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Groundwater Info Report (Summers Engineering) - 1905

PLEASANT VALLEY WATER DISTRICT
COALINGA, CALIFORNIA
Groundwater Information

November 1984

Revised
January 1985

Summers Engineering, Inc.
Consulting Engineers
Hanford, California

Memorandum

Date December 28, 1992

To: Edward F. Huntley
215-37 Resources BuildingFrom: Louis A. Beck, Chief 8-421-5222
San Joaquin District
Department of Water Resources

Subject: Pleasant Valley Water Bank

The purpose of this memorandum is to suggest that you reevaluate Pleasant Valley as a ground water storage area. My suggestion is based on the assumption that State Water Resources Control Board Decision 1630 will result in review of storage south of the Delta.

The Pleasant Valley ground water basin is separate and distinct from San Joaquin Valley ground water because of a fold at Guajarral Hills. This lack of seepage from the basin makes it desirable for occasional fill and withdrawal operations. Also, the water table was 300 to 350 feet below the ground surface over most of the basin in December 1991. The ground water storage capacity would be 3,000 acre-feet per foot of water table rise if the entire basin area in Townships 20 and 21 south could be used. A water table rise of 250 feet could store 750,000 acre-feet.

There are undesirable features in this area (300 feet of lift from the aqueduct and poor water quality in the basin) but the unique features of lack of leakage and its storage capacity could make it economically feasible.

cc: James S. Allen, President
Pleasant Valley Water District
Post Office Box 468
Coalinga, California 93210

Joseph B. Summers
Summers Engineering, Inc.
Post Office Box 1122
Hanford, California 93232

Kendall L. Manock
Baker, Manock & Jensen
Attorneys at Law
5260 North Palm Avenue
Fresno, California 93704

Carroll M. Hamon
Carlos Madrid

Beck 12/28

GROUNDWATER INFORMATION

Pleasant Valley is a closed groundwater basin with boundaries that nearly coincide with the boundaries of the Pleasant Valley Water District (see Plate 1). The only outlets to the groundwater basin are the Arroyo Pasajero Gap between the Anticline Ridge and the Guijarral Hills and the Polvadero Gap between the Guijarral Hills and the Kettleman Hills. There are subsurface barriers in both gaps which restrict the flow of water to the east. Due to the severe overdraft of the groundwater no flow has passed these barriers for many decades. The geology of the groundwater reservoir in Pleasant Valley is that of unconfined aquifers several thousand feet in thickness. Numerous investigations by Federal agencies and local organizations substantiate this geological condition. A 1969 study by the Standard Oil Company of California (Chevron) developed a geological cross section as indicated on Plates 2 & 3.

The Bureau of Reclamation in an unpublished preliminary report of Pleasant Valley on land classification makes the following statement:

The surface soils of the district are predominantly recent alluvial soils derived from the sedimentary rock parent material of the surrounding hills. These soils are deep, light to medium textured and very gently sloping to slightly undulating in topography. They are for the most part free of harmful salts but there are a few areas that are slightly affected. The Bureau Land Classification places most of these soils in land class 1 or 2.

The report further states:

There does not appear to be any wide-spread sheets of clay or silt which act as barriers to water movement and would create large bodies of semi-perched or confined groundwater....

The Bureau of Reclamation further analyzed the problems of salt balance within the District. It was their conclusion that if there was no artificial recharge to the groundwater basin there would be sufficient space available that:

...it would be 60-70 years before shallow drains could be effective in providing outflow for salt balance....

The Bureau further considered the concept of groundwater pumping to maintain a salt balance. This groundwater pumping would be only to remove any highly saline water from the groundwater basin for disposal ultimately through a drainage facility or other means. The Bureau stated that under this concept there might be a need for some drainage disposal within a time frame of 25 to 50 years.

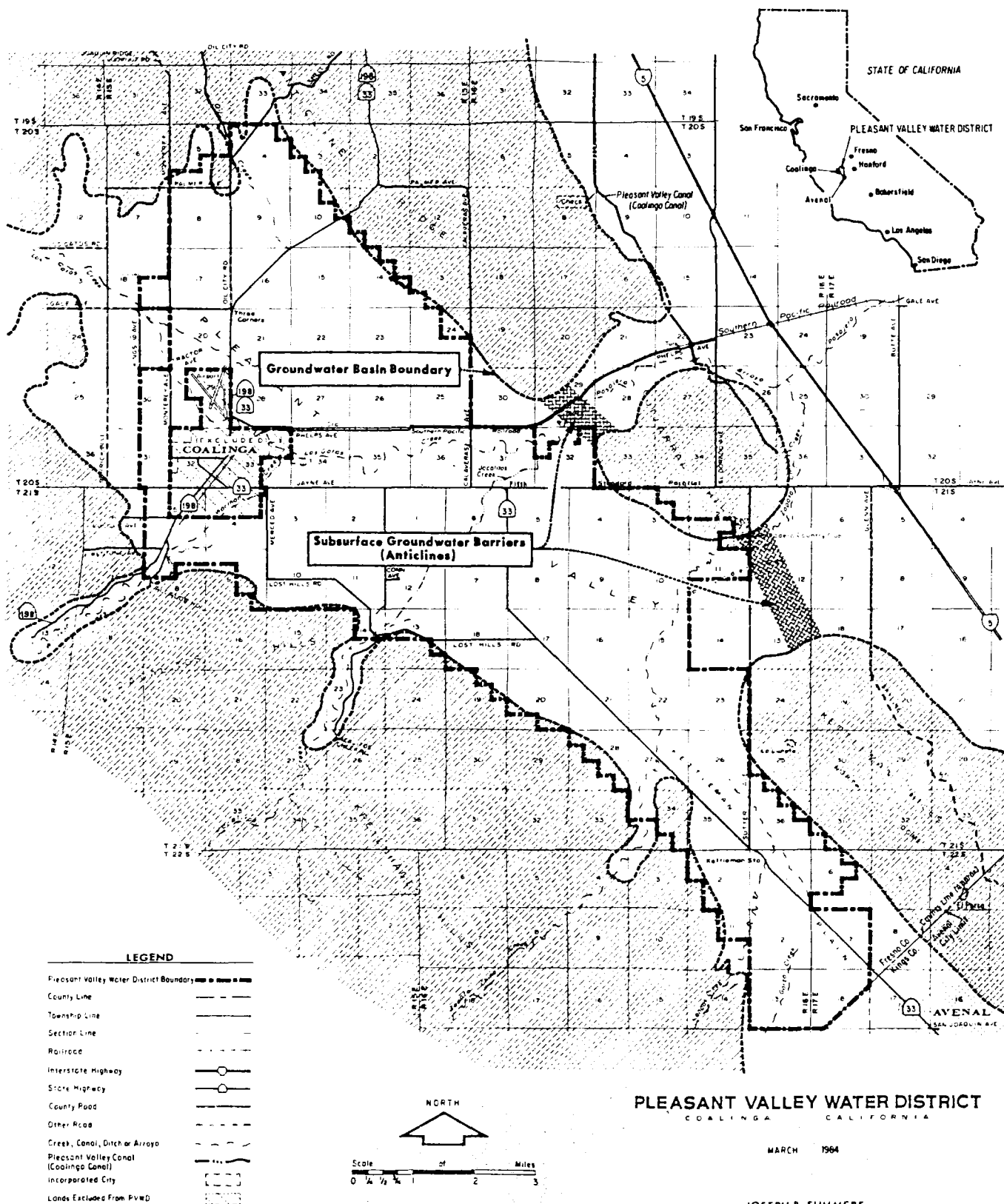
The current plans of the Pleasant Valley Water District would eliminate this latter need. The District intends to irrigate a smaller area than was considered by the U.S.B.R. in 1964 and also use a conjunctive supply. The current plan is to irrigate an area of approximately 32,000 acres with an imported water supply from the Bureau of Reclamation together with groundwater pumping. Minimum pumping would be 5,000 acre feet per year, which is the safe yield of the groundwater basin. An additional amount would also be pumped equal to the waters lost by deep percolation past the root zone. This should contribute another 5,000 to 10,000 acre feet per year to the District supply. Calculations have been made to determine the amount of available storage as a result of the overdraft upon the groundwater supply. Based upon a specific yield of 10.3% and assuming available space of approximately 200' above the current groundwater level, this would provide additional storage of 800,000 acre feet. Assuming the deep percolation past the root zone was not pumped, a

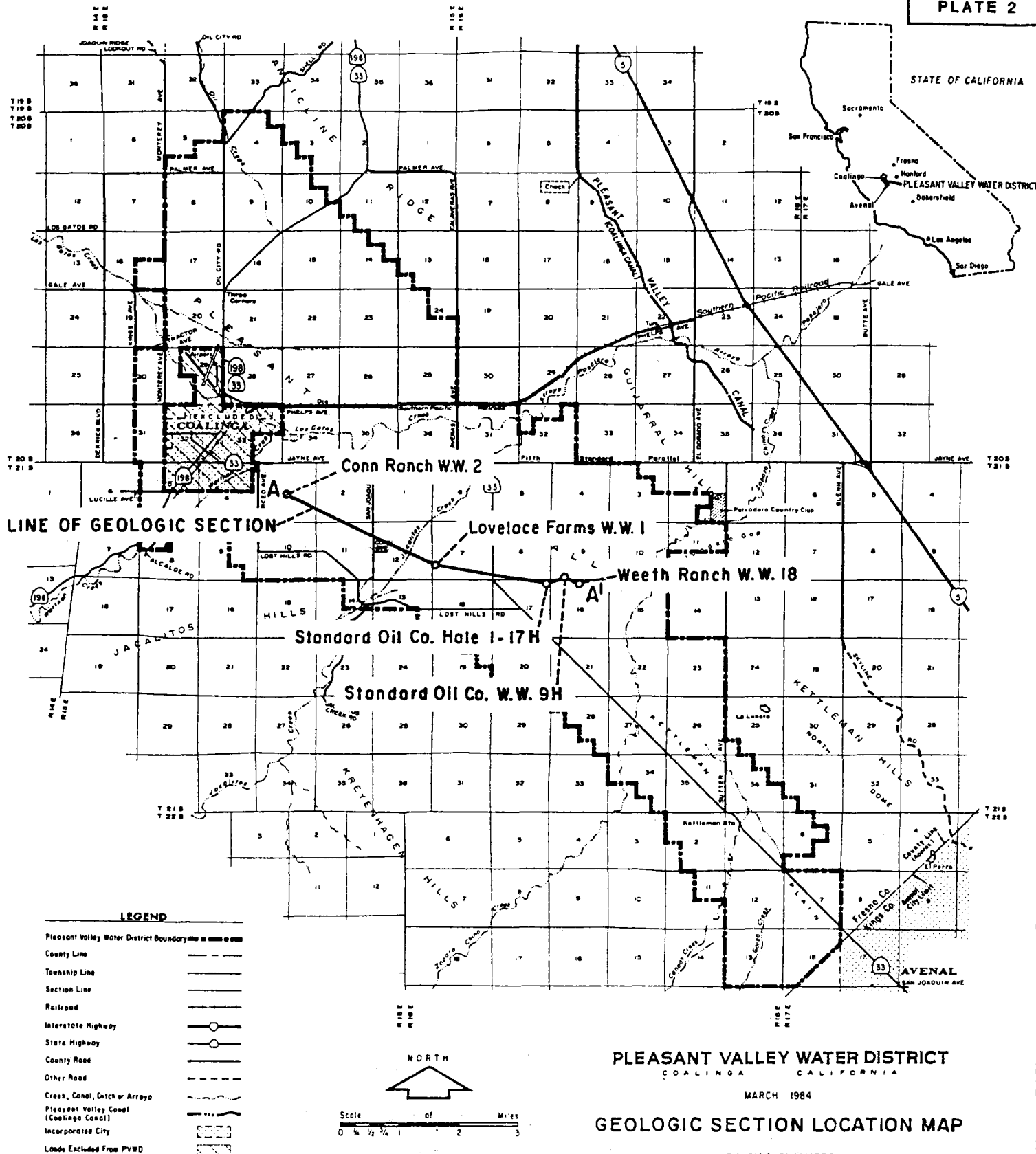
maximum of 10,000 acre feet per year would enter the groundwater reservoir. With these conditions flow across the subsurface barriers might commence in 80 years. With a conjunctive operation of groundwater together with the surface supply there does not appear to be any drainage problems that would impact the District lands within the foreseeable future.

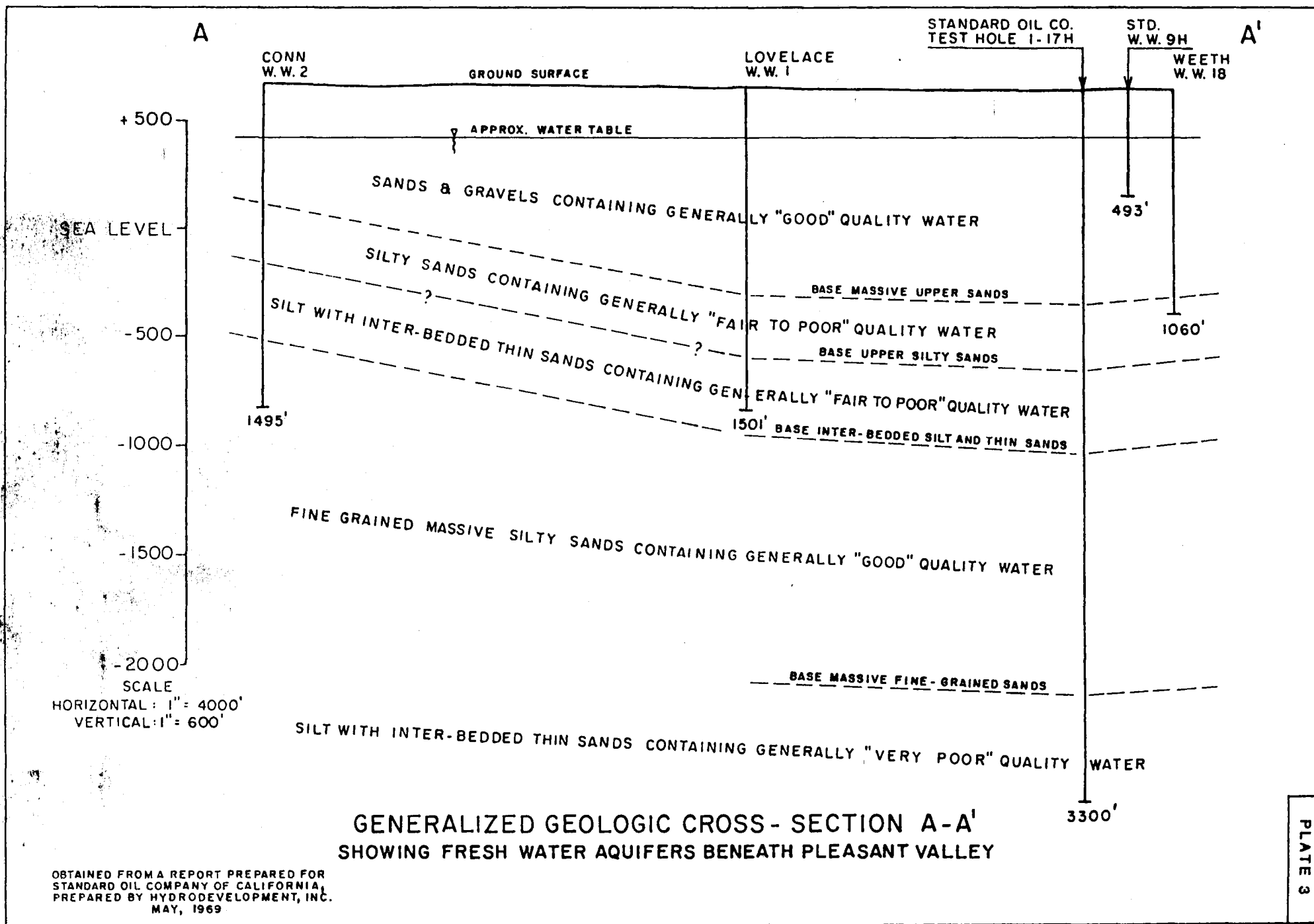
In a meeting with Bureau of Reclamation Officials in late November 1984 the question was raised regarding the levels of selenium and other trace elements within the District. The District had several soil samples analyzed by the saturated extract method together with groundwater analyses to provide this data. Tabulations giving the results of these analyses are attached. Plate 4 gives the location of the various soil and water samples. It is our opinion that the saturated extract procedure used in the analyses would result in concentrations comparable to or greater than that of waters developed by subsurface drainage. The values of trace elements in shallow groundwater in the San Luis Service Area has been included in the soil analysis tabulation for comparison.

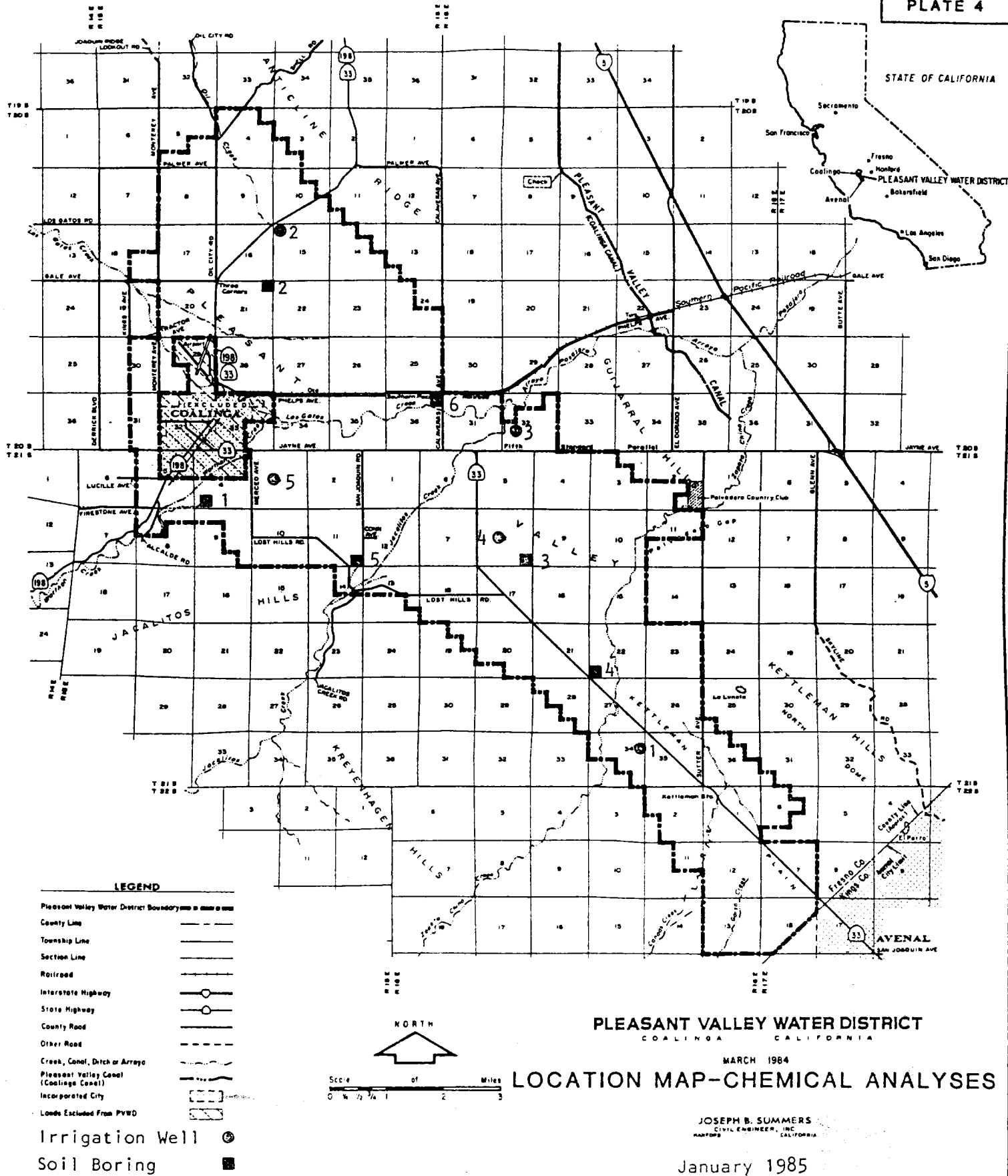
It is our conclusion that with a closed basin such as Pleasant Valley an imported water supply would not impact upon the San Joaquin Valley drainage problems.

In the event that under the worst scenario a drainage problem did arise, the most feasible solution would be disposal by solar evaporation within the District. The proposed San Luis Drain would be over 20 miles to the east of the District. The cost of conveying any drain water to this proposed facility would be in excess of six million dollars and not a viable alternative to local disposal by evaporation.









SOCT ^{1/}

Determination	Soil Boring Number						Shallow Groundwater in ^{5/} San Luis Drain Service Area (130 Samples)	
	1		2		3		Median	Maximum
	2'	4'	2'	4'	2'	4'		
Calcium (Ca)	460	370	425	209	485	4825	310	630
Magnesium (Mg)	255	290	295	69	205	1810	92	4,000
Sodium (Na)	1340	1580	500	357	615	6733	460	30,000
Chloride (Cl)	298	228	412	246	147	1729	290	16,000
Arsenic (As)	0.004	0.004	0.001	0.002	0.002	0.0001	0.002	0.082
Cadmium (Cd)	0.005	<0.005	0.007	<0.005	<0.005	<0.0001	<0.001	0.002
Chromium (Cr ⁺⁶)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	0.010	0.170
Lead (Pb)	<0.01	<0.01	0.01	<0.01	<0.01	<0.001	<0.001	0.017
Mercury (Hg)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	0.0016
Nickel (Ni)	<0.01	<0.01	<0.01	0.02	<0.01	<0.0 -	-	-
Selenium (Se)	0.003	0.011	0.018	0.029	0.011	0.0001	0.006	3.8
Thallium (Tl)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.0 -	-	-
Iron (Fe)	0.05	0.05	0.05	0.05	0.05	0.0003	0.05	7.4
Boron (B)	4.05	4.70	2.4	2.4	2.01	2.040	3.10	120
pH (Std. Units)	7.6	8.0	7.9	8.0	8.0	7.1.6	7.5	8.5
Conductivity (micro- mhos/cm, @ 25°C)	6900	7600	5400	2680	4840	514131	3655	68000
Sodium Adsorption Ratio	12.4	14.9	4.6	5.5	5.9	6.		

< Means actual value less than the value shown
limitations prevented testing for lower value

- ^{1/} All units milligrams/liter unless otherwise noted.
- ^{2/} Soil saturated extract analyses, sampled January 5, 1984, and other Inorganic
from the San Luis Drain
California", Table 1, Page
- ^{3/} Values above those listed considered as "Restricted Hazardous"
- ^{4/} Soluble threshold limit concentrations as defined by
Services in their proposed hazardous waste identification
above those listed considered as "Hazardous".
- gation Report 84-4319

WATER QUALITY ANALYSES OF IRRIGATION WELLS WITHIN PLEASANT VALLEY WATER DISTRICT

<u>Determination</u>	<u>Well #1</u>	<u>Well #2</u>	<u>Well #3</u>	<u>Well #4</u>	<u>Well #5</u>	<u>San Luis Canal</u> ^{2/}	<u>State of California and EPA Drinking Water Standards</u>
Calcium (Ca)	66	70	186	184	147	14	
Magnesium (Mg)	46	85	160	134	108	7	
Sodium (Na)	223	223	249	303	328	26	
Carbonate (CO ₃)	0	0	0	0	0	-	
Bicarbonate (HCO ₃)	159	153	120	151	199	-	
Chloride (Cl)	45	146	338	337	363	29	
Sulfate (SO ₄)	495	533	1390	1370	1130	28	
Arsenic (As)	0.001	0.005	0.001	0.001	0.001	0.00	0.05
Cadmium (Cd)	<0.005	<0.005	<0.005	<0.005	<0.005	-	0.01
Chromium (Cr ⁺⁶)	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	0.05
Lead (Pb)	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	0.05
Mercury (Hg)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	0.002
Nickel (Ni)	<0.05	<0.05	<0.05	<0.05	<0.05	-	0.0134
Selenium (Se)	0.001	0.008	0.003	0.006	0.004	0.01	0.01
Thallium (Tl)	<0.05	<0.05	<0.05	<0.05	<0.05	-	
Iron (Fe)	0.05	0.05	<0.05	<0.05	<0.05	0.04	
Hardness (CaCO ₃)	353	523	1120	1010	810	66	
Boron (B)	0.55	2.05	1.00	1.30	1.50	0.2	
pH (Std. Units)	7.9	7.9	7.8	7.7	7.6	7.9	
Conductivity (micromhos/cm, @ 25°)	1540	1850	2700	2850	2720	266	
Percent Sodium (%)	57.8	48.0	32.5	39.5	46.8	46	
Total Dissolved Solids (TDS)	1160	1450	2550	2420	2210	156	
Sodium Adsorption Ratio:	5.2	4.2	3.2	4.1	5.0	1.4	

< Means actual value less than the value shown. Lab
limitations prevented testing for lower values.

^{1/} All units milligrams/liter unless otherwise noted, sampled January 5, 1985.

^{2/} 1983 Average Water Quality of the San Luis Canal.