W 144

FIELD BOOK
361

CITY OF
SAN DIEGO - CALIFORNIA
ADDITIONAL WATER SUPPLY
MISSION GORGE DAMSITES 1 & 2

3

KEUFFEL & ESSER CO.

DRAWING MATERIALS
AND
SURVEYING INSTRUMENTS.

NEW YORK.
CHICAGO. ST. LOUIS. SAN FRANCISCO. MONTREAL.

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.

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

FOR KEITH'S RAILROAD CURVE TABLES SEE END OF BOOK.

E.73 - 4-55

CITY OF SAN DIEGO
California

Additional Water Supply

Water Commission Office
320 McNeece Bldg
Cor 6th & F Sts
H. N Savage C.E

B.K #3

129
1.305
2)2595
1.2975 Cov Ret Wall Cath Ch higher thaypt on Curb

Ref A2

Sta A2

68 to Top of Old Mission Dam △ 354-54

Riv Bed " " " Line △ #3-#4 230-56

" 2 to 3 180-53 10'10'

67 to 68 - 81-47

66 to 67 66-14

Index

Original Index in back of book

Sta	Az	Rod	H. Dist	Vert L	
64 to 65	36-37	2.18			
π @ #64			364.78		
#64 to #233	338-01	8.50	846	0	
			Cor. Dist		
#64 to #	326-24	9.04	900'	+4-38	+73.0 433
	Shots across Gorge for Topog.				
π @ #64	321-10	8.08	800'	+5-33	+77.8 437.8
	307-13	8.00	792	+5-35	+82 442.0
	299-0	7.58	750	+6-16	+82.2 442.2
	297-30	7.20	718	+3-41	+46 406.0
	287-50	7.50	746	+4-21	+56.7 416.7
	287-31	8.78	859	+8-04	+122 482
Exposed Rock	278-51	7.73	762	+7-0	+99.3 453.3
Earth	267-20	8.00	790	+6-18	+87 447.3
"	257-42	8.50	840	+5-45	+84.5 444.5
"	251-19	8.75	870	+4-56	+75 435
"	245-50	9.70	965	+4-22	+73.5 433.5
"	240-04	9.90	988	+4-27	+76.5 436.5
"	230-03	10.80	1075	+3-30	+62.8 422.8
Exposed	244-11	9.25	920	+2-26	+40 400
Earth	249-28	8.14	810	+2-50	+40.7 400.7
	262-51	7.25	745	+1-42	+21.5 381.5
#64 To Ax point No side set to Shoot So side	260-34	7.00	700	0	360

Additional Topography Mission Damsite #1

Hayler Loc
Franklin π
Williams

3

Sept 22/21

FS on #65 Bk #2 p13

360 B #1 p ?

Hub uphill from #233A for Topog in gulch North

On rock hog back S.R @ Surf

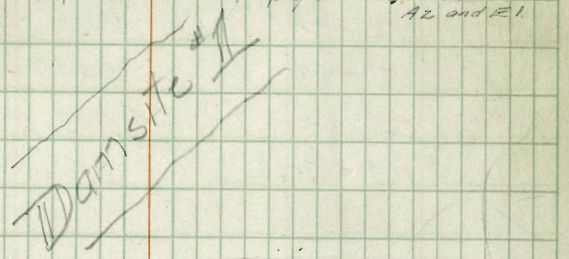
" " " Exposed

" " Toe sheer Cliff " Main Outcrop side below

" " Top " " on bench

@ a lath not marked * see next page

? Something Rotten in Az and El



Gulch washed bar up + also down hillside 100 each way

360 Hub set on No side

Plotted 10/25/21
HRB

Sta	Az	Rod	H. Dist	Vert ∠	
π@#233	5.0				
Earth	✓131-08	9.70	965	+4-30	+76 436
"	✓139-35	9.80	970	+4-54	+83 443
"	✓147-53	9.75	970	+4-34	+77 437
Rock Exposed	153-11	10.05	1000	+4-23	+76.8 436.8
	✓155-35	10.60	1055	+4-25	+81.5 441.5
		11.20	1110	+5-18	+103 463
π@ △X p#3	5.00				360
	✓85-08	7.60	758	+2-51	+37.6 397.6
	✓104-35	7.25	722	+4-02	+51 411
	✓109-11	7.35	732	+3-48	+47.6 407.6
	✓105-30	8.05	798	+5-52	+82 442
	✓112-53	8.60	850	+5-29	+79.3 439.3
	✓116-23	9.05	899	+5-03	+79.2 439.2
	✓122-24	10.60	1045	+4-02	+74.2 434.2
	✓119-23	8.20	818	+2-54	+41.5 401.5

See also pages 52+53

Platted 10/25/61 HRB

Shots So across R same stunt p#3

on No side S.D R B.S. #64

lath unmarked * see p#3 ?

— ?

II Damsite #1
Additional Topog
above 360 Elev

End

Sta	Az	Rod	H. Dist	Vert ∠	
π @ #4 } B#2 p 53 }	4.65				
#4 to 236	320-01	3.07	262	+22-40	+109 469
π @ #236	4.66				
#236 to #51	203-12	10.50	1050	0.	360.
" to #237	226-46	1.23	123	"	360
foot of Cliff	198-16	10.80	1075	+3-30	+66 426
"	195-17	9.84	980	+2-36	+45.5 405.5
	192-36	9.50	945	+3-08	+52 412
"	188-49	8.90	888	+2-50	+44 404
Earth	181-42	8.40	835	+3-36	+52.8 412.8
Rock Exposed	179-41	8.20	815	+4-36	+65.7 425.7
Earth	177-30	8.10	805	+4-0	+56.3 416.3
"	174-10	8.00	793	+4-25	+61.5 421.5
Rock Exposed	172-06	8.00	790	+5-56	+82 442
Earth	165-05	7.88	780	+6-57	+94.2 454.2
"	166-37	7.60	755	+5-07	+67.8 427.8
"	163-45	7.45	742	+4-51	+62.8 422.8
"	161-30	7.25	720	+5-07	+64.2 424.2
"	161-32	7.80	770	+6-54	+93.0 453.0
"	157-02	7.05	695	+6-28	+79 439
"	156-27	6.74	670	+4-23	+51.2 411.2
"	152-33	6.97	690	+5-54	+71 431
"	144-02	6.98	690	+6-03	+73 433
Rock Exposed	138-54	7.10	700	+6-15	+76.8 436.8

Additional Topog above 360 Damsite #2

BS on #3 Stub line down ℄ from Old Mission Dam
See Bk #2 p 53   Az 3 to 4 - 230-56

Book #1 is in Office
Az of Original line not available

BS #4 in River Bed

Beginning shots for additional Contours

Cliff goes up Vert 40ft ±10ft back 960'
Toe Vert Cliff E end

Damsite #2
Add. Topog above 360

Platted Oct 25 '21 HRB.

Sta	Az	Rod	H Dist	Vert L	
T@236					
					+805
Rock Exposed	132-27	7.15	705	+6-31	440.5
" "	124-27	7.48	738	+6-26	+83 443
	120-48	8.05	799	+5-41	+79.7 439.2
#236 to #55	161-53	6.22		0	360
54 to 55	52-27	1.52			
T@ #55	6.07				
#55 to #236	341-36	6.30		0	
					+37.7
Earth	337-25	6.00	688	+3-08	397.7
					+45
Rock Exp.	340-51	7.50	748	+3-27	405
					+533
Earth	349-17	8.70	868	+3-32	413.3
"	346-29	9.25	919	+5-02	+81 441
					+845
Rock Exp	338-42	8.10	802	+6-01	444.5
" "	331-56	7.28	718	+6-52	+865 446.5
"	326-26	7.20	712	+6-39	+828 442.8
"	325-26	7.10	700	+6-40	+818 441.8
"	321-43	6.32	630	+3-50	+422 402.2
"	322-08	"	630	+2-54	+32 397
Earth not much	312-36	6.70	668	+4-0	+465 406.5
					+878
Rock Exp.	311-0	7.60	750	+6-41	447.8
					+94
Earth	304-27	8.30	820	+6-34	454
"	300-12	8.95	885	+5-50	+90.2 450.2

End shots to So Side

Begin shots to No side

Sept 23/21

BK #2 - p11

BS #54

1st Add Topog Shot to No Side.

Domestic #2

Add Topog above 360

small cliff outcrop Top

" " " Toe

Platted Oct 25-21 R.B.

Sta	Az	Rod	H. Dist	Vert ∠	
	5.07				+83.8
⊼ @ 55 ✓	293-30	10.80	1075	+4-27	443.8
					+82.5
Rock Exp ✓	287-20	10.60	1055	+4-28	442.5
					-31.5
✓	335-15	5.40	538	-3-21	328.5
					-46.3
✓	336-32	5.18	514	-5-0.9	313.7

See also pages 52+53

Plotted 10/25/21 HEB

Additional Topog above 360 Damsite #2

⊼ ℄ Gulch Rock Washed bare

} two shallow Test pits in Earth

End shots to No Side

"P" Line

Sta	Az	Rod	H. Dist (BS)	Vert ∠ (HI)	FS	Elev
π @ #67	H.I. = 364.47 4.47					360
#67 to "P" 0+00	30°-22'	4.96	483.2	-9°-36'	-81.71	278.3
π @ 0+00			4.93	283.23		
BM	341-36	0.66	67	0	1.26	281.97
π @ P0+00▲	4.93					
0 to ▲2+91	256°-43'	2.90	291	+0°-47'	1.50	281.73
π @ 2+91▲			5.17	286.90		
1					8.6	278.3
2					8.9	278.0
5+23					11.44	275.46
2+91 to 5+23▲	254°-51'	2.31	232	-1°-33'		
π @ 5+23	4.6		BS 4.62	HI 280.08		
3		2.22	223	+1°-0'	+3.8	279.3
4					3.8	276.3
5					4.7	275.4
to 9+43▲	220°-10'	4.19	420	-1°-50'	13.44	262.02
6					5.5	274.6
6+78					7.8	272.3
			4.43	266.45		
π @ 9+43						
7					2.2	264.3
8					6.0	260.5
9					6.1	260.4
10					3.1	263.4
to 10+50▲	196°-37'	1.06	107		3.11	263.34

Hayler Loc
Franklin π
Williams Rod.

Transit #3

1.26

P Begins

Alibi {Vert Vernier poor shape}

Profile for Pipe Line Mission Dam to S.D. Sept 24/21

F.S. #68 = Az 81°-47'

π H.I. = 278.3 + 4.93 = 283.23 − 1.26 = 281.97 {Iron Bolt in top of Abutment of Old Mission Dam. Appox Axis also}

BS on 262.02 @ 9+43

Sta	Az.	Rod	H. Dist	Vert ∠	FS	Elev
⊼@10+50			B.S. 5.27	HI 268.61		263.34
to 13+91	▲192°-07'	3.40	341		4.89	263.72
11					8.2	260.4
12					7.6	261.0
13					7.4	261.2
⊼@13+91			4.61	268.33		
to 15+87	▲184°-38'	1.95	196		8.74	259.59
14					5.4	262.9
15					8.8	259.5
⊼@15+87			4.72	264.38		
to 21+66	▲170°-57'	5.78	579	+0°-46'	+7.75	267.34
16					4.5	259.9
17					5.3	259.1
18					4.2	260.2
19					3.8	260.6
20					1.0	263.4
⊼@21+66			5.21	272.55		
to 25+16	▲200°-35'	3.49	350		0.23	271.62
21					4.5	268.1
22					4.8	267.8
23					3.4	269.2
24					2.0	270.8
25					0.8	271.8
to ⊼@25+16			5.23	276.70		
30+90	▲224°-04'	5.73	574	-1°-06'	11.03	260.59

13+91
1 96
15+87

1587
578
21+66
350
25+16

25+16
5-74
30+90

B.S. on 10+50 263.34

H.I. off 13+91

259.7

267.6
4.8
72.4
9
71.5

H.I. off 15+87

267.23

H.I. off 21+66 267.34

271.47

In Co Highway Grade

260.61

Sta	A2	Rod	H. Dist	Vert ∠		Elev
	BS	FS				
π @ 25+16	5.23	5.23	276.70			
26					5.5	271.2
27					6.6	270.1
28					9.1	267.6
29					12.0	264.7
π @ 30+90		5	5.35	265.94		
to 36+31	237°-29'	5.40	541		9.98	255.96
30					3.1	262.8
31					5.3	260.6
32					8.5	257.4
33					9.7	256.2
34					9.9	256.0
35					10.3	255.6
36					9.9	256.0
π @ 36+31		5.18	261.14			
to 42+34	244°-07'	6.02	603	+0°-48'	+8.44	264.40
37					4.8	256.3
38					4.2	256.9
39					5.3	255.8
40					7.8	253.3
41					4.9	256.2
42		5.66	567	+0°-35'	+5.77	264.8

5.17

30+90
5 41
36+31
7 03

43 34
271.47

25+16

261.80
5.23
267.03

255.89

36+31

264.15 by levelling

Sta	Az	Rod	Hor Dist	Vert ∠		Elev
		BS	HI	FS		
℄ @ 42+34			5.17	269.57		
to 47+05	214°-54'	4.70	471		9.70	259.87
43					7.2	262.4
44					9.8	259.8
45					10.3	259.3
46					9.6	260.0
℄ a						
℄ @ 47+05			5.13	265.00		
to 49+50	196°-23'	2.44	244	-3°-48'	-16.13	243.68
47					4.8	260.2
48					11.4	253.6
49		2.95	295	-3°-38'	-18.7	241.
℄ @ 49+50			5.10	248.78		
to 53+00	175°-12'	3.49	350		10.21	238.57
50					8.4	240.4
51					10.8	238.0
52					10.7	238.1
to 56+90	195°-00'	3.89	390	? (+4°-02') ?		249.58
℄ @ 53+00			5.29	243.86		
54					3.7	240.2
55					1.4	242.5
56		3.00		+1°-08'	7.60	244.6

HI from 42+34 264.15

259.58

HI off 47+05

243.56

(Stakes marked wrong for this page 100.)

HI off 49+50

238.44

(?)

249.58

HI off 53+00

43+34
4 71
48+05
2 45
50 + 50
1 51
54 + 00
3 + 90
57 + 90

Mon 9/28/21

Sta	Az	Rod	H. Dist	Vert L	Elev
	BS	HI	FS		
℄ @ 56+90	5.08	5.08 ✓	254.66 ✓		249.58
to ″ 44	93°-31′	2.96	249	+23-40 +109.34	358.8 ✓
44 to 43	22-22			0	
℄ @ 56+90	5.00	5.00	254.58		
to 61+90	193-08	4.99	500	−0°−1′ 5.75	248.83 ✓
℄ @ 61+90	5.07		253.90		248.83
No of Highway 57+94 / 59+40	13-08	3.95	396	−1°-21′ -9.3	✓39.5 ✓
〃	〃	2.50	250	−5°-57′ -25.4	✓13.4 ✓
63+23	198-32	1.32	133	−0°-53′ 7.1	✓46.8 ✓
to 64+25	198-32	2.34	235	−0°-35′ 7.49	246.41 ✓
℄ @ 64+25	5.09	5.09 ✓	251.50		246.41
63+65	18-32	0.61	60	−10-32 -11.0	235.4
63+15	192-47	0.90	90	−6-38 -10.3	236.1
66+30	〃	2.05	205	−3-40 -13.8	233.1
66+71	〃	2.45	246	−0-40 -2.8	✓43.6
to 68+43	192-47	4.17	418 ✓	+0°-56′ +6.81	253.22 ✓
℄ @ 68+43		4.53	257.75		253.22
67+51	12-47	0.91	92 ✓	−2°-28′ -3.9	✓49.3
69+39	196-30	0.95	96	6.0	251.8 ✓
71 12	198-20	2.68	269	3.5	254.3 ✓
to 73+61	200-18 ✓	5.17 ✓	518 ✓	+0°-27′ 0.60 +4.09	257.31 ✓

61+90
2 35
64+25
4+16
68+43.3
5+17.8
73+61

64 5
48
59.7

Rod 4.30 +14°-21′ to Sta 57 = 360.

Tie "P" to 360. Cont Line

Book # p #

Levels for Check

HI. off 56+90 = 249.58

		HI.	+		
✓	263.72 ✓	264.49	0.77	13+91	
	59.7	4.8		15+87	
TP	261.87	262	274.90	13.03	
	267.23	7.67		21+66	
	271.47	3.43		25+16	
TA	272.09	281	272.73 ✓	0.64	
TP	260.61	12.12	261.59 ✓	0.98	on 30+90
	255.89	5.70	268.89	13.00	" 36+31
	264.15	4.74			on 42+34
	259.58	9.31	260.08	0.50	" 47+05
TP	247.79	12.29	249.48	1.69	
	243.56	5.92			on 49+50
	238.44	11.04	251.23	12.79	" 53+0
	242.58 ✓	1.65			
		57.54 ✓		4340	
				144	
					− 57.54
					+ 43.40
					− 14.14
				6272	
				1414	
				4858	

Stg	Az	Rod	H Dist	Vert L.	Diff	Elev
K@73+61			473	267.04		253.31
74+25	247-54	0.80	64	-27°-16'	-33.0	224.3
74+74	"	1.14	113	-6°-53	-13.6	243.7
75+14	"	1.53	153	-7°-06	-18.9	238.4
75+98	"	2.37	237	-4°-12'	-17.3	240.0
76+48	"	2.87	287	-3°-23	-16.9	240.4
76+94	"	3.32	338	-1°-23	-8.0	249.3
to 77+30	247-54	3.68	369		8.69	253.35
K@77+30			449	257.84		253.38
78+23	258-13	0.93	93	-3°-04	-5.0	248.4
79+19	"	1.88	189		7.2	250.6
to 80+13	258-13	2.82	283	+0°-52'	+4.27 0.13	257.71
K@80+13			513	262.84		257.71
to 81+42	223-38	1.28	129	+4°-05	+9.17	266.88
K@81+42			513	272.01		266.88
to 83+12	248-12	1.69	170	-4°-01	-11.89	254.99
K@83+12			527	260.26	-11.89	254.99
83+81	279-02	0.75	69	-18°-08	-22.5	232.5
85+32	"	1.20	120	-4°-42'	-9.9	245.1
85+72	"	2.60	260	-4°-33'	-20.7 -1.39	234.3
to 88+43	279-02	5.30	531	-0°-09'	6.70	253.56

73+61
3 69
77+30
2 83
80+13
1+27
81+42
83+12
88+43

Sta	Az	Rod	H. Dist	Vert ∠	Diff. Elev
℄ @ 88+43		4.57	258.13 257.97		253.56
to 89+13 ▲	254-26	0.69	70	-1°-0' 5.78	252.35 252.19
℄ @ 89+13		2.84	256.40 24		253.56
to 90+24 ▲	227-13	1.10	111	-1-10 6.37 -2.27	249.87 250.03
℄ @ 90+24		4.42	254.45 29		250.03 249.87
90+45	237-11	0.21	21	-13°-15 -4.9	245.1
91+09	"	0.90	85	-14-40 -22.3	227.7
91+75	"	1.52	151	-5°-45 -15.2	234.8
to 93+00 ▲	237-11	2.75	276	-1°-0 9.25 -48.2	245.20 245.04
℄ @ 93+00		4.44	249.64 48		245.50 245.04
to 94+30 ▲	231-43	1.29	130	-0°-37 5.89 -1.40	243.75 243.59
℄ @ 94+30		4.40	248.15 247.99		243.75 243.59
95+28	225-09	0.98	98	-5°-10' -8.9	234.9
95+95	"	1.65	165	-3°-44' -10.8	233.0
to 98+52 ▲	225-09	4.21	42	+0°-20 2.10 +2.46	246.05 245.89
℄ @ 98+52		4.60	250.65 49		246.05 245.89
Backshot 96+60	45-09	1.35	19	-8°-08 -2.75	248.6

88+43
70
89+13
1 11
90+24
2 76
93 00
1 30
94+30
4 22
98+52

284

225-09
150
75 09

H.I. off 88+43 253.40 by B.S.

Tues 9/27/21

BS HI FS

Sta	Az	Rod	H. Dist	Vert. L	Diff	Elev
T@98+52	4.6		250 ✓65 ~~49~~			246.05 ~~245.60~~
Back Shot 97+72	45-09	0.81	80	-6°-07	-8.7	✓37.4
as usual 98+90	237-21	1.21	118	-11-02	-23.0	223.1 ✓
to 100+68 ▲	237°-21'	2.15 ✓	216 ✓	-2°-39'	-9.97	236.08 ~~235.52~~
T@100+68		4.27	240.19			236.08 ~~235.52~~
101+87	263°-34	1.46	119	-26-08	-58.2	177.9 ✓
102+41	"	1.86	183	-8-54	-28.6	207.5 ✓
103+19	"	2.50	251	+0-23	+1.7	✓37.8 ✓
103+89	"	3.20	321	+2-20	+13.10	✓49.2 ✓
to 104+28 ▲	263°-34'	3.59	360'	+2-30	+15.69	25[illegible] ~~251.61~~
T@104+28		4.30	~~256.07~~ ~~255.91~~			"
105+59	238-24	1.30	131	-3°-10'	-7.2	244.6 ✓
to 106+61 ▲	238°-24'	2.32 ✓	233'	-1°-01	-4[illegible] 8.51	247.~~40~~ ✓56
T@106+61		4.70	252.~~+0~~ ✓26			"
106+91	264-06	0.32	30	-18°-45'	-10.0	237.6 ✓
107+34	"	0.90	73	-26°-40'	-36.6	211.0 ✓
107+48	"	0.94	87	-16°-54'	-26.5	✓21.1 ✓
107+90	"	1.29	130	-2°-30	-5.6	✓42.0 ✓
to 108+60 ▲	264°-06'	1.98	199'	+0-7'	4.30	247.~~80~~ 96
T@108+60		4.56	252.~~36~~ ✓57			"
to 110+03 ▲	235°-34'	1.42	143'	-1°-51	9.05	243.~~21~~ ✓47

BS put up Gulch

98+52
2 16

100 +	68
3	60
104 +	28
2	33
106 +	61
1	99
108 +	60
1	43
110 +	03

		B S		H.I.		F S
Sta	Az	Rod	H. Dist	Vert ∠	Diff	Elev
⊼@110+03		4.27	247.~~58~~ 74			243.~~31~~ 47
111+15	216-32	1.11	112		10.0	237.7
111+76	"	1.72	173		7.6	240.1
112+12	"	2.08	209		4.8	242.9
to 112+62 ▲	216°-32'	2.58	259	-0°-25'	5.90	241.~~68~~ 84
⊼@112+62		4.81	246.~~49~~ 65			"
* 112+97	198-50	0.29	30		+1.0	247.7
* 114+03	203 0	1.40	141		-6.5	240.2
*	187-56	3.04	277	+17-55	+89.5	331.3
114+88	214-40	2.25	226		3.6	243.0
to 115+54 ▲	214°-40'	2.91	292	+0°-42'	1.31	245.~~18~~ 34
⊼@115+54		5.02	250.~~20~~ 36			"
116+35	217-36	0.82	81	-8°-55'	-12.5	232.8
to 117+00 ▲	217°-36'	Level 1.45	146	-2°-47'	11.23	~~238.97~~ 239.13
⊼@117		4.30	243.~~27~~ 43			"
to 117+96 ▲	208°-01'	Level 0.95	96	-0°-01'	4.40	~~238.87~~ 239.03
⊼@117+96		4.55	243.~~42~~ 58			
118+87	202-43	0.90	91		8.4	235.2
119+57	"	1.60	161		12.0	231.6
to 120+52 ▲	202°-43'	2.55	256	-0°-10'	5.08	~~238.34~~ 238.5

110+03
2 59
112+62
2 92
115+54
1 46
117+00
96
117+96
2 56
120+52

N.B.

about where pipe line would go. Deep Gulch {112+62 ▲ to 115+54 ▲
Affects Stas on Profile if used S.R. Boy "

330 Fletcher #11

B.S H.I. F.S

Sta	Az	Rod	H. Dist	Vert ∠	Diff	Elev
π@120+52		4.73	243.~~87~~ 73			~~238.37~~ 238.80
to 123+91 ▲	199°-52'	3.38	339	+0°-28'	2.18	~~240.89~~ 241.05
		4.27	245.~~16~~ 32			"
π@123+91						
to 124+78 ▲	186°-18'	0.86	87'	+2°-13	0.80	~~244.36~~ 51
π@124+78		4.69	249.~~05~~ 21			"
to 125+20 ▲	154°-29'	0.41	42'	+1°-01	3.75	245.~~30~~ 46
π@125+20		4.50	249.~~80~~ 96			"
	122°-24					
127+31	"	2.10	211		9.8	240.2
to 128+80 ▲	122°-24'	3.59	360'	-0°-10'	5.72	~~244.08~~ 24
π@128+80		5.25	249.~~33~~ 49			"
131+19	260-40	2.38	239		4.5	245.0
to 132+53 ▲	260°-40'	3.72	373'	+0°-26'	2.41	~~246.92~~ 247.08
π@132+53		5.12	252.~~04~~ 20			"
to 134+00 ▲	213°-48'	1.46	147'	+0°-53	2.94	249.~~10~~ 26

```
120+52
  3 39
123+91
  0 87
124+78
  0 42
125+20
  3 60
128+80
  3 73
132+53
  1 47
134+00
```

So side Co. Highway {over Culvt / ℄ gulch} sharp turn fill W side Island #1

In Hwy on line

{No side Highway is same point (diff Elev -5±) as #12 △ of Damsite #3

No side Hwy grade

		BS	HI	FS		
Sta	Az	Rod	H Dist	Vert ∠	Diff	Elev
⊼@134		.514	254.~~24~~ 40			249.26 ~~249.10~~
to 136+66 ▲	205°-53'	2.65 ✓	266'	+0-58	0.78	253.~~46~~ 64
⊼@136+66		5.28	258.~~74~~ 90 ✓			"
to 141+35 ▲	229°-48'	4.68	469	+0°-51	+6.94	260.~~40~~ 56 ✓
⊼@141+35		5.03				
	134-24	1.21	97	+26-40 (see below)	+48.98	309.54 ✓
⊼@△#13 = 141+35	Az started anew from Dam #3 ℄ 4.95 FS. ℄ Dam 133-40 42					?
	133-40	with Plumbbob 4.95 = 1.225	265.37	+26-40	49.58	260.42 ✓
to 143+44 ▲	220-09	2.08 ✓	209	-0-41	7.38	257.94 ✓
⊼@143+44		4.37	262.36 ✓			
142+54	40-09	0.90	90	+3-08	+4.9	✓262.9 ✓
144+94	220-34	1.50	150	-3-55	-10.3	247.7 ✓
145+64	"	2.20	220	-3-40	-14.1	✓243.9 ✓
to 147+87 ▲	220-34	4.42 ✓	443	-1°-29	-11.48 ✓	246.51 ✓

Cont. on p 43

260.40
49.58
309.98

134	00
2	66
136 +	66
4	69
141 +	35
2	09
143 +	44
4	43
147	87

Level Calc's checked to 141+35

So side Hwy Grade

"P" — Tie — Dam #3

on ℄ Damsite #3 is same △ as #13 Damsite #3 ℄

Vert ∠ to Fletcher stake 310
Az on ℄ Damsite #3 — 134-24 / 133-40

Error 0.02
Error 0°44'

Wed 9/28/21

#△13 ℄ Damsite #3 — Compass read N 1° E Var 14-30

Wed Oct 5 21

to Fletcher 310 ℄ Dam

Below Co Road 50' ± N.

Minus Sta

Survey for Tunnel near St Joseph's Hospital — "T" Begins

276-22 19

Sta	Az	Rod	H. Dist	Vert ∠	Diff Elev	
		B.S.	H.I.	F.S.		
0+00						
T@		5.83	295.82			289.99
T@ 0+00	5 18				5.18	290.64
to 5+26	8°-22'	5.25	526.0	-2°-56	-26.87	263.77
T@ 5+26		4.21				
to 8+22	37-24	2.95	296.0	-2°-40	-13.76	250.01
T@ 8-22		3.98	253.99			
	198-06	3.35	336.0	-1°-05	-6.3	243.7
	188-08	1.87	185.6	-6°-29	-21.1	228.9
	102-04	0.91	75.1	-25-27	-35.7	214.3
	44-08	1.38	121.9	-20-33	-45.7	204.3
	26-25	2.54	242.4	-12-51	-55.3	194.7
	29-14	4.12	402.4	-9-12	-65.2	184.8
again T@ 8+22		3.93	253.94			250.01
T 74 to 6+78	18-38	8.55	8.52	-3°-50'	-57.09	192.92

Continued p 23

Compass reads N 1° W on 360-0

= 270 ft West

BS on 7' point S.E Cor 5th & University Ave

= 7' Point S.W. Cor 6th & University Ave

Copper plug in Curb N.W Cor 6th & Univ "

7' point S.W. Cor. 6th & Univ Ave = 0+00

5+26
2.96
8+22
8 66
16-88

W side graded road

E Side graded road

In ℄ gulch in N ½ St Joseph Hospital Lot

" " " (North and Below) " " " " "

Thurs 3/29/21

Tunnel Line South from 6th + Univ

BS HI FS

Sta	Az	Rod	H Dist	Vert ∠	Off	Elev
℄ @ 0+00			5.23	295.87		290.64
	23-12	2.81	288.0	-1°-39	-8.1	282.5
to 4+77	180°-17'	4.76	477.0	+0°-6'	4.20	291.67
℄ @ 4+77			5.23	296.90		
to 11+98	90-10-30	7.20	721.0	-0°-56'	-11.75	279.97
℄ @ 11+98			5.25			
to 14+90	133°-48-30"	2.91	288.0	-6-32	-32.99	246.93
℄ @ 14+90			5.20	252.13		
	2-11	4.35	436.	+1-40	+12.7	259.6
	8-55	3.35	336		3.65	248.5
	355-55	1.08	109		90	243.1
	77-20	0.51	51.3	-6°-32	-5.9	241.0
	171-05	0.70	69.1	-9°-31	-11.6	235.3
	168-49	3.10	309.6	-3-52	-20.9	226.0
	173-30	5.48	547.7	-2-50	-27.11	219.8
to 22+71	175-38	7.50	751	-1°-26'	-18.78	228.15

+ "T" Begins

So along R/side 6th St

b ℄

Back shot Head of gulch W/ of St/os Hospital Bldgs

7' offset City Plug SW cor 6th & Robinson Ave

4+77
7 21
11+98

7' " " " SW cor 8th + Robinson Ave
2 92
14 90
7 51
22+41

R side of road So in gulch to Park

℄ Head of gulch (near 8th + Univ.)

℄ gulch or drainage wash

" "

" "

" "

" "

" "

W/ 45' ± of road on hillside

B.S. H.I. F.S.

Sta	Az	Rod	H. Dist	Vert ∠	Diff	Elev	
							22+41 / 6 / 36 / 30+77 / 1 / 95 / 32+72 / 4 / 31 / 37+03
℄ @ 22+~~41~~ 37		4.59	232.74			226.15 ✓	✓
	43-0	0.49	45.2	−18°-11	-14.8 ✓	213.4	℄ Drainage Wash
	122-50	1.08	106.6	−8-35	-16.1 ✓	212.1	" " "
	176-15	2.28	227.0	−5-22	-21.3 ✓	206.9	" " "
	176-0	3.90	389.5	−3-34	-24.3 ✓	203.9	" " "
to 30+~~77~~ 73	181-08	8.35	8.36	−1°-57'	-28.42 ✓	199.73 ✓	E side road down into Park opp Masistens Ho
℄ @ 30+~~77~~ 73		5.08	204.81				
	350-0	3.15	316.0	+0-10'	+0.9	400.6 ✓	Back shots ℄ drainage
	7-35	1.65	166.0		9.0	195.8 ✓	" " " @ road bridge East
	25-45	0.42	42.2 ✓	−7°-40'	-5.7	194.0 ✓	℄ drainage
	155-56	1.25	125.5	−3-45	-8.2	191.5	" "
	191-30	2.10	211.0	−2-42	-9.9	189.8	" "
to 32+~~72~~ 68	193-44	1.94 ✓	195	−1°-40'	-5.68	194.05	E side road
℄ @ 32+~~72~~ 68	5.14	5.14					
	239-20	2.67	257.2	+11-37	+52.87	246.92	4"x4" Post on N Line of Balboa Park
to 37+~~03~~ 36+86	13-00	4.30 ✓	417.8	+10-05	+74.29	268.34	2"x2" Stake " " " " "

Sta	Az	B.S. Rod	H.I. H. Dist	Vert ∠	F.S. Diff	El
⊼@ ~~37+03~~ 36+86		3.98				
to 38+~~24~~07 Δ	90-40	1.20 ✓	120.5	+3-33	+7.48	275.82
⊼@ ~~38+24~~07		4.99				
	89-41-30	11.00		+0°-35	+11.23	287.05

282.96
6.12
289.08

37+03
1 21
38 + 24

to Concrete Mon. on N line Balboa Park near Richmond
Marked 79+21.20 BM 282.96 (City datum)
289.08 435.5

END F T Line

Cont'd from p 19

"T"

Stg	Az	Rod	H. Dist	Vert ∠	Diff	El	
⊼ @16+74		B.S 5.00	H.I. 197.92			F.S 192.92	E side Hwy grade opp junction of gulch from SE
	139-35	1.04	91.0	-21-27	-35.8	157.1	℄ Bot drainage from St Jos Hospital
	180-03	2.30	228.8	-5-40	-22.7	170.2	" " " " " " " "
	186-44	4.10	411.0	-1-36	-11.5	181.4	" " " " " " "
	184-42	4.50	451.0	+0°-36	+4.7	197.6	On side hill above Hwy " " "
	174-27	3.10	311.0	+1-43	+4.30	202.2	" " " " " " of drainage " " "
	167-15	3.14	312.1	+5-33	+30.3	223.2	" " " " " " " "
	151-04	2.38	234	+8-20	+34.3	227.2	" " " " " " " Cor hog back
	142-15	3.18	318	+5-50	+32.3	225.2	" " " " " around E " "
	118-16	3.75	374	-4-27	-29.2	163.7	℄ drainage from E — ℄ St Jos Gulch
	111-15	3.78	378	-4-15	-28.1	164.8	No side bot " " " toe of ridge No side
	116-52	2.45	242	-8-02	-34.2	158.7	" " " " " " " " " "
	112-34	2.06	200	-10-26	-36.9	156.0	℄ drainage from E
	114-08	1.45	135	-15-27	-37.8	155.1	Toe of hogback between gulches @ juction of
	59-25	1.26	105	-22-06	-44.4	148.5	℄ main drainage @ junct
	63-56	1.68	163	-10-55	-31.5	161.4	On ridge to E of " "
	93-23	3.43	339	+6-23	+38.1	231.0	" " E of both gulches
	72-41	2.60	258	+7-28	+33.6	226.5	" " " "
	58-11	2.70	268	+6-56	+32.4	225.3	" " " " " "
	49-50	"	268	+6-58	+32.8	225.7	" " "
	34-50	3.50	346	+6-37	+40.1	233.0	" " " Cor turning into gulch from E
	23-12	3.45	346	+0-02	+0.2	193.1	Same as last lower
	11-0	2.90	281	-10-37	-52.7	140.2	℄ main drainage
	359-0	2.55	246	-11-33	-50.2	142.7	N side " " toe ridge up to road
	9-36	1.48	132	-19-24	-46.7	146.2	" " " " " " " " "

B.S H.I. F.S

Sta	Az	Rod	H. Dist	Vert ∠	Diff	El
⊼@16+~~76~~ 74			197.92			192.92
	14-37	4.20	418	-5-22	-39.3	153.6
	23-53	5.30	531	+1-0	+9.2	202.1
	13-38	5.12	513	+1-36	+14.4	207.3
	12-02	5.85	586	+1-36	+16.4	209.3
	9-02	6.62	663	+1-57	+22.6	215.5
	9-23	7.35	736	+2-30	+32.0	224.9
to 21+~~24~~ 18 ▲	346-48	4.45	444.4	-3-29	-27.05	165.87
⊼@21+~~24~~ 18		5.20	171.05			
	29-10	3.95	387	+8-37	+58.9	224.8
	27-04	4.55	449	+7-31	+59.2	225.1
	22-56	4.80	474	+7-04	+56.9	224.8
	19-25	5.30	524	+6-0	+55.2	221.1
	16-16	5.60	554	+5-57	+57.8	223.7
	14-07	6.50	648	+4-25	+50.1	216.0
	13-01	6.70	669	+4-06	+48.0	213.9
to 28+~~10~~ 07 ▲	(347° 17') 349-43	6.85	684.2	-3°-00	-35.88	129.99
⊼@ 28+~~10~~ 07		5.23	135.20			
	159-02	6.90	691	+0-34	+6.8	136.8
	153-35	4.35	436	+0-58	+7.4	137.4
	148-40	3.20	321	+0-37	+3.5	133.5

16+78
4 46
21+24
6 84
28+10

℄ gulch #2 from E up bottom 100' ± dist. from E main drainage
On Hill E of main drainage & Not above gulch
" " " " " " " " @ Cor
" " " " "
" "
" "

On Hill to E of main drainage
" "
" "
" "
" "
" "
" "

Break at ridge Canyon to East

on E Side highway grade

In Bot Main Drainage E to E ridge
" " " "

B.S. H.I. F.S.

Sta	Az	Rod	H. Dist	Vert ∠	Diff	El.
T @ 28+78 OV			135.28			129.99
	135-30	2.00	201	-2-52	+10.0	120.0
	112-27	1.60	161	-1°-56	-5.4	124.6
"	72-50	1.58	159	-0-24	-1.1	128.9
"	75-12	2.25	221	+8-28	+32.9	162.9
"	63-19	3.50	348	+5-05	+30.9	160.9
"	30-29	2.85	283	+6-23	+31.6	161.6
"	27-52	4.15	394	+13-08	+92.0	222.0
"	39-16	7.05	387	+14-06	+96.0	226.0
"	47-40	4.25	407	+12-27	+89.7	219.7
	50-30	measured 11.0	11.0			
"	30-33	2.45	246	+1-30	+6.4	136.4
"	52-40	2.15	216	-0-36	-2.2	127.8
"	4-03	3.25	326	-2-07	-12.0	118.0
to 32+76 66	11-49	4.65	464.4	+3-20	+27.03	157.02
T @ 32+76 66			4.30	161 30		"
to 37+89	39-22	5.22	523	+1°-57	+17.78	174.80
T @ 37+89			4.41	179 19		"

28+10
+ 66
327 76
5 23
37+99

Along toe ridge E of drainage

" " " "

" " " " @ cor into gulch #3

Break at ridge Canyon to East

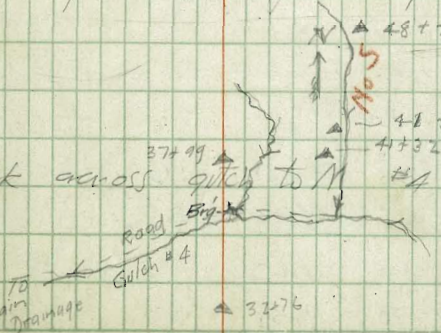
No side of " " "

Triangular Stake marked V.L. 364

On hill toe No side gulch to E

& Bot gulch to E

On Cor of hogback across from highway



		B.S.	H I	F.S.		
Sta	Az	Rod	H. Dist	Vert ∠	Diff	El
⊼ @ 37+~~92~~ 89		–				174.80
✓	204-14	5.00	497	+5-31	+48.0	222.8
✓	198-17	4.65	463	+5-18	+42.9	217.7
✓	191-0	4.35	431	+6-25	+48.4	223.2
✓	185-58	4.08	404	+7-18	+51.6	226.4
✓	177-26	4.10	405	+7-12	+51.3	226.1
✓	170-07	4.45	438	+7-30	+57.8	232.6
✓	162-0	4.05	404	+2-47	+19.6	194.4
✓	149-40	3.80	376	-6-12	-40.9	133.9
✓	143-24	3.65	35✓	-11-24	-71.0	103.8
✓	161-18	2.70	256	-13-30	-61.5	113.3
✓	181-50	2.40	221	-16-42	-66.3	108.5
✓	198-25	2.50	238	-15-02	-63.0	111.8
✓	210-36	3.05	293	-11-49	-61.4	113.4
✓	223-54	3.95	383	-10-47	-72.7	102.1
✓	228-57	4.85	475	-8-56	-74.4	100.4
to 41+~~32~~ 20 △	110-54	3.32 ✓	331.0	+4-27	+25.76 ✓	200.56 ✓
⊼ @ 41+~~32~~ 20		442	204.98			"
	246-57	2.45	210	-22-26	-82.0	113.6
✓	221-08	2.10	172	-25-03	-81.1	119.5
✓	176-15	2.38	213	-20-05	-77.4	123.2
✓	152-10	1.42	106	-28-14	-59.7	140.9
✓	178-50	1.35	103	-29-42	-58.6	142.0

37+99
3 33
41+32

No slopes of hogback of 32+76 △ So side gulch #4
" " "
" " "
" " "
" " "
" " "
" " "
" " "

℄ gulch #4
along toe of hogback So side gulch #4
" " " "
" " " "
" " " "
" " " "
" " " "

℄ gulch #4
" " "
" " " junct with gulch from No or #No 5 (skatch p25)
on hill toe W side gulch #5 below 41+32
" " " " " " " " "

B.S. H.I. F.S.

41+32
47
41+79
6-41
48 20

Sta	Az	Rod	H. Dist	Vert ∠	Diff	El	Remarks
⊼@41+~~32~~ 20			204.98			200.56	
	232-0	1.40	96.0	-34-30	-46.8	153.8	No side gulch #4 toe hill to North
	167-20	2.03	181	-20-05	-66.0	134.6	" " " " " " " " {break into gulch W#5 {Between 37+49 & 41+32
	312-37	0.76	73	+13-55	+18.0	218.6	On same hill with 41+32
	5-54	0.96	76	+27-47	+40.0	240.6	" " " " " above ▲
To 41+~~79~~ 67 ▲	87-08	0.46	47	By levels	-2.71	202.27	
⊼@41+~~79~~ 67		4.36	206.63				
	94-50	1.26	106	-24-10	-47.5	154.8	Up r/side gulch #5 of p #25 sketch
	76-10	1.42	135	-13-52	-33.3	169.0	Toe " " " "
	69-06	2.25	223	-7-50	-30.5	171.8	" " " "
	68-23	2.94	294	-4-45	-24.3	178.0	" " " "
	66-02	4.05	404	-2-42	-19.5	182.8	" " " "
	52-44	3.50	348	+5-32	+33.7	236.0	same hill side high up
	48-52	3.36	333	+6-38	+38.7	241.0	" " " " "
	46-0	2.35	229	+9-24	+38.0	240.3	" " " " "
	43-36	2.05	203	+7-52	+27.9	230.2	" " " " "
	43-18	1.05	107	+9-06	+16.6	218.9	" " " " "
To 48+~~20~~ 08 ▲	59-46	6.40	641	+2-21	+26.28	228.55	East side gulch #5
⊼@48+~~20~~ 08		4.55	233.08				
	234-25	2.00	193	-11-23	-38.9	189.7	Same hill above same toe
	224-03	2.08	195	-15-36	-54.5	174.1	℄ gulch #5

BS HI FS

Sta	Az	Rod	H Dist	Vert ∠	Diff	El
⊼@48+20 (08)		4.55	233.08			228.55
	247-0	1.53	146	-13-15	-34.4	192.2
	254-06	1.85	186	-0-34	-1.8	226.8
	288-34	1.59	160	-0-27	-1.3	227.3
	313-56	1.36	137	+0-25	+1.0	229.6
	347-13	1.71	171	+2-50	+8.5	237.1
	345-34	1.03	96	-16-0	-27.6	201.0
	7-30	1.50	148	-7°-54	-20.5	208.1
	18-54	2.38	239	-2-33	-10.4	218.2
	25-50	3.00	301	-0-53	-4.6	224.0
	26-56	3.45	346	Levels	5.3	227.8
to 52+55 (42) ▲	27-06	4.34	433.68	+3-09	+23.89	252.44
⊼@52+55 (42)		4.29	256.71			
	170-30	0.55	48	-22-58	-20.2	232.2
	83-14	0.89	88	-8-52	-13.7	238.7
	80-40	1.60	161	Levels 1.01		246.6
	80-28	2.90		+1-09	+5.8	258.2
to 57+26 (08) ⊙	81-10	4.70	466.46	+5-39	+46.16	298.60
⊼@57+26 (08)		4.25	302.83			
	138-18	0.53	46	-23-12	-19.6	279.0
to 59+98 (72) ▲	81-10	2.71	264.32	+9-41	+45.10	343.70

48+20
4 35
52+55
4 71
57+26
2 72
59+98

Same hill same toe
" " higher up
" " "
" " "
" " "
℄ gulch #5.
" " "
" " "
" " "
" " "

Hub is tack in old stake scribed { No side #228 So " #229
is also on W side gulch #5

℄ gulch #5
" " "
" " "
" " "

is on W side of gulch #5 P.O.T.

℄ gulch
On fill W side Maryland St

347.00

		BS	H.I		FS		
Sta	Az	Rod	H. Dist	Vert ∠	Diff	El	
⊼@59+~~48~~ 72		5.18	348.86			343.70	W side Maryland St fill
to 63+~~66~~ 40 △	1°-00	3.67	368	+1°-06	+7.08	350.78	7' plug @ S W Cor Madison Ave & Maryland St (Curb Elev. should be 347.00 + 6.12 = 353.12)
⊼@63+~~66~~ 40	0°-14'	(Az. Tie)					to 7' plug W side @ End of Maryland St
⊼@63+~~66~~ 40		5.23	356.01			"	
to 68+~~32~~ 06 △	310-16	4.65	466	-0-29'	-3.92 9.16	346.86 346.85	Top steep bluff head of gulch near No. end of Delaware St
⊼@68+~~32~~ 06		4.43	351.26			"	
	316-50	1.35	81	-39-28	-66.5	280.4	Head of gulch bottom of bluff
	317-12	2.85	213	-30-33	-125.3	221.6	℄ of bot. gulch
	316-41	4.25	352	-24-53	-162.63	184.20	" " " "

59+72
3 68
63+66
4 66
68 32

Gulch next W. of #5

" T I "

Line up gulch between 37+99 & 41+32 Mon Oct 3/21

37+99
5 56
43+55

F.S. on 41+32

on hillside North of Gulch next W. of Gulch #5

Sta	Az	Rod	H Dist			
T@37+89		4.32	179.10			174.80
✓	94-20	2.67	261	+9-38	+44.2	219.0
✓	77-02	3.26	315	+11-08	+61.9	236.7
✓	65-30	3.76	360	+11-55	+76.1	250.9
✓	59-32	4.30	419	+9-36	+71.0	245.8
✓	55-50	4.55	441	+10-06	+78.6	253.4
✓	53-20	4.90	478	+9-28	+79.8	254.6
✓	47-53	5.15	499	+10-38	+94.4	269.2
✓	46-16	5.55	543	+9-06	+87.2	262.0
to 43+55	41°-31'	5.55	549.9	+6°-0'	+57.83 ✓	232.63 ✓
T@37+89 ✓	37-24	4.90	491	+2-42	+23.1	197.9
✓	38-50	4.15	416	+1-18	+9.4	184.2
✓	42-58	3.38	339	Levels 4.4		174.7
✓	39-45	3.18	319	-1-43	-9.5	165.3
✓	48-50	2.53	254	-3-30	-15.2	159.6
✓	50-40	2.16	214	-6-34	-24.6	150.2
✓	69-20	1.84	183	-8-0	-25.5	149.3
✓	134-43	1.63	159	-15-26	-42.1	132.7
✓	136-02	1.32	104	-26-35	-53.3	121.5
T@43+55		4.80				232.63
	274-35	1.25	102	-26-10	-50.0	182.6
	303-37	1.15	94	-26-05	-46.0	186.6

same hillside lower

" " "

" " "

℄ Bot gulch

Toe E of ℄

℄ gulch

Toe of same hill Low down

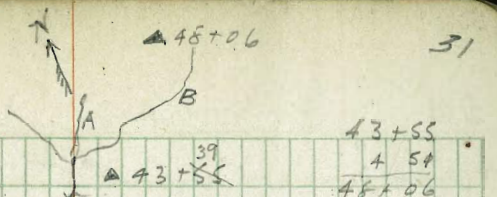
" " " " " break @ Cor

℄ gulch @ out-let

℄ bot gulch

℄ " " @ junct of 3 drains

Sta	Az	Rod	H Dist	Vert ∠	Diff	Elev
℄ @ 43+55 39		4.50	237.41			232.62
	340-07	1.27	124	-1-06	-24.2	208.4
	352-24	1.61	161	-3-36	-9.9	222.7
	359-07	2.20	221	+2-08	+8.2	240.8
	3-23	2.70	269	+5-44	+26.9	259.5
	5-54	3.25	315	+8-24	+47.2	279.8
	7-10	3.64	354	+10°-0'	+62.5	295.1
	55-15	3.85	375	+9-40	+64.0	296.6
	54-38	3.03	299	+7-12	+38.0	270.6
	59-52	2.15	214	+6-06	+22.8	255.4
	55-30	1.45	146	+2-02	+5.2	237.8
	54-15	1.17	118		6.5	230.9
	9-28	0.71	65	-18-06	-21.3	211.3
47+71 to 48+06	52°-49'	4.50	432.4	+11-43	+89.68	322.31
47+71 ℄ @ 48+06		4.50				
50+74 to 51+10	11-41	3.03	302.88	+3°-28'	+18.36	340.67
		5.14				
50+74 ℄ @ 51+10						
To 52+51.15	14°-45'	1.40	141.0	+0-26'	4.08	341.73



43+55
4 54
48+06
3 04
51+10
1-41
52+51

℄ of draw in ℄ of head of gulch or "A"

℄ of " " " " " B

On top @ head of gulch B

℄ Madison Ave @ Intersect with E prop Line Rhode Island Ave

π @ 52+~~51~~ 15		5 10				341.73
				4.10		342.73
	90-16					
To ~~55+24~~ 54+88 @	41-47	2.72	273	-0°-29'	7.29	339.54
		442				
π @ ~~55+24~~ 54+88	T'					
page #29 to 68+32 T▲	83-00	4.92	493	+0°-47	+6.75	346.29
π @ ~~55+24~~ 54+88	31-57	2.75	200	-31°-36	-123	216.5
"	42-17	2.40	167	-33-52	-112	227.5
"	20-23	4.00	3.15	-27-42	-165.1	174.4
π @ T 68+32 06						
to T 63+66 40	130-17	OK Az				

BM on Mon @ SW Cor Madison & Rhode Is Ave's
Shot E on ℄ Paving Madison Ave

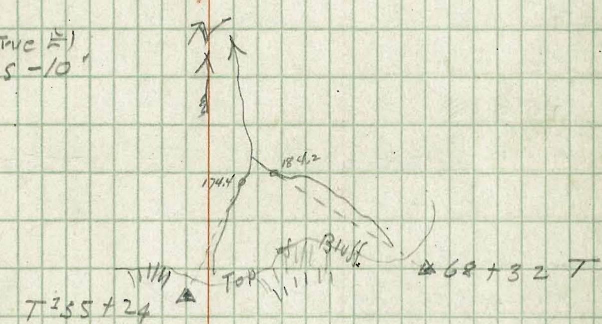
@ Head (on top of Bluff) deep gulch No of Madison Ave

52+51
2 73
55+24

Tie to T' from T² — Error: Level 0.5, Az 0-01'

Bot ℄ draw { True E 15-10'
" " "

310-16
180
130-16



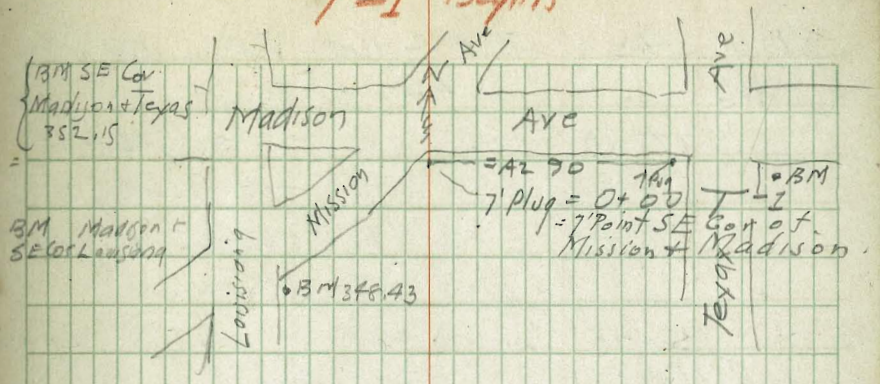
Tunnel Line - Sandrock Grade to Balboa Park.

North from Madison Ave.

Sta	Az	Rod	H. Dist	Vert ∠		
		2.96	355.11			352.15
Az from E St Line 7' plug						
T @ 0+00	5°23				5.23	347.88
					6.71	346.40
to 3+30	38-58	3.29	330	+0°-29'	2.65	352.46
T @ 3+30		4.36	356.82			
to 6+17	0-17°	2.86	287	-1°-54	-9.5	342.96
T @ 6+17		4.26				
	66°-45	1.10	91	-25-10	-42.3	300.7
	21°-0	1.72	153	-19-44	-55.0	288.0
to 11+68	356-09	5.50	538.64	-8-37	-81.63	261.33
T @ 11+68		4.51	265.84			
	162-40	1.72	173		7.3	258.5
	146-0	0.59	56	-16-12	-16.0	245.3
	9-27	2.00	193	-11-32	-39.4	221.9
To 16+86	4-18	5.17	511.48	-6°-26'	-57.65	203.68

2+6 352.15

T-1 Begins



3+30
2 87
6+17
5 51
11+68
8 18
16+86

Is on bank above road down gulch 150' ± above R.R. Bridge

℄ Bot Gulch above El Ry Bridge

East edge of Road

℄ 130' gulch

Sta	Az	Rod	H. Dist	Vert ∠	Diff	Elev.
π@16+86 (67)		4.18	207.86			203.68 ✓
	177-10	0.96	96	−3-36	-6.0	197.7 ✓
	168-20	0.39	36	−16-02	-10.7	193.0 ✓
	68-40	0.42	35	−25-26	-16.7	187.0 ✓
		End	this	Line North		
	Same	Line π again	on	0+00		South
π@0+00	5.23	6.70	355.13			348.43
					5.23	349.90 ✓
to	▲ 242-58	5.92	593	−0-39	-6.73	343.17 ✓
to 5+55	▲ 236°-35′	5.54	555 ✓	−0-38	-6.16 ✓	343.74 ✓
						"
π@5+55		5.29	349.03 ✓			"
to 10+56 ✓	▲ 241-28	5.00 ✓	501 ✓	−1°-31′	-13.25 ✓	330.49 ✓
π@10+56		5.03	335.52 ✓			"
To	182-03	1.34	135			
to 18+71 ✓	▲ 180-23	8.14	815 ✓	−0°-27	-6.46	324.09 ✓
π@18+71 ✓		5.17				
to 24+97 ✓	▲ 180-0	6.25	626 ✓	−1°-10′	-12.78 ✓	311.31 ✓

10-56
8 15
———
18+71
6 26
———
24+97

℄ Bot Gulch
" " "
" " "

from Madison — T+1
0+00 = 7′ Tie Point Plug SE Cor Mission + Madison
SWlly along So side Mission Ave

0+00
7′ Tie Point NW Cor Mission + Mississippi

7′ Tie Point SE Cor Mission + Mississippi

@ SWl. Cor of Mission + Alabama

(7′ Tie Point) SWl Cor Alabama + Monroe

@ SWl Cor Alabama + Meade (no 7′ Point found)

@ NWl cor " El Cajon {7′ E of Wl Prop Line on Curb
= 7′ E. of W. Line of Alabama + .55 N of N Curb of El Cajon.

Sta	Az	Rod	H Dist	Vert ∠	Diff Elev	BS	HI.	FS	
π@24+97		4.18	315.43		311.31				
				2 6 1	312.88				
to 30+39 △	180-03	5.41	542	-1°-34'	-14.80	296.51			
π@30+39		5.18	301 69		11				
to 36+54 △	180-02	6.14	615	-0°-6'	6.20	295.49			
π@36+54		5.13	300 67		11				
to 43+35 △	180-03	6.80	681	-0-22	9.13	291.49			
π@43+35									
	180-04								
		5.24	297.47		292.23				
π@43+35	5.16								
To 46+61 △	257-00	3.25	324.4	-4°-02'	-22.90	269.33			
π@46+61		5.18	274 51						
to 49+57 △	180-05	2.95	296	+0°-41'	+4.95 4.14	270.18			

5.24
42.23
297.47
5.15
292.32

24+97
5 42
30 39
6 15
36+54
6 F1
43 35
6+79
50+14

312.69 BM NE Cor Alabama + El Capitan

7' Point SW Cor Alabama + Howard - No Plug in.

7' point NW Cor Alabama - Polk

Alabama + Lincoln 7' point found

	HI.		
	5.74	277.35	27161

7' point Alabama at Unv Ave 1.76 275.59

BM Alabama + Lincoln Curb NW Cor

FS Alabama at Unv Ave Az of 180-04 43+35

3-26

46+61

Approx SE Prop Line Cor Florida + Lincoln 2 9 6

49+57

270.37

	B.S	H.I	F.S			
Sta	Az	Rod	H. Dist	Vert ∠	Diff	El
⊼@49+57		4.71	275.08			270.37
	145-12	0.38	36	-17-48	-11.5	√58.9
	136-07	1.70	169	-4-53	-14.4	√56.0
	137-0	2.72	272	-3-20	-15.9	√54.5
to 53+08 ▲	151-06	3.50	351	+1-42	+10.43	280.80
⊼@53+08		4.84	285.64			"
	352-48	0.63	44	-34-40	-29.5	√51.3
	167-26	0.75	76		7.21	278.4
		2.22	223	-2°-09	-8.37	272.43
to 60+17 ▲	168-40	7.08	709	-2-48	-34.59	246.21
⊼@60.17		4.50	250.71			
		5.85	586	+0-37	+5.9	√52.1
	351-29	3.50	351		6.3	√46.4
	353-25	1.25	126		11.2	√39.5
	338-35	0.26	24	-20-44	-9.0	√37.2
	222-0	1.50	150	-4°-32	-11.9	√34.3
	202-10	4.20	421	-2-18	-16.8	√29.4
to 67+53 ▲	194-26	7.35	736	-0-22	9.08	241.63
⊼@67+53		4.49	246.12			"
	5-55	2.21	220	-3-34	-13.8	√27.8

Outlet 36" Conc pipe bottom invert
On surface in bottom wash
" " " " "

53+08
7 09
60+17
7-36
67-53

On Prop Line + No side fill Univ Ave

Tues 10/4/21

No side fill
Invert 36" Culv Conc Pipe under Univ Ave
So side Top fill Univ Ave over ℄ wash
On BM NE Cor Univ. + Alabam Conc Mon
271.61

So side toe Univ Ave fill in invert of Culvert 36"
℄ of wash
" " "
" " "
" " "
" " "

" " "

Sta	Az	Rod	H. Dist	Vert ∠	Diff	El
⊼@67+53			246.12			241.63
	26-55	1.55	154	−6°-05	-16.5	√25.1
	137-50	0.86	83	−13-14	-19.4	√22.2
	150-47	1.70	168	−7-26	-21.9	√19.7
	185-54	2.95	294	−5°-0	-25.7	√15.9
	193-14	5.50	550	−2°-51	-27.7	√13.9
	191-10	7.38	738	−2-37	-33.7	√07.9
to 76+64	△190-47	9.10	911	−2-24	-38.08	203.55
⊼@76+64		5.31	208.86			
	180-06	4.00	401	−0°-32'	8.9	200.0
	181-02	3.35	336		9.7	199.2
	181-33	1.97	198		7.9	201.0

Ends @ No side

67+53
9+11
76+64

℄ of Wash
" " "
" " "
" " "
36" Culvert {Top Concr. top E side Florida St
℄ E gutter = ℄ Wash Curb wrecked by wash
13' point = 13' W + 13 S. of Intersect of St Lines
In Florida St @ Myrtle Ave Old R.R. Hub out {Spike put in

End. is at No Line of Balboa Park
13' line W of ℄ Florida St √ for Az FS @ Upas {Approx 13' Lines Both out}
In W gutter
" " "
of Balboa Park + Florida St

East San Diego Tunnel Line "T-2"

Sta	Az	Rod	BS / HI / FS / I. H. Dist	Vert L	Diff El
		4.87	362.99		358.12 ✓
0+00	5 | 5				
to 7+11 ✓	▲ 360-0	7.10 ✓	711	-0°-8'	6.98 356.01
⊼ @ 7+11		5.15	361.16		"
to 11+52 ✓	▲ 354-40	4.40 ✓	441	+0°-17'	2.93 358.23
⊼ @ 11+52		5.01	363.24		"
to 12+89 ✓	▲ 356-11	1.36	137 ✓	-1°-54'	9.55 353.69
⊼ @ 12+89		4.46	358.15		"
to 14+38 ~~14+46~~	▲ 7°-32'	1.56	149 ✓	-13-06	-34.67 ✓ 319.02
		5.05	324.07		
⊼ @ 14+38 ~~14+46~~					
To 21+93 ~~22+03~~	▲ 35-03	7.56	755	-2°-53'	-37.99 ✓ 281.03
⊼ @ 21+93 ~~22+03~~		4.45	285.48		
✓	235-24	1.32	132 ✓	-4-32	-10.5 270.5
✓	12-05	0.99	97	-10-35	-18.0 263.0
✓	34-45	3.12	311	-5-01	-27.3 253.7

T-2 Begins

352 04

Tues 10/4/21

0+00 = Point on S Line E/ Cajon and 10' W. of ℄ of Fairmount Ave

Brass Plug in Curb SW Cor E/ Cajon & Fairmount

(Az 360-0 Compass reads N 0-30 W with Var @ 14° 30' E

F.S. to 10' W/ of ℄ of Fairmount Ave @ Olive Ave

7+11
4 41
11+52
1 37
12+89
1+57
14+46
7+57
22+03

In field N. of Olive Ave

" " " " " above road grade

On W/ edge graded road

℄ Gulch wash

" " "

" " "

B.S. H.I. F.S.

Sta	Az	Rod	H. Dist	Vert ∠	Dif	El	
℄@ 21+93 22+03	44S			285.48		281.03	
	35-16	4.45	444	-4-06	-31.9	249.1	℄ gulch wash
to 29+62.50 ▲	43-05	7.58	7.57	-2-34	-33.9✓	247.11	⨯ edge graded road
℄@ 29+62.50			453	251.64			
	237-04	1.50	151	-1°-43	-4.5	242.6	℄ gulch wash
	320-30	0.52	51	-11-36	-10.4	236.7	" " "
	14-47	1.28	127	-7-0	-15.6	231.5	" " "
	33-22	2.35	234	-4-59	-20.4	226.7	" " "
34+96 to 35+08 ▲	22-11	5.45✓	546	-1-42	-16.22✓	230.89	⨯ edge graded road
℄@ 34+96 35+08			4.29	235 18			
	201-15	1.15	115	-5-09	-10.4	220.5	℄ wash
	266-27	0.54	51	-15-50	-14.5	216.4	" " "
	331-17	1.22	120	-8-26	-17.9	213.0	" " "
	342-24	3.90	389	-3-30	-23.8	207.1	" " "
to 39+34.22✓ ▲	355-39	4.25✓	426	-1°-20	-9.93	220.96	⨯ edge graded road
℄@ 39+34.22✓			4.38	225 34			
	256-37	0.82	80	-10-37	-15.0	206.0	℄ wash
	354-47	2.18	218	-5-48	-22.0	199.0	" "
	0-48	4.10	409	-3-58	-28.35✓	192.61	

End of T-2 North

22+03
7 59
29+62
5 46
35+08
4 26
39+34

T+2

East San Diego

Wed Oct 5/21

Sta	Az	Rod	B.S. / H. Dist	H.I. / Vert ∠	F.S. / Diff	El	
	5.15						
0+00			4.83	362.95		358.12	Same 0+00 as on p 38 same BM.
to 7+01 ▲	180-06	7.00	701	+0°-18'	+3.65	361.77	Point 10' W of ℄ of Fairmount Ave + 6.5' North of S Line Orange Ave
⊼@7+01			5.15	366.92		"	
to 13+82 ▲	269-35	6.80	681	+0°-12'	2.40	364.52	S. Line of Orange Ave + 10' W. of E. Line Van Dyke Ave.
⊼@13+82			5.11	369.63			
to 22+08 ▲	269-55	8.25	826	+0°-07'	3.33	366.30	S.W Cor Stockton + Orange Aves
			5.12	371.42		"	
to 28+90 ▲	269-56	6.81	6.82	+0°-2'	4.65	366.77	S. E. Cor Orange + Central Ave.s
⊼@28+90			5.01	371.78		"	
to 33+46 ▲	269-57	4.55	456	+0°-5'	4.32	367.46	S. Line Orange Ave and 5' East of West Line of Sisson Ave
⊼@33+46			5.24	372.70		"	
to 39+61 ▲	180-02	6.14	615	-0°-34	-6.09	361.37	Point 1.67' S. of S. Line of Anna St and 5' E. of W. Line of Sisson Ave

7+01
6 81
13+82
8 26
22+08
6 82
28+90
4+56
33+46
6 15
39+61

Sta	Az	Rod	H. Dist	Vert ∠	Diff El	
		B.S.	H.I.	F.S.		
⊼@39+61		5.17	366.54			361.37
to 45+60 △	180-22	5.98	599	−0°-53′	-9.22	352.15
⊼@45+60		5.08	357.23			"
to 53+21 △	179-59	7.60	761	−0°-32′	-7.08	346.07
⊼@53+21		5.15	350.22			
to 60+01 △	180-0	6.79	680	−1°-05	-12.86	332.21
⊼@60+01		5.17	337.38			
		New H.I.			4.70	332.68
		4.70	341.34			336.64
to 62+98 △	236-57	2.96	297	−2°-03′	-10.62	326.02
⊼@62+98		4.47	330.49			
to 65+73 △	212-58	2.85	275.0	−11-26	-55.58	270.44
⊼@65+73		4.50	274.04			"
	247-35	1.11	112.		10.2	264.7
	208-15	2.45	246.	−2-40	-11.4	259.0
to 70+48 △	194-32	4.74	475	−1°-54	-15.72	254.72

29+61
5 99
45+60
7 61
53+21

Point on N Line University Ave and 1.67 E of W. Line of Sisson Ave.

Point on S Line of Klauber Ave and 1.67 E. of W. Line of Sisson Ave.

53+21
6 80
60+01
2 47
62+98
2 86
4

336.64 Brass Plug at N.W. Cor Sisson + Castle

" " Castle 50 St Line

@ top of ridge

@ junct of gulches

62+98
65+73
65+73
2 75
70+48

W side bot @ Toe of ridge to W
℄ main Wash below junct

B.S. H.I. F.S.

Sta	Az	Rod	H. Dist	Veit L	Diff Elev 254.72	
T@ 70+48			498 25970			
	317-30	0.88	89		4.5	255.2
	218-10	2.14	215	-1-55	-7.2	247.5
	205-22	3.35	336	-1-37	-9.5	245.2
	207-34	5.60	561	-1-37	-15.8	238.9
to 77+19	208-35	6.70	671	-1-36	-18.7	236.00
T@ 77+19			494 24094			
	176-0	0.29	30		8.3	232.6
	198-80	1.75	176	-1°-58	-6.0	230.0
	218-05	4.00	401	-2°-0	-14.0	224.0
to 85+18	217-26	7.98	799	-1°-31	-24.14	214.86
T@ 85+18			443 21929			
	8-10	0.92	93		5.3	214.0
	224-40	0.60	61		8.5	210.8
	194-45	1.34	134	-2-48	-6.5	208.4
	197-33	2.38	239	-2-19	-9.6	205.3
	197-39	4.72	473	-1-40	-13.76	201.1
		End	South	77+2		

70+48
G 71
77+19
7 99
85 18

℄ wash
" "
" "
" " 3' Lower ~~N~~ Left

℄ wash
" "
" " Xing Service Line down ℄ gulch

℄ wash
" "
" "
" " Jct. with canyon from N.W. near City Boundary

Contd from p 18 BS H.I. FS

"D" Contd from p 18

Sta	Az	Rod	H. Dist	Vert ∠	Diff Elev	
⊼ @ 147+87			4.28	250.79		246.51
to 148+90 △	200-38	1.02	103	+1°-07	221	248.58
⊼ @ 148+90			4.35	252.93		
149+20	221-57	0.33	30	-20-25	-11.2	r 37.4
149+59	"	0.78	69	-21-33	-27.0	r 21.6
149+71	"	0.86	81	-15-30	-20.0	228.6
150+31	"	1.40	141	-1°-10'	-2.9	r 48.7
to 151+25 △	221-57	2.34	235	+0°-03'	4.00	248.93
⊼ @ 151+25			4.74	253.67		
152+96	232-29	1.73	171	-8-12	-24.4	r 24.5
153+16	"	1.90	191	∠	4.5	249.2
153+74	"	2.48	249		11.7	242.0
154+01	"	2.75	276	+0-32'	+4.7	r 53.1
to 154+34 △	232-29	3.08	309	+0-47'	+4.23	253.16
			4.83	r 57.99		
to 155+37 △	217-26	1.02	103	-1°-05	6.77	251.22
⊼ @ 155+37			4.98	256.20		
156+23	197-05	0.85	86		9.0	247.2
157+55	"	2.18	218	-4-36	-17.5	r 33.7
158+33	"	2.96	296	-2-44	-14.1	r 37.1

foot of Vert Cliff

just out of mouth of Mission Gorge So Side

Time Oct 6/21

147+87
1 03
148+90
2 35
51+25
3 09
54+34
1 03
55+37

B.S H.I. F.S

201-31 P.

Sta	Az	Rod	H. Dist	Vert ∠	Diff Elev	
π @ 155+37	49°		256.20			251.22
159+96	197-05	4.60	459	-3-34	-28.6	222.6
fo 160+33	197-05	6.95	696	-2°-14'	-27.08	224.14
π @ 160+33		4.51	226.65			
165+67	198-40	3.35	334	-5-04	-29.6	194.5
fo 169+62	198-40	7.28	729	-0-12'	7.00	221.65
π @ 169+62		4.43	226.08			
166+76	18-40	2.95	286	-10-33	-53.3	168.4
fo 173+24	210-56	4.61	462	+0°-12'2.48		223.60
π @ 173+24		4.41	228.01			
175+27	201-31	1.02	103		13.4	214.6
179+37	"	5.20	513	-6°-05	-54.8	168.8
fo 183+44	201-31	9.19	920	-2°-07'	-33.95	189.65
π @ 183+44		4.50	194.15			
181+35	201-31	2.23	209	+15°-0	-56.2	133.5
182+11	"	1.52	133	-21-25	52.1	137.6

155-37 155+37
2807 6 96
1843 44
160+33
7 29
167+62
4 62
171+24
9 20
183+44

Back shot ℄ gulch below Auxiliary Spillway Dam #3

On hillside So.t leaving thence Co. Road of Gorge

" " "

P.O.T.

℄ of Wash back shot

Toe Ridge on bottom Gulch

Sta	Az	Rod	H. Dist	Vert ∠	Diff	El.
		BS	HI	FS		
A @ 183+44			194.15			189.65
184+41	201 - 31	1.02	99	+14-15	-24.6	165.1
185+42	"	2.02	198	+9-28	+33.0	227
to 186+04 ▲	201-31	2.67	260.49	+9-39	+44.29	233.94
T @ 186+04		4.53	238.47			
187+74	207-13	1.70	170	-3-08	-9.3	246
to 190+35 ▲	207-13	4.30	431	-1-43	-12.91	221.03
T @ 190+35		4.40	225.43			
	245-9	2.25	224	-5-30	-21.6	199.4
192+21	251-24	1.90	186	-3-38	-31.5	189.5
192+99	"	2.65	264	-4-06	-19.0	202.0
194+10	"	3.75	375	-2-33	-16.7	204.3
to 195+38 ▲	251-24	5.02	503	+2-36	-22.78	198.25
T @ 195+38		4.56	202.81			
196+37	258-10	1.20	99	+25-40	-47.2	151.0
197+53	"	2.15	215	+2-45	-10.3	188.0
198+04	"	2.65	266	-0-25	-1.9	196.4
199+94	"	4.55	456	+1-25	+11.2	208.5
to 202+61 ▲	258-10	7.22	723	+2-05	+26.25	224.50

Bot gulch
On hillside

Hub at Fence Cor (Fence runs North + West from Hub)

Ø bot. gulch

183 + 44
2 60
186 04
4 31
190 + 35
5 63
195 + 38
7 23
202 + 61

Sta	Az	B.S. Rod	H. Dist	H.I. Vert ∠	Diff El	FS ±	
℄@202+61		4.57	229.07			224.50	
to 204+80 ▲	254-33	2.18	219	-2-58	-11.31	213.19	
℄@204+80		4.44	217.63				
	27-27	2.82	2.83	+2-10'	+10.7	227.9	W fence from hub @ Cor p 4-5
206+92	243-38	2.45	212	-22°-0'	-85.4	127.8	Bot gulch E side @ toe
207+44	"	2.95	264	-18-55	-91.0	122.2	" " " "
209+12	"	4.35	432	-5°-58	-42.6	170.6	on Hill
210+01	"	5.20	521	-0°-26'	-4.0	209.2	" "
to 211+51 ▲	243-38	6.70	671	+1-27'	+16.98	230.17	
℄@211+51		4.54	234.71				
	247-28	0.13	14				
212+32	"	080	81		1.6	233.1	N+S Fence
214+25	"	2.73	274		8.8	225.9	
216+22	"	4.70	471		14.7	220.0	
to 219+42 ▲	247-28	7.90	791	-0°-42'	-9.65	220.52	
℄@219+42		4.37	224.89				
217+38	67-25	2.04	2.04	-2-50	-10.1	210.4	Back shot ground
218+23	"	1.19	119	-2-30	-5.2	215.3	" " N+S fence
221+81	234-31	2.38	239		7.1	217.8	N+S fence
to 222+68 ▲	234-31	3.25	326	-0-53'	9.25	215.64	

202+61
2.19
204+80
6.71
211+51
7.9.1
219+42
3.26
222+68

		B.S.	H.I.	F.S.		
Sta	Az	Rod	H. Dist	Vert ∠	Dif	El.
K@222+68			4.54	220.18		215.64
	164-48	3.05	304	+4-52.	+25.8	241.4
224+74	214-04	2.05	206		6.8	213.4
226+32	"	3.63	364		4.6	215.6
to 229+89 ▲	214-04	7.20	721	+0°-31'	+6.49	222.13
K@229+89			5.10	227.23		
to 234+98 ▲	196-40	5.08	509	+0°-5'	4.03	223.20
K@234+98			5.0	228.20		
	169-22	4.93	494			
236+93	177-40	1.95	195	-4-07	-14.0	209.2
237+84	"	2.85	286	-2-05	-10.1	213.1
239+09	"	4.10	411	-2-17	-16.4	206.8
to 241+23 ▲	177-40	6.24	625	-0°-7'	6.37	221.83
K@241+23			4.98	226.81		
	203-39	5.80	581			
	201-53	5.70	571			
242+99	184+17	1.75	176		3.2	223.6
246+04	"	4.80	481		6.0	220.8
to 248+74 ▲	184-17	7.50	751	+0°-39'	+8.52	230.35

Hub @ fence cors E+W and N

E+W fence

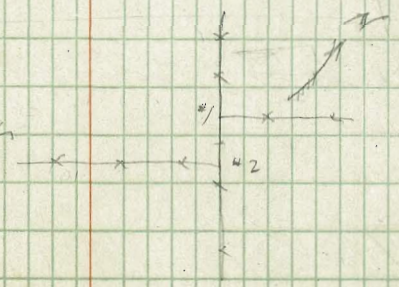
fence Cor N+S+W

ground on line

"

Fence Cor #1 sketch

" " #2



222+68
7 21
229+89
5 09
234+98
6+25
241+23
7 51
✓ 248+74

B.S. H.I. F.S.

Sta	Az	Rod	H. Dist.	Vert ∠	D.H.	El
℄@246+74			4.93	235.28		230.35
250+75	201-48	2.00	201		7.6	227.7
253+30	"	4.55	456	−1°-20	-10.6	219.8
to 255+48 △	201-48	6.73	674	−0°-23	9.25	226.03
℄@255+48			4.85	230.88		
257+14	207-27	1.65	166		5.40	225.5
258+69	"	3.20	321		12.4	218.5
259+44	"	3.95	396		5.1	225.8
to 260+46 △	207-27	4.97	498	0	4.55	226.33
℄ 260+46			4.85	231.18		
261+43	204-41	0.97	97	−5-10	-8.7	217.6
262+24	"	1.80	178	−7-28	-23.7	203.1
263+22	"	2.75	276	−1°-30	-7.7	219.1
264+32	"	3.85	386		7.8	223.4
to 266+27 △	204-41	5.80	581	−0°-4'	5.58	225.60

246+74
6 74
255+48
4+98
260+46
5 81
266+27

		BS.	HI	FS		
Sta	Az	Rod	H. Dist	Vert ∠	Diff	El
T @ #54						360.0
B.S. #55	230 08'	1.52		0° 00'		
✓	296° 17'	6.85	681	+4° 45'	+56.6	416.6
✓	290° 19'	5.80	581	0° 00'		360
✓	293° 35'	5.20	519	-3° 17'	-29.8	330.2
✓	288° 32'	4.35	399	-17° 02'	-122.2	237.8
✓	289° 24'	3.60	316	-20° 40'	-119.3	240.7
✓	277° 03'	2.90	238	-25° 15'	-112.4	247.6
✓	270° 34'	2.20	140	-32° 34"	-100.5	259.5
✓	206° 22'	.62	63	0° 0'		360.0
✓	167° 02'	.93	79	+23° 49	+34.8	394.8
✓	248° 07	1.00	82	-25° 50'	-39.7	320.3

See Book #4 page 29
for later notes.

Mr. H.N.S.
John Head
Fred Barrett

G.R. Hayler. Inst. 47

7-1-22

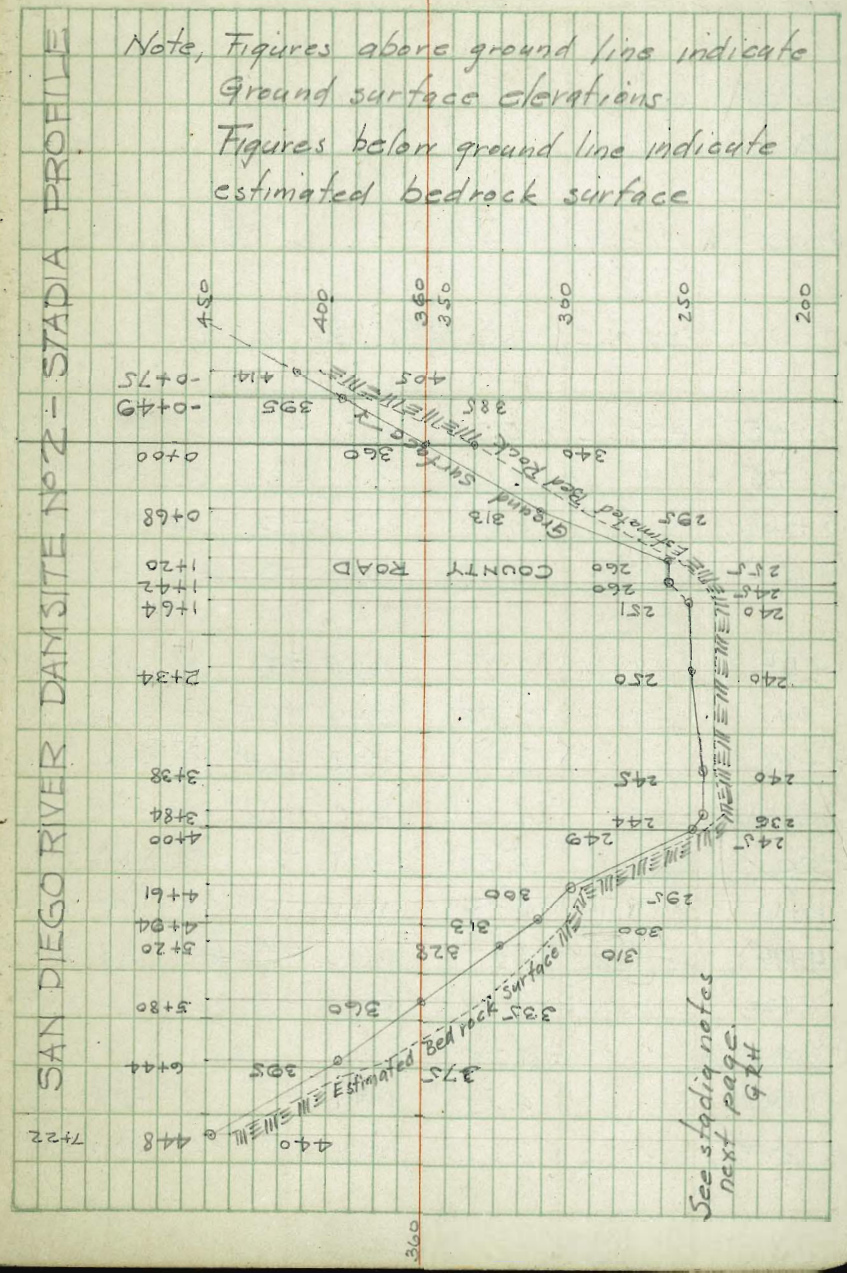
Stq #55 of 360' Contour
Test Pit Rock at 1'
Stq #238 of 360' Contour
Point #23 (Fletcher)
Toe of North Slope
Core Drill Hole #1 Now working
Core drill Hole #4 Casing in
In road
On hub at 360 Contour
Test Pit Rock 3' deep
On hillside on line

B.S. H.I. F.S.

Sta.	Az	Rod	H. Dist	Vert	℄	Diff El

SAN DIEGO RIVER DAMSITE No 2 - STADIA PROFILE

Note, Figures above ground line indicate Ground surface elevations
Figures below ground line indicate estimated bedrock surface



Sta	Az	Rod (B.S.)	H. Dist (H.I.)	Vert ∠ (F.S.)	Diff	El
BS on △ 56	46°-31					
⊼ @ △ 57			4.82	364.82		360
to 0+00 △	230-51	0.50		0		
⊼ @ 0+0.0	320-22 (359-60, N 39 -3.8)		4.96	364.96		360
-0+49	140-22	0.73	48.5	+35°-27	+35.0	395.0
-0+75	"	1.13	74.8	+36-03	+54.3	414.3
+0+68	320-22	0.99	68.3	-34-24	-46.7	313.3
1+42	"	2.12	142	-35-20	-100.5	259.5
1+64	"	2.35	163.5	-33-30	-108.7	251.3
2+34	"	2.85	234.4	-25-09	-110.1	249.9
3+38	"	3.76	337.6	-18-52	-115.4	244.6
3+84	"	4.18	384.1	-16°-48	-115.9	244.1
4+00	"	4.30	400.1	-15-32	-111.5	248.5
4+61	"	4.68	461.1	-7-28	-60.4	299.6
4+94	"	4.97	493.6	-5-25	-46.8	313.2
5+20	"	5.21	520.0	-3-32	-32.1	327.9
to 5+80 △	"	5.79		0		360
6+44	"	6.45	644.1	+3-08	+35.28	395.3
7+22	"	7.32	722.3	+6-57	+88.0	448.0

San Diego R. Damsite No 2

Hayler Loc
Franklin ⊼
Williams Rod

Stadia Profile — Oct 21/21

46-31

(See profile on preceeding page for estimated depth to bedrock. GRH.)

Compass on 0 Az = 0-30' E

0+00 to 57 = 0.50 Rod

Northly on Axis on Profile ℄

So'ly " " " " " On hillside
"
No'ly " " " " " "
" " " " - No edge Co road
" " " In R bed
" " " " " "
" " " " " "
" " " " " Toe No. Slope
" " " On No Slope {Old Mission Ditch Bed *
" " " " " "
" " " In old test pit
" " " On No. Slope
" " " " " " @ 360 Contour
" " "
" " "

Plotted Oct 25 '21 HRB

Sta	Az	Rod	H Dist	Vert L	
℄@5+80 △		4.90			
to 237	227-39	0.38		0 5.15	
to 236	45-54	0.82		5.20	
		0.82			
℄@236		4.87			
236 to 235	32-58	2.16		0 4.80	
		2.16			
℄@235 △		4.59	364.59		360
235 to 234	15°-40	2.74			
					+30
	243-54	1.25	117	+14°-25	390
	264-10	1.90	166	+20-55	+63 423
	302-05	1.53	124	+26-0	+60.2 420.2
	321-50	1.54	130	+23-21	+56 416
	337-36	2.06	189	+16-57	+57.2 417.2
	359-22	2.04	196	+6-30	+23 383
	354-05	1.49	145	+9-31	+24.3 384.3
	330-50	1.16	105	+17-39	+33.5 393.5
	304-06	0.91	72	+27-08	+36.8 396.8
	250-43	0.86	78	+18-01	+25.3 385.3
℄@234		4.75	364.75		360
	262-04	1.50	128	+22-13	+52.5 412.5

515

Levels across R
0.30 Error

Hub 360 Contour Stake N.G.

" " "

Az on 5+80
236 to 5+60 Rod 0.82

214-07 1°-00 Error in Az lines on opp side
212-58 (Valley original 360 Survey

Az from Dam #2 Axis
Contour points for Damsite #2 Topog

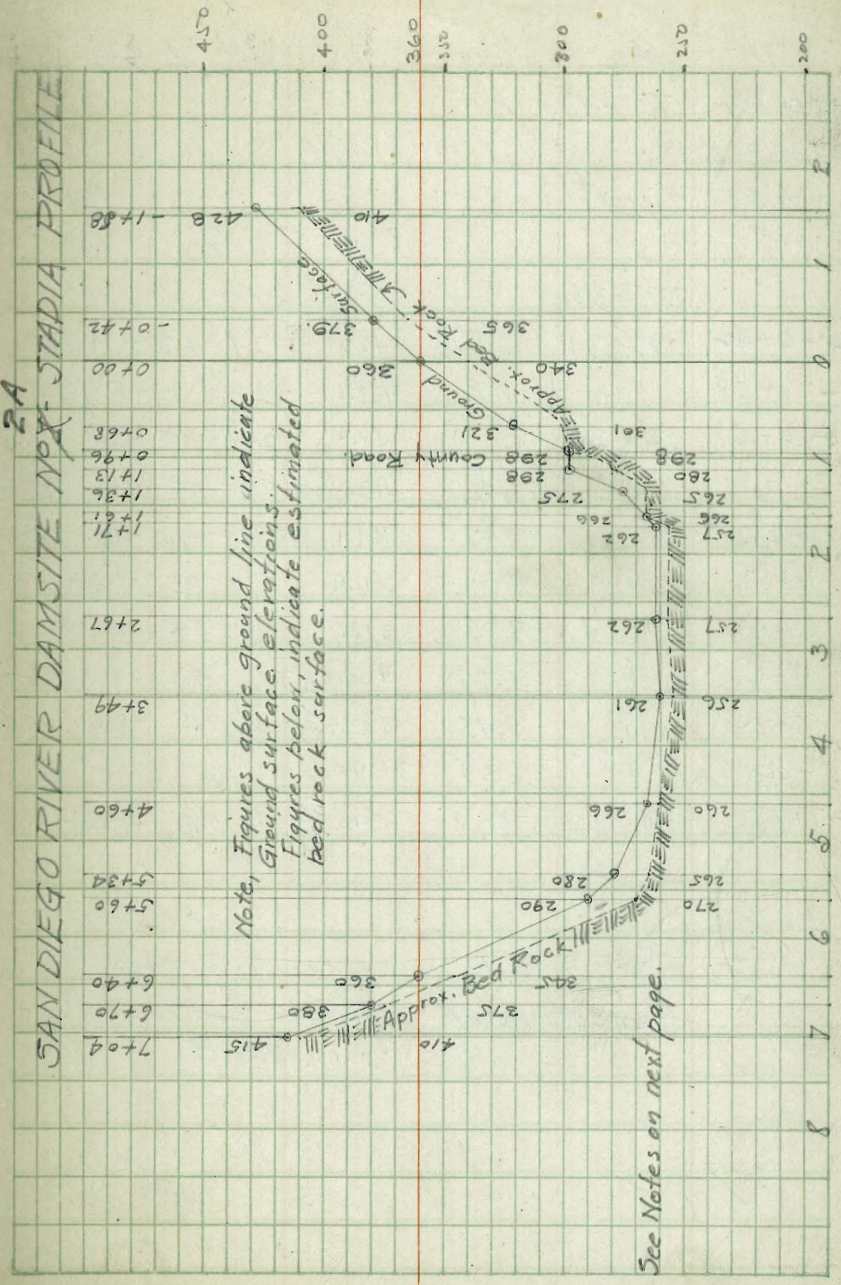
plotted 10/25/61

Sta	Az	Rod	H Dist	Vert L	
					+548
T@234	297-15	1.60	139	+21-34	414.8
	331-52	2.98	285	+12-0	+60.5 420.5
	345-02	2.55	253	+5-51	+25.7 385.7
	245-33	0.60	57	+12-33	+12.7 372.7
	Shots across S.D.R to Soly Side				
	89-27	7.64	762	+2-40	+35.5 395.5
	92-02	7.35	733	+2-08	+27.5 387.5
	93-47	7.60	758	+3-14	+42.7 402.7
	102-33	7.50	748	+3-36	+47.0 407.0
	123-11	7.55	752	+3-58	+51 411
	131-47	7.80	778	+3-28	+47 407
	135-49	8.30	827	+3-47	+54.8 414.8
	136-14	8.90	887	+3-55	+60.7 420.7
	140-35	9.90	987	+3-58	+68.2 428.2
	146-25	10.12	1008	+3-23	+60 420
	End for Dam #2 Profile + Topog				

Az from Dam #2 Axis

B.S. H.I. F.S.

Sta	Az	Rod	H. Dist.	Vert	∠	Diff El



Sta	Az	Rod (B.S.)	H. Dist	Vert ∠ (H.I.)	Diff (F.S.)	Elev
62 to 63	7-24	1.90				
⊼@63 △		479	364.79			360
63 to 64	24-48 (4)	1.29				
	277-31					
to +0+42	97-31	0.50	42.2	+24-42	+19.4	379.4
− 1+58	"	1.86	158.1	+23-10	+67.7	427.7
+ 0+68	277-31	0.89	68.2	−29-35	-38.7	321.3
1+13	"	1.46	113.4	−28-37	-61.9	298.1
1+61	"	2.15	161.1	−30-19	-94.2	265.8
2+67	"	3.02	266.9	−20-13	-98.3	261.7
3+49	"	3.76	348.7	−15-55	-99.4	260.6
4+60	"	4.78	460.0	−11-30	-93.6	266.4
5+34	"	5.45	533.9	−8-34	-80.4	279.6
to 6+40 ▲	"	6.39	640	0		360.0
7+05	"	7.08	704.5	+4-34	+55.3	415.3

Note, See profile on preceeding page for estimated depth to bed rock
G.R.H.

S.D.R Dam No 1

24 -48
7 28
20

Stadia Profile

63 A is Original 360 Contour Line Station

Axis Dam #1 Profile. Compass 0 Az = No 45 W
" " S
" "
" "
No. edge Co road
S D R bed, toe Soly Slope (or near as rod may be read)
" " "
" " "
" " "
On Noly Slope toe
360 Contour

Platted Oct 25 '41 H.R.B.

Old Mission Dam: Profile and Topography

Hayler
Franklin
Williams

(See sketch page 59)

Oct 22/21

Sta	Az	Rod (BS)	H. Dist (H.I.)	Vert ∠ (F.S)	± Diff	Elev	Description
(Bk#2 p 58)							
68 to 0+00	354-54	5.48	538	8-38			Rod 5.40 Vert ∠ 8-38 Compass on 0-0 Az = N0-20E
							Δ68 is on So hillside Original 360 Contour Survey
		4.90	284.61				
π on 0+00						279.71	0+00 a tack in Conc top Old Mission Dam ℄ Middle of dam
T.B.M					2.10	282.51	Top Bolt So end Old Mission Dam
T.B.M					4.50	280.11	" rock point top " " " No end
	343-30						Called Axis of Dam which is crooked
	"	1.17			0.97	283.6	No end of dam on hill same elev ± as top of dam
	"	1.54	146	+12-55	+33.5	313.2	" " top steep slope on hill side on knoll
	"	1.82	172	+13-35	+41.5	321.2	" " " of knoll
	"	1.04			2.7	281.9	No end top of dams masonry
	165-10	0.67			3.7	280.9	" " of Break in Soly end of Dam Top Masonry
	"	"			8.7	275.9	" " " " " " " " Bot "
	"	0.80			8.9	275.7	So " " " " " " " " "
	"	"			2.7	281.9	" " " " " " " " Top "
	"	0.97			2.15	282.45	So end top Masonry where it breaks down
	"	1.02			11.2	273.4	" " Bot " @ surf earth = extrem So end
	"	1.35			10.4	274.2	Toe of hillside So of dam ℄
	"	1.80	178	+2-07	+6.7	286.4	on hillside
	"	2.50	248	+4-24	+19.1	298.81	fence No of Co road
	"	2.83	281	+4-31	+23.3	303.01	" So " " "
	"	3.43	340	+5-42	+33.8	313.51	On hillside So of " "
to "A"	177-09	1.05	105	-3-15	-5.95	273.76	Toe of wing down stream So end dam (point "A")

Dam ∠s about 0+00

See sketch p 59

Plotted 10/26/21 HRB.

4 9 / 6 343 / 9 0 / 25 3 / 18 0 / 7 3 7.3

BS · H.I. FS

Sta	Az	Rod	H. Dist	Vert ∠	Diff	El	Remarks
			284.61				
0+00 ⊼	253-30	0.06			12.9	271.7	lower toe of dam River bottom (point "B")
"	73-30	0.04			7.9	276.7	Upper face toe " on silt (" "C")
	337-54	0.72			14.3	270.3	lower toe of dam River bottom (" D)
	345-36	0.72			6.8	277.8	(Elev. Top of dam 282.0) upper face " " on silt (" E)
	338-48	1.01			6.1	278.5	lower junct with ledge
	281-53	1.41	141	− 3-43		−8.6 271.11	River bed No Side
	293-23	1.79			6.6	278.0	on Slope No side
	307-02	1.49	148	+ 4-31		+11.7 291.4	On hogback top No side
	318-14	1.41	139	+ 7-40		+18.6 298.3	" " " " "
	324-20	1.21			1.7	282.9	" " below
	329-35	1.48	143	+ 9-57		+25.2 304.9	
	325-35	1.82	177	+ 9-03		+28.3 308	Hub on top hog back No side
	354-40	1.75	168	+ 11-33		+34.3 314	On hogback top So edge
	"	2.31	223	+ 10-48		+42.5 322.2	" " "
	7-37	2.63	258	+ 7-35		+34.4 314.1	On Bench
	19-12	2.39	237	+ 6-10		+25.5 305.2	" " So edge
	28-29	2.18	217	+ 2-31		+9.6 289.3	On slope
	38-32	1.92			6.7	277.9	" No edge R top silt
	21-10	1.30			6.5	278.1	" " " " " "
	6-03	1.55	154	+ 4-20		+11.6 291.3	" slope above last shot
	69-48	1.76			8.4	276.2	℄ of R on silt
	85-53	1.38			8.0	276.6	In R " " No edge stream
	"	0.61			4.9	279.7	" " Silt
	106-33	0.86	86	− 3-03		−4.6 275.1	" " " " "

Platted 10/26/21 H.R.B.

H.I.

Sta	Az	Rod	H. Dist	Vert ℄	Diff	El	
℄@0+00			284	61		279.71	
✓	117-0	1.55			90	275.6	℄ R So edge stream
✓	97-0	1.86			89	275.7	10 R " " "
✓	115-45	1.91			49	279.7	R edge Soly slope
✓	122-15	2.37	236	+2-37		290.6 +10.9	On Soly slope
✓	122-46	2.92	291	+3-36		298 +18.3	@ fence No side road
✓	137-22	1.85	184	+2-42		288.4 +8.7	On So Slope
✓	174-09	1.98	197	+2-24		288 +8.3	" " "
✓	194-58	2.63	261	+5-05		303 +23.3	@ fence No side road
✓	204-07	2.30	229	+2-57		291.5 +11.8	On Soly Slope
✓	210-29	2.09			50	279.6	" " "
✓	187-57	1.71			55	279.1	" " "
✓	218-54	1.88			106	274.0	℄ R So edge
✓	237-10	1.70	170	-2-03		273.6 −6.1	1m R bed
✓	215-05	1.00	100	-3-19		273.9 −5.8	" " "
✓	247-15	0.57			73	277.3	" " " on roof
✓	"	1.50			86	276.0 −10.0	" " " "
	266-45	1.50	150	-3-50		269.7 −9.5	" " " " " No. edge
	286-20	0.63	61	-8-47		270.2	" " " " " " "
		End					

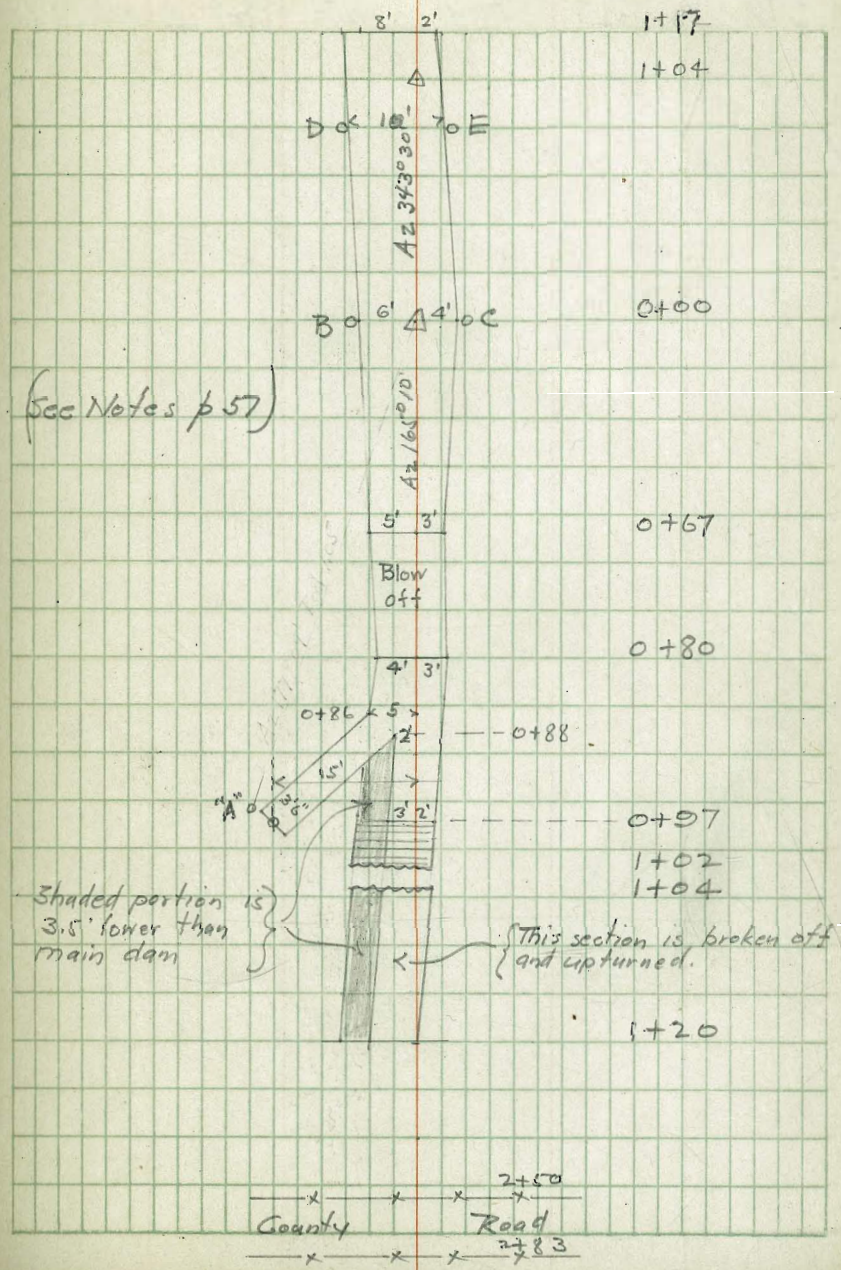
Old Mission Dam Profile & Topog

Plotted out 7/6 41

Sta	Az	BS Rod	HI H. Dist	FS Vert	℄ Diff	El

Old Mission Dam

10-22-71
Hayler



Sta	Az	Rod.	H. Dist	Vert	L Diff	El.

INDEX

KEITH'S RAILROAD CURVE TABLES.

Published by KEUFFEL & ESSER CO., New York.

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HOW TO USE KEITH'S TABLES.

EXAMPLE.

Wanted a Curve with an Ext. of about 12 ft. Angle of Intersection or I. P. = 23° 20′ to the R. at Station 542+72.

Ext. in Tab. IV opposite 23° 20′ = 120.87
120.87 ÷ 12 = 10.07. Say a 10° Curve.

Tan. in Tab. IV opp. 23° 20′ = 1183.1
1183.1 ÷ 10 = 118.31.

Tab. V correction for A. 23° 20′ for a 10° Cur. = 0.16
118.31 + 0.16 = 118.47 = corrected Tangent.

(If corrected Ext. is required find in same way)
Ang. 23° 20′ = 23.33° ÷ 10 = 2.3333 = L. C.

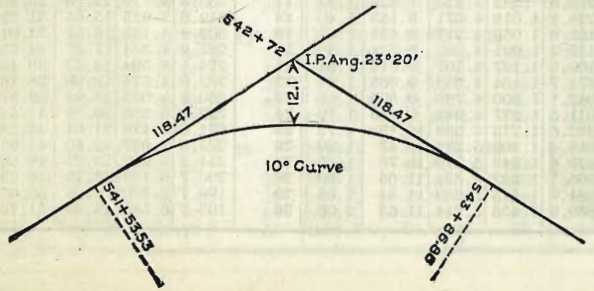
2° 19½′ = def. for sta.	542	I. P. = sta.		542+72
4° 49½′ = " " "	+50	Tan. =		1.18.47
7° 19½′ = " " "	543	B. C. = sta.		541+53.53
9° 49½′ = " " "	+50	L. C. =		2.33.33
11° 40′ = " " "	543+	E. C. = Sta.		543+86.86
	86.86			

100 − 53.53 = 46.47 × 3′ (def. for 1 ft. of 10° Cur.) = 139.41′ = 2° 19½″ = def. for sta. 542.

Def. for 50 ft. = 2° 30′ for a 10° Curve.

Def. for 36.86 ft. = 1° 50½′ for a 10° Curve.

(These tables are published in Field Books of KEUFFEL & ESSER Co., New York, N. Y.)



CITY - BENCH MARKS

		City Datum	U.S.G.S. Datum
SE Cor	Madison + Texas	Brass Plug in Curb	346.03	352.15
" "	" Louisiana	" " " "	342.31	348.43
N.E. "	University + Alabama	" " " Con. Mon.	265.49	271.61
S.W. "	" + Florida	" " " Curb	287.08	293.20
N E "	Alabama + El Cajon	" " " "	306.57	312.69
N W "	" + Lincoln	" " " "	286.11	292.23
N W "	" + Cypress	" " " "	244.98	251.10
N W "	" + Upas	" " " "	259.50	265.62
N.W "	6th + University	" " " "	283.87 =	289.99

East San Diego Bench Marks

Fairmount + El Cajon S.W.Cor B.P. 352.00 358.12

Castel + Sisson. N.W.Cor B.P. 330.52 336.64 / Blks

330.52
6.12
336.64

62-63 7-24

63-64 24-48

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 14 FEET WIDE. SIDE SLOPES 1½ TO 1.

FOR SINGLE TRACK EMBANKMENT.

	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	10.3	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.