

CLASSICAL DANCE

B4

B

TRANSTI

998

19

W68

H. S. CROCKER COMPANY

DRAWING MATERIALS AND
SURVEYING INSTRUMENTS

SAN FRANCISCO

TABLES FOR EXCAVATIONS AND EMBANKMENTS

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING

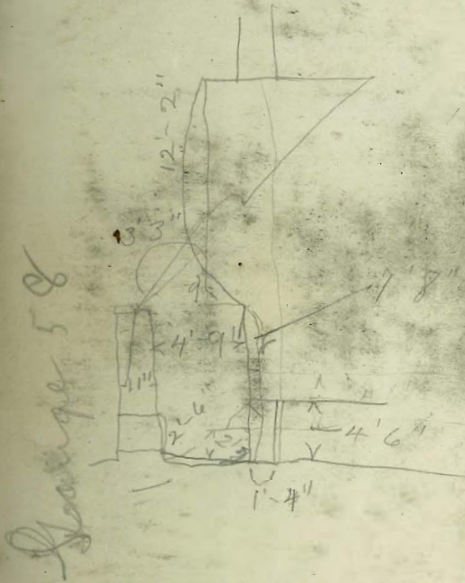
Roadway 18 Feet Wide. Side Slopes 1 to 1.
For Single Track Excavation.

"Copyright, 1895, by Kneffel & Esser Co."

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	0
1	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	1
2	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	2
3	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	3
4	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	4
5	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	5
6	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	6
7	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	7
8	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	8
9	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	9
10	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	10
11	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	11
12	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	12
13	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	13
14	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	14
15	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	15
16	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	16
17	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	17
18	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	18
19	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	19
20	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	20
21	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	21
22	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	22
23	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	23
24	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	24
25	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	25
26	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	26
27	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	27
28	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	28
29	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	29
30	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	30
31	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	31
32	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	32
33	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	33
34	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	34
35	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	35
36	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	36

Calculated by Julian A. Hall, M. Am. Soc. C. E.

2'-5" to W.L.



MICROFILMED

JAN X 8 1965

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MICROFILMED

2001 8 X 1124

10/1/07	Tied Hole #6.			
	Sts.	Width-bob.	Width-top.	
Sta 0	0	7.6	0	Open Cut X Tunnel
.02	5	7.3	.9	
3 1/2	17	5.33	7.5	
3 1/2	6.5	6.2	6.2	
63 2/3	6.5	6.2	6.2	

OK 5 7/2 41

9/10 to 9/30 1907. Job #56.

Cw Ft. Cw Yds.

40.75 41

74.94 22.11.

40.30 1307.

83. 9.2 Yds per day
4.6 " " per man
\$.55 per Yd.
← 9/19/07

48. 4.8 Yds. per day
2.4 " " per man
\$.56 " Yd.

Giant #1	50 #	@ .1625	=	\$ 8.125
" #2	50 #	" .1075	=	5.375
Fine	300	" .005	=	1.50
Caps	200	" .00625	=	1.25
				<u>\$ 16.250</u>

Cost of labor	9/10 to 9/18	=	40.00
" " "	9/19 " 9/30	=	64.00
" " Powder			<u>16.25</u>
			<u>120.25</u>

Ctr. Surr. Measurement of Ditch
between 4S and Johnson Gulch.

4-9-08 2
Wueste
Barrera

12

+91

+67

+29

+25

= 299 + 00 (Wueste 25 Tunnel)

Ditch begins

Intersection with bench

Cope's Mark 5S

11

10

9

8

7

6

+79

+725

+58

+42

= 283 + 50 (Wueste's 25 Tunnel)

Cope's Mark 5N

Intersection with bench

Ditch ends

5

+80

4

3

+85

2

+33

+15

= 283 + 25 (Cope's 25 bench)

Ditch begins

Intersection with bench

Cope's Mark 4S

1

+48

0

Tunnel 5
Condition good

Minol slips

Earth slide 9 yds

Earth slide 8 yds

Clean

500
373
127

+20
28
27
26
+48
25
24 +20
23
+53
22
21
20
19
+85
+22
18
+95
+65
17
+35
16
15
+27
14
13
12 + 01

310 + 25 (Copes 25' bench)

302 + 00 (Copes 25' bench)

299 + 75 (Copes 25' bench)

Ditch begins

Ditch ends

10x8x8 Bldr.

x
x
x
4x5x7 Bldr.

averages
4x5x10 Bldr

+ bad shape
x
6x4x12 Bldr

2 stakes on bank
306+00 306+07

x
x
x
Kiel Mk on Bldr
4x6x10 Boulder ship
10 yard slide

minor partner slips

	+A25	332+00
44		
43		
	+50	
42		
	+40	
41		
40		
	+35	
39		
	+45	
38		
37		
36		
	+36	323+00 (Copes bench)
35		
34		
33		
	+50	
32		
31		
	+56	
30		
	+06	316+75 Copes 25 bench
29		
28	+67	
-		

Little Slips & Washes

2 1/2 x 3 x 4 RR

7 x 2 1/2 x 3 1/2 Bldr.

x 1/3 full

Spine Slips

x

4 x 9 x 5 Bldr & Smollones

1/4 full

5 x 3 x 3 Bldr

60
 59
 58
 +85 = 345+50 coper bench
 57
 56
 55
 54
 +10
 +25 = 340+75 coper bench
 53
 +45
 52
 +09
 51
 +28
 50
 +89
 +81
 +62
 +12 = 336+75 coper bench
 49
 48
 47
 46
 45

Ditch begins

Ditch ends

Ditch begins

Ditch ends

Unim portant slips
 of wood

2 full
 steep disint.
 graded slip

4' back of Stake mked
 340+45

opp stake Phub flume
 begins

opp little stake

opp Stake mked 337+50

Choked

Little slips & v-ditches

388
 212
 507
 173
 538

+70
 +35
 76
 +92
 75
 74
 +85
 +73
 +25
 73
 72
 +545
 71
 70
 69
 68
 +215
 67
 66
 65
 +275
 64
 63
 62
 +85
 61

= 359 + 25

= 355 + 100 Copes

= 352 + 100 Copes bench hub

Ditch begins

End unfinished ditch & cut

Unfinished ditch begins

Cut begins

opposite Kiel MK on Blvd in bank

x $\frac{1}{2}$ full loose RK & debris

opposite Kiel MK on RK

} Ditch apparently never excavated

} Ditch nearly filled up by teams working here

Ditch in fair condition

x 10 x 12 x 15 Blar

86 +0.5

86

+97

85

84

83

82

+74.5

2369+50

81

80

79

78

77

76 +80.5

2364+50

Probable end of ditch

End solid ditch

Kiel mark on opp.

opposite Kiel mark

ditch clean & in good shape

100' line

Ref Pt "

	Vertical centers		man dier west of line	ditto in direction of foot
	normal	reversed		
1	$\frac{1}{16}$	$\frac{6}{16}$	$\frac{7}{32}$	.0182
2	$\frac{1}{2}$	2"	$1\frac{3}{4}$	.1458
3	$2\frac{3}{4}$	$3\frac{3}{8}$	$3\frac{1}{16}$	.2552
4	$2\frac{13}{16}$	$3\frac{7}{16}$	$3\frac{2}{16}$	.2604
5	$4\frac{5}{16}$	$4\frac{15}{16}$	$4\frac{10}{16}$	.3854
6	$3\frac{6}{16}$	$4\frac{6}{16}$	$3\frac{14}{16}$	.3229
7	$1\frac{3}{16}$	$1\frac{3}{4}$	$1\frac{15}{32}$	.1224
8	$\frac{4}{16}$ (East)	$\frac{4}{16}$	$\frac{0}{16}$	.00
9	$1\frac{1}{2}$ (East)	$\frac{3}{4}$ (East)	$1\frac{1}{4}$	.0938

Movement of Moravia Dam 8
 3-20-14 winter - summer
 with Sitz Transier - windy

150'
line
Ref Pt #

Double Center
normal reverse

mean
dist
west of
line

ditto
in
decimals
of foot

mountain of Moma Dam 9
3-10-14 West, Suva, Wendoza
Windy - Litz Transit water 8379

20	8 $\frac{1}{4}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	.6875
19	7	7 $\frac{1}{4}$	7 $\frac{1}{8}$	.5938
18	7 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	.6250
17	6 $\frac{3}{4}$	7	6 $\frac{3}{8}$	.5729
16	7 $\frac{1}{8}$	7 $\frac{3}{8}$	7 $\frac{1}{4}$	.6042
15	7 $\frac{1}{8}$	7 $\frac{1}{2}$	7 $\frac{5}{16}$	.6094
14	8	8 $\frac{1}{8}$	8 $\frac{1}{16}$	.6719
13	8 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$	.7093
12	9	9	9	.7500
11	9	9 $\frac{1}{8}$	9 $\frac{1}{16}$	.7552
10	8 $\frac{3}{4}$	9 $\frac{1}{8}$	8 $\frac{15}{16}$	.7445
9	8 $\frac{1}{2}$	8 $\frac{3}{4}$	8 $\frac{7}{8}$	.7396
8	8 $\frac{3}{4}$	9 $\frac{1}{8}$	8 $\frac{15}{16}$	.7445

7	$9\frac{1}{8}$	$9\frac{1}{4}$	$9\frac{3}{16}$	.7656
6	$9\frac{3}{4}$	$9\frac{3}{4}$	$9\frac{3}{4}$	.9125
5	$9\frac{5}{8}$	$9\frac{1}{4}$	$9\frac{3}{16}$	.7656
4	$8\frac{1}{8}$	$8\frac{1}{4}$	$8\frac{3}{16}$	.6923
3	$8\frac{1}{4}$	$8\frac{1}{2}$	$8\frac{3}{8}$	.6979
2	$8\frac{1}{2}$	$8\frac{1}{2}$	$8\frac{1}{2}$	.7083
1	$8\frac{1}{8}$	$8\frac{1}{4}$	$8\frac{3}{16}$	.6923

Movement of Morona Dam

Leitz transit Water 117.4

Wueste.
Swenson.
Garnier
Dilley

.150' line

10-A-15.

Ref Points

Normal

Reversed

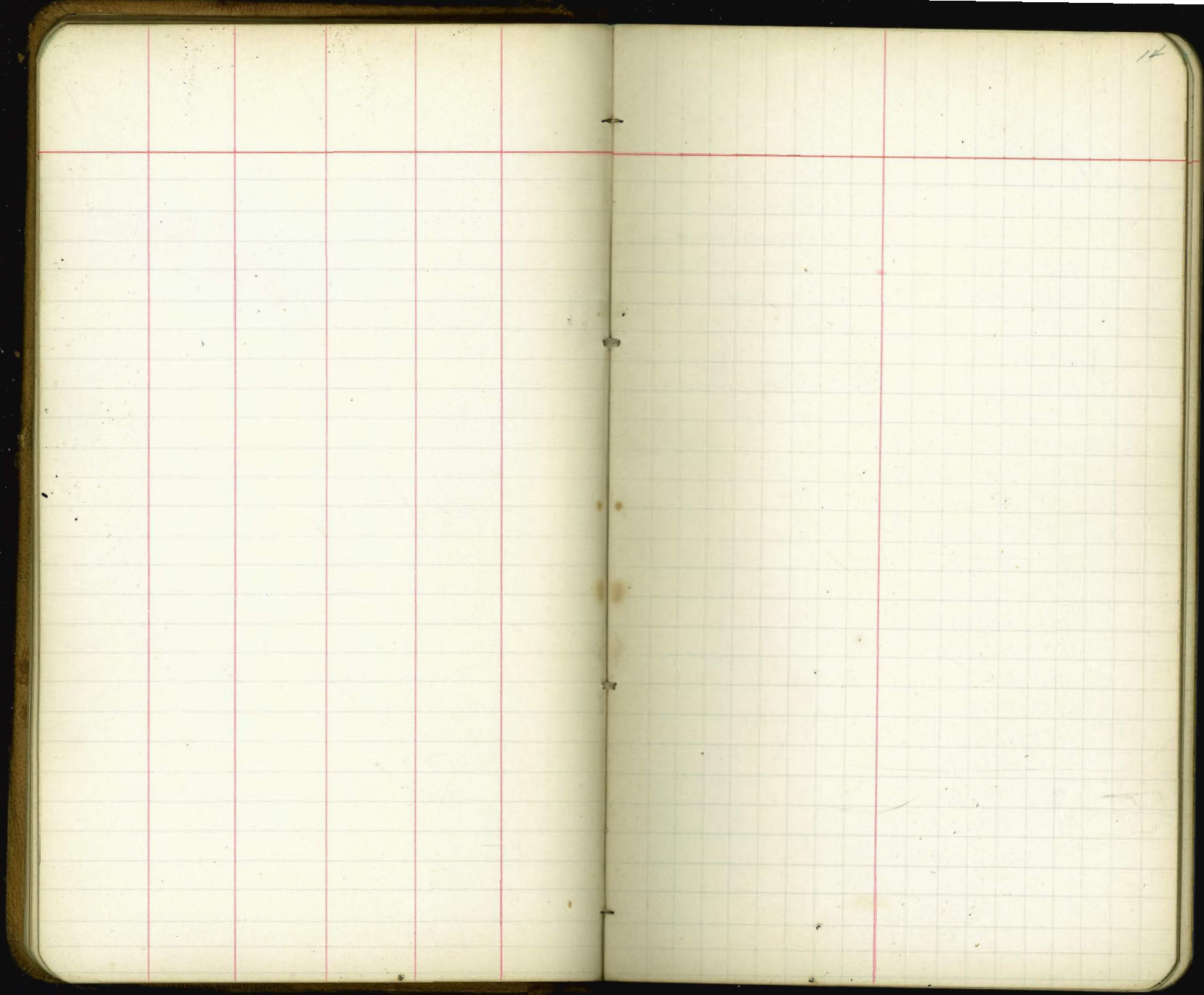
Ref Points	Normal	Reversed		
13	9"	9 $\frac{3}{16}$ "	9 $\frac{3}{32}$ "	.7578
12	9 $\frac{1}{2}$ "	9 $\frac{3}{4}$ "	9 $\frac{5}{8}$ "	.8021
11	9 $\frac{1}{2}$ "	9 $\frac{1}{2}$ "	9 $\frac{1}{2}$ "	.7917
10	9 $\frac{1}{8}$ "	9 $\frac{7}{16}$ "	9 $\frac{9}{32}$ "	.7734
9	9"	9 $\frac{1}{4}$ "	9 $\frac{1}{8}$ "	.7604
8	9 $\frac{3}{8}$ "	9 $\frac{1}{2}$ "	9 $\frac{7}{16}$ "	.7865
7	9 $\frac{1}{2}$ "	9 $\frac{5}{8}$ "	9 $\frac{9}{16}$ "	.7969
6	9 $\frac{15}{16}$ "	10 $\frac{1}{4}$ "	10 $\frac{3}{32}$ "	.8411
5	9 $\frac{1}{16}$ "	9 $\frac{1}{2}$ "	9 $\frac{9}{32}$ "	.7734
4	8 $\frac{1}{8}$ "	8 $\frac{1}{2}$ "	8 $\frac{5}{16}$ "	.6927
3	8 $\frac{1}{16}$ "	8 $\frac{1}{2}$ "	8 $\frac{9}{32}$ "	.6901
2	8 $\frac{1}{4}$ "	8 $\frac{13}{16}$ "	8 $\frac{17}{32}$ "	.7109
1	7 $\frac{7}{8}$ "	8 $\frac{5}{16}$ "	8 $\frac{1}{8}$ "	.6771

Normal Reversed

20	7 ⁹ / ₁₆ "	7 ³ / ₄ "	7 ^{10 1/2} / ₁₆ "	.6380
19	7 ⁵ / ₈ "	7 ¹¹ / ₁₆ "	7 ^{10 1/2} / ₁₆ "	.6380
18	7 ¹ / ₂ "	7 ³ / ₄ "	7 ⁵ / ₈ "	.6354
17	7 ¹ / ₈ "	7 ¹ / ₂ "	7 ⁵ / ₁₆ "	.6094
16	7 ¹ / ₂ "	7 ⁷ / ₈ "	7 ¹¹ / ₁₆ "	.6406
15	7 ¹ / ₂ "	7 ¹³ / ₁₆ "	7 ^{10 1/2} / ₁₆ "	.6380
14	{ 8 ¹ / ₄ " 8 ⁷ / ₁₅ "	{ 8 ⁹ / ₁₆ " 8 ³ / ₈ "	7 ¹ / ₂ "	.7083

Elevation of Monena Dam

Ref Points	+	H.I.	-	Elev
BM. S. side	1.09	156.29		155.20
1			3.93	52.36
2			3.95	52.34
3			3.93	52.36
4 ^{TR}	2.515	154.875	3.93	152.36
5			2.51	52.365
6			2.53	52.345
7			2.57	52.305
8			2.55	52.325
9			2.575	52.360
10 ^{TR}	2.565	154.855	2.585	152.29
11			2.56	52.295
12			2.55	52.305
13			2.54	52.315
14			2.525	52.330
15			2.52	52.335
16	2.66	155.005	2.51	152.345
17			2.665	52.340
18			2.595	52.410
19			2.59	52.415
20			2.68	52.365
BM. North Side			6.70	148.305



Lower Otay Auxiliary Reservoir

Contour = Top of Dam.

Honk Dist.

16°43'L 62.0

0°29'R 55.0

2°55'R 48.0

174°11'R 27.0

108°23'R 76.0

106°13'R 112.0

105°45'R 146.0

104°26'R 190.0

98°44'R 186.0

93°24'R 200.0

86°10'R 201.0

81°05'R 225.0

74°58'R 222.0

71°18'R 212.0

71°42'R 173.0

70°02'R 125.0

60°00'R 112.0

53°26'R 94.0

45°17'R 90.0

15°44'L 64.0

0°15'R 57.0

7°33'R 64.0

19°54'R 64.0

25°40'R 71.0

Location of Transit Point

55.4' from center of spillway

311' " engine House

on axis of Dam.

Course of Axis S25°30'W

84' below crest of Dam =

center of outlet.

Lower end of Spillway on top

upper " " " "

crest of Dam.

" " "

CONTOUR - 2' Below Crest
of Dam.

Height	Dist
25° 28' R	69.0
19° 24' R	60.0
8° 16' R	61.0
161° 10' R	27.0
107° 11' R	70.0
105° 50' R	135.0
103° 06' R	176.0
99° 30' R	182.0
90° 45' R	200.0
80° 13' R	226.0
73° 43' R	218.0
71° 59' R	172.0
71° 44' R	148.0
69° 50' R	112.0
57° 51' R	99.0
52° 42' R	88.0
45° 44' R	88.0

Contour: 4' below Crest of Dam

Hor Δ	Dist
26° 20' R	66.0
20° 21' R	59.0
15° 54' R	63.0
14° 05' R	56.0
149° 13' R	28.0
104° 35' R	78.0
105° 39' R	127.0
102° 09' R	175.0
100° 10' R	183.0
93° 05' R	192.0
89° 11' R	196.0
84° 56' R	187.0
81° 44' R	208.0
78° 56' R	220.0
76° 07' R	204.0
73° 00' R	167.0
76° 22' R	127.0
60° 32' R	98.0
45° 47' R	86.0
41° 20' R	63.0
33° 37' R	59.0

Same for all Contours.

" " " "

Contour = 6' below top of Dam

Hour Dist

28° 21' R 65.0

24° 33' R 63.0

19° 01' R 58.0

130° 35' R 24.0

103° 48' R 75.0

101° 30' R 126.0

99° 55' R 160.0

92° 14' R 183.0

84° 10' R 189.0

78° 22' R 208.0

75° 00' R 192.0

74° 31' R 167.0

76° 47' R 128.0

71° 00' R 107.0

61° 46' R 92.0

45° 47' R 81.0

Contour = 5' below top of Dam.

91.71
912
639

1382
487
895

19

Concrete Outlet Pentah

29° 21' R 62.0	} 6.34' below top of Dam
23° 04' R 57.0	
121° 52' R 27.0	
102° 03' R 67.0	
99° 56' R 118.0	
93° 21' R 103.0	
87° 03' R 114.0	
80° 42' R 116.0	
72° 04' R 101.0	
64° 17' R 82.0	
43° 57' R 73.0	
89° 30' R 165.0	upper res.
86° 37' R 183.0	
80° 32' R 200.0	
77° 31' R 193.0	
75° 25' R 177.0	
76° 25' R 153.0	
80° 27' R 135.0	
85° 00' R 150.0	
88° 14' R 155.0	

Contour = 10' below Top of Dam

Head	Dist.
78° 27' R	102.0
95° 41' R	100.0
98° 16' R	90.0
100° 23' R	61.0
111° 50' R	31.0
39° 54' R	12.0
56° 44' R	52.0
73° 30' R	86.0

Capin's Rocks

Hon. A Dist.

97° 49' R 57.0

Cont. 2' below top of Dam.

94° 27' R 58.0

96° 59' R 60.0

104° 30' R 51.0

105° 59' R 53.0

4' below crest of Dam.

1st Rock

105° 38' R 55.0

103° 22' R 49.0

97° 44' R 61.0

94° 14' R 56.0

6' below Crest of Dam.

93° 40' R 55.0

103° 35' R 50.0

104° 46' R 57.0

97° 34' R 62.0

8' below Crest of Dam.

Shook's Rock.

96°02'R 133.0 Top of Dam.
 97°52'R 139.0
 92°51'R 137.0

92°14'R 136.0 }
 97°47'R 127.0 } 2' below Crest of Dam.
 98°04'R 140.0 }

98°04'R 142.0 4' below Crest of Dam.
 91°04'R 140.0
 94°20'R 130.0
 93°56'R 115.0
 97°35'R 118.0

98°52'R 117.0 6' below Crest of Dam.
 98°32'R 126.0
 102°47'R 139.0
 99°27'R 144.0
 101°56'R 159.0
 97°27'R 160.0
 92°16'R 155.0
 88°40'R 138.0
 90°17'R 125.0
 91°49'R 109.0

	+	H.L.	-	Elev.	
	0.50	486.50		486.0	U.S.G.S.
			4.54	481.96	top of
			7.08	479.42	" "
T.P.	0.92	475.66	11.76	474.74	
			4.98	470.68	spillway
			4.93	470.73	"
			6.30	469.36	Exit
T.P.	0.31	465.20	10.77	464.89	
	0.35	452.90	12.65	452.55	
	0.00	439.93	12.97	439.93	
	0.29	427.18	13.04	426.89	
	0.92	415.61	12.49	414.69	
	0.12	403.73	12.00	403.61	
	0.05	390.94	12.84	390.89	
	0.88	379.64	12.18	378.76	
	1.10	368.30	12.44	367.20	
	1.94	357.70	12.54	355.76	
			1.39	356.31	Top of
			2.58	355.12	Weir knee
			7.72	349.98	Top of
			10.24	347.96	D.O.
			11.23	346.47	center
	7.17	361.36	3.51	354.19	
			1.45	369.91	center

14.55 ✓

139.19 ✓

B.M. North end Lower Clay Dam.

fill - top of Dam

8" pipe

floor at entrance

25' from entrance

spillway

Spillway walls 8' high.

" Bottom width = 32.9'

" Top width = 41.5'

" length = 361.5'

Spillway Auxiliary Dam.

" " "

Concrete portal at outlet Auxiliary Dam

gauge auxiliary Dam

of foot valve

of pump

H.I	Dist	Elev.	Elev.
Inst. on axis of Dam	14.75'	from engine House	
	361.36		
	65.0	1.20	360.16 1st elbow
	199.0	0.22	361.14 2 nd " "

elbow of discharge pipe where same leaves bldg. Dist. 14.75' Elevation = 362.98. Bearing N 22° E

Dist from inst. to pump 22'. Bearing N 43° 30' E

Course. N 53° 20' W.

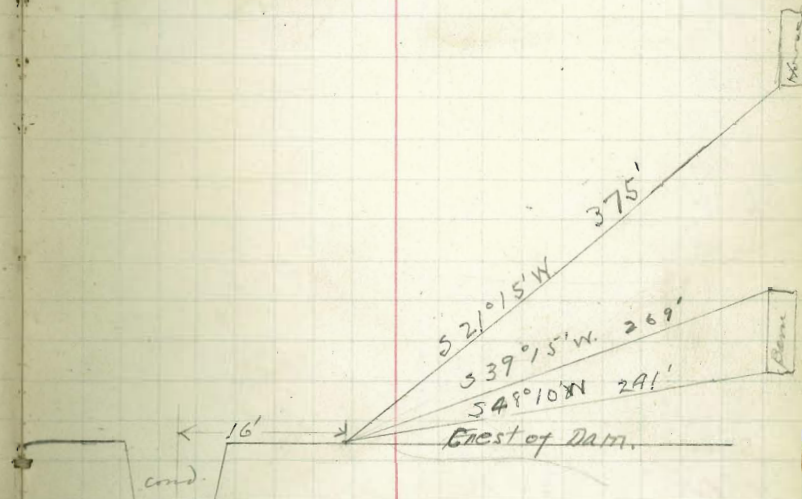
at base of dam.

Magnetic traverse Hauser to
Morena Road Beg Sta 444+00²³

Sta	M. C.
0+00	
205	S77°10'E
2+05	
257	S65°15'E
4+62	
231	S47°E
6+93	
258	S57°35'E
9+51	
229	S59°20'E
11+75	
151	N86°E
13+32	
356	S54°30'E
16+88	
187	S42°E
18+75	
133	S60°45'E
20+08	
231	S78°45'E
22+39	
116	S52°45'E
23+55	
295	S18°40'E
26+50	
249	S51°50'E
28+99	

Sta	M.C.
28+99	
223	S38°05'E
31+22	
127	S65°40'E
32+49	
326	S31°30'E
36+75	
130	S60°20'E
38+65	
394	S71°05'E
41+99	
359	S77°35'E
45+58	
172	S86°E
46+30	= West end traverse thru J. A. Warren Property

Location Hauser Cottage and Barn.
From Lower Dividing Dam



Sta	M.C.
0+00	on old fence line East end Inavense thru J.A. Warren Property
465	
4+65	585°E.
429	575°15'E
8+94	
232	N 87°50'E
11+26	
311	N 72°35'E
14+37	
227	581°30'E
16+64	
222	S 71°E.
18+86	
224	N 82°35'E
21+10	
485	572°30'E
25+95	
157	S 67°15'E.
27+52	
250	582°40'E
30+02	
170	S 50°E.
31+72	
415	S 67°10'E.
35+87	
494	555°15'E.
40+81	

Sta	M.C.
40+81	
412	547°50'E
45+73	
241	523°15'E
48+14	= West end traverse thru Grisby
325	577°35'E
51+99	

Property. Top of divide

Location Grisby wye.



$$\begin{array}{r} 1792 \\ 298 \\ \hline 2080 \end{array}$$

$$\begin{array}{r} 1792 \\ 298 \\ \hline 2080 \end{array}$$

Elev of man hole in terms of Res. gage. L.O

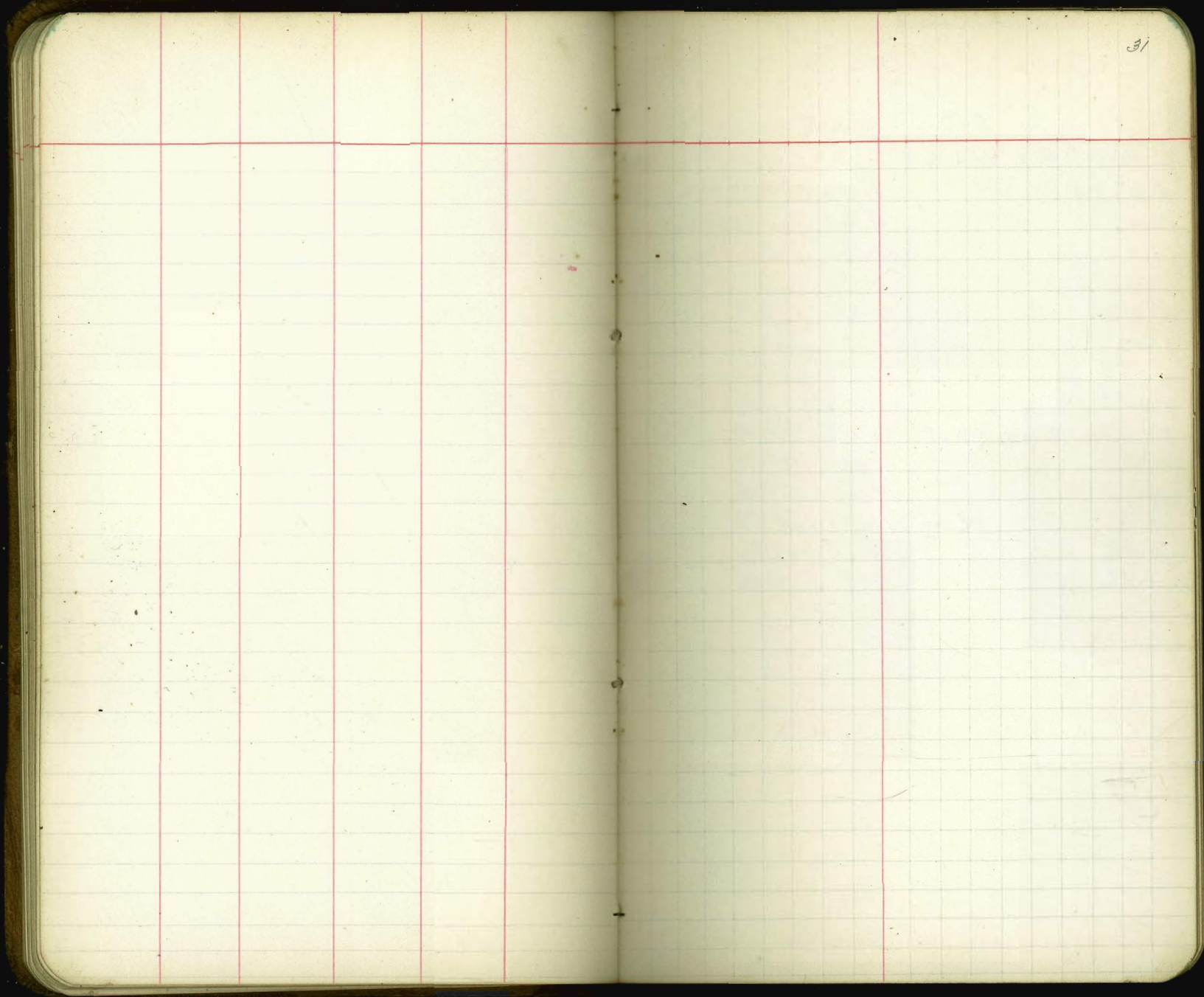
	+	H.I.	-	Elev.
		129.8	Taking B.S. on Gage.	
TP	12.82	142.48	0.14	129.66
T.P.	12.70	159.39	0.84	141.64
	8.44	162.32	0.46	153.88
			2.80	159.52 = Elev of

Man Hole (on rim) of Concrete)

33.96
4.24
29.72
129.8
159.52 ✓

4.24

OK. Rev.



Drain ground Filter Plant.

	+	HI	-	Elev	ELEV	grade	Cut.
0+00	9.2	109.2		100.00 Assumed	100.00	98.	2.0
0+18			9.70	99.50	99.50	98.59	.91
0+50			4.6	104.60	104.60	101.47	3.13
0+63			4.7	104.5			
0+75			1.5	107.7			
0+85			0.30	108.9			
1+00			2.5	106.7			
1+21			3.5	105.7			
1+46			8.6	100.6			
1+71	0.62	96.79	13.03	96.17			
1+96			4.8	91.99			
2+21			9.5	87.29			
2+46	5.13	89.56	12.36	84.43			
2+71			6.7	82.86			
2+91			9.9	79.66			

TP

11-18-15. 33

Kneeshaw

Dunne

Tunnel #4

Sta 0 S. Portal

1

2

+74

3

+57 S. face of cave in.

4 Not put in

5

not put in

+70

N. face of cave in

6

7

8

9

10

N Portal

sample taken just outside

drain runs out 150' 4" tile

Stationed from each portal to face of the cave in. Cannot be accurately stationed until cleared.

Tunnel is timbered but timber is very rotten.

drain begins.

Tag put here.

Tunnel 3
0 S Portal

1 Tag

1+16 Timber

2 Tag

2+16 Timber

2+28

2+40 Timber

3 Tag

4 Tag

5 Tag

6 Tag

+10 Shaft

7 Tag

8 Tag

9 Tag

10 Tag

11 Tag

12 Tag

Timber from portal to 1+16

Timber from 2+16 to 2+28

Timber from 2+40 to N portal

Tunnel 3 cont.

13

Tag

14

Tag

15

Tag

16

Tag

17

Tag

18

Tag

+04

N. Portal,

Tunnel is drained to a sump 40' N of
N. portal, about 350' of pipe needed to drain
sump.

Tunnel # 2

0 S. Portal

+40

1

2

3

4

5

6

7

+40

8

9

+50 Shaft

10

11

12

13

Timber to 0+40

0/

timber to 13+00

Tunnel #2 cont

14

15

16

17

18

+90 N. Postal.

Timber 18+45 to 18+90

11-19-15 38

Knoeshars
Dunne

Tunnel #1

0 S. Portal

+12

1

2

3

4

5

+89

6

7

8

+02

9

10

+20

Shaft

11

12

13

Timber to 0+12

Timber to 8+02

Tunnel #1 cont.

14

15

16

17

18

+53

19

20

+54

Timber to N portal

Upper Otay Watershed census

1	G.M. Rowan	6
2	Fritz Bormann	2
3	Simmons	4
4	Rudd	2
5	Gas. McJennitt	2
6	C.G. Ferguson	3
7	McNutt	4
8	J.G. Wetter	1
9	Stacy Holmes	2
10	A.T. McFarlane	3
11	Babecker Ranch	

Barn, corral + toilet within 300' of water.
Very unsanitary. Run off through corral
6 or 8 hogs have access to Lake

Week ends only.

Week ends only

110 head of cattle + horses seen, there are
not more than 200 head in the shed.
40 to 50 head of hogs

11-27-10-4
Kneeshan,

Drain. N end Tunnel 3 Pipeline

	H.I.	-	cut
0	12.3	5.8	6.5
+25		5.6	6.6
+50		5.8	6.3
+75		4.8	7.0
1+00		5.0	6.9
+25		5.8	6.3
+50		6.8	4.9
+75		8.1	3.5
2+00		7.8	3.7
+25		8.4	3.0
+50		9.1	2.2
+75		9.0	2.2

Grade = .1 in 25'

Bottom of Tunnel drain

Lower Otay Watershed

	H	C	Hoy	g		
1 Mrs Bashloush	2				3	
2 R. C. Gillis 1020 Inw Bld LA.	20	500			2	H. Magami good 6
3 Sam Bennis	4	20			3	good
4 L.C. Hubbard	4	150			5	Fair
5 Sean = R. Alexander. Throckmorton Frank	20	500			2	Poor
6 C.A. Camp	15	15	15		5	Very Poor
7 Char Plummer	2	2	6		2	Fair
8 S.V. Ferron	10				2	Poor 0.10
9 John Roe	10	20	10		3	Poor
10 Mrs L.A. Clark	12	10	10		5	Fair
11 Fred Clark					3	Poor
12 B.L. Shickler	10	20	10		2	Very Poor 5-
13 Henry Faquin	12	20			1	Poor
14 I.W. Allen	6	20	10		3	Fair

Kneeshaw
11-29-15

Lorrey Otay Watershed cont.

		H C Hg g			
15	H.H. Hagenbuck	1 2	Very Poor	1	
16	L. Harvey	20 100 20	Fair	10	
17	W.S. Howard	12 50 20	Fair	5	
18	Lair Larsen	2	Poor		1
19	M.T. Popplewell. Tamul Ranch	100 50 20	good	6	
20	Char Briarhoar	15 20 10	Poor	3	
21	Char F. Ferguson	20 20	Fair	5	
22	J.L. Maxfield	10 10 10			
		7 Indian Perm.	Poor Very	2	25
23	C.M. Frost + E.M. Hunt.	1	Poor	2	1
24	W ^m Setty	15 10 6	good	3	
25	Dy W ^m Wade	6	Very good	2	2
26	W.H. Cooper	10 10	Poor		1
27	A. Moreno		Very Poor	4	6
28	W ^m Varney	12 60	Poor	10	

11-30-15 23

12-1-15

12-1-15 24

Lower Otay Watershed cont.

No.	Name	H. C. Hg. g	Condition	Count
29	Frank Doran	6 15 6	Poor	7
30	W.J. Miller	8 20	Fair	1
31	A.S. McManus	12 30 10	Fair	5
32	A.A. Walker	20 60 10	Poor	9
33	C.M. Bratten	8 40	Fair	2
34	T.L. Moore	12 25	Fair	3
35	M.D. Peterson	8 20	Poor	3
36	Thompson	4 10	Good	3
37	Indians		Very Poor	50

12-2-15

45

12-3-15

Barrett Watershed

1	Geo Swain	100	Poor	7
2	L.P. Biddleman	6	Very poor	4
3	Felix Mendoza	6	" "	3
4	Cecilio Salazar	100	" Poor	16
5	W. E. Cook	2	good	5
6	L. Watta		Fair	5
7	J.F. Horning		Fair	3
8	D.C. Rinearson	10	Poor	3
9	J.F. Korte	50	Poor	3
10	R.G. Stewart	12	Fair	4
11	C.O. Griffin	200 H	Poor	3
12	AW Wolin		good	4
13	Bentons Ranch	300	Good	2
14	Ed Dunham	4	Fair	5

Barrett cont.

15	T. E. Ahlstrom	Poor	1
16	J. S. Burns	Poor	2
17	J. Y. Byers	Very Poor	2
18	C. E. Green Noble Mine	Fair	1
19	C. Skove	Poor	2
20	Dan O'Neill	Very Poor	1
21	Lee Morris	Poor	1
22	Campus Cattle Co	Very Poor	4
23	U.S. Forest Service	Fair	2
24	Indians	Very Poor	20
25	Imail	Fair	4

12-7-15

46

20

Morena Water Shed

12-5-15

12-6-15

1	Char Hook	Poor	8	
2	Bruce Casbere	Fair	6	
3	SW. Cameron	Poor	2	
4	Tom M ^c Cain	good	2	
5	Joe Valdez	Very Poor	8	
6	Ralph S. Burton	good	6	
7	Indians	Very Poor	4	
8	D. g. mc almond	good	6	2
9	Indians	Very Poor	3	
10	Frank Thiny	Fair	1	4
11	Indians	Very Poor		4
12	Jesse Morris	Poor	1	
13	Bob Israel	Poor	1	
14	Frank Flinn	Poor		2

Monna cont

15 U.S. Forest Service

16 W.C. Zinkand

17 Seth Swensen

12-8-15

48

Good

5

Poor

2

Very Poor

4

Kneesharr 49
Corrall 12-16-15

Levels from Dullet Tower to Filter Plant

	+	HI	-	Elev
	00	130.0		130.00
T.P.	10.94	139.77	1.17	128.83
	12.80	151.60	0.97	138.80
	12.50	162.89	1.21	150.39
	0.46	153.54	9.81	153.08
	0.35	140.92	12.97	140.57
	0.22	128.36	12.78	127.14
	1.05	116.59	12.83	115.52
	0.76	104.85	12.49	104.09
	0.00	91.77	13.08	91.77
	0.00	78.95	12.92	78.95
	7.65	74.67	11.83	67.02
			4.94	69.73
	13.18	87.75	0.00	74.67
	13.17	100.48	0.54	87.31
	13.09	113.67	0.50	99.98
	12.40	125.18	0.29	117.78
	12.54	137.44	0.28	124.90
	12.62	149.45	0.61	136.83
	12.75	162.19	0.01	149.44
	2.25	152.19	12.25	149.94
	0.79	139.97	13.01	139.18
	3.02	129.90	13.09	126.88
		129.90		

Gage on tower.

concrete headwall and drain. B.M.
center of gage.

gage on tower.

Levels to gage in chlorine plant

	+	H.I.	-	Elev
B.M.	0.67	67.69		67.02
	0.00	59.64	8.05	59.64
			0.81	59.83

Levels for dam, main and valves

B.M.	0.84	67.86		67.02
TP	0.33	56.88	11.31	56.55
			15.00	41.88
			11.8	45.08
			8.3	48.58
			7.85	49.03
T.P.	2.94	46.73	13.09	43.79
			9.6	37.1

Levels at Water tank

B.M.	3.86	228.60		224.80
			3.0	225.60
		225.60 + 15.0 =		240.60

Kneesharr. 50

12-22-15

concrete headwall on drain.

Gage &

concrete headwall on drain

Probable crest of dam.

Bottom of sewer invert
& Main at chlorine plant
& gate #1

Top of present dam

on base of Tank
& in & outlet
Top of Tank

150'

Double Center

R.P.'s

Normal Reversed Mean decimal

1	8 ¹ / ₈	8 ¹ / ₄	8 ³ / ₁₆	.6923
2	8 ⁵ / ₈	8 ⁵ / ₄	8 ⁵ / ₈	.7199
3	8 ¹ / ₂	8 ¹ / ₂	8 ¹ / ₂	.7083
4	8 ⁵ / ₈	8 ⁵ / ₈	8 ⁵ / ₈	.7199
5	9 ³ / ₄	9 ³ / ₄	9 ³ / ₄	.8125
6	10 ¹ / ₄	10 ¹ / ₂	10 ³ / ₈	.8646
7	10	10 ¹ / ₄	10 ¹ / ₈	.8438
8	9 ³ / ₄	10 ¹ / ₄	9 ¹⁵ / ₁₆	.8281
9	9 ¹ / ₂	9 ⁷ / ₈	9 ¹¹ / ₁₆	.8073
10	9 ⁵ / ₈	9 ⁷ / ₈	9 ³ / ₄	.8125
11	9 ³ / ₄	10 ¹ / ₄	9 ¹⁵ / ₁₆	.8281
12	9 ⁷ / ₈	10	9 ¹⁵ / ₁₆	.8281
13	9 ¹ / ₂	9 ⁵ / ₈	9 ⁹ / ₁₆	.7969

Moena Measurements 1-5-16: 51

Kneeshaw,

Ogburn,

Swenson.

Foggy. Lietz Transit
Water 118.76

Morina Movements (cont)

14	$8\frac{7}{8}$	9	$8\frac{15}{16}$	.7448
15	$7\frac{3}{4}$	8	$7\frac{7}{8}$	.6563
16	$7\frac{1}{4}$	$7\frac{3}{4}$	$7\frac{1}{2}$	.6250
17	7	$7\frac{2}{8}$	$7\frac{3}{16}$	.5990
18	$7\frac{1}{2}$	$7\frac{3}{4}$	$7\frac{5}{8}$	.6354
19	$7\frac{1}{2}$	$7\frac{3}{4}$	$7\frac{5}{8}$	.6354
20	$7\frac{1}{2}$	$7\frac{3}{4}$	$7\frac{5}{8}$	.6354

Pipe Line.

Upper Stay to Lower Stay

AR	AL	Mag.
152+22.5		S34°E
142+00	11° 56'	S45° 00'E
141+00	47° 00'	N87°E
140+00	85°	S7°30'E S7°29'E
113+40	30°	S22°30'W S22°31'W
83+00	32° 38'	
65+00	0° 40'	S10° 45'E S10° 47'E
35+00	18°	S10°E S10° 07'E
24+00 P.O.T.		
10+00 P.O.T.		S7°45'W S7°53'W
7+50	8° 19'	
4+00	18° 23'	S0°30'E S° 26°E
2+32	7° 11'	S19°E S18° 49'E
0+00		S26°E S26°E

1-31-16 53

Kneeshaw
Bellamy
Carroll

Clear

Intake

12+00 Road

Face of out let valve. Upper stay
dia. valve 20"

"A" Line
Upper & Lower Otay Pipeline

Sta.	ΔR	ΔL	Mag.
			S11°W
55+00	20°		S10°E
46+50	1°30'		S11°45'E
44+00	18°30'		S30°E
38+00		5.9°	S29°W
35+40	23°30'		S0°45'W
30+55		18°	S18°15'W
23+75	23°30'		S5°E
16+75		26°30'	S21°30'W
16+50			S7°45'W
13+00			S0°30'E
12+25			S19°E
11+40			S26°E
10+00	13°30'		
7+50	8°19'		
4+00	18°23'		
2+32	7°11'		
0+00			

Kneeshaw 1754

Bellamy Hc.

Carroll R.C.

2-9-16

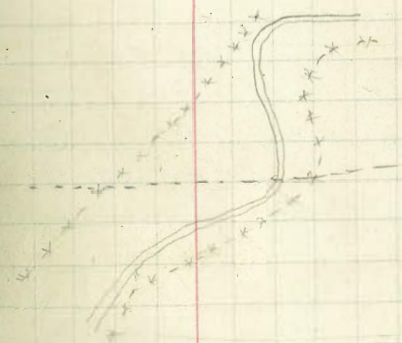
hazy

Fence

Draw

Road

Fence



Face of outlet valve Upper Otay

"A" cont.

2-11-16

55

sta AR AL Mag

100+43 P.O.T. S74°30'W

99+00 40°

S34°45'W

94+60 16°

S18°30'W

89+00 28°30'

S10°E

86+48 56°30'

84+65 P.O.T.

S66°30'E

81+00

107°

S40°30'W

77+39± 30°

S10°30'W

73+00 20°30'

S10°E

67+30 27°

S37°E

62+06

47°

57+47± P.O.T.

S11°W

P.O.T.

"A" Line Levels

Upper to Lower Otay Pipe line

Kneeshaw 56
 Belamy
 Carrall
 2-10-16

Sta	+	H.I.	-	Elev	T.P. & B.M.	clear
T.P.	11.85	157.51			145.66	0+00 to 10+00 sec pp 66 at sta 11+90 old line
A11+00			0.0	157.5		
12			7.8	149.71		
T.P.	0.12	145.25	12.38		145.13	Rock on line 12+20
+20			1.9	155.61		
+35			2.4	155.11		
13			16.8	140.71		
+25			9.5	148.01		
14			1.8	155.71		
T.P.	4.72	149.67	0.30		144.95	Rock 14+65 5' L
15			3.2	146.47		
16			3.3	146.37		
+50			3.0	146.67		
17			5.5	144.17		
18			7.9	141.77		
19			10.4	139.27		
20			11.5	138.17		
21			13.6	136.07		
22			2.2	147.47		
T.P.	7.13	155.28	1.52		148.15	Rock on line 22+20
23			3.4	151.88		
+75			4.7	150.58		
24			4.3	150.98		
25			5.6	149.68		
26			8.7	146.58		
T.P.	1.15	144.21	12.22		143.06	Rock 26+40 10' L Road stake 140
27			6.0	138.21		

"A" Line Levels

Upper to Lower Otay Pipe Line

Sta	+	H.I.	-	Elev.
A 28		144.21	12.4	131.81
	+10		15.2	129.01
29			4.1	140.11
T.P.	10.63	153.07	1.77	142.44
30			7.3	145.77
	+55		5.3	147.77
31			4.7	148.37
32			7.8	145.27
33			11.3	141.77
34			7.3	145.77
35			3.3	149.77
T.P. +40	2.53	150.80	4.80	148.27
36			5.1	145.7
37			8.3	142.5
38			13.1	137.7
T.P.	0.77	138.45	13.12	137.68
39			6.1	132.35
	+20		7.3	131.15
	+50		14.1	124.35
40			8.2	130.25
T.P.	11.77	149.19	1.03	137.42
41			10.6	138.59
42			4.6	145.59
43			3.2	145.99
44			4.0	145.19
T.P.	5.73	151.07	3.85	145.34
45			3.1	147.97
46			3.9	147.17

Top Road stake 137 29+47

AL

On hub Δ R

Δ L T.P. on hub
On hub sta. 38

Rock on line 40+80

Hub sta. 44

"A" Line Levels

Upper to Lower Otay Pipe Line

Sta.	+	H.I.	-	Elev.
A46+50		151.07	5.1	145.97
47			5.8	145.27
48			8.9	142.17
49			12.1	138.97
50			13.7	137.37
51			15.0	136.07
52			14.7	136.37
53			12.7	138.37
54			12.1	138.97
55 T.P.			12.75	138.32

On hub ΔR

436' 2A" MB Pipe

4-26-16.

Sta.	+	H.I.	-	ELEV.
	4.39	79.33		69.94 B.M.
0+00			8.8	70.5
+50			13.8	65.5
1+00			8.4	70.9
+25			2.8	76.5
+50			0.8	78.05
T.P.	12.62	91.23	0.72	78.61
2+00			8.7	82.5
T.P.	12.74	102.72	1.25	89.98
3+00			10.7	92.02
+50			4.7	98.02
T.P.	13.03	114.42	1.33	101.39
4+00			10.7	103.7
+20			7.8	106.6
+50			5.7	108.7
5+00			1.1	113.3
T.P.	12.91	126.83	0.50	113.92
+50			10.1	116.7
6+00			6.5	120.3
+50			0.6	126.2
T.P.	12.78	138.79	0.82	126.01
7+00			3.2	135.5
T.P.	12.10	150.32	0.57	138.22
+30			11.3	139.0
+50			7.5	142.8
8+00			0.5	149.8
T.P.	12.80	162.49	0.63	149.69

on Concrete base of Tower.

Sta	+	H.I.	-	Elev
		162.49		
8+50			7.6	154.8
9+00			2.5	159.9
+20			1.5	160.9
T.P.	2.16	163.70	0.95	161.54
+50			2.6	161.1
10+00			4.0	159.7
+40			6.9	156.8
+75			8.9	154.8
11+00			12.7	151.
T.P.	0.61	151.24	13.07	150.63
+50			4.7	146.5
+85			9.2	142.
+92			12.4	138.8
T.P.	0.25	138.73	12.76	138.48
12+00			1.1	137.6
+30			4.8	133.9
+50			10.3	128.4
T.P.	1.40	127.83	12.30	126.43
13+00			6.6	121.2
+20			11.9	115.9
T.P.	0.55	115.70	12.68	115.15
+50			7.9	107.8
T.P.	0.42	103.38	12.74	102.96
14+00			7.9 6	95.7
+10			12.1	91.2
T.P.	0.58	91.90	12.06	91.32

Wagon road South Side
Rock 5' South of Road.

North Side of Road
South " " " "

East side of Road.

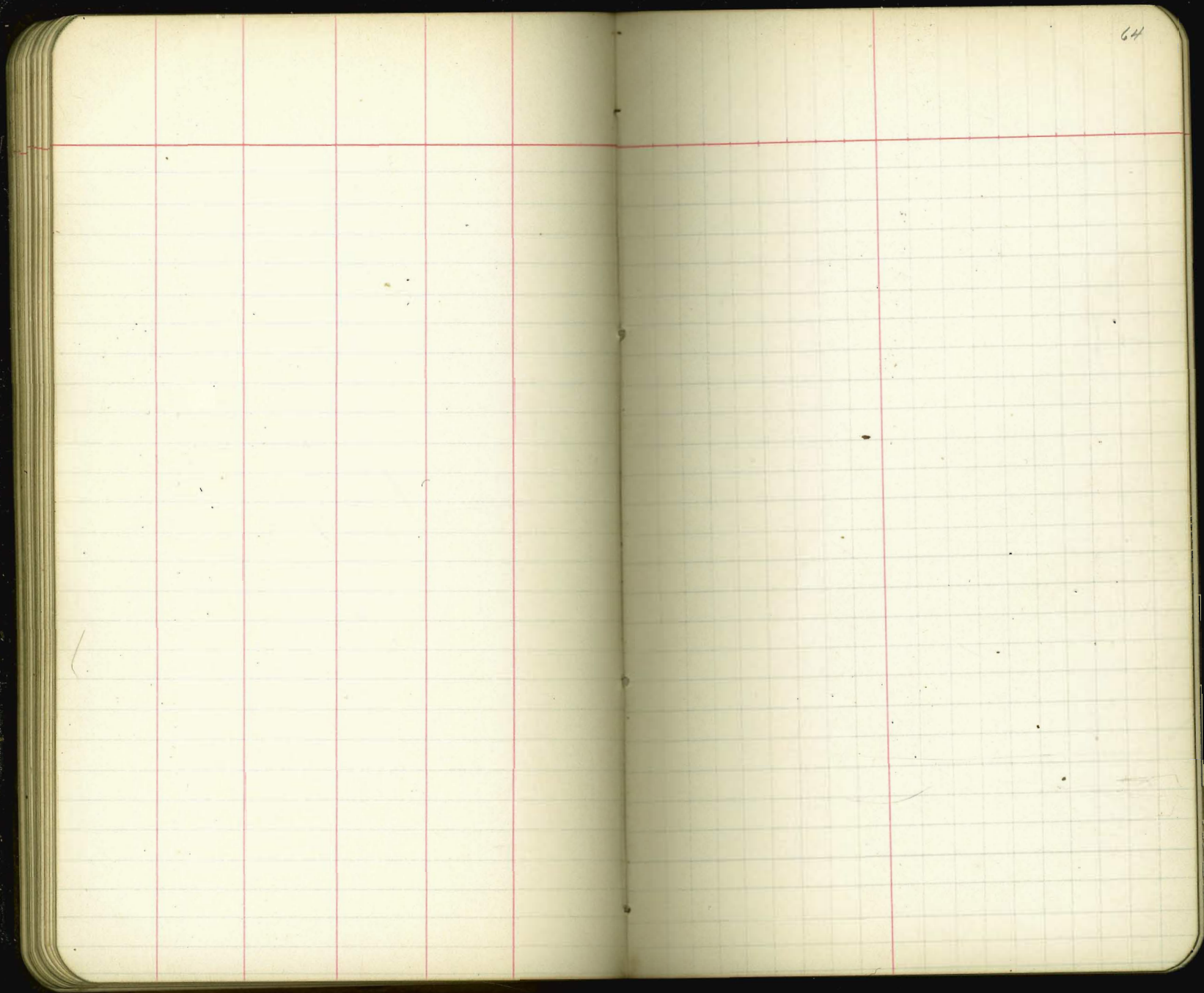
West Side of Road.

Bottom Ditch 3' x 3'

Sta	+	H.I.	-	Elev.
		91.90		
14+50			6.0	85.9
15+00			12.3	79.6
T.P.	1.0	79.86	13.04	78.86
A +61 ³			4.6	75.2
16+00			9.5	70.3
+30			12.5	67.3
T.P.	0.87	68.95	11.78	68.08
+60			6.2	62.7
+80			12.65	56.3
+91			10.7	58.2
T.P.	3.68	59.97	12.66	56.29
17+30			5.1	54.8
17+43			11.6	48.3
			12.36	47.61

Control point (Top concrete wall)

Base 24" Gate (Filter Plant)
B.M. Correct Elev. 47.82



Levels Pipe Line

Upper Otay to Lower Otay

1-31-16 66.

Meesham
Bellamy
Carrell

Sta	+	H7	-	Elev
0+00	6.18	206.18		200.00 = 174.50
+65		180.68	1.5	178.9
1			17.5	63.2
+35			16.5	64.2
+75			12.1	68.6
2			5.2	75.5
+20			3.5	77.2
+32			3.9	76.8
3			4.7	76.0
4			6.9	73.8
T.P.	3.95	204.67	5.46	200.72
4+60		179.17	11.1	175.22 168.1
+90			21.0	59.2
5			25.0	54.2
+10			19.0	60.2
6+50			7.6	71.6
7			6.4	72.8
+50			6.4	72.8
8			7.7	71.5
9			11.1	69.1
T.P.	1.24	193.64	12.27	192.40
10		168.14	3.3	166.90 64.8
11			12.8	53.3
T.P.	1.17	182.26	12.55	181.09
11+75		156.76	7.8	153.59 49.0
11+95			11.3	45.5
T.P.	0.15	171.31	11.10	171.16
		145.81		145.86

Bottom invert of outlet valve Upper Otay
 → L. Otay working elev. dia of valve 20"

AR

AR

Rock 4'R +10

AR

9+75

Fence 11+15

Levels - Pipe Line

Upper Otay to Lower Otay

Sta.	+	H.I.	-	Elev.
11	+95	171.31	4.0	141.8
12		145.81	3.7	42.1
"	+25		7.7	38.1
"	+30		9.4	36.4
"	+75		12.5	33.7
13			15.1	30.7
"	+50		32.0	13.8
"	+75		21.0	24.8
14			16.2	29.6
"	+50		12.9	32.9
15			17.5	30.3
16			16.6	29.2
17			18.0	27.8
"	+75		17.6	28.2
18			18.7	27.1
19			17.5	29.3
20			15.5	30.3
	75		14.0	31.8
21			10.4	35.4
	50		5.4	40.4
T.P.	8.95	178.25	2.01	169.80
22		152.75	5.8	47.0
	+50		2.3	50.5
23			1.0	51.8
24			2.5	50.3
25			4.9	47.9
	+50		6.2	46.6

Hand Level

+20 24.0

+40 33.3

+80 = 34.2

Fence 14+50

Levels - Pipe Line

Upper Otay to Lower Otay

Sta	+	H.I.	-	Elev
26		178.25	9.5	43.3
+50		152.75	14.5	38.3
27			17.9	34.9
+25			18.0	34.8
+75			25.0	27.8
28			23.0	29.8
+60			16.0	36.8
29			14.5	38.3
30			11.5	41.3
T.P.	1.93	169.40	10.78	167.47
30+50		143.90	3.9	141.97
31			7.0	36.9
32			11.0	32.9
+50			9.1	34.8
33			9.3	34.6
34			6.1	37.8
35			1.	42.5
36			12.5	31.4
37			18.5	25.4
+25			18.0	25.9
38			24.0	19.9
+25			18.0	25.9
+50			20.0	23.9
39			18.2	25.7
40			11.7	32.2
41			6.4	37.5
42			0.9	43.0

ΔL

Levels. - Pipe Line

Upper Otay to Lower Otay

Sta	+	H.I.	-	Elev.
T.P.	7.90	176.35	0.95	168.45
43		150.85	3.8	47.1
44			3.0	47.9
45			4.6	46.3
46			7.6	43.3
47			10.9	40.0
48			13.0	37.9
49			14.0	36.9
50			14.3	36.6
51			12.4	38.5
52			11.9	39.0
53			11.4	39.5
T.P.	1.28	167.18	10.45	165.90
54		141.68	3.9	37.8
55			4.1	37.6
56			5.4	36.3
+75			8.1	33.6
57			10.5	31.2
T.P.	1.29	155.72	12.75	154.43
58		130.22	8.7	21.5
59			7.8	12.4
+25			25.8	05.4
60			20.0	10.2
61			11.9	18.3
62			2.2	28.0
T.P.	11.4)	166.82	0.31	155.41
63		141.52	5.0	36.3
T.P.	9.24	174.53	1.53	65.29

Rock on line at +25

" 10' L +60

Levels - Pipe Line

Upper Otay To Lower Otay

Sta	+	H.I.	-	Elev.
64		174.53	4.6	44.4
		149.03		
65			1.7	48.3
66			4.1	44.9
67			9.8	39.2
+50			12.6	36.4
68			11.2	37.8
69			3.4	45.6
+30			2.2	46.8
T.P.	4.92	178.73	6.72	173.81
		153.23		
70			2.8	50.4
+70			3.9	49.3
71			6.2	47.0
T.P.	1.40	167.93	12.20	166.53
		142.43		
72			3.7	38.7
73			6.8	35.6
74			5.8	36.6
75			9.4	33.0
T.P.	2.00	157.60	12.33	155.60
		132.10		
76			8.9	23.2
77			18.3	13.8
78			8.6	23.5
T.P.	12.72	169.84	.48	157.12
		144.34		
79			7.0	37.3
T.P.	11.67	180.20	1.31	168.53
		154.70		
80			7.8	46.9
79+98.3			6.34	148.46
81			3.9	50.8
82			3.2	51.5

Rock on line +40

Rock on line +65

Rock on line +35

10' L +55

Rock on line +60

Hub on Hustans Road line

Levels. Pipe Line
Upper Otay to Lower Otay

Sta.	+	H.I.	-	Elev.
83		180.20	4.1	50.6
84		154.70	5.6	49.1
85			5.3	49.4
86			3.7	51.0
T.P.	5.10	182.06	3.24	176.96
87		156.56	5.8	50.8
88			5.6	51.0
+50			6.2	50.4
89			7.7	48.9
90			12.0	44.6 ^w
+25			14.2	42.4
+60			17.2	39.4
91			13.0	43.6
92			11.1	45.5
T.P.	0.30	169.89	12.47	169.59
93		144.39	2.7	41.7
94			8.0	36.4
T.P.	1.14	158.63	12.40	157.49
T.P.	1.36	147.32	12.67	145.96
95		121.82	5.1	16.7
96			21.0	00.8
97			.8	21.0
T.P.	13.02	159.74	.60	146.72
T.P.	13.0	171.79	.95	158.79
98		146.29	9.4	36.9
99			3.5	42.8
+50			4.4	41.9
100			12.1	34.2

Δ R

Top of Road Stake Sta. 75

Rock on line +50

5' L +30

10' R +75

Rock at Sta. 97

Rock on line +70

Levels- Pipe Line
Upper Otay to Lower Otay

2-2-16 72

Sta	+	H.I.	-	Elev
T.P.	0.36	160.58	11.57	160.22
100 + 90		135.08	18.8	16.3
101			16.8	19.3
+25			12.3	22.8
T.P.	12.16	171.88	0.86	159.72
102		146.38	.2	46.3
T.P.	7.94	179.64	.18	171.70
+25		154.14	5.0	49.6
103			5.0	49.1
104			5.9	48.2
105			8.2	45.9
106			8.4	45.7
107			8.2	45.9
108			8.1	46.0
109			8.6	45.5
110			11.3	42.8
T.P.	1.55	170.75	10.44	169.20
T.P.	3.03	161.26	12.52	158.23
111		135.76	4.4	31.4
+65			15.8	20.0
112			10.4	25.4
T.P.	12.15	172.33	1.08	160.18
113		146.83	6.4	40.4
+40			3.1	43.7
114			2.5	44.3
T.P.	9.85	180.32	1.86	170.47
115		154.82	7.7	47.1

Top of stake 100

Rock on line +60

Top Stake 110

Rock on line +95

" " " +40

ΔL

Top Stake 114

Levels. Pipe. Line
Upper Otay to Lower Otay

Sta	+	H.I	-	Elev
116		180.32 154.92	4.3	50.5
117			4.2	50.6
118			4.1	50.7
119			3.7	51.1
120			3.3	51.5
T.P.	4.74	178.96 153.46	6.10	174.22
121			3.1	50.4
122			5.4	48.1
123			7.3	46.2
124			5.7	47.8
125			4.9	48.6
126			10.7	42.8
T.P.	2.74	169.44 145.94	12.26	166.70
127			5.7	38.2
+65			9.9	34.0
128			7.1	36.8
+50			3.4	40.5
129			1.7	42.2
T.P.	4.35	173.00 147.50	.79	168.65
130			5.1	42.6
131			3.2	44.3
132			3.3	44.2
+56			2.7	44.8
133			8.1	39.4
T.P.	2.03	162.19 136.69	12.84	160.16
+80			17.6	19.1
134			15.0	21.7
+70			1.0	35.7

20' L + 85

Rock on line + 50

Top stake 129

Rock on line + 15

Levels - Pipe Line

Upper Otay to Lower Otay

164.48
138.98
25.50

74

Sta.	+	H.I.	-	Elev.
135		162.19	3.8	32.9
+60		136.69	10.3	26.4
136			7.9	28.8
+50			3.6	33.1
137			15.1	21.6
+25			17.0	19.7
138			4.1	32.6
T.P.	5.81	164.48	3.52	158.67
+56		138.98	0.5	38.5
139			4.9	34.1
+10			5.6	33.4
+50			27.0	12.0
140			8.9	30.1
+30			18.7	20.3
+75			5.3	33.7
141			8.4	30.6
142			8.1	30.9
T.P.	1.59	154.32	11.75	152.73
143		128.72	3.9	24.9
144			11.5	16.3
T.P.	1.07	142.44	12.95	141.37
145		116.94	9.2	107.7
T.P.	0.77	130.21	13.0	129.44
146		104.71	12.6	92.8
T.P.	1.03	118.62	12.62	117.59
T.P.	0.40	106.46	12.56	106.06
147		80.96	7.5	73.4
T.P.	6.68	102.60	10.54	95.92

10' L +45

6' L +20

2' L +8

2' L +12

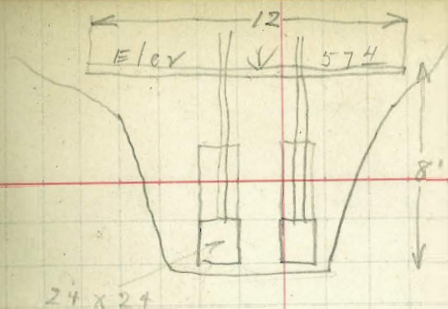
25' L +75

Rock on line +50

40' R +50

Levels - Pipe Line
Upper Otay to Lower Otay

Sta.	+	H. I.	-	Elev
147+70		102.60	13.0	64.1
148		77.10	11.1	66.0
149			4.4	72.7
150			4.6	72.5
151			7.5	69.6
+85			9.2	67.9
T.P.	2.10	92.14	12.56	90.04
152+22		66.64	9.2	57.4
T.P.	11.74	103.20	0.68	91.46
T.P.	12.44	115.53	0.11	103.09
T.P.	13.05	127.93	0.65	114.88
T.P.	12.10	140.03	0.00	127.93
T.P.	12.90	152.93	0.00	140.03
T.P.	12.56	165.49	0.00	152.93
T.P.	11.09	175.93	0.65	164.88
B.M.			2.72	173.21



Sta. 152 at Tower

= 147.71 Otay working elev.
B.M. on reservoir at chemical house

Profile Level for change of
 line sta 136+00 to 142+00
 u.o. - s.o. Biquina

Wm. Denny
 3-17-16.

76

Sta 136+00	4.85	133.65		128.8	
136+37			1.39		132.26
0	0.42	126.07	8.00	125.65	
137+21			10.00		116.07
137+68			2.29		123.78
0	7.93	132.80	1.00	125.07	125.07
138+00			4.54		128.26
138+59			1.20		131.60
0	0.73	125.53	8.00	124.80	
138+80			2.46		123.07
0	0.82	118.35	8.00	117.53	
139+00			5.27		113.08
0	0.73	111.08	8.00	110.35	
139+15			5.95		105.33

See page 74

0	171	111.08 104.79	800	103.08
139+33			683	979.6
139+50			117	93.1
139+66			60	98.8
139+80			1.1	103.7
0	705	111.84	000	104.79
139+89			258	109.26
0	734	119.18	000	111.84
140+00			229	116.89
0	667	125.85	000	119.18
140+13			346	122.39
0	569	131.54	000	125.85
140+50			314	128.40

131.54

141.400

0.29

131.25

141.30 = 143.400

0.87

130.67

4.05
3.35

70

cor

79

85
36
121

2 gal outside wht.
1 lb. Lamp black
10 gal linseed oil boiled
1 lb can prussian blue
10 lb gray mettalic
100 lb Prussian mettalic
1 qt Japan
2 # 30 brusher-adams
20 gal creosote.
1 gal Turpentine

10 9 4
 11 7 7
 8 1 9
 7.66 479.72
 356.97
 23.65
 400
 395
 1 1/2 m
 3 1/2 m
 2 1/2 m
 22.78
 22.5
 97
 15 3 1/2
 8 4 1/2
 2 80
 159.52
 4 x 6
 10 5 1/2
 4 x 6-8

109
 9 3.13
 93.79
 1236
 214

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.
FOR SINGLE TRACK EMBANKMENT.
ROADWAY 14 FEET WIDE. SIDE SLOPES 1 1/2 TO 1.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	7.0	7.2	7.3	7.5	7.6	7.8	7.9	8.1	8.2	8.4	0
1	8.5	8.7	8.8	9.0	9.1	9.3	9.4	9.6	9.7	9.9	1
2	10.0	10.2	10.8	10.5	10.6	10.8	10.9	11.1	11.2	11.4	2
3	11.5	11.7	11.8	12.0	12.1	12.3	12.4	12.6	12.7	12.9	3
4	13.0	13.2	13.3	13.5	13.6	13.8	13.9	14.1	14.2	14.4	4
5	14.5	14.7	14.8	15.0	15.1	15.3	15.4	15.6	15.7	15.9	5
6	16.0	16.2	16.3	16.5	16.6	16.8	16.9	17.1	17.2	17.4	6
7	17.5	17.7	17.8	18.0	18.1	18.3	18.4	18.6	18.7	18.9	7
8	19.0	19.2	19.3	19.5	19.6	19.8	19.9	20.1	20.2	20.4	8
9	20.5	20.7	20.8	21.0	21.1	21.3	21.4	21.6	21.7	21.9	9
10	22.0	22.2	22.3	22.5	22.6	22.8	22.9	23.1	23.2	23.4	10
11	23.5	23.7	23.8	24.0	24.1	24.3	24.4	24.6	24.7	24.9	11
12	25.0	25.2	25.3	25.5	25.6	25.8	25.9	26.1	26.2	26.4	12
13	26.5	26.7	26.8	27.0	27.1	27.3	27.4	27.6	27.7	27.9	13
14	28.0	28.2	28.3	28.5	28.6	28.8	28.9	29.1	29.2	29.4	14
15	29.5	29.7	29.8	30.0	30.1	30.3	30.4	30.6	30.7	30.9	15
16	31.0	31.2	31.3	31.5	31.6	31.8	31.9	32.1	32.2	32.4	16
17	32.5	32.7	32.8	33.0	33.1	33.3	33.4	33.6	33.7	33.9	17
18	34.0	34.2	34.3	34.5	34.6	34.8	34.9	35.1	35.2	35.4	18
19	35.5	35.7	35.8	36.0	36.1	36.3	36.4	36.6	36.7	36.9	19
20	37.0	37.2	37.3	37.5	37.6	37.8	37.9	38.1	38.2	38.4	20
21	38.5	38.7	38.8	39.0	39.1	39.3	39.4	39.6	39.7	39.9	21
22	40.0	40.2	40.3	40.5	40.6	40.8	40.9	41.1	41.2	41.4	22
23	41.5	41.7	41.8	42.0	42.1	42.3	42.4	42.6	42.7	42.9	23
24	43.0	43.2	43.3	43.5	43.6	43.8	43.9	44.1	44.2	44.4	24
25	44.5	44.7	44.8	45.0	45.1	45.3	45.4	45.6	45.7	45.9	25
26	46.0	46.2	46.3	46.5	46.6	46.8	46.9	47.1	47.2	47.4	26
27	47.5	47.7	47.8	48.0	48.1	48.3	48.4	48.6	48.7	48.9	27
28	49.0	49.2	49.3	49.5	49.6	49.8	49.9	50.1	50.2	50.4	28
29	50.5	50.7	50.8	51.0	51.1	51.3	51.4	51.6	51.7	51.9	29
30	52.0	52.2	52.3	52.5	52.6	52.8	52.9	53.1	53.2	53.4	30
31	53.5	53.7	53.8	54.0	54.1	54.3	54.4	54.6	54.7	54.9	31
32	55.0	55.2	55.3	55.5	55.6	55.8	55.9	56.1	56.2	56.4	32
33	56.5	56.7	56.8	57.0	57.1	57.3	57.4	57.6	57.7	57.9	33
34	58.0	58.2	58.3	58.5	58.6	58.8	58.9	59.1	59.2	59.4	34
35	59.5	59.7	59.8	60.0	60.1	60.3	60.4	60.6	60.7	60.9	35
36	61.0	61.2	61.3	61.5	61.6	61.8	61.9	62.1	62.2	62.4	36

Calculated by Julien A. Hall, M. Am. Soc. C. E.