

Los Angeles, Cal. May 27, 1912.

Mr. Wm. G. Henshaw,
Mills Building,
San Francisco, California.

Dear Sir:-

In accordance with your instructions, I give below a preliminary report on the irrigation of the lower San Luis Rey Valley. This report is necessarily an outline. The lines suggested must be verified by survey and a study of the lands jointly with Mr. Fletcher. It is probable that the whole plan will be greatly modified, but the cost should not be greatly increased.

OUTLINE-

The area considered lies between Bonsall to Oceanside and thence along the coast to include Carlsbad. Roughly this area may be divided into four sections.

- (a) Bonsall to the West line of Guajome Rancho.
- (b) Guajome Rancho to Oceanside.
- (c) Oceanside to Carlsbad.

Sections (a) and (c) are riparian and 2000 acres are allowed here to settle lands not already under agreement. The remaining 3000 acres are non-riparian, but consist of land so valuable that high prices can be secured for water and make the system strong enough to be remunerative.

PROPOSED METHOD OF IRRIGATION-

A plan is to utilize pumping plants placed in the

Wm.G.Henshaw,

-2-

May 27, 1912.

river bed and pumping to a sufficient elevation to cover the riparian lands along the river, conveying the water in cement pipes or concrete conduits. It is obviously desirable that as long as water is flowing on the surface in the river that the various pipe lines should be designed for gravity flow and the pumping plants used when surface flow ceases. Attention may be given later to several storage sites.

SECTION "A", BONSCALL TO GUAJOME-

This is a narrow portion of the river with a number of small ownerships ending in the large Guajome Rancho. The elevation of a pumping plant would be 130' above sea. The true riparian lands could be served by a 20' lift and a pipe line on each side of the river. However, at first glance, it appears that the pumping lift should be about 75', which would secure the entire irrigation of Guajome Rancho as well, and it is so estimated here.

SECTION "B", GUAJOME RANCHO TO OCEANSIDE-

There seems little doubt that this section will be best served by a development of existing ditches. On the north side the Libbey Ditch is taken out at a point of the river where the valley narrows somewhat and where the probability is that a submerged dam would bring water to the surface in the summer. Whether this is done or not, it is a feasible site for pumping plants. The Libbey Ditch flows by one of its laterals into a shallow lake some three miles distant, which probably will be found very useful for impounding winter floods. This is now

apparently not used for such purpose, but fills naturally from side drainage.

Similarly, on the south side, the ditch of the San Luis Rey Company is taken out at a point slightly up stream from the heading of the Libbey Ditch. These ditches, at present take out surface flow until the river dries up. To supplement the decreasing flow, several pumping plants exist owned by individual owners, which are put into service in the summer. If it were possible to improve the ditches and couple up the pumping plants by some joint action of the present owners this section could be operated for little additional first cost. The lower end of the south side pipe line would be the City of Oceanside's pumping plant, where water could be delivered in case of shortage of the city supply without changing the City's present pumping plant.

SECTION "C"-

This is a zone extending along the ocean between Oceanside and Carlsbad, about six miles long and extending inland for a width of about three miles. The altitude varies from about 50' above sea to 200'. It has already been noted that Pumping Plant No. 1 will serve zone (a) and also may be extended to zone (c).

The following is estimated cost:

Pumping Plant No. 1- sufficient to cover zone (a) 1000 acres Riparian lands, principally Guajome Rancho, and also zone (c), 3000 acres along coast, total 4000 acres, 750 miners inches-		
Pumping plant		
24" Cement pipe @ \$.60 per ft.		
11½ miles @ \$3200 " mile,		\$ 36,800.
Riveted pipe		
1½ miles @ \$5000 " "		<u>7,500.</u>

Pumping Plant No. 2, and reconstruction of local ditches, sufficient to irrigate 1000 acres, 250 miners inches, Pumping Plant No. 2, 18" Cement pipe 8 miles @ \$3000

24,000.

Annual Operating Expense. --

Plant No. 1
 Power and attendance,
 Interest on Plant 6%
 Depreciation 2½%
 Ditch tenders

1,000.

Total --

Per acre,

" Miners inch

" 1000 Gals.

Plant No. 2
 Power and attendance,
 Interest on Plant 6%
 Depreciation 2½%
 Ditch tenders

1,000.

Total --

Per acre,

" Miners inch

" 1000 Gals.

Plant # 1

15 sec feet raised 75 feet.

Assume a drawdown of 20 feet

Cost of water development	15,000	\$
" " Engine, producer & pumps	20,000	\$
" " Building, foundations & piping	7,000	\$
Total Cost of Plant	42,000	\$
" " Generator & electrical machinery	2,000	\$
	44,000	\$

Plant # 2

5 sec feet raised 10 feet.

Assume draw down of 20 feet

Cost of water development -	6,000	\$
" " motor, pump etc - - -	2,000	\$
" " Building pipe etc - - -	1,500	\$
	9,500.00	

~~5 miles of line~~

Cost of 5 miles of transmission	2,000	\$
	11,500	
	44,000	

15% for engineering & contingence	5,550.00
Grand Total	63,000

Cost of operation 7 months 24 hours per day

Fuel oil, (21.25) - - -	6,000	\$
Supplies & incidentals - - -	1,000	\$
Attendance - - - - -		
1 man @ 1800 ⁰⁰		
2 men @ 700 ⁰⁰		
" @ 500 ⁰⁰		
	3,000	\$
	10,000	

Cost forward - - - 10,000⁰⁰

Interest on 63000 @ 6% = 3,780⁰⁰

Depreciation on 50,000 @ 5% = 2,500⁰⁰

Total Cost per annum = 16,380⁰⁰

18"	60 cts
24"	80 cts.

Quotation by
Arthur Bent.

Appendix A.

Oceanside Pumping Plant.

From Records of City of Oceanside.

		Gallons.	
1905	Dec.	2,550,888.	
1906	June	4,723,808	
	July	5,966,488	
	Aug.	7,675,692	
	Sept.	5,358,923	
1908	Sept.	6,884,700	
	Dec.	2,998,975	
1909	Feb.	2,188,825	
1910	June 30 - Dec. 31	46,512,000	
1911	Jan. 1 - June 30	42,674,000	
	June 30 - Dec. 31	<u>45,543,000</u>	88,217,000
1912	Jan.	5,577,500	
	Feb.	6,985,500	
	Mar.	4,549,000	
	Apr.	4,965,000	

Annual Operating Cost. (~~Estimated by W.E. Post~~)

Actual operating expenses	\$ 3500.	From City Record
10% Interest and depreciation on plant	\$ 2500.	Est. by W. S. Post.
	\$ 6000.	

Probable cost wholesale at City Reservoir 7¢ per 1000 gals.

Exhibit "B"

Mr. Lee made the underflow investigations for the Los Angeles Aqueduct, and is an authority on the subject.

Los Angeles, Calif.

June 7, 1912

Mr. W.S. Post,

749 Garland Ave.,

Los Angeles, Calif.

Dear Sir:

My recent visit to the San Luis Rey River and examination of the surface and underground water conditions of that stream were necessarily very incomplete on account of the limited time at my disposal. There is also much information which I lack which I could obtain by a conversation with you. However there are some features of the problem which you are attacking, upon which I may be able to offer suggestions which will be of value to you.

In traveling up the river I was greatly impressed by the zone of rank vegetation and swamp land on either bank of the stream which widens out to a distance of about 2000 feet in several localities. Judging from my past experience in the measurement of soil evaporation and transpiration, I should say that the annual loss by evaporation from the river bottoms between Pala and the ocean amounts to a continuous flow of between 5 and 10 sec. ft. The diversion of all water from the channel at the lower end of Warner Ranch to some point without the drainage area, together with the surface or ground storage of water supplied by tributary streams below and artificial distribution of that water to irrigated lands along the lower river bottom would to a great extent eliminate this needless loss. According to testimony given a few days ago by F. C. Finkle before the California State Railroad Commission, the value of a miner's inch of water in the vicinity of Los Angeles is \$2000. At this rate the saving of seven and one-half sec. ft would mean the creating of water rights valued at \$750,000. With careful study I believe that a practical scheme could be worked out for irrigating more lands than are now under cultivation along the San Luis Rey and at the same time allow your proposed diversion to be made. The verdure along the river bottoms would of course disappear to a certain extent but the practical benefit to mankind would far exceed the aesthetic value of the natural vegetation.

The gravel accumulation above Pala has great value as a storage site for flood waters. Its efficiency could be very greatly increased by spreading the flood waters from Pauma Creek and other streams near by, retarding their velocity and allowing the waters to percolate into the porous formation instead of flowing directly into the channel of the San Luis Rey. This method of storage is being used successfully on several streams of Southern California which I have visited.

The wells which Mr. Case is measuring are most of them equipped with windmills or power pumps and some of them are near irrigation ditches. This gives rise to local variations in the ground water surface which will lead to confusion and error in drawing final conclusions from the data. I would suggest that the company establish their own wells and locate them where they will be most free from disturbing loc-

al conditions. Two inch holes drilled with a spoon auger and cased with light galvanized sheet metal, perforated, are very effective. Their first cost is small and very little attention is needed to keep them in good condition.

I do not feel that I have yet sufficiently covered the ground to be able to recommend a general plan of gathering the field data necessary to a solution of your problem, but I shall be glad at any time to make further examination with this end in view. I am enclosing a bill for the time which I have spent upon this matter as you suggest.

Yours Very Truly,
Charles E. Lee
(signed)

619 Federal Bld.
Los Angeles, Calif.

Oceanside No. Water M Project. From To Subject

From Volcan Land + Water ...
749 Central Ave
Oceanside Water Project.
Subject Report No. 193

"GRIP"
INDIVIDUAL FILE
Binder and Perforator

Theo. H.P. Bonsall Plant -

$$250 \overline{) 45000} \left(\begin{array}{r} 280 \\ 250 \\ \hline 20000 \end{array} \right)$$

$$\frac{5 \times 62.5 \times 110}{550} = 62$$

say 100 H.P.	8000
say 2000 ft Pipe.	4000
" Wells.	8000

24
500

2400 H.P. hours -

$$\begin{array}{r} 02 \\ \hline 48.00 \\ 30 \\ \hline \$ 1440 \end{array}$$

$$\begin{array}{r} 1500 \\ 12 \\ \hline 3000 \\ 1500 \\ \hline 18,500 \end{array}$$

$$\begin{array}{r} 365 \\ .04 \\ \hline 14.60 \text{ feet.} \\ 43560 \\ 14.6 \\ \hline 261360 \\ 174240 \\ 43560 \\ \hline 635976.0 \end{array}$$

4,777 cost \$ 28000

$$4800 \overline{) 28000} \left(\begin{array}{r} 56 \\ 240 \\ \hline 400 \end{array} \right)$$

$$4800 \overline{) 13500} \left(\begin{array}{r} 3 \end{array} \right)$$

$$4 \overline{) 6360000} \text{ cit.} \left(\begin{array}{r} 1599000 \\ 3 \\ \hline 4,770,000 \end{array} \right)$$

$$4800 \overline{) 70000} \left(\begin{array}{r} 15 \\ 4800 \\ \hline 22000 \end{array} \right)$$

Dam.

El Salto

Stat.	Depth.	Sect.	Sq. Ft.		
0	0	0 x 0		160 x 50	8000
+ 50	40	8 x 40	320	620 x 50	31,000
+ 100	60	12 x 60	920	1180 x 25	29,500
+ 25	90	16 x 90	1440	1440 x 25	36,000
+ 50	90	16 x 90	1440	810 x 50	40,500
+ 100	30	6 x 30	180	90 x 50	4500
+ 150	0	0 x 00	0		

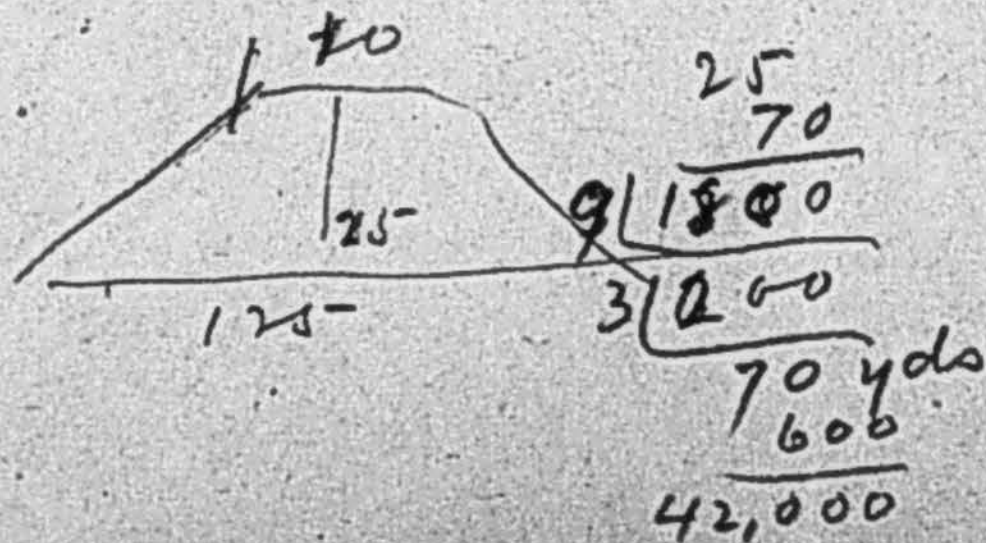
3 | 149,500
9 | 49,833
 5540 yds

$\frac{1690}{1440}$

$\frac{2360}{1180}$
 $\frac{1620}{810}$

$\frac{4 | 118000}{29500}$

$\frac{4 | 144000}{3600}$



184.2
24.4
41.6

250.2

Summary of Data.

	Drainage Area Sq. miles	Mean Annual Rainfall.	Runoff per sq. mi. Probable Mean Yield Acre-ft.
Warners Dam	210	19.6	150 31,000
Rem... ...		25 ±	
Warners to Pala	118	22.5	170 20,000
Pala to Oceavide Borranat.	250	17.5	80 18,000
			<hr/> 69,000

Subtract Division Warners
~~Escudido~~ 31,000
38,000

Subtract Division Escudido 4,000

Net available below Escudido - 34,000

Subtract losses now due
to evaporation - say.

4,000
30,000

Subtract 1/2 of Irrigating
Ditches Pala Merano -
S.L.R. + Hibby + City of
Oceavide + estimated Pumping Plants.

Report - Arthur L. Adams -

Line from Monserrate ~~to~~

(18 miles) to Carlsbad Junction 92,510 ft.

18 " to City Reservoir 94,100 "

Elev. Carlsbad Junction 204 ft.

" City Reservoir 220 ft.

$$\begin{array}{r} \sqrt{5250} \\ 3 \\ \hline 1600 \\ \hline 64000 \\ \hline 10000 \\ \hline 7500 \end{array}$$

4 - $\frac{5}{\dots}$ count - 30

117°30'
33'5"

25'

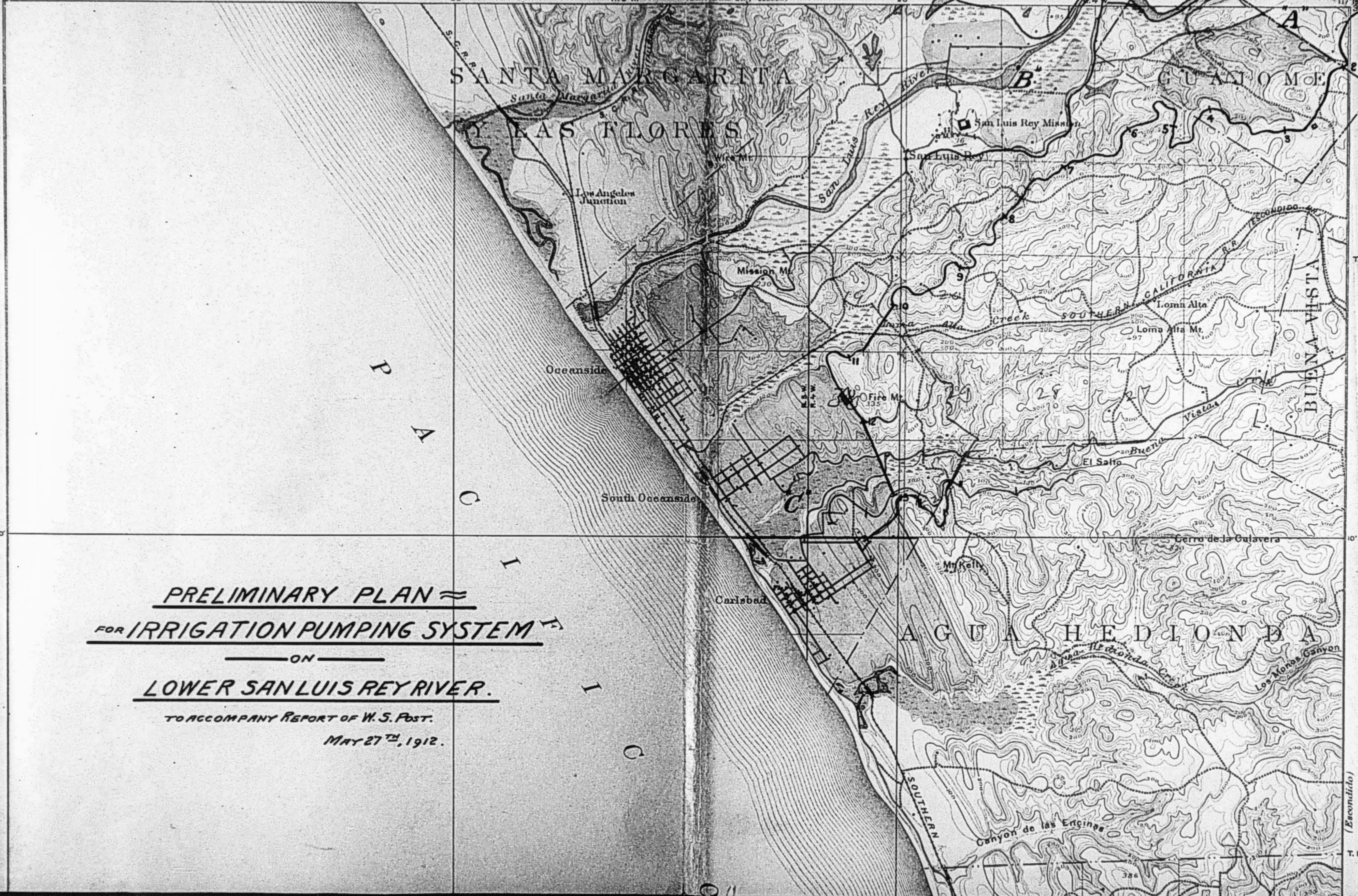
R. B. W.

(San Luis Rey 18600)

20'

PUMPING PLANT
NO. 1

PUMPING PLANT
NO. 2



PRELIMINARY PLAN ≈
FOR IRRIGATION PUMPING SYSTEM
— ON —
LOWER SAN LUIS REY RIVER.
TO ACCOMPANY REPORT OF W. S. POST.
MAY 27TH, 1912.

T. 11 S.

T. 12 S.

(Escuchado)

Section	Acres	Acft	Acft per day	sect. for 7 mo.	M.S.	Pumping Plant - sec.
(B) (1.)	1000	1500	5	2.5	125	5
(C) ² Wilbey Ditch S.K. R. Ditch	500	750	2.5	1.25	67 1/2	5
	500	750	2.5	1.25	67 1/2	
(3)	3000	4500	20	10	500	10
	<u>5000</u>			15 = 750 M.G.		<u>20</u>
						<u>75</u>

2 m =

2940

Plant "B"
" C -
750 M.G. lift. 75 ft.
250 M.G. " 20"

(15)
(15)
(5)

1-2-1950
1 in 1950

section	Acres.	Acft required.	Acft per day 7 mos.	Sec. ft. for 7 mos.	Supplied by Pumping Plant see ft.	Reservoir	Conduit
(a)	2600	4000	20	10	7	1300 Winnate	24"
(b) Northside	800	1200	6	3	3	none	18"
(b) Southside	1500	2250	11	6	6	(Moore?)	30"
(c) Libbey Ditch	1500	2250	11	6	6	WMS lake in section S. T 115 R 4 W. also for distribution	24"
(c) S. L. R. Ditch + City of Ocean- side	2000	3000	14	7	none	Guajome Reservoir 4600 Acft -	24"
(d)	3600 + 400 Guj. <u>4000</u> +	—	—	4	4		
	9,400						

Los Angeles, Cal. May 27, 1912.

Mr. Wm. G. Henshaw,
Mills Building,
San Francisco, California.

Dear Sir:

In accordance with your instructions, I give below a preliminary report on the irrigation of the lower San Luis Rey Valley. This report is necessarily an outline. The lines suggested must be verified by survey and a study of the lands jointly with Mr. Fletcher. It is probable that the whole plan will be greatly modified in detail, but the cost should not be greatly increased.

OUTLINE

The area considered lies between Bonsall to Oceanside and thence along the coast to include Carlsbad. Roughly this area may be divided into two sections.

(a) An area extending from Monserrate Rancho to Oceanside. In this area are the riparian lands of the San Luis Rey. All could be served by the pipe line here projected, but it is not proposed to irrigate any lands from which riparian rights have been purchased, only such as cannot be settled in any other way. The exact acreage which must be so handled cannot yet be determined, but it is expected to be

about 500 acres.

(b) A zone about 2 miles wide extending from Oceanside to Carlsbad and beyond, containing 3000 to 4000 acres. This is high priced property, which cannot be otherwise served, and which can afford high water rates.

DESCRIPTION OF PROPOSED SYSTEM

The plan is to provide a cement pipe line from Monserrate Narrows to Carlsbad, 22 miles long. The winter flow will be diverted into the pipe line and when this ceases the pumps will be started, operating probably 7 months in the year. In case reservoir storage for flood waters in the winter is acquired, the pumping period will not extend over 3 or 4 months.

A supplementary pumping plant is recommended somewhere near Bonsall. The cost of operating both plants will be \$1500. per month.

COST OF PUMPING PLANT

Mr. Fletcher states the two pumping plants at Monserrate Ranch have a capacity of 600 or 700 inches.

These may be appraised for the purposes of this report as Pumping Plant No. 1. - - - - - \$20,000.

Pumping Plant No. 2 may possibly consist of the existing Anderson plant, but for the purposes of this report, a new one would cost - - - - - 20,000.

24 Cement Pipe line 20½ miles @ \$4200. - - 86,100.

24" Riveted Pipe 1½ miles @ 5200. - - 7,800.

Total - - - - - \$ 133,900.

CONCLUSION

1. The Monserrate Narrows are considered to be ample to yield 500 Miners inches by pumping, in addition to the needs of the Monserrate Rancho.

2. The wide area of sands between Monserrate Rancho and Anderson provide a large reserve storage, which is also filled independently by Moosa Canyon drainage, a valuable source of water supply. This area should easily provide for 500 inches additional pumping supply, as well as serve the needs of the Anderson Ranch.

3. To relieve the annual pumping cost as much as

possible, which cost would be approximately \$10,000 per year, attention is drawn to storage possibilities at Monserrate Canyon, Moosa Canyon, El Salto and several other possible sites, which only survey can determine.

4. The value of 1 miners inch of water at Carlsbad is \$1500. as a minimum, and for domestic purposes 25 cents per 1000 gallons may be secured. After taking care of the needs of the South Coast Land Co. and the few unsecured riparian owners, you can safely depend on delivering along the Coast 600 Miners inches, which on the above valuation is worth fully \$1,000,000.

Very sincerely yours,

1st Draft - Killed

May 27, 1912.

Mr. Wm. G. Henshaw,
Mills Building,
San Francisco, California.

Dear Sir:-

In accordance with your instructions, I give below a preliminary report on the irrigation of the lower San Luis Rey Valley. This report is necessarily an outline and represents an opinion as to the most economical solution of the problem. The lines suggested must be verified by survey, and it is probable that the whole plan will be greatly modified, but the probable cost should not be greatly increased.

OUTLINE-

The area considered lies between Monserate Ranch to Oceanside and thence along the coast to include Carlsbad. Roughly this area may be divided into four sections.

- (a) From Monserate Narrows to Bonsall.
- (b) Bonsall to the West line of Guajume Rancho.
- (c) Guajume Rancho to Oceanside.
- (d) Oceanside to Carlsbad.

PROPOSED METHOD OF IRRIGATION-

A plan is to utilize pumping plants placed in the river bed and pumping to a sufficient elevation to cover the riparian lands along the river, conveying the water in cement pipes or concrete conduits. It is obviously desirable that as long as water is flowing on the surface in the river that the various pipe lines should be designed for gravity flow and the pumping plants used when surface

flow ceases. Attention also will be drawn to several storage sites, which would further relieve the pumping plants.

SECTION (A), MONSERATE NARROWS TO BONSALL-

The lands to be irrigated lie principally on the south side of the river, and one conduit line is sufficient. A pumping plant with a capacity of 300 miners inches is already installed with a lift of about 10'. The conduit or cement pipe line would have an initial elevation of 280' above sea, and extend for a distance of _____ miles to Bonsall, and will irrigate _____ acres. It should be noted that this conduit need not maintain a high elevation, unless it is desired later to extend it in the direction of Carlsbad. It is assumed here that it will be run at an elevation to secure this result and a separate estimate given for its extension to Carlsbad.

In a side canon at the Monserate Narrows appears a reservoir site worth considering, where storm water from the river can be stored in winter, and to that extent relieve the amount of pumping. This reservoir site and the most of the lands considered in this section are a part of the original Monserate Ranch.

SECTION (B), BONSALL TO GUAJUME-

This is a narrow portion of the river with a number of small ownerships ending in the large Guajume Rancho. The elevation of a pumping plant would be 130' above sea. The true riparian lands could be served by a 20' lift and a pipe line on each side of the river. However, at first thought, it appears that the pumping lift should be about 50', which would secure the entire irrigation of Guajume Rancho as well.

SECTION (C), GUAJUME RANCHO TO OCEANSIDE-

There seems little doubt that this section will be best served by a development of existing ditches. On the north side the Libbey Ditch is taken out at a point of the river where the valley narrows somewhat and where the probability is that a submerged dam would bring water to the surface in the summer. Whether this is done or not, it is a probable site for pumping plants. The Libbey Ditch flows by one of its laterals into a shallow lake some three miles distant, which probably will be found very useful for impounding winter floods. This is now apparently not used for such purpose, but fills naturally from side drainage.

Similarly, on the south side, the ditch of the San Luis Rey Company is taken out at a point slightly up stream from the heading of the Libbey Ditch. These ditches, at present, take out surface flow until the river dries up. To supplement the decreasing flow, several pumping plants exist owned by individual owners, which are put into service in the summer. If it were possible to improve the ditches and couple up the pumping plants by some joint action of the present owners, this section could be installed and operated economically. The lower end of the south side pipe line would be the City of Oceanside's pumping plant, where water could be delivered in case of shortage of the city supply without changing its present pumping plant.

SECTION (D)-

This is a zone extending along the ocean between Oceanside and Carlsbad, about six miles long and extending inland for a width of about three miles. The altitude varies from about 50' above sea

to 300'. It has already been noted that the highest pumping plant at Monserate Narrows would start with an elevation of 275'. If this pipe line were maintained towards Carlshad on as low a grade as practical, it would deliver water on Section (d) at about the 200' elevation. The first study of such a conduit line appears to indicate that it will pay to elevate the water in this conduit some 50' near the town of Bonsall. In this way, the remainder of the distance is greatly shortened, and it is probable that several storage sites, as at Vista, would then be made available. This suggests that the Bonsall pumping station may be made quite powerful and be the real source of supply for Section (d). This would be true, especially, if your control of Monserate Ranch and other lands in Section (a) make unnecessary the immediate development of a water system for that section.

ESTIMATES-

Section (a)-

Pumping Plant- Capacity _____ miners inches;

Lift _____ foot; Cost \$ _____

Section (b)-

Pumping Plant: Capacity _____ miners inches;

Lift _____ foot; Cost \$ _____

Section (c)-

Pumping Plant: Capacity _____ miners inches;

Lift _____ foot; Cost \$ _____

Section (d)-

Pumping Plant: Capacity _____ miners inches;

Lift _____ foot; Cost \$ _____

Sheet No.	Flood Plain Acres	Shale Bottom				Waste Lands Rough or unimproved	Total	Rejection Rights
		B. Side	N. Side	S. Side	N. Side			
Sheet No. 1	880	1320	800	1040	800	1340	5200	1520
" No. 2	1600	1200	800	1000	1200	{ 1200 R. 1000 R. } 6400	6400	2800
" No. 3	1000	500	400	200	400	100	1600	1600
	<u>3480</u>	<u>3020</u>	<u>2000</u>	<u>2240</u>	<u>2400</u>	<u>3640</u>	<u>3200</u>	<u>5920</u>

Ed Fletcher Papers

1870-1955

MSS.81

Box: 40 Folder: 9

Business Records - Reports - Post, W.S - "Preliminary Report on the Irrigation of lower San Luis Rey Valley"



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