	AF
Scenario I/I in Percent of Inflow	3.38%		Golf Courses	673	AF	Max Volume in Reservoirs	495	AF
Scenario I/I Volume, Annual	10.37	MG	Van Vleck	215	AF	Res/Comm Available w/Van Vleck	-30	AF
Scenario Precip Modifier	37%		Res/Comm Demand	440	AF	Res/Comm Available w/o Van Vleck	185	AF

Inflows
Outflows

Climate Inputs	Units	October	November	December	January	February	March	April	May	June	July	August	September	Annual Totals
Precipitation (Average)	in	1.26	3.36	2.94	4.41	3.36	3.15	1.47	0.42	0.21	0.00	0.00	0.42	21.00
Scenario Precipitation	in	0.47	1.25	1.10	1.64	1.25	1.17	0.55	0.16	0.08	0.00	0.00	0.16	7.83
Pan Evaporation	in	4.09	1.65	1.41	1.23	1.88	2.48	3.87	5.89	6.27	8.44	7.65	6.29	51.14
Effective Lake Evaporation	in	3.07	1.24	1.05	0.93	1.41	1.86	2.90	4.42	4.70	6.33	5.74	4.72	38.36
RMCSD WWRP														
# Days in Month	days	31	30	31	31	28	31	30	31	30	31	31	30	365
Wastewater Influent	MG	26.05	25.21	26.05	26.05	23.53	26.05	25.21	26.05	25.21	26.05	26.05	25.21	306.69
Wastewater Influent	AF	79.94	77.36	79.94	79.94	72.21	79.94	77.36	79.94	77.36	79.94	79.94	77.36	941.27
I/I Estimate (Average)	AF	7.24	7.01	7.24	7.24	6.54	7.24	7.01	7.24	7.01	7.24	7.24	7.01	85.28
Scenario I/I Estimate	AF	2.70	2.61	2.70	2.70	2.44	2.70	2.61	2.70	2.61	2.70	2.70	2.61	31.81
Site Run-off	AF	0.26	0.70	0.62	0.93	0.70	0.66	0.31	0.09	0.04	0.00	0.00	0.09	4.41
Pond Precipitation (direct)	AF	0.42	1.12	0.98	1.47	1.12	1.05	0.49	0.14	0.07	0.00	0.00	0.14	6.98
Pond Evaporation	AF	-2.74	-1.10	-0.94	-0.82	-1.26	-1.66	-2.59	-3.94	-4.19	-5.64	-5.11	-4.21	-34.20
RMCSD Secondary Storage Reservoirs														
Reservoir # 1 Vol	AF	52.65	57.40	115.40	184.12	254.48	314.56	373.79	401.25	382.52	311.72	205.96	107.43	
Reservoir # 1 Surface Area	acre	18.74	18.84	20.07	21.31	22.56	23.55	24.46	24.90	24.61	23.55	21.77	19.87	
Reservoir #2 Vol	AF	12.35	3.46	14.26	18.83	20.08	17.91	17.30	9.73	-2.55	-17.09	-28.05	-28.44	
Reservoir # 2 Surface Area	acre	3.32	3.80	4.60	5.40	6.20	6.70	7.20	7.40	7.30	6.70	5.40	4.10	
Total Water Surface Area	acre	22.05	22.64	24.67	26.71	28.76	30.25	31.66	32.30	31.91	30.25	27.17	23.97	
Contributing Water Shed Area	acre	17.95	17.36	15.33	13.29	11.24	9.75	8.34	7.70	8.09	9.75	12.83	16.03	
Reservoir Run-off	AF	0.63	1.63	1.26	1.64	1.06	0.86	0.34	0.09	0.05	0.00	0.00	0.19	7.75
Reservoir Precip (direct)	AF	0.86	2.36	2.25	3.66	3.00	2.96	1.45	0.42	0.21	0.00	0.00	0.31	17.50
Reservoir Evaporation	AF	-5.64	-2.33	-2.17	-2.06	-3.38	-4.69	-7.65	-11.89	-12.49	-15.95	-12.98	-9.42	-90.67
RMCC Irrigation Lakes														
Lake Water Shed Run-off	AF	0.12	0.31	0.27	0.41	0.31	0.29	0.14	0.04	0.02	0.00	0.00	0.04	1.96
Lake Precipitation (direct)	AF	0.44	1.17	1.02	1.54	1.17	1.10	0.51	0.15	0.07	0.00	0.00	0.15	7.31
Irrig. Lake Evaporation	AF	-2.87	-1.15	-0.98	-0.86	-1.32	-1.74	-2.71	-4.12	-4.39	-5.91	-5.35	-4.40	-35.80
Disposal														
Percent of Annual Total	%	8%	1%	0%	0%	0%	1%	4%	10%	17%	22%	21%	15%	
Residential Irrigation	AF	2.36	0.38	0.00	0.06	0.07	0.29	1.26	3.00	5.07	6.42	6.25	4.51	30
Golf Course	AF	-53.53	-8.70	-0.10	-1.31	-1.48	-6.55	-28.51	-68.01	-115.09	-145.61	-141.79	-102.32	-673
Van Vleck Ranch Demand	AF	-17.10	-2.78	-0.03	-0.42	-0.47	-2.09	-9.11	-21.73	-36.77	-46.52	-45.30	-32.69	-215
Effluent Storage														
Beginning Water Volume in Res.	AF	65	70.9	142.5	227.3	314.2	388.3	461.5	495.4	472.2	384.8	254.3	132.6	
Change in Water Volume	AF	5.9	71.6	84.8	86.9	74.2	73.1	33.9	-23.1	-87.4	-130.6	-121.6	-67.6	0.0
Final Water Volume in Reservoirs	AF	70.9	142.5	227.3	314.2	388.3	461.5	495.4	472.2	384.8	254.3	132.6	65.0	

Appendix D Log Pearson Analysis

ECHO OF INPUT:

Stream:

n = 28

Q(1) = 16.9; Q(2) = 28.8; Q(3) = 12.6; Q(4) = 32.01; Q(5) = 34.09; Q(6) = 23.78; Q(7) = 16.09; Q(8) = 28.48; Q(9) = 21.86; Q(10) = 21.1; Q(11) = 20.99; Q(12) = 29.48; Q(13) = 22.6; Q(14) = 14.17; Q(15) = 14.77; Q(16) = 17.52; Q(17) = 29.32; Q(18) = 20.78; Q(19) = 23.08; Q(20) = 6.16; Q(21) = 22.86; Q(22) = 12.86; Q(23) = 24.3; Q(24) = 31.26; Q(25) = 22.92; Q(26) = 27.24; Q(27) = 12.04; Q(28) = 24.54.

skew coefficient [of the logarithms] C_s = -1.292

OUTPUT:

i	Return period T (yr)	Probability P (percent)	Frequency factor K	y = log (Q)	Flood discharge Q (m^3/s)
1	1.05	95.2	-1.923	0.997	10
2	1.11	90.1	-1.339	1.093	12
3	1.25	80	-0.72	1.195	16
4	2	50	0.209	1.348	22
5	5	20	0.838	1.452	28
6	10	10	1.065	1.489	31
7	25	4	1.243	1.519	33
8	50	2	1.329	1.533	34
9	100	1	1.388	1.543	35
10	200	0.5	1.432	1.55	35

Calculate Reset

Your request was processed at 09:59:19 am on August 7th, 2024 [240807 09:59:19].

Thank you for running online_pearson. Please call again. [080402]

ECHO OF INPUT:

Stream:

n = 111

Q(1) = 11.1; Q(2) = 13.8; Q(3) = 16.2; Q(4) = 18; Q(5) = 17.7; Q(6) = 9; Q(7) = 16.5; Q(8) = 13.2; Q(9) = 14.7; Q(10) = 13.2; Q(11) = 18; Q(12) = 8.4; Q(13) = 11.4; Q(14) = 13.2; Q(15) = 20.7; Q(16) = 14.1; Q(17) = 12.6; Q(18) = 8.1; Q(19) = 12; Q(20) = 14.1; Q(21) = 6.9; Q(22) = 11.7; Q(23) = 10.8; Q(24) = 19.5; Q(25) = 19.2; Q(26) = 24.6; Q(27) = 20.4; Q(28) = 8.4; Q(29) = 25.2; Q(30) = 28.2; Q(31) = 21.9; Q(32) = 17.1; Q(33) = 22.2; Q(34) = 18.6; Q(35) = 8.4; Q(36) = 11.1; Q(37) = 14.7; Q(38) = 10.8; Q(39) = 23.7; Q(40) = 16.2; Q(41) = 25.8; Q(42) = 12.3; Q(43) = 21; Q(44) = 22.5; Q(45) = 14.7; Q(46) = 18.6; Q(47) = 27.3; Q(48) = 11.7; Q(49) = 14.1; Q(50) = 11.7; Q(51) = 19.8; Q(52) = 18.3; Q(53) = 15; Q(54) = 15.3; Q(55) = 13.8; Q(56) = 18.9; Q(57) = 15; Q(58) = 26.1; Q(59) = 22.5; Q(60) = 11.4; Q(61) = 13.8; Q(62) = 28.5; Q(63) = 17.1; Q(64) = 15.3; Q(65) = 6.6; Q(66) = 11.1; Q(67) = 23.7; Q(68) = 22.8; Q(69) = 19.8; Q(70) = 24.3; Q(71) = 31.5; Q(72) = 37.5; Q(73) = 12.6; Q(74) = 14.4; Q(75) = 23.7; Q(76) = 18.3; Q(77) = 12.9; Q(78) = 15.6; Q(79) = 15.6; Q(80) = 15.6; Q(81) = 20.7; Q(82) = 24.9; Q(83) = 15.3; Q(84) = 28.2; Q(85) = 23.4; Q(86) = 18.6; Q(87) = 29.4; Q(88) = 11.7; Q(89) = 25.8; Q(90) = 21.9; Q(91) = 15.9; Q(92) = 14.4; Q(93) = 19.2; Q(94) = 22.8; Q(95) = 18.6; Q(96) = 12.9; Q(97) = 13.5; Q(98) = 18.9; Q(99) = 22.2; Q(100) = 17.7; Q(101) = 21.9; Q(102) = 6; Q(103) = 18.6; Q(104) = 8.4; Q(105) = 22.2; Q(106) = 27; Q(107) = 18.3; Q(108) = 26.1; Q(109) = 7.5; Q(110) = 19.5; Q(111) = 13.2.

skew coefficient [of the logarithms] C_s = -0.446

OUTPUT:

i	Return period T (yr)	Probability P (percent)	Frequency factor K	y = log (Q)	Flood discharge Q (cfs)
1	1.05	95.2	-1.761	0.935	9
2	1.11	90.1	-1.32	1.005	10
3	1.25	80	-0.812	1.085	12
4	2	50	0.074	1.226	17
5	5	20	0.855	1.35	22
6	10	10	1.224	1.409	26
7	25	4	1.588	1.467	29
8	50	2	1.808	1.502	32
9	100	1	1.995	1.532	34
10	200	0.5	2.159	1.558	36

Calculate Reset

Your request was processed at 09:45:06 am on August 7th, 2024 [240807 09:45:06].

Appendix E Cost Estimates

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER MASTER PLAN
Alternative 1A - 3 New Wells, No Treatment
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT		TOTAL PRICE
General						
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$205,400	All Req'd	$	205,400
2	Construction Surveying (1% of Total Bid Price)	LS	$40,700	All Req'd	$	40,700
New Well Installation						
3	Drill new well to 500-feet; includes well casing (complete in-place including well development and test pumping)	EA	$475,254	3	$	1,425,800
4	Install 75 HP well pump, motor, and column	EA	$133,380	3	$	400,200
5	Pump house installation, including piping, valves, flowmeter, and chlorination equipment	EA	$215,250	3	$	645,800
6	Panel, VFD, SCADA controls	EA	$242,400	3	$	727,200
7	Power distribution	EA	$86,100	3	$	258,300
8	Access road	LS	$8,000	All Req'd	$	8,000
Distribution System Connection to New Wells						
9	Excavate, furnish, and install 10" PVC C-900 pipe, includes backfill	LF	$212	410	$	87,000
10	Excavate, furnish, and install 8" PVC C-900 pipe, includes backfill	LF	$181	2,677	$	484,100
11	Install 10" gate valves with thrust blocks	EA	$5,148	3	$	15,500
12	Connection to existing, including flushing, testing, and disinfection	LS	$15,000	All Req'd	$	15,000

Sum of Estimated Construction Cost	**$**	**4,313,000**
Contingency (20%)	$	863,000
Design, Engineering, and Construction Administration (25%)	$	1,079,000
Environmental, Permitting, Legal, Land Acquisition	$	94,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**6,349,000**

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER MASTER PLAN
Alternative 1B - 5 New Wells , No Treatment
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE
General					
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$340,200	All Req'd	$ 340,200
2	Construction Surveying (1% of Total Bid Price)	LS	$67,400	All Req'd	$ 67,400
New Well Installation					
3	Drill new well to 500-feet; includes well casing (complete in-place including well development and test pumping)	EA	$475,254	5	$ 2,376,300
4	Install 75 HP well pump, motor, and column	EA	$133,380	5	$ 666,900
5	Pump house installation, including piping, valves, flowmeter, and chlorination equipment	EA	$215,250	5	$ 1,076,300
6	Panel, VFD, SCADA controls	EA	$242,400	5	$ 1,212,000
7	Power distribution	EA	$86,100	5	$ 430,500
8	Access road	LS	$10,000	All Req'd	$ 10,000
Distribution System Connection to New Wells					
9	Excavate, furnish, and install 10" PVC C-900 pipe, includes backfill	LF	$212	638	$ 135,400
10	Excavate, furnish, and install 8" PVC C-900 pipe, includes backfill	LF	$181	4,382	$ 792,300
11	Install 10" gate valves with thrust blocks	EA	$5,148	3	$ 15,500
12	Connection to existing, including flushing, testing, and disinfection	LS	$20,000	All Req'd	$ 20,000

Sum of Estimated Construction Cost	**$**	**7,143,000**
Contingency (20%)	$	1,429,000
Design, Engineering, and Construction Administration (25%)	$	1,786,000
Environmental, Permitting, Legal, Land Acquisition	$	97,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**10,455,000**

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER MASTER PLAN
Alternative 2A - 3 New Wells, Partial Treatment
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT		TOTAL PRICE
General						
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$401,800	All Req'd	$	401,800
2	Construction Surveying (1% of Total Bid Price)	LS	$79,600	All Req'd	$	79,600
New Well Installation & Treatment						
3	Drill new well to 500-feet; includes well casing (complete in-place including well development and test pumping)	EA	$475,254	3	$	1,425,800
4	Install 75 HP well pump, motor, and column	EA	$133,380	3	$	400,200
5	Pump house installation, including piping, valves, flowmeter, and chlorination equipment	EA	$215,250	3	$	645,800
6	Panel, VFD, SCADA controls	EA	$242,400	3	$	727,200
7	Power distribution	EA	$86,100	3	$	258,300
8	Access road	LS	$8,000	All Req'd	$	8,000
9	Construct a permanent water treatment facility to treat 655 gpm*	LS	$3,888,000	All Req'd	$	3,888,000
	* see following sheet for WTF cost estimate					
Distribution System Connection to New Wells						
14	Excavate, furnish, and install 10" PVC C-900 pipe, includes backfill	LF	$212	410	$	87,000
15	Excavate, furnish, and install 8" PVC C-900 pipe, includes backfill	LF	$181	2,677	$	484,100
16	Install 10" gate valves with thrust blocks	EA	$5,148	3	$	15,500
17	Connection to existing, including flushing, testing, and disinfection	LS	$15,000	All Req'd	$	15,000

Sum of Estimated Construction Cost	**$**	**8,436,000**
Contingency (20%)	$	1,688,000
Design, Engineering, and Construction Administration (25%)	$	2,109,000
Environmental, Permitting, Legal, Land Acquisition	$	300,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**12,533,000**

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER MASTER PLAN
Alternative 2B - 5 New Wells, Partial Treatment
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT		TOTAL PRICE
General						
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$689,100	All Req'd	$	689,100
2	Construction Surveying (1% of Total Bid Price)	LS	$136,500	All Req'd	$	136,500
New Well Installation & Treatment						
3	Drill new well to 500-feet; includes well casing (complete in-place including well development and test pumping)	EA	$475,254	5	$	2,376,300
4	Install 75 HP well pump, motor, and column	EA	$133,380	5	$	666,900
5	Pump house installation, including piping, valves, flowmeter, and chlorination equipment	EA	$215,250	5	$	1,076,300
6	Panel, VFD, SCADA controls	EA	$242,400	5	$	1,212,000
7	Power distribution	LS	$86,100	5	$	430,500
8	Access road	LS	$10,000	All Req'd	$	10,000
9	Construct a permanent water treatment facility to treat 1174 gpm of well water*	LS	$6,910,000	All Req'd	$	6,910,000
	* see following sheet for WTF cost estimate					
Distribution System Connection to New Wells						
14	Excavate, furnish, and install 10" PVC C-900 pipe, includes backfill	LF	$212	638	$	135,400
15	Excavate, furnish, and install 8" PVC C-900 pipe, includes backfill	LF	$181	4,382	$	792,300
16	Install 10" gate valves with thrust blocks	EA	$5,148	3	$	15,500
17	Connection to existing, including flushing, testing, and disinfection	LS	$20,000	All Req'd	$	20,000

Sum of Estimated Construction Cost	**$**	**14,471,000**
Contingency (20%)	$	2,895,000
Design, Engineering, and Construction Administration (25%)	$	3,618,000
Environmental, Permitting, Legal, Land Acquisition	$	300,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**21,284,000**

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER MASTER PLAN
Alternative 3A - 3 New Wells, Portable Treatment
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT		TOTAL PRICE
General						
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$205,400	All Req'd	$	205,400
2	Construction Surveying (1% of Total Bid Price)	LS	$40,700	All Req'd	$	40,700
New Well Installation						
3	Drill new well to 500-feet; includes well casing (complete in-place including well development and test pumping)	EA	$475,254	3	$	1,425,800
4	Install 75 HP well pump, motor, and column	EA	$133,380	3	$	400,200
5	Pump house installation, including piping, valves, flowmeter, and chlorination equipment	EA	$215,250	3	$	645,800
6	Panel, VFD, SCADA controls	EA	$242,400	3	$	727,200
7	Power distribution	EA	$86,100	3	$	258,300
8	Access road	LS	$8,000	All Req'd	$	8,000
Distribution System Connection to New Wells						
9	Excavate, furnish, and install 10" PVC C-900 pipe, includes backfill	LF	$212	410	$	87,000
10	Excavate, furnish, and install 8" PVC C-900 pipe, includes backfill	LF	$181	2,677	$	484,100
11	Install 10" gate valves with thrust blocks	EA	$5,148	3	$	15,500
12	Connection to existing, including flushing, testing, and disinfection	LS	$15,000	All Req'd	$	15,000

Sum of Estimated Construction Cost	**$**	**4,313,000**
Contingency (20%)	$	863,000
Design, Engineering, and Construction Administration (25%)	$	1,079,000
Environmental, Permitting, Legal, Land Acquisition	$	94,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**6,349,000**

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER MASTER PLAN
Alternative 3B - 5 New Wells, Portable Treatment
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE
General					
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$340,200	All Req'd	$ 340,200
2	Construction Surveying (1% of Total Bid Price)	LS	$67,400	All Req'd	$ 67,400
New Well Installation					
3	Drill new well to 500-feet; includes well casing (complete in-place including well development and test pumping)	EA	$475,254	5	$ 2,376,300
4	Install 75 HP well pump, motor, and column	EA	$133,380	5	$ 666,900
5	Pump house installation, including piping, valves, flowmeter, and chlorination equipment	EA	$215,250	5	$ 1,076,300
6	Panel, VFD, SCADA controls	EA	$242,400	5	$ 1,212,000
7	Power distribution	EA	$86,100	5	$ 430,500
8	Access road	LS	$10,000	All Req'd	$ 10,000
Distribution System Connection to New Wells					
9	Excavate, furnish, and install 10" PVC C-900 pipe, includes backfill	LF	$212	638	$ 135,400
10	Excavate, furnish, and install 8" PVC C-900 pipe, includes backfill	LF	$181	4,382	$ 792,300
11	Install 10" gate valves with thrust blocks	EA	$5,148	3	$ 15,500
12	Connection to existing, including flushing, testing, and disinfection	LS	$20,000	All Req'd	$ 20,000

Sum of Estimated Construction Cost	**$**	**7,143,000**
Contingency (20%)	$	1,429,000
Design, Engineering, and Construction Administration (25%)	$	1,786,000
Environmental, Permitting, Legal, Land Acquisition	$	97,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**10,455,000**

RMCSD

IWMP Alt 3B

PLANNING LEVEL COST

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER MASTER PLAN
Alternative 4A - 3 New Wells, Full Treatment
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE
General					
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$552,900	All Req'd	$ 552,900
2	Construction Surveying (1% of Total Bid Price)	LS	$109,500	All Req'd	$ 109,500
New Well Installation					
3	Drill new well to 500-feet; includes well casing (complete in-place including well development and test pumping)	EA	$475,254	3	$ 1,425,800
4	Install 75 HP well pump, motor, and column	EA	$133,380	3	$ 400,200
5	Pump house installation, including piping, valves, flowmeter, and chlorination equipment	EA	$215,250	3	$ 645,800
6	Panel, VFD, SCADA controls	EA	$242,400	3	$ 727,200
7	Power distribution	EA	$86,100	3	$ 258,300
8	Access road	LS	$8,000	All Req'd	$ 8,000
Distribution System Connection to New Wells					
9	Excavate, furnish, and install 10" PVC C-900 pipe, includes backfill	LF	$212	410	$ 87,000
10	Excavate, furnish, and install 8" PVC C-900 pipe, includes backfill	LF	$181	2,677	$ 484,100
11	Install 10" gate valves with thrust blocks	EA	$5,148	3	$ 15,500
12	Connection to existing, including flushing, testing, and disinfection	LS	$15,000	All Req'd	$ 15,000
Water Treatment Facility					
13	Construct a permanent water treatment facility to treat well water, media filtration*	LS	$6,880,000	All Req'd	$ 6,880,000

* see following sheet for WTF cost estimate

Sum of Estimated Construction Cost	**$**	**11,609,000**
Contingency (20%)	$	2,322,000
Design, Engineering, and Construction Administration (25%)	$	2,903,000
Environmental, Permitting, Legal, Land Acquisition	$	350,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**17,184,000**

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER MASTER PLAN
Alternative 4B - 5 New Wells, Full Treatment
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE
General					
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$959,900	All Req'd	$ 959,900
2	Construction Surveying (1% of Total Bid Price)	LS	$190,100	All Req'd	$ 190,100
New Well Installation					
3	Drill new well to 500-feet; includes well casing (complete in-place including well development and test pumping)	EA	$475,254	5	$ 2,376,300
4	Install 75 HP well pump, motor, and column	EA	$133,380	5	$ 666,900
5	Pump house installation, including piping, valves, flowmeter, and chlorination equipment	EA	$215,250	5	$ 1,076,300
6	Panel, VFD, SCADA controls	EA	$242,400	5	$ 1,212,000
7	Power distribution	EA	$86,100	5	$ 430,500
8	Access road	LS	$10,000	All Req'd	$ 10,000
Distribution System Connection to New Wells					
9	Excavate, furnish, and install 10" PVC C-900 pipe, includes backfill	LF	$212	638	$ 135,400
10	Excavate, furnish, and install 8" PVC C-900 pipe, includes backfill	LF	$181	4,382	$ 792,300
11	Install 10" gate valves with thrust blocks	EA	$5,148	3	$ 15,500
12	Connection to existing, including flushing, testing, and disinfection	LS	$15,000	All Req'd	$ 15,000
Water Treatment Facility					
13	Construct a permanent water treatment facility to treat well water, media filtration*	LS	$12,277,000	All Req'd	$ 12,277,000

* see following sheet for WTF cost estimate

Sum of Estimated Construction Cost	**$**	**20,157,000**
Contingency (20%)	$	4,032,000
Design, Engineering, and Construction Administration (25%)	$	5,040,000
Environmental, Permitting, Legal, Land Acquisition	$	350,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**29,579,000**

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER MASTER PLAN
Alternative 5A - 3 New Wells, Treat at 3 New Wells WTP
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE
General					
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$388,900	All Req'd	$ 388,900
2	Construction Surveying (1% of Total Bid Price)	LS	$77,100	All Req'd	$ 77,100
New Well Installation					
3	Drill new well to 500-feet; includes well casing (complete in-place including well development and test pumping)	EA	$475,254	3	$ 1,425,800
4	Install 75 HP well pump, motor, and column	EA	$133,380	3	$ 400,200
5	Pump house installation, including piping, valves, flowmeter, and chlorination equipment	EA	$215,250	3	$ 645,800
6	Panel, VFD, SCADA controls	EA	$242,400	3	$ 727,200
7	Power distribution	EA	$86,100	3	$ 258,300
8	Access road	LS	$8,000	All Req'd	$ 8,000
Piping to Connect Wells to WTP					
9	Excavate, furnish, and install 10" PVC C-900 pipe to existing WTP, includes backfill	LF	$212	17,200	$ 3,649,200
12	Connection to existing, including flushing, testing, and disinfection	LS	$15,000	All Req'd	$ 15,000
9	Excavate, furnish, and install 10" PVC C-900 pipe, includes backfill	LF	$212	410	$ 87,000
10	Excavate, furnish, and install 8" PVC C-900 pipe, includes backfill	LF	$181	2,677	$ 484,100

Sum of Estimated Construction Cost	**$**	**8,167,000**
Contingency (20%)	$	1,634,000
Design, Engineering, and Construction Administration (25%)	$	2,042,000
Environmental, Permitting, Legal, Land Acquisition	$	144,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**11,987,000**

PLANNING LEVEL COST

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER MASTER PLAN
Alternative 5B - 5 New Wells, Treat at Existing WTP
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE
General					
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$548,700	All Req'd	$ 548,700
2	Construction Surveying (1% of Total Bid Price)	LS	$108,700	All Req'd	$ 108,700
New Well Installation					
3	Drill new well to 500-feet; includes well casing (complete in-place including well development and test pumping)	EA	$475,254	5	$ 2,376,300
4	Install 75 HP well pump, motor, and column	EA	$133,380	5	$ 666,900
5	Pump house installation, including piping, valves, flowmeter, and chlorination equipment	EA	$215,250	5	$ 1,076,300
6	Panel, VFD, SCADA controls	EA	$242,400	5	$ 1,212,000
7	Power distribution	LS	$86,100	5	$ 430,500
8	Access road	LS	$10,000	All Req'd	$ 10,000
Piping to Connect Wells to WTP					
9	Excavate, furnish, and install 14" PVC C-900 pipe, includes backfill	LF	$241	17,200	$ 4,150,100
12	Connection to existing, including flushing, testing, and disinfection	LS	$15,000	All Req'd	$ 15,000
9	Excavate, furnish, and install 10" PVC C-900 pipe, includes backfill	LF	$212	638	$ 135,400
10	Excavate, furnish, and install 8" PVC C-900 pipe, includes backfill	LF	$181	4,382	$ 792,300

Sum of Estimated Construction Cost	**$**	**11,522,000**
Contingency (20%)	$	2,305,000
Design, Engineering, and Construction Administration (25%)	$	2,881,000
Environmental, Permitting, Legal, Land Acquisition	$	147,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**16,855,000**

PLANNING LEVEL COST

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER MASTER PLAN
Alternative 6 - Use Clementia for Domestic Storage
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE
General					
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$9,300	All Req'd	$ 9,300
2	Construction Surveying (1% of Total Bid Price)	LS	$1,900	All Req'd	$ 1,900
3	Rental	Month	$6,181	4	$ 27,800
4	Diesel for 100 days	Gal	$5	8880	$ 44,400
5	Connection to access hatch	ls	$10,000	All Req'd	$ 10,000
	Legal costs to get statutory exemption	ls	$100,000	All Req'd	$ 100,000

Sum of Estimated Construction Cost	**$**	**193,000**
Contingency (20%)	$	39,000
Design, Engineering, and Construction Administration (25%)	$	49,000
Environmental, Permitting, Legal	$	60,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**341,000**

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER SYSTEM MASTER PLAN
Alternative 7 - New Tank in Village C
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT		TOTAL PRICE
General						
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$106,600	All Req'd	$	106,600
2	Construction Surveying (1% of Total Bid Price)	LS	$21,200	All Req'd	$	21,200
New Tank						
3	Site work and excavation	LS	$499,200	All Req'd	$	499,200
4	Tank foundation, reinforced concrete slab 6" thick with min. 24" aggregate fill	CY	$640	185	$	118,600
5	Overflow piping	LS	$25,600	All Req'd	$	25,600
6	Construct 1.0 MG bolted steel tank, includes valving, piping	EA	$1,152,000	1	$	1,152,000
7	SCADA, telemetry, and controls	LS	$100,000	All Req'd	$	100,000
Transmission System Connection to New Tank						
8	Connection to existing, including flushing, testing, and disinfection	LS	$20,000	All Req'd	$	20,000
9	Excavate, furnish, and install 12" PVC C-900 pipe, includes backfill	LF	$230	850	$	195,400

Sum of Estimated Construction Cost	**$**	**2,239,000**
Contingency (20%)	$	448,000
Design, Engineering, and Construction Administration (25%)	$	560,000
Environmental, Permitting, Legal	$	25,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**3,272,000**

RMCSD

IWMP Alt 7

PLANNING LEVEL COST

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER SYSTEM MASTER PLAN
Alternative 8 - New Tank in Village H
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE
General					
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$112,100	All Req'd	$ 112,100
2	Construction Surveying (1% of Total Bid Price)	LS	$22,200	All Req'd	$ 22,200
New Tank					
3	Site work and excavation	LS	$499,200	All Req'd	$ 499,200
4	Tank foundation, reinforced concrete slab 6" thick with min. 24" aggregate fill	CY	$640	185	$ 118,600
5	Overflow piping	LS	$25,600	All Req'd	$ 25,600
6	Construct 1.0 MG bolted steel tank, includes valving, piping	EA	$1,152,000	1	$ 1,152,000
7	SCADA, telemetry, and controls	LS	$100,000	All Req'd	$ 100,000
Transmission System Connection to New Tank					
8	Excavate, furnish, and install 12" PVC C-900 pipe, includes backfill	LF	$230	1,320	$ 303,400
9	Connection to existing, including flushing, testing, and disinfection	LS	$20,000	All Req'd	$ 20,000

Sum of Estimated Construction Cost	**$**	**2,353,000**
Contingency (20%)	$	471,000
Design, Engineering, and Construction Administration (25%)	$	589,000
Environmental, Permitting, Legal	$	25,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**3,438,000**

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER SYSTEM MASTER PLAN
Alternative 9 - New Tank at Van Vleck
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT		TOTAL PRICE
General						
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$138,900	All Req'd	$	138,900
2	Construction Surveying (1% of Total Bid Price)	LS	$27,500	All Req'd	$	27,500
New Tank						
3	Site work and excavation	LS	$698,880	All Req'd	$	698,900
4	Tank foundation, reinforced concrete slab 6" thick with min. 24" aggregate fill	CY	$640	289	$	185,200
5	Overflow piping	LS	$35,840	All Req'd	$	35,900
6	Construct 1.4 million-gallon bolted steel tank, includes valving, piping	EA	$1,612,800	1	$	1,612,800
7	SCADA, telemetry, and controls	LS	$100,000	All Req'd	$	100,000
Transmission System Connection to New Tank						
8	Excavate, furnish, and install 12" PVC C-900 pipe, includes backfill	LF	$230	420	$	96,600
9	Connection to existing, including flushing, testing, and disinfection	LS	$20,000	All Req'd	$	20,000

Sum of Estimated Construction Cost	**$**	**2,916,000**
Contingency (20%)	$	584,000
Design, Engineering, and Construction Administration (25%)	$	729,000
Environmental, Permitting, Legal	$	25,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**4,254,000**

RMCSD

IWMP Alt 9

PLANNING LEVEL COST

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER SYSTEM MASTER PLAN
Alternative 10 - Village C Booster Station
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT		TOTAL PRICE
General						
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$54,500	All Req'd	$	54,500
2	Construction Surveying (1% of Total Bid Price)	LS	$10,800	All Req'd	$	10,800
Booster Station Installation						
3	Install booster station, includes pump house, piping, valves, and flowmeter	LS	$213,500	All Req'd	$	213,500
	Install 25 HP regular duty pump and motor	EA	$95,300	2	$	190,600
	25 HP VFDs	EA	$10,020	2	$	20,100
4	Install 40 HP fire pump and motor	EA	$152,400	2	$	304,800
5	40 HP VFDs	EA	$16,700	2	$	33,400
6	Power distribution, electrical, instrumentation and controls	LS	$134,400	All Req'd	$	134,400
7	Install emergency generator & automatic transfer switch	EA	$37,000	4	$	148,000
Distribution System Connection to New Booster Station						
8	Excavate, furnish, and install 12" PVC C-900 pipe, includes backfill	LF	$230	54	$	12,500
9	Connection to existing, including flushing, testing, and disinfection	LS	$20,000	All Req'd	$	20,000

Sum of Estimated Construction Cost	**$**	**1,143,000**
Contingency (20%)	$	229,000
Design, Engineering, and Construction Administration (25%)	$	286,000
Environmental, Permitting, Legal	$	20,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**1,678,000**

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER SYSTEM MASTER PLAN
Alternative 11 - New Hydrants and Pipeline Upsizing
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE
General					
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$274,000	All Req'd	$ 274,000
2	Construction Surveying (1% of Total Bid Price)	LS	$54,300	All Req'd	$ 54,300
3	Temporary controls of traffic	LS	$200,000	All Req'd	$ 200,000
4" Pipe Upsizing					
4	Excavate, furnish, and install 8" PVC C-900 pipe, includes backfill	LF	$181	18,409	$ 3,328,400
5	Connection to existing, including flushing, testing, and disinfection	EA	$5,000	50	$ 250,000
Fire Hydrants					
6	Install fire hydrant assemblies	EA	$8,800	13	$ 114,400
Upsizing for Existing Conditions					
7	Excavate, furnish, and install 12" PVC C-900 pipe along Guadalupe Dr, includes backfill	LF	$230	3,282	$ 754,900
8	Excavate, furnish, and install 10" PVC C-900 pipe along Escuela Dr, includes backfill	LF	$212	2,679	$ 568,000
9	Connection to existing, including flushing, testing, and disinfection	EA	$5,000	2	$ 10,000
Upsizing for Buildout Conditions					
10	Excavate, furnish, and install 12" PVC C-900 pipe along De La Cruz Dr, includes backfill	LF	$230	585	$ 134,600
11	Excavate, furnish, and install 12" PVC C-900 pipe along Clementia Cir, includes backfill	LF	$230	280	$ 64,400
12	Connection to existing, including flushing, testing, and disinfection	EA	$5,000	2	$ 10,000

Sum of Estimated Construction Cost	**$**	**5,763,000**
Contingency (20%)	$	1,153,000
Design, Engineering, and Construction Administration (25%)	$	1,441,000
Environmental, Permitting, Legal	$	40,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**8,397,000**

PLANNING LEVEL COST

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER SYSTEM MASTER PLAN
Alternative 12 - WWRP Improvements
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE
General					
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$11,700	All Req'd	$ 11,700
2	Construction Surveying (1% of Total Bid Price)	LS	$2,400	All Req'd	$ 2,400
3	EQ Basin Air Gap	LS	$ 57,440	All Req'd	$ 57,500
4	New Chlorine Contact Basin	EA			
5	Dechlorination System	EA	$ 45,233	All Req'd	$ 45,300
6	DAF Pump Improvements	LS	$128,000	All Req'd	$ 128,000

Sum of Estimated Construction Cost	**$**	**245,000**
Contingency (20%)	$	49,000
Design, Engineering, and Construction Administration (25%)	$	62,000
Environmental, Permitting, Legal	$	20,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**376,000**

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER SYSTEM MASTER PLAN
Alternative 13 - Reclaimed Transmission Improvements
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE
General					
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$181,400	All Req'd	$ 181,400
2	Construction Surveying (1% of Total Bid Price)	LS	$35,400	All Req'd	$ 35,400
3	Temporary controls of traffic	LS	$60,000	All Req'd	$ 60,000
4	North Course Transmission Replacement	LF	$230	11,600	$ 2,668,000
5	North Course Pump Station Rehab	LS	$862,700	All Req'd	$ 862,700

Sum of Estimated Construction Cost	**$**	**3,808,000**
Contingency (20%)	$	762,000
Design, Engineering, and Construction Administration (25%)	$	952,000
Environmental, Permitting, Legal	$	25,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**5,547,000**

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
INTEGRATED WATER MASTER PLAN
Permanent Water Treatment Plant for Full Treatment of Five Wells
PLANNING LEVEL COST ESTIMATE
(YEAR 2024 COST)

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE
General					
1	Mobilization/Demobilization (not to exceed 5% of Total Bid Price)	LS	$556,100	All Req'd	$ 556,100
2	Project safety, temporary traffic control, quality control	LS	$75,000	All Req'd	$ 75,000
Central Water Treatment Facility					
3	Site work, including clearing and grubbing	LS	$373,793	All Req'd	$ 373,800
5	Operating/Mechanical building	SF	$273	6,469	$ 1,766,200
6	Evaporation pond excavation/embankment	CY	$78	4,433	$ 345,800
7	Evaporation pond liner	SF	$1.56	185,698	$ 289,700
8	Backwash settling tanks	LS	$2,180,456	All Req'd	$ 2,180,500
9	Treatment equipment	LS	$3,815,799	All Req'd	$ 3,815,800
10	Mechanical, electrical, HVAC, plumbing	LS	$1,915,687	All Req'd	$ 1,915,700
11	Sodium hypochlorite system, including chemical feed pumps and equipment	LS	$358,218	All Req'd	$ 358,300
12	Controls and instrumentation work	LS	$467,241	All Req'd	$ 467,300
13	Generator set and automatic transfer switch	LS	$132,385	All Req'd	$ 132,400

Sum of Estimated Construction Cost	**$**	**12,277,000**
Contingency (20%)	$	2,456,000
Design, Engineering, and Construction Administration (25%)	$	3,070,000
TOTAL ESTIMATED PROJECT COST (2024 DOLLARS)	**$**	**17,803,000**

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
NET PRESENT VALUE ANALYSIS
INTEGRATED WATER MASTER PLAN
Existing Conditions - Groundwater Alternatives
(YEAR 2024 COST)

	No Treatment Req'd	Permanent WTP for Partial Flow	Portable Treatment Unit (10% of years)	Permanent WTP for Full Flow	Pipeline to Existing WTP
Capital Costs	$ 6,349,000	$ 12,533,000	$ 6,349,000	$ 17,184,000	$ 11,987,000
Annual O&M	$ 105,093	$ 321,320	$ 243,793	$ 573,785	$ 105,093
Present Worth O&M	$ 1,718,400	$ 5,254,000	$ 3,986,400	$ 9,382,200	$ 1,718,400
Salvage Value	$ 1,270,827	$ 2,524,893	$ 1,270,827	$ 3,510,097	$ 3,460,347
Present Worth Salvage Value	$ 855,200	$ 1,699,200	$ 855,200	$ 2,362,200	$ 2,328,700
Net Present Value	**$ 7,212,200**	**$ 16,087,800**	**$ 9,480,200**	**$ 24,204,000**	**$ 11,376,700**
Alt 3 % of time used for equal NPV	**n/a**	**54%**	**n/a**	**n/a**	**23%**

*NPV=Capital cost + present day worth of annual O&M-salvage value

*Present Worth O&M = Annual O&M $\times \frac{(1+i)^N-1}{i(1+i)^N}$

where i = interest rate, N = years

Rancho Murieta CSD
IWMP
NPV ANALYSIS (20 Year)

RANCHO MURIETA COMMUNITY SERVICES DISTRICT
NET PRESENT VALUE ANALYSIS
INTEGRATED WATER MASTER PLAN
Buildout Conditions - Groundwater Alternatives
(YEAR 2024 COST)

	No Treatment Req'd	Permanent WTP for Partial Flow	Portable Treatment Unit (10% of years)	Permanent WTP for Full Flow	Pipeline to Existing WTP
Capital Costs	$ 10,455,000	$ 21,284,000	$ 10,455,000	$ 29,579,000	$ 16,855,000
Annual O&M	$ 167,486	$ 356,072	$ 352,486	$ 635,843	$ 167,486
Present Worth O&M	$ 2,738,600	$ 5,822,300	$ 5,763,600	$ 10,397,000	$ 2,738,600
Salvage Value	$ 2,103,537	$ 4,352,730	$ 2,103,537	$ 6,119,873	$ 4,593,597
Present Worth Salvage Value	$ 1,415,600	$ 2,929,300	$ 1,415,600	$ 4,118,500	$ 3,091,400
Net Present Value	**$ 11,778,000**	**$ 24,177,000**	**$ 14,803,000**	**$ 35,857,500**	**$ 16,502,200**
Alt 3 % of time used for equal NPV	**n/a**	**52%**	**n/a**	**n/a**	**18%**

*NPV=Capital cost + present day worth of annual O&M-salvage value

*Present Worth O&M = Annual O&M $\times \frac{(1+i)^N-1}{i(1+i)^N}$

where i = interest rate, N = years

Rancho Murieta CSD
IWMP
NPV ANALYSIS (20 Year)

Discount Rate: 2% Per December 2022 OMB Circular

Salvage Values	20	Planning Period (yrs)

Alternative:	No treatment needed			blending treatment						portable treatment unit			permanent treatment						Pipeline to Existing WTP			
Item	PVC Pipelines	Well (casing, column) & Wellhouse	well pumps and motors	PVC Pipelines	Well (casing, column) & Wellhouse	well pumps and motors	WTF Mechanical Building	Backwash tanks	mech, elec, hvac, plumbing	PVC Pipelines	Well (casing, column) & Wellhouse	well pumps and motors	PVC Pipelines	Well (casing, column) & Wellhouse	well pumps and motors	WTF Mechanical Building	Backwash tanks + treatment equip	mech, elec, hvac, plumbing	PVC Pipelines	Well (casing, column) & Wellhouse	well pumps and motors	
Capital Costs	$571,100	$1,856,333	$400,200	$571,100	$1,856,333	$400,200	$551,500	$1,872,200	$598,200	$571,100	$1,856,333	$400,200	$571,100	$1,856,333	$400,200	$984,700	$3,343,200	$1,068,100	$4,220,300	$1,856,333	$400,200	
Lifespan	50	40	20	50	40	20	50	30	40	50	40	20	50	40	20	50	30	40	50	40	20	
Annual Depreciation (straight line)	$11,422	$46,408	$20,010	$11,422	$46,408	$20,010	$11,030	$62,407	$14,955	$11,422	$46,408	$20,010	$11,422	$46,408	$20,010	$19,694	$111,440	$26,703	$84,406	$46,408	$20,010	
Salvage Value at Planning Period	$342,660	$928,167	$0	$342,660	$928,167	$0	$330,900	$624,067	$299,100	$342,660	$928,167	$0	$342,660	$928,167	$0	$590,820	$1,114,400	$534,050	$2,532,180	$928,167	$0	
		Total	$1,270,827				Total	$2,524,893			Total	$1,270,827					Total	$3,510,097				Total $3,460,347

Buildout Alternatives

Alternative:	No treatment needed			blending treatment						portable treatment unit			permanent treatment						Pipeline to Existing WTP			
Item	PVC Pipelines	Well (casing, column) & Wellhouse	well pumps and motors	PVC Pipelines	Well (casing, column) & Wellhouse	well pumps and motors	WTF Mechanical Building	Backwash tanks	mech, elec, hvac, plumbing	PVC Pipelines	Well (casing, column) & Wellhouse	well pumps and motors	PVC Pipelines	Well (casing, column) & Wellhouse	well pumps and motors	WTF Mechanical Building	Backwash tanks + treatment equip	mech, elec, hvac, plumbing	PVC Pipelines	Well (casing, column) & Wellhouse	well pumps and motors	
Capital Costs	$927,700	$3,093,833	$666,900	$927,700	$3,093,833	$666,900	$989,100	$3,358,000	$1,072,800	$927,700	$3,093,833	$666,900	$927,700	$3,093,833	$666,900	$1,766,200	$5,996,300	$1,915,700	$5,077,800	$3,093,833	$666,900	
Lifespan	50	40	20	50	40	20	50	30	40	50	40	20	50	40	20	50	30	40	50	40	20	
Annual Depreciation (straight line)	$18,554	$77,346	$33,345	$18,554	$77,346	$33,345	$19,782	$111,933	$26,820	$18,554	$77,346	$33,345	$18,554	$77,346	$33,345	$35,324	$199,877	$47,893	$101,556	$77,346	$33,345	
Salvage Value at Planning Period	$556,620	$1,546,917	$0	$556,620	$1,546,917	$0	$593,460	$1,119,333	$536,400	$556,620	$1,546,917	$0	$556,620	$1,546,917	$0	$1,059,720	$1,998,767	$957,850	$3,046,680	$1,546,917	$0	
		Total	$2,103,537				Total	$4,352,730			Total	$2,103,537					Total	$6,119,873				Total $4,593,597

Existing Conditions

Short Lived Asset Reserve	no treatment				
Item	QTY	Cost Per Unit	5 Year	15 Year	
well house piping and valves	3	$ 71,750	$ 43,050		
SCADA, VFD, controls and panels	3	$ 242,400		$ 48,480	
gate valves	3	$ 5,148		$ 1,030	
		Total	$ 43,050	$ 49,510	

Short Lived Asset Reserve	blending treatment				
Item	QTY	Cost Per Unit	5 Year	15 Year	
well house piping and valves	3	$ 40,180	$ 24,108		
SCADA, VFD, controls and panels	3	$ 135,744		$ 27,149	
gate valves	3	$ 2,883		$ 577	
evap pond liner	1	$ 162,232		$ 10,815	
chem feed pumps	1	$ 40,120		$ 2,675	
WTP controls and instrumentation	1	$ 43,609		$ 2,907	
filter media	1	$ 50,150	$ 10,030		
		Total	$ 34,138	$ 44,123	

Short Lived Asset Reserve	portable treatment unit				
Item	QTY	Cost Per Unit	5 Year	15 Year	
well house piping and valves	3	$ 71,750	$ 43,050		
SCADA, VFD, controls and panels	3	$ 242,400		$ 48,480	
gate valves	3	$ 5,148		$ 1,030	
		Total	$ 43,050	$ 49,510	

Short Lived Asset Reserve	permanent treatment				
Item	QTY	Cost Per Unit	5 Year	15 Year	
well house piping and valves	3	$ 71,750	$ 43,050		
SCADA, VFD, controls and panels	3	$ 242,400		$ 48,480	
gate valves	3	$ 5,148		$ 1,030	
evap pond liner	1	$ 289,700		$ 19,313	
chem feed pumps	1	$ 71,644		$ 4,776	
WTP controls and instrumentation	1	$ 77,873		$ 5,192	
filter media	1	$ 89,554	$ 17,911		
		Total	$ 60,961	$ 78,791	

Existing Alts Annual Operation and Maintenance (O&M)				
Item	no treatment	blending	temp treatment	WTP
Labor	$ 10,000	$ 86,800	$ 20,000	$ 155,000
Utilities*	$ 1,034	$ 45,379	$ 2,534	$ 81,034
Supplies, Parts, Maintenance, Misc Repairs	$ 1,000	$ 16,800	$ 1,000	$ 30,000
Chemicals	$ -	$ 19,600	$ 500	$ 35,000
Equipment Replacement	$ 500	$ 74,480	$ 1,000	$ 133,000
Short Lived Asset Reserve	$ 92,560	$ 78,261	$ 92,560	$ 139,752
Portable Treatment Equipment			$ 126,200.00	
Totals	$ 105,093	$ 321,320	$ 243,793	$ 573,785

Buildout Conditions

Short Lived Asset Reserve	no treatment				
Item	QTY	Cost Per Unit	5 Year	15 Year	
well house piping and valves	5	$ 71,750	$ 71,750		
SCADA, VFD, controls and panels	5	$ 242,400		$ 80,800	
gate valves	3	$ 5,148		$ 1,030	
		Total	$ 71,750	$ 81,830	

Short Lived Asset Reserve	blending treatment				
Item	QTY	Cost Per Unit	5 Year	15 Year	
well house piping and valves	5	$ 40,180	$ 40,180		
SCADA, VFD, controls and panels	5	$ 135,744		$ 45,248	
gate valves	3	$ 2,883		$ 577	
evap pond liner	1	$ 162,232		$ 10,815	
chem feed pumps	1	$ 40,120		$ 2,675	
WTP controls and instrumentation	1	$ 52,331		$ 3,489	
filter media	1	$ 50,150	$ 10,030		
		Total	$ -	$ 50,210	$ 62,803

Short Lived Asset Reserve	portable treatment unit				
Item	QTY	Cost Per Unit	5 Year	15 Year	
well house piping and valves	5	$ 71,750	$ 71,750		
SCADA, VFD, controls and panels	5	$ 242,400		$ 80,800	
gate valves	3	$ 5,148		$ 1,030	
		Total	$ 71,750	$ 81,830	

Short Lived Asset Reserve	permanent treatment				
Item	QTY	Cost Per Unit	5 Year	15 Year	
well house piping and valves	5	$ 71,750	$ 71,750		
SCADA, VFD, controls and panels	5	$ 242,400		$ 80,800	
gate valves	3	$ 5,148		$ 1,030	
evap pond liner	1	$ 289,700		$ 19,313	
chem feed pumps	1	$ 71,644		$ 4,776	
WTP controls and instrumentation	1	$ 93,448		$ 6,230	
filter media	1	$ 89,554	$ 17,911		
		Total	$ 89,661	$ 112,149	

Buildout Alts Annual Operation and Maintenance (O&M)				
Item	no treatment	blending	temp treatment	WTP
Labor	$ 10,000	$ 86,800	$ 20,000	$ 155,000
Utilities	$ 1,906	$ 45,379	$ 3,406	$ 81,034
Supplies, Parts, Maintenance, Misc Repairs	$ 1,300	$ 16,800	$ 1,500	$ 30,000
Chemicals	$ -	$ 19,600	$ 700	$ 35,000
Equipment Replacement	$ 700	$ 74,480	$ 1,500	$ 133,000
Short Lived Asset Reserve	$ 153,580	$ 113,014	$ 153,580	$ 201,810
			$ 171,800.00	
Totals	$ 167,486	$ 356,072	$ 352,486	$ 635,843

Appendix F Groundwater Findings Technical Memorandum

ADKINS ENGINEERING & SURVEYING

Technical Memorandum

Literature Review for Groundwater Availability and in Support of Supplemental Well for Rancho Murieta Community Services District

TO: **Melinda Morris, General Manager**

Rancho Murieta Community Services District
15160 Jackson Road
Rancho Murieta, CA 95683

FROM: **Michael Moser, PE and Principal**

Adkins Engineering & Surveying, Inc
1435 Esplanade Avenue
Klamath Falls, OR 97601

DATE: **May 8, 2024**

CC: **Lisa Maddaus, PE and CEO**

Maddaus Water Management, Inc
105 Zephyr Road
Alamo, CA 94507

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Introduction

This technical memorandum is prepared for Rancho Murieta Community Services District (RMCSD or District) by Adkins Engineering & Surveying, Inc (Adkins), for the purpose of researching groundwater availability near the District via literature review. This task is part of the Integrated Water System Master Plan (IWMP) production carried out in partnership with Maddaus Water Management, Inc (MWM). Within this memo, the following key pieces of research were reviewed:

- South American Subbasin Groundwater Sustainability Plan, 2022, and appendices, notably:
    - Appendix 2-B: CoSANA Modeling Report (Woodard & Curran, 2021).
    - Appendix 3-A: Interconnected Surface Waters in the South American Subbasin (Larry Walker Associates, 2021).
    - Appendix 3-C: Vulnerable well impact analysis in the South American Subbasin (Larry Walker Associates, 2021).
- Central Sacramento Groundwater Management Plan, 2005, and appendices, notably:
    - Appendix E: Impact Analysis for Well Protection Program (Namvar & Taghavi, Water Resource & Information Management Engineering, Inc (WRIME), 2005).
- Production Water Well Assessment Technical Memorandum (Dunn Environmental, Inc (DE), 2013).

Relevant information within these key pieces of research is coalesced to assess and outline the potential groundwater availability near the District for both a backup supply well and long-term use. The District must comply with California SB 552 which outlines the requirement for small water suppliers (defined as less than 3,000 connections) to increase drought resilience by having a back-up water supply, either a well that meets average day demands, or an intertie with another water supplier. The existing and buildout conditions average day demands (determined by Adkins and MWM as part of the IWMP) were used to linearly interpolate to the 3,000 connection SB 552 target to calculate an average daily flow rate of 1,234 gallons per minute (GPM). Thus, this memo summarizes the availability of groundwater in terms of the South American and Cosumnes Subbasins as well as local availability.

First, this memorandum will summarize key findings from the literature reviewed. Then, regional and localized results are compared in terms of groundwater availability, groundwater level trends, and water budget for near-term and planning horizon. Finally, this memo will present recommendations for potential well placement, yield, and use.

Summary of Documents Reviewed

Appendix 2-B: CoSANA: An Integrated Water Resources Model of the Cosumnes, South American, and North American Groundwater Subbasins

This appendix to the South American Subbasin Groundwater Sustainability Plan (GSP) is an extensive modeling study, representing the North American Subbasin (NASb), South American Subbasin (SASb), and Cosumnes Subbasin (CoSb) in Sacramento County, California. This study outlines goals and objectives, model development and calibration, water supply and demands, development of baseline conditions and assumptions, and recommendations.

The South American Subbasin GSP was developed using the Cosumnes, South American, and North American Subbasins Integrated Water Resources Model (the CoSANA model, or CoSANA). The CoSANA model is a regional integrated water resources model, representing the complex relationships between land surface processes, hydrologic cycles, geology, and movement of water (surface water, groundwater, and interconnected surface and groundwaters) throughout the system.

Rancho Murieta is on the boundary of the SASb and the CoSb. Approximately 22% of the District falls within the CoSb based on urban area, compared to 32% within the SASb. The remaining demand of 46% falls outside of NASb, SASb, and CoSb boundaries, but within the model boundary. For the purposes of this literature review, modeling outputs and assumptions described here will focus on the SASb and CoSb as relevant to Rancho Murieta.

Geology is represented in CoSANA by five layers: the Riverbank Formation, the Laguna Formation, the Mehrten Formation, the Valley Springs Formation, and the Ion Formation. Generally, the Riverbank Formation is the recent alluvium, up to 188 feet thick. The Laguna Formation is up to 502 feet thick. The Mehrten Formation, a water bearing formation, is up to 1,487 feet thick. The Valley Springs Formation is also a water bearing formation and is up to 824

feet thick. The Ione Formation terminates just above the basement of fresh groundwater and is up to 795 feet thick. Minimal borings penetrate deeper than this layer.

These layers vary spatially across the project site, designated by 9 cross sections to show model stratigraphy. Cross Section E-E', indicated in Figure 1, spans from west to east across the SASb and CoSb, terminating just south of the Cosumnes River. For the purposes of our review, the left-most side of this cross section will be used to represent the stratigraphy of soil types within Rancho Murieta.

The CoSANA model indicates that the Mehrten Layer near Rancho Murieta is at and just below the ground surface and extending approximately 60-70 feet below ground surface, followed by the Valley Springs Layer which extends approximately 130 feet below the Mehrten Layer. The Ione Layer extends to a depth of approximately 500 feet below the Valley Springs Layer, or 750 feet below the ground surface. The approximate saltwater interface is nearly 1,000 feet below the ground surface. These modeled values are relatively consistent with observed test well drilling in this location. In the "Production Water Well Assessment" by Dunn Environmental, Inc (DE), discussed in later sections, they determine the local water bearing formations as the Mehrten, Valley Springs, and Ione Formations.

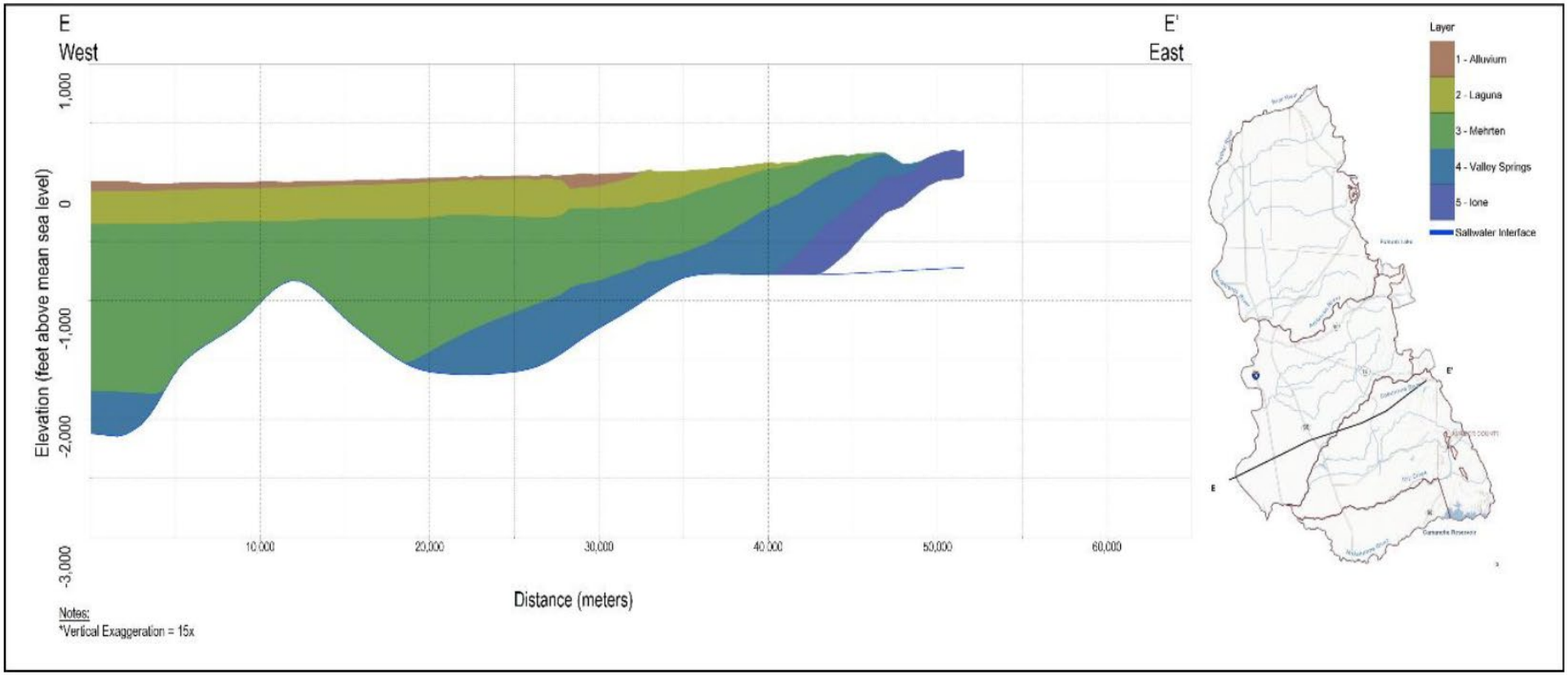

Figure 2-31: CoSANA Cross Section E-E'

Figure 1: Cross section location and vertical stratigraphy near Rancho Murieta, from CoSANA Model Report, page 2-42.

The CoSANA model provides detailed water budgets at each model element that are aggregated into water budgets for selected geographic areas. These water budgets were determined using extensive inflow and outflow data, from hydrologic inflows to subsurface groundwater interactions to evapotranspiration on land cover type and water demands.

The existing conditions water budget was used as a starting point for the various baseline conditions. Table 1 shows the cumulative water budget for each subbasin for existing conditions. The annual cumulative change in storage for SASb is 5,551 AFY while the annual cumulative change in storage for CoSb is -5,510 AFY. This corresponds to the gaining and losing reaches analysis described in the "Interconnected Surface Waters" report, discussed further in the next section. In short, the upper Cosumnes River, as it runs through Rancho Murieta and travels east, is considered a "losing reach" which means that surface water flows are being lost to groundwater via seepage. This would indicate that, at least in this location along the Cosumnes River, seepage is recharging groundwater volumes despite the overall loss in groundwater in the subbasin perspective (Larry Walker Associates, 2021).

Table 1: Cumulative annual groundwater budget for existing conditions, from CoSANA Model Report, page 4-14.

Table 4-2: Summary of CoSANA Groundwater Budget
(Average Annual for the Period WY 1995-2018)

Subbasin	Pumping (AFY)	Deep Percolation (AFY)	Gain from Stream (AFY)	Recharge from Canals (AFY)	Subsurface Inflow (AFY)	Boundary Flows (AFY)	Change in Storage (AFY)
NASb	315,794	189,988	85,907	18,320	18,220	30,019	26,661
SASb	221,618	130,317	101,953	15	-8,884	3,769	5,551
CoSb	130,048	108,054	18,977	0	-2,333	-162	-5,510
Total	**667,460**	**428,359**	**206,837**	**18,335**	**7,003***	**11,302**	**26,702**

Note: CoSANA total is a summation of NASb, SASb, and CoSb values and excludes areas outside of these subbasins.
* The model-wide subsurface inflow value includes subsurface flows to and from areas outside of the combined NASb, SASb, and CoSb area.

Using these water budgets, CoSANA produced groundwater contours across timesteps. The boundaries of these are Spring of 1998, marked by the end of a relatively wet period (Figure 2), and Fall of 2015, marked by the end of a recent drought periods (Figure 3).

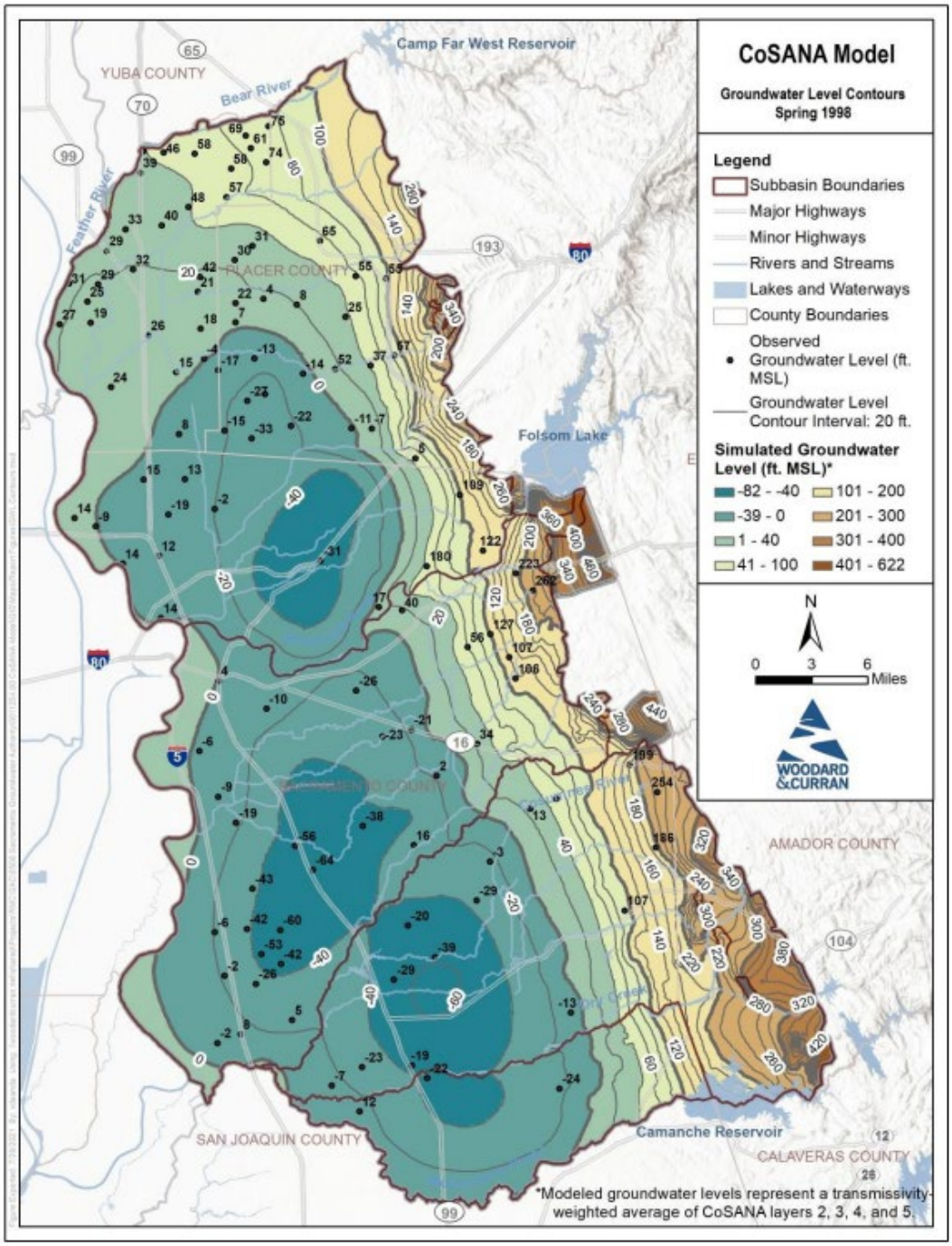

Figure 4-21: CoSANA Groundwater Level Contours – Spring 1998 (End of Wet Period)

Figure 2: Groundwater contours as modeled for Spring of 1998, from CoSANA Model Report, page 4-20.

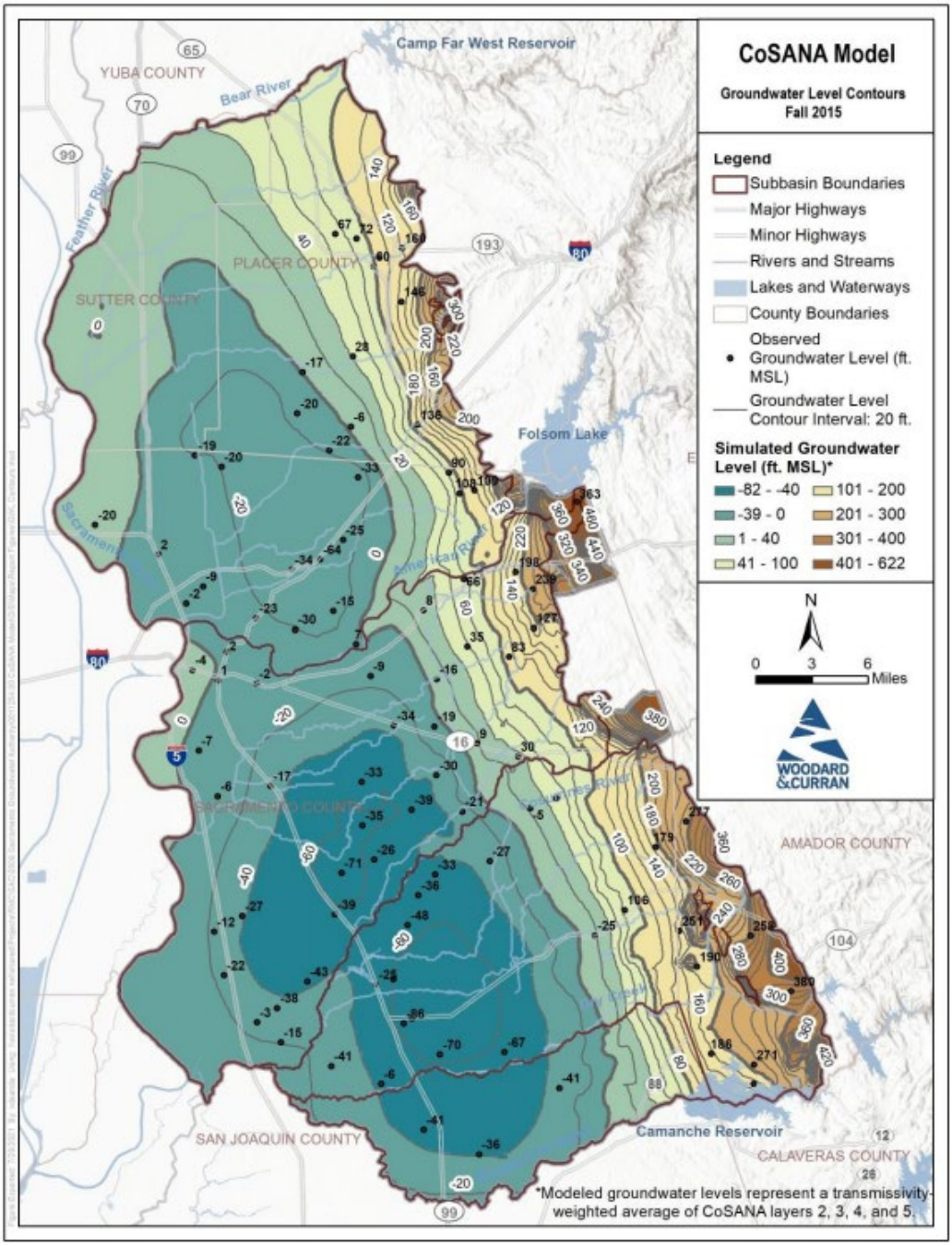

Figure 4-22: CoSANA Groundwater Level Contours – Fall 2015 (End of Drought Period)

Figure 3: Groundwater contours as modeled for Fall of 2015, from CoSANA Model Report, page 4-21.

For the Rancho Murieta location, these contours correspond with a high (Spring of 1998) groundwater at approximately 160 to 140 feet above MSL, or 20 to 40 feet below the ground surface. The model contours correspond to a low groundwater (Fall of 2015) at approximately

140 to 120 feet MSL, or 40 to 60 feet below the ground surface. As discussed in the "Production Water Well Assessment," test holes drilled in a cross section along the Cosumnes River showed groundwater at just above or just below 50 feet below the ground surface for a 2002 and a 1995 test hole, respectively (Figure 16). Thus, regional groundwater predictions made by CoSANA are substantiated by local groundwater investigations via field testing in the Rancho Murieta location.

CoSANA Hydrograph #25 (location ID 6802 – Cosumnes River, south of Rancho Murieta) modeled groundwater about 34 feet below the ground surface (213.68ft), with observed records showing just 22 feet below the ground surface. The trends appear to oscillate seasonally with a slight downward trend from 1994 to 2003 as shown in Figure 4.

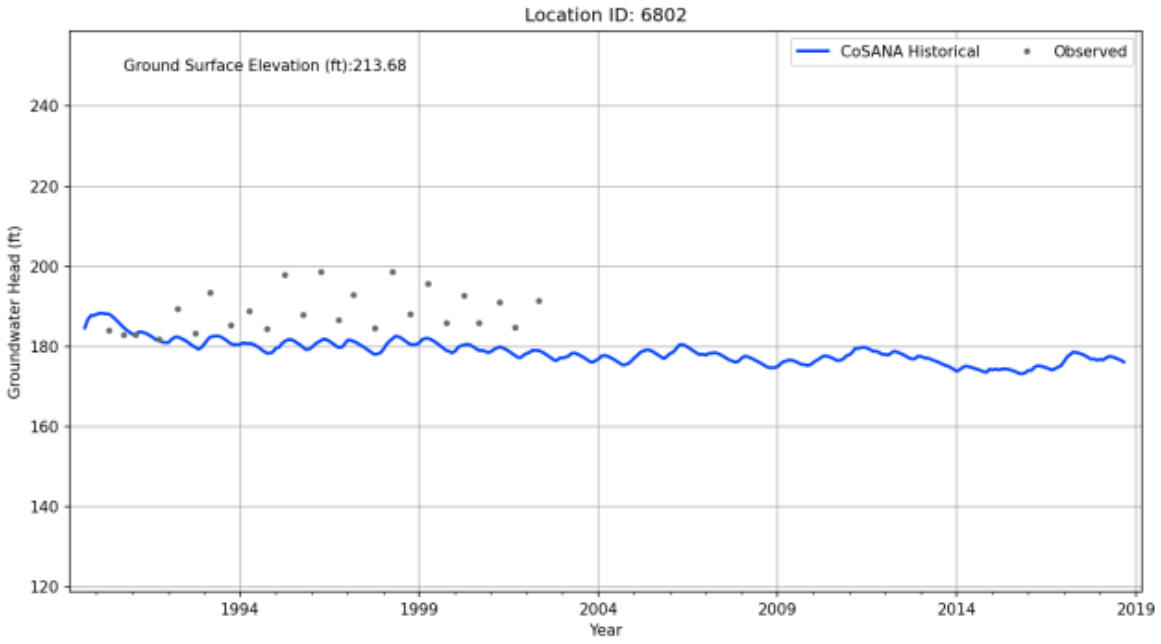

Figure 4-49: CoSANA Groundwater Level Hydrograph – Hydrograph #25

Figure 4: Modeled and observed groundwater levels for test well near Rancho Murieta, from CoSANA Model Report, page 4-36

As part of the development of the GSPs for each subbasin, three sets of baseline conditions have been defined for the CoSANA model. These represent the current conditions baseline (CCBL), projected conditions baseline (PCBL), and projected conditions baseline under climate change (PCBL with Climate Change) conditions. All baseline conditions utilize a planning horizon through 2070. The CCBL is a representation of long-term average conditions

assuming that a recent level of development and water demand persists over a long-term period of hydrologic conditions. The PCBL is a representation of the projected land and water use conditions of 2040 projected through the end of the planning horizon. The PCBL with Climate Change shares the same projected land use as the PCBL, but with additional factors such as changes in streamflow, precipitation, and evapotranspiration. Urban water use is assumed to remain unchanged.

The CCBL for SASb shows an annual positive change in storage of 2,158 AFY. For CoSb, this annual change is slightly negative, -233 AFY. These values are summarized in Table 2 below.

Table 2: Projected CCBL cumulative annual groundwater budget, from CoSANA Model Report, page 5-17.

Table 5-3: CCBL Average Annual Groundwater Budget

Subbasin	Pumping (AFY)	Deep Percolation (AFY)	Gain from Stream (AFY)	Recharge from Canals (AFY)	Boundary Flows (AFY)	Subsurface Inflow (AFY)	Change in Storage (AFY)
NASb	303,094	183,468	81,494	16,732	28,125	8,161	14,843
SASb	212,626	120,915	91,328	26	4,089	-1,573	2,158
CoSb	127,875	109,064	15,575	0	1,442	1,559	-233
Total	**643,595**	**413,447**	**188,397**	**16,758**	**33,656**	**8,147**	**16,768**

Note: Boundary Flows term includes flow between areas outside of the CoSANA model domain and baseflow from small watersheds. Subsurface Inflows includes flow between the simulated subbasins in CoSANA and areas outside of Bulletin 118 subbasins.

The PCBL for SASb shows an annual negative change in storage at the end of the planning horizon of -1,128 AFY. For CoSb, this annual change is -1,293 AFY. These values are summarized in Table 3 below.

Table 3: Projected PCBL cumulative annual groundwater budget, from CoSANA Model Report, page 5-38.

Table 5-6: PCBL Average Annual Groundwater Budget

Subbasin	Pumping (AFY)	Deep Percolation (AFY)	Gain from Stream (AFY)	Recharge from Canals (AFY)	Boundary Flows (AFY)	Subsurface Inflow (AFY)	Change in Storage (AFY)
NASb	323,167	167,424	107,950	16,376	30,140	6,710	5,390
SASb	234,003	121,313	105,665	26	4,886	986	-1,128
CoSb	128,332	107,977	16,494	0	1,536	1,030	-1,293
Total	**685,501**	**396,714**	**230,109**	**16,402**	**36,561**	**8,726**	**2,969**

Note: Boundary Flows term includes flow between areas outside of the CoSANA model domain and baseflow from small watersheds. Subsurface Inflows includes flow between the simulated subbasins in CoSANA and areas outside of Bulletin 118 subbasins.

The PCBL with Climate Change for SASb shows an annual negative change in storage at the end of the planning horizon of -6,222 AFY. For CoSb, this annual change is -9,762 AFY. These values are summarized in Table 4 below.

Table 4: Projected PCBL with Climate Change cumulative annual groundwater budget, from CoSANA Model Report, page 5-38.

Table 5-9: PCBL with Climate Change Average Annual Groundwater Budget

Subbasin	Pumping (AFY)	Deep Percolation (AFY)	Gain from Stream (AFY)	Recharge from Canals (AFY)	Boundary Flows (AFY)	Subsurface Inflow (AFY)	Change in Storage (AFY)
NASb	343,000	160,987	122,181	16,401	32,744	7,228	-3,502
SASb	245,752	114,730	118,164	26	6,198	411	-6,222
CoSb	137,276	101,490	20,744	0	1,540	3,739	-9,762
Total	**726,028**	**377,207**	**261,089**	**16,427**	**40,481**	**11,378**	**-19,486**

This indicates that from a long-term, subbasin-wide perspective, groundwater is projected to become increasingly overdrawn in the subbasins that surround Rancho Murieta. As this is a subbasin-wide analysis, however, this does not mean that the aquifers near Rancho Murieta would dry up, just that the water balance shows a negative change in storage for the entire subbasin. This is supported in the "Vulnerable well impact analysis" (Larry Walker Associates, 2021), discussed in later sections, which determined that even after the historic drought event of 2015, no wells in the SASb were reported dry. This means that a return to Fall 2015 groundwater level lows is unlikely to result in catastrophic and widespread well impacts.

Appendix 3-A: Interconnected Surface Waters (ISW) in South American Subbasin

This appendix is a modeling study that informs on the full South American Subbasin GSP. This study reports on long-term and recent groundwater level conditions (2005-2018) in the SASb and characterizes interconnected surface waters (ISW) using the outputs of the CoSANA model. This appendix outlines the location and quantity of streamflow depletions, the identification of ISW locations, timing and quantity of ground- and surface-water interactions, and provides projections and recommendations for dynamic groundwater levels across the SASb.

Because the eastern reach of the Cosumnes is nearest Rancho Murieta, only modeling outputs relevant to this reach will be summarized in our literature review. The two gages analyzed on the Cosumnes River are the Michigan Bar gage (MHB) just upstream of Rancho Murieta and the USGS McConnell gage (MCC) which is approximately 20 miles downstream of MHB. Groundwater elevation mapping in the SASb is represented by contour maps showing depth to groundwater. Figure 5 shows depth to groundwater using overall averages from 2005-2018 for Spring and Fall. These represent the existing conditions baseline.

Future groundwater elevations are simulated by four scenarios. These are Projected, representing increased groundwater demands from planned developments; Projected CC representing the Projected demands, with a median climate warming scenario; Projected PMA representing groundwater use with feasible, in-progress projects and management actions (harvest water, recharge efforts, regional conjunctive use); and Projected PMA CC representing the Projected PMA demands and management actions with a median climate warming scenario. The Projected Scenario represents “business as usual” developments and increases for groundwater. The Projected CC represents “business as usual” with warmer temperatures and less precipitation. For the sake of comparison, the Projected CC Scenario would be the “worst case” of the four scenarios compared to baseline.

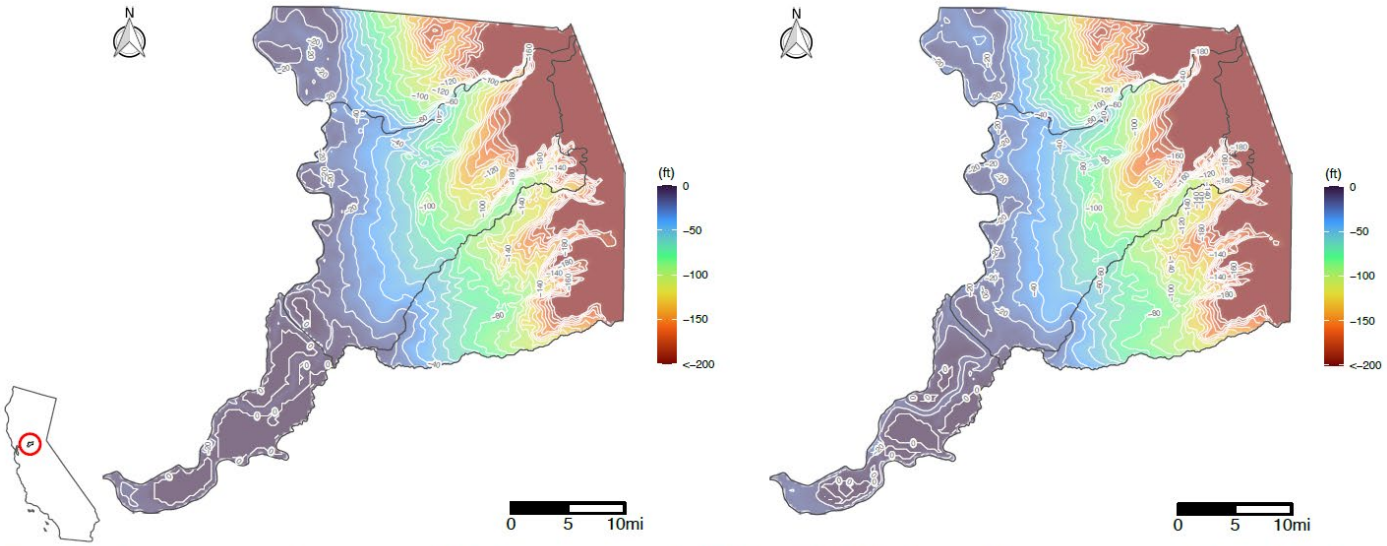

Figure 20: Depth to groundwater in the SASb for average spring (left) and fall (right) conditions across the entire period of record evaluated (2005-2018).

Figure 5: SASb depth to groundwater contours for average spring and fall from 2005-2018, from ISW Report, page 40.

For the Rancho Murieta location, the model indicates that groundwater levels are generally 160 to 140 (Spring) to 104 to 120 (Fall) feet MSL, or 20 to 40 (Spring) to 40 to 60 (Fall) feet below the ground surface. Projected CC groundwater levels, the "worst case" modeled, are expected to be -5 feet from the existing depth to groundwater modeled. If PMA are implemented under projected conditions, then groundwater is modeled to increase by 0 to 5 feet in the Rancho Murieta location. See Figure 6.

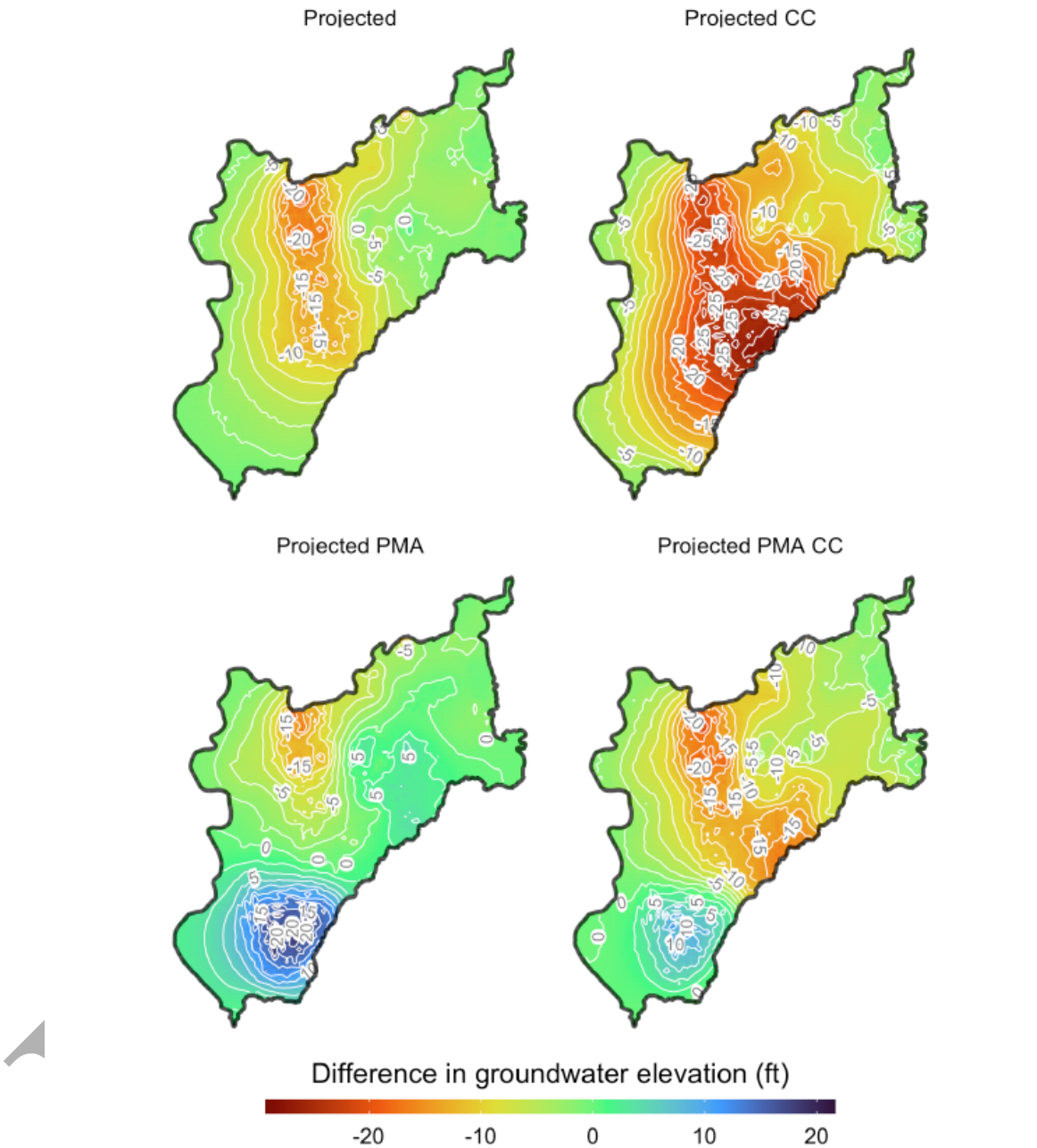

Figure 21: Modeled difference in groundwater level between each of the scenarios and the current conditions baseline at a Fall 2015 benchmark. PMA lead to substantial increases in groundwater level that reduce seepage (e.g., improve baseflow) and increase streamflow at ISW reaches. Climate change projections lead to groundwater level declines, but assume no corrective action or land use change. In reality, climate change would require specialized adaptive management to avoid significant and unreasonable impacts to beneficial users of groundwater and ISW.

Figure 6: Modeled difference in groundwater for each scenario compared to baseline, ISW Report, page 41.

Over time, the Cosumnes is characterized as a stream experiencing active depletion, or losses, to seepage. Understanding the location and timing of gaining and losing streams is essential for anticipating how ISW depletions might change over time and water management

scenarios. See Figure 7 for the seasonal variation in stream losses for the Cosumnes River, the lower right-most reach illustrated.

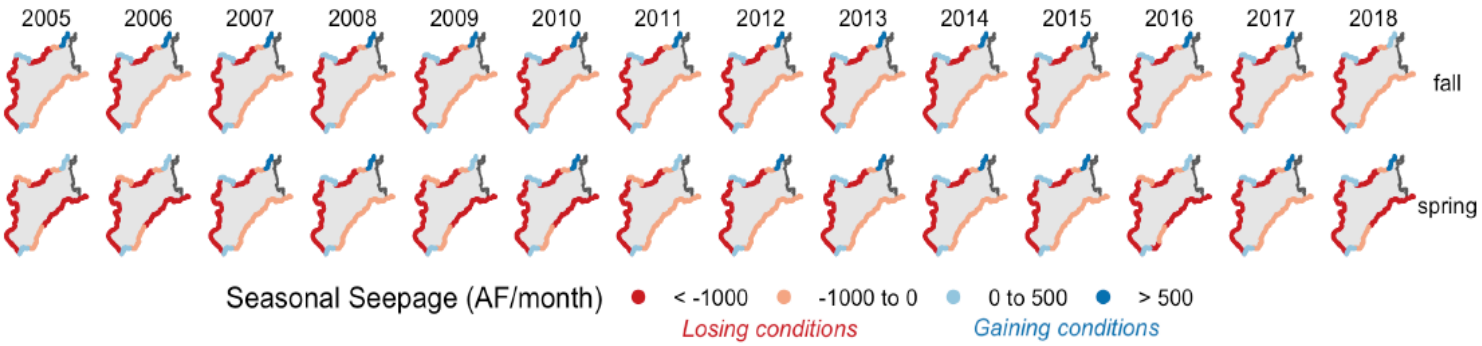

Figure 29: Major gaining and losing stream reaches from 2005-2018 in fall and spring according to the current conditions baseline. Average seasonal seepages show mostly losing (red) reaches.

Figure 7: Major streams in the SASb classified as gaining or losing for spring and fall seasons, 2005-2018, from ISW Report, page 51.

The figure shows that the Cosumnes River is consistently losing surface flows to groundwater via seepage. This is generally on the scale of 0 to 1,000 AF per month in the Fall, to greater than 1,000 AF per month in the Spring. As these losses to seepage on the Cosumnes River are relatively consistent despite season across the study period, it is reasonable to assume that groundwater recharge along losing reaches is stable.

Appendix 3-C: Vulnerable well impact analysis in the South American Subbasin

This appendix is an assessment report of wells in the SASb in terms of the recent drought (2012-2016) conditions. This assessment includes review of well construction data, well depth, and historic groundwater trends to determine the extent of which wells in the SASb are negatively impacted. This appendix also recommends sustainable management criteria to mitigate impacts to vulnerable wells.

During fall of 2015, groundwater levels reach a modern historical low in the SASb, brought on by four years of drought (2012-2016). These conditions were exacerbated by excess pumping to augment lost surface water supply. Despite this, no wells in the SASb were reported dry, in contrast to more than two thousand wells reported dry across California. This suggests that a return to Fall 2015 groundwater level lows is unlikely to result in catastrophic and widespread well impacts.

Key data used in this analysis include groundwater measurements taken by various state-level and local sources and well completion reports. Summary of measurements were compared to CoSANA existing conditions baseline for groundwater over the study period (2005-2018). Projections for groundwater utilized the scenarios outlined in the ISW Report (see Figure 6). Wells were classified as vulnerable if groundwater levels were projected to fall below the 30-foot operating margin above the total completed well depth.

Well impact analysis under projected baseline conditions was evaluated to assess impacts assuming a return to historic Fall 2015 lows, and projected groundwater management and climate change scenarios. Results suggest that, even assuming a worst-case climate change scenario with no projects and management actions, existing wells are unlikely to be negatively impacted. For Rancho Murieta, the "worst case scenario" indicates that groundwater levels drop to 5 feet lower than existing conditions, with wells in this area being mostly in the Valley Springs or Ione Formations, leaving these wells with a considerable buffer against climate-change conditions (see Figure 8). This is supported by the "Impact Analysis for Well Protection Program" discussed in the next section (see Figure 14).

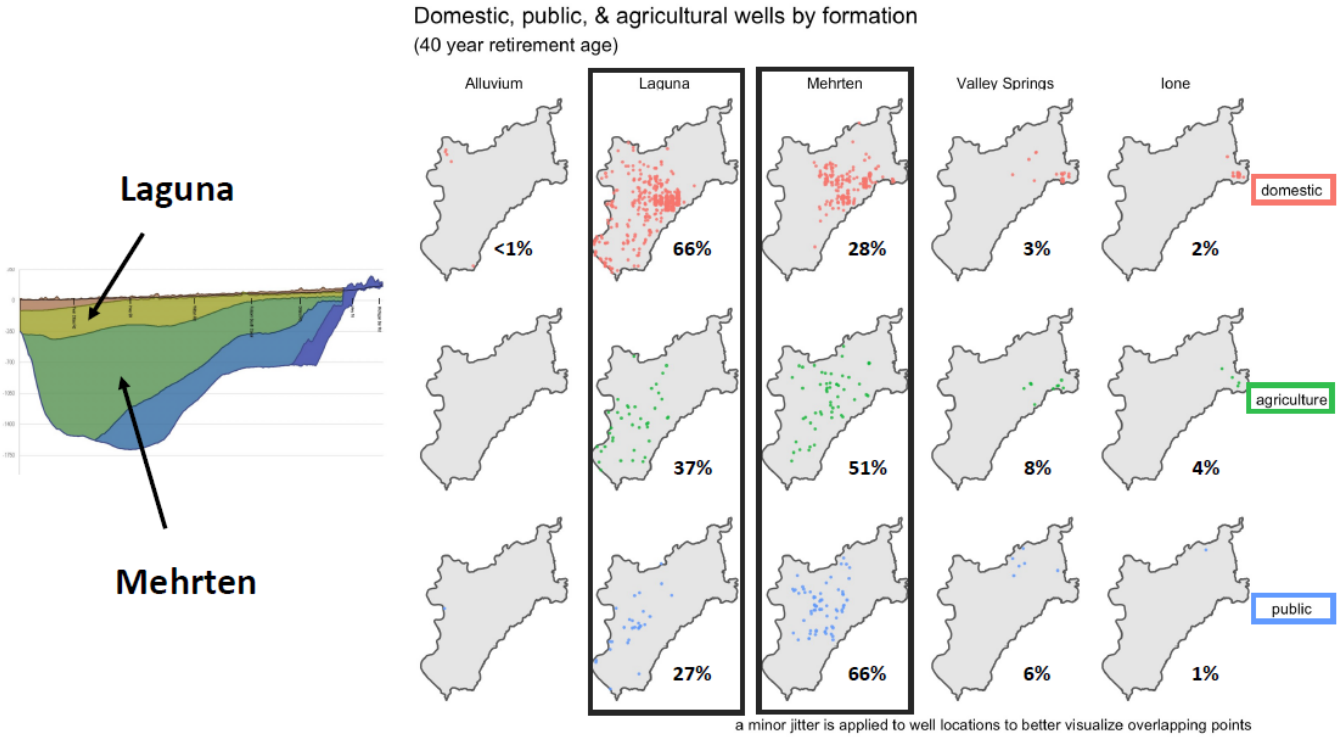

Figure 12: Most wells that provide beneficial uses bottom out in the Laguna or Mehrten, thus transmissivity-weighted heads from these layers (the principal aquifer) are used to evaluate differences in groundwater elevation implied by the projected scenarios.

Figure 8: Well types by formation in SASb, from Vulnerable well assessment report, page 23.

Appendix 1-A, E: Central Sacramento County Groundwater Management Plan – Impact Analysis for Well Protection Program Technical Memorandum

This appendix to the GSP is part of the Central Sacramento Groundwater Management Plan (GMP). It is a technical memorandum that summarizes the results of a hydrologic model used to analyze three simulations in the Central Basin of Central Sacramento County. These future scenarios are the "No Project" Baseline, the Proposed Project, and the Reduced Surface Water Availability.

The "No Project" represents land and water use conditions based on Sacramento County's General Plan build-out level of development through 2030, and corresponding water supply conditions. The "Proposed Project" represents development build-out conditions with the water supplies proposed under the Zone 40 WSMP, representing increased development from "No Project" with corresponding increased water demands. The "Reduced Surface Water Availability" is considered the "worst case scenario" where buildout conditions occur, but with a 26,700 AFY reduction in surface water diversion for Zone 40 and increased groundwater pumping by 26,700 AFY. See Figure 9 for a map of Zone 40.

The modeled groundwater levels were compared with the well bottom depth elevation data across test wells in Zone 40. Water supplies and demands were determined for each subregion using agriculture and urban demands with projected groundwater and surface water uses, plus any remediation reuses. These demands and supplies were developed for each subregion in the study area, which included Rancho Murieta. Using the 2030 Baseline as basis, Rancho Murieta was determined to have a total water demand of 6,096 AFY. Supplies were determined to be 6,096 AFY, 6,096 AFY, and 6,120 AFY for the No Project, Proposed Project, and Reduced Surface Water Availability scenarios, respectively.

Wells in the western part of the Central Basin pump from the upper aquifer, Layer 1 (which corresponds with the Laguna Formation), while wells in the eastern part pump from the lower aquifer, Layer 2 (corresponding with the Mehrten, Valley Springs, and Ione Formations). The wells analyzed along the east-west cross section are shown in Figure 10 with a vertical distribution of the same cross section shown in Figure 11.

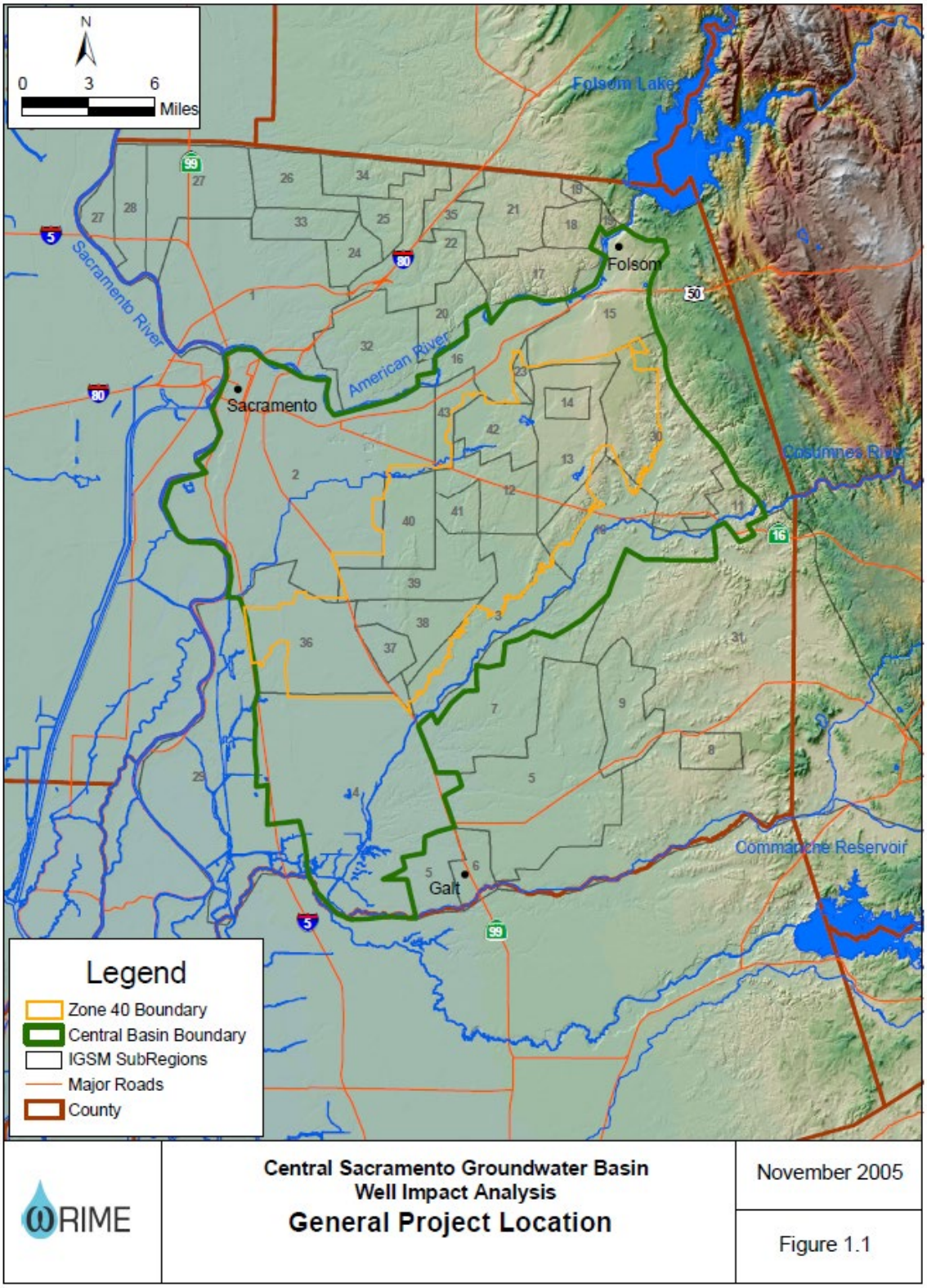

Figure 9: Map of Zone 40 in Central Sacramento County, from Impact Analysis TM, page 4.

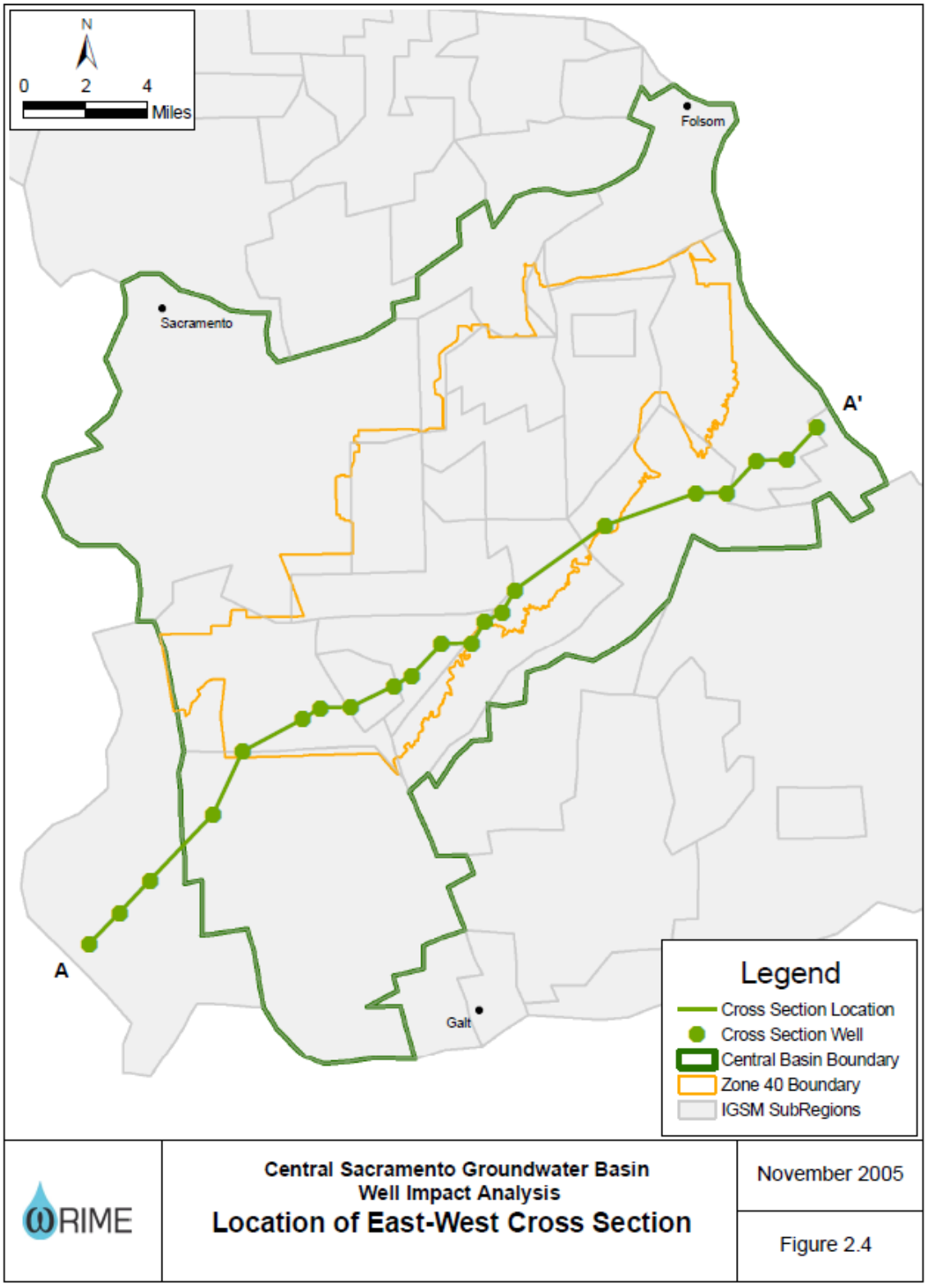

Figure 10: Cross section well locations, from Impact Analysis TM, page 13.

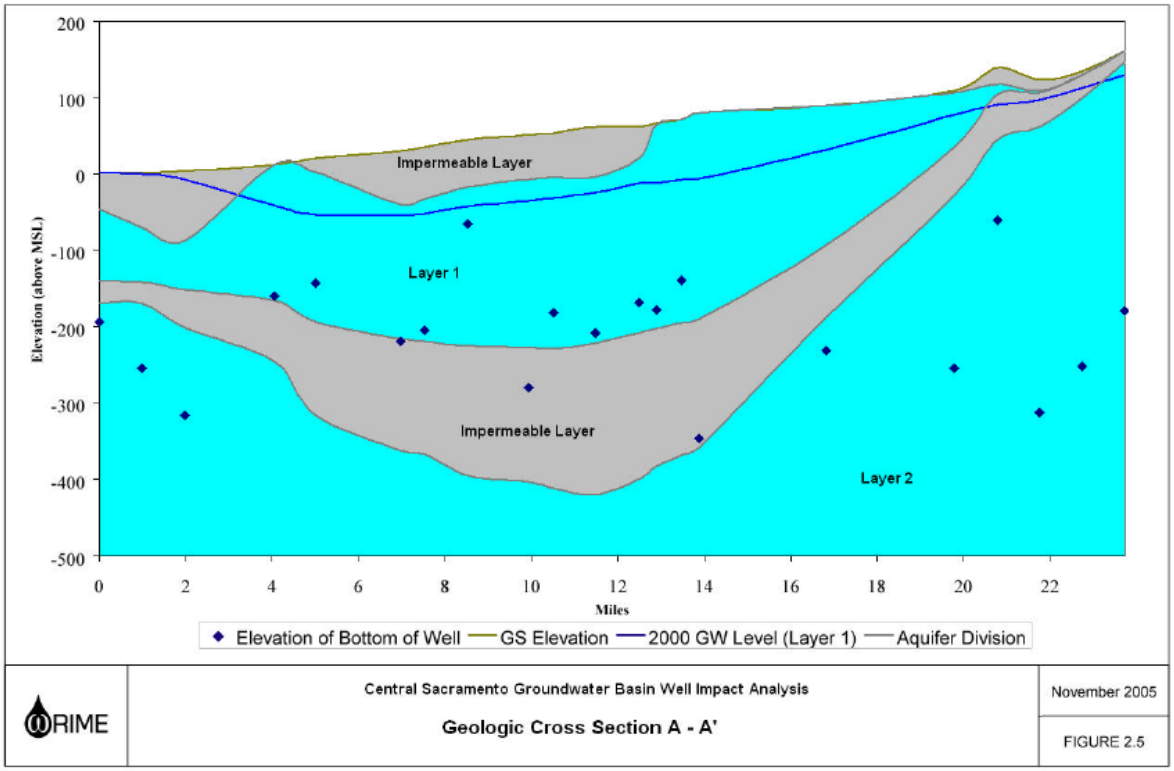

Figure 11: Cross section well depths within Layers 1 and 2, from Impact Analysis TM, page 15.

Along the A-A' cross section in the figure above, the two right-most points represent wells nearest to Rancho Murieta. These two wells are approximately 320-feet and 370-feet below the ground surface.

Modeled groundwater levels for Layer 2 in the Reduced Surface Water scenario are compared to the No Project scenario in Figure 12 and are compared to the Proposed Project scenario in Figure 13. This shows that, even with increased demands due to build-out conditions and reduced stream flows, the decline in groundwater levels near Rancho Murieta are 0 to 5 feet or near 5 feet, respectively. As the sample wells in this location are pumping from Layer 2, the wells were not indicated as impacted negatively by the scenarios modeled, shown in Figure 14. This is supported by the "Vulnerable well impact analysis" discussed in previous sections.

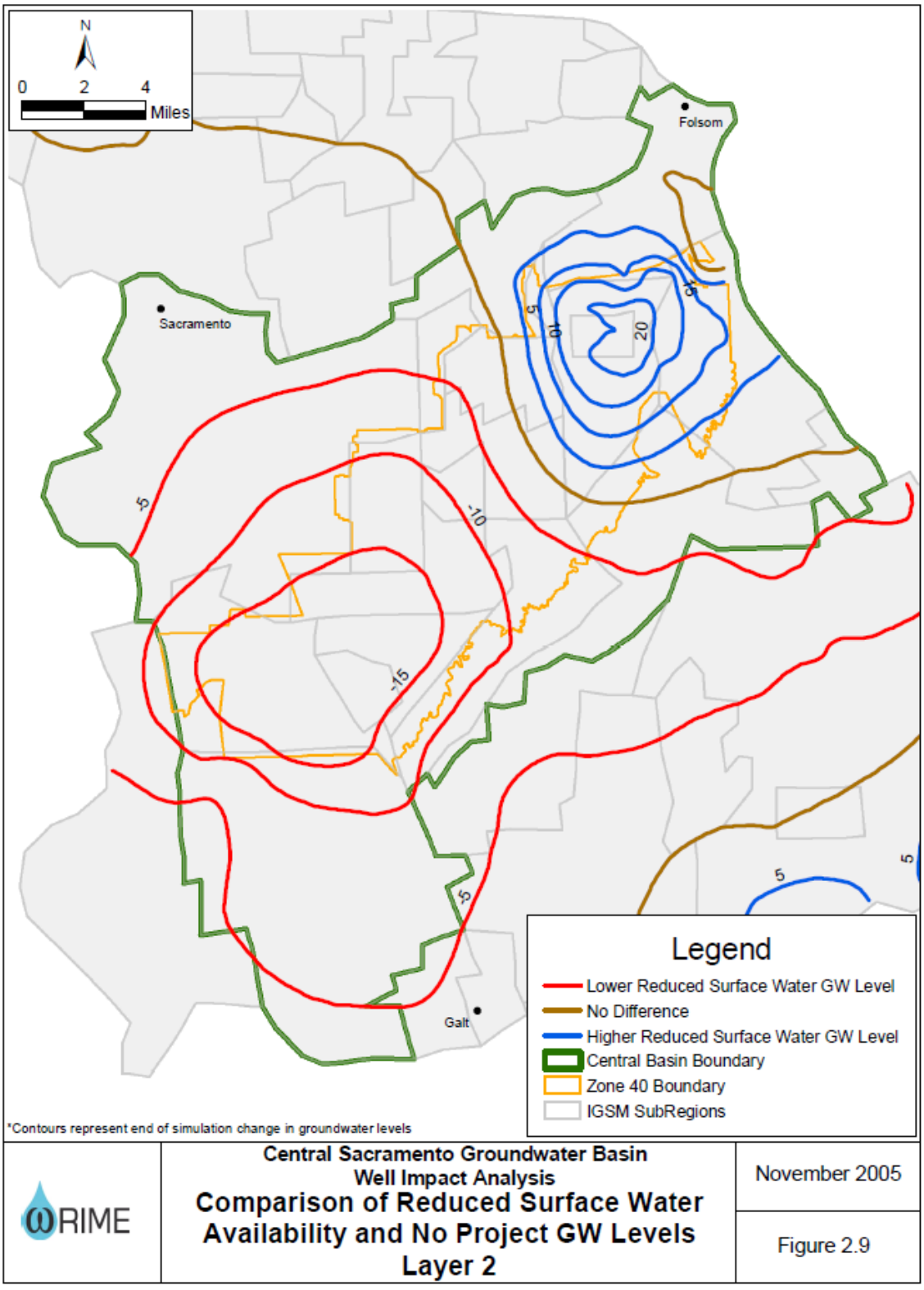

Figure 12: Groundwater contours in Layer 2 comparing Reduced Surface Water Scenario with No Project Scenario, from Impact Analysis TM, page 19.

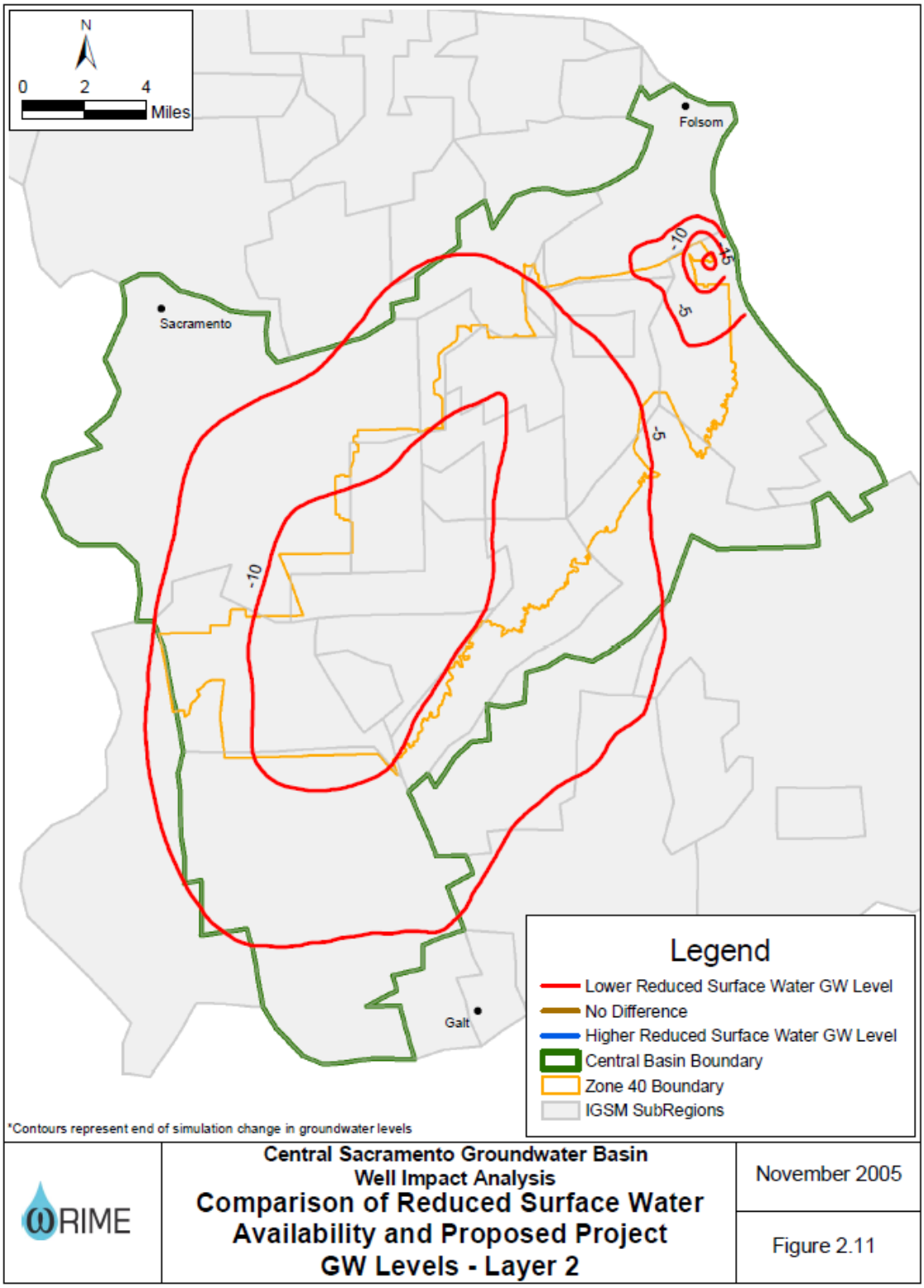

Figure 13: Groundwater contours in Layer 2 comparing Reduced Surface Water Scenario with Proposed Project Scenario, from Impact Analysis TM, page 21.

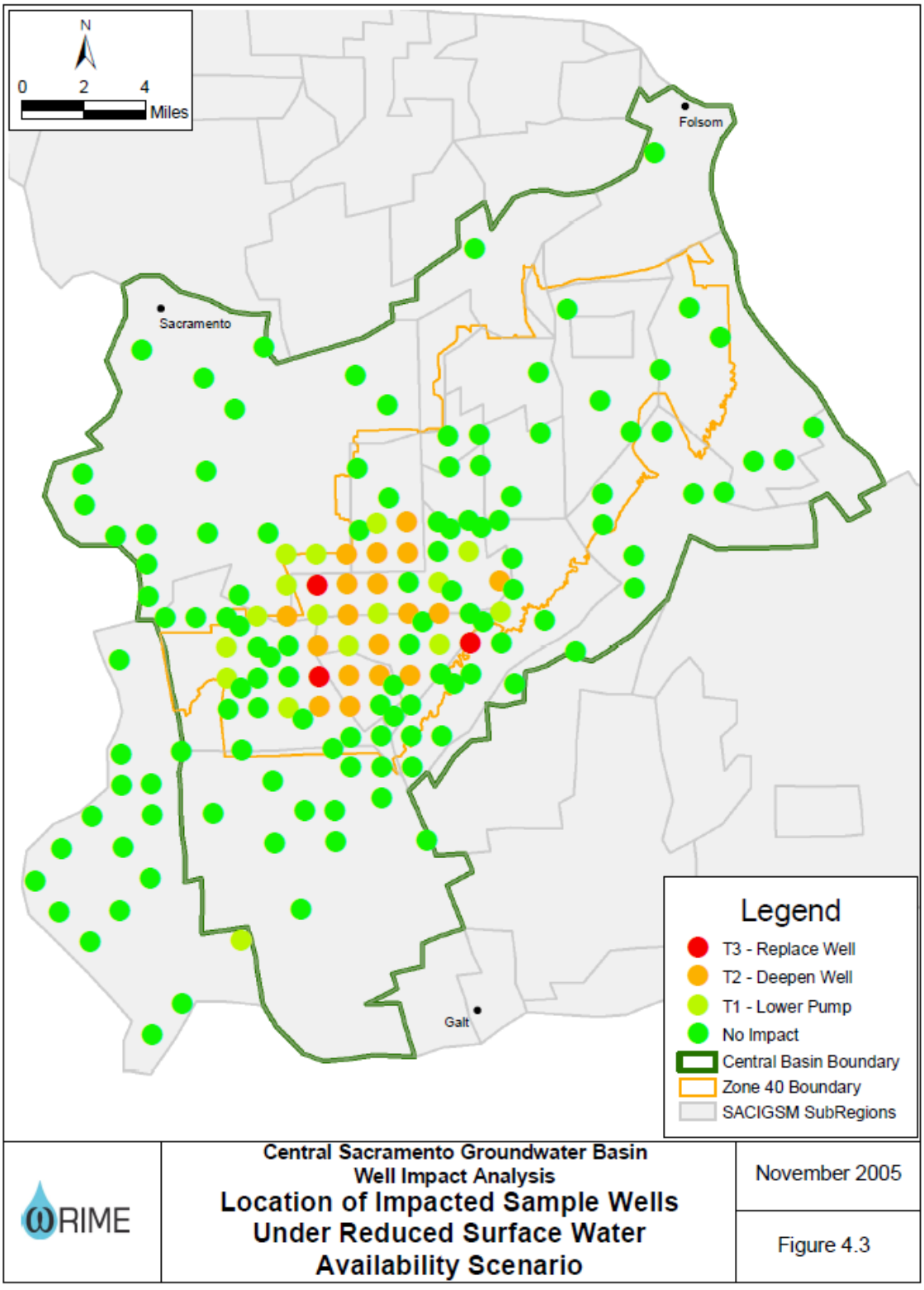

Figure 14: Impacted sample wells under Reduced Surface Water Scenario, from Impact Analysis TM, page, page 35.

Production Water Well Assessment

This technical memorandum by Dunn Environmental, Inc (DE), (2013) outlines previous test well assessments conducted for Rancho Murieta Community Services District (RMCSD or District). This well assessment also included a geophysical analysis, preliminary hydrogeologic model, and the completion of two test holes in 2013. The goal of this assessment was to locate a sustainable groundwater source for the District that could provide 370 GPM as calculated by District staff at the time. It is important to note that this value is not sufficient for current District needs, nor SB 552, but was determined in 2011 based on District needs at the time that memo was written.

Previous investigations assessed in this report included: two test holes completed by Ludhorff & Scalmanini Consulting Engineers (LSCE) in 1988; one test hole completed by Eaton Drilling in 1994; five test holes completed by Eaton Drilling in 1995; one test hole completed by GeoConsultants in 2002, in addition to electrotulleric soundings completed for 17 locations; and review of previous work an available regional hydrogeologic information by HDR in 2003.

Test holes from each of the previous investigations ranged from 250 to 700 feet of depth, some encountering basement and others calculating potential yield. The 2002 investigation conducted by GeoConsultants calculated a specific capacity of 4.3 GPM/foot at one test hole. Based on the pump and recovery test, average transmissivity for this test hole was estimated to be 14,317 gallons per day (gpd) per foot of well depth.

Based on review of the previous investigations and resistivity profiles, DE chose two test hole locations to identify alluvial aquifers and specific capacities of a production well. The test holes determined by DE were drilled in August and September 2013 and are named TH-A and TH-B. These were combined with previous investigations and the cross-section A-A' was developed. See Figure 15 for the plan view of this cross section with a vertical distribution of the same cross section in Figure 16.

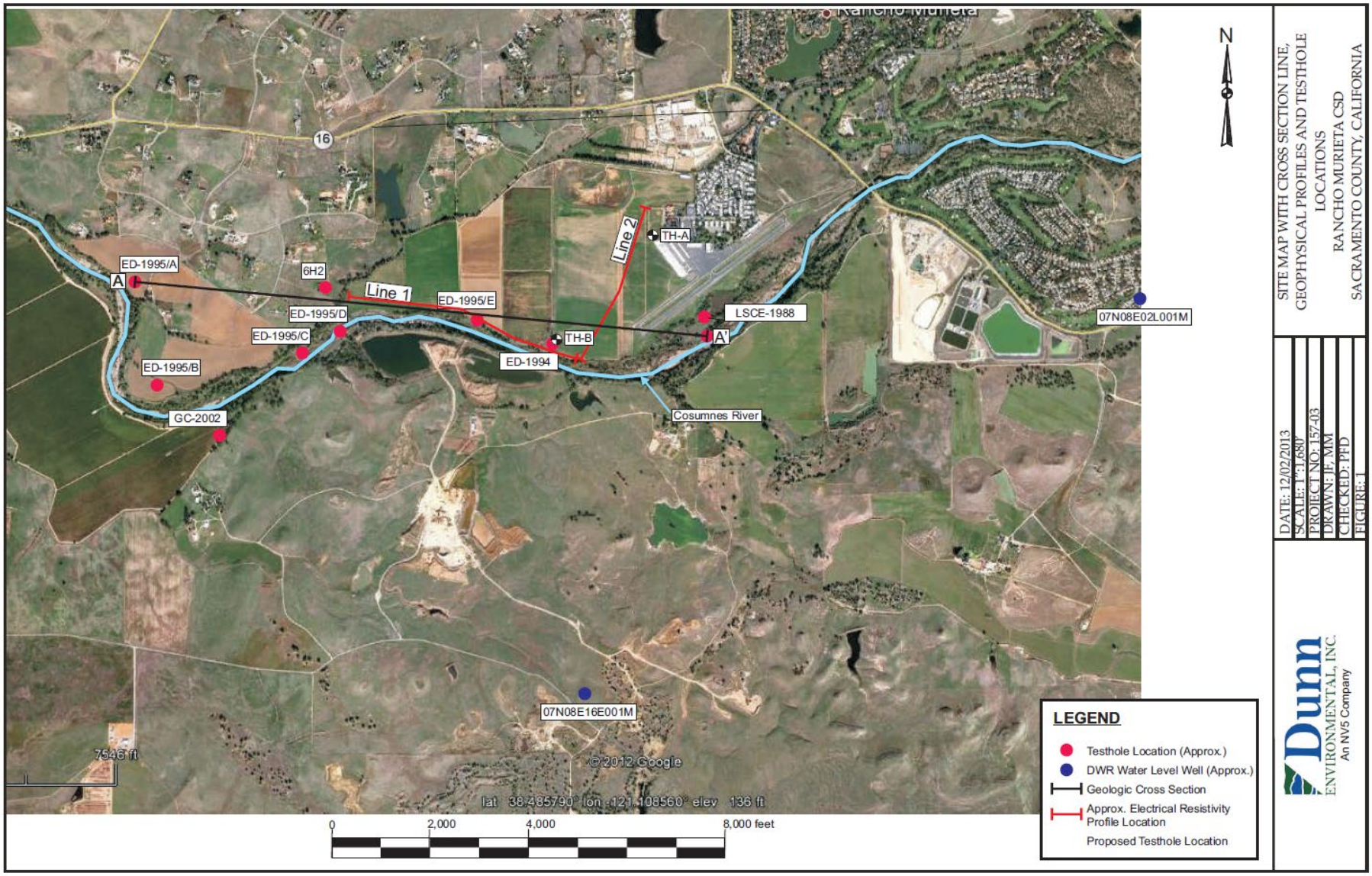

Figure 15: Cross section A-A' developed by Dunn Environmental, Inc, from Production Well TM, page 5.

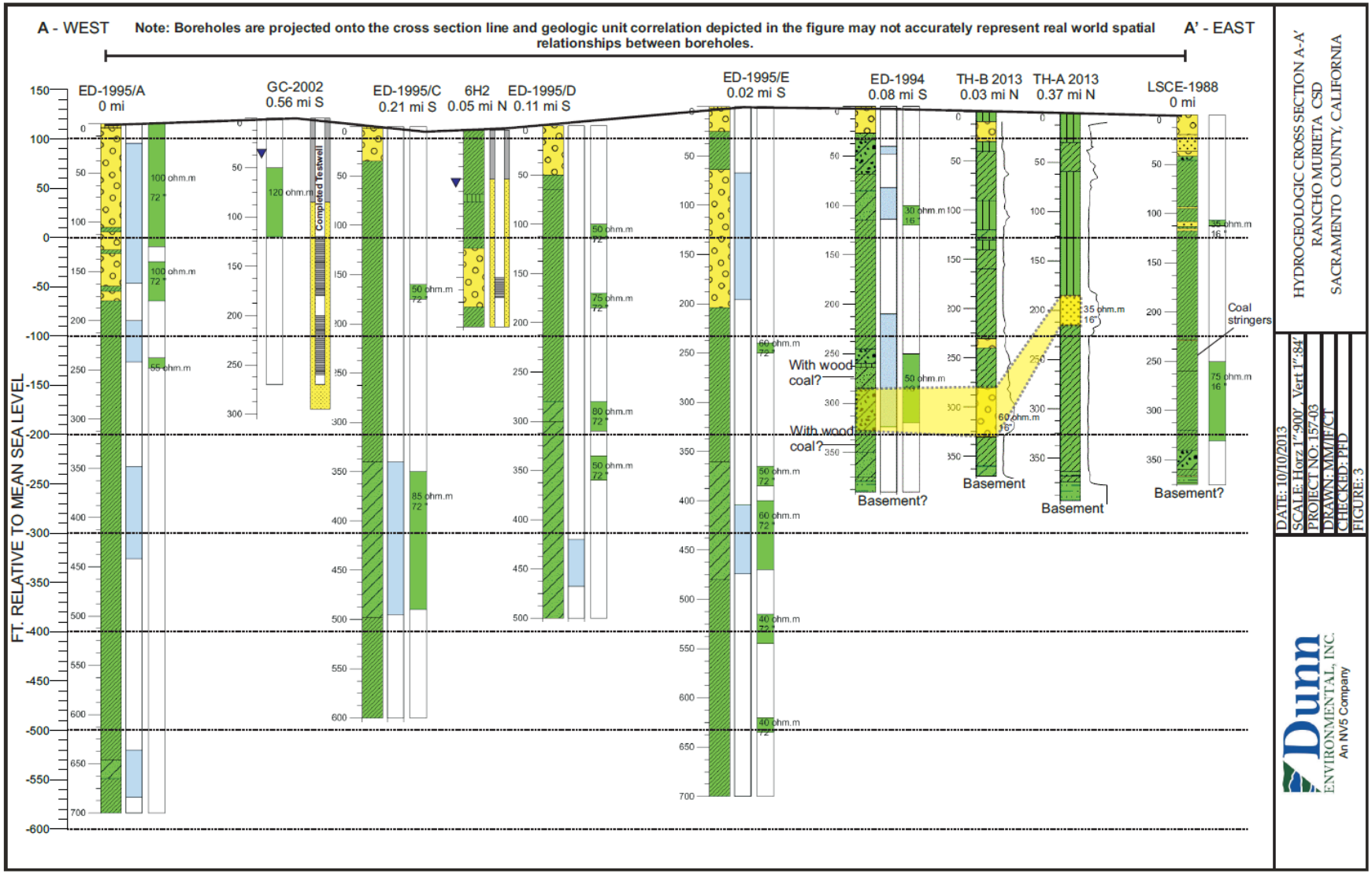

Figure 16: Vertical strata of the cross-section A-A' developed by Dunn Environmental, Inc, from Production Well TM, page 10.

Bedrock was encountered between 360 and 380 feet below ground surface in both test holes with water production zones identified between 180 and 300 feet below ground surface. Airlifting flow was measured and ranged from 100 to 150 GPM; DE notes that flow estimates from airlifting are typically conservative. Borehole and surface geophysical responses indicated that each test hole had layers with significant water production potential well yields ranging from 150 to 500 GPM.

Water quality samples were also collected from each test hole during drilling. Two primary maximum contaminant level (MCL) exceedances were observed for arsenic in TH-A. One secondary MCL exceedance for iron was observed from 280 to 300 feet in TH-B. Five secondary MCL exceedances for manganese were observed in five sampled zones in TH-B. It is important to note that observed metal parameter exceedances may be related to sample turbidity and could remedy through further well development.

This memorandum recommends that up to two production wells should be considered, located within 50 feet of TH-A and TH-B. DE recommends this could be achieved via two options: install a production well near TH-B that is more likely to meet the production goal of 370 GPM, as calculated by the District in 2011; or install a production well near TH-A and conduct aquifer testing and water quality analysis, then evaluate the appropriateness of installing a second production well near TH-A based on the results of that analysis. It is important to note that 370 GPM is not sufficient for current District needs, nor SB 552, but was determined in 2011 based on District needs at the time that memo was written.

Review Findings and Comparison

Local Availability

From the "Vulnerable well impact analysis," most wells in the Rancho Murieta location are in the Valley Springs and Ione Formations (called "Layer 2" in the "Impact Well Analysis" memo), with some rural domestic wells in the Mehrten Formation ("Layer 1"). Thus, these wells are significantly deeper than climate predictions bringing groundwater levels down to the recent historic drought levels of Fall 2015. Further, the "Impact Analysis for Well Protection Program" notes that groundwater pumping from the confined aquifer in Layer 2 would result in decreased

pressure within the aquifer rather than a drop in groundwater levels. Based on the review of data collected in this technical memo, only 2 agricultural wells and 0 rural residential wells are in use in Rancho Murieta, indicating that the second aquifer has local availability.

Water balance for Rancho Murieta conducted in the "Impact Analysis for Well Protection Program" determined that Rancho Murieta had a total water demand of 6,096 AFY using the baseline 2030 as basis. Supplies were determined to be 6,096 AFY, 6,096 AFY, and 6,120 AFY for the No Project, Proposed Project, and Reduced Surface Water Availability scenarios, respectively. This suggests that under the "worst case" modeled, Rancho Murieta has some availability of groundwater to augment reduced surface water availability.

The reach of the Cosumnes River that runs through Rancho Murieta is defined as a consistently losing reach by the "Interconnected Surface Waters" report meaning that the Cosumnes River loses flows to seepage in the range of 0 to over 1,000 AFY. These values are relatively consistent despite season (Spring vs Fall) across the study period. This means that as surface flows are lost to seepage in this location, groundwater is likely being recharged in the upper layers (Alluvium and Laguna Formations).

Regional Availability

The CoSANA Model Report shows that under the current conditions baseline, there is an annual positive change in storage of 2,158 AFY in the SASb. For CoSb, this annual change is slightly negative, -233 AFY. This means that the model indicates that the groundwater is being recharged in the SASb and is being slightly overdrawn in the CoSb. (Table 2). For the projected conditions baseline condition, for the SASb there is an annual negative change in storage at the end of the planning horizon of -1,128 AFY. For CoSb, this annual change is -1,293 AFY. This means that both subbasins are expected to experience an overdraw in groundwater. (Table 3). Under the projected buildout with climate change scenario, the SASb shows an annual negative change in storage at the end of the planning horizon of -6,222 AFY. For CoSb, this annual change is -9,762 AFY. This means that both subbasins are expected to experience a large deficit in groundwater. (Table 4).

The model indicates that from a long-term, subbasin-wide perspective, groundwater is projected to become increasingly overdrawn in the subbasins that surround Rancho Murieta. As

this is a subbasin-wide analysis, however, this does not mean that the aquifers are running dry under these scenarios, just that the water balance is indicating that pumping is greater in volume than recharging. In fact, the "Vulnerable well impact analysis" determined that even after the historic drought event of 2015, no wells in the SASb were reported dry. This indicates that a return to Fall 2015 groundwater level lows is unlikely to result in catastrophic and widespread changes in existing wells and therefore availability of groundwater.

Groundwater Trends

CoSANA modeling outputs show groundwater contours in the Rancho Murieta area that closely match the results of test wells in the area, which show groundwater 20 to 60 feet below the ground surface (range of Spring to Fall levels). These levels vary seasonally over the study period of 2005 to 2018; see Figure 5 for the average Spring and Fall groundwater levels. One test well hydrograph for CoSANA was near Rancho Murieta, which showed modeled groundwater about 34 feet below the ground surface and observed records showing just 22 feet below the ground surface. The trends oscillate seasonally with a slight downward trend from 1994 to 2003 as shown in Figure 4.

Figure 7 from the "Interconnected Surface Waters" report shows that the Cosumnes River is consistently losing surface flows to groundwater via seepage. As these losses to seepage on the Cosumnes River are consistent across the study period regardless of Spring or Fall season, it is reasonable to assume that groundwater recharge along this reach is stable in the upper layers.

Future modeling conducted in the "Interconnected Surface Waters" report indicate that even under the "worst case scenario" modeled – "business as usual" developments and increased demands for groundwater with warmer temperatures and less precipitation – groundwater is expected to drop by only 5 feet below its current levels near Rancho Murieta. This is visualized in Figure 6. Further, the "Impact Analysis for Well Protection Program" indicates that wells near Rancho Murieta would not be negatively impacted by increased build-out demands with climate-change driven reduction of available surface water. It could be inferred, then, that both reports suggest that wells near Rancho Murieta would be resilient to climate change scenarios.

Depth of Aquifer and Potential Yield

The E-E' cross section in CoSANA Modeling Report and the A-A' cross section in the "Impact Analysis for Well Protection Program" both suggest that wells drilled near Rancho Murieta will pump from the lower water-bearing layers. Both reports indicate that groundwater levels near Rancho Murieta are relatively stable even under increased demands and reduced supply in climate change scenarios. Wells in this area are generally in the Valley Springs and Ione Formations, with some domestic wells in the Mehrten Formations (see Figure 8).

Further, the "Production Water Well Assessment" noted that GeoConsultants investigated groundwater near the Cosumnes River, finding the static water level at 39 feet below the ground surface, with a 24.92-foot drawdown. The calculated specific capacity in this location was 4.3 GPM/foot. The test holes drilled by DE in 2013 indicated a specific capacity of 5 to 10 GPM per foot of depth. Using the 4.3 GPM/foot calculated by GeoConsultants in 2002, a well drilled near these locations would need to be approximately 289 feet into the water bearing zone to meet a 1,243 GPM average daily demand. Using a 10 to 5 GPM/foot as estimated by the 2013 test hole investigations would require a well to be 124 to 249 feet into the water bearing zone, respectively. As this flow is relatively large, it is likely that two or more wells will be required to deliver a combined total flow of 1,243 GPM. Two wells were recommended as Option 2 in the "Production Water Well Assessment."

While these depths are well within Layer 2 from the "Impact Analysis for Well Protection Program," in-field test holes indicate that basement likely occurs near 380 feet for some test wells and near 700 feet below the ground surface for other test wells. This is reflected in Figure 11 showing two aquifers separated by an impermeable layer. The "Production Water Well Assessment" indicates that potential water production zones are between 180 and 300 feet below the ground surface for the shallower aquifer and between 350 to nearly 500 feet below the ground surface for the lower aquifer.

The estimated well depths based on calculated specific capacity in the "Production Water Well Assessment" memo are greater than the water bearing zone thicknesses encountered during test drilling. To achieve 1,234 GPM in the lower water bearing zone, using 5 GPM/foot as estimated during test drilling in 2013, two wells would be required. To achieve 2,038 GPM in the lower water bearing zone using 5GPM/foot, four wells would be required. Each of these

wells would need to be drilled to a total well depth of 500 feet each, based on the recommendations in the "Production Water Well Assessment."

Groundwater Management Plan Requirements

In 2014, the California State Legislature adopted the historic Sustainable Groundwater Management Act (SGMA), which established a statewide framework to help protect groundwater resources. The SGMA requires that operators of new wells and groundwater pumping are required to pay a base filing fee and a variable dollar-per-acre-foot pumped annually, based on local GSAs, GSPs, and whether or not the well is located in unmanaged or probationary areas. In unmanaged areas or probationary basins, those who install new wells are required to file groundwater extraction reports with the State Water Resources Control Board and to pay a report filing fee annually.

Rancho Murieta is part of the Sloughhouse Resource Conservation District (SRCD). SRCD is bisected by the Cosumnes Subbasin and the South American Subbasin and therefore must adhere to and report to each subbasin authority. In June of 2022, SRCD established that fees per acre-foot of groundwater pumped would be imposed only on agricultural irrigators. There is no fee for municipal or domestic groundwater pumping. See Attachment A for the hearing and resolution that SRCD established this fee structure.

Personal correspondence with the Interim District Manager of SRCD, Brittany Friedman, (3/5/2024, email), indicated that SRCD is in the process of restructuring their fees so at some point in the future there may be a fee for public uses. See Attachment B for a copy of this correspondence.

Summary and Recommendations

Water budgets were constructed on subbasin and subregion scales across the literature reviewed. These budgets considered hydrologic conditions to estimated water supplies and changes in developments and land use to estimate water demands. Scenarios to evaluate changes in water demands and supplies were developed to project these water budgets out through planning horizons, 2070 and 2030 for the "CoSANA Modeling Report" and the "Impact Analysis for Well Protection Program," respectively. Regionally, modeling indicates that the

SASb and the CoSb experience a negative change in annual cumulative water budget. The "Impact Analysis for Well Protection Program" notes that groundwater pumping from the confined aquifer in Layer 2 would result in increased pressure within the aquifer rather than a drop in groundwater levels. Further, based on the analysis in that report, only 2 agricultural wells and 0 rural residential wells are in use in Rancho Murieta, indicating that the second aquifer has local availability despite a regional deficit in water budget.

Water is currently available locally, and it is likely that groundwater will continue to be available into the future under a variety of climate change scenarios. However, as regional groundwater availability declines, it is important to consider the potential uses of new wells(s): long-term daily flow augmentation is likely unsustainable for the District. Thus, a well should be considered an emergency source or drought resilience and not be used to augment normal daily demands.

The results of multiple modeling and analysis studies show that groundwater levels are 20 to 60 feet below the ground surface near Rancho Murieta. This is confirmed by in-field test hole investigations that encountered groundwater between 30 to 50 feet below the ground surface. Under a multitude of modeling scenarios that analyzed developments, changes to water supplies and demands, and climate change scenarios, groundwater levels are expected to decrease by just 5 feet lower than existing groundwater levels. "Vulnerable well impact analysis" reviewed well vulnerability compared to the recent historic low of 2015 and indicated that wells near Rancho Murieta have a considerable buffer against climate change as they are drilled deep into the second aquifer layer, which is confined below an impermeable layer.

Thus, Rancho Murieta CSD should consider a production well drilled to at least this lower confined aquifer. For a production well to meet the 1,234 GPM average day demands for 3,000 connections, based on calculated specific capacity, it must be between 125 and 300 feet into the water bearing zones according to the "Production Water Well Assessment." If the District were to decide to utilize this well for future build-out as an emergency or drought resilient source, the well(s) would need to supply 2,038 GPM which would need to be 204 to 474 feet into the water bearing zone.

These estimated depths are greater than the thickness of the water bearing zones described in the "Production Water Well Assessment." To achieve 1,234 GPM in the lower

water bearing zone, using 5 GPM/foot as estimated during test drilling in 2013, two wells would be required. To achieve 2,038 GPM in the lower water bearing zone using 5GPM/foot, four wells would be required. Each of these wells would need to be drilled to a total well depth of 500 feet each, based on the recommendations in the "Production Water Well Assessment." The range of specific capacity calculated in this memo is based on a 6 inch diameter well. A larger diameter well could produce more flow. These depths are well within and are likely to be supported by the confined lower aquifer as described in the "Impact Analysis Technical Memorandum."

The location of a production well should follow the recommendations outlined by Dunn Environmental, Inc: located within a 50-foot radius of TH-A and TH-B. Dunn Environmental, Inc also recommend that water quality testing and well production assessment should be conducted during and just following construction of a production well. Actual well flows and water quality cannot be determined until well development for a production well is conducted. As the flows required of this well are relatively high, two or more production wells may be required to meet the 1,234 GPM production for 3,000 connections or the 2,038 GPM for the 2043 build-out conditions. Location will be dependent on the capacity the District selects and the results of well development flow testing and water quality analysis.

Rancho Murieta is part of the Sloughhouse Resource Conservation District (SRCD). There is no fee for municipal or domestic groundwater pumping with SRCD. Personal correspondence with the Interim District Manager of SRCD, Brittany Friedman, (3/5/2024, email), indicated that SRCD is in the process of restructuring their fees so at some point in the future there may be a fee for public uses. See Attachment B for a copy of this correspondence.

If there are any concerns, questions, or comments about the contents of this memorandum, please reach out to me.

Sincerely,

Michael Moser, P.E.

Project Manager & Principal

Attachments:

A. Sloughhouse Resource Conservation District Notice of Meeting & Resolution
B. Correspondence with SRCD Interim District Manager

References

Dunn Environmental, Inc. (2013). "Technical Memorandum: Production Water Well Assessment."

Larry Walker Associates, (2021). "Interconnected Surface Waters (ISW) in the South American Subbasin: Characterization of Historical and Present-day Conditions, and Approached for Monitoring and Management." *Appendix 3-A, South American Subbasin Groundwater Sustainability Plan, 2021*.

Larry Walker Associates, (2021). "Vulnerable well impact analysis in the South American Subbasin: well inventory, historical groundwater trends, and analysis to inform Sustainable Management Criteria." *Appendix 3-C, South American Subbasin Groundwater Sustainability Plan, 2021*.

Larry Walker Associates, Woodard & Curran. (2021). *South American Subbasin Groundwater Sustainability Plan*. California Department of Water Resources.

Namvar & Taghavi, Water Resource & Information Management Engineering, Inc (WRIME). (2005). "Technical Memorandum: Central Sacramento County Groundwater Management Plan – Impact Analysis for Well Protection Program." *Appendix E, Central Sacramento County Groundwater Management Plan*.

Sacramento County Water Agency. (2006). *Central Sacramento County Groundwater Management Plan*.

Woodard & Curran, (2021). "CoSANA: An Integrated Water Resources Model of the Cosumnes, South American, and North American Groundwater Subbasins." *Appendix 2-B, South American Subbasin Groundwater Sustainability Plan, 2021*.

Attachment A

SRCD Notice of Meeting & Resolution

BEFORE THE BOARD OF DIRECTORS OF THE SLOUGHHOUSE RESOURCE CONSERVATION DISTRICT

DRAFT RESOLUTION No. 2022.06.08.01

Resolution Adopting a Groundwater Management Sustainability Fee in the Sloughhouse RCD Cosumnes Subbasin GSA Area

WHEREAS, the State of California enacted the Sustainable Groundwater Management Act ("SGMA") in 2014, inter alia, to provide for the sustainable management of groundwater basins, to enhance local management of groundwater consistent with rights to use or store groundwater, to provide local groundwater agencies with the authority and the technical and financial assistance necessary to sustainably manage groundwater, and to manage groundwater basins through the actions of local governmental agencies to the greatest extent feasible. (Water Code, § 10720.1 et seq.); and

WHEREAS, The Sloughhouse Resource Conservation District is a Groundwater Sustainability Agency over part of its jurisdiction in the Cosumnes River Subbasin under the provisions of SGMA and the Board of Directors ("Board") of the Sloughhouse Resource Conservation District also concurrently functions as the Sloughhouse Resource Conservation District Groundwater Sustainability Agency ("Agency"); and

WHEREAS, SGMA authorizes a GSA to impose a fee on the extraction of groundwater or other regulated activity to fund the costs of a groundwater sustainability program. (Water Code, § 10730.) The levy of a fee on groundwater extraction for the purpose of managing the sustainability of a groundwater subbasin constitutes (1) a charge imposed for a specific benefit conferred directly to the payor that is not provided to those not charged, and (2) a charge imposed for a specific government service provided directly to the payor that is not provided to those not charged; and

WHEREAS, The collective GSAs of the Cosumnes Subbasin have arranged for the preparation by HDR, a professional engineering consulting firm, the Cosumnes Subbasin Fee Study ("Fee Study"), which is incorporated by reference into this Resolution, to justify the adoption of the fees herein. The Fee Study shows that the fee adopted herein is not a tax, that the amount is no more than necessary to cover the reasonable costs of the governmental activity, and that the manner in which those costs are allocated to a payor bear a fair or reasonable relationship to the payor's burdens on, or benefits received from, the governmental activity; and

WHEREAS, the Agency seeks to establish a groundwater sustainability fee ("Fee") within its jurisdictional boundaries in the Cosumnes Subbasin as authorized by Water Code section 10730 based on the Fee Study; and

WHEREAS, pursuant to Water Code section 10730(d), prior to imposing the Fee, the Agency has held a public meeting, at which written or oral presentations have been made; and

WHEREAS, pursuant to Water Code section 10730(d), the Agency posted notice of the time and place of the public meeting at which the Fee will be considered, the notice was

published in the newspaper in compliance with Government Code section 6066, the notice was posted on the Agency's website and was mailed to interested parties, and the data to support the Fee was available to the public at least 20 days before the Agency's public meeting to impose the Fee; and

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Sloughhouse Resource Conservation District as follows:

1. The Agency finds that all prerequisites required before adopting the Fee have been met, including the proper public noticing of the hearing and the conduct of the public hearing.

2. The Agency approves the Fee Study and finds that it is the proper basis on which to establish the Fee, and that the Fee adopted herein is not a tax, that the amount is no more than necessary to cover the reasonable costs of the governmental activity, and that the manner in which those costs are allocated to a payor bear a fair or reasonable relationship to the payor's burdens on, or benefits received from, the governmental activity.

3. The Agency hereby adopts the Fee as set forth in Attachment A hereto.

4. The Agency Administrator is hereby authorized and directed to work with the County of Sacramento Department of Finance Auditor-Controller Division to add the Fee as more fully set forth in Attachment A to the County's annual secured tax roll; and

5. the Agency Administrator and Agency Counsel are hereby authorized and directed to take such other and further steps as may be necessary or appropriate to implement the intent and purpose of this resolution.

PASSED AND ADOPTED on this 8th day of June 2022, by the following vote, to- wit:

AYES: Garms, Silva, Washburn, Liebig
NOES: Schneider
ABSENT:
ABSTAIN:

I, the undersigned, hereby certify that I am the duly appointed and acting Secretary of the Sloughhouse Resources Conservation District, and that at a meeting of the Board of Directors of the District held on June 8, 2022 that Resolution 2022.06.08.01 was adopted and has not been rescinded or amended since the date of its adaptation and that it is now in full force and effect.

Austin Miller, SRCD Secretary

6-8-22
Date

SLOUGHHOUSE RESOURCE CONSERVATION DISTRICT
GROUNDWATER SUSTAINABILITY AGENCY

GROUNDWATER SUSTAINABILITY FEE
ATTACHMENT A

SECTION 1. DEFINITIONS

1.1 "Acre Foot" or "AF" is a unit of measurement defined by the volume of water necessary to cover one acre of surface area to a depth of one foot. It is equal to 325,851 gallons.

1.2 "Administrator" means the Administrator of the Agency.

1.3 "Agency" means the Sloughhouse Resource Conservation District or the Sloughhouse Resource Conservation District Groundwater Sustainability Agency.

1.3 "Board" means the Board of Directors of the Sloughhouse Resource Conservation District.

1.4 "Fee" means the Groundwater Sustainability Fee charged as set forth herein.

1.5 "Jurisdictional Area" means those parcels of real property within the Subbasin and those parcels of real property adjacent to the Subbasin that use groundwater derived, extracted, or otherwise obtained from within the Subbasin excluding therefrom any area for which the Agency has entered into an agreement that provides that the Fee shall not be charged within such area, or any portion thereof.

1.6 "Person" means the owner of property charged the Fee, or the owner of real property with a means of extracting groundwater.

1.8 "Subbasin" means the Cosumnes Groundwater Subbasin as set forth in Bulletin 118 of the California Department of Water Resources, as may be amended from time-to-time.

SECTION 2. ESTABLISHMENT OF FEE

2.1 There is hereby charged within the Jurisdictional Area a Fee pursuant to Section 10730 of the California Water Code, and as more fully set forth herein.

2.2 Persons using groundwater to irrigate shall pay up to $10.00, per irrigated acre per year (with each year beginning October 1 and continuing until September 30).

2.3 The actual annual charges for Persons irrigating with groundwater will be determined based on irrigated acreage as determined from the 2018 published Statewide Crop Mapping data provided by the California Department of Water Resources.

2.4 The Fee shall be payable to the Agency as follows:

2.4.1 The Agency shall determine those real properties that are subject to the Fee and shall submit the Fee data to the County of Sacramento Department of Finance Auditor-Controller Division to be included in the annual secured tax roll.

2.4.2 If any Person fails to pay the Fee as charged, the Person shall pay interest and/or penalties to the Agency as allowed by law.

2.4.3 In addition to the interest and penalty set forth in Section 2.4.2, above, the Board may elect to utilize any of the remedies available to it for failure to pay the Fee as set forth in Water Code section 10730.6.

2.4.4 Fee revenues may be used for support of the Agency's groundwater sustainability program, including but not limited to, administration costs, implementation of the Groundwater Sustainability Plan, planning projects, and management actions.

SECTION 3. APPEAL

3.1 Should a Person wish to contest the projected amount of groundwater extraction on which the Fee is assessed, the Person shall first be required to pay the Fee as charged. Within thirty (30) days following payment of the Fee, the Person may file an appeal with the Agency, on a form approved by the Administrator, setting forth the basis upon which the appeal is made. The appeal will be considered timely filed if, within the time allowed, 1) the form is postmarked, United States first class mail, 2) delivered to the Administrator or Clerk of the Board by electronic mail, or 3) personally delivered to the Administrator.

3.2 Within thirty (30) days of filing the appeal, the Administrator shall meet with the Person to discuss the basis of the appeal. The Administrator is authorized to grant the appeal, in whole or in part, or deny the appeal. The determination shall be made no later than fifteen (15) days following the meeting and shall be in writing and delivered to the Person in the same manner as the filing of the appeal.

3.3 If the Person who filed the appeal is dissatisfied with the determination of the Administrator, the Person may file an appeal to the Board within thirty (30) days of delivery of the determination, following the procedures for filing an appeal as set forth in Section 3.1, above.

3.4 The appeal will be placed on the agenda for the next available Board meeting occurring within sixty (60) days of the filing of the appeal. The Board shall receive evidence, and hear from the appellant and staff regarding the merits of the appeal. The Board is authorized to grant the appeal, in whole or in part, or deny the appeal. The determination of the Board shall be memorialized in a minute order and shall be the final decision of the Agency.

SLOUGHHOUSE RESOURCE CONSERVATION DISTRICT
GROUNDWATER SUSTAINABILITY AGENCY

NOTICE OF MEETING AND HEARING ON

PROPOSED GROUNDWATER SUSTAINABILITY FEE

NOTICE IS HEREBY GIVEN that on Wednesday, June 8, 2022, at the hour of 1 p.m., or as soon thereafter as the matter may be heard, the Board of Directors of the Sloughhouse Resource Conservation District, acting as a groundwater sustainability agency in the Cosumnes Subbasin, will hold a public meeting and hearing at the Rancho Murieta Community Service District office, 15160 Jackson Hwy, Rancho Murieta, California. In compliance with the Americans with Disabilities Act and in response to the COVID-19 pandemic, if you need special assistance to participate in this meeting or have concerns about attending the meeting in person, please contact the Clerk of the Board at 916-526-5447 or info@SloughhouseRCD.org to make reasonable arrangements or for call-in information. The Board will consider the following matter:

Proposed levy of a groundwater sustainability fee (the "Groundwater Sustainability Fee") to fund the costs of a groundwater sustainability program in the Cosumnes Subbasin, including, but not limited to, the implementation of the Cosumnes Subbasin Groundwater Sustainability Plan, fund associated groundwater management activities, and meet the requirements of the Sustainable Groundwater Management Act.

The Sloughhouse Resource Conservation District GSA proposes to levy the Groundwater Sustainability Fee under its authority granted by California Water Code section 10730 on all irrigated land within the Sloughhouse Resource Conservation District GSA area within the Cosumnes Subbasin.

The Groundwater Sustainability Fee would be charged in the amount of $10 per acre irrigated with groundwater per year.

Data upon which the proposed Groundwater Sustainability Fee is based may be obtained from the Sloughhouse Resource Conservation District online at www.SloughhouseRCD.org. All interested persons are invited to present their views and comments on this matter. Written/emailed statements may be filed with the District Manager of the District at any time prior to the close of the meeting and oral statements may be made at the meeting.

Dated/Published: May 25, and June 1, 2022

Austin Miller
District Manager
info@SloughhouseRCD.org
916-526-5447

Attachment B

Correspondence with SRCD

Re: Rancho Murieta

Brittany Friedman <brittany@sloughhousercd.org>

Tue 3/5/2024 9:02 PM

To:Brie Galareaux <bgalareaux@adkinsengineering.com>

Hi Brie,

Thanks for the email. We are currently restructuring our fees and will have an updated number and structure breakdown in May 2024. At the moment the fee extends to irrigated lands in the district, only. This is for private groundwater usage and not public/municipal, at this time.

Best,

Brittany Friedman

Interim District Manager, Sloughhouse Resource Conservation District

(916) 526-5447 | sloughhousercd.org

brittany@sloughhousercd.org

On Fri, Mar 1, 2024 at 9:52 AM Brie Galareaux <bgalareaux@adkinsengineering.com> wrote:

> Hi Brittany,
>
> I'm working with Michael Fritsche on the Rancho Murieta Integrated Water Master Plan and have some questions about your District's fee structure so I can include that in some of our reports.
>
> From what I can find online, I see that SRCD imposes a $10 per acre of irrigated land when pumping groundwater. Does your District have a fee for municipal/public uses?
>
> Feel free to call or reply via emial.
>
> Thanks,
>
> **o / 541.884.4666**
>
> **a / 1435 Esplanade Ave, Klamath Falls, OR 97601**
>
> **w / AdkinsEngineering.com**

Appendix G Clementia Reservoir - Water Rights Analysis Memo

Wagner&Bonsignore
Consulting Civil Engineers, A Corporation

Nicholas F. Bonsignore, P.E.
Robert C. Wagner, P.E.
Paula J. Whealen

Martin Berber, P.E.
Patrick W. Ervin, P.E.
David P. Lounsbury, P.E.
Vincent Maples, P.E.
Leah Orloff, Ph.D, P.E.
David H. Peterson, C.E.G., C.H.G.
Ryan E. Stolfus

MEMORANDUM

To: Michael Fritschi, Director of Operations
Rancho Murieta Community Services District

From: Ryan Stolfus

Date: June 30, 2023

Re: Clementia Reservoir - Water Rights Analysis

This Memorandum summarizes our analysis of the water rights associated with Clementia Reservoir (Reservoir) located within the Rancho Murieta Community Services District (RMCSD) and how to continue to maintain a water diversion and use record to optimize Clementia Reservoir as part of the municipal water system. We understand that RMCSD has used Calero and Chesbro Reservoirs as the primary municipal water supply reservoirs, however, Clementia Reservoir is authorized by Permit 16762, as described below, as part of the municipal water supply system and is intended to be a part of the municipal water supply system. The use of Clementia Reservoir as part of the municipal water supply system is required to optimize use of water under the permit and increase the total amount of water available to RMCSD to reliably serve the community.

The State Water Resources Control Board's (State Water Board) online database shows that there are two appropriative water rights associated with the Reservoir, License 13285 (Application A023419) and Permit 16762 (Application A023416) filed concurrently with each other on December 19, 1969.

The following information was reviewed in preparation of this Memorandum:

- Information obtained from the State Water Board water right files for License 13285 (Application A023419) and Permit 16762 (Application A023416).
- State Water Resources Control Board eWRIMS electronic database.
- U.S. Geological Survey (USGS) 7.5 Minute Topographic Quadrangle for Folsom SE.
- Google Earth and U.S. Department of Agriculture aerial imagery of the Reservoir and vicinity.
- Monitoring records provided by RMCSD staff.

For reference, we are enclosing a copy of water right License 13285 (**Exhibit 1**) and Permit 16762 (**Exhibit 2**).

Appropriative Water Rights

We have reviewed the State Water Board files for water right 13285 (Application A023419) Permit 16762 (Application A023416) and found the rights to be in good standing. Recent State Water Board annual water use reports have been filed with the assistance of Wagner & Bonsignore. Following is a summary of the appropriative water rights associated with the Reservoir:

License 13285 (Application A023419)

Owner of Record:	Rancho Murieta Community Services District
Priority Date:	December 19, 1969
Storage Collection Season:	November 1 to May 31
Water Source:	Unnamed stream (natural watershed area of Clementia Reservoir)
Purpose of Use:	Recreational Use
Place of Use:	Clementia Reservoir
Storage Amount:	1,047 acre-feet

Status:

License 13285 authorizes the collection of up to 1,047 acre-feet of water from the upstream watershed that naturally flows into the Reservoir. The only authorized use for this water is recreational purposes at the Reservoir. Water collected pursuant to this right cannot be used as part of the municipal water supply.

Permit 16762 (Application A023416)

This summary only details Permit 16762 in relation to Clementia Reservoir. Permit 16762 also authorizes direct diversion of water and storage of water in Calero, Chesbro and Lower Lakes that is not the focus of this memorandum.

Owner of Record:	Rancho Murieta Community Services District
Priority Date:	December 19, 1969
Storage Collection Season:	November 1 to May 31
Water Source:	Cosumnes River
Purpose of Use:	Municipal, Recreation, Industrial, and Irrigation
Place of Use:	Service Area of Rancho Murieta Community Services District
Storage Amount:	Total of 4,050 acre-feet (combined for all storage reservoirs), including 850 acre-feet in Clementia Reservoir

Status:

Permit 16762 authorizes the diversion to storage in all three reservoirs referenced above including up to 850 acre-feet of water annually from the Cosumnes River (River) into the Reservoir. The only water that can be used from the Reservoir for municipal purposes is water that originated from the River that was pumped into the Reservoir.

Analysis of Historical Pumping from The Cosumnes River to Clementia Reservoir

The table below shows the record of diversion of water from the River into the Reservoir since 2013, pursuant to Permit 16762, that is authorized to be used for municipal purposes.

Clementia Reservoir	
Year	River Water Diverted to Reservoir (acre-feet)
2013	10
2014	84
2015	150
2016	137
2017	109
2018	153
2019	132
2020	150
2021	169
2022	15
2023	130
Total	**1,237**

Approximately 1,237 acre-feet of River water has been diverted into the Reservoir since 2013 and is held in storage for future use in the municipal water system, however, no water has been pumped from the Reservoir to be used in the municipal water system. Please note that Reservoir capacity, including water lost to annual evaporation, is the limiting factor as to how much River water can be stored in the Reservoir. You cannot physically store more River water in the Reservoir than its capacity as any excess River water would be lost to spilling over the dam or evaporation. As stated above, Permit 16762 allows for a maximum of 850 acre-feet of water to be diverted from the River into Reservoir annually.

Water Diversions to the Reservoir Authorized by Permit 16762

Based on the RMCSD monitoring data, in most years the Reservoir does not fill from its own watershed pursuant to License 13285. River water is required to be pumped, pursuant to Permit 16762, to fill the Reservoir to full capacity.

Water has been pumped from the River into Clementia Reservoir and is held in storage. As such, a record of diversion has been made, however, a record that demonstrates the use of that River water from the Reservoir for municipal purposes is required to optimize Permit 16762. River water that is stored in the Reservoir must be put to beneficial use in the municipal water system to maintain the authorized use.

We trust the foregoing and enclosed provides you with the information you requested. Please contact me if you have any questions.

Encl. √

Exhibit 1

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

License for Diversion and Use of Water

APPLICATION 23419 PERMIT 16765 LICENSE **13285**

THIS IS TO CERTIFY, That

Rancho Murieta Community Services District
P.O. Box 1050
Rancho Murieta, CA 95683

has made proof as of **June 21, 1994** (the date of inspection) to the satisfaction of the State Water Resources Control Board of a right to the use of the water of an **Unnamed Stream** in Sacramento County

tributary to **Cosumnes River thence Mokelumne River**

for the purpose of **Recreational use**

under Permit **16765** of the Board and that the right to the use of this water has been perfected in accordance with the laws of California, the Regulations of the Board and the permit terms; that the priority of this right dates from **December 19, 1969** and that the amount of water to which this right is entitled and hereby confirmed is limited to the amount actually beneficially used for the stated purposes and shall not exceed **one thousand forty-seven (1,047) acre-feet per annum to be collected from November 1 of each year to May 31 of the succeeding year.**

This license does not authorize collection of water to storage outside of the specified season to offset evaporation and seepage losses or for any other purpose. (0000005)

After the initial filling of the reservoir, licensee's right under this license extends only to water necessary to keep the storage reservoir full by replacing water lost by evaporation and seepage, and to refill if emptied for necessary maintenance or repair. (0000040)

THE POINT OF DIVERSION OF SUCH WATER IS LOCATED:

By California Coordinates, Zone 2, North 305,440 and East 2,267,230, being within NE¼ of SW¼ of Section 35, T8N, R8E, MDB&M.

A DESCRIPTION OF THE LANDS OR THE PLACE WHERE SUCH WATER IS PUT TO BENEFICIAL USE IS AS FOLLOWS:

At Clementia Reservoir within Section 35, T8N, R8E, MDB&M, as shown on map filed with State Water Resources Control Board.

Licensee shall install and maintain an outlet pipe of adequate capacity in his dam as near as practicable to the bottom of the natural stream channel, or provide other means satisfactory to the State Water Resources Control Board, in order that water entering the reservoir which is not authorized for appropriation under this license may be released. (0050043)

Licensee shall allow representatives of the State Water Resources Control Board, employees of the Omochumne-Hartnell Water District, and other parties as may be authorized from time to time by said Board, reasonable access to project works to determine compliance with the terms of this license. (9990800)

Licensee shall allow representatives of the State Water Resources Control Board and other parties, as may be authorized from time to time by said Board, reasonable access to project works to determine compliance with the terms of this license.

The quantity of water diverted under this license is subject to modification by the Board if, after notice to the licensee and an opportunity for hearing, the Board finds that such modification is necessary to meet water quality objectives in water quality control plans which have been or hereafter may be established or modified pursuant to Division 7 of the Water Code. No action will be taken pursuant to this paragraph unless the Board finds that (1) adequate waste discharge requirements have been prescribed and are in effect with respect to all waste discharges which have any substantial effect upon water quality in the area involved, and (2) the water quality objectives cannot be achieved solely through the control of waste discharges.

Pursuant to California Water Code Sections 100 and 275 and the common law public trust doctrine, all rights and privileges under this license, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the Board in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water.

This continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this license with a view to eliminating waste of water and to meeting the reasonable water requirements of licensee without unreasonable draft on the source. Licensee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to: (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this license and to determine accurately water use as against reasonable water requirement for the authorized project. No action will be taken pursuant to this reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the Board also may be exercised by imposing further limitations on the diversion and use of water by the licensee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Sec. 2; is consistent with the public interest and is necessary to preserve or restore the uses protected by the public trust.

Reports shall be filed promptly by licensee on appropriate forms which will be provided for the purpose from time to time by the Board.

The right hereby confirmed to the diversion and use of water is restricted to the point or points of diversion herein specified and to the lands or place of use herein described.

This license is granted and licensee accepts all rights herein confirmed subject to the following provisions of the Water Code:

Section 1625. Each license shall be in such form and contain such terms as may be prescribed by the Board.

Section 1626. All licenses shall be under the terms and conditions of this division (of the Water Code).

Section 1627. A license shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code) but no longer.

Section 1628. Every license shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a license is issued takes the license subject to the conditions therein expressed.

Section 1629. Every licensee, if he accepts a license does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any license granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any licensee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any licensee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Section 1630. At any time after the expiration of twenty years after the granting of a license, the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State shall have the right to purchase the works and property occupied and used under the license and the works built or constructed for the enjoyment of the rights granted under the license.

Section 1631. In the event that the State, or any city, city and county, municipal water district, irrigation district, lighting district, or political subdivision of the State so desiring to purchase and the owner of the works and property cannot agree upon the purchase price, the price shall be determined in such manner as is now or may hereafter be provided by law for determining the value of property taken in eminent domain proceedings.

Dated: MAY 20 1997

STATE WATER RESOURCES CONTROL BOARD

Roger K. Mann

for *Chief, Division of Water Rights*

Exhibit 2

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

PERMIT FOR DIVERSION AND USE OF WATER

AMENDED **PERMIT** 16762

Application 23416 of Bank of America, N.T.&S.A. as Corporate Custodian of the Pension Trust Fund for Operating Engineers

c/o Daniel F. Gallery, Attorney, 926 J Building, Sacramento, California 95814

filed on December 19, 1969, has been approved by the State Water Resources Control Board SUBJECT TO VESTED RIGHTS and to the limitations and conditions of this Permit.

Permittee is hereby authorized to divert and use water as follows:

1. Source:

Source:	Tributary to:
(1) Cosumnes River	Mokelumne River
(2-8) Unnamed Streams	Cosumnes River
(9) Unnamed Stream	Crevis Creek thence
	Deer Creek thence
	Cosumnes River

2. Location of point of diversion:	40-acre subdivision of public land survey or projection thereof	Section	Township	Range	Base and Meridan
See Supplement Page 2					

County of Sacramento

3. Purpose of use:	4. Place of use:	Section	Township	Range	Base and Meridan	Acres
Municipal						
Recreational						
Industrial	3,600 acres in Sections 2, 3					
	and 4, T7N, R8E, MDB&M; and					
	Sections 26, 27, 28, 33, 34					
	and 35, T8N, R8E, MDB&M					
Irrigation	500 acres net within gross					
	area of the 3,600 acres					

The place of use is shown on map filed with the State Water Resources Control Board.

APPLICATION 23416 PERMIT 16762

(SUPPLEMENT)

2. Location and Point of diversion:	40-acre subdivision of public land survey or projection thereof	Section	Township	Range	Base and Meridian
(1) Cosumnes River - by California Coordinates, zone 2, X = 2,267,670 and Y=303,970	SW¼ of SE¼	35	8N	8E	MD
Diversion and Rediversion					
(2) Chesbro Reservoir - by California Coordinates zone 2, X=2,265,570 and Y=308,460	NW¼ of NW¼	35	8N	8E	MD
Rediversion:					
(3) Laguna Joaquin Reservoir - By California Coordinates, zone 2, X=2,258,230 and Y=304,130	SE¼ of SE¼	33	8N	8E	MD
(4) Peralta Reservoir - by California coordinates, zone 2, X=2,258,400 and Y=307,200	SE¼ of NE¼	33	8N	8E	MD
(5) Clementia Reservoir - by California Coordinates, Zone 2, X=2,267,230 and Y=305,440	NE¼ of SW¼	35	8N	8E	MD
(6) Bass Reservoir - North 1,750 feet and East 1,260 feet from SW corner of Section 35	NW¼ of SW¼	35	8N	8E	MD
(7) Black Bass Reservoir - North 3,900 feet and East 3,170 feet from SW corner of Section 35	SW¼ of NE¼	35	8N	8E	MD
(8) Calero Reservoir - South 1,200 feet and West 2,500 feet from NE Corner of Section 27	NW¼ of NE¼	27	8N	8E	MD

5. The water appropriated shall be limited to the quantity which can be beneficially used and shall not exceed (a) 6 cubic feet per second by direct diversion from the Cosumnes River to be diverted from November 1 of each year to May 31 of the succeeding year, and (b) 4,050 acre-feet per annum by storage to be collected from November 1 of each year to May 31 of the succeeding year as follows:

A. 3,900 acre-feet per annum from the Cosumnes River to be stored as follows:

(1) 1,250 acre-feet per annum in Chesbro Reservoir,
(2) 2,610 acre-feet per annum in Calero Reservoir,
(3) 850 acre-feet per annum in Clementia Reservoir, and
(4) 40 acre-feet per annum in Fairway No. 10 Lower Lake.

The combined amount under (2), (3) and (4) shall not exceed a total of 2,650 acre-feet.

B. 50 acre-feet per annum from an unnamed stream to be stored in Chesbro Reservoir.

C. 100 acre-feet per annum from an unnamed stream to be stored in Calero Reservoir.

The maximum rate of diversion from the Cosumnes River to offstream storage shall not exceed 46 cubic feet per second. The equivalent of the continuous flow allowance by direct diversion for any 7-day period may be diverted in a shorter time if there is no interference with vested rights. The total amount of water to be taken from the source shall not exceed 6,368 acre-feet per water year of October 1 to September 30.

This permit does not authorize collection of water to storage outside of the specified season to offset evaporation and seepage losses or for any other purpose. (0000005)

6. The amount authorized for appropriation may be reduced in the license if investigation warrants. (0000006)

7. Said construction work shall be completed on or before December 1, 1980. (0000008)

8. Complete application of the water to the proposed use shall be made on or before December 1, 1990. (0000009)

9. Progress reports shall be submitted promptly by permittee when requested by the State Water Resources Control Board until license is issued. (0000010)

10. Pursuant to California Water Code Sections 100 and 275, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to minimizing waste of water and to meeting the reasonable water requirements of permittee without unreasonable draft on the source. Permittee may be required to implement such programs as (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation. (0000012)

11. Permittee shall allow representatives of the State Water Resources Control Board, employees of Omochumne-Hartnell Water District, and other parties as may be authorized from time to time by said board, reasonable access to project works to detrmine compliance with the terms of this permit. (0000011)

12. The quantity of water diverted under this permit and under any license issued pursuant thereto is subject to modification by the State Water Resources Control Board if, after notice to the permittee and an opportunity for hearing, the Board finds that such modification is necessary to meet water quality objectives in water quality control plans which have been or hereafter may be established or modified pursuant to Division 7 of the Water Code. No action will be taken pursuant to this paragraph unless the Board finds that (1) adequate waste discharge requirements have been prescribed and are in effect with respect to all waste discharges which have any substantial effect upon water quality in the area involved, and (2) the water quality objectives cannot be achieved solely through the control of waste discharges. (0000013)

13. No water shall be appropriated under this permit until a public district or some other organization capable, to the satisfaction of the Board, of supplying the place of use on a continuous permanent basis, has been established. (0000028)

14. Permittee shall install and maintain outlet pipes of adequate capacity in his dams as near as practicable to the bottom of the natural stream channels, or provide other means satisfactory to the State Water Resources Control Board, in order that water entering the reservoirs which is not authorized for appropriation under this permit may be released. (0050043)

15. In accordance with the requirements of Water Code Section 1393, permittee shall clear the site of the proposed reservoirs of all structures, trees and other vegetation which would interfere with the use of the reservoirs for water storage and recreational purposes. (0120050)

16. If the storage dams will be of such size as to be within the jurisdiction of the Department of Water Resources as to safety, construction shall not be commenced until the Department has approved plans and specifications. (0360048)

17. After the initial filling of Laguna Joaquin, Peralta, Bass, and Black Bass Reservoirs, permittee's right under this permit, as it pertains to these reservoirs, extends only to water necessary to keep these reservoirs full by replacing water beneficially used and water lost by evaporation and seepage, and to refill if emptied for necessary maintenance or repair. Such right shall be exercised only during the authorized diversion season. (0000041)

18. For the protection and preservation of fish life, diversions under this permit from the Cosumnes River shall be subject to the following terms and conditions:

A. No water shall be diverted when the flow is less than 70 cubic feet per second.
B. Only up to 6 cubic feet per second shall be diverted when the flow is between 70 and 175 cubic feet per second (but such diversion shall not reduce the flow below 70 cubic feet per second.
C. Only those flows in excess of 175 cubic feet per second shall be diverted at all other times, except in dry years, as follows:

(1) If on February 1, the total amount that could have been diverted under this permit under the foregoing schedule is less than 400 acre-feet, then permittee may, during February, divert the flows in excess of 70 cubic feet per second, up to a maximum of 46 cubic feet per second.
(2) If on March 1, the total amount that could have been diverted under the foregoing schedule is less than 2,000 acre-feet, then permittee may, during March, divert the flows in excess of 70 cubic feet per second up to a maximum of 46 cubic feet per second.

(0140060)

(3) If on April 1, the total amount that could have been diverted under the foregoing schedule is less than 4,400 acre-feet, then permittee may, during the remainder of the diversion season (April 1 to May 31), divert the flows in excess of 70 cubic feet per second up to a maximum of 46 cubic feet per second.

D. For the purpose of providing maximum continuous downstream fish migration flows as early as possible in the spring months during years when one of the schedules as set forth in paragraphs C(1), C(2), or C(3) above is commenced, the permittee shall continue such diversion schedule (set forth under C(1), C(2), or C(3) respectively) in order to complete the diversion to storage under the permit as soon as possible, and shall not revert to the diversion schedule under B and C above, except for direct diversion to supply its direct diversion requirements during the remainder of the diversion season not to exceed 6 cubic feet per second. The total seasonal diversion shall not exceed 6,368 acre-feet.

E. All measurements of flows shall be determined at the U.S. Geological survey gaging station "Cosumnes River at Michigan Bar." (0140060)

19. The Board retains jurisdiction over this permit for the purpose of modifying the minimum fisheries flow requirements to conform to future Board determinations and fisheries flow requirements of permits issued pursuant to Applications 5645B, 5646, 5647A, 19266, and 21835. (0000600)

20. Permittee shall, upon authorization by the U.S. Congress of the Nashville Unit of the Cosumnes River Division of the Federal Central Valley Project, report annually to the Board on the status of negotiations for a firm water supply for the place of use under this permit, to the extent such supply is not available under prior vested rights of permittee. (0270999)

21. Permittee shall divert no water during the period November 1 to June 1 of each season except during such time as there is a continuous visible surface flow in the bed of Cosumnes River from permittee's point of diversion to the gaging station at Highway 99 known as "Cosumnes River at McConnell." (0160999)

22. Permittee shall install and maintain measuring devices acceptable to the State Water Resources Control Board to measure accurately the quantity of water diverted from Cosumnes River. (0060062)

23. No water shall be used under this permit until the permittee has, through grant of easement or dedication or other means satisfactory to the County of Sacramento, provided for access by the general public to Cosumnes River through the proposed place of use. Such access shall be minimum of 50 feet wide on each bank of the River, or such width as may be in conformity with the parkway plan of the County of Sacramento; provided, however, that reasonable public access along the river is maintained. (0000999)

24. No water shall be used under this permit until the permittee has filed a report of waste discharge with the California Regional Water Quality Control Board, Central Valley Region, pursuant to Water Code Section 13260, and the Regional Board or State Water Resources Control Board has prescribed waste discharge requirements or has indicated that waste discharge requirements are not required. Thereafter, water may be diverted only during such times as all requirements prescribed by the Regional Board or State Board are being met. No discharges of waste to surface water shall be made unless waste discharge requirements are issued by a Regional Board or the State Board. A discharge to groundwater without issuance of a waste discharge requirement may be allowed if after filing the report pursuant to Section 13260:

(1) The Regional Board issues a waiver pursuant to Section 13269, or
(2) The Regional Board fails to act within 120 days of the filing of the report.

No report of waste discharge pursuant to Section 13260 of the Water Code shall be required for percolation to the groundwater of water resulting from the irrigation of crops. (0290101)

25. In order to prevent degradation of the quality of water during and after construction of the project, prior to commencement of construction permittee shall file a report pursuant to Water Code Section 13260 and shall comply with any waste discharge requirements imposed by the California Regional Water Quality Control Board, Central Valley Region, or by the State Water Resources Control Board. (0000100)

26. When the flow of treated wastewater reaches 424 acre-feet per annum, permittee shall implement the use of such wastewater for irrigation purposes in lieu of water from other sources as provided in Sections 15550 and 15551 of the Water Code. Such use shall be reported on the annual progress reports filed with the Board. (0000999)

27. This permit is subject to the agreement dated March 26, 1979 bewteen permittee and Omochumne-Hartnell Water District, to the extent such agreement covers matters within the Board's jurisdiction. (0000300)

28. Suitable metering and recording devices shall be installed, operated and maintained in good working order by Rancho Murieta at the following locations:

A. On the discharge line of each pumping station located within the forebay of the CIA diversion Canal headworks and which divert water to offstream storage pursuant to Permit 16762. A suitable recording device shall also be installed which will provide a continuous record on a strip or circular chart of rates and time of diversion for each pump.

B. At the headworks of the CIA canal a continuous stage recorder to record diversions into the canal. Direct measurements to be made at least bimonthly to provide an accurate stage-discharge relationship. The recorder may be removed during periods of high water.

C. On any other pumping facilities which divert water from the Cosumnes River including but not limited to those facilities commonly referred to as the:

(1) Bass Lake Pump
(2) Old Bridge Pump
(3) Rock Plant Pump

Totalizing meters will be deemed adequate for the foregoing and for (D) and (E).

D. A meter shall be installed in the Cosumnes Irrigation Association Canal downstream from the Laguna Joaquin Reservoir.

E. At all points where water is withdrawn from storage for beneficial use, except from Fairway No. 10 Upper Lake. Water withdrawn for transfer to another reservoir will also be measured except for transfers among Calero, Clementia and Chesbro or from those reservoirs to the Treatment Plant.

F. For purposes of the measurements described above, hour meters of KWH consumption shall not be considered adequate unless otherwise agreed to.

G. At Calero, Chesbro and Clementia Reservoirs changes in storage will be measured at least monthly, and this information, plus any additional measurements actually made regarding changes of storage, furnished to the Board upon request. (0060062)

29. Permittee shall devise a method or plan satisfactory to the State Water Resources Control Board to obtain current stream flow data at the U. S. Geological Survey gaging station at Michigan Bar. Such plan shall be submitted to the Chief of the Division of Water Rights within 60 days. (0000999)

Application 23416 **Permit** 16762

30. Permittee shall make all reasonable effort to collect local runoff to storage to the extent local runoff is available in lieu of diverting water from the Cosumnes River. (0000999)

31. (0000029) added Water Conc.

This permit is issued and permittee takes it **subject to the following provisions of the Water Code:**

Section 1390. A permit shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code), but no longer.

Section 1391. Every permit shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a permit is issued takes it subject to the conditions therein expressed.

Section 1392. Every permittee, if he accepts a permit, does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any permit granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any permittee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any permittee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Dated: AUGUST 5 1980

STATE WATER RESOURCES CONTROL BOARD

Walter G. Pettit

Chief, Division of Water Rights

P16762
9-12-86 Assgd to Rancho Murieta Properties, Inc.
1-14-88 Assgd to Rancho Murieta Community Services District

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

ORDER

APPLICATION 23416 PERMIT 16762 LICENSE

ORDER APPROVING A NEW DEVELOPMENT SCHEDULE
AND AMENDING THE PERMIT

WHEREAS:

1. A petition for extension of time within which to develop the project and apply the water to the proposed use has been filed with the State Water Resources Control Board.

2. The permittee has proceeded with diligence and good cause has been shown for extension of time.

NOW, THEREFORE, IT IS ORDERED THAT:

1. Paragraph 7 of the permit is amended to read as follows:

   CONSTRUCTION WORK SHALL BE
   COMPLETED ON OR BEFORE December 1, 1990

2. Paragraph 8 of the permit is amended to read as follows:

   COMPLETE APPLICATION OF THE
   WATER TO THE PROPOSED USE
   SHALL BE MADE ON OR BEFORE December 1, 2000

3. Paragraph 31 is added to this permit as follows:

   The State Water Resources Control Board, under its authority to conserve the public interest, retains continuing authority over this permit to require permittee to develop and implement a water conservation program, after notice and opportunity for hearing. The requirements for this term may be satisfied by permittee's compliance with any comprehensive water conservation program, approved by the State Water Resources Control Board, which may be imposed by a public agency.

Dated: SEPTEMBER 14 1982

Raymond Walsh

Raymond Walsh, Chief
Division of Water Rights

WRCB
133 (12-67)