

Draft

**TECHNICAL MEMORANDUM**  
**ENERGY DEMAND OF ALTERNATIVE PROJECTS**

TO: Ed Brauner, City of Santa Rosa  
Dan Carlson, City of Santa Rosa  
Marie Meredith, City of Santa Rosa

FROM: Andy Hauge, HBA  
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DATE: 15 September 1995

RE: Santa Rosa Subregional Long-Term Wastewater Project  
Energy Demand of Alternative Projects (TM-E-1)

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**INTRODUCTION**

Associated with the operation of any one of the alternative projects will be the consumption of electrical energy for operation of pumping stations. Pumping of water will constitute the largest single element of consumption of natural and monetary resources for operation and maintenance of the project facilities. The Geysers Alternative is the only project which also produces electrical power.

**CONCLUSION**

The attached Table PS-E-1, "Pump Stations Operation Matrix" summarizes, for each alternative project, the electrical power demand (in kilowatt-hours per year) for operation of the pump stations associated with each project. This table is based on the attached "Pump Stations Characteristics" Table which includes the number of pumps and pump size for each pump station, necessary to satisfy the hydraulic requirements to deliver water to each project component.

In summary, the total electrical power demand for each alternative project is as follows:

Alternative Project	Average Total Additional Kilowatt-Hours/Year Demand (Production)
1. No Project	0
2A. Tolay A	38,200,000 (0)
2B. Adobe Road and Lakeville	35,100,000 (0)

<b>Alternative Project</b>	<b>Average Total Additional Kilowatt-Hours/Year Demand (Production)</b>
2C. Tolay C	39,100,000 (0)
2D. Sears Point and Lakeville	48,500,000 (0)
2E. ASR and Smaller Tolay	39,300,000 (0)
3A. Two Rock	22,200,000 (0)
3B. Bloomfield	23,900,000 (0)
3C. Carroll Road	23,900,000 (0)
3D. Valley Ford	24,500,000 (0)
3E. Huntley	23,500,000 (0)
3F. ASR and Smaller Two Rock	23,600,000 (0)
4. Geysers Recharge	119,700,000 (412,800,000)*
5A. Direct Discharge to Russian River	1,250,000 (0)
5B. Direct Discharge to Laguna	0 (0)

\* Ultimately, this alternative would produce power in excess of “demand.” Discussion follows.

## ASSUMPTIONS

The assumptions used to generate the energy consumption table PS-E-1 are as follows:

- “Summer” (S) operation of pump stations means the continuous six month irrigation season of May through October.
- “Winter” (W) operation means, unless otherwise noted, the continuous six month season of November through April, except for operation of the direct discharge pump station “D” for Subalternative 5A, which is assumed limited to an equivalent of 100 days operation in winter.
- Pump Stations designated to operate (S/W) means continuous year around operation.
- Pump stations are assumed to operate 24 hours per day, except the irrigation booster pump stations (SBPS and WBPS) which are assumed to operate 18 hours per day.
- The storm water pump stations associated with the Tolay A, Tolay C, and Adobe Road reservoirs (TASW, TCSW, ARSW) are assumed to operate the equivalent of continuously for 30 days per year.
- ASR wells are assumed to be 700 gpm capacity each, with 75 horsepower motors, 14 wells total, operating 24 hours per day for six months.

- All pumps are assumed to have a hydraulic efficiency of 80 percent.
- All pump motors are assumed to have an efficiency of 90 percent.
- The Geysers pump stations (G1, G2, G3, and G4) are assumed to operate an equivalent of 89 percent full capacity to account for the lower delivery in the summer than in the winter (per monthly water balance for Geysers alternative).

As can be seen from Table PS-E-1, Alternative Project No. 4, Geysers Steamfield Recharge, consumes the most electrical power.

This project is the only project which also produces electrical power. In fact, the gross production of power is projected to exceed the total consumption of power by a factor of more than 3:1.

$$\begin{aligned}
 \text{Net Power Production} &= \text{Gross Power Production} - \text{Power Consumption} \\
 &= 58,000 \text{ kw-hr/MG} \times 19.5 \text{ MGD} \times 365 \text{ days/yr} \\
 &\quad - 124,418,000 \text{ kw-hr/yr (from Table PS-E-1)} \\
 &= (412,800,000 - 124,418,000) \text{ kw-hr/yr} \\
 &= 288,000,000 \text{ kw-hr/yr}
 \end{aligned}$$

where the unit energy production value of approximately 58,000 kw-hr per million gallons of water is an annual average recovery value projected by Unocal Corporation.

19.5 MGD is the projected annual average rate of water delivery to the Geysers based on the projected water balance for the design year and on the assumption that agricultural irrigation in the Laguna continues, but at the reduced rate of approximately 50 percent of the 1994 rate.

## SUMMARY

The above assumptions are probably somewhat conservative, resulting in somewhat larger projected total energy consumption than may be actually realized. In reality, pumps may be somewhat more efficient than 80 percent, and pumps will not operate the full number of hours assumed because of maintenance downtime and other planned or unplanned interruptions in service. However, the energy consumption presented is proposed as satisfactorily accurate for this level of project development.

The forthcoming cost estimate for the alternative projects will translate these estimates of energy consumption into seasonal and annual operations costs for each project.

This memorandum estimates the annual electrical power consumed by the various candidate projects. Alternative Project No. 4, Geysers Recharge, is the only project which will also generate electrical power. Power produced will exceed the power consumed by this project.

TABLE PS-E-1

SANTA ROSA SUBREGIONAL LONG TERM WASTEWATER PROJECT  
PUMP STATIONS OPERATION MATRIX  
NOV 25, 1995

ALTERNATIVE PROJECT	PUMP STATION CODE (PS-___)																							
	S	TASW	TCSW	ARSW	T	SP	L	AR	TR	B	CR	VF	H	ASR-2	SES	FGS	FGB	BVS	BVB	G1	G2	G3	G4	D
1																								
2A	W	W			S			S							S	S/W	S/W	S/W	S/W					
2B	W			W			S	S							S	S/W	S/W	S/W	S/W					
2C	W		W		S										S	S/W	S/W	S/W	S/W					
2D	W					S	S								S	S/W	S/W	S/W	S/W					
2E	W	W			S									S	S	S/W	S/W	S/W	S/W					
3A	W								S						S	S/W	S/W	S/W	S/W					
3B	W									S					S	S/W	S/W	S/W	S/W					
3C	W										S				S	S/W	S/W	S/W	S/W					
3D	W											S			S	S/W	S/W	S/W	S/W					
3E	W												S		S	S/W	S/W	S/W	S/W					
3F	W								S					S	S	S/W	S/W	S/W	S/W					
4																				S/W	S/W	S/W	S/W	
5A																								W
5B																								
AVERAGE KW	1,880	800	1,480	820	2,240	2,860	480	970	380	780	760	895	670	210	995	112	83	280	55	1,772	3,099	3,304	4,807	822
AVERAGE KW-HR/DAY	40,320	14,400	35,760	19,680	53,760	64,560	11,520	23,280	8,640	18,240	18,240	21,480	16,080	5,040	21,480	2,888	2,232	6,240	1,320	42,528	85,256	79,296	110,568	12,528
AVG 1,000 KW-HR/YEAR	7,258	432	1,073	590	9,677	11,621	2,074	4,190	1,555	3,283	3,283	3,898	2,894	907	3,898	981	815	2,278	482	15,623	34,768	29,943	40,357	1,280

SEE THE "PUMP STATIONS CHARACTERISTICS TABLE", PS-1.1, FOR PUMP STATION CAPACITY AND FEATURES.

TABLE PS-E-1 CONT.

ALTERNATIVE PROJECT	PUMP STATION CODE (PS-___)															
		SBPS-2	SBPS-3				SBPS-7	SBPS-8	SBPS-9	SBPS-10	SBPS-11	SBPS-12				
1																
2A			S				S			S						
2B			S				S			S	S					
2C		S	S				S			S	S					
2D			S			S	S	S		S	S	S				
2E			S				S			S	S					
3A																
3B																
3C																
3D																
3E																
3F																
4																
5A																
5B																
AVERAGE KW		30	45				900	98	18	3,360	60	1,120				
AVERAGE KW-HR/DAY		540	810	0	0	0	16,200	1,764	324	60,480	1,080	20,160	0	0	0	0
AVG 1,000 KW-HR/YEAR		97	146	0	0	0	2,916	318	58	10,886	194	3,629	0	0	0	0

MISSING PUMP STATIONS CODES REFLECT PSs DELETED FROM FINAL PROJECT DESCRIPTION AND COST ESTIMATE.

TABLE PS-E-1 CONT.

ALTERNATIVE PROJECT	PUMP STATION CODE (PS- )																				AVERAGE TOTAL	ANNUAL POWER COST	
	WBPS-1		WBPS-3	WBPS-4	WBPS-5	WBPS-6	WBPS-7	WBPS-8	WBPS-9	WBPS-10	WBPS-11	WBPS-12	WBPS-13			WBPS-16	LBP8-1	LBP8-2	LBP8-3	LBP8-4		KW-HR/YEAR	@ \$0.065/KW-HR
1																						0	\$0
2A																	S	S	S	S		38,186,000	\$2,080,130
2B																	S	S	S	S		35,106,000	\$1,930,776
2C																	S	S	S	S		39,098,000	\$2,150,360
2D																	S	S	S	S		48,648,000	\$2,670,196
2E																	S	S	S	S		39,267,000	\$2,158,686
3A	S		S	S	S	S	S										S	S	S	S		22,167,000	\$1,219,186
3B	S		S	S	S	S	S										S	S	S	S		23,896,000	\$1,314,226
3C	S		S	S	S	S	S	S									S	S	S	S		23,921,000	\$1,318,656
3D	S		S	S	S	S	S	S									S	S	S	S		24,504,000	\$1,347,720
3E			S	S	S	S	S	S									S	S	S	S		23,483,000	\$1,282,116
3F	S		S	S	S	S	S		S	S	S	S	S			S	S	S	S	S	23,673,000	\$1,296,516	
4																						119,881,000	\$6,583,006
5A																						1,250,000	\$68,750
5B																						0	\$0
AVERAGE KW	4		11	82	1,063	15	30	8	1	37	8	4	104			16	4	261	26	28			
AVERAGE KW-HR/DAY	72	0	198	1,478	19,134	270	540	144	18	666	144	72	1,872	0	0	270	72	4,098	408	488			
AVG 1,000 KW-HR/YEAR	13	0	36	266	3,444	49	97	26	3	120	26	13	337	0	0	49	13	848	84	84			

MISSING PUMP STATIONS REFLECT PS# DELETED FROM FINAL PROJECT DESCRIPTION AND COST ESTIMATE.

**PARSONS ENGINEERING  
SCIENCE, INC.**

**SANTA ROSA SUBREGIONAL LONG-TERM WASTEWATER PROJECT  
ALTERNATIVE PROJECTS**

**PUMP STATIONS CHARACTERISTICS  
AUG 1, 1995**

PUMP STATION CODE PS-	ALTERNATIVE PROJECT	PURPOSE OF P.S. (1)	LOCATION OF P.S.	NUMBER OF PUMPS (2)	PUMP CAPACITY (GPM, EACH)	STATION TDH (FT)	MOTOR HP (EACH PUMP)	PUMP TYPE (3)	STORAGE TANK (4)	SURGE TANK (5)	STAND-BY POWER (6)	P.S. BUILDING SIZE (7)	LOT SIZE (8)
"S"	2 OR 3 (ANY)	A	MEADOWLANE PONDS	4, OUTSIDE	6,000	350	750	VT	NO	NO	YES	20' X 60'	CP
"TASW"	2A, 2E	B1	TOLAY A BACKDAM	3, INSIDE	25,000	-	400	VT	NO	NO	NO	20' X 60'	RP
"TCSW"	2C	B2	TOLAY C BACKDAM	3, INSIDE	46,000	-	1,000	VT	NO	NO	NO	20' X 60'	RP
"ARSW"	2B	B4	ADOBE ROAD STORMWATER DAM	3, INSIDE	28,400	-	550	VT	NO	NO	NO	20' X 60'	RP
"T"	2A	C	TOLAY DAM	5, INSIDE	5,600	370	750	CENT	NO	YES	NO	20' X 60'	RP
	2C			5	9,300	205	650						
	2E			5	12,600	61	260						
"SP"	2D	C	SEARS POINT DAM	5, INSIDE	10,000	260	900	CENT	NO	YES	NO	20' X 40'	RP
"L"	2B, 2D	C	LAKEVILLE DAM	4, INSIDE	4,200	150	215	CENT	NO	YES	NO	20' X 40'	RP
"AR"	2B	C	ADOBE ROAD DAM	5, INSIDE	9,100	100	325	CENT	NO	YES	NO	20' X 60'	RP
"TR"	3A	C	TWO ROCK DAM	4, INSIDE	5,900	80	160	CENT	NO	YES	NO	20' X 40'	RP
	3F			3	6,300	55	120						
"B"	3B	C	BLOOMFIELD DAM	4, INSIDE	5,800	170	340	CENT	NO	YES	NO	20' X 40'	RP
"CR"	3C	C	CARROLL RD DAM	4, INSIDE	5,900	170	340	CENT	NO	YES	NO	20' X 40'	RP
"VF"	3D	C	VALLEY FORD DAM	4, INSIDE	5,900	200	400	CENT	NO	YES	NO	20' X 40'	RP
"H"	3E	C	HUNTLEY DAM	4, INSIDE	5,800	150	300	CENT	NO	YES	NO	20' X 40'	RP



PUMP STATION CODE PS-	ALTERNATIVE PROJECT	PURPOSE OF P.S. (1)	LOCATION OF P.S.	NUMBER OF PUMPS (2)	PUMP CAPACITY (GPM, EACH)	STATION TDH (FT)	MOTOR HP (EACH)	PUMP TYPE (3)	STORAGE TANK (4)	SURGE TANK (5)	STAND-BY POWER (6)	P.S. BUILDING SIZE (7)	LOT SIZE (8)
"ASR-2"	2E, 3F	J	PET. HILL RD. AT RP EXPWY	3, INSIDE	2,300	170	140	CENT	NO	YES	NO	20' X 40'	30' X 65'
"SEB"	2,3 (ANY)	E	DELTA POND	4, OUTSIDE	3,200	350	400	VT	NO	YES	NO	20' X 20'	CP
"FGS"	2,3,4,5	F1	WEST COLLEGE PONDS	2, OUTSIDE	1,600	-	150	VT	NO	NO	NO	20' X 20'	CP
"FGB"	2,3,4,5	F2	REDWOOD HWY 2, INSIDE N. OF FG PKWY	2, INSIDE	1,600	-	125	CENT	NO	NO	NO	20' X 20'	30' X 50'
"BVS"	2,3,4,5	G1	WEST COLLEGE PONDS	2, OUTSIDE	2,800	-	350	VT	NO	NO	NO	20' X 20'	CP
"BVB"	2,3,4,5	G2	SONOMA COUN FAIRGROUNDS	2, INSIDE	1,600	-	75	CENT	NO	NO	NO	20' X 20'	30' X 50'
"G1"	4	H1	DELTA POND	4, OUTSIDE	5,100	470	900	VT	NO	NO	NO	20' X 40'	CP
"G2"	4	H2	HWY 128 @ PINE FLAT ROAD	5, INSIDE	3,800	1,040	1,500	CENT	YES	YES	NO	30' X 60'	ONE ACRE
"G3"	4	H3	PINE FLAT ROA	5, INSIDE	3,800	940	1,250	CENT	YES	YES	NO	30' X 60'	ONE ACRE
"G4"	4	H4	PINE FLAT	5, INSIDE	3,800	1,275	1,750	CENT	YES	YES	NO	30' X 60'	ONE ACRE
EXISTING PUMP STATION													
"D"	5B	I	DELTA POND	2, INSIDE 1, INSIDE	11,000 5,000	85 85	350 75	VT VT	NO	NO	NO	EXISTING	CP
EXISTING PUMP STATION													
"DR"	5B	I	AT DENNER RA	3, OUTSIDE 1, OUTSIDE	2,000 1,200	- -	150 75	CENT CENT	NO	YES	NO	NONE	CP

PUMP STATION CODE PS-	ALTERNATIVE PROJECT	PURPOSE OF P.S. (1)	LOCATION OF P.S. (AREA)	NUMBER OF PUMPS (2)	PUMP CAPACITY (GPM, EACH)	STATION TDH (FT)	MOTOR HP (EACH)	PUMP TYPE (3)	STORAGE TANK (4)	SURGE TANK (5)	STAND-BY POWER (6)	P.S. BUILDING SIZE (7)	LOT SIZE (8)
"SBPS-1"	2E	D	X-PET.HILL RD.	2, INSIDE	2,000	20	15	CENT	NO	NO	NO	10' X 10'	20' X 40'
"SBPS-2"	2C	D	PET. HILL RD.	2, INSIDE	2,500	50	40	CENT	NO	NO	NO	10' X 10'	20' X 40'
"SBPS-3"	2A,B,C,D,E	D	PET. HILL RD.	2, INSIDE	1,300	125	60	CENT	NO	NO	NO	10' X 10'	20' X 40'
"SBPS-4"	2C,E	D	X-PET. HILL RD.	2, INSIDE	1,800	65	40	CENT	NO	NO	NO	10' X 10'	20' X 40'
"SBPS-5"	2C	D	X-PET HILL RD.	2, INSIDE	1,000	20	10	CENT	NO	NO	NO	10' X 10'	20' X 40'
"SBPS-6"	2C,D	D	X-PET. HILL RD.	2, INSIDE	865	40	15	CENT	NO	NO	NO	10' X 10'	20' X 40'
"SBPS-7"	2D	D	PET. HILL RD.	5, INSIDE	9,400	70	225	CENT	NO	YES	NO	20' X 60'	30' X 90'
"SBPS-8"	2A,B,C,D,E	D	PET. HILL RD.	2, INSIDE	2,350	160	130	CENT	NO	YES	NO	20' X 20'	30' X 50'
"SBPS-9"	2D	D	E. RAILROAD A	2, INSIDE	2,600	25	25	CENT	NO	NO	NO	10' X 10'	20' X 40'
"SBPS-10"	2A,B,C,D,E	D	ADOBE RD.	6, INSIDE	18,400	140	900	CENT	NO	YES	NO	20' X 60'	30' X 90'
"SBPS-11"	2B,C,D,E	D	ADOBE RD.	3, INSIDE	3,200	40	40	CENT	NO	NO	NO	20' X 20'	30' X 50'
"SBPS-12"	2D	D	LAKEVILLE RD.	4, INSIDE	7,600	185	500	CENT	NO	YES	NO	20' X 60'	30' X 90'
"SBPS-13"	2B 2E	D	X-LAKEVILLE R	4, INSIDE 2	7,500 700	200 90	500 20	CENT	NO	YES	NO	20' X 60' 10' X 10'	30' X 90' 20' X 40'
"SBPS-14"	2C	D	X-LAKEVILLE R	4, INSIDE	6,600	100	220	CENT	NO	YES	NO	20' X 40'	30' X 70'
"SBPS-15"	2B,C	D	X-LAKEVILLE R	2, INSIDE	2,200	60	40	CENT	NO	NO	NO	10' X 10'	20' X 40'
"SBPS-16"	2B,C,D	D	X-LAKEVILLE R	2, INSIDE	1,000	40	15	CENT	NO	NO	NO	10' X 10'	20' X 40'
"SBPS-17"	2B,C,D	D	X-LAKEVILLE R	3, INSIDE	4,500	220	340	CENT	NO	YES	NO	20' X 40'	30' X 70'
"SBPS-18"	2A,B,E	D	X-LAKEVILLE R	3, INSIDE	3,100	95	100	CENT	NO	YES	NO	20' X 20'	30' X 50'

PUMP STATION CODE PS-	ALTERNATIVE PROJECT	PURPOSE OF P.S. (1)	LOCATION OF P.S.	NUMBER OF PUMPS (2)	PUMP CAPACITY (GPM, EACH)	STATION TDH (FT)	MOTOR HP (EACH)	PUMP TYPE (3)	STORAGE TANK (4)	SURGE TANK (5)	STAND-BY POWER (6)	P.S. BUILDING SIZE (7)	LOT SIZE (8)
"WBPS-1"	3A,B,C,D,F	D	MARTINONI RD.	2, INSIDE	225	45	5	CENT	NO	NO	NO	10' X 10'	20' X 40'
"WBPS-2"	3A,B,C,D,E,F	D	X-TOMALES RD.	2, INSIDE	1,475	400	200	CENT	NO	YES	NO	20' X 20'	30' X 50'
"WBPS-3"	3A,B,C,D,E,F	D	SEAVEY RD.	2, INSIDE	300	135	15	CENT	NO	NO	NO	10' X 10'	20' X 40'
"WBPS-4"	3A,B,C,D,E,F	D	SPRING HILL RD	2, INSIDE	1,560	200	110	CENT	NO	YES	NO	20' X 20'	30' X 50'
"WBPS-5"	3A,B,C,D,E,F	D	PEPPER RD.	4, INSIDE	7,560	185	475	CENT	NO	YES	NO	20' X 60'	30' X 90'
"WBPS-6"	3A,B,C,D,,E	D	VALLEY FORD	2, INSIDE	680	90	20	CENT	NO	NO	NO	20' X 20'	30' X 50'
"WBPS-7"	3A,B,C,D,E,F	D	CANFIELD RD.	2, INSIDE	665	180	40	CENT	NO	NO	NO	20' X 20'	30' X 50'
"WBPS-8"	3C,D	D	VALLEY FORD	2, INSIDE	820	25	10	CENT	NO	NO	NO	20' X 20'	30' X 50'
"WBPS-9"	3F	D	VALLEY FORD	2, INSIDE	30	70	1	CENT	NO	NO	NO	10' X 10'	20' X 40'
"WBPS-10"	3F	D	BLOOMFIELD R	2, INSIDE	1,850	75	50	CENT	NO	NO	NO	10' X 10'	20' X 40'
"WBPS-11"	3F	D	CARROLL RD.	2, INSIDE	250	80	10	CENT	NO	NO	NO	10' X 10'	20' X 40'
"WBPS-12"	3F	D	HWY 1	2, INSIDE	140	75	5	CENT	NO	NO	NO	10' X 10'	20' X 40'
"WBPS-13"	3F	D	VALLEY FORD	2, INSIDE	2,600	150	140	CENT	NO	YES	NO	20' X 20'	30' X 50'
"WBPS-14"	3F	D	X-ROBLAR RD.	2, INSIDE	550	180	35	CENT	NO	NO	NO	20' X 20'	30' X 50'
"WBPS-15"	3F	D	X-ROBLAR RD.	2, INSIDE	500	200	35	CENT	NO	NO	NO	20' X 20'	30' X 50'
"WBPS-16"	3F	D	MEACHUM RD.	2, INSIDE	1,000	60	20	CENT	NO	NO	NO	20' X 20'	30' X 50'
"LBPS-1"	2,3,4(7),5(?)	D	GREEN VALLEY	2, INSIDE	220	55	5	CENT	NO	NO	NO	10' X 10'	20' X 40'
"LBPS-2"	2,3,4(7),5(?)	D	GRATON RD.	3, INSIDE	5,060	100	175	CENT	NO	YES	NO	20' X 60'	30' X 90'
"LBPS-3"	2,3,4(7),5(?)	D	BODEGA HWY.	2, INSIDE	750	130	35	CENT	NO	NO	NO	20' X 20'	30' X 50'
"LBPS-4"	2,3,4(7),5(?)	D	BURNSIDE RD.	2, INSIDE	420	235	35	CENT	NO	NO	NO	20' X 20'	30' X 50'

# FOOTNOTES

- (1) A DELIVER PLANT EFFLUENT TO STORAGE RESERVOIR IN SOUTH COUNTY OR WEST COUNTY  
B1 DELIVER STORMWATER COLLECTED BEHIND TOLAY A BACKDAM TO DOWNSTREAM OF TOLAY MAIN DAM  
B2 DELIVER STORMWATER COLLECTED BEHIND TOLAY C BACKDAM TO DOWNSTREAM OF TOLAY MAIN DAM  
B3 DELIVER STORMWATER COLLECTED BEHIND STORMWATER DIVERSION DAM TO DOWNSTREAM OF SEARS POINT DAM  
B4 DELIVER STORMWATER COLLECTED BEHIND STORMWATER DIVERSION DAM TO DOWNSTREAM OF ADOBE ROAD DAM  
C DELIVER STORED WATER TO IRRIGATION AREAS  
D BOOST PRESSURE TO SERVE HIGHER ELEVATION ZONES IN IRRIGATION AREAS  
E DELIVER STORED WATER TO SEBASTOPOL IRRIGATION AREA  
F1 DELIVER STORED WATER TO FOUNTAINGROVE GOLF COURSE  
F2 BOOST PRESSURE TO SERVE HIGHER ELEVATION FOUNTAINGROVE COUNTRY CLUB  
G1 DELIVER STORED WATER TO SONOMA COUNTY FAIRGROUNDS  
G2 BOOST PRESSURE TO REACH HIGHER ELEVATION BENNETT VALLEY PARKS, SCHOOLS AND GOLF COURSE  
H1 START DELIVERY OF WATER TO THE GEYSERS. TO PS-G2 AT FOOT OF PINE FLAT ROAD  
H2 LIFT WATER UP FIRST LEG, TO PS-G3  
H3 LIFT WATER UP SECOND LEG, TO PS-G4  
H4 LIFT WATER UP THIRD LEG, TO DISTRIBUTION TANKS  
I DELIVER WATER TO THE DIRECT DISCHARGE POINT AT THE RUSSIAN RIVER  
J TO SEND WATER FROM ASR WELLS TO SOUTH COUNTY OR WEST COUNTY SYSTEM
- (2) INCLUDES ONE STAND-BY PUMP; IE, NUMBER OF PUMPS WHICH COULD BE OPERATING AT ANY ONE TIME TOTALS ONE LESS THAN NUMBER LISTED. PUMPS LOCATED INSIDE OR OUTSIDE BUILDING, AS INDICATED.
- (3) VT = VERTICAL TURBINE, CENT = CENTRIFUGAL, SUB = SUBMERSIBLE
- (4) TO SERVE AS WET WELL FOR PUMPS AND TO ALLOW BACK-DRAINING PART OF PIPELINE.  
TANK SIZE = 250,000 GALLONS, ABOVE GRADE
- (5) YES = HYDROPNEUMATIC TANK AND AIR COMPRESSOR SYSTEM  
NO = HYDRAULICALLY OPERATED PRESSURE RELIEF VALVES, TO DUMP WATER TO WET WELL OR CREEK  
JUST LONG ENOUGH TO RELIEVE PRESSURE SPIKE UPON POWER FAILURE
- (6) DIESEL GENERATOR IN STATION SUFFICIENT FOR TWO PUMPS
- (7) ALL BUILDINGS TO BE MASONRY CONSTRUCTION, SINGLE STORY, WITH PEAKED METAL ROOFING PANELS.  
BUILDING TO HOUSE PUMP CONTROL PANELS, INSTRUMENTATION, AND PUMPS (WHERE INDICATED).  
BUILDINGS HOUSING PUMPS WILL INCLUDE NOISE ATTENUATION INSULATION AND FEATURES
- (8) CP = CURRENT CITY OWNED PROPERTY, RP = WITHIN PROPOSED RESERVOIR PROPERTY,  
LOT SIZE = DEPTH FROM R.O.W. X LENGTH ALONG R.O.W.  
LOT IS PARCEL OF PROPERTY NEEDED FOR PUMP STATION BUILDING, TANKS (IF DESIGNATED), AND PARKING AREA