APPENDIX F

Water Demand Calculation Report

Water Demand Calculation

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From: Carl Sloan
Subject: Water Demand Calculation Report - DRAFT
Project: 6339-01-08 Hidden Falls Regional Park

Total pages: 7

1. Introduction

This water demand calculation was prepared specifically for the Hidden Falls Regional Park project. This report provides detailed information regarding the calculations of the Maximum Day Demand (MDD) and the Peak Hour Demand (PHD) for this project. The calculations were prepared using the most current information available for the project. Future information obtained for the proposed area, or from other sources may result in changes.

2. Project Description and Background

The Hidden Falls Regional Park project consists of approximately 1,200 acres; and involves access and recreational improvements. It is located in Auburn, Placer County, and consists of two properties know as the Spears Ranch (approximately 979 acres) and Didion Ranch (approximately 221 acres). The project area for this water demand calculation is located within the Spears Ranch portion of the project. Currently the project proposes the use of groundwater wells for water service.

3. Water Calculations Criteria

a. Proposed Improvements and Assumptions
   i. One (1) staging area of similar size to the Didion Ranch Staging Area.
   ii. Existing house to provide service for sixty (60) overnight campers, five (5) staff members and one (1) commercial kitchen. No shower or laundry facility.
   iii. One (1) maintenance yard.
   iv. One (1) caretaker residence.
   v. Water demand calculations based on wastewater usage.

b. References
   i. Chapter 16 of the Title 22 California Code of Regulations used to calculated MDD and PHD.
   ii. Onsite Wastewater Treatment System Manual - EPA 625/R-00/008-Chapter 3 (Appendix C).
   iii. Existing Well Reading Data from the Didion Ranch Staging Area (Appendix B).

4. Results

Water demand calculations results are included in Appendix A titled Water Demand Calculations Table attached. The results include the MDD and PHD calculations for each specific use as well as the entire project.

5. Conclusions

Based on the assumptions listed above and per results in the attached Appendix A - Water Demand Calculations Table, the groundwater source shall provide the new public water system with a minimum MDD of 4.7 gpm and PHD of 7.1 gpm; that includes a 20% contingency for the entire project. In case that the new public water system is incapable of supporting the entire project, MDD and PHD calculations are included for each specific use in Appendix A.

Per section 64554.(a)(2) of the Title 22 of the California Code of Regulations in Chapter 16 the public water system shall have storage capacity equal to or greater than the MDD of 5616 gallons, unless the system can demonstrate that it has an emergency source connection that can meet the MDD requirement.

APPENDIX A - Water Demand Calculation

Project: HIDDEN FALLS REGIONAL PARK
Job number: 6339-01-08
Date: 03/07/2009
Revised: 04/07/2009
Prepared by: MDH
Checked by: CAM

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Facility	*Type of Occupancy*	*Occupants*	*Data Source*	*Average Daily Demand*	*Total Average Daily Demand*	*MDD* [5]	*PHD* [6]
Existing House 1	Organized Camps	60 Campers	Table 3-6 Bunkhouse[1]	40 Gal/Person/Day	2400 Gal/Day	2.50 GPM	3.75 GPM
Existing House 1	Organized Camps	5 Staff	Table 3-3 Residential[1]	69.3 Gal/Person/Day	346.5 Gal/Day	0.36 GPM	0.54 GPM
Comm. Kitchen in Existing House 1		195 meals[3]	Table 3-4 Restaurant -Per Meal[1]	3 Gal/Meal/Day	585 Gal/Day	0.61 GPM	0.91 GPM
Caretaker House 2	Single Dwelling	1	Table 3-3 Residential[1]	69.3 Gal/Person/Day	69.3 Gal/Day	0.07 GPM	0.11 GPM
Staging Area	Picnic Areas	100	Hidden Falls (Didion)Well Reading	October 2008[2]	236.2 Gal/Day	0.25 GPM	0.37 GPM
Maintenace Yard	Workshop	5 Staff	Table 3-4 Industrial Building[1]	13 Gal/Person/Day	65 Gal/Day	0.07 GPM	0.10 GPM
				TOTAL (Gal/Day)	**3702 Gal/Day**	***5616 Gal/Day***	***8496 Gal/Day***
				TOTAL (GPM)	**2.6 GPM**	**3.9 GPM**	**5.8 GPM**
				TOTAL plus 20% Contigency (GPM)[7]	**3.1 GPM**	**4.7 GPM**	**7.0 GPM**

NOTES:

1. Data Source from EPA 625/R-00/008-Chapter 3
2. Maximum Month October 2008 from Hidden Falls (Didion) Well Reading
3. 195 meals based on 65 persons x 3 meals/day
4. Average Day Demand (ADD)
5. Maximum Day Demand (MDD). MDD calculations based on a peaking factor of 1.5 as delineated in section 64554.(b)(2)(C) of the Title 22 of the California Code of Regulations in Chapter 16.
6. Peak Hour Demand (PHD). PHD calculations based on a peaking factor of 1.5 from the MDD as delineated in section 64554.(b)(2)(D) of the Title 22 of the California Code of Regulations in Chapter 16.
7. 20% Contingency added to calculated water demand for unaccounted usage (i.e. hose bibs, drinking fountains, etc)

APPENDIX B
Hidden Falls (Didion) Well Reading
Average Day Demand Calculation

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Data provided by Placer County Parks Division - Dated 2/25/2009						Calculated by Carlton Engineering
Reading No.	Date of Reading	Meter Reading at Well head (gallons)	Days Since Last Reading	Gal/Day Since Last Reading	Gal/Day Running Average	**ADD (Average Day Demand) Calculation *Interpolated value**
2	08/01/2008	429950	0	0.0		
3	08/05/2008	430310	4	90.0	90.0	
4	08/08/2008	430540	3	76.7	84.3	ADD= (432870 - 429950)gal/31days
5	08/14/2008	431060	6	86.7	85.4	ADD=94.2 gpd
6	08/15/2008	431100	1	40.0	82.1	ADD= 94.2 gpd (1/24 hr) (1/60 min)
7	08/19/2008	431370	4	67.5	78.9	ADD=0.07 gpm
8	08/22/2008	431600	3	76.7	78.6	
9	08/27/2008	432470	5	174.0	96.9	
10	08/29/2008	432550	2	40.0	92.9	08/31/2008 432870 gal*
11	09/02/2008	433190	4	160.0	101.3	09/01/2008 433030 gal*
12	09/05/2008	433360	3	56.7	97.4	
13	09/09/2008	437160	4	950.0	184.9	ADD= (438480 - 433030)gal/30days
14	09/12/2008	437450	3	96.7	178.6	ADD=181.6 gpd
15	09/16/2008	437710	4	65.0	168.7	ADD= 181.6 gpd (1/24 hr) (1/60 min)
16	09/19/2008	437840	3	43.3	161.0	ADD=0.13 gpm
17	09/24/2008	438110	5	54.0	151.1	
18	09/26/2008	438180	2	35.0	147.0	
19	09/30/2008	438480	4	75.0	142.2	
20	10/03/2008	438590	3	36.7	137.1	10/01/2008 4438517 gal*
21	10/10/2008	438920	7	47.1	128.1	
22	10/14/2008	439410	4	122.5	127.8	ADD= (445840 - 438517)gal/31days
23	10/17/2008	439800	3	130.0	127.9	ADD=236.2 gpd
24	10/21/2008	444950	4	1287.5	185.2	ADD= 236.2 gpd (1/24 hr) (1/60 min)
25	10/22/2008	445340	1	390.0	187.7	ADD=0.16 gpm
26	10/24/2008	445480	2	70.0	184.9	**MAXIMUM MONTH**
27	10/28/2008	445720	4	60.0	179.2	
28	10/31/2008	445840	3	40.0	174.6	
29	11/04/2008	445930	4	22.5	168.2	11/01/2008 445863 gal*
30	11/07/2008	446010	3	26.7	163.9	ADD= (447860 - 445863)gal/30days
31	11/12/2008	446350	5	68.0	159.2	ADD=66.6 gpd
32	11/14/2008	446490	2	70.0	157.5	ADD= 66.6 gpd (1/24 hr) (1/60 min)
33	11/18/2008	446810	4	80.0	154.7	ADD=0.05 gpm
34	11/21/2008	446960	3	50.0	151.9	11/30/2008 447860 gal*
35	12/02/2008	448060	11	100.0	147.2	12/01/2008 447960 gal*
36	12/05/2008	448140	3	26.7	144.4	ADD= (449510 - 447960)gal/31days
37	12/09/2008	448380	4	60.0	141.8	ADD=50 gpd
38	12/12/2008	448500	3	40.0	139.5	ADD= 50 gpd (1/24 hr) (1/60 min)
39	12/16/2008	448680	4	45.0	136.7	ADD=0.03 gpm
40	12/19/2008	448790	3	36.7	134.6	12/31/2008 449510 gal*
41	01/06/2009	449870	18	60.0	126.1	01/01/2009 449570 gal*
42	01/09/2009	449995	3	41.7	124.5	ADD= (451020 - 449570)gal/23days
43	01/13/2009	450290	4	73.8	123.3	ADD=63 gpd
44	01/16/2009	450400	3	36.7	121.7	ADD= 63 gpd (1/24 hr) (1/60 min)
45	01/20/2009	450960	4	140.0	122.2	ADD=0.04 gpm
46	01/23/2009	451020	3	20.0	120.4	

APPENDIX C

EPA 625/R-00/008-Chapter 3

Chapter 3:
Establishing treatment system performance requirements

Table 3-3. Residential water use by fixture or appliance[a,b]

Fixture/use	Gal/use: Average range	Uses/person/day: Average range	Gal/person/day: Average range[c]	% Total: Average range
Toilet	3.5 2.9-3.9	5.05 4.5-5.6	18.5 15.7-22.9	26.7 22.6-30.6
Shower	17.2[d] 14.9-18.6	0.75[d] 0.6-0.9	11.6 8.3-15.1	16.8 11.8-20.2
Bath	See shower	See shower	1.2 0.5-1.9	1.7 0.9-2.7
Clothes washer	40.5	0.37 0.30-0.42	15 12.0-17.1	21.7 17.8-28.0
Dishwasher	10 9.3-10.6	0.1 0.06-0.13	1 0.6-1.4	1.4 0.9-2.2
Faucets	1.4[e]	8.1[f] 6.7-9.4	10.9 8.7-12.3	15.7 12.4-18.5
Leaks	NA	NA	9.5 3.4-17.6	13.7 5.3-21.6
Other Domestic	NA	NA	1.6 0.0-6.0	2.3 0.0-8.5
Total	NA	NA	69.3 57.1-83.5	100

[a]Results from AWWARF REUWS at 1,188 homes in 12 metropolitan area. Homes surveyed were served by public water supplies, which operate at higher pressure than private water sources. Leakage rates might be lower for homes on private water supplies.

[b]Results are averages over range. Range is the lowest to highest average for 12 metropolitan areas.
[c]Gal/person/day might not equal gal/use multiplied by uses/person/day because of differences in the number of data points used to calculate means.
[d]Includes shower and bath.
[e]Gallons per minute.
[f]Minutes of use per person per day.

Source: Mayer et al., 1999.

EPA 625/R-00/008-Chapter 3

Chapter 3:
Establishing treatment system performance requirements

Table 3-4. Typical wastewater flow rates from commercial sources[a,b]

Facility	Unit	Flow, gallons/unit/day	
		Range	Typical
Airport	Passenger	2-4	3
Apartment house	Person	40-80	50
Automobile service station[c]	Vehicle served Employees	8-15 9-15	12 13
Bar	Customer Employees	1-5 10-16	3 13
Boarding house	Person	25-60	40
Department store	Toilet room Employee	400-600 8-15	500 10
Hotel	Guest Employee	40-60 8-13	50 10
Industrial building (sanitary waste only)	Employee	7-16	13
Laundry (self-service)	Machine Wash	450-650 45-55	550 50
Office	Employee	7-16	13
Public lavatory	User	3-6	5
Restaurant (with toilet)	Meal	2-4	3
Conventional	Customer	8-10	9
Short order	Customer	3-8	6
Bar/cocktail lounge	Customer	2-4	3
Shopping center	Employee Parking Space	7-13 1-3	10 2
Theater	Seat	2-4	3

aSome systems serving more than 20 people might be regulated under USEPA's Class V Underground Injection Control (UIC) Program. See http://www.epa.gov/safewater/uic.html for more information.

[b]These data incorporate the effect of fixtures complying with the U.S. Energy Policy Act (EPACT) of 1994.

cDisposal of automotive wastes via subsurface wastewater infiltration systems is banned by Class V UIC regulations to protect ground water. See http://www.epa.gov/safewater/uic.html for more information.

Source: Crites and Tchobanoglous, 1998.

EPA 625/R-00/008-Chapter 3

Chapter 3:
Establishing treatment system performance requirements

Table 3-6. Typical wastewater flow rates from recreational facilities[a]

Facility	Unit	Flow, gallons/unit/day	
		Range	Typical
Apartment, resort	Person	50-70	60
Bowling alley	Alley	150-250	200
Cabin, resort	Person	8-50	40
Cafeteria	Customer	1-3	2
	Employee	8-12	10
Camps:			
Pioneer type	Person	15-30	25
Children's, with central toilet/bath	Person	35-50	45
Day, with meals	Person	10-20	15
Day, without meals	Person	10-15	13
Luxury, private bath	Person	75-100	90
Trailer camp	Trailer	75-150	125
Campground-developed	Person	20-40	30
Cocktail lounge	Seat	12-25	20
Coffee Shop	Customer	4-8	6
	Employee	8-12	10
Country club	Guests onsite	60-130	100
	Employee	10-15	13
Dining hall	Meal served	4-10	7
Dormitory/bunkhouse	Person	20-50	40
Fairground	Visitor	1-2	2
Hotel, resort	Person	40-60	50
Picnic park, flush toilets	Visitor	5-10	8
Store, resort	Customer	1-4	3
	Employee	8-12	10
Swimming pool	Customer	5-12	10
	Employee	8-12	10
Theater	Seat	2-4	3
Visitor center	Visitor	4-8	5

[a]Some systems serving more than 20 people might be regulated under USEPA's Class V UIC Program.

Source: Crites and Tchobanoglous, 1998.