

Sta L. WARNER DAM. FLEXCREST 2715
C. R.

0+00 $\frac{00}{10}$ 00 $\frac{00}{10}$

+30 $\frac{-15}{47.5}$ $\frac{-15}{24}$ $\frac{-21}{24}$ -240 $\frac{-27.0}{91.0}$

+75 $\frac{-40}{110}$ $\frac{-40}{55}$ $\frac{-46}{55}$ -460 $\frac{-91.0}{283.0}$

1+10 $\frac{-61}{162.5}$ $\frac{-65}{80}$ $\frac{-71}{80}$ -730 $\frac{-101}{180}$ $\frac{-107}{185}$ $\frac{-107}{331}$

1+40 $\frac{-83.0}{217.5}$ $\frac{88.0}{108}$ $\frac{95.0}{108}$ -960 $\frac{-101}{65}$ $\frac{-107}{70}$ $\frac{-107}{331}$

1+50 $\frac{89-95}{332}$ $\frac{-101}{110}$ $\frac{-107}{100}$ $\frac{-107}{100}$ -1070 $\frac{-107}{370}$ $\frac{-103}{570}$

1+75 $\frac{-107}{331}$ -1070 $\frac{-107}{280}$ $\frac{-101}{285}$ $\frac{-93}{289}$

1+80 $\frac{-107}{331}$ -1070 $\frac{-107}{140}$ $\frac{-101}{145}$ $\frac{-96}{288}$

2+50 $\frac{-107}{331}$ $\frac{-107}{55}$ $\frac{-101}{30}$ -100 $\frac{-96}{60}$ $\frac{-90}{70}$

Sta L. C. R.

3+20 $\frac{-107}{331}$ $\frac{-101}{205}$ $\frac{-96}{185}$ -910 $\frac{-92}{155}$ $\frac{840}{262.0}$

3+60 $\frac{-81}{212.5}$ $\frac{-75}{90}$ $\frac{-81}{90}$ -600 $\frac{-84}{170}$ $\frac{-76}{238}$

4+00 $\frac{-68}{180}$ $\frac{-45}{75}$ $\frac{-51}{75}$ -430 $\frac{-80}{180}$ $\frac{-70}{270}$

4+50 $\frac{-40}{110}$ $\frac{-27}{50}$ $\frac{-33}{50}$ -310 $\frac{-71}{200}$ $\frac{-67}{211}$

5+05 $\frac{-10}{35.0}$ -18:0 $\frac{-56}{178}$

5+52 $\frac{00}{10}$ 00 $\frac{50}{10.}$

	L	R
2715		
2705	$\frac{-10}{35.0}$	$\frac{16}{58}$
2700	$\frac{-15}{47.5}$	$\frac{-21}{73}$
2685	$\frac{-30}{85}$	$\frac{36}{118}$
2675	$\frac{-40}{110}$	$\frac{46}{148}$
2665	$\frac{50}{135}$	$\frac{56}{178}$
2650	$\frac{-65}{172.5}$	$\frac{-71}{223}$
2635	$\frac{80}{210}$	$\frac{86}{268}$
2625	$\frac{-90}{235}$	$\frac{-96}{288}$

2620	$\frac{95}{247.5}$	$\frac{707}{313}$
2608	$\frac{107}{277.5}$	$\frac{107}{331}$

51 1/2

~~236~~

2638.4

265.6

2904.0

265.6

287.7

552.7

Range 3 West

30

29

stick

N 99 1/4 E

North

North

Stone 28
28 cr.
30 1/4 cr.

stone 1/16

27

stone 1/16 Gal. pipe

stone 1/16

stone to East

stone 1/32

M.C. Corners - Stone

stone 33

34

in River

31

32

Hold

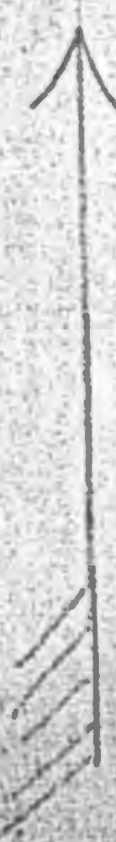
Hold

15 1/2

Stephens

T9S R2W

T10S R2W



6

5

41949
2736

5417
5322

51

500
136
450

5001
14638

1500

3475
3419

6026 W

2689
85

2679.5

435-1°

N 71° 42' E	1362	428	1293
N 78° 47' E	3991	766	3914
N 78° 47' E	4135	804	4056
S 85° 23' E	2372		2364
S 85° 23' E	5140	414	5123
S 85° 23' E	6962	561	6944
N 52° 24' E	3223	1966	2558
N 25° 57' W	9188	8262	402
S 74° 36' W	367	1100	362
S 75° 24' W	2788	703	2098
N 82° 36' W	7320	943	7259
S 87° 53' W	4605	170	4602
S 85° 41' W	3471	261	3461
S 66° 18' W	9305	3740	852
S 69° 26' W	4134	1452	3870
S 60° 58' W	6359	3086	5560
S 33° 57' W	4316	3581	2410
	13169	222	200
	107	1391.5	2624.8
	14246	584	16521
		1425.9	427.69
			4276.2

	N	S	E	W
S 51° 09' E	912.6	5725	710.7	
N 48° 51' E	400.	263.2	301.2	
N 46° 40' E	345.	236.8	250.9	
N 55° 42' E	1771	99.8	146.3	
N 71° 42' E	2559	804	243.0	
N 46° 01' W	4772	331.4		343.4
N 29° 34' W	3982	346.4		196.5
S 69° 26' W	3371	1184		315.6
S 60° 58' W	6359	308.6		556.
S 33° 57' W	431.6	358.1		241.
	1358.0	1357.6	1657.1	1652.5

	N	S	E	W
S 49° 04' E	520°	3407	3929	
N 29° 56' E	384°	3329	1917	
S 89° 54' W	1448		25	1448
N 0° 02' W	609.0	6090		
S 36° 02' W	2672	6650	2165	1574
S 27° 36' W	2825		2504	1309
S 38° 26' W	2431		1904	1511

9819	110095	73		
56.	179			
997.9	625	584.6	584.7	

340.7
289
216.5
250.4
190.4

0005

30.9
221

8.8

58188
58

300
290

618 | 584.6
 749

 618
 242.0
 247.2

 1480
 1236

 2440

202
2836

100358
102051

9791
22.6

Fluor

Lot below Flinn's store 485

	N	S	E	W
S 18° 40' E	585	5542	1872	
N 73° 37' E	1718	485	1648	
N 50° 09' E	5044	3232	3872	3922
N 45° 06' W	4720	3332		3343
S 69° 34' W	4317	1507		4045
	7049	7049	7392	7388

220

234+253
7+7628

14902
4124

19026

12697
6766

19463

240+034
8+7640

12697

40004
238+7640

12697
6766

19463

	N	S	E	W
S31°47'W	4338	3687		228.5
S52°57'E	911.2	548.2	726.5	
N47°03'E	400	272.5	2928	
N51°03'W	987.4	620.6		767.9
N43°58'W	330	238		229
	9169	9169	10193	10193

S54°40'W	95.6	55.3		78.0
S60°17'W	427.4	211.9		371.2
S43°58'E	33.0	23.8	22.9	
S51°03'E	987.4	620.6	767.9	
N44°52'E	34.5	244.5	243.4	
N41°15'W	887.3	667.1		585.0
	911.6	911.6	10342	10342

S69°54'W	255.9	87.8		240.2
S53°54'W	177.1	104.1		143.1
N41°15'W	887.3	667.1		585.0
N54°40'E	114.0	65.9	93.0	
N68°31'E	335.9	123.0	312.6	
S31°22'E	403.2	344.3	209.9	
S47°49'E	476.7	320.1	353.2	
	856.0	856.3	968.7	968.3

S31°22'E	403.2	344.3	209.9	
S47°49'E	476.7	320.1	353.2	
N69°54'E	136.7	46.8	127.9	
N76°59'E	399.1	89.9	388.8	
N39°44'W	173.7	133.6		111.0
N67°33'W	263.3	100.5		243.3
N38°05'W	588.3	463.1		362.9
S64°06'W	322.0	140.6		289.7
S68°31'W	78.4	28.7		72.9
	8339	8337	10798	10798

Lot A

Lot B

Lot C

Lot D

F 17772 T 80

8.12

S86°05'W	310.0	221.2		309.3
S83°53'W	347.1	37.0		345.1
S64°30'W	605.5	260.7		540.5
S38°05'E	582.0	458.1	359.0	
S67°33'E	263.3	100.5	243.3	
S39°44'E	173.2	133.6	111.0	
N76°59'E	413.5	93.1	402.9	
S87°11'E	237.2	11.6	236.9	
N9°15'W	941.8	929.6		151.4

N84°24'W	412.2	40.3	1022.1	1022.7	1353.1	1352.3
S85°56'W	150		10.6			410.7
S9°11'E	941.4		929.3	150.2		
S87°11'E	514.0		25.3	513.4		
N6°22'W	930.6	924.9				103.2

S72°48'W	36.2	965.2	965.2	663.6	663.5
S73°36'W	278.5		10.9		35.0
N84°24'W	319.3	31.0	78.7		267.5
S6°22'E	930.6		924.9	103.2	
S87°11'E	696.2		34.2	695.9	
N50°36'E	322.3	204.6		249.1	
N27°45'W	918.5	813.1			427.8

			1048.7	1048.7	1048.1	1048.1
N14°59'W	33.6	32.5				8.7
N85°56'E	658.3	646.7		656.6		
S9°11'E	941.4		929.3	150.2		
N87°11'W	237.2	11.6				236.9
S76°59'W	147.0		33.1			143.2
N25°37'W	966.6	871.6				418.0
			962.4	962.4	806.8	806.8

G + F

Lot N#5

O.K.

Lot N#6

G

O.K.

Lot N#7

H + I

F

2001
4/30
8/26

6967
23
4462

S 76° 59' W	266.5		600	259.6
N 39° 44' W	173.7	133.6		111.0
N 67° 33' W	263.3	100.5		243.3
N 38° 05' W	588.3	463.1		362.9
N 64° 06' E	610	2664	548.7	
S 14° 59' E	336		32.5	8.7
S 25° 37' E	966.6		871.6	418.0
	963.6	964.1	975.4	976.8

Lot E

N 5° 24' W	33.6	33.4		3.2
N 73° 36' E	278.8	78.7	267.5	
N 72° 48' E	36.7	10.9	35.0	
S 27° 45' E	918.8		813.1	427.8
S 50° 36' W	322.3		204.6	249.1
N 87° 11' W	250.0	123		249.7
N 14° 31' W	911.5	882.4		228.3
			730.3	730.3

Lot H

N 87° 11' W	446.7	21.9		446.2
N 6° 22' W	930.6	924.9		103.2
S 84° 24' E	319.3		31.0	317.8
S 15° 24' E	33.8		33.4	32
S 14° 31' E	911.5		882.4	228.4
	946.8			549.4

Lot I

		N	S	E	W
S 73° 36' W	278.8		78.7		267.5
N 84° 24' W	732.0	71.4			728.5
S 86° 05' W	460.5		31.5		459.4
S 83° 53' W	347.1		37.0		345.1
S 64° 30' W	930.5		400.6		839.8
S 67° 38' W	413.4		157.3		382.3
S 59° 10' W	635.9		325.9		546.0
S 32° 09' W	431.6		365.4		229.7
S 52° 57' E	912.6		549.2	727.6	
N 47° 03' E	400.0	272.5		292.8	
N 44° 52' E	345.0	244.5		243.4	
N 53° 54' E	177.1	104.3		143.1	
N 69° 54' E	255.1	87.9		240.2	
N 69° 54' E	136.2	46.8		127.9	
N 76° 59' E	399.1	89.9		388.8	
N 76° 59' E	413.5	93.1		402.9	
S 87° 11' E	237.2		11.6	236.9	
S 87° 11' E	514.0		25.3	513.4	
S 87° 11' E	696.7		34.2	695.9	
N 50° 36' E	322.3	204.6		249.1	
N 27° 45' W	918.8	813.1			427.8
S 72° 48' W	36.2		10.9		35.0
S 73° 36' W		2028.1	2027.6	4262.0	4261.1

911.2 = ^S548.4 ^E726.5

Beginning at a point in road S 43° 17' E 34³ from Post #21 E.M.A.
Co. Highway Sta 182+63¹ P.T. bears N 31° 47' E 69⁴
thence N 31° 47' E 69⁴ to Sta 182+63¹ P.T. County highway
thence following center line said highway
N 31° 47' E 364⁴

106

CLASSIFICATION OF WARNERS RANCH

 Area non-tillable lands ----- 8,359 acres
 Area Lakes ----- 87 "
 Area Reservoir ----- 7,600 "
 16,046 "

Total Area of Ranch ----- 44,091 acres
 Deducted ----- 16,046 "
 Acres of good plow land ----- 28,045
6,889
 21,156

Total Area of Sub-irrigated land ----- 6,889 acres.

Area now tillable lands

279 Acres
 58 "
 557 "
 133 "
 211 "
 322 7
 223 4
 2400 5
 796 5
 179 4
 34 5
 88 7
 12 -
 34 7
 190 1
 56 "
 79 "
 2253 "
 218 "
 154 "
 78 "

 8359 Acres

Area of Lakes

1 Acre
 4 4.2
 5 "
 5 "
 5 "

 87 Acres

106

Area of Reservoir 7600 Acres

Area now tillable lands 8359 Acres
 " Lakes 87 "
 " Reservoir 7600 "
 16046 Acres

Total area of Ranch = 44091 Acres
 Deducted 16046
 28045 Acres of good
6889 plow land
 21156

Area of Sub irrigated land

119 Acres
 1922 "
 121 "
 4672 "
 55 "

 6889 " Total Subirrigated lands

Classification of Warners Ranch

Sub irrigated lands

106

5.2 sq in = 5200000 sq ft = 119 Acres ✓
 36.5 sq in = 36500000 sq ft = 838 Acres ✓
 47.3 sq in = 47300000 sq ft = 1083 Acres ✓
 83.8 sq in = 83800000 sq ft = 1922 Acres ✓
 5.30 sq in = 5300000 sq ft = 121 Acres ✓
 9330 sq in = 93300000 sq ft = 2140 Acres ✓

from which
deductions are
to be made

197
 1943 Acres
 141 Acres
 1625 Acres
 968
 4677 Acres
 5 - Deducted for lost lake
 4672
 55 Acres ✓

119
 1922
 121
 4672
 55
 6889

Deduction in
 Lake 63 Acres
 4
 9
 1
 120
 197 Acres Deducted

6.15 sq in = 6150000 sq ft
 70.85 sq in = 70850000 sq ft
 42.20 sq in = 42200000 sq ft
 2.40 sq in = 2400000 sq ft

Warner

Water Plane Measurements
 Warner Ranch

Hole No. 11 Elev. 2713 Depth 7'		Hole No. 14 Elev. 2798 Depth of hole 9'	
Date	Elev. of Water Surface	Date	Elev. of Water Surface
1912		1912	
Dec. 3	2706.6	Dec 3	2794.4
17	2706.5	17	2794.4
1913		1913	
Jan 2	2706.3	Jan 2	2794.6
14	2706.1	14	2794.8
29	2706.4	29	2794.9
Feb. 3	2706.1	Feb. 10	2794.9
10	2706.7	March 3	2795.5
March 3	2708.7	18	2794.9
18	2709.4	June 3	2793.6
June 3	2708.6	17	2793.3
17	2708.3	July 1	2793.3
July 1	2708.2	18	2793.3
18	2708.2	Aug 8	2793.3
Aug 8	2708.1	Sept. 4	2793.5
23	2707.8	23	2792.7
Sept 5	2707.6		
23	2707.2		

M. P. Measurements, Cont'd

Hole No. 19
Elev. 2986
Depth of hole 9'

Hole No. 24
Elev. 2817
Depth of hole 8'

Date	Elev. of Water Surface
1912 Dec 3	2979.1
1912 Dec 17	2979.9
1913 Jan 2	2979.9
1913 Jan 14	2980.1
1913 Jan 29	2980.3
1913 Feb 10	2980.2
1913 March 3	2981.8
1913 March 18	2982.7
1913 June 3	2980.6
1913 June 17	2980.0
1913 July 1	2978.9
1913 July 18	2978.6
1913 Aug 8	2981.3
1913 Sept 5	2977.9
1913 Sept 23	2977.4

Date	Elev. of Water Surface
1912 Dec 3	2811.1
1913 Jan 2	2811.3
1913 Jan 14	2811.8
1913 Jan 29	2812.4
1913 Feb 10	2813.0
1913 March 3	2815.4
1913 March 18	2815.1
1913 June 3	2811.5
1913 June 17	2811.0
1913 July 1	2810.9
1913 July 18	2810.8
1913 Aug 8	2810.7
1913 Sept 5	2810.8
1913 Sept 23	2810.9

Hole No. 25
Elev. 2790
Depth of hole 7.5'

Hole No. 28
Elev. 2837
Depth of hole 7'

Date	Elev. of Water Surface
1912 Dec 3	2782.5
1912 Dec 17	2782.5
1913 Jan 2	2782.5
1913 Jan 14	2782.5
1913 Jan 29	2782.9
1913 Feb 10	2782.5
1913 March 3	2783.9
1913 March 18	2784.2
1913 June 3	2782.9
1913 June 17	2782.7
1913 July 1	2782.6
1913 July 18	2782.3
1913 Aug 28	2782.3
1913 Aug 8	2782.3
1913 Sept 23	2782.3
1913 Sept 5	2781.7
1913 Sept 23	2788.2

Date	Elev. of Water Surface
1912 Dec 3	2835.2
1912 Dec 17	2835.1
1913 Jan 2	2835.0
1913 Jan 14	2835.2
1913 Jan 30	2835.0
1913 Feb 10	2834.8
1913 March 3	2835.4
1913 March 18	2834.7
1913 June 3	2834.1
1913 June 17	2834.1
1913 July 1	2833.0
1913 July 18	2832.8
1913 Aug 28	2832.8
1913 Aug 8	2832.6
1913 Aug 23	2832.7
1913 Sept 5	2832.7
1913 Sept 23	2832.5

Hole No. 36
Elev. 2789
width of hole 5'

Date	Elev. of Water surface
1917	
Dec. 3	2784.7
17	2784.8
1913	
Jan 2	2785.0
14	2785.1
30	2785.8
Feb. 10	2785.6
March 3	2786.9
18	2786.7
June 3	2784.0
17	2783.7
July 1	2783.7
18	Dry
28	"
Aug 8	"
23	"
Sept. 5	2782.5
23	2782.7

Hole No. 50
Elev. 2703
width of hole 9'

Date	Elev. of Water surface
1913	
Jan 2	Dry
14	"
24	"
Feb. 10	"
March 3	"
18	"
June 2	"
17	"
July 1	"
18	"
Aug 8	"
23	"
Sept. 5	"
23	"

Hole No. 63
Elev. 2729
width of hole 8'

Date	Elev. of Water surface
1917	
Dec. 3	2722.9
17	2723.0
1913	
Jan 2	2723.3
14	2723.3
30	2724.6
Feb. 10	2724.6
March 3	2727.7
18	2727.4
June 3	2725.1
17	2724.5
July 1	2723.9
18	2723.2
Aug 8	2722.8
Sept. 5	2721.6
23	2721.8

Hole No. 83
Elev. 2885
width of hole 12'

Date	Elev. of Water surface
1913	
Jan 2	Dry
14	"
29	"
Feb. 10	"
March 3	"
18	"
June 3	"
17	"

Hole F
Elev. 3095

Date	Elev. of Water surface
1917	
Dec. 3	3090.4
17	3090.8
1913	
Jan 2	3091.0
14	3091.3
29	3091.7
Feb. 10	3091.9
March 3	3092.5
18	3091.9
June 3	3089.5
17	3088.8
July 1	3088.5
18	3088.2
Aug 8	3088.2
Sept. 5	3087.2
" 23	3087.1

To divert Canada Verde from Helm place to near Hot Springs 100 M.I. - 12" concrete and Steel pipe, requires -

2,300 cement pipe at .35 -----	\$ 805
4,100 Riv. Pipe at .90 -----	3,690
Overhead ---- 20% -----	905
	<u>\$ 5,400</u>

To secure the power drop of 460 ft. producing say 40 H.P. with 50 M.I. flowing, requires -

2,700' 6" Casing at \$1.00 -----	\$ 2,700
Power House and Machinery, 50 H.P. at \$43	2,150
Overhead ---- 20% -----	950
	<u>\$ 5,800</u>

Hot Springs Dam

27 ft. Depth of water and containing 27,000,000 galls. Earth Dam 32 feet high and concrete Dam 27 ft. high.

If built of earth requires -

600 cu.yds. puddle at \$1.50 -----	\$ 900
6,000 " Earth at \$.25 -----	1,500
Outlet pipes and valve -----	300
Overhead -----	600
	<u>\$ 3,300</u>

Or, if built of concrete as an arch -

600 bbls cement at \$3.60 -----	\$ 2,200
Crushed rock, screened gravel, forms and placing, 400 cu.yds. in all at \$4.50-----	1,800
Excavation, and Riprap and gates -----	900
Overhead -----	700
	<u>\$ 5,600</u>

Eagle Nest Dam

Data

Reservoir

Maximum Depth -----	26 ft.
Area flooded -----	2/3 acre
Capacity - Acre feet -----	5.7 acre ft.
" Gallons -----	1,850,000 Gallons.

Storage capacity is equivalent to 100 M.I. flowing for 18 hours. If the stream is flowing 100 Miners Inches, the yield in 6 hours with accumulation becomes 400 M.I. for 6 hours.

Or, if the minimum flow of stream is 10 M.I., you are assured of 40 Miners Inches flow for 6 hours, and still retain a considerable amount in storage.

Dam - Curved Arch Type

Height -----	26 feet
Length -----	130 "
Width -----	2 "
Radius -----	75 "

Estimate of Cost

Eagles Nest Dam

Cement - 300 lbs at \$4. -----	\$ 1,200
Concrete in place, including forms, crushed rock and sand, 200 cu.yds at \$5.00 -----	1,000
Gates -----	200
Overhead - 20% -----	500
	<u>\$ 2,900</u>

Eagles Nest Power Plant

Elevation of outlet from Dam -----	4,503 feet
" 1700' along Road -----	4,493 "
" at Power Site A -----	4,212 "
Power Drop -----	281 "
Usable H.P. assuming 100 H.I. flowing --	50 H.P.

Cost

1,700 ft. 12" Cement Pipe at .50 -----	\$ 850
800 ft. 6" casing at 1.00 -----	800
Power House installed complete 50 H.P. at \$50 -----	2,500
Overhead - 20% -----	850
	<u>\$ 5,000</u>

is

Power House "A" on Fletcher land at the southwest corner

of Section 20. It is possible to extend the pressure pipe line down the valley, keeping in this land to a lower site "B" elevation 4,050 or 162 ft. lower and securing 30 H.P. additional.

The additional cost would be -

1,800 ft. 6" Casing -----	\$ 1,800
Extra Installation 30 H.P. at \$50 -----	1,500
Overhead -----	900
	<u>\$ 4,000</u>

Thence the water would flow through Indian land to the

Helm Intake.

November 1, 1916.

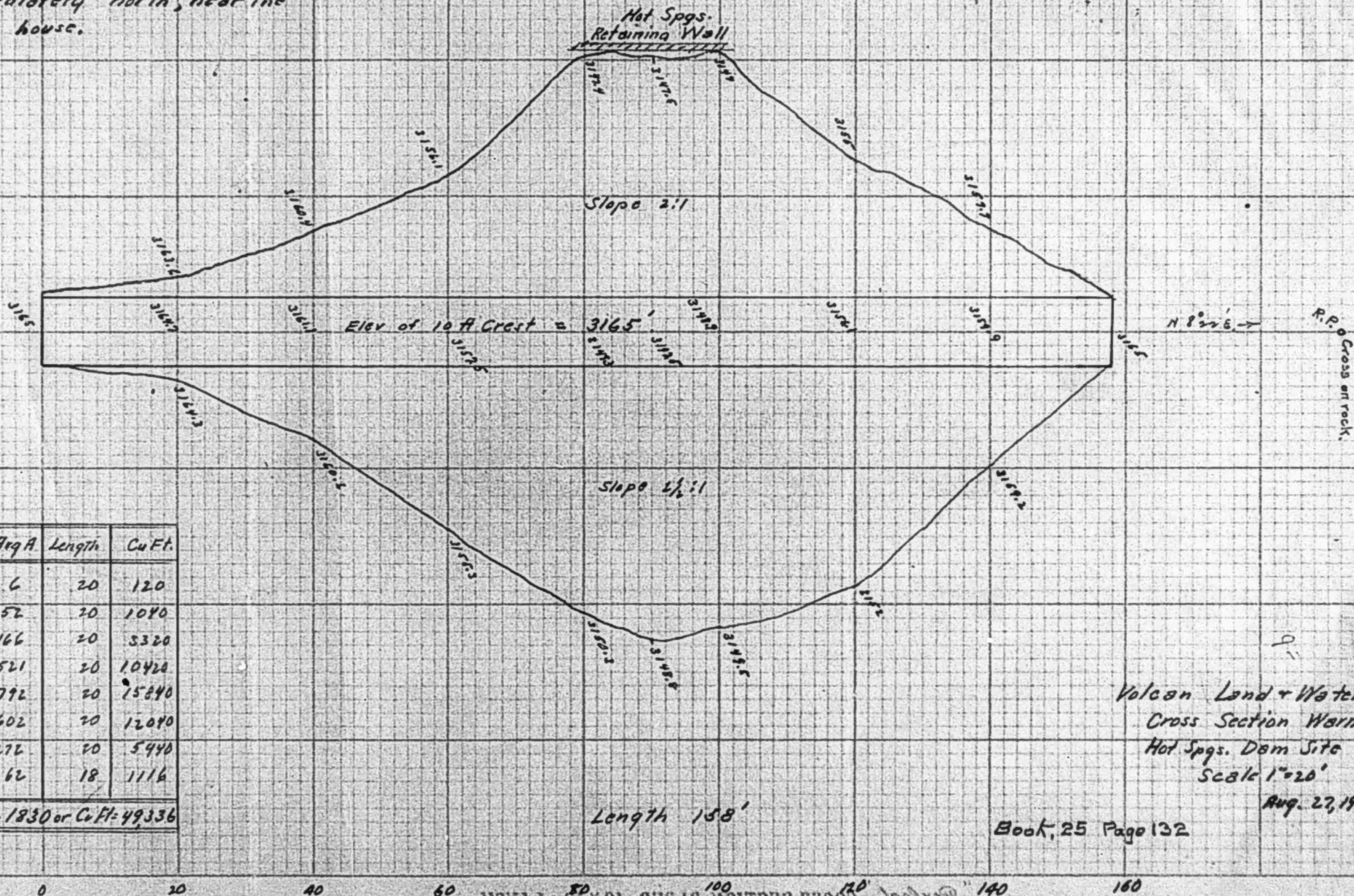
Mr. Post:

Enclosed find map and records of Hot Springs Dam. Will you please get things in shape at your convenience; in writing, and turn over to Mr. Ream, so he can go ahead with the construction of the dam at Warners this coming spring. Can we not build a cement wall, say 8" thick as a cut-off wall, and would it not be cheaper than to use adobe in the center? What do you think about it?

Ed Fletcher.

FES

Note. The Elev. of crest is 3165'
 This corresponds with the
 low point of the saddle
 immediately north, near the
 milk house.



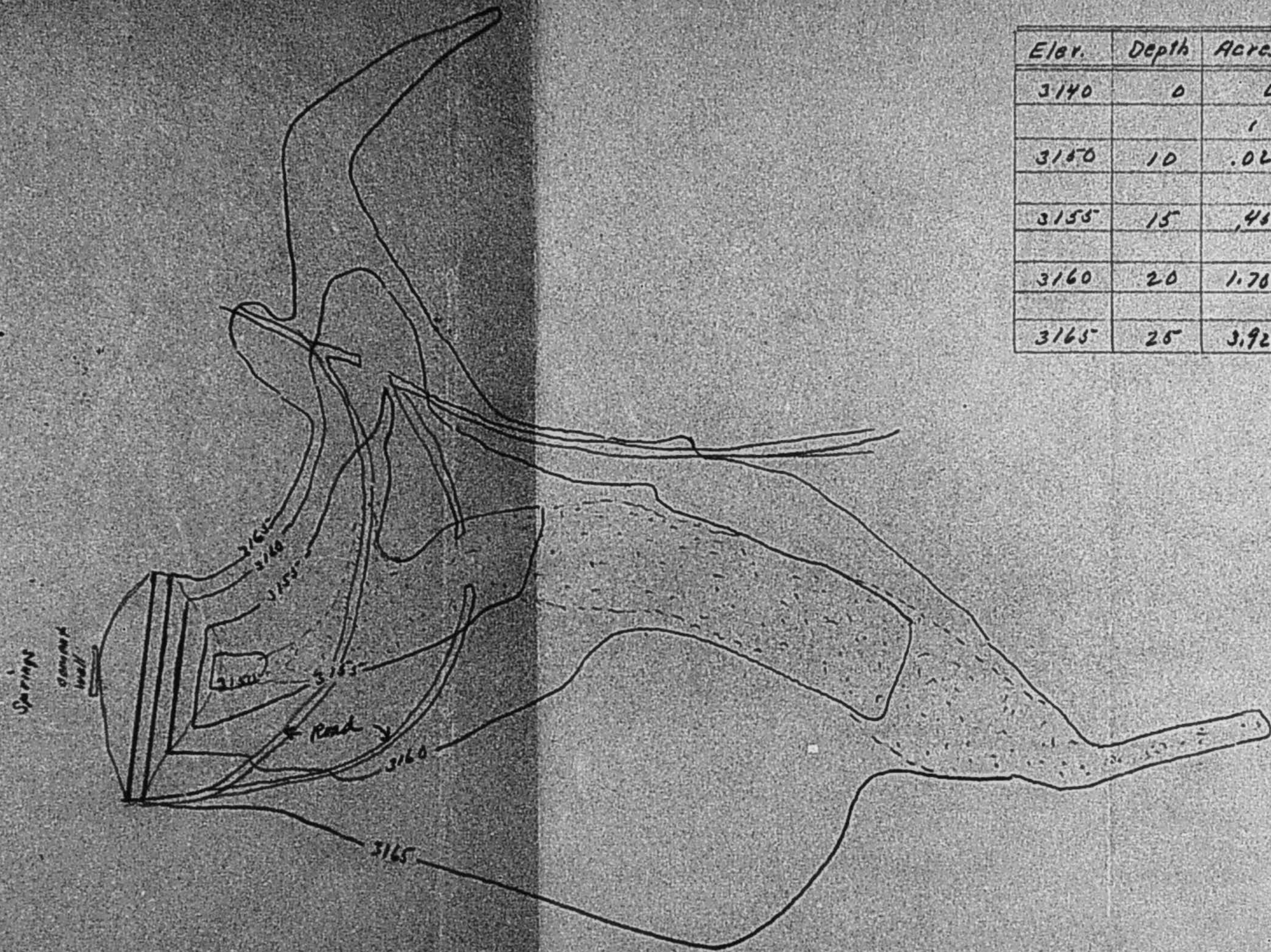
Station	Area	Area	Length	Cu Ft.
0+00	0	6	20	120
+20	25	52	20	1040
+40	40	166	20	3320
+60	52	521	20	10420
+80	94	792	20	15840
+100	95	602	20	12040
+120	73	272	20	5440
+140	45	62	18	1116
+158	0			

Vol in Cu Yds = 1830 or Cu Ft = 49336

Volcan Land & Water Co
 Cross Section Warner
 Hot Spgs. Dam Site
 Scale 1"=20'

Aug. 27, 1916

Book, 25 Page 132



Elev.	Depth	Acres	Avg	Ac. Ft.	Mil. Gal.
3140	0	0			
		1	.01	11	0
3150	10	.02			
			.233	1.17	.38
3155	15	.46			
			1.07	5.35	1.74
3160	20	1.76			
			2.81	14.05	4.59
3165	25	3.92			
				20.6	6.7

Volcan Land & Water Co
 Contour Map
 Hot Spgs. Rest.
 Scale 1" = 100'
 Aug 28, 1916

Studies based on Maximum Storms of Last Twenty Years.
(1894-95 to 1913-14)

WARNERS RESERVOIR

Assuming reservoir empty on February 1st, 1905 (which was the beginning of a series of very wet seasons) and that the conduit had a capacity of 60 sec. ft.; then it would have required a reservoir capacity of 62,000 acre feet to hold back the run-off of the following seasons until the conduit could have carried it off. The maximum depth of water or 72 ft. would have been attained on February 1st, 1907. This water stored together with subsequent run-off would have lasted until July 1st, 1909, allowing for evaporation.

PAMO RESERVOIR

(Assuming that Sutherland was not built)

Assuming reservoir empty on February 1st, 1905 (which was the beginning of a series of very wet seasons) and that the conduit had a capacity of 60 sec. ft.; then it would have required a reservoir capacity of 50,000 acre feet to hold back the run-off of the following seasons until the conduit could have carried it away. The maximum depth of water or 160 ft. would have been attained on June 1st, 1906. This water stored together with subsequent run-off would have lasted until July 1st, 1908 allowing for evaporation.

Studies based on Maximum Storms of Last Twenty Years.

(1894-95 to 1913-14)

SUTHERLAND RESERVOIR

Assuming the reservoir empty on January 1st, 1895 (the beginning of a heavy storm period) and that the conduit had a capacity of 60 sec. ft.; then a reservoir having a capacity of 24,000 acre feet would have been required to hold back the water until it could have been carried away by the conduit. The maximum depth of water or 140 feet would have occurred April 1st, 1895. This stored water together with subsequent run-off would have lasted until April 1st, 1896, allowing for evaporation.

PAMO RESERVOIR

(Assuming Sutherland Reservoir built to a depth of 140 ft.)

Assuming the reservoir empty on February 1st, 1905 (the beginning of a heavy storm period) and that the conduit had a capacity of 60 sec. ft.; then a reservoir having a capacity of 8500 acre feet would have been required to hold back the water until it could have been conveyed away by the conduit. The maximum depth of water, or 90ft., would have been attained on April 1st, 1905. The water stored, together with subsequent run-off, would have lasted until June 15th, 1905, allowing for evaporation.

Studies based on maximum storms of Last Twenty Years.
(1894-95 to 1913-14 inc.)

SAN DIEGO RIVER AT DIVERTING DAM
(including South Fork)

Assuming all the reservoirs empty on February 1st, 1905 (which was the beginning of a series of very wet seasons). Assume that the flume carried away a continuous flow of 20 millions gallons per day, of which 10 millions were taken to Lower Otay Reservoir and 10 millions to La Mesa Reservoir. Assume also that 8½ million gallons daily were taken from La Mesa Reservoir into the city distributing system.

The maximum storage on the San Diego River would have occurred about April 1st, 1912 and would have required a reservoir capacity of 52,000 acre feet in order to hold back the subsequent run-off until the flume could have carried it to the Lower Otay and the La Mesa Reservoirs. This storage could be obtained as follows:

	<u>Capacity</u>	<u>Depth</u>
Cuyamaca Lake Reservoir	5000 acre feet	27.0 ft.
Boulder Creek, Poverty Gulch and Conejos Reservoir, etc.	3000 " "	" "
Diverting Dam	12,000 " "	130 "
El Capitan	<u>32,000 " "</u>	115 "
	52,000 " "	

With a discharge into Lower Otay of 10 million gallons per day that reservoir would have been filled by July 1st, 1908 to its capacity of 35,700 acre feet; allowing for evaporation. From that date it would only have been possible to draw ten million gallons per day from the storage. *because of lack of capacity in La Mesa and Otay.* On the San Diego River. This would have been mostly passed through the flume to La Mesa Reservoir to supply the city demands of 8½ million gallons per day and to counter-act

the evaporation losses. A small amount would have gone to Lower Otay to counter-act the evaporation losses there.

La Mesa reservoir would have needed to be constructed to a depth of 100 ft. with a capacity of 5960 acre feet. This would have become filled on January 1st, 1913.

SUMMARY OF STREAM GAGINGS.

July 1st, 1912 to June 30th, 1913.

July 14, 1913.

AROUND WARNER'S RANCH.

Month	Carrizo Creek	Susanna Creek	Matagual Creek	San Luis Rey near Warners	West Fork of San Luis Rey
1912					
July	#15	#51	51.5	0	0
August	#7	#7	24.2	0	0
September	#8	#8	25.7	0	0
October	#13	#17	43.2	0	#20
November	#14	#19	47.0	0	#30
December	#16	#38	55.0	0	#40
1913					
January	20.9	47.	61.5	60.	61.
February	64.3	82.	76.1	203.	555.
March	78.8	165.	110.	80.	763.
April	30.4	112.	80.4	52.4	337.
May	17.2	40.	57.4	44.	80.
June	12.0	15.	40.0		
Total	296.6	581.	672.0		

Estimated.

PRELIMINARY TABLE OF STREAM FLOW.

AROUND WARNER'S RANCH.

Second-feet.

	Carrizo Creek	Susanna Creek	Matagual Creek	San Taylors Buena Vista Cr.	San Ysidro Creek	Canada Verde (Eagle N.)	Canada Agua Caliente	Agua Caliente Creek	Puerto Cruz Creek	Rincon Creek	San Luis Rey River at Warner's Dam.
1912											
July	-	-	.8	-	-	-	.3	-	0	-	1.8
August	-	-	.4	-	-	-	.3	-	0	-	1.4
Sept	-	-	.4	-	-	-	.3	-	0	-	1.4
October	-	-	.7	-	-	-	.3	-	0	-	3.4
November	-	-	.8	-	-	-	.3	-	0	-	2.2
December	-	-	.9	-	-	-	.3	-	0	-	2.2
1913											
January	.4	-	1.0	-	-	.5	.3	-	.9	.9	7.2
February	1.0	1.2	1.2	.4	-	1.0	.5	-	1.0	2.0	36.2
March	.7	2.8	1.7	.3	-	1.5	.5	-	1.2	15.0	28.6
April	.4	2.2	1.3	.2	-	1.0	.3	-	.9	7.	-
May											
June											

Agua Tibia Spring = .07 Second-feet.

Total Area of Warner's Rancho per assessment lists of County Assessor's = 43,283 Acres.

FILE
Eng Data.

PRELIMINARY TABLE OF STREAM FLOW.

AROUND WARNER'S RANCH.

Second-feet.

	Carrizo Creek	Susanna Creek	Matagual Creek	Sam Taylors Buena Vista Cr.	San Ysidro Creek	Canada Verde (Legle N.)	Canada Agua Caliente	Agua Caliente Creek	Puerto Cruz Creek	Rincon Creek	San Luis Rey River at Warner's Dam.
<u>1912</u>											
July	-	-	.8	-	-	-	.3	-	0	-	1.3
August	-	-	.4	-	-	-	.3	-	0	-	1.4
Sept	-	-	.4	-	-	-	.3	-	0	-	1.4
October	-	-	.7	-	-	-	.3	-	0	-	3.4
November	-	-	.8	-	-	-	.3	-	0	-	2.2
December	-	-	.9	-	-	-	.3	-	0	-	2.2
<u>1913</u>											
January	.4	-	1.0	-	-	.5	.3	-	.9	.9	7.2
February	1.0	1.2	1.2	.4	-	1.0	.5	-	1.0	2.0	36.2
March	.7	2.8	1.7	.3	-	1.5	.5	-	1.2	15.0	28.6
April	.4	2.2	1.3	.2	-	1.0	.3	-	.9	7.	-
May											
June											

Agua Tibia Spring = .07 Second-feet.

Total Area of Warner's Rancho per assessment
lists of County Assessor's = 43,283 Acres.

DATA FOR MASS CURVE.

San Luis Rey River.

Area 210 sq.mi.

at Warners Dam

1880-81 to 1912-13.

Season	% of Normal Rainfall	Runoff per sq.mi. from Runoff curve	Total Ac.ft. Runoff Gross yield	Accumulation Gross runoff Acre-feet.
1880-81	84	90	18500	18500
81-82	85	15	3200	21700
82-83	77	10	2100	23800
83-84	238	1200	252000	275800
84-85	73	50	10500	286300
85-86	154	300	63000	349300
86-87	72	50	10500	359800
87-88	99	35	7300	367100
88-89	128	340	71400	438500
89-90	153	560	117600	556100
1890-91	123	300	96000	652100
91-92	87	100	21000	673100
92-93	106	50	10500	683600
93-94	63	30	6300	689900
94-95	130	140	29400	719300
95-96	57	20	4200	723500
96-97	109	60	12600	736100
97-98	59	20	4200	740300
98-99	54	5	1000	741300
99-00	72	10	2100	743400
1900-01	97	30	6300	749700
01-02	76	10	2100	751800
02-03	113	45	9500	761300
03-04	52	10	2100	763400
04-05	148	250	52500	815900
05-06	156	319	66957+	882857
06-07	116	250	52500	935357
07-08	88	100	21000	956357
08-09	111	40	8400	964757
09-10	98	160	33600	998357
1910-11	103	170	35700	1034057
11-12	98	56+	11723+	1045780
12-13	71	29+	6049+	1051829

+ = Actual Measurements.

Mean for 33 years 31,873 Acre-feet.
Mean for 33 years 152 Acre-feet per square mile.

Data for Mass Curve - Danbury Dam - Warner Dam
 Accumulated by months

Months	← close up →	1905-06 ac-ft	1911-12 ac-ft	1912-13 ac-ft
7 July 1 -		815900	11034057	1045780
		168	108	109
8 Aug 1	"	816068	11034165	1045889
		123	72	88
9 Sept		816191	11034237	1045977
		104	101	83
10 Oct 1		816295	11034338	1046060
		131	78	209
11 Nov 1		816426	11034416	1046269
		750	91	117
12 Dec 1		817176	11034507	1046386
		446	182	138
1 Jan 1 -	188	817622	11034689	1046524
		778	248	443
2 Feb 1		818400	11034937	1046967
		2511	191	2008
3 Mar		820911	11035128	1048975
		47012	4850	1758
4 Apr		867923	11039978	1050733
		10343	4270	744
5 May		878266	11044248	1051477
		2921	1350	252
6 June 1		884187	11045598	1051729
		1670	182	100
7		882857	11045780	1051829

by year

Warner Watershed Planimeter Computations

Rainfall 1912-13

$$36 \text{ sq mi} = 06.10 \text{ (1)}$$

$$1210 \text{ (2)}$$

$$\frac{31820 + 3}{1210} = 06.06$$

$$\frac{36}{06.06} = \frac{\text{Area}}{\text{Plan}} \quad \text{sq mi Area} = \frac{\text{Corrected}}{.06} \times \text{Plan Reading} - \text{Formula}$$

inches	Plan	Area	Mean Rain
52	0840	52 x 8.5 = 442	
98	1612	98 x 12.5 = 1225	
18	0290	18 x 17.5 = 315	
26	0412	26 x 22.5 = 585	
9.5	0976	9.5 x 27.5 = 261	
5.5	0035	5.5 x 32 = 176	
1	0038	1 x 37.5 = 38	
210 Tot.		3042 ÷ 210	

Theo. - Mean Rain over Warner's 210sqmi = 14.5 inches

Plan .1815 = 109 sq mi Santa Isabel
 Warner's Dam off 6048, 1912-13
 sq mi = 28.8 ac-ft
 Coords [14.5, 28.8]

Plan	Area	Mean Rain
Bet. 10 & 15	0205	12.5 x 13.5 = 168
" 15 & 20	0668	40.1 x 17.5 = 702
20 & 25	0584	35.2 x 22.8 = 803
25 & 30	0295	17.7 x 27 = 478
30 & 35	0070	7.2 x 31.5 = 228
	109.7	2287 ÷ 110

Mean rain over S. Isabel's 110sqmi = 20.8 Mean

Dam off 6100 ac-ft. 1912-13
 " sq mi = 55.4 ac-ft
 Coordinates [20.8, 55.4]

San Diego, Cal.
July 26, 1912.

Mr. Wm. G. Henshaw,
C/o Ed. Fletcher Co.
San Diego, Cal.

Dear Sir:

Replying to your inquiry for a comparison of the
the drainage output of Warner's dam and Moreno Dam,
the following contains all the data in my possession.

Warner Dam

Drainage Area	210 sq/ miles
Runoff-1911-12 July to July	12808 Acre-ft.
Runoff per sq.mi.	60 " "
Mean Rainfall, prelim. figure, 1911-12	14.4 inches
Normal rainfall, prelim. figure	20. "
% of 1911-12 to normal	72%

Moreno Dam

Drainage Area	135 sq.miles.
Runoff 19 11- 12, taken as total stored water in Moreno Dam, published height June 25, 55 ft/7in and stated to store 1,000,000,000 gals	3360 Acre-ft
Runoff per sq/mile	17 " "
Normal rainfall, average 5 years, all of Cotton- wood and Pine V. Creek O'Shaughnessy	21.5 inches
Rainfall, 1911-12, ditto using same %72 above	15.6

Comparative Run*off, Jan. 1 to May 20 1912.

	Morena Dam	Cuyamaca Dam	Santa Ysabel	San Luis Rey
Watershed sq.miles	135	12	117	210
Gage of Reservoir	82.5	23' 8 3/8"		
Acre-ft. stored or Runoff	3364	3056	10,710	10,360
Runoff per sq.mile	29	255	92	50

Conditions of streams May 18-20, 1912.

Estimated or observed

		Sq. miles
Morena	1 sec.ft.	XXXX 135
Barrett	6 " "	260
San Diego River	33 " " at Diverting Dam	100
Santa Ysabel	87 " " at Suntherland	70
Ban Luis Rey	16 " " at Warner's Dam	210

My copy in Los Angeles

incomplete

San Diego, Calif., July 29, 1912.

Mr. Ed Fletcher,
San Diego, Calif.

Dear Sir:

Referring to your inquiry as to the correctness of an application of same hydrantic constants, on the Cottonwood System to the Warner and Santa Ysabel Systems, and thereby concluding that the power available at Werners is 2600 K. W., I furnish herewith all the measurements for comparison.

To avoid confusion of this matter of gagings, the only data presented by Mr. O'Shanghnesy in his report to Byllesby and Company is data which is already published on the Cottonwood by the U. S. Geological Survey and has no more authority and is no better or worse than any other except as the gaging station may be better.

The exceptionally fine opportunity to determine "net run-off", that is "run-off less evaporation" by using resevoir quantities at Morema Dam is withheld. As far as possible we furnish it for 1911-12 in the following comparison.

July 24, 1917
August 8, 1917

Col. Ed Fletcher,
Office.
Dear Sir:-

The following statement is in answer to your inquiry of July 21st.

<u>Reservoir</u>	<u>Height</u>	<u>Elevation of Top Contour</u>	<u>Outlet Elevation</u>	<u>Acres Flooded</u>	<u>Capacity</u>	
					<u>Acres</u>	<u>Million Gallons</u>
Warner	107	2727	2644	6080	203,140	66,193
Sutherland	190	2115	1930	797	56,900	18,540
Pamo	156	1006	890	1050	47,500	15,480

T. P. Ellis.

TPE:K

SUMMARY OF STREAM GAGINGS.

July 1st, 1912 to June 30th, 1913.

July 14, 1913.

AROUND WARNERS RANCH.

Month	Carrizo Creek	Susanna Creek	Matagual Creek	San Luis Rey near Warners	West Fork of San Luis Rey
<u>1912</u>					
July	#15	#31	51.5	0	0
August	# 7	# 7	24.2	0	0
September	# 8	# 8	25.7	0	0
October	#13	#17	43.2	0	#20
November	#14	#19	47.0	0	#30
December	#16	#38	55.0	0	#40
<u>1913</u>					
January	20.9	47.	61.5	60.	61.
February	64.3	82.	76.1	203.	555.
March	78.8	165.	110.	80.	763.
April	30.4	112.	80.4	52.4	337.
May	17.2	40.	57.4	44.	80.
June	12.0	15.	40.0		
Total	296.6	581.	672.0		

Estimated.

VOLCAN LAND & WATER COMPANY

WARNER RESERVOIR CAPACITIES

July 17, 1917

Contour U.S.G.S.	Depth	Acres Flooded	Total Acre Feet
2620	0	0	0
2630	10	17	58
2640	20	58	433
2650	30	260	2,023
2660	40	875	7,698
2670	50	1,405	19,098
2680	60	1,822	35,233
2690	70	2,300	55,845
2700	80	2,960	82,745
2710	90	4,010	116,995
2715	95	4,560	138,420
2720	100	5,340	163,170
2727	107	6,080	203,140

MATAQUAL.

Day	July	August	Sept.	Oct.	Nov.	Dec.
1	1.4	.40	.85	0.3	.8	1.0
2	1.4	.40	.78	.3	.8	1.0
3	1.3	.39	.72	.3	.8	.9
4	1.133	.39	.66	.3	.8	.9
5	1.3	.39	.60	.3	.8	.9
6	1.2	.38	.55	.3	.8	.9
7	1.2	.38	.51	.8	.8	.9
8	1.2	.38	.47	.8	.8	.9
9	1.1	.37	.43	.8	.8	.9
10	1.1	.37	.40	.8	.8	.9
11	1.1	.37	.40	.8	.8	.9
12	1.0	.36	.39	.8	.8	.9
13	1.0	.36	.39	.8	.8	.9
14	0.9	.36	.38	.8	.8	.9
15	0.8	.35	.38	.8	.8	.9
16	0.8	.35	.37	.8	.8	.9
17	0.7	.33	.37	.8	.8	.9
18	0.7	.31	.36	.8	.8	.9
19	0.6	.28	.36	.8	.8	.9
20	0.54	.26	.35	.8	.8	.9
21	0.5	.25	.35	.8	.8	.9
22	0.5	.24	.34	.8	.8	.9
23	0.5	.23	.34	.8	.8	.9
24	0.5	.22	.33	.8	.8	.9
25	0.5	.22	.33	.8	.8	.9
26	0.5	.21	.32	.8	.8	.8
27	0.5	.21	.32	.8	.8	.8
28	0.5	.86	.31	.8	.8	.8
29	0.5	.86	.31	.8	.8	.8
30	0.4	.86	.30	.8	1.10	.8
31	0.4	.86		.8		.8
TOTAL	26.0	12.20	12.97	21.8	2.42	27.5
Mean	0.84	.39	.43	.703	.8	.89
Acres Ft.	51.5	24.2	25.7	43.2	47.7	55.55

Matagual continued.(2)

Day	January		February		March	
	Gage Height	Discharge	Gage Height	Discharge	Gage Height	Discharge
1		(.9)	.33	.98		(2.38)
2		(.9)		(1.00)		(2.32)
3	.29	.90		(1.02)		(2.26)
4		(.9)		(1.04)		(2.19)
5		(.91)		(1.06)		(2.13)
6		(.91)		(1.08)		(2.06)
7		(.92)		(1.10)		(2.00)
8		(.92)	.30	(1.12)		(1.93)
9	.31	.93		(1.10)		(1.86)
10		(.93)		(1.08)		(1.80)
11		(.93)		(1.06)		(1.73)
12		(.94)		(1.04)		(1.67)
13		(.94)		(1.02)	.44	(1.61)
14	.31	.95	.33	1.01		(1.61)
15		(1.00)		(1.02)		(1.61)
16		(1.05)		(1.03)		(1.62)
17		(1.10)		(1.04)		(1.62)
18		(1.15)		(1.05)		(1.62)
19	.38	1.19	.34	1.06		(1.63)
20		(1.16)		(1.28)		(1.63)
21		(1.13)		(1.50)	.41	1.63
22		(1.10)		(1.72)		(1.641)
23		(1.07)		(1.94)		(1.65)
24	.33	1.05		(2.16)		(1.06)
25		(1.04)		(2.38)		(1.67)
26		(1.03)	.52	2.58		(1.68)
27		(1.02)		(2.52)	.42	(1.68)
28		(1.01)		(2.45)		(1.68)
29		(1.00)				(1.59)
30		(.99)				(1.69)
31		(.98)				(1.70)
Total		30.95		38.44		55.66
Mean		1.00		1.37		1.79
Acres Ft.		61.5		76.1		110.

Matagual continued (3)

Day	April		May		June	
	Gage Height	Discharge	Gage Height	Discharge	Gage Height	Discharge
1		(1.70)		(1.27)		(.78)
2	.41	(1.70)		(1.25)		(1.76)
3		(1.65)		(1.24)		(.74)
4		(1.60)		(1.23)		(.71)
5		(1.55)		(1.21)	.23	(.69)
6		(1.50)	.32	(1.19)		(.72)
7		(1.45)		(1.14)		(.74)
8		(1.40)		(1.09)		(.77)
9		(1.35)		(1.05)	.25	.79
10		(1.30)	.30	1.00		(.78)
11	.35	1.24		(.99)		(.77)
12		(1.24)		(.97)		(.77)
13		(1.25)		(.96)		(.76)
14		(1.25)		(.94)		(.76)
15		(1.25)		(.93)	.25	.75
16		(1.26)		(.91)		(.69)
17		(1.26)		(.90)		(.63)
18		(1.26)		(.89)		(.57)
19		(1.27)		(.87)	.20	(.51)
20		(1.27)		(.85)	.20	(.45)
21		(1.27)		(.83)		(.50)
22		(1.28)	.25	(.81)		(.55)
23		(1.28)		(.81)		(.60)
24		(1.28)		(.81)		(.64)
25		(1.29)		(.81)		(.69)
26		(1.29)		(.81)		(.63)
27		(1.29)		(.81)	.27	.77
28		(1.30)		(.81)		.7
29	.32	1.30	.23	(.81)		.6
30		(1.28)		(.81)		.5
31						
TOTAL		40.61		29.00		20.32
Mean		1.35		.97		.68
Acres Ft.		80.4		57.4		40.40

Matagual continued (4)

Day	July		August		Sept.		Oct.	
	Gage Height	Discharge	Gage Height	Discharge	Gage Height	Discharge	Gage Height	Discharge
1		(.3)		(.4)	.18	.37		
2	.18	.30		(.4)		(.37)		
3		(.3)		(.4)		(.37)	.18	.4
4		(.3)		(.4)		(.37)		
5		(.3)		(.4)		(.37)		
6		(.3)		(.5)		(.3)	.19	.4
7		(.3)		(.5)		(.3)		
8	.17	.26	.24	.70		(.3)		
9		(.3)		(.7)	.17	.30		
10		(.3)		(.6)		(.3)		
11		(.2)		(.5)		(.3)		
12		(.2)		(.4)		(.3)		
13		(.2)		(.3)		(.3)		
14		(.2)		(.3)		(.3)	.16	.3
15		(.2)		(.3)		(.3)		
16		(.2)		(.3)		(.3)		
17		(.2)		(.3)		(.3)		
18	.13	.18		(.3)		(.3)		
19		(.2)		(.3)		(.3)		
20		(.2)		(.3)		(.3)		
21		(.2)	.17	.27		(.2)	.19	.4
22		(.2)		(.3)		(.2)		
23	.16	.23		(.3)	.16	.2		
24		(.3)	.15	.26		(.2)		
25		(.3)		(.3)		(.2)		
26	.18	.44		(.3)		(.3)		
27		(.4)	.17	(.3)		(.3)		
28		(.4)		(.3)		(.3)		
29		(.4)		(.3)	.17	.34	.19	.4
30		(.4)		(.3)		(.3)		
31		(.4)		(.3)				
Total		28.6		11.6		8.85		
Mean		.28		.37		.29		
Acres Ft.		17.0		23.0		17.5		

Table No. 8

MASS TABULATION FOR WARNER'S RESERVOIR

DOMESTIC USE

Reservoir Capacity = 200,000 acre feet.

Draft ----- = 24,750 acre feet per annum at the rate of 9,900 acre feet from October to March inclusive, and 14,850 acre feet from April to September inclusive.

Initial draft 10% of total, increasing uniformly and reaching 100% in 10 years.

Season	OCTOBER 1st to MARCH 31st			APRIL 1st			Mean Area Water Surface Acres	Evaporation less 90% of rainfall Feet	Total Adjusted Withdrawals Ac.Ft.	Net Additions of Reservoir		Released for Escondido Ac.Ft.	Mean Area Water Surface Acres	Evapo less Ra Feet	
	Reservoir Oct. 1 Ac. Ft.	Runoff Ac.Ft.	Draft Ac.Ft.	Reservoir Ac. Ft.	Waste Ac.Ft.	Reservoir : Apr. 1 Ac.Ft.				Runoff Ac.Ft.	Draft Ac.Ft.				
1888-89	50,000	19,600	990	2,400	+ .48	+ 1,150	+ 151	+ 19,760	0	69,769	8,600	1,485	0	2,700	- 2.28
89-90	71,555	32,200	1,980	3,100	+ .86	+ 2,670	+ 690	+ 32,890		104,445	14,000	2,970	0	3,700	- 2.18
90-91	110,055	36,050	2,970	4,350	+ .69	+ 3,000	+ 30	+ 36,080		146,135	15,650	4,555	0	4,850	- 2.23
91-92	149,180	15,050	3,960	5,050	+ .07	+ 354	- 3606	+ 11,444		160,624	6,650	5,940	0	5,100	- 2.40
92-93	151,884	22,220	4,950	5,200	+ .18	+ 935	- 4015	+ 18,205		170,089	9,730	7,425	0	5,350	- 2.37
93-94	162,444	11,030	5,940	5,300	- .24	- 1,270	- 7210	+ 3,820		166,264	4,920	8,910	960	5,200	- 2.49
94-95	151,114	69,800	6,930	5,550	+ .51	+ 2,830	- 4100	+ 65,700	16,814	200,000	30,120	10,395	0	6,100	- 2.28
95-96	200,000	5,430	7,920	6,050	- .38	- 2,300	- 10220	- 4,790	0	195,210	2,510	11,880	1,900	5,750	- 2.53
96-97	172,140	17,150	8,910	5,550	+ .28	+ 1,550	- 8910	+ 9,790		181,930	7,550	13,365	460	5,500	- 2.34
97-98	165,505	2,930	9,900	5,250	- .38	- 1,990	- 11890	- 8,960		156,545	1,450	14,850	2,450	4,800	- 2.53
98-99	131,295	2,230	9,900	4,300	- .47	- 2,020	- 11920	- 9,690		121,605	1,160	14,850	1,350	3,850	- 2.56
99-00	99,445	11,960	9,900	3,400	- .21	- 715	- 10615	- 8,655		90,790	1,040	14,850	720	2,900	- 2.48
1900-01	71,110	29,700	9,900	2,700	+ .06	+ 162	- 9900	- 38		71,072	4,360	14,850	1,050	2,400	- 2.41
01-02	55,412	6,820	9,900	2,250	- .18	- 405	- 10305	- 3,485		51,927	3,130	14,850	1,500	2,000	- 2.47
02-03	35,187	10,930	9,900	1,800	+ .27	+ 486	- 9900	+ 1,516		36,703	4,890	14,850	400	1,700	- 2.35
03-04	23,553	4,400	9,900	1,450	- .49	- 711	- 10611	- 6,211		17,342	2,080	14,850	1,500	1,050	- 2.56
04-05	1,242	19,570	9,900	680	+ .73	+ 496	- 9900	+ 10,166		11,408	8,580	14,850	0	710	- 2.22
05-06	4,058	47,890	9,900	1,550	+ .80	+ 1,240	- 9900	+ 39,230		43,288	20,720	14,850	0	2,050	- 2.20
06-07	46,078	36,860	9,900	2,400	+ .35	+ 840	- 9900	+ 27,800		73,878	16,000	14,850	0	2,700	- 2.32
07-08	70,628	12,760	9,900	2,700	- .07	- 189	- 10089	+ 2,671		73,299	5,670	14,850	0	2,550	- 2.44
08-09	59,639	23,400	9,900	2,580	+ .30	+ 774	- 9900	+ 14,314		73,953	10,230	14,850	0	2,650	- 2.34
09-10	64,943	21,980	9,900	2,700	+ .06	+ 162	- 9900	+ 12,242		77,185	9,620	14,850	0	2,750	- 2.41
1910-11	67,185	15,160	9,900	2,700	+ .15	+ 405	- 9900	+ 5,665		72,850	6,700	14,850	0	2,600	- 2.37
11-12	60,310	8,770	9,900	2,350	- .21	- 494	- 10394	- 1,624		58,686	3,960	14,850	830	2,200	- 2.32
12-13	43,396	4,140	9,900	1,950	- .15	- 292	- 10192	- 6,052		37,344	1,770	14,850	2,030	1,650	- 2.50
13-14	19,314	15,840	9,900	1,500	+ .32	+ 480	- 9900	+ 6,420		25,734	6,790	14,850	460	1,450	- 2.51
14-15	14,574	42,310	9,900	1,750	+ .71	+ 560	- 9900	+ 32,970		47,544	18,130	14,850	0	2,100	- 2.12
15-16	47,854	174,542	9,900	4,250	+ .86	+ 3,655	- 9900	+ 168,297	16,151	200,000	7,526	14,850	0	5,800	- 2.18

R C H 31st A P R I L 1st 1 to S E P T E M B E R 30th													
ons of	Reservoir				Released	Mean Area	Evaporation	Conserved	Total	Net Additions	Reservoir		
from	: Apr. 1				for	Water	less 90% of	Evapora-	Adjusted	or Deductions	Oct. 1		
Waste	Runoff	Draft	Escondido	Surface	Rainfall	Acres	tion	withdrawals	from Reservoir	Waste	Ac.Ft.	Season	
Ac.Ft.	Ac.Ft.	Ac.Ft.	Ac.Ft.	Ac.Ft.	Ac.Ft.	Acres	Acres Feet	Ac.Ft.	Ac. Ft.	Ac. Ft.	Ac.Ft.		
0	69,769	8,600	1,485	0	2,700	- 2.28	- 6,150	+ 1,830	- 5,805	+ 1,795	0	71,555	1888-89
	104,445	14,000	2,970	0	3,700	- 2.18	- 8,080	+ 2,660	- 8,390	+ 5,610		110,055	89-90
	146,135	15,650	4,555	0	4,850	- 2.23	- 10,800	+ 2,750	- 12,605	+ 3,045		149,180	90-91
	160,624	6,650	5,940	0	5,100	- 2.40	- 12,200	+ 2,750	- 15,390	- 8,740		151,884	91-92
	170,089	9,730	7,425	0	5,350	- 2.37	- 12,700	+ 2,750	- 17,375	- 7,645		162,444	92-93
	166,264	4,920	8,910	960	5,200	- 2.49	- 12,950	+ 2,750	- 20,070	- 15,150		151,114	93-94
16,814	200,000	30,120	10,395	0	6,100	- 2.28	- 13,900	+ 2,750	- 21,545	+ 8,575	8,575	200,000	94-95
0	195,210	2,510	11,880	1,900	5,750	- 2.53	- 14,550	+ 2,750	- 25,580	- 23,070		172,140	95-96
	181,930	7,550	13,365	460	5,500	- 2.34	- 12,900	+ 2,750	- 23,975	- 16,425		165,505	96-97
	156,545	1,450	14,850	2,450	4,800	- 2.53	- 12,150	+ 2,750	- 26,700	- 25,250		131,295	97-98
	121,605	1,160	14,850	1,350	3,850	- 2.56	- 9,870	+ 2,750	- 23,320	- 22,160		99,445	98-99
	90,790	1,040	14,850	720	2,900	- 2.48	- 7,200	+ 2,050	- 20,720	- 19,680		771,110	99-00
	71,072	4,360	14,850	1,050	2,400	- 2.41	- 5,780	+ 1,660	- 20,020	- 15,660		55,412	1900-01
	51,927	3,130	14,850	1,500	2,000	- 2.47	- 4,950	+ 1,430	- 19,870	- 16,740		35,187	01-02
	36,703	4,890	14,850	400	1,700	- 2.35	- 4,000	+ 1,210	- 18,040	- 13,150		23,553	02-03
	17,342	2,080	14,850	1,500	1,050	- 2.56	- 2,690	+ 860	- 18,180	- 16,100		1,242	03-04
	11,408	8,580	14,850	0	710	- 2.22	- 1,780	+ 700	- 15,930	- 7,350		4,058	04-05
	43,288	20,720	14,850	0	2,050	- 2.20	- 4,520	+ 1,440	- 17,930	+ 2,790		46,078	05-06
	73,878	16,000	14,850	0	2,700	- 2.32	- 6,260	+ 1,860	- 19,250	- 3,250		70,628	06-07
	73,299	5,670	14,850	0	2,550	- 2.44	- 6,230	+ 1,750	- 19,330	- 13,660		59,639	07-08
	73,953	10,230	14,850	0	2,650	- 2.34	- 6,200	+ 1,810	- 19,240	- 9,010		64,943	08-09
	77,185	9,620	14,850	0	2,750	- 2.41	- 6,650	+ 1,880	- 19,620	- 10,000		67,185	09-10
	72,850	6,700	14,850	0	2,600	- 2.37	- 6,170	+ 1,780	- 19,240	- 12,540		60,310	10-11
	58,686	3,960	14,850	830	2,200	- 2.32	- 5,100	+ 1,530	- 19,250	- 15,290		43,396	11-12
	37,344	1,770	14,850	2,030	1,650	- 2.50	- 4,150	+ 1,230	- 19,800	- 18,030		19,314	12-13
	25,734	6,790	14,850	460	1,450	- 2.51	- 3,640	+ 1,000	- 17,950	- 11,160		14,574	13-14
	47,544	18,130	14,850	0	2,100	- 2.12	- 4,450	+ 1,480	- 17,820	+ 310		47,854	14-15
16,151	200,000	7,526	14,850	0	5,800	- 2.18	- 12,644	+ 2,750	- 24,744	- 17,218	0	182,782	15-16

Table No. 9

MASS TABULATION FOR WARNER'S RESERVOIR

IRRIGATION USE

Reservoir capacity = 200,000 acre feet.
 Draft ----- = 28,000 acre feet per annum at the
 rate of 9,300 acre feet from October to March inclusive, and 18,700
 acre feet from April to September inclusive.
 Initial draft 10% of total, increasing uniformly and
 reaching 100% in 10 years.

..... O C T O B E R 1st to M A R C H 31 to														
Season	Reservoir Oct. 1 Ac.Ft.	Runoff Ad.Ft.	Draft Ac.Ft.	Mean Area Water Surface Acres	Evaporation Less 90% of Rainfall Ft.	Ac.Ft.	Total Adjusted Withdrawals Ac.Ft.	Net Additions or Deductions from Reservoir Ac. Ft.	Waste	:: Reservoir Apr. 1 Ac. Ft.	Runoff Ac.Ft.	Draft	Released for Escondido Ac. Ft.	Mean Area Water Surface Acres
1888-89	50,000	19,6000	930	2,400	+ .48	+ 1,152	+ 222	+ 19,822	0	:: 69,822	8,600	1,870	0	2,650
89-90	72,222	32,200	1,860	3,150	+ .86	+ 2,702	+ 842	+ 33,040	0	:: 105,264	14,000	3,740	0	3,800
90-91	109,994	36,050	2,790	4,170	+ .69	+ 2,880	+ 90	+ 36,140	0	:: 146,134	15,650	5,610	0	4,800
91-92	148,224	15,050	3,720	5,200	+ .07	+ 364	- 3,356	+ 11,694	0	:: 159,918	6,650	7,480	0	5,050
92-93	149,738	22,220	4,650	5,180	+ .18	+ 933	- 3,717	+ 18,503	0	:: 168,241	9,730	9,350	0	5,300
93-94	158,801	11,030	5,580	5,200	- .24	- 1,250	- 6,830	+ 4,200	0	:: 163,001	4,920	11,220	960	5,050
94-95	145,891	69,800	6,510	5,500	+ .51	+ 2,800	- 3,710	+ 66,090	11,981	:: 200,000	30,120	13,090	0	6,100
95-96	200,000	5,430	7,440	6,050	- .38	- 2,300	- 9,740	- 4,310	0	:: 195,690	2,510	14,960	1,900	5,700
96-97	159,690	17,150	8,370	5,550	+ .28	+ 1,550	- 6,820	+ 10,330	0	:: 180,020	7,550	16,830	460	5,300
97-98	160,630	2,930	9,300	5,100	- .38	- 1,940	- 11,240	- 8,310	0	:: 152,320	1,450	18,700	2,450	4,550
98-99	123,870	2,230	9,300	4,050	- .47	- 1,900	- 11,200	- 8,970	0	:: 114,900	1,160	18,700	1,550	3,550
99-00	89,360	1,960	9,300	3,050	- .21	- 640	- 9,940	- 7,980	0	:: 81,380	1,040	18,700	720	2,600
1900-01	58,370	9,700	9,300	2,380	+ .06	+ 143	- 9,157	+ 543	0	:: 58,913	4,360	18,700	1,050	2,150
01-02	39,853	66,820	9,300	1,900	- .18	- 342	- 9,642	- 2,822	0	:: 37,031	3,130	18,700	1,500	1,600
02-03	17,171	10,930	9,300	1,360	+ .27	+ 367	- 8,933	+ 1,997	0	:: 19,168	4,890	9,350	400	1,200
03-04	12,408	4,400	4,650	1,020	- .49	- 500	- 5,150	- 750	0	:: 11,658	2,080	9,350	1,500	600
04-05	1,958	19,570	9,300	750	+ .73	+ 548	- 8,752	+ 10,818	0	:: 12,776	8,580	18,700	0	800
05-06	1,586	47,690	9,300	1,480	+ .80	+ 1,185	- 8,115	+ 39,775		:: 41,361	20,720	18,700	0	1,950
06-07	40,471	36,860	9,300	2,250	+ .35	+ 778	- 8,522	+ 28,338		:: 68,809	16,000	18,700	0	2,550
07-08	61,929	12,760	9,300	2,500	- .07	- 175	- 9,475	+ 3,285		:: 65,214	5,670	18,700	0	2,500
08-09	48,184	23,440	9,300	2,300	+ .30	+ 690	- 8,610	+ 14,830		:: 63,014	10,230	18,700	0	2,300
09-10	50,764	21,890	9,300	2,350	+ .06	+ 141	- 9,159	+ 12,731		:: 63,495	9,620	18,700	0	2,350
10-11	50,365	15,160	9,300	2,200	+ .15	+ 330	- 8,970	+ 6,190		:: 56,555	6,700	18,700	0	2,120
11-12	41,025	8,770	9,300	1,950	- .21	- 410	- 9,710	- 350		:: 40,085	3,960	18,700	830	1,800
12-13	21,555	4,140	9,300	1,400	- .15	- 210	- 9,510	- 5,370		:: 16,185	1,770	9,350	2,030	950
13-14	4,985	15,840	4,650	980	+ .32	+ 314	- 4,336	+ 11,504		:: 16,489	6,790	18,700	460	850
14-15	2,729	42,310	9,300	1,450	+ .71	+ 1,030	- 8,270	+ 34,040		:: 36,769	18,130	18,700	0	1,800
15-16	33,669	174,542	9,300	4,050	+ .86	+ 3,483	- 5,817	+ 168,725	2,394	:: 200,000	7,526	18,700	0	6,000

..... to September 30th													
Reservoir	Waste	Reservoir	Runoff	Draft	Released for Escondido	Mean Area Surface	Evaporation Less 90% of Rainfall	Conserved Evaporation	Total Adjusted Withdrawals	Net Additions or Deductions from Reservoir	Waste	Reservoir	Season
Ac. Ft.	Ac. Ft.	Ac. Ft.	Ac. Ft.	Ac. Ft.	Ac. Ft.	Acres	Ft. Ac. Ft.	Ac. Ft.	Ac. Ft.	Ac. Ft.	Ac. Ft.	Ac. Ft.	
22	0	:: 69,822	8,600	1,870	0	2,650	-2.28 -6150	+ 1,820	- 6,200	+ 2,400	0	72,222	1888-89
40	0	:: 105,264	14,000	3,740	0	3,800	-2.18 -8280	+ 2,750	- 9,270	+ 4,730	0	109,994	89-90
40	0	:: 146,134	15,650	5,610	0	4,800	-2.23 -10700	+ 2,750	- 13,560	+ 2,090	0	148,224	90-91
94	0	:: 159,918	6,650	7,480	0	5,050	-2.40 -12100	+ 2,750	- 16,830	- 10,180	0	149,738	91-92
03	0	:: 168,241	9,730	9,350	0	5,300	-2.37 -12570	+ 2,750	- 19,170	- 9,440	0	158,801	92-93
00	0	:: 163,001	4,920	11,220	960	5,050	-2.49 -12600	+ 2,750	- 22,030	- 17,110	0	145,891	93-94
90	11,981	:: 200,000	30,120	13,090	0	6,100	-2.28 -13900	+ 2,750	- 24,240	+ 5,880	5,880	200,000	94-95
10	0	:: 195,690	2,510	14,960	1,900	5,700	-2.53 -14400	+ 2,750	- 28,510	- 26,000	0	169,690	95-96
30	0	:: 180,020	7,550	16,830	460	5,300	-2.34 -12400	+ 2,750	- 26,940	- 19,390	0	160,630	96-97
10	0	:: 152,320	1,450	18,700	2,450	4,550	-2.53 -11500	+ 2,750	- 29,900	- 28,450	0	123,870	97-98
70	0	:: 114,900	1,160	18,700	1,350	3,550	-2.56 -9100	+ 2,450	- 26,700	- 25,540	0	89,360	98-99
80	0	:: 81,380	1,040	18,700	720	2,600	-2.48 -6450	+ 1,820	- 24,050	- 23,010	0	58,370	99-00
43	0	:: 58,913	4,360	18,700	1,050	2,150	-2.41 -5180	+ 1,510	- 23,420	- 19,060	0	39,853	1900-01
22	0	:: 37,031	3,130	18,700	1,500	1,600	-2.47 -3950	+ 1,160	- 22,990	- 19,860	0	17,171	01-02
97	0	:: 19,168	4,890	9,350	400	1,200	-2.35 -2820	+ 920	- 11,650	- 6,760	0	12,408	02-03
50	0	:: 11,658	2,080	9,350	1,500	600	-2.56 -1530	+ 600	- 11,780	- 9,700	0	1,958	03-04
18	0	:: 12,776	8,580	18,700	0	800	-2.22 -1770	+ 700	- 19,770	- 11,190	0	1,586	04-05
75		:: 41,361	20,720	18,700	0	1,950	-2.20 -4290	+ 1,380	- 21,610	- 890	0	40,471	05-06
38		:: 68,809	16,000	18,700	0	2,550	-2.32 -5920	+ 1,740	- 22,880	- 6,880	0	61,929	06-07
85		:: 65,214	5,670	18,700	0	2,300	-2.44 -5620	+ 1,620	- 22,700	- 17,030	0	48,184	07-08
30		:: 63,014	10,230	18,700	0	2,300	-2.34 -5380	+ 1,600	- 22,480	- 12,250	0	50,764	08-09
31		:: 63,495	9,620	18,700	0	2,350	-2.41 -5670	+ 1,620	- 22,750	- 13,130	0	50,365	09-10
90		:: 56,555	6,700	18,700	0	2,120	-2.37 -5030	+ 1,500	- 22,230	- 15,530	0	41,025	10-11
40		:: 40,085	3,960	18,700	830	1,800	-2.32 -4180	+ 1,220	- 22,490	- 18,530	0	21,555	11-12
70		:: 16,185	1,770	9,350	2,030	950	-2.50 -2380	+ 790	- 12,970	- 11,200	0	4,985	12-13
04		:: 16,489	6,790	18,700	460	850	-2.51 -2330	+ 740	- 20,550	- 13,760	0	2,729	13-14
40		:: 36,769	18,130	18,700	0	1,800	-2.12 -3820	+ 1,290	- 21,230	- 3,100	0	33,669	14-15
25	2,394	:: 200,000	7,526	18,700	0	6,000	-2.18 -13080	+ 2,750	- 29,030	- 21,504	0	178,496	15-16

HYDRAUL

From the papers of Ed Fletcher, the following letters have been removed to the alphabetized correspondence files:

"WARNER'S DAM: HYDRAULICS"

BROWN, WALTER HY to Chickering, Harry, January 24, 1913
HUBER, W. L. to Post, Wm. S., July 3, 1912
POST, WM. S. to Coffin Valve Co., July 20, 1915
TRAENOR, JOHN to Post, Wm. S., November 11, 1913

Ed Fletcher Papers

1870-1955

MSS.81

Box: 50 Folder: 10

**Business Records - Water Companies - Volcan
Land and Water Company - San Dieguito
System - Warner Dam (Lake Henshaw) and
associated projects - Hydraulics and Survey - Notes**



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