

**CALAVERAS
COUNTY
WATER
DISTRICT**

BUSINESS OFFICE
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Post Office Box 846
San Andreas, California 95249
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December 5, 2012

Anne L. Olson, P.E.
Senior Water Resource Control Engineer
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670

RE: Tentative Waste Discharge Requirements for Douglas Flat/Vallecito
Wastewater Treatment Facility, Calaveras County

Dear Ms. Olson:

The following comments are provided by the Calaveras County Water District (CCWD) in reply to the Tentative Waste Discharge Requirements for the Douglas Flat/Vallecito Facility received from your office and dated November 20, 2012:

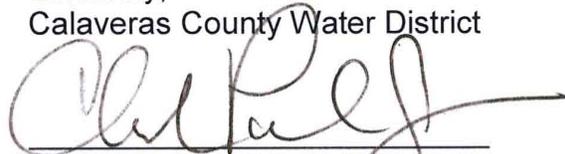
Page / Item	Comments												
Page 2, Item No.7	The LAA is 60-acres total with 26-acres irrigated and the balance serving as setback.												
Page 2, Item No.10	CCWD completed modifications to the effluent storage pond as follows: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th><u>Surface Area</u> (acres)</th> <th><u>Depth</u> (feet)</th> <th><u>Volume</u> (ac-ft)</th> <th><u>Effective Dates</u></th> </tr> </thead> <tbody> <tr> <td>6.6</td> <td>11.5</td> <td>45.7</td> <td>Before Nov. 20, 2012</td> </tr> <tr> <td>7.0</td> <td>13.5</td> <td>59.2</td> <td>After Nov. 20, 2012</td> </tr> </tbody> </table> <p>¹ Measured at two feet of freeboard.</p>	<u>Surface Area</u> (acres)	<u>Depth</u> (feet)	<u>Volume</u> (ac-ft)	<u>Effective Dates</u>	6.6	11.5	45.7	Before Nov. 20, 2012	7.0	13.5	59.2	After Nov. 20, 2012
<u>Surface Area</u> (acres)	<u>Depth</u> (feet)	<u>Volume</u> (ac-ft)	<u>Effective Dates</u>										
6.6	11.5	45.7	Before Nov. 20, 2012										
7.0	13.5	59.2	After Nov. 20, 2012										
Page 5, Item No.22 a & b	The 0.085-mgd and 0.105-mgd maximum monthly flows used in the 100-year water balances were normalized (made same) by averaging wet weather flows for winter months (121-181 days). For a shorter timeframe of one month (28-31 days), the monthly maximum flow can be greater than these normalized values.												

<p>Page 6, Item No.26</p>	<p>The 100-year rainfall of 67-inches stated by Regional Board staff is highly conservative and not representative for this facility; and it potentially burdens CCWD with having to design and construct oversized facilities with excess capacity. Rainfall data for weather stations in the region are tabulated below. Douglas Flat/Vallecito has less rainfall than Sheep Ranch at 400-ft higher elevation. A 100-year rainfall of 61.0" and average rainfall of 33.4" were used in the water balances.</p> <table border="1" data-bbox="394 569 1312 831"> <thead> <tr> <th><u>Station Name</u></th> <th><u>100-Yr Rainfall</u></th> <th><u>Average Rainfall</u></th> <th><u>Relative Distance</u></th> <th><u>Relative Elevation</u></th> <th><u>Years of Record</u></th> </tr> </thead> <tbody> <tr> <td>Angels Camp</td> <td>56.7"</td> <td>31.3"</td> <td>4.5-miles</td> <td>Lower</td> <td>56</td> </tr> <tr> <td>Altaville</td> <td>51.3"</td> <td>28.4"</td> <td>5.5-miles</td> <td>Lower</td> <td>38</td> </tr> <tr> <td>Sheep Ranch</td> <td>64.3"</td> <td>35.5"</td> <td>7-miles</td> <td>Higher</td> <td>55</td> </tr> <tr> <td>Murphys 3NW</td> <td>64.9"</td> <td>35.9"</td> <td>5-miles</td> <td>Higher</td> <td>7</td> </tr> <tr> <td>Murphys 2N</td> <td>66.8"</td> <td>36.9"</td> <td>4.5-miles</td> <td>Higher</td> <td>30</td> </tr> </tbody> </table>	<u>Station Name</u>	<u>100-Yr Rainfall</u>	<u>Average Rainfall</u>	<u>Relative Distance</u>	<u>Relative Elevation</u>	<u>Years of Record</u>	Angels Camp	56.7"	31.3"	4.5-miles	Lower	56	Altaville	51.3"	28.4"	5.5-miles	Lower	38	Sheep Ranch	64.3"	35.5"	7-miles	Higher	55	Murphys 3NW	64.9"	35.9"	5-miles	Higher	7	Murphys 2N	66.8"	36.9"	4.5-miles	Higher	30
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<p>Page 15, Section B. Item No.1 and 2</p>	<p>The 0.085-mgd and 0.105-mgd maximum monthly flows used in the 100-year water balances were normalized (made same) by averaging wet weather flows for winter months (121-181 days). For a shorter timeframe of one month (28-31 days), the monthly maximum flow can be greater than these normalized values. As a practical flow limitation, the maximum monthly flow should correspond to the WWTF capacity designed for a maximum monthly "wet weather" flow of 0.13-mgd.</p>																																				
<p>Page 15, Section B. Item No.2</p>	<p>The second paragraph states, "Approval is dependent on submittal of a water balance capacity analysis demonstrating that the as-built hydraulic capacity of the WWTF is consistent with the flow limits." The subject water balances were submitted on October 19, 2012 by CCWD, and it is our understanding were reviewed and accepted by Regional Board staff. CCWD does not see the benefit of having to resubmit the same water balances and potentially opening up the permitted flow limits to further review and revision in the near future. CCWD would like to have some finality and certainty to the permit process once the final WDRs are issued and adopted by the Regional Board.</p>																																				

<p>Page 19, Section G. Item No.2 and 4</p>	<p>CCWD proposes to operate the UV system at its design dose of 80 mJ/cm² and 65% UVT until operating parameters are otherwise determined by site-specific validation testing of the UV system in accordance with National Water Research Institute (NWRI) Guidelines and a validation report is accepted and approved by the California Department of Public Health, Drinking Water Technical Operation Section. CCWD will submit a copy of the validation report to the Regional Board for concurrence before implementing any operational changes to the UV system.</p>
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Thank you for your time and assistance. If you have questions or comments regarding this letter, please contact Teresa Tanaka at (209) 754-3306 or me at (209) 754-3174.

Sincerely,
Calaveras County Water District



Charles Palmer, P.E. #62306
Associate Civil Engineer

CP/tbk
Enclosures (5): Water Balances
cc: Lixin Fu, Regional Board
Teresa Tanaka, CCWD
Bill Perley, CCWD

Douglas Flat / Vallecito Wastewater Treatment Plant

WATER BALANCE

**Normal Rainfall / Existing Conditions
(60,000-gpd ADWF and 45.7 ac-ft Storage)**

Date: October 16, 2012

YEAR		PLANT FLOW ⁽¹⁾				CLIMATE DATA ⁽²⁾				SPRAYFIELD PERCOLATION			INFLOWS (FILL)			OUTFLOWS (DRAW)			STORAGE ⁽³⁾	
Month	Days	Flow ADWF (gpd)	Flow ADWF (gal/mon)	Flow I&I (gpd)	Flow Q + I&I (gal/mon)	Station ⁽²⁾ Rainfall (inches)	Normal Rainfall (inches)	Monthly ET=K _c x ET _o (inches)	Net ET (inches)	Rain Perc. (inches)	Applied Perc. (inches)	Total Perc. (inches)	Flow Q + I&I (ac-ft)	Pond Precip. (ac-ft)	Accum. Inflow (ac-ft)	Irrig. Applied (ac-ft)	Pond Evap. (ac-ft)	Accum. Outflow (ac-ft)	Net Storage (ac-ft)	Pond Elev. (feet)
Oct	31	60,000	1,860,000	-	1,860,000	5.2%	1.75	2.98	1.23	0.0	1.4	1.4	5.71	1.02	6.73	5.69	1.02	6.71	0.0	1,877.5
Nov	30	60,000	1,800,000	24,000	2,520,000	10.8%	3.61	1.56	0.00	2.0	1.8	3.8	7.73	2.10	16.57	3.90	1.06	11.67	4.9	1,879.3
Dec	31	60,000	1,860,000	24,000	2,604,000	15.7%	5.26	0.99	0.00	4.3	0.5	4.8	7.99	3.07	27.63	1.18	0.67	13.52	14.1	1,881.8
Jan	31	60,000	1,860,000	24,000	2,604,000	19.3%	6.45	1.12	0.00	5.3	0.5	5.9	7.99	3.76	39.38	1.18	0.76	15.45	23.9	1,883.4
Feb	28	60,000	1,680,000	24,000	2,352,000	17.4%	5.81	1.68	0.00	4.1	0.5	4.7	7.22	3.39	49.99	1.18	1.14	17.76	32.2	1,884.7
Mar	31	60,000	1,860,000	24,000	2,604,000	16.8%	5.62	2.60	0.00	3.0	0.5	3.6	7.99	3.28	61.26	1.18	1.76	20.70	40.6	1,886.1
Apr	30	60,000	1,800,000	24,000	2,520,000	8.2%	2.74	3.84	1.10	0.0	0.5	0.5	7.73	1.60	70.59	3.57	2.60	26.86	43.7	1,886.6
May	31	60,000	1,860,000	-	1,860,000	4.0%	1.33	5.08	3.76	0.0	0.5	0.5	5.71	0.77	77.07	9.31	3.44	39.62	37.5	1,885.6
Jun	30	60,000	1,800,000	-	1,800,000	0.9%	0.31	6.00	5.69	0.0	0.5	0.5	5.52	0.18	82.78	13.49	4.06	57.18	25.6	1,883.7
Jul	31	60,000	1,860,000	-	1,860,000	0.1%	0.03	6.45	6.42	0.0	0.0	0.0	5.71	0.02	88.51	13.90	4.37	75.44	13.1	1,881.7
Aug	31	60,000	1,860,000	-	1,860,000	0.2%	0.06	5.83	5.76	0.0	0.0	0.0	5.71	0.04	94.25	12.49	1.97	89.90	4.3	1,879.1
Sep	30	60,000	1,800,000	-	1,800,000	1.4%	0.46	4.44	3.98	0.0	0.0	0.0	5.52	0.27	100.04	8.63	1.50	100.04	0.0	1,877.5
TOTAL	365		21,900,000		26,244,000	100.0%	33.4	42.6	27.9	18.8	7.0	25.8	80.5	19.5		75.7	24.4			

Sheep Ranch & Angels Camp Composite ⁽⁵⁾

100-Yr Return Period 61.0 in/yr
 Normal Year Rainfall 33.4 in/yr

Storage Pond Data ⁽⁴⁾

Pond Pool Area 6.5 acres
 Pond Catchment Area 7.0 acres
 Pond Bottom Elevation 1877.5 ft
 Elev. @ 2-ft Freeboard 1887 ft
 Volume @ 2-ft Freeboard 45.7 ac-ft
 Top of Levee 1889 ft

Spray Field Data

Spray Field Property 61.5 acres
 Irrigable Spray Field Area 26 acres
 Soil Percolation Capacity 0.05 inches/hour
 Crop Coefficient (Kc) 0.8

Footnotes:

- (1) 75,000-gpd ADWF with 59.2 ac-ft of storage; 60,000-gpd ADWF with 45.7 ac-ft of storage.
- (2) Percentage monthly rainfall scaled from Sonora RS (Station B40 8353 00). ET_o average Zones 11 and 12. Net ET - P = ET_o X Crop Coefficient (Kc) - Precipitation (P)
- (3) Storage pond capacity and elevations are estimated from a professional survey conducted by John Gnipp of Condor Earth Technologies on October 21, 2005.
- (4) Modifications to storage pond in October 2012 will provide 45.7 ac-ft of storage capacity; further modifications completed by October 2013 will increase storage capacity to 59.2 ac-ft.
- (5) The 100-year and normal year rainfall events are equally weighted composites of historical rainfall data for Sheep Ranch (B20 8145) and Angels Camp (B30 0209) stations.



Douglas Flat / Vallecito Wastewater Treatment Plant

WATER BALANCE

**100-Year Rainfall / Existing Conditions
(60,000-gpd ADWF and 45.7 ac-ft Storage)**

Date: October 16, 2012

YEAR		PLANT FLOW ⁽¹⁾				CLIMATE DATA ⁽²⁾				SPRAYFIELD PERCOLATION			INFLOWS (FILL)			OUTFLOWS (DRAW)			STORAGE ⁽³⁾	
Month	Days	Flow ADWF (gpd)	Flow ADWF (gal/mon)	Flow I&I (gpd)	Flow Q + I&I (gal/mon)	Station ⁽²⁾ Rainfall (inches)	100-Yr Rainfall (inches)	Monthly ET=K _c xET _o (inches)	Net ET (inches)	Rain Perc. (inches)	Applied Perc. (inches)	Total Perc. (inches)	Flow Q + I&I (ac-ft)	Pond Precip. (ac-ft)	Accum. Inflow (ac-ft)	Irrig. Applied (ac-ft)	Pond Evap. (ac-ft)	Accum. Outflow (ac-ft)	Net Storage (ac-ft)	Pond Elev. (feet)
Oct	31	60,000	1,860,000	-	1,860,000	5.2%	3.19	2.98	0.00	0.2	2.6	2.8	5.71	1.86	7.6	5.63	1.86	7.5	0.1	1,877.5
Nov	30	60,000	1,800,000	24,000	2,520,000	10.8%	6.58	1.56	0.00	5.0	2.6	7.6	7.73	3.84	19.1	5.63	1.06	14.2	5.0	1,879.3
Dec	31	60,000	1,860,000	24,000	2,604,000	15.7%	9.59	0.99	0.00	8.6	1.8	10.4	7.99	5.60	32.7	3.79	0.67	18.6	14.1	1,881.8
Jan	31	60,000	1,860,000	24,000	2,604,000	19.3%	11.77	1.12	0.00	10.7	1.8	12.4	7.99	6.86	47.6	3.79	0.76	23.2	24.4	1,883.5
Feb	28	60,000	1,680,000	24,000	2,352,000	17.4%	10.60	1.68	0.00	8.9	1.8	10.7	7.22	6.18	61.0	3.79	1.14	28.1	32.9	1,884.8
Mar	31	60,000	1,860,000	24,000	2,604,000	16.8%	10.25	2.60	0.00	7.6	1.8	9.4	7.99	5.98	75.0	3.79	1.76	33.7	41.3	1,886.2
Apr	30	60,000	1,800,000	24,000	2,520,000	8.2%	4.99	3.84	0.00	1.2	2.6	3.8	7.73	2.91	85.6	5.63	2.60	41.9	43.7	1,886.6
May	31	60,000	1,860,000	-	1,860,000	4.0%	2.42	5.08	2.66	0.0	1.1	1.1	5.71	1.41	92.7	8.20	3.44	53.6	39.2	1,885.8
Jun	30	60,000	1,800,000	-	1,800,000	0.9%	0.57	6.00	5.43	0.0	1.1	1.1	5.52	0.33	98.6	14.18	4.06	71.8	26.8	1,883.9
Jul	31	60,000	1,860,000	-	1,860,000	0.1%	0.06	6.45	6.39	0.0	1.1	1.1	5.71	0.04	104.3	16.27	4.37	92.4	11.9	1,881.5
Aug	31	60,000	1,860,000	-	1,860,000	0.2%	0.12	5.83	5.71	0.0	0.0	0.0	5.71	0.07	110.1	12.37	1.97	106.8	3.3	1,878.7
Sep	30	60,000	1,800,000	-	1,800,000	1.4%	0.83	4.44	3.61	0.0	0.0	0.0	5.52	0.48	116.1	7.82	1.50	116.1	0.0	1,877.5
TOTAL	365		21,900,000		26,244,000	100.0%	61.0	42.6	23.8	42.2	18.2	60.4	80.5	35.6		90.9	25.2			

Sheep Ranch & Angels Camp Composite ⁽⁵⁾

100-Yr Return Period 61.0 in/yr
Normal Year Rainfall 33.4 in/yr

Storage Pond Data ⁽⁴⁾

Pond Pool Area 6.5 acres
Pond Catchment Area 7.0 acres
Pond Bottom Elevation 1877.5 ft
Elev. @ 2-ft Freeboard 1887 ft
Volume @ 2-ft Freeboard 45.7 ac-ft
Top of Levee 1889 ft

Spray Field Data

Spray Field Property 61.5 acres
Irrigable Spray Field Area 26 acres
Soil Percolation Capacity 0.05 inches/hour
Crop Coefficient (Kc) 0.8

Footnotes:

- (1) 75,000-gpd ADWF with 59.2 ac-ft of storage; 60,000-gpd ADWF with 45.7 ac-ft of storage.
- (2) Percentage monthly rainfall scaled from Sonora RS (Station B40 8353 00). ET_o average Zones 11 and 12. Net ET = ET_o X Crop Coefficient (Kc) - Precipitation (P)
- (3) Storage pond capacity and elevations are estimated from a professional survey conducted by John Gnipp of Condor Earth Technologies on October 21, 2005.
- (4) Modifications to storage pond in October 2012 will provide 45.7 ac-ft of storage capacity; further modifications completed by October 2013 will increase storage capacity to 59.2 ac-ft.
- (5) The 100-year and normal year rainfall events are equally weighted composites of historical rainfall data for Sheep Ranch (B20 8145) and Angels Camp (B30 0209) stations.



Douglas Flat / Vallecito Wastewater Treatment Plant

WATER BALANCE

Normal Rainfall / Future Conditions

(75,000-gpd ADWF and 59.2 ac-ft Storage)

Date: October 16, 2012

YEAR		PLANT FLOW ⁽¹⁾				CLIMATE DATA ⁽²⁾				SPRAYFIELD PERCOLATION			INFLOWS (FILL)			OUTFLOWS (DRAW)			STORAGE ⁽³⁾	
Month	Days	Flow ADWF (gpd)	Flow ADWF (gal/mon)	Flow I&I (gpd)	Flow Q + I&I (gal/mon)	Station ⁽²⁾ Rainfall (inches)	Normal Rainfall (inches)	Monthly ET=K _c xET _o (inches)	Net ET (inches)	Rain Perc. (inches)	Applied Perc. (inches)	Total Perc. (inches)	Flow Q + I&I (ac-ft)	Pond Precip. (ac-ft)	Accum. Inflow (ac-ft)	Irrig. Applied (ac-ft)	Pond Evap. (ac-ft)	Accum. Outflow (ac-ft)	Net Storage (ac-ft)	Pond Elev. (feet)
Oct	31	75,000	2,325,000	-	2,325,000	5.2%	1.75	2.98	1.23	0.0	2.0	2.0	7.13	1.02	8.16	6.99	1.02	8.01	0.1	1,877.6
Nov	30	75,000	2,250,000	30,000	3,150,000	10.8%	3.61	1.56	0.00	2.0	2.0	4.0	9.67	2.10	19.93	4.33	1.06	13.40	6.5	1,879.8
Dec	31	75,000	2,325,000	30,000	3,255,000	15.7%	5.26	0.99	0.00	4.3	1.5	5.8	9.99	3.07	32.98	3.33	0.67	17.40	15.6	1,882.1
Jan	31	75,000	2,325,000	30,000	3,255,000	19.3%	6.45	1.12	0.00	5.3	1.5	6.9	9.99	3.76	46.74	3.33	0.76	21.49	25.3	1,883.6
Feb	28	75,000	2,100,000	30,000	2,940,000	17.4%	5.81	1.68	0.00	4.1	1.5	5.7	9.02	3.39	59.15	3.33	1.14	25.95	33.2	1,884.9
Mar	31	75,000	2,325,000	30,000	3,255,000	16.8%	5.62	2.60	0.00	3.0	1.5	4.6	9.99	3.28	72.42	3.33	1.76	31.04	41.4	1,886.2
Apr	30	75,000	2,250,000	30,000	3,150,000	8.2%	2.74	3.84	1.10	0.0	1.5	1.5	9.67	1.60	83.68	5.72	2.60	39.36	44.3	1,886.7
May	31	75,000	2,325,000	-	2,325,000	4.0%	1.33	5.08	3.76	0.0	1.5	1.5	7.13	0.77	91.59	11.47	3.44	54.27	37.3	1,885.5
Jun	30	75,000	2,250,000	-	2,250,000	0.9%	0.31	6.00	5.69	0.0	1.5	1.5	6.90	0.18	98.68	15.65	4.06	73.98	24.7	1,883.5
Jul	31	75,000	2,325,000	-	2,325,000	0.1%	0.03	6.45	6.42	0.0	1.5	1.5	7.13	0.02	105.83	17.23	4.37	95.58	10.3	1,881.2
Aug	31	75,000	2,325,000	-	2,325,000	0.2%	0.06	5.83	5.76	0.0	0.0	0.0	7.13	0.04	113.00	12.49	1.97	110.04	3.0	1,878.6
Sep	30	75,000	2,250,000	-	2,250,000	1.4%	0.46	4.44	3.98	0.0	0.0	0.0	6.90	0.27	120.17	8.63	1.50	120.17	0.0	1,877.5
TOTAL	365		27,375,000		32,805,000	100.0%	33.4	42.6	27.9	18.8	16.3	35.1	100.7	19.5		95.8	24.4			

Sheep Ranch & Angels Camp Composite ⁽⁵⁾

100-Yr Return Period 61.0 in/yr
 Normal Year Rainfall 33.4 in/yr

Storage Pond Data ⁽⁴⁾

Pond Pool Area 6.5 acres
 Pond Catchment Area 7.0 acres
 Pond Bottom Elevation 1877.5 ft
 Elev. @ 2-ft Freeboard 1889 ft
 Volume @ 2-ft Freeboard 59.2 ac-ft
 Top of Levee 1891 ft

Spray Field Data

Spray Field Property 61.5 acres
 Irrigable Spray Field Area 26 acres
 Soil Percolation Capacity 0.05 inches/hour
 Crop Coefficient (Kc) 0.8

Footnotes:

- (1) 75,000-gpd ADWF with 59.2 ac-ft of storage; 60,000-gpd ADWF with 45.7 ac-ft of storage.
- (2) Percentage monthly rainfall scaled from Sonora RS (Station B40 8353 00). ET_o average Zones 11 and 12. Net ET = ET_o X Crop Coefficient (K_c) - Precipitation (P)
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Douglas Flat / Vallecito Wastewater Treatment Plant

WATER BALANCE

**100-Year Rainfall / Future Conditions
(75,000-gpd ADWF and 59.2 ac-ft Storage)**

Date: October 16, 2012

YEAR		PLANT FLOW ⁽¹⁾				CLIMATE DATA ⁽²⁾				SPRAYFIELD PERCOLATION			INFLOWS (FILL)			OUTFLOWS (DRAW)			STORAGE ⁽³⁾	
Month	Days	Flow ADWF (gpd)	Flow ADWF (gal/mon)	Flow I&I (gpd)	Flow Q + I&I (gal/mon)	Percent Rainfall (inches)	100-Yr Rainfall (inches)	Monthly ET=K _c xET _o (inches)	Net ET (inches)	Rain Perc. (inches)	Applied Perc. (inches)	Total Perc. (inches)	Flow Q + I&I (ac-ft)	Pond Precip. (ac-ft)	Accum. Inflow (ac-ft)	Irrig. Applied (ac-ft)	Pond Evap. (ac-ft)	Accum. Outflow (ac-ft)	Net Storage (ac-ft)	Pond Elev. (feet)
Oct	31	75,000	2,325,000	-	2,325,000	5.2%	3.19	2.98	0.00	0.2	3.3	3.5	7.13	1.86	9.0	7.15	1.86	9.0	0.0	1,877.5
Nov	30	75,000	2,250,000	30,000	3,150,000	10.8%	6.58	1.56	0.00	5.0	2.6	7.6	9.67	3.84	22.5	5.63	1.06	15.7	6.8	1,879.9
Dec	31	75,000	2,325,000	30,000	3,255,000	15.7%	9.59	0.99	0.00	8.6	1.6	10.2	9.99	5.60	38.1	3.47	0.67	19.8	18.2	1,882.5
Jan	31	75,000	2,325,000	30,000	3,255,000	19.3%	11.77	1.12	0.00	10.7	1.6	12.3	9.99	6.86	54.9	3.47	0.76	24.1	30.9	1,884.5
Feb	28	75,000	2,100,000	30,000	2,940,000	17.4%	10.60	1.68	0.00	8.9	1.6	10.5	9.02	6.18	70.1	3.47	1.14	28.7	41.5	1,886.2
Mar	31	75,000	2,325,000	30,000	3,255,000	16.8%	10.25	2.60	0.00	7.6	1.6	9.2	9.99	5.98	86.1	3.47	1.76	33.9	52.2	1,887.9
Apr	30	75,000	2,250,000	30,000	3,150,000	8.2%	4.99	3.84	0.00	1.2	2.6	3.8	9.67	2.91	98.7	5.63	2.60	42.1	56.6	1,888.6
May	31	75,000	2,325,000	-	2,325,000	4.0%	2.42	5.08	2.66	0.0	2.5	2.5	7.13	1.41	107.2	11.21	3.44	56.8	50.5	1,887.6
Jun	30	75,000	2,250,000	-	2,250,000	0.9%	0.57	6.00	5.43	0.0	2.5	2.5	6.90	0.33	114.5	17.20	4.06	78.0	36.4	1,885.4
Jul	31	75,000	2,325,000	-	2,325,000	0.1%	0.06	6.45	6.39	0.0	2.5	2.5	7.13	0.04	121.6	19.28	4.37	101.7	20.0	1,882.8
Aug	31	75,000	2,325,000	-	2,325,000	0.2%	0.12	5.83	5.71	0.0	2.5	2.5	7.13	0.07	128.8	17.81	1.97	121.5	7.4	1,880.1
Sep	30	75,000	2,250,000	-	2,250,000	1.4%	0.83	4.44	3.61	0.0	2.5	2.5	6.90	0.48	136.2	13.26	1.50	136.2	0.0	1,877.5
TOTAL	365		27,375,000		32,805,000	100.0%	61.0	42.6	23.8	42.2	27.5	69.7	100.7	35.6		111.0	25.2			

Sheep Ranch & Angels Camp Rainfall ⁽⁵⁾

100-Yr Return Period 61.0 in/yr
Normal Year Rainfall 33.4 in/yr

Storage Pond Data ⁽⁴⁾

Pond Pool Area 6.5 acres
Pond Catchment Area 7.0 acres
Pond Bottom Elevation 1877.5 ft
Elev. @ 2-ft Freeboard 1889 ft
Volume @ 2-ft Freeboard 59.2 ac-ft
Top of Levee 1891 ft

Spray Field Data

Spray Field Property 61.5 acres
Irrigable Spray Field Area 26 acres
Soil Percolation Capacity 0.05 inches/hour
Crop Coefficient (Kc) 0.8

Footnotes:

- (1) 75,000-gpd ADWF with 59.2 ac-ft of storage; 60,000-gpd ADWF with 45.7 ac-ft of storage.
- (2) Percentage monthly rainfall scaled from Sonora RS (Station B40 8353 00). ETo average Zones 11 and 12. Net ET = ETo X Crop Coefficient (Kc) - Precipitation (P)
- (3) Storage pond capacity and elevations are estimated from a professional survey conducted by John Gnipp of Condor Earth Technologies on October 21, 2005.
- (4) Modifications to storage pond in October 2012 will provide 45.7 ac-ft of storage capacity; further modifications completed by October 2013 will increase storage capacity to 59.2 ac-ft.
- (5) The 100-year and normal year rainfall events are equally weighted composites of historical rainfall data for Sheep Ranch (B20 8145) and Angels Camp (B30 0209) stations.



Douglas Flat / Vallecito Wastewater Treatment Plant

WATER BALANCE SENSITIVITY ANALYSIS

(For Variations in Parameters / 100-Year Rainfall and Crop Coefficient)

Date: October 18, 2012

Condition	Monthly ADWF (gpd)	Monthly I&I (gpd)	Annual Flow (mgal)	100-Yr Rain (inches)	Crop Coefficient (Kc)	Sprayfield Percolation (inches)	Pond	Peak Storage (ac-ft)
							Inflows/ Outflows (ac-ft)	
Existing	60,000	24,000	26.2	61.0	1.00	53.4	116.1	43.7
Existing	60,000	24,000	26.2	61.0	0.80	60.4	116.1	43.7
Existing	60,000	24,000	26.2	61.0	0.65	68.4	116.1	43.7
Existing	60,000	24,000	26.2	64.9	1.00	57.0	118.4	45.6
Existing	60,000	24,000	26.2	64.9	0.80	65.3	118.4	45.6
Existing	60,000	24,000	26.2	64.9	0.65	73.3	118.4	45.6
Future	75,000	30,000	32.8	61.0	1.00	59.0	136.2	56.6
Future	75,000	30,000	32.8	61.0	0.80	69.7	136.2	56.6
Future	75,000	30,000	32.8	61.0	0.65	77.7	136.2	56.6
Future	75,000	30,000	32.8	64.9	1.00	64.0	138.5	58.6
Future	75,000	30,000	32.8	64.9	0.80	74.6	138.5	58.6
Future	75,000	30,000	32.8	64.9	0.65	82.6	138.5	58.6

Conclusions: Changing 100-year rainfall from 61.0" to 64.9" results in a nominal 2 ac-ft increase in the required storage capacity for both existing and future conditions. Lowering the crop coefficient from 1.0 to 0.65 reduces the evapotranspiration rate and increases the required amount of sprayfield percolation, but it has no net effect on peak storage in the ponds.

