Attachment 8.4 – Supporting Documents

Water Quality and Other Expected Benefits

Project D – Root Creek Water District, In-Lieu Groundwater Recharge

Madera Region – IRWM Implementation Grant Application

Table of Contents

Power Savings	3
Well Monitoring Locations	7
Groundwater Quality Test Results	11

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Attachment 8.4, Power Savings

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Root Creek Water District
In-Lieu Groundwater Recharge Project
Energy Savings from Raised Groundwater Levels

Specific Yield	0.11	(see note 1)
Energy to lift 1 AF/1 ft	1.46	kWh (see note 2)
Annual Recharge Volume	6,100	AF
Assumed Area of Dispersal	10	square miles
Period of Storage	5	years
Rise in Groundwater Levels	9	ft
Depth pumped over area	3	ft
Volume pumped over area	19,200	/year
Energy Savings	1,214,455	KW-hrs
Monetary Savings	$121,445	/year (see note 3)
Net Savings per AF Recharged	$19.91	

Notes

1) Specific Yield value of 0.11 (11%) from Hydrogeologic Investigation of Southeastern Madera County, P&P and KDSA, 1998 and 2001

2) Assumes 70% equipment efficiency. Source: University of California Cooperative Extension, Tulare Conty, Energy and Cost Required to Lift or Pressurize Water, 1998

3) The pumping rate is based on an assumed electricity cost of $0.010/KW-hr, a typical egricultural electricity rate in Madera County.

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Attachment 8.4, Well Monitoring Locations

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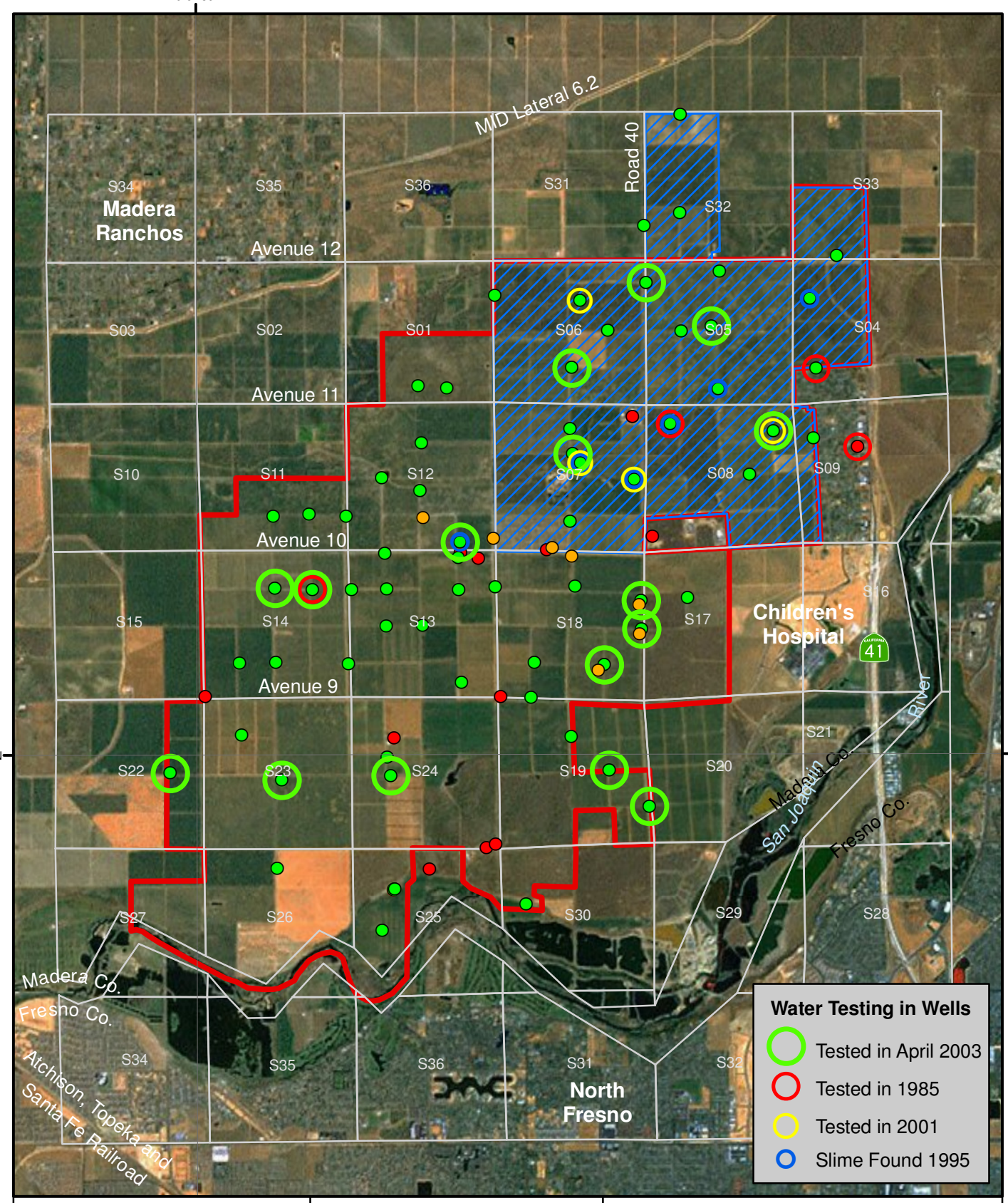

0.5 0.25 0 0.5
Miles

EST. 1968
PROVOST & PRITCHARD
CONSULTING GROUP
An Employee Owned Company

2505 Alluvial Ave
Clovis . CA . 93611
Tel(559) 326.1100

- Ag Well
- Domestic Well
- Abandoned Well
- Section Boundary
- Project Area
- Root Creek Water District

Root Creek Water District
Water Testing Locations Map

Attachment 8.4
Proposition 84 Integrated Regional Water Management Grant Application

G:\Clients\Root Creek WD-1249\GIS\124910C1-APP\Map\RCWD_Water_Quality.mxd

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Attachment 8.4, Groundwater Quality Test Results

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Chemical Quality Samples of Wells in Root Creek Water District

	S&J Ranch Well Number																
	17	**22**	**76**	**83**	**91**	**113**	**120**	**129**	**145**	**146**	**153 (1)**	**153-2 (1)**	**156**	**169 (2)**	**169-2 (2)**	**180**	**182**
Calcium (mg/L)	17	19	18	20	14	10	17	38	13	10		26	22		42	16	14
Magnesium (mg/L)	6	6	7	9	6	4	8	12	6	5		9	8		14	4	3
Potassium (mg/L)	4	3	5	5	6	5	6	6	5	4		7	3		7	4	2
Sodium (mg/L)	22	13	20	20	27	15	20	102	20	12		35	34		42	47	65
Carbonate (mg/L)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10		<10	<10		<10	<10	<10
Bicarbonate (mg/L)	120	120	70	150	130	60	80	170	100	70		120	160		140	170	190
Sulfate (mg/L)	2	3	3	6	3	3	3	<1	4	3		14	8		8	2	<1
Chloride (mg/L)	20	5	38	8	15	10	35	172	11	9		52	22		106	22	31
Nitrate (mg/L)	3	3.8	25.6	11	3.8	22.1	21.8	1.3	10.1	9.5		5.8	<0.4		4.6	0.9	<0.4
Fluoride (mg/L)	0.2	<0.1	<0.5	<0.5	<0.5	0.2	<0.5	<0.1	0.2	<0.5		0.2	<0.1		<0.1	<0.1	<0.1
Boron (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05		<0.05	<0.05	<0.05
Iron (mg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05		<0.05	<0.05	0.1
Manganese (mg/L)	0.51	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.3	<0.01	<0.01		<0.01	0.63		<0.01	<0.01	0.16
pH	6.7	6.9	6.7	7.1	7.2	7	6.6	7.1	6.8	7.6		6.8	7.2		6.9	7.3	7.5
Electrical Conductivity @25°C (umhos/cm)	256	217	280	282	261	184	278	807	220	168		395	342		587	326	374
SAR	1.2	0.7	1	0.9	1.5	1	1	3.7	1.2	0.8		1.5	1.6		1.4	2.7	4.1
TDS by summation (mg/L)	190	170	190	230	200	130	190	500	170	120		270	260		360	270	300
Arsenic (ug/L)	13	<2	<2	<2	<2	2	2	59	<2	<2		5	32		4	21	109
Alpha (pCi/L)	0.5	4.9	1.0	1.0	0.8	5.0	0.0	3.0	0.4	3.0		1.2	6.4		2.3	1.9	0.4
HPC (CFU/ml)	10	10	9	11	2	11	12	160	4	7	16	6	17	900	820	11	9
DBCP (ug/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01		<0.01	<0.01	<0.01
EDB (ug/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01		<0.01	<0.01	<0.01
Upper Perf. Depth (ft)	**200**		**232**	**240**	**240**	**240**	**260**	**280**	**224**	**240**		**462**	**374**		**450**	**340**	**414**
Lower Perf. Depth (ft)	**380**		**628**	**492**	**414**	**492**	**600**	**810**	**444**	**472**		**730**	**796**		**780**	**485**	**772**
Date Sample Collected	04/08/03	04/10/03	04/08/03	04/08/03	04/08/03	04/10/03	04/08/03	04/10/03	04/08/03	04/10/03	04/07/03	04/10/03	04/10/03	04/07/03	04/08/03	04/08/03	04/10/03

Notes: (1) #153 and #153-2 are for the same well. #153 was collected during first 15 minutes of operation after being shutdown, #153-2 was collected after well had been pumping for more than one day
(2) #169 and #169-2 are for the same well. #169 was collected during first 15 minutes of operation after being shutdown, #169-2 was collected after well had been pumping for more than one day
(3) Inorganic constituents and alpha activity analysis by FGL Environment of Santa Paula
(4) DBCP and EDB analysis by Appl, Inc. of Fresno
(5) HPC analysis by Twining Laboratories, Inc. of Fresno

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