W142

FIELD BOOK

361 A

CITY OF
SAN DIEGO — CALIFORNIA
ADDITIONAL WATER SUPPLY
MISSION GORGE DAMSITE NO 3
TOPOGRAPHY
AUG - 1921

1

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.

CITY OF
SAN DIEGO, CALIFORNIA
ADDITIONAL WATER SUPPLY
MISSION GORGE DAMSITE No 3
TOPOGRAPHY
AUG - 1921

H.M. Savage
Hydraulic Engr.

BK #1

Notes below Copied from Other Books.

Sta	Az	Rod	Hor Dist.	Vert L
#73 to #A1	297-08	6.61		
" " A#2	307-27	5.82		
" " A#3	319-10	6.78		
#18 to #19	312-06	4.20		
19 to 20	319-27	2.95		
20 - 21	354-47	1.75		
21 to 22	57-17	2.45		
143 to 144	249-44	5.50	143 in SORTed	
142 to 143	25-01	3.09		
138 to 139	46-10	7.90	Ry R of W } Santee	
139 to 140	31-31	6.60		
145 to 146	301-03	2.62		

3/4/64

Note, Instrument constant is 97.5 for 1.00 on rod. That is, all rod readings should be multiplied by 1.025
(f+c) for transit = 1.04.

G.R. Hayler – Engineer
A.E. Franklin – Inst.
E.O. Williams – Rod

Stadia Survey – Mission Gorge Site #3

Δ0 to Δ5 All on axis of dam

Sta – Sta	Azm.	Rod	Hor. Dist	Vert. ∠	Diff. Elev	Elev
0+00 – 1	133°-40'	0.96	79.2	+27°-03	40.33	350.33
1 – 2	"	1.86	157.8 (166.61)	+24-55	73.8 ~~73.28~~	383.8 ~~383.28~~
2 – 3	"	1.64	166.44	+7-02	20.36	404.4 ~~403.84~~
3 – 4 +on rock	"	3.27	335.06	2°-20	-13.68	390.7 ~~390.16~~
4 – 5		2.52	257.32 ~~257.37~~	5°-04	22.7 ~~22.81~~	368.0 ~~367.35~~

T@Δ#1

Mag Var @ 14°30 E

8-19-21

Constant for Instrument = 1.025

Az Rod held Vertical

Elev 0+00 = 310.0

4.1 Rod

314.565 + 6.485 = 308.08 BM

308.08
+ 6.485
314.565

Chained 79.2
" 159.0
" 166.6
335.89
2384
256.39

4.82
4.60
4.43

R.P = -0+21.2

15' North of axis at RP 0-21.2 = Elev 320.0

Sta	Az	Rod	Hor Dist	Vert ∠	Diff El	El
π @ Δ#1 465						350.34
"	313-33	0.29	24.	-27-31	-12.5	337.8
	"	0.55	47.	-25-28	-22.4	327.9
	"	0.94	78.	-26.53	-39.5	310.8
	280-46	1.13	98.	-23-29	-42.6	307.7
	267-43	1.18	107.	-20-50	-40.7	309.6
	252-53	1.49	142.	-15-55	-40.5	309.8
	249-08	1.71	170.	-10-56	-32.8	317.5
	243-44	2.06	204.	-10-51	-39.1	311.2
	239-23	2.45	247.	-8-31	-36.9	313.4
	238 23	2.77	279.	-8-04	-39.6	310.7
	235-53	3.10	314.	-7-02	-38.7	311.6
	229-44	3.10	318.	-3°-40"	-20.7	329.6
	223-22	3.04	313.	+1-33	-8.4	341.9
	217-36	2.78	286.	-0-15	-1.2	349.1
	207-26	2.68	276.	+1-33	+7.4	357.7
	"	2.31	238.	+1°-55	+8.0	358.3
	"	1.49	153.	+2-27	+6.5	361.8
	215-51	1.73	178.	+0-28	+1.4	351.7
	223-11	1.87	192.	-2-06	-7.0	343.3
	219-08	2.32	239.	-0°-37	-2.6	347.7
	222-48	2.71	279.	-1-47	-8.7	341.6
	229-06	2.56	263.	-3-36	-16.5	333.9
	331-29	2.14	218	-5-07	-19.5	330.8
π @ Δ#1	"	1.65	168	-6-51	-20.2	330.1

Example — For Reduction of Notes —

Example { Vert ∠ = 27°31 / Rod = .29 } Use table #18 Searles. p 310

Horiz Dist = Coef. [(1.025 x Rod) + 1.04]

= .787 [(1.025 x 29.) + 1.04] = 24.2 (not exact)

or expressed in nearest foot = 24 ft. ans.

Vert Dist or Diff in elev = Horiz. Dist. x tan Vert ∠.

24. x tan 27°31' = 24 x .521 = 12.5 ans. (G.C.)

Sta	Az	Rod	Hor Dist	Vert ∠	Diff El	Elev
						350.3
T@ △#1	236-49	1.30	130.	-10°-30	-24.1	326.2 ✓
	234-51	0.77	78.	-9°-52	-13.6	336.7 ✓
	243-26	0.51	51.	-11°-38	-10.5	339.8 ✓
	205-43	0.61	61.	+ 0°-30	+ 5.3	355.6 ✓
	164-13	0.76	71.	+18°-31'	+23.7	374.0 ✓
	189-14	1.10	110.	+ 9°-48	+19.0	369.3 ✓
	202-35	1.10	114.	+0°-50'	+ 1.7	352.0 ✓
	221-51	1.28	131.	- 3°-50'	- 8.8	341.5 ✓
	133-40	0.76	66.	+23-47	+29.1	379.4 ✓
	66-02	1.55	150.	+13-57	+37.3	387.6 ✓
	83-16	1.74	164.	+16-59	+50.1	400.4 ✓
	83-04	2.25	208.	+18-37	+70.1	420.4 ✓
	74-08	2.28	215.	+16-54	+61.2	411.5 ✓
	68-14	2.67	255.	+15-35	+71.1	421.4 ✓
	56-31	2.30	228.	+11-26	+46.1	396.4 ✓
	56-22	3.09	305.	+11-41	+63.2	413.5 ✓
	65-30	3.14	302.	+14-40	+79.1	429.4 ✓
	50-22	1.97	198.	+7-56	+27.6	379.9 ✓
	44-29	1.80	184.	+5-30	+17.6	367.9 ✓
	45-07	2.37	242.	+6-0	+25.4	375.7 ✓
	35-32	2.15	222.	+0-12	+0.8	351.1 ✓
	46-03	1.14	117.	+4-44	+9.6	359.9 ✓
	"	0.53	55.	+4-19	+4.2	354.6 ✓
	15-25	0.91	91.	-10-02	-16.1	334.2 ✓
T@ △#1	0-44	0.62	60.	-13-32	-14.4	335.9 ✓

Sta	Az	Rod	Hor. Dist	Vert ∠	Diff El	Elev
						350.3
T @ Δ#1	328-32	0.86	73.	-25-27	-34.8	314.5 ✓
1 to #6	36-38	2.13	219.	+0-47	+2.68 ✓	353.0 ✓
T @ Δ#6 +.78	243-26	1.69	164.	-14-07	-4.3	311.7 ✓
	250-11	1.24	113.	-19-50	-40.7	312.3 ✓
	231-08	0.97	97.	-9-58	-17.0	336.0 ✓
	222-11	0.78	80.	-6-38	-9.3	343.7 ✓
	239-02	0.37	36.	-15-31	-10.0	343.0 ✓
	242-46	0.62	60.	-16-0	-17.2	335.8 ✓
	256-44	1.13	98.	-23-57	-43.5	309.5 ✓
	271-56	0.90	71.	-29-41	-40.5	312.5 ✓
	293-0	0.88	57.	-37-50	-44.3	308.7 ✓
	266-45	0.66	54.	-27-19	-27.9	325.1 ✓
	300-20	0.57	35.	-40-43	-30.1	322.9 ✓
	327-56	0.68	44.	-37-52	-34.2	318.8 ✓
	351-30	0.67	51.	-31-33	-31.3	321.7 ✓
	22-38	0.37	34.	-19-27	-12.0	341.0 ✓
	16-11	0.68	62.	-20-27	-23.1	229.9 ✓
	42-48	0.74	77.	-2-05	-2.8	350.2 ✓
	59-40	0.64	65.	+8-33	+9.8	362.8 ✓
	54-04	0.89	91.	+5-15	+8.3	361.3 ✓
	62-42	1.15	114.	+11-36	+23.4	376.4 ✓
	69-04	0.91	88.	+14-45	+23.2	376.2 ✓
	76-23	0.70	64.	+20-34	+24.0	377.0 ✓
	83-55	0.94	84.	+21-30	+33.1	386.1 ✓

Elev Δ#1 = 350.3

25' Nearer Δ6 is 15' higher

20' further from Δ6 is 15' lower

330' Contour 1dth (North at rt. angles to 330 Contour)

23' N.W. is 29' lower

Sta	Az	Rod	Hor Dist	Vert L	Diff El	Elev

Sta	Az	Rod	Hor Dist	Vert L	Diff El	Elev	
	83-55					353.0	
T of Δ 6	"	1.35	121.	+ 21-45	+ 48.2	401.2	✓
	68-55	1.35	130.	+ 14-55	+ 34.7	387.7	✓
	84-47	1.68	145.	+ 22-03	+ 58.7	411.7	✓
	103-35	1.34	107.	+ 28-27	+ 58.0	411.0	✓
	154-21	1.04	89.	+ 24-34	+ 40.7	393.7	✓
	184-30	0.80	78.	+ 13-54	+ 19.3	372.3	✓
					Elev Δ#2 =	383.8	
T@Δ#2	350-50	0.38	37.	— 16-31	- 10.9	372.9	✓
	4.85 18-41	0.84	86.	- 5-35	- 8.4	375.4	✓
	35-45	0.60	62.	- 1-24	- 1.5	382.3	✓
	"	0.32	34.	- 0-45	- 0.4	383.4	✓
	47-33	0.95	97.	+ 6-50	+ 10.8	394.6	✓
	73-54	0.85	83.	+ 14-20	+ 21.2	405.0	✓
	80-50	0.56	56.	+ 12-40	+ 12.6	396.4	✓
	133-02	0.18	18.	+ 13-14	+ 4.2	388.0	✓
	133-40	0.67	68.	+ 8-07	+ 9.7	393.5	✓
	"	1.10	112.	+ 6-40	+ 13.1	396.9	✓
	118-11	1.24	124.	+ 10-05	+ 22.0	405.8	✓
	111-43	0,96	96.	+ 11-10	+ 19.0	402.8	✓
	88-07	1,51	147.	+ 13-50	+ 36.2	420.0	✓
	86-06	1,74	169.	+ 14-05	+ 42.4	426.2	✓
	82-49	2.30	223.	+ 14-05	+ 56.0	439.8	✓
	74-42	2.25	218.	"	+ 54.6	438.4	✓
	69-20	2.16	212.	+ 12-53	+ 48.5	432.3	✓
	63-06	2.14	213.	+ 12-10	+ 45.9	429.7	✓

Sta	Az	Rod	Hor. Dist	Vert L	Diff El	Elev	
	68-10	2.40	235. +	12-45	+53.1	436.9	✓
⊼@△# 2	98-29	1.90	186. +	12-40	+41.8	425.6	✓
	453			Elev	△#3 =	404.4	
⊼@△#3	297-51	1.47	149. −	8-10	−21.4	383.0	✓
	280-05	1.14	113. −	11-35	−23.1	381.3	✓
	278-53	1.78	177. −	10-27	−32.6	371.8	✓
	264-37	1.99	198. −	10-29	−36.6	367.8	✓
	264-34	2.50	250. −	9-47	−43.1	361.3	✓
	256-10	2.54	254. −	9-26	−42.2	362.2	✓
	246-46	2.83	284. −	8-57	−44.8	359.6	✓
	246-40	3.38	341. −	8-06	−48.5	355.9	✓
〃	〃	4.02	405. −	7-56	−49.2	355.2	✓
	240-11	3.78	381. −	8-15	−55.1	349.3	✓
	236-41	3.02	303. −	8-56	−47.6	356.8	✓
	226-10	3.25	325. −	9-36	−55.0	349.4	✓
	217-36	2.83	281. −	10-36	−52.6	351.8	✓
	206-56	2.37	237. −	10-02	−42.0	362.4	✓
	〃	1.57	155. −	11-55	−30.6	373.8	✓
	〃	0.86	84. −	14-27	−21.6	382.8	✓
	〃	0.53	51. −	16-20	−15.0	389.4	✓
	〃	0.30	30. −	14-12	−7.6	396.8	✓
	260-43	0.33	32. −	15-56	−9.1	395.3	✓
	257-54	0.84	81. −	15-08	−21.9	382.5	✓
〃	246-50	1.43	140. −	13-26	−33.4	371.0	✓
〃	247-0	2.17	216. −	10-50	−41.3	363.1	✓

360
133-40
-20

Sta	Az	Rod	Hor Dist	Vert L	Diff El	Elev
						404.4
T@△#3	229-50	2.20	218.	-11-28	-44.2	360.2 ✓
	"	1.49	146.	-13-06	-34.0	370.4 ✓
	133-40	0.38	40.	+0-40	+0.5	404.9 ✓
	"	0.77	80.	-2-08	-3.0	401.4 ✓
	"	1.21	125.	-1-12	-2.6	401.8 ✓
	"	1.80	185.	-2-40	-8.6	395.8 ✓
	150-53	1.54	156.	7-40	21.0	383.4 ✓ (?)
"	164-26	1.00	101.	-8-20	-14.8	389.6 ✓
	183-20	1.69	171.	-8-34	-25.7	378.7 ✓
	173-03	2.08	211.	-7-03	-26.1	378.3 ✓
	188-50	2.30	232.	-8-20	-34.0	370.4 ✓
	106-25	0.63	63.	+11-54	+13.1	417.5 ✓
	70-29	0.89	89.	+11-17	+17.7	422.1 ✓
	64-08	0.53	53.	+12-15	+11.5	415.9 ✓
T@△#3	60-45	1.28	127.	+11-06	+24.9	429.3 ✓
T@△#5				Elev	△#5 =	368.0 ✓
#5 to #7	5.0 30°-12' ✓	3.64	370.	+5°-33	+36.00	404.0 ✓
	310-45	0.93	96.	+2-03	+3.6	371.6 ✓
	"	1.72	176.	+3-56	+12.1	380.1 ✓
	349-03	1.15	118.	+5-10	+10.6	378.6 ✓
	348-52	2.44	246.	+7-53	+34.1	402.1 ✓
	348-08	3.46	348.	+8-20	+51.0	419.0 ✓
	330-25	4.00	404.	+7-11	+51.0	419.0 ✓
	337-55	4.96	500.	+8-27	+74.2	442.2 ✓

Mon 8/22/21

Sta	Az	Rod	Hor Dist	Vert L	Diff El.	Elev.
						368.0
T@Δ 5	348-38	5.02	504.	+8-55	+79.1	447.1
	0-43	5.20	524.	+7-57	+73.1	441.1
	7-45	4.10	413.	+7-38	+55.5	423.5
	3-37	3.46	348.	+8-24	+51.4	419.4
	14-52	2.76	279.	+7-35	+37.1	405.1
	24-0	1.97	201.	+6-0	+21.1	389.1
	32-40	2.43	248.	+5-34	+24.0	392.0
	51-20	2.11	215.	+6-0	+22.6	390.6
	66-14	1.44	147.	+6-10	+15.9	383.9
	65-44	2.72	275.	+7-13	+34.8	402.8
	79-38	2.23	225.	+8-39	+34.3	402.3
	94-24	2.25	227.	+8-25	+33.6	401.6
	100-04	3.03	305.	+8-08	+43.5	411.5
	110-03	2.78	280.	+8-10	+40.2	408.2
	"	1.87	191.	+5-54	+19.8	387.8
	123-11	3.15	320.	+6-30	+36.4	404.4
	132-39	2.42	247.	+4-40	+20.1	388.1
	136-20	3.12	319.	+4-54	+21.7	389.7
	148-10	3.38	345.	+5-02	+30.2	398.2
	152-06	2.94	302.	+2-26	+12.8	380.8
	166-55	3.42	352.	-1-02	-6.4	361.6
	182-03	2.64	270.	-4-08	-19.4	348.6
	162-39	2.03	208.	-1-09	-4.2	363.8
	"	1.25	129.	-1-32	-3.5	364.5
	129-37	1.46	150.	+-3-36	+9.4	377.4

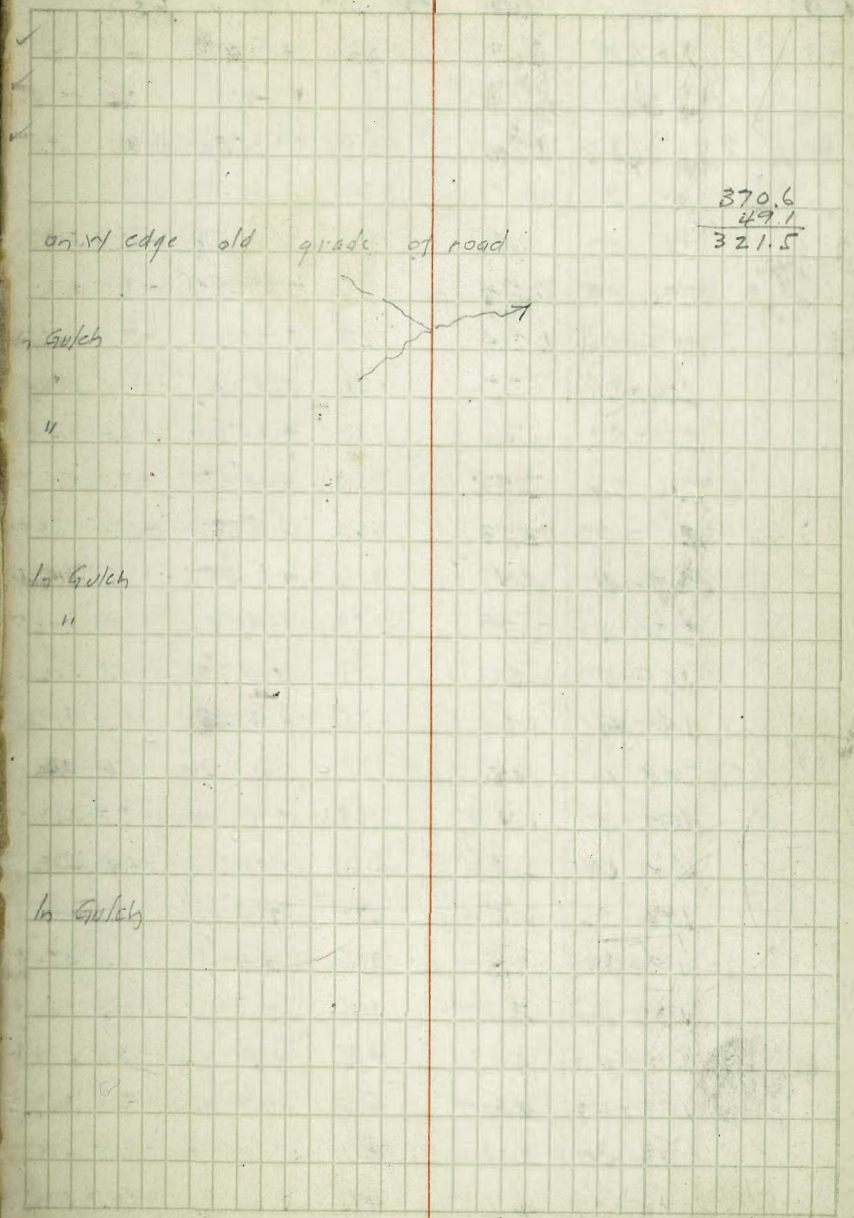
Cor. post 3"x3" in mound of rocks

Sta	Az	Rod	Hor Dist	Vert L		
						368.0
T at △#5	122-27	0.62	65.	+ 1.55	+2.2	370.2
	212-38	0.95	97.	-6-57	-11.8	356.4
	222-55	0.68	69.	-8-27	-9.7	358.3
	245-56	1.26	129.	-4-42	-10.6	357.4
	276-0	1.76	182.	-2-13	-7.0	361.0
	293-08	2.16	223.	+ 0-40	+2.6	370.6
	30-12	0.90	92.	+6-09	+9.4	377.4
	"	1.90	193.	+5-55	+20.0	388.0
	"	3.00	305.	+5-34	+29.6	397.6
T@△#7				Elev △#7 =		404.0
	118-43	0.56	58.	-3-22	-3.4	400.6
#7 - #8	71-39	3.40	345.	-5-30	33.39	370.6
	"	1.57	161.	-4-15	-11.9	392.1
	118-0	1.42	147.	-0-16	-0.7	403.3
	126-03	2.24	231.	+1-45	+7.0	411.0
	138-12	4.70	483.	+2-48	+23.6	427.6
	122-17	4.77	490.	+2-21	+20.0	424.0
	102-20	5.52	567.	+2-08	+21.2	425.2
	101-19	4.50	462.	+0-34	+4.6	408.6
	100-43	2.35	241.	-1-29	-6.3	397.7
	54-40	1.30	133.	-5-48	-13.5	390.5
	43-48	1.94	198.	-5-12	-18.0	386.0
	0-19	2.07	213.	+2-23	+8.9	412.9
	342-33	3.84	392.	+4-45	+32.4	436.4

low point in Saddle

404.0
33.4
370.6

Sta	Az	Rod	Hor Dist	Vert L	Diff El.	El
						404.0
	6-10	3.05	314.	+1-07	+6.1	410.1
	23-58	2.46	253.	-1-30	-6.6	397.4
	48-32	2.98	303.	-5-48	-30.7	373.3
T@ △ #8		4.90		Elev. △ #8 =		370.6
#8 to #9	29-40	5.13	522.	-5-23	-49.13	321.5
T@ #8	341-51	0.86	85.	-12-0	-18.1	352.5
	254-10	0.39	39.	-11-55	-8.2	362.4
	188-04	0.80	83.	+2-30	+3.6	374.2
	236-22	0.99	101.	+6-08	+10.9	381.5
	181-56	2.08	205.	+11-52	+43.1	413.7
	170-45	1.58	162.	+4-58	+14.1	384.7
	167-26	2.76	279.	+6-55	+33.9	404.5
	131-23	1.26	123.	+13-32	+29.6	400.2
	95-02	1.10	110.	+11-04	+21.5	392.1
	52-12	1.17	121.	+0-55	+19.4	390.0
	58-24	0.60	62.	+4-0	+4.3	374.9
	7-24	0.89	91.	-6-52	-10.9	359.7
	6-02	1.56	157.	-9-02	-25.0	345.6
	341-0	1.67	193.	-0-48	-2.7	367.9
	333-38	2.76	284.	+2-30	+12.4	383.0
	"	4.0	410.	+2-25	+17.3	387.9
	342-50	3.30	340.	+0-46	+4.5	375.1
	0-14	3.23	332.	-1-42	-9.9	360.7
	8-49	3.77	387.	-3-0	-20.2	356.4



Sta	Az	Rod	Hor Dist	Vert L	Diff El.	Elev	
T@Δ#8	11-21	2.56	261.	-5-04			
				Elev Δ#9		321.5	
						286.3	
9 to #10 Δ	10°-12'	4.33	441.	-4-33	-35.17	~~285.66~~	
	246-27	0.47	46.	-14-58	-12.3	309.2	In Gulch Bot
	220-13	0.84	86.	-5-55	-8.9	312.6	" " "
	219-06	1.24	127.	-3-58	-8.8	312.7	
	206-28	1.27	131.	-1-32	-3.5	318.0	
	216-52	1.76	181.	+1-04	+3.4	324.9	
	216-24	2.58	265.	+1-52	+8.7	330.2	
	211-42	3.93	400.	+5-22	+37.4	358.9	Old road grade
	207-41	3.11	316.	+5 08	+28.3	349.8	" " "
	200-40	2.53	258.	+4-56	+23.1	344.6	" " "
	188-52	2.06	211.	+4-02	+14.8	336.3	" " "
	181-46	1.51	155.	+4-34	+12.3	333.8	" " "
	208-0	1.81	185.	0-0	0	321.5	
	192-42	1.63	168.	+1-58	+5.8	327.3	
	186-08	2.36	242.	+4-0	+16.9	338.4	
	194-56	2.74	279.	+5-46	+28.1	349.6	
	184-12	3.30	335.	+5-02	+29.3	350.8	In side Gulch
	192-40	3.62	366.	+7-22	+47.4	368.9	
	191-30	4.53	455	+8-34	+68.5	390.0	
	183-35	5.07	510	+8-29	+76.0	397.5	
	189-02	4.16	421	+7-14	+53.5	375.0	
	178-27	4.67	473	+6-36	+54.7	376.2	In Gulch

321.5
35.2
286.3

167
228

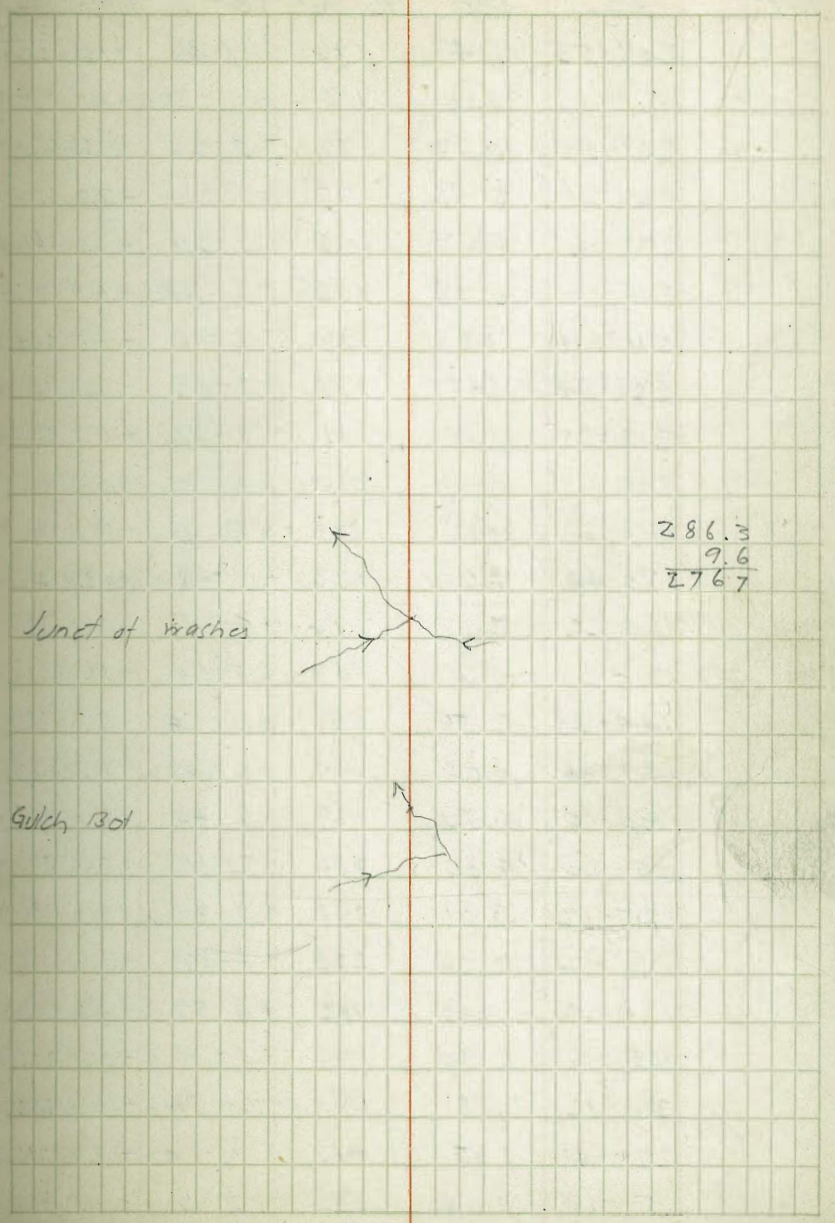
Sta	Az	Rod	Hor Dist	Vert L	Diff El	Elev
						321.5
	165-08	4.37	432.	+11-12	+85.5	407.0
	147-57	3.87	377.	+12-52	+86.0	407.5
	124-48	2.28	218.	+15-22	+60.0	381.5
	157-05	3.20	319.	+9-56	+55.8	377.3
	170-46	3.58	360.	+8-20	+52.7	374.2
	172-32	2.68	271.	+7-30	+35.7	357.2
	167-20	2.07	210.	+7-06	+26.1	347.6
	154-52	1.36	134.	+12-12	+29.0	350.5
	128-52	1.04	98.	+16-54	+29.8	351.3
	"	2.10	200.	+15-30	+55.4	376.9
	102-29	1.94	184.	+15-52	+52.3	373.8
	80-02	1.12	109.	+14-12	+27.6	349.1
	51-36	2.09	213.	+6-28	+24.2	345.7
	39-58	2.19	225.	+3-0	+11.8	333.3
	33-17	1.55	160	+1-40	+4.7	326.2
	9-12	1.74	179	-4-15	-13.3	308.2
	355-54	2.07	209	-7-48	-28.6	292.9
	302-51	0.41	35.	-26-06	-17.1	304.4
	"	1.18	122.	-0-55	-2.0	319.5
	257-58	1.19	121.	+5-10	+10.9	332.4
	265-04	1.82	185.	+6-18	+20.4	341.9
	267-0	2.60	264.	+6-32	+30.3	351.8
	273-31	3.42	346.	+7-06	+43.1	364.6
	285-17	4.51	457	+6-56	+55.5	377.0
	291-28	4.96	502	+6-0	+52.8	374.3

℄ Old grade
Gulch ℄ Bot
" " "

43
51

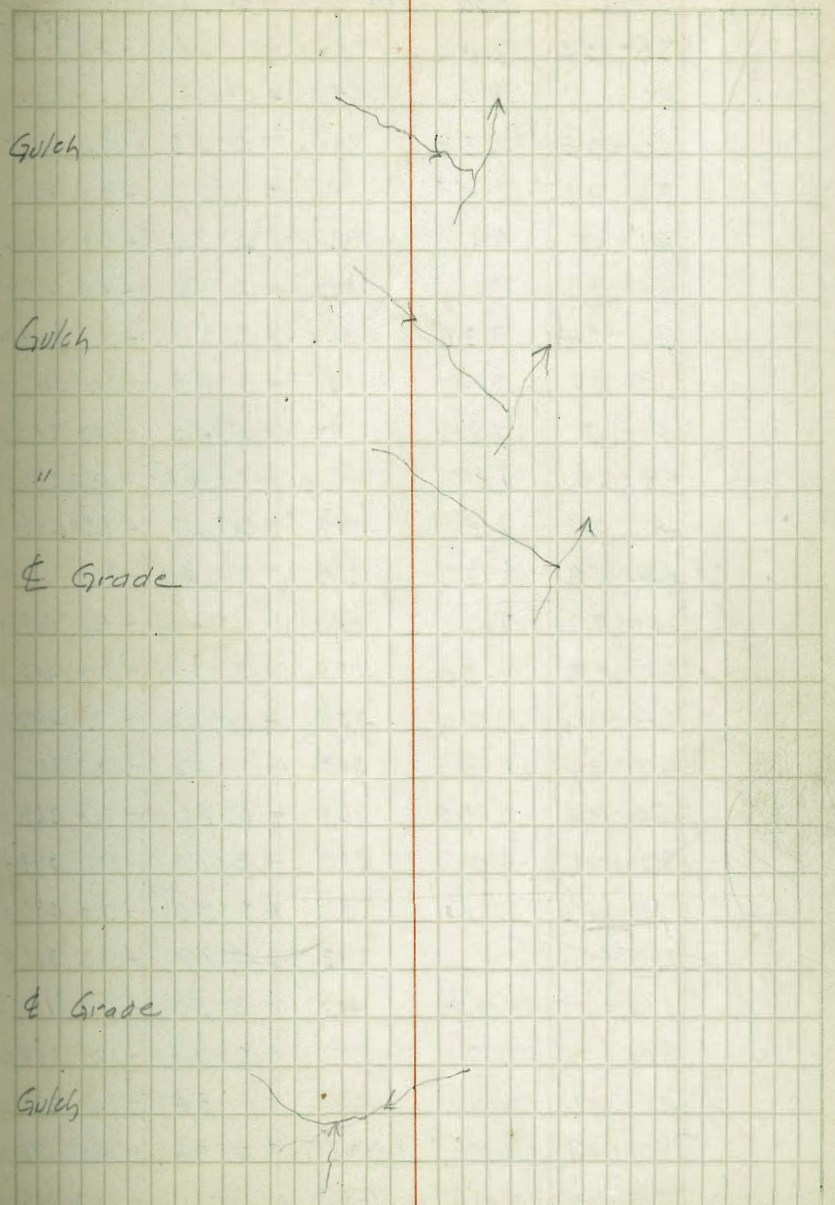
174
248

Sta	Az	Rod	Hor Dist	Vert ∠	Diff El.	Elev
						3215
	301-26	4.18	428.	+3°58'	+29.8	351.3
	304-02	3.93	405	+1-48	+12.7	334.2
	327-57	3.42	352	-0-6'	-0.6	320.9
	314-48	2.96	305	+0-55	+4.9	326.4
	297-32	2.48	253	+3-34	+15.8	337.3
	"	2.51	258.	+2-14	+10.1	331.6
	304-34	2.13	220.	+0-42	+2.7	324.2
	324-08	1.96	202.	-1-46	-6.2	315.3
T@ Δ#9	288-14	1.77	182.	+2-48	+8.9	330.4
T@ #10 Δ	505			Elev Δ#10 =		286.3
					-9.6	276.7
#10 To #11	297-36	3.47	356.	-1°-32'	-19.08	266.58
	327-41	0.95	96.	-8-28	-14.3	272.0
	"	0.74	75.	-9-36	-12.7	273.6
	314-22	0.97	97	-11-04	-19.0	267.0
	290-16	1.38	141	-6-28	-16.0	270.0
	293-48	1.74	175	-8-46	-27.0	259.0
	287-0	2.08	213	-3-44	-13.9	272.4
	281-53	2.72	278	-2-02	-9.9	276.4
	263-38	2.74	280	+4-28	+21.8	308.1
	253-23	3.55	360	+6-12	+39.2	325.5
	"	2.71	275	+6-0	+29.0	315.3
	219-30	2.18	223	+4-20	+16.8	303.1
	239-22	2.13	218	+4-40	+17.7	304.0
	258-45	2.01	206	+3-48	+13.7	400.0

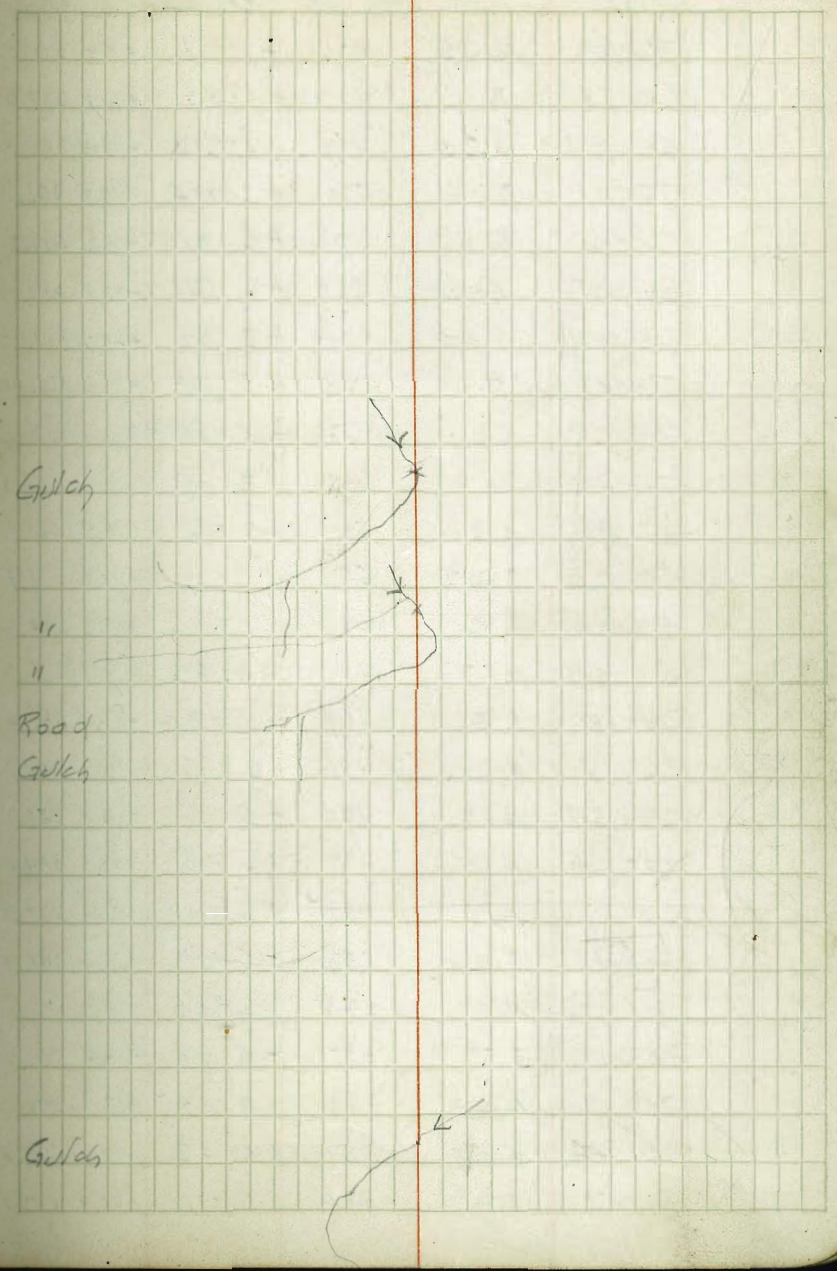


286.3
9.6
276.7

Sta	Az	Rod	Hor Dist	Vert ∠	Diff El	Elev
						286.3
	249-53	1.42	146.	+1-46	+4.5	290.8
	"	1.10	113.	−2-20	−4.6	281.7
	237-29	0.69	70.	−9-26	−11.6	274.7
	289-24	0.75	77	−5-22	−7.2	279.1
	232-16	0.63	65	−5-30	−6.2	280.1
	201-30	0.98	102	+2-28	+4.4	290.7
	211-54	1.26	130	−2-10	−4.9	281.4
	221-54	1.65	170	+2-04	+6.1	292.4
	212-25	2.05	211	+3-02	+11.2	297.5
	204-42	1.97	203	+0-02	+0.1	286.4
	197-56	1.96	202	+3-0	+10.6	296.9
	170-48	1.20	123	+5-48	+12.4	298.7
	164-22	2.08	210	+8-14	+30.4	316.7
	131-27	1.56	158	+7-04	+19.6	305.9
	144-45	2.58	255	+11-26	+51.6	337.9
	149-14	4.08	402	+11-42	+83.2	369.5
	130-10	4.70	469.	+9-40	+80.0	366.3
	118-26	4.30	434	+7-32	+57.5	343.8
	125-12	3.01	301.	+9-32	+50.6	336.9
	120-12	2.26	228.	+7-38	+30.6	316.9
	120-40	1.00	102.	+4-32	+8.0	294.3
	55-16	0.90	93.	−1-18	−21.1	265.2
	36-12	1.15	117.	−6-54	−14.1	272.2
	22-41	1.37	141.	−3-16	−8.0	278.3
	5-18	1.54	159.	−0-04	−0.2	286.1



Sta	Az	Rod	Hor Dist	Vert L		286.3
	25-04	2.00	206	+1-28	+5.2	291.5
	35-28	2.46	252	+1-04	+4.7	291.0
	40-09	2.58	264	-0-33	-2.5	283.8
	38-48	2.87	295	+0-04	+0.3	286.6
	41-0	3.11	320	+0-30	+2.9	289.2
	49-32	3.13	322	+0-12	+1.1	287.4
	38-24	3.39	348	+3-04	+18.6	304.9
	32-31	3.14	322	+3-33	+20.0	306.3
	37-0	1.85	191	-0-48	-2.7	283.6
	59-26	1.89	195	-2-48	-9.5	276.8
	65-08	1.91	197	-0-21	-1.2	285.1
	54-52	2.32	239	-0-40	-27.9	257.4
	47-58	2.25	232	-1-42	-6.9	279.4
	51-49	2.90	298	-0-39	-3.4	282.9
	64-10	3.20	329	+0-32	+3.1	289.4
	63-26	3.10	319	-0-02	-0.2	286.1
	65-34	2.99	308	+0-31	+2.8	289.1
	99-04	2.08	213	+3-31	+13.1	299.4
	90-42	2.91	298	+2-30	+13.0	299.3
	102-22	2.86	293	+4-19	+22.1	308.4
	"	3.98	407	+3-50	+27.2	313.5
	90-27	3.77	387	+2-14	+15.1	301.4
	81-33	3.49	359	+1-34	+9.8	296.1
	80-44	4.17	428	+0-36	+4.5	290.8
	79-28	4.26	437	+1-21	+10.3	296.6



Sta	Az	Rod	Hor Dist	Vert L		286.3
	72-23	4.25	436	+1-17	+9.7	296.0
	64-58	4.16	427	+1-36	+11.9	298.2
	59-17	4.20	432	+1-22	+10.3	296.6
	57-31	5.06	520	+2-04	+18.8	305.1
	54-55	6.35	651	+2-31	+28.2	314.9
	58-07	6.44	661	+2-51	+32.8	319.1
	65-12	6.40	654	+3-55	+44.7	331.0
	73-15	6.50	665	+3-04	+35.6	321.9
	79-28	6.61	677	+3-56	+46.40	332.7 332.6
	74-43	5.37	549	+3-08	+30.0	316.3
	66-35	4.97	510	+2-46	+24.5	310.8
	52-20	5.02	516	+2-28	+22.2	308.5
	53-04	4.34	446	+1-58	+15.3	301.6
	39-33	4.67	476	+4-42	+39.0	325.3
	38-10	5.59	569	+5-30	+54.7	341.0
	26-18	4.73	480	+6-27	+54.3	340.6
	29-54	4.12	420	+5-31	+40.6	326.9
	18-04	4.32	438	+6-13	+47.7	334.0
	6-47	4.77	483	+6-27	+52.0	338.3
	348-19	5.26	533	+5-57	+55.6	341.9
	331-08	4.37	443	+6-05	+47.2	333.5
	343-49	3.77	385	+5-06	+34.4	320.7
	350-24	4.43	452	+4-43	+37.3	323.6
	355-26	3.43	351	+3-42	+22.7	309.0
	5-17	2.97	304	+3-56	+20.8	307.1

℄ Road

" "

Summit of Saddle 313.2

Cathy Fletcher 330 Contour

24
14
10

Sta	Az	Rod	Hor Dist	Vert L		286.3	
	358-18	2.36	243	+1-54	+8.1	294.4	
	336-10	2.39	245	+2-24	+10.3	296.6	
	327-11	3.17	325	+3-31	+20.0	306.3	
	314-21	3.58	367	+3-35	+22.8	309.1	
	318-49	4.16	423	+5-30	+40.8	327.1	
	321-12	2.35	242	+0-31	+2.2	288.5	
	316-14	1.86	191	-1-52	-6.2	280.1	
	330-08	1.34	138	-3-01	-7.2	279.1	
				Elev Δ #11 = 276.7			
π @ 11							
11 to #12	260-46	7.26	744	-2-03	-26.7	250.0	W edge Highway 16ft Bed Δ to 10' of ℄
	115-24	0.78	76	-14-52	-20.2	256.5	Gulch Bot
	143-05	0.91	93	-5-04	-8.2	268.5	
	180-06	0.62	55	-23-05	-23.4	253.3	" "
	229-17	0.98	93	-16-56	-28.3	248.4	" "
	250-45	1.04	100	-15-14	-27.2	249.5	" "
	255-07	1.49	147	-11-40	-30.4	246.3	" "
	247-35	1.94	194	-9-36	-32.8	243.9	" "
	255-32	2.41	243	-8-04	-34.4	242.3	" "
	261-06	2.94	300	-5-06	-26.6	250.1	" "
	260-34	3.60	366	-6-12	-39.8	236.9	" "
	261-32	3.78	386	-4-38	-31.2	245.5	℄ Highway fill over gulch
	257-29	3.64	372	-4-36	-30.0	246.7	
	254-06	3.23	330	-4-30	-25.8	250.9	Trail
	"	2.71	277	-4-52	-23.5	253.2	"

225
216
282

Tues 8/23/21

1-9-17

Sta	Az	Rod	Hor'l Dist	Vert L		276.7
TP @ 11	249-31	3.65	376.	-0-10'	-1.1	275.6
	244-20	3.32	341.	-0-24	-2.4	274.3
	"	2.83	291.	-0-16	-1.3	275.4
	235-04	2.57	264.	+2-38	+12.2	288.9
	223-03	2.78	233.	+4-38	+18.8	295.5
	237-47	2.15	222.	-1-30	-5.8	270.9
	214-48	1.67	172.	+3-12	+9.6	286.3
	229-32	1.50	154.	-3-0	-8.1	268.6
	202-57	1.26	130.	+1-04	+2.4	279.1
	182-52	1.65	167.	+7-20	+21.5	298.2
	203-0	2.31	232.	+8-54	+36.3	313.0
	206-20	3.45	342.	+10-57	+66.2	342.9
	220-08	3.75	372.	+10-26	+68.5	345.2
	221-18	2.93	295.	+8-0	+41.4	318.1
	230-02	3.42	345.	+6-52	+41.6	318.3
	230-54	3.97	401.	+6-08	+43.0	319.7
	242-49	4.16	426.	+4-26	+32.9	309.6
	244-42	4.93	504.	+4-30	+39.6	316.3
	249-30	5.58	570.	+3-26	+34.1	310.8
	247-17	6.30	641.	+5-02	+56.2	332.9
	235-57	5.75	572.	+10-01	+101.0	377.7
	230-0	5.32	526.	+11-04	+103.0	379.7
	219-56	5.30	521	+11-38	+107.0	383.7
	225-29	4.70	469	+9-43	+80.4	357.1
	234-12	4.63	465	+8-33	+70.0	346.7

Gulch

Lots

Fletcher 330

Sta	Az	Rod	Hor Dist	Vert ∠		276.7	
T @ 11	228-52	4.20	423.	+7-48	+58.0	334.7	
	101-29	1.02	104.	−6-48	-12.4	264.3	Toe Mt.
	111-10	1.60	164.	−3-46	-10.7	266.0	"
	99-54	1.70	175.	+0-35	+1.8	278.5	
	347-55	0.67	60.	+21-30	+23.7	300.4	
	322-34	1.68	162.	+14-32	+41.9	318.6	
	302-35	2.20	218.	+11-26	+44.1	320.8	
	293-33	2.75	276.	+9-02	+44.0	320.7	
	286-22	3.62	366.	+6-36	+42.4	319.1	
	277-49	3.46	356.	+1-56	+12.0	288.7	
	269-19	3.21	330.	−2-36	-15.0	261.7	
	"	2.86	294.	−2-51	-14.7	262.0	
	282-24	1.04	108.	−1-33	-2.9	273.8	
				Elev Δ #12 =		250.0	
T @ Δ #12	14-11	3.85	396.	+2-58	+20.4	270.4	℄ Highway Grade
	15-51	3.12	318.	+3-32	+19.6	269.6	"
	26-05	2.77	283.	+3-27	+17.1	267.1	"
	68-58	3.22	331.	0	0	0	"
	78-30	3.38	347.	−2-20	-14.1	235.9	℄ Gulch below Highway fill (7.5 above bottom) 30" Arch Culv.
	83-14	2.99	307.	−0-36	-3.2	246.8	N edge Highway (center 10' South)
	82-55	1.61	166.	−0-58	-2.8	247.2	10' N ℄ " (N edge)
	76-14	0.73	76.	−1-16	-1.7	248.3	℄ Highway
	10-02	1.77	144.	−27-23	-74.5	175.5	℄ gulch
	215-46	0.84	87.	+0-38	+1.0	251.0	℄ Highway
	209-25	3.72	382.	+1-06	+7.4	257.4	"

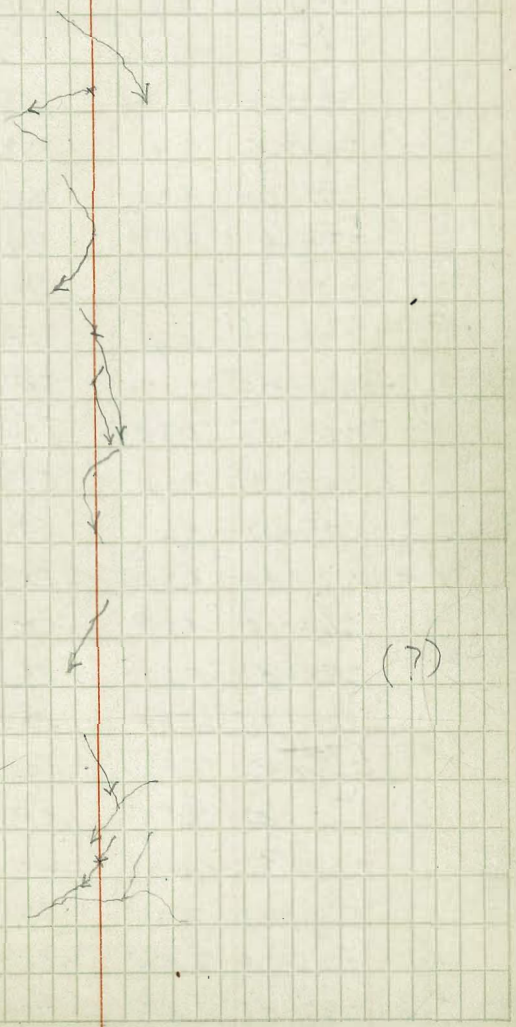
6.32
1.85
4.37

133-40
180
313-40

Sta	Az	Rod	Hor Dist	Vert L		250.0	
T @ △ #12	211-11	4.87	500.	+1-02	+9.0	259.0	✓ ℄ Highway
	219-05	8.38	860.	+0°58'	+14.6	264.6	✓ "
#12 to 13	219-06	8.39	861.	+0-58	+14.6	264.6	✓ On ℄ Dam No edge of Highway
T @ #13	133-34	1.15	95.	+26-40	+47.7	312.3	✓ Sta 0.0 So End Dam Stk #3
	137-0	0.76	65.	+25-12	+30.6	295.2	✓ Test Pit #X #5 So. side
	0-28	1.13	99.	-22-50	-41.7	227.9	✓ " " #4 ℄ " "
T @ #13 4 ℄		?					Azim set from So. line of dam ℄ 133-40
	215-33	2.11	217.	+0-58	+3.7	268.3	✓ ℄ Highway
	215-45	4.44	457.	+0-29	+3.8	268.4	✓ " "
#13 to #14	216-24	6.32	650.	+1-10	+13.2	277.8	✓ 10' No ℄ "
T @ △ #14 5.0	187-26	0.97	100.	+2-44	+4.8	282.6	✓ ℄ of Highway
	190-45	2.10	214.	+2-45	+10.3	288.1	✓ " "
#14 to #15 △	212-07	2.86	293.	+3-06	+15.9	293.7	✓ 10 No ℄ "
	28-12	0.47	49.	-2-34	-2.2	275.6	✓ Edge (No) Highway
	320-26	0.63	49.	-30-24	-28.7	249.1	✓
	281-50	0.79	61.	-30-10	-35.5	242.3	✓
	243-34	1.25	113.	-20-48	-41.4	236.4	✓
	230-47	0.79	77.	-14-49	-20.4	257.4	✓
	215-12	1.25	126.	-8-56	-19.8	258.0	✓
	192-24	1.18	122.	+2-38	+5.6	283.4	✓ No edge High way
	182-55	1.15	119.	+2-22	+4.9	282.7	✓ So " "
	177-16	1.13	114.	+8-50	+17.8	295.6	✓ Upper Cut "

Sta	Az	Rod		Vert ∠		277.8	
	136-0	0.62	55.	+22-25	+22.7	300.5	✓ ✓
	103-14	1.06	94.	+21-50	+37.7	315.5	✓ ✓
	58-47	0.96	95.	+12-02	+20.3	298.1	✓ ✓
	57-31	1.65	165.	+9-49	+28.6	306.4	✓ ✓
	83-04	1.13	114.	+19-30	+40.3	318.1	✓ ✓
					Elev △#5 =	368.0	
T@△#5 5°							
5 to 17	224-28	3.30	336	-4-54	-28.7	339.3	
T@# 17 △ 5.1	281-17	1.61	162.	-6-30	-18.5	320.8	✓ Junc of Irrashes
	277-48	1.66	168.	-4-28	-13.1	326.2	✓
	286-53	1.58	161.	-4-54	-13.7	325.6	✓
	314-32	1.47	151.	-2-56	-7.7	331.6	✓
	315-57	0.97	99.	-4-36	-8.0	331.3	✓
	304-46	1.00	101.	-7-50	-13.9	325.4	✓ Irr ash
	288-54	0.89	91.	-5-06	-8.1	331.2	✓
	271-04	"	91.	-4-58	-7.9	331.4	✓
	253-48	1.08	111.	-5-33	-10.8	328.5	✓
	240-19	1.29	133.	-2-02	-4.7	334.6	✓
	205-04	0.69	71.	+5-52	+7.2	346.8	✓
	193-45	2.12	217.	+3-28	+13.1	359.4	✓
	221-06	1.03	106.	+1-28	+2.7	342.0	✓
	213-22	2.64	271.	+2-26	+11.5	350.8	✓
	202-08	3.19	327.	+2-39	+15.1	354.4	✓
	172-35	3.12	320.	+3-25	+19.1	358.4	✓

Sta	Az	Rod	Hor Dist	Vert L		339.3	
T@17	162-48	3.15	319.	+6-07	+34.2	373.5	T. Old wagon Road
	149-56	3.70	379.	+4-06	+27.1	366.4	✓
	139-20	3.00	307.	+4-58	+26.5	365.8	✓
	148-55	1.76	181.	+4-10	+13.2	352.5	✓
	"	0.38	39.	-9-10	- 6.3	333.0	✓ Wash
	27-0	0.33	33.	-13-12	- 7.6	331.7	✓ "
7	35-47	0.52	54.	-1-30	-14.1	325.2	✓
5	52-33	1.21	125.	+2-06	+ 4.6	343.9	✓
	62-26	1.11	115.	-1-26	- 2.9	336.4	✓ Wash
7	81-33	1.10	114.	+2-42	+5.4	344.7	✓
	109-55	1.18	122.	-1-29	- 3.2	336.1	✓ "
	101-52	1.98	204.	+0-52	+ 3.1	342.4	✓ "
	101-46	2.12	218.	+2-11	+8.3	347.6	✓ Old road
	115-44	3.10	319.	+1-07	+ 6.2	345.5	✓ Wash
	124-03	3.02	309.	+3-13	+17.3	356.6	✓
	130-46	3.95	404.	+4-05	+28.8	368.1	✓
	120-03	4.00	411.	+1-52	+13.4	352.7	✓ Wash
	114-31	3.95	407.	-0-28	- 3.4	335.9	✓ (?) (?)
	55-44	1.96	202.	+1-18	+4.6	343.9	✓
	51-46	1.92	198.	+2-15	+7.8	347.1	✓ Small Wash
	46-24	1.85	190.	+3-18	+10.9	350.2	✓
	25-30	1.30	134.	+3-05	+7.2	346.5	✓
	11-41	1.35	139.	+0-36	+1.5	340.8	✓
	357-14	1.63	168.	+3-19	+9.7	349.0	✓
	349-40	3.39	344.	+5-45	+34.6	373.9	✓



2 f 2
5 64

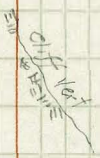
Sta	Az	Rod	Hor Dist	Vert L		339.3
T @ 17	338-0	4.10	419.	+4-01	+29.3	368.6
	327-20	4.35	445.	+3-23	+26.2	365.5
	323-26	2.94	302.	+2-17	+12.2	351.5
	312-04	3.25	334.	+0-41	+4.0	343.3
	325-0	2.06	212.	+1-06	+4.1	343.4
	300-45	2.48	255.	−1-55	-8.5	330.8
	290-05	2.31	238.	−2-40	-11.1	328.2 wash
	292-04	3.58	368.	−2-10	-13.9	325.4
	279-41	3.84	394.	−3-06	-21.3	318.0 "
	284-0	4.09	418.	−4-0	-29.2	310.1 "
	291-32	4.41	454.	−2-15	-17.8	321.5
	301-03	5.12	527.	−1-04	-9.8	329.5
	286-34	5.58	574.	−2-06	-21.1	318.2 wash
	283-21	5.64	579.	−2-26	-24.5	314.8
	279-51	5.62	575.	−2-36	-26.0	313.3
	271-44	5.75	589.	−1-30	-15.4	323.9
	264-18	5.87	602.	+0-13	+2.3	341.6
	258-59	5.68	582.	+1-0	+10.1	349.4
	260-35	4.88	501.	+0-31	+4.5	343.8
	246-32	3.89	400.	+1-12	+8.4	347.7
	247-51	2.78	286.	−0-21	-1.8	337.5
	268-30	4.08	420.	−1-47	-13.1	326.2
	274-58	3.61	370.	−2-59	-19.3	320.0
	279-29	2.50	257.	−3-32	-15.9	323.4
#17 to #16	287-08	7.45	762	−2-25	-32.2	307.1

Sta	Az	Rad	Hor Dist	Vert L		307.1	
T @ 16	5.1 287-11	0.45	46.	-5·35	-4.5	302.6	✓
	321-46	1.08	112.	+0·53	+1.7	308.8	✓
	350-59	0.72	73.	+8·14	+10.6	317.7	✓
	26-45	2.12	212.	+9·38	+36.0	343.1	✓
	64-37	1.68	169.	+8·24	+24.9	332.0	✓
	80-23	1.15	118.	+5·11	+10.7	317.8	✓
	82-41	0.66	68.	+5·26	+6.4	313.5	✓
	107-54	1.00	103.	+1-52	+3.4	310.5	✓
	128-29	1.30	134.	-2-17	-5.3	301.8	✓ Wash
	162-28	1.25	129.	+3·38	+8.2	315.3	✓
	213-47	0.79	82.	+1-02	+1.5	308.6	✓
	143-06	0.58	59.	-8·06	-8.4	298.7	✓
	164-56	0.54	56.	-3·33	-3.5	303.6	✓
	"	0.30	27.	-22·02	-10.9	296.2	✓ Wash
	193-34	0.45	43.	-17-04	-13.5	293.6	✓ "
	213-36	0.50	51.	-7-45	-6.9	300.2	✓
	265-13	0.72	69.	-16·36	-20.6	286.5	✓ "
	265-47	1.05	106.	-8-13	-15.3	291.8	✓
	257-35	1.40	144.	-A-21	-10.9	296.2	✓
	286-30	1.62	163.	-9-27	-27.2	279.9	✓ True El - 6e ℄ Wash @ Fill on Highway {30" Culv.
	277-43	1.28	128.	-10·30	-23.7	283.4	✓
	255-53	2.13	217.	-3·58	-15.1	292.0	✓
	252-32	2.70	277.	-0·31	-2.5	304.6	✓
	240-32	3.39	348.	+2-27	+14.9	322.0	✓
	243-28	3.71	380.	-1-43	-11.4	295.7	✓

Sta	Az	Rod	Hor Dist	Vert L		307.1	
T @ △ #16	227-39	3.95	405.	+2-27	+17.4	324.5	✓
	"	3.22	330.	+3-02	+17.5	324.6	✓
	211-36	3.09	316.	+4-43	+26.0	333.1	✓
	200-43	3.15	319.	+7-0	+39.2	346.3	✓
	196-11	2.47	251.	+5-19	+23.3	330.4	✓
	182-0	3.15	317.	+7-08	+39.7	346.8	✓
	173-48	2.55	260.	+5-44	+25.9	333.0	✓
	"	1.91	195.	+4-48	+16.3	323.4	✓
	203-24	1.73	177.	+4-40	+14.4	321.5	✓
	213-54	1.32	135.	+3-41	+8.7	315.8	✓
	229-04	1.55	160.	+2-06	+5.8	312.9	✓
	240-55	1.98	204.	+0-26	+1.5	308.6	✓
	232-0	2.35	242.	+2-27	+10.3	317.4	✓
#16 to #15	260-06	3.08	316.	-3-02	-16.8	290.3	✓
T @ △ #15	227-11	1.04	107.	-1-38	-3.1	287.9	✓ ℄ Highway
	230-34	2.58	266.	-2-33	-11.8	278.5	✓ "
	233-04	3.26	335.	-2-53	-16.8	273.5	✓ "
	225-30	2.29	236.	-0-08	-0.5	289.8	✓ Upper Cut edge Highway
	222-37	1.86	192.	+2-10	+7.2	297.5	✓ " "
	217-50	1.04	107.	+3-36	+6.7	297.0	✓ " "
	176-34	0.26	23.	+24-0	+10.2	300.5	✓
	253-22	0.94	90.	-15-52	-25.6	264.7	✓
	282-06	0.51	40.	-30-12	-23.3	267.0	✓
	3-22	0.50	40.	-28-19	-21.5	268.8	✓

Sta	Az	Rod	Hor Dist	Vert ∠		290.3	Remarks
π @ #15	37-40	0.62	59.	-16-56	-18.0	272.3	✓
	48-05	0.85	82.	-14-52	-21.8	268.5	✓
	52-27	1.17	118.	-9-17	-19.3	271.0	✓
	50-13	1.47	144.	-12-51	-31.9	258.4	✓ True El 5.5 lower ℄ Wash
	35-25	1.58	152.	-14-48	-40.2	250.1	-10' at 15' nearer inst. Wed 8/24/21
(p 20)							
π @ Δ #15	4-53	1.50	123.	-26-56	-62.4	227.9	✓ BS #14
	334-34	1.25	93.	-31-50	-57.8	232.5	✓
	282-50	1.09	83.	-30-36	-49.0	241.3	✓
	265-11	1.08	90.	-25-56	-43.7	246.6	✓
	262-27	1.60	138.	-24-05	-61.7	228.6	✓ Corrected elev. (G.C.)
#15 to #18	333-14 ✓	4.55	374. ✓	-26-33 ✓	-186.8	~~103.5~~ 100.5	✓ Bed of S.D R. (Should be elev. 100.5 see p. 42)
~~15 to #18~~							
π @ Δ #18 48	145-39	0.67	70.	0	0	100.5	✓ " " " Toe Mt junct of Wash from So
	177-30	0.98	101.	0	0	100.5	✓ "
	188-58	1.79	184.	"	0	100.5	✓ " " "
	197-35	2.90	298.	"	0	100.5	✓ " " "
(?)	202-46	3.80	380	+0-10	+1.0	101.5	✓ " " "
	206-15	4.63	476.	0	0	100.5	✓ " " "
	211-04	5.12	526.	"	0	100.5	✓ " " "
	216-26	7.22	741.	-0-3	-0.6	99.9	✓ " " "
	208-24	5.15	526.	+3-58	+36.4	136.9	✓
	204-15	5.42	545.	+7-56	+75.9	176.4	✓
	199-22	4.91	488.	+10-22	+89.2	189.7	✓
	194-31	4.70	458.	+12-54	+105.0	205.5	✓

Sta	Az	Rod	Hor Dist	Vert L		100.5	
⊼ @ △18	201-54	4.46	451.	+7-04	+55.9	156.4	✓ Top Cliff to SDS bed
	197-40	4.00	401.	+8-45	+61.7	162.2	✓
	193-0	"	398.	+10-02	+70.0	170.5	✓
	187-30	3.98	391.	+11-54	+82.4	182.9	✓
	180-40	3.11	299.	+14-39	+78.2	178.7	✓
	175-03	3.00	285.	+16-12	+82.8	183.3	✓
	179-06	2.37	231.	+13-0	+53.3	153.8	✓
	166-03	2.43	218.	+20-51	+83.1	183.6	✓
	152-45	2.15	188.	+22-46	+78.8	179.3	✓
	136-08	2.20	202.	+19-06	+69.9	170.4	✓ ℄ Wash
	127-07	2.18	190.	+23-12	+81.4	181.9	✓
	108-20	2.25	193.	+24-05	+86.2	186.7	✓
	95-06	2.27	203.	+21-02	+78.0	178.5	✓
	76-52	2.80	263.	+17-0	+80.3	180.8	✓
	70-14	2.70	263.	+13-12	+61.7	162.2	✓ Top Cliff to S.D.R bed +10'
	72-45	3.50	340.	+14-50	+90.1	190.6	✓
	67-03	4.47	441.	+11-26	+89.2	189.7	✓
	60-01	4.55	457.	+8-30	+68.2	168.7	✓
	67-45	3.77	378.	+8-50	+58.8	159.3	✓
	68-07	2.90	294.	+6-24	+33.0	133.5	✓ Toe face Cliff Vert.
	55-27	3.64	374.	+1-23	+9.1	109.6	✓ " Mt Slope +6' SD Bed
	50-37	4.00	411.	+0-33	+3.9	104.4	✓ SDR bed So side
	59-43	2.99	307.	+1-30	+8.0	108.5	✓
	64-36	2.40	247.	+1-20	+5.7	106.2	✓ 15' So to Cliff face
	73-14	1.91	196.	+2-48.	+9.6	110.1	✓ Toe " "



Sta	Az	Rod	Hor Dist	Vert L		100.5	
⊼@△18	89-36	1.30	134.	+2.46	+6.5	107.0	✓Toe Cliff face
	122-53	0.59	61.	0	0	100.5	✓ " " " + SDR bed So side
	142-55	0.76	78.	+5-0	+6.8	107.3	✓ Same wash going up
	136-02	1.32	131.	+11-30	+26.6	127.1	✓ " " " " "
	137-54	1.55	150.	+14-32	+38.8	139.3	✓ " " " " "
	128-54	1.59	145.	+19-30	+51.3	151.8	✓
	125-31	1.13	106.	+17-31	+33.4	133.9	✓ L.E of wash
	107-55	1.26	117.	+19-24	+41.2	141.7	✓
	146-10	1.52	142.	+17-32	+44.8	145.3	✓ " " "
	170 40	1.75	175.	+10-23	+32.1	132.6	✓
	182-54	1.95	197.	+7-19	+25.3	125.8	✓
	191-04	2.70	278.	+2-38	+12.8	113.3	✓
	193-34	3.20	328.	+3-10	+18.1	118.6	✓
	196-44	370	380.	+3-07	+20.7	121.2	✓ Toe face of Cliff 25'± above R Bed
	No. Side S.D.R						
(7)(219-01)	119-01	3.44	354.	0	0	100.5	✓ 7
	222-22	2.38	245.	-0-11	-0.7	99.8	✓ "No Side" S.D.R. Bed + Toe of Mt
	239-28	1.54	159.	+0-35	+1.6	102.1	✓ " " " "
	278-56	0.80	83.	+0-36	+0.9	101.4	✓ " " " "
	342-12	0.79	82.	+1-51	+2.6	103.1	✓ " " " "
	29-25	1.80	185.	+0-12	+0.6	101.1	✓ " " " "
	35-26	3.54	364.	+0-08	+0.8	101.3	✓ " " " "
	37-12	5.65	580.	+0-12	+2.0	102.5	✓
	38-33	6.62	680.	+0-10	+2.0	102.5	✓
	43-59	7.40	760.	+0-23	+5.1	105.6	✓ So Side SDR @ ℄ Dam BM 104.24

A

No Side Damsite #3

Sta	Az	Rod	Hor Dist	Vert ∠			
π @ Δ #19 4.6						310.00	on ℄ Dam No Side {Contour #310 @ White Post
#19 to #20	133°40	2.06 ~~1.88~~	153 ~~143.~~	30.36 ~~+30 41~~	+90.8 ~~+84.9~~	400.8 ~~394.9~~	" " " {310 Hub a 15 ± E of Line (balanced in)
	328-10	2.15	162.	+30-58	+97.4	407.4	✓
	345-33	2.22	176.	+28-38	+96.0	406.0	✓
	4-50	2.50	222.	+21-51	+89.0	399.0	✓
	2-53	1.93	170.	+22-17	+69.8	379.8	✓
	12-55	1.85	172.	+18-05	+56.1	366.1	✓
#19 to #21	31-14	1.31	131.	+10-04	+23.3	333.3	✓
	47-28	0.61	63.	+3-56	+4.3	314.3	✓
	69-03	0.59	59.	-11-04	-11.5	298.5	✓
	56-02	0.98	101.	-2-48	-5.0	305.0	✓
	133-40	0.46	38.	-27-30	-19.8	290.2	✓ Test Pit #1 El top 3"x6" post Bot 25 or 30' lower
	184-22	0.48	39.	-27-26	-20.2	289.8	✓
	229-0	0.32	33.	+5-28	+3.1	313.1	✓
	253-40	0.53	52.	+14-10	+13.1	323.1	✓
	313-40	0.45	37.	+27-42	+19.4	329.4	✓ Hub Fletcher
	351-16	0.97	82.	+25-0	+38.2	348.2	✓
	334-18	1.30	101.	+29-28	+57.2	367.2	✓
	313-40	1.60	121.	+30-54	+72.5	382.5	✓
	"	1.15	91.	+28-56	+50.3	360.3	✓
	285-58	1.50	124.	+27-32	+64.6	374.6	✓
	268-19	"	132	+22-24	+54.5	364.5	✓
	279-50	1.12	96.	+23-31	+41.8	351.8	✓
	258-35	1.22	116.	+16-23	+34.0	344.0	✓
	227-13	0.97	99.	+6-35	+11.7	321.7	✓

Sta	Az	Rod	Hor Dist	Vert L		310.0
T @ #19	210-50	0.92	95.	-2-09	-3.6	306.4 ✓
	211-41	1.30	134.	-0-15	-0.6	309.4 ✓
	205-54	2.45	252.	-0-47	-3.5	306.5 ✓
	206-18	2.10	216.	-0-24	-1.5	308.5 ✓
	214-57	2.15	220.	+4-58	+19.1	329.1 ✓
	219-14	1.90	193.	+7-0	+23.7	333.7 ✓
	228-28	1.66	167.	+9-14	+27.1	337.1 ✓
	228-43	2.30	232.	+8-17	+33.8	343.8 ✓
				Elev Δ #21 =		333.3
T @ Δ #21	92-0	0.54	52.	-15-05	-14.0	319.3 ✓
	105-39	0.87	67.	-30-37	-39.6	293.7 ✓
	29-14	0.71	72.	-7-0	-8.8	324.5 ✓
	"	1.47	146.	-11-20	-29.3	304.0 ✓
	38-26	1.78	181.	-7-11	-22.8	314.5 ✓
	"	2.37	241.	-5-40	-23.8	309.5 ✓
	36-31	2.68	276.	-3-14	-25.6	307.7 ✓
	34-21	2.12	218.	-1-10	-4.5	328.8 ✓
	23-39	2.04	206.	+7-38	+27.6	360.9 ✓
	8-08	1.58	155.	+12-47	+35.1	368.4 ✓
	"	2.02	193.	+15-34	+53.7	387.0 ✓
	331-34	1.90	153.	+28-0	+81.3	414.6 ✓
				Elev Δ #20 =		~~394.9~~ 400.8
T @ Δ #20	313-40 ✓	1.00	94.	+17-0½	+28.8	429.6 ✓
#20 To #22	"	~~1.04~~ 1.65	98.	~~+17-0~~ 16°55'	~~+30.0~~ +29.5	~~424.9~~ 430.3

Fletcher 310 Hub

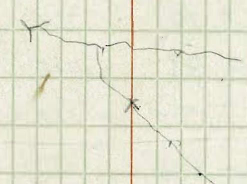
℄ Gulch

Sta	Az	Rod	Hor. Dist.	Vert L		400.8 ~~394.9~~
T@ #20	20 - 0	1.34	132.	+12 -10	+28.4	429.2
	20 - 20	2.08	205.	+11 -56	+43.3	444.1
	354 - 17	1.96	185.	+16 -30	+54.8	455.6
	4 - 19	2.78	268.	+15 -20	+73.4	474.2
	11 - 26	3.21	311.	+13 -46	+76.3	477.1
	6 - 17	3.35	322.	+14 -34	+83.7	484.5
	213 - 16	0.64	65.	-8 -30	-9.7	391.1
	218 - 0	1.66	168.	-7 -44	-22.8	378.0
	227 - 45	1.58	161.	-6 -17	-17.7	383.1
	209 - 16	1.95	191.	-12 -33	-42.5	358.3
#20 to #23	213 - 21	~~4.47~~ 4.55	443.	~~-9 -26~~ 9°W28'	~~-73.5~~ -74.0	~~331.4~~ 326.8
	214 - 30	2.60	270.	-9 -08	-43.4	366.4
	211 - 15	2.75	273.	-10 -49	-52.2	348.6
	202 - 12	2.71	266.	-11 -36	-54.6	346.2
	198 - 35	3.05	302.	-10 -46	-57.4	343.4
	193 - 46	3.25	321	-11 -15	-63.9	336.9
	243 - 11	1.25	129.	+1 -54	+4.3	405.1
	246 - 44	0.86	88.	+4 -32	+7.0	407.8
	244 - 24	0.84	87.	+0 -06	+0.2	401.0
	282 - 40	0.53	50.	+17 -07	+15.2	416.0
	313 - ~~40~~	0.60	55.	+20 -28	+20.5	421.3
	350 - 20	0.51	48.	+18 -35	+16.1	416.9
	"	1.01	94.	+18 -0	+30.5	431.3

Sta	Az	Rod	Hor Dist	Vert L		430.3 / 424.9
T@Δ#22 5.2	264-49	0.45	47.	-0-10	-0.1	430.2
	326-30	0.46	47.	+9-06	+7.5	437.8
	347-0	1.32	128.	+13-06	+29.8	460.7
	323-51	1.34	134.	+10-06	+23.8	454.1
	295-07	1.42	146.	+3-10	+8.1	438.4
	298-28	2.32	238.	+3-21	+13.9	444.2
	287-09	2.91	298.	+2-38	+13.7	444.0
	283-48	3.39	348.	+2-33	+15.5	445.8
	274-43	3.50	360.	+0-12	+1.3	431.6
	277-42	2.42	249.	-0-33	-2.4	427.9
	265-30	2.27	233.	-3-11	-13.0	417.3
	254-07	1.72	175.	-5-17	-16.1	414.2
	247-50	2.39	243.	-4-58	-21.0	409.3
	253-25	2.85	290.	-5-35	-28.3	402.0
	257-0	3.65	373.	-3-24	-22.1	408.2
	"	4.45	455.	-3-11	-25.3	405.0
	"	5.85	597.	-3-05	-32.2	398.1
	247-10	5.65	575	-5-31	-55.3	375.0
	245-15	4.75	482.	-5-57	-50.0	380.3
	236-40	2.86	290.	-7-20	-37.3	393.0
	223-53	2.92	293.	-9-02	-46.7	383.6
	227-59	2.00	202.	-8-0	-28.4	401.9
	215-13	2.15	214.	-10-41	-40.3	390.0
	222-54	1.32	133.	-8-36	-20.1	410.2
	258-43	1.18	122.	-2-12	-4.7	425.6

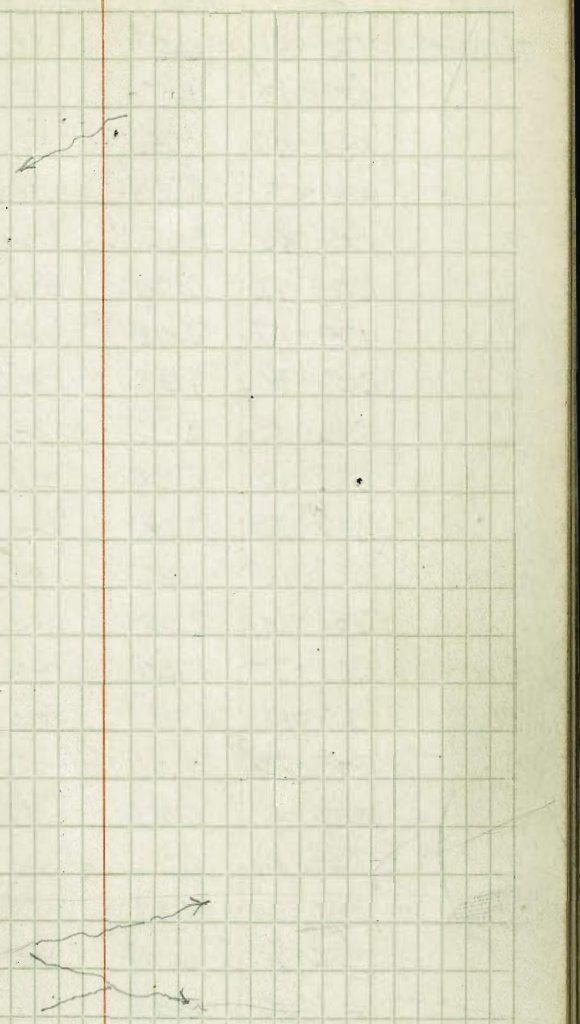
Thurs 8/25/21

Sta	Az	Rod	Hor Dist	Vert L			
⊼@ △ #23 [5.0]				Elev. △ #23 =		~~321.4~~ 326.8	
#23 To #24	215-30	~~3.31~~ 3.39	329.	~~-10-30~~ 10°32'	- ~~61.0~~ 61.1	~~260.~~ 265.7	
	B.S. #20 - 213°-21' Az -23						
⊼ @ 23 [4.9]	36-27	0.55	55.	+10-34	+10.2	337.0	✓
	49-14	0.73	76.	+3-24	+4.5	331.3	✓
	70-24	0.98	101.	+1-06	+1.9	328.7	✓
	86-58	1.44	148.	-2-24	-6.2	320.6	✓
	92-53	1.85	189.	-5-02	-16.5	310.3	✓
	112-33	0.85	86.	-8-58	-13.6	313.2	✓
	128-18	1.26	125.	-11-18	-25.0	301.8	✓
	154-04	1.58	154.	-13-10	-36.0	290.8	✓
	176-55	1.30	127.	-12-58	-29.3	297.5	✓
	181-07	1.97	192	-12-42	-43.3	283.5	✓
	189-46	2.50	245.	-12-29	-54.2	272.6	✓
	188-41	2.83	277.	-13-06	-64.5	262.3	✓
	183-53	2.86	280.	-13-33	-67.5	259.3	✓
	197-37	2.66	260.	-13-34	-62.7	264.1	✓
	205-51	2.08	200.	-15-02	-53.7	273.1	✓ Wash
	199-11	1.61	157.	-13-40	-38.2	288.6	✓
	216-16	1.45	139.	-15-23	-38.2	288.6	✓ " same above
	261-14	1.09	109.	-10-41	-20.5	306.3	✓ " " "
	255-15	0.83	81.	-13-32	-19.5	307.3	✓
	226-41	0.81	79.	-13-49	-19.4	307.4	✓
	200-46	0.94	90.	-15-27	-24.8	302.0	✓
	159-0	0.76	74.	-13-50	-18.2	308.6	✓

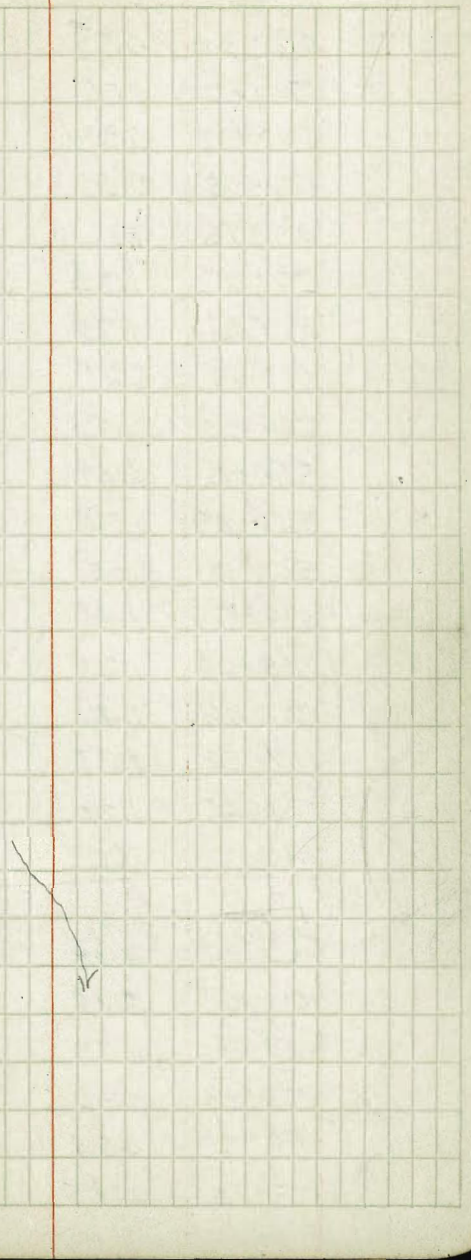


Sta	Az	Rod	Hor. Dist.	Vert ∠		326.8 ~~321.4~~	
⊼@ *23	112-45	0.35	34.	-15-26	-9.4	317.4	✓
	215-06	0.37	36.	-14-32	-9.3	317.5	✓
	305-17	0.46	48.	+2-03	+1.7	328.5	✓
	280-44	0.95	98.	-0-10	-0.3	326.5	✓
	286-53	1.32	136.	+-2-50	+6.7	333.5	✓ Top end trash above mentioned
	259-30	1.31	134.	-4-26	-10.4	316.4	✓
	257-06	1.68	172.	-3-12	-9.6	317.2	✓
	263-16	2.01	207.	-1-38	-5.9	320.9	✓
	268-55	2.85	293.	-1-24	-7.2	319.6	✓
	286-12	3.17	325.	+2-0	+11.3	338.1	✓
	271-10	3.19	327.	+0-34	+3.2	330.0	✓
	258-47	2.95	303.	-1-04	-5.6	321.2	✓
	246-31	2.96	303.	-2-24	-12.7	314.1	✓
	238-04	3.25	333.	-3-32	-20.7	306.1	✓
	234-26	3.96	406.	-3-24	-24.0	302.8	✓
	242-03	3.78	388.	-1-53	-12.8	314.0	✓
	252-33	3.95	405.	-3-13	-22.7	304.1	✓
	"	3.50	360.	-0-34	-3.5	323.3	✓
	266-12	4.40	452.	+2-07	+16.7	343.5	✓
	269-19	3.84	395.	+2-02	+14.0	342.8	✓
	283-25	4.19	427.	+4-10	+31.0	357.8	✓
	278-57	4.82	491.	+3-58	+34.0	360.8	✓
	314-15	3.22	217.	+12-56	+49.8	376.6	✓ Wash ℄
	326-33	3.25	323.	+10-27	+59.5	386.3	✓
	331-50	2.78	276.	+10-09	+49.4	376.2	✓

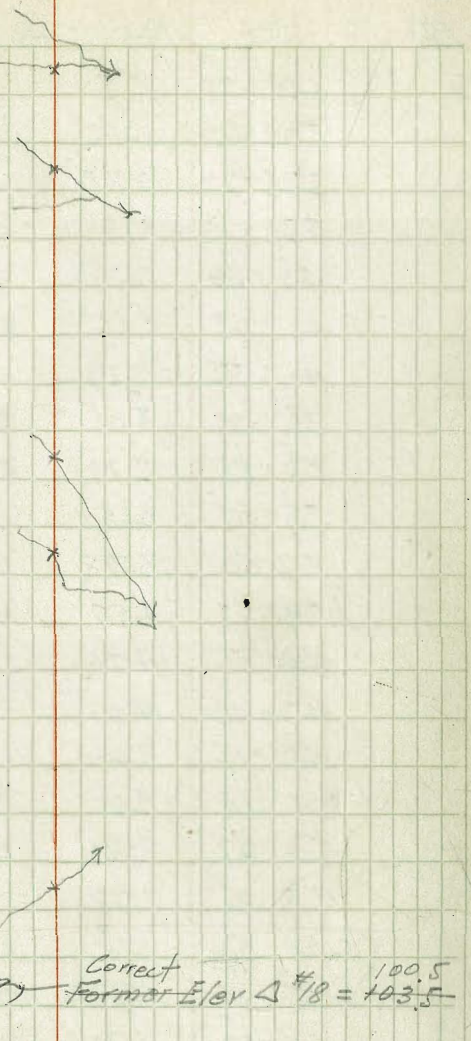
Sta	Az	Rod	Hor Dist	Vert ∠		326.8 / 321.4
π @ #23	312-0	2.60	263.	+7-41	+35.5	362.3
	297-19	2.33	238.	+4-10	+17.3	344.1
	287-27	2.61	268.	+1-45	+8.2	335.0
	"	2.78	286.	+2-30	+12.5	339.3
	297-56	1.64	167.	+5-25	+15.7	342.5
	320-41	1.70	168.	+11-21	+33.7	360.5
	335-0	1.89	188.	+10-25	+34.6	361.4
	350-38	1.83	181.	+11-43	+37.6	364.4
	15-48	2.10	207.	+11-25	+41.7	368.5
	05-0	1.29	128.	+11-20	+25.7	352.5
	331-33	0.97	97.	+9-50	+16.8	343.6
π @ Δ #24				Elev Δ #24 =		265.7 / ~~280.4~~
#24 To #25	172-42	~~2.49~~ / ~~2.42~~	240.	~~11° 04'~~ / ~~-11-01~~	-47.1 / ~~-46.7~~	218.6 / ~~213.7~~
	169-17	1.95	191.	-12-40	-42.9	222.8
	158-37	1.85	174.	-16-55	-53.0	212.7
	157-43	1.43	128.	-21-10	-49.5	216.2
	149-11	1.30	115.	-22-04	-46.7	219.0
	137-43	1.16	100.	-23-54	-44.3	221.4
	129-16	1.32	110.	-25-54	-53.3	212.4
	113-41	1.11	93.	-25-45	-44.9	220.8
	101-10	0.85	70.	-25-28	-33.3	232.4
	"	0.48	43.	-21-43	-17.1	248.6
	143-04	0.70	58.	-26-02	-28.3	237.4
	185-22	0.29	29.	-14-0	-7.2	258.5
	205-18	0.98	100.	-5-25	-9.4	256.3



Sta	Az	Rod	Hor Dist	Vert ∠		265.7 ~~260.4~~
T@ 24	170-51	0.87	88.	-8-04	-12.5	253.2
	177-49	1.17	115.	-12-16	-25.0	240.7
	183-47	1.95	198.	-6-34	-22.8	242.9
	184-25	2.50	254.	-7-08	-31.8	233.9
	195-45	2.66	272.	-4-01	-19.1	246.6
	205-12	2.20	226.	-1-27	-5.7	260.0
	199-17	2.05	210.	-3-43	-13.6	252.1
	207-30	1.53	157.	-2-40	-7.3	258.4
	213-12	1.89	194.	+0-29	+1.6	267.3
	228-0	2.25	231.	+1-02	+4.2	269.9
	237-33	2.38	244.	+3-39	+15.5	281.2
	237-19	1.55	159.	+3-46	+11.1	276.8
	251-01	2.08	212.	+6-07	+22.7	288.4
	258-27	1.40	140.	+9-36	+23.7	289.4
	248-13	0.97	100.	+4-14	+7.3	273.0
	295-19	0.65	65.	+11-0	+12.6	278.3
	328-41	0.85	85.	+11-35	+17.4	283.1
	345-27	1.22	122.	+10-15	+22.1	287.8
	355-24	1.35	137.	+7-52	+18.9	284.6
	354-11	0.98	99.	+9-0	+15.7	281.4
	4-05	0.93	96.	+4-06	+6.9	272.6
	14-13	1.05	106.	+8-0	+14.9	280.6
	27-10	0.60	62.	+4-38	+5.0	270.7
	21-34	0.55	57.	-0-45	-7.4	258.3
	17-45	0.44	46.	+3-45	+3.0	268.7



Sta	Az	Rod	Hor Dist	Vert ∠		265.7 ~~260.4~~
T@ 24	66-30	0.55	54.	-14-43	-14.2	251.5
	70-12	0.75	76.	-7-25	-9.9	255.8
	66-27	0.91	93.	-6-32	-10.6	255.1
	55-05	0.66	68.	-1-47	-2.1	263.6
	40-56	1.12	114.	+6-40	+13.3	278.0
	27-27	1.35	136.	+8-36	+20.6	286.3
	16-46	1.79	180.	+9-15	+29.3	295.0
	18-45	2.11	211.	+9-51	+36.7	302.4
	24-30	2.12	213.	+7-27	+27.8	293.5
	354-16	1.64	129.	+28-54	+71.3	337.0
	346-39	1.74	173.	+9-58	+30.4	296.1
	91-0	1.05	106.	-7-40	-14.2	251.5
	106-50	1.45	147.	-7-22	-19.0	246.7
	109-04	1.28	125.	-13-04	-29.0	236.7
	120-46	1.46	140.	-14-49	-37.1	228.6
	117-58	1.87	182.	-13-20	-43.2	222.5
	136-45	1.74	172.	-21-45	-68.5	197.2
	142-21	1.66	140.	-24-54	-65.1	200.6
T@ Δ ±25 ~~48~~						218.6 ~~213.7~~
25 To ±18	106-37	2.85 ~~2.96~~	225 ~~240~~	-27° 38' -27-35	117.6 ~~125.5~~	100.5 ~~88.2~~
	33-16	0.45	45.	-10-25	-8.2	210.4
	95-58	0.55	43.	-29-40	-24.5	194.1
	139-53	0.72	57.	-26-54	-31.5	187.1
	165-22	0.54	50.	-19-28	-17.7	200.9
	175-12	0.85	78.	-19-25	-27.5	191.1



~~Something Rotten (?)~~ Correct ~~Former Elev~~ Δ ±18 = ~~+103.5~~ 100.5

Sta	Az	Rod	Hor Dist	Vert ∠		218.6
T@Δ#25	198-25	0.75	77.	-7-18	-9.9	208.7
	204-0	0.42	44.	-1-57	-1.5	217.1
	225-22	0.83	85.	+4-20	+6.4	225.0
	221-15	1.15	119.	-1-28	-3.1	215.5
	43-29	1.61	164.	-6-08	-17.6	201.0
	42-52	2.61	268.	+-2-0	+9.4	228.0
	41-37	3.29	337.	+4-03	+23.8	242.4
	36-02	3.06	309.	+7-30	+40.6	259.2
	37-55	2.79	283.	+6-07	+30.4	249.0
	35-07	3.65	367.	+8-0	+37.5	256.1
	37-50	3.98	403.	+6-44	+47.6	266.2
	39-25	4.57	465.	+5-53	+47.8	266.4
	44-37	4.74	487.	+1-55	+16.2	234.8
	47-06	4.05	416.	0	0	218.6
	49-19	3.45	355.	-1-46	-10.9	207.7
	51-15	3.00	307.	-3-25	-18.3	200.3
	50-27	2.60	266.	-3-35	-16.6	202.0
	53-06	2.37	244.	-2-35	-11.0	207.6
	54-56	1.98	200.	-7-53	-27.7	190.9
	61-50	1.93	188.	-12-58	-43.3	175.3
	55-12	1.70	163.	-15-19	-44.7	173.9
	50-19	1.50	134.	-21-31	-52.9	165.7
	60-17	1.66	141.	-24-30	-64.2	154.4
	72-37	2.15	186.	-23-34	-81.1	137.5
		296				

Sta	Az	Rod	Hor Dist	Vert ∠			
T@ △ "18 4 75						100.5	In S.D.R Bed
	0-36	1.03	103.	+10°-0	+18.1	118.6	✓
	333-56	0.97	97.	+10-26	+17.8	118.3	✓
	318-34	1.31	105.	+28-0	+55.9	156.4	✓ Mouth of Wash from No side ✓
	318-36	1.60	133.	+25-47	+64.3	164.8	✓ Up same Wash " " " ✓
	"	1.80	152.	+24-57	+70.8	171.3	✓ " " " ✓
	315-54	2.05	178.	+23-08	+76.0	176.5	✓ " " " ✓ ? Something Rotten Elevs (?) (G.C.)
	316-12	3.40	304.	+21-05	+117.2	217.7	✓ " " "
	307-03	2.15	190.	+21-54	+76.4	176.9	✓ Along No lower slope (?)
	307-27	2.71	243.	+21-0	+93.4	193.9	✓
	298-38	1.36	127.	+18-02	+41.3	141.8	✓
	287-11	1.66	146.	+22-12	+59.6	160.1	✓
	274-55	1.55	139.	+21-10	+53.7	154.2	✓
	266-36	1.85	164.	+21-40	+65.1	165.6	✓
	254-30	2.10	197.	+16-54	+59.8	160.3	✓
	258-35	1.44	139.	+14-41	+36.4	136.9	✓
	249-35	1.85	183.	+11-35	+37.5	138.0	✓
	237-09	1.94	194.	+9-41	+33.1	133.6	✓
	248-29	2.38	228.	+15-10	+61.8	162.3	✓
	250-51	2.65	244.	+18-48	+83.1	183.6	✓
	249-0	3.08	292.	+16-0	+83.7	184.2	✓
	245-34	2.90	278.	+14-50	+73.6	174.1	✓
	242-51	2.75	269.	+12-41	+60.5	161.0	✓
	236-58	2.55	255.	+9-32	+42.8	142.3	✓
	232-36	2.52	258.	+3-49	+17.2	117.7	✓

Sta	Az	Rod	Hor Dist	Vert L			
						100.5	
⊼@Δ#18	227-55	2.45	252.	+1-46	+7.8	108.3	✓
	221-43	2.40	248.	-0-15	-1.1	99.4	✓ No edge SDR Bed
	232-50	1.90	196.	+2·28	+8.4	108.9	✓ Toe Cliff Vert 18'±
	232-18	1.83	188.	+0-13	+0.7	101.2	✓ No edge SDR Bed
	242-33	1.45	50.	+0·48	+0.7	101.2	✓ " " "
	253-30	1.22	126.	+2·29	+5.4	105.9	✓ Toe cliff Vert 15'±
	238-36	1.06	109.	0	0	100.5	✓ In R Bed
	267-30	0.85	88.	+2-32	+3.9	104.4	✓ Toe Mo Slope
	272·25	1.10	111.	+8·05	+15.8	116.3	✓
	290-10	1.07	107.	+9-40	+18.2	118.7	✓
	304-10	1.05	105.	+10-07	+18.6	119.1	✓
	316-20	1.01	101.	+9-52	+17.5	118.0	✓
	318-10	0.87	87.	+9·28	+14.5	115.0	✓
	"	0.78	80.	+5-20	+7.4	107.9	✓
	"	0.55	57.	+2-40	+2.7	103.2	✓
	348-52	0.80	83.	+1-53	+2.7	103.2	✓ Toe Mt Slope
	10-0	1.29	130.	+8·0	+18.3	118.8	✓
	17-57	1.66	166.	+9·40	+28.3	128.8	✓ Top Cliff Slopes ~35°± down to R. bed
	9-27	1.89	183.	+14-03	+45.8	146.3	✓
	12-56	2.28	221.	+13-41	+53.9	154.4	✓
	15-12	2.50	245.	+12·40	+55.1	155.6	✓
	20·22	2.77	273.	+11-30	+55.5	156.0	✓
	9-13	3.42	335.	+12·24	+73.7	174.2	✓ (?)
	23-20	3.68	362.	+11·27	+73.3	173.8	✓ Top Cliff
	25-20	3.65	369.	+6-45	+43.7	144.2	✓ Toe "

Sta	Az	Rod	Hor Dist	Vert ∠	Diff El	Elev
						100.5
T @ Δ #18	30 - 20	3.50	360.	+2-25	+15.2	115.7
	34 - 31	3.50	360.	+0-14	+1.4	101.9
	30 - 51	2.80	288.	+0-34	+2.8	103.3
	On ℄ Damsite #3					
(Fletcher 5-50						
T @ 3+89.0						101.9
	76 - 59	0.42	44.	0	0	101.9
	53 - 36	1.51	155.	+3-32	+9.5	111.4
	72 - 16	1.50	154.	+0-09	+0.4	102.3
	32 - 06	2.22	227.	+0-08	+0.5	102.4
	110 - 46	0.43				
T @ Δ #19	45					3100
#19 to #26	111 - 21	1.54	128.0	-26-04	-62.6	2474
T @ Δ 26	317 - 50		100		-8.0	2474 / 2394
	107 - 04	1.30	65.0	-45-46	-66.7	1807

✓

✓ Toe Mt Slope ℄ S.D.R. No Side

✓ " " "

104.24
+ 2.65
106.89 H.I.

Azim. from So Side Dam 133-40

✓ Core Hole #1

✓ " " #2

✓ " " #3

✓ " " #4

℄ Pump Well Hole

✓

✓ ℄ Test Pit ~~#3~~ #2 Δ #26 P.O. Rock Ryside Pit #3

✓ " " " ~~#4~~ #3

Notes on Test Pits. 8/25/21

Test Pit #~~X~~ 5 on South Side of site at Sta 0+38 of Fletcher's axis line. Ground Elevation about 288.0 6'x6' hole - 11' deep In 3' of fairly good porphyry.

Test Pit #~~X~~ 4 on South Side 4'-6" deep on 8-23-21 In 1' of rock - Still working this pit.

Test Pit #~~X~~ 1 on North Side 6'x6' hole 30' deep In 2' of fairly good rock.

Test Pit #~~X~~ 2 Irregular excavation 8' deep In 4' of fairly good loose porphyry.

Test Pit #~~X~~ 3 Irregular excavation 10' deep In 4' of fairly good seamed porphyry.

Water in sump is about 5.5' below stream bed Driller says that it was 2.5' below stream bed when he started about June 27th 1921.

Damsite #3

Sta	Az	Rod	Hor Dist	Vert L		
π @ #20	4.85					400.8
#20 to #19	133 - 40	2.06		-30 - 36	90.8	310.0
#20 to #22	313 - 40	1.05		+16 - 55	29.5	430.3
#20 to 23		4.55		-9 - 28	74.0	326.8
π @ #23	4.90					
#23 to #24	215 - 30	3.39		-10 - 32	-61.1	265.7
π @ #24	4.88					
#24 to #25	172 - 47	2.49		-11 - 04	-47.1	218.6
π @ #25	505	2.45				
#25 to #18	106 - 37	2.85		-27 - 38	-117.6	101.0
π @ #18	4.70					
#18 To #15		4.60		-26 -40		

Same party 9/7/21

Transit #3

42
43

Checking Stadia Shots made Transit #2
Both Verniers on Transit #2 were poor shape

			π	+
100.50				
BM @ Dam	104.24	105.86		1.62
△ #18	100.50	5.36	1	

Sta	Az	Rod	Hor Dist	Vert ∠	
#216 to #217	182-38	7.56		0	
4.77					
T @ #217					
#217 to #218	195-51	2.70		"	
5.13					
T @ #218					
#218 to #219	242-07	2.04		"	
4.69					
T @ #219					
	179-32	0.74		-11°-15	
	266-05	0.95		0	
	272-30	1.98		"	
	263-14	3.90		"	
	241-22	3.45		"	
#219 to #220	227-50	5.56		"	
5.13					
T @ #220					
#220 to #221	236-20	2.50		"	
5.05					
T @ #221					
	271-20	2.72		"	✓
	241-0	2.60		"	✓
	212-20	2.58		"	✓
	205-17	4.36		"	
#221 to #222	201-41	6.62		"	
5.11					
T @ #222					
#222 to #223	234-48	1.59		"	
5.16					
T @ #223					
#223 to #224	284-14	0.79		"	

Continued from Bk #2 P #44

360 Contour

Ties 10/13/21

"

"

Ranch fence cor Δ #219 on line of N & S

360

"

"

"

"

"

"

"

"

"

"

"

"

"

"

"

"

Sta	Az	Rod	Hor Dist	Vert ∠	
T@ #224	4.40				
	331-20	1.05		0	
#224 to #225	338-0	1.71		4	
	4.45				
T@ #225					
	0-15	1.50		4	
	2-27	4.72		4	
#225 to #226	346-38	7.40		4	
	4.71				
T@ #226					
	17-35	2.15		4	✓
	355-28	3.50		4	✓
	334-14	4.00		4	✓
	331-23	7.80		4	✓
	317-02	6.35		4	✓
	303-35	6.25		4	✓
	284-36	4.88		4	✓
#226 to #227	267-47	5.80		4	
#226 to #229	230-15	8.07		4	
	5.30				
T @ #227				4	
#~~227~~ 226 to #228	260-19	2.40		4	
	4.55				
T@ #228					
	79-50	1.88		4	✓
	33-50	1.70		4	✓
	6-20	1.15		4	✓
	344-15	0.85		4	✓
	303-0	1.10		4	

360 Contour

Head of Wash

35. #226 Compass off 2° ≠ to ry (On Rocky Ridgeback

(~~Draftsmans Note~~ ? ~~227~~-228 G.G.)

P.O. Rock 227 AEF

Upg Box Canon to ry

Sta	Az	Rod	Hor Dist	Vert ∠	
⊼ @ #228	4.55 269-0	2.00 ✓		0	✓
	251-15	4.10 ✓		"	✓
	250-30	2.30 ✓		"	✓
⊼ @ #227 again	5.30				
	246-20	2.05 ✓		"	✓
	197-37	3.70 ✓		"	✓
	185-30	4.15 ✓		"	✓
#227 to #229	184-50 5.07	4.94 ✓		"	✓
⊼ @ #229	219-45	2.50 ✓		"	✓
	215-54	3.90 ✓		"	✓
	206-45	4.35 ✓		"	✓
	180-12	4.20 ✓		"	✓
	176-14	5.10 ✓		"	✓
#229 to #230	173-34	10.15 ✓		"	
⊼ @ #230	4.91				
	348-20	2.35 ✓		"	✓
	321-30	1.65 ✓		"	✓
#230 to #231	195-56 4.35	3.00 ✓		"	
⊼ #231					
	91-33	0.76 ✓		"	
	102-35	1.37 ✓		-12-48	330.2
#231 to #232	223-25	1.15 ✓		0	

360

" ℄ wash

"

Corrected Azm (-0°58')

245°22'

" BS 226 Mag N 3-30 W - Az 0

" 196°39'

" 185°32'

183°52'

Checks BS of Az

218°47'

" B.S. on #226 " " N 3-0 W

360 214°56'

" 205°47'

" 179°14'

" 175°16'

" 172°36' Compass back 0-0 ok

347°22'

" Back of #230 △

" 320°32'

" 194°58'

90°35'

fence Cor W side El Cajon Rancho { mentioned Bk # Bk # 2

101°37'

Fletcher hub # 20 marked 300

360 222°27'

Stg	Az	Rod	Hor Dist	Vert L		
T @ #232	464			0		
	109-38	7.40	732	-6-06	-78.2	281.5
#232 to #66	159-30	8.40		0		
	307-10	1.33		"		
	254-25	2.38		"		
	251-42	3.85		"		
	223-44	3.80		"		
#232 to #233	223-32	3.92		"		
T @ 233	5.18					
1st 233 to #65	144-37	7.56		"		
T @ #65						
#65 to #64	217-35	} 0°-58' Error in Az Closure				
64 to 65	36-37					
T @ #64	485					
64 to #63	205-49					
	308-49	7.20		0		
	304-0	6.80		"		
	292-38	6.95		"		
	288-37	6.75		"		
	281-35	6.95		"		
	273-41	6.85		"		
	268-41	6.98		"		
	259-15	7.10		"		

360 Contour

108°40' on So End Old Mission Dam

	Corrected Azm.						
	158°32'	S. 21.0 E	358.25	6.35	364.64	not a 360 hub some tp. near #65	
360	305 12'						
"							253° 27'
"							250° 44'
"							222° 46'
"							222° 34'

N-1-15 E

359.90 5.31 5.26 365.18 on 64 to 65 Hubs

Corrected Azm 148°39' (GC)

Closure

Az 65 to 64 = 217-35 on Closure

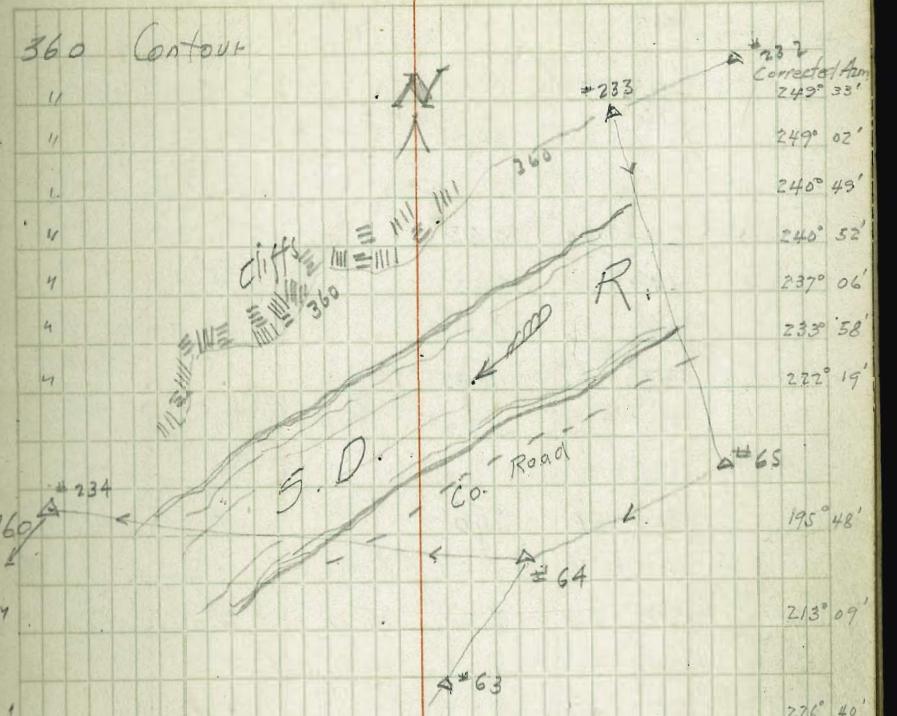
Az 217-35 back to #64 is brought around from N to side S.D.R Valley, See Bk #7 P #13

See p. 48 Shots across S.D.R to 360 Cont on Cliffs

Corrected Azm 204° 51' (GC)

360	" " "	307° 51'
"		303° 02'
"		291° 40'
"		287° 39'
"		280° 37'
"		272° 43'
"		267° 43'
"		258° 17'

Sta	Az	Rod	Hor Dist	Vert L
	4.85			
π @ #64				0
	250-31	7.15		4
	250-0	7.35		4
	241-47	8.10		4
	241-50	8.50		4
	238-04	8.30		4
	234-56	8.60		4
#64 to #234	223-21	10.20		4
				x
	4.87			* Wed 9/14/21
π @ #234				
#234 to #235	196-46	2.70		0
	4.74			
π @ #235				
#235 to #236	214-07	2.19		4
	4.70			
π @ #236				
#236 to #237	227-38	1.21		4
	4.99			
π @ #237				
#237 to #238	234-31	2.62		4
	4.69			
π @ #238				
	202-05	1.00	92	-17-18
	249-35	1.90		0
#238 to #239	249-54	2.12		4
	4.60			
π @ #239				
	270-0	0.80		4
	271-50	1.95		4
	252-20	2.40		4

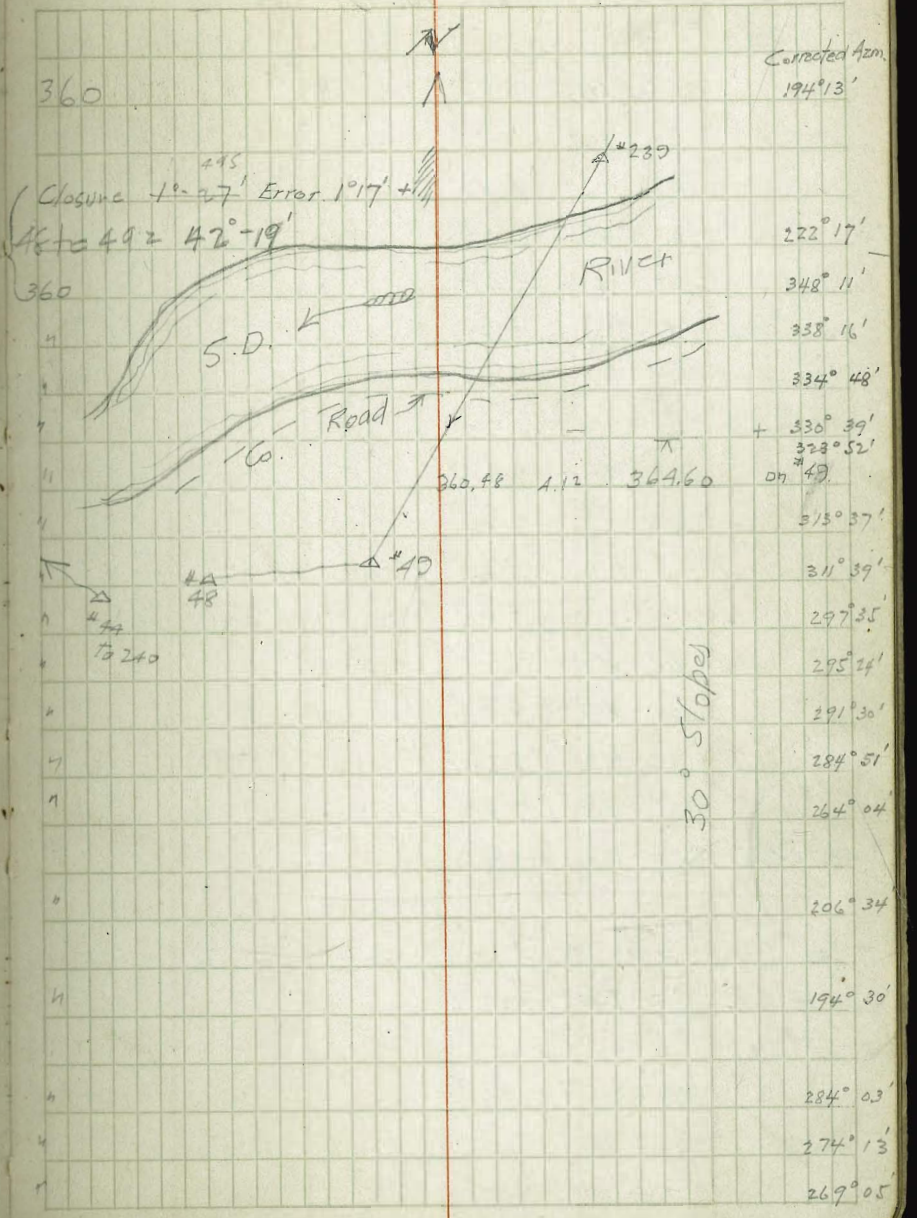


360 Contour

Sta	Az	Rod	Hor Dist	Vert L
T @ #239	4.60			
#239 to #49	195-30	8.00		0
	4.70	So side SDR		
T @ #49	4.70	Shots across to steep Slopes		
#49 to #48	223-36	0.89		4
H.I off #49	349-28	6.45		4
	339-33	6.33		4
	336-05	6.45		4
	331-56	6.30		4
	325-09	4		4
	314-54	7.10		4
	312-56	7.55		4
	298-52	6.30		4
	296-41	6.55		4
	292-47	6.68		4
	286-08	6.60		4
	265-21	7.83		4
	4.51			
T @ #48				
#48 to #47	4.55 207-51	1.34		4
	4.75			
T @ #47				
#47 to #46	195-54	1.26		4
	4.47			
T @ #46				
	285-20	6.94		4
	275-30	6.85		4
	270-22	7.33		4

174

48
49



Sta	Az	Rod	Hor Dist	Vert ∠
T @ #46	265-51	7.10		0
	256-10	7.58		"
	250-06	7.70		"
	245-02	8.15		"
	235-48	9.05		"
	234-14	9.60		"
#46 to #44	185-32	9.20		"
T @ #44	438			
#44 to #43	203-23	1.20		"
	293-31	7.40		"
	283-25	7.30		"
	278-13	7.55		"
	270-15	7.90		"
	266-43	8.25		"
	260-35	8.63		"
	259-32	9.20		"
	257-34	9.30		"
#44 to #240	251-07	11.40		"
T @ #240	5.14 B.S. on #44			
#240 to #241	263-58	0.88		"
T @ #241	4.56			
	293-0	2.55		"
	288-50	3.14		"
	270-30	2.20		"

360 Contour

Corrected Azm
264° 37'
254° 53'
248° 49'
243° 45'
234° 31'
232° 57'

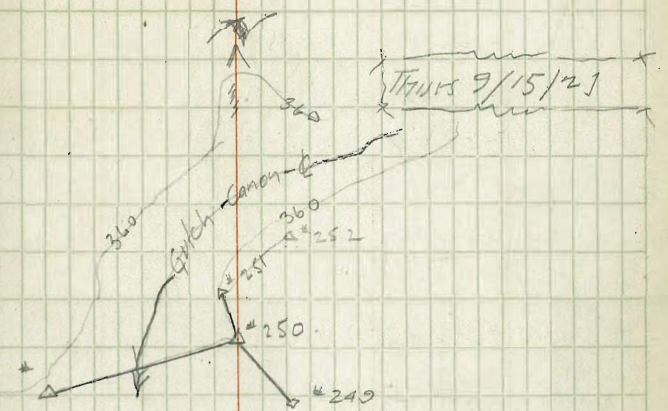
T Back on No side of SD River

Sta	Az	Rod	Hor Dist	Vert ∠
π @ #241	4.56	3.65		0
	254-37	4.20		"
	247-57	4.35		"
#241 to #242	238-18	6.09		"
π @ #242	4.54			
	236-55	1.24		"
	238-05	2.35		"
#242 to 243	235-10	3.55		"
π @ #243	5.01			
	264-50	0.86		"
	228-30	1.44		"
#243 to #244	224-46	2.11		"
π @ #244	4.49			
	234-30	0.98		"
#244 to #245	233-26	3.15		
π @ #245	4.27			
	37-30	1.68		"
	175-47	0.65		-31-42
	251-40	0.61		0
#245 to #246	247-07	2.29		
π @ #246	4.76			
	36-45	1.00		"
	238-0	1.50		"
#246 to #247	234-08	3.65		"

360 Contour
"
"
"
"
"
"
"
"
"
"
"
Back shot in gulch not visible @ #244
330 Fletcher lath Only
360
" Back shot in gulch " " " #245
"
"

Sta	Az	Rod	Hor Dist	Vert ∠
T@ #247	463 24-45	1.15		0
#247 to #248	247-43	0.82		"
	468			
T@ #248				
	300-30	0.66		"
	285-40	1.45		"
#248 to #249	286-22	2.59		"
	460			
T@ #249				
	311-38	2.15		"
	313-52	2.93		"
#249 to #250	306-50	3.81		"
	476			
T@ #250	E side Stub Line			
#250 to #251	331-39	0.56		
	W to side			
#250 to #259	235-32	5.72		"
	248-55	4.70		"
	267-30	5.10		"
	283-10	4.85		"
	295-50	5.73		"
	300-51	5.35		"
	317-25	5.12		"
	454			
T@ #251				
#251 to #252	356-42	1.69		"
	533			
T @ #252				
	311-37	3.55		"
	323-54	4.22		"

360 Back Shot in quick



Tri-n Rt into deep box canon in which two rods used from stub line up E side

See sketch above

360 △ for Main Line to be picked up later

" On West side of Box Canon

" " " "

" " " "

" " " "

" " " "

" " " "

1953

E side 360 also

Continuing W side 360

~~52~~
53

Sta	Az	Rod	Hor Dist	Vert L
T @ #252	5.33 329-43	5.35		0
	29-55	1.30		"
	348-37	4.46		"
	357-47	4.65		"
#252 to #253	25-53	2.65		"
	5.02			
T @ #253				
#253 to #254	34-12	4.27		"
	448			
T @ #254				
	203-30	1.15		"
	173-40	0.78		"
	18-06	2.60		"
#254 to #255	351-08	4.95		0
	345-28	4.11		"
	339-0	3.77		"
	332-32	3.02		"
	311-52	2.60		"
	303-28	2.42		"
	286-53	2.30		"
	440			
T @ #255				
	159-13	3.70		0
	99-50	1.60		"
	58-0	1.35		"
#255 to #256	36-51	1.95		"

360 XX/cut side Box Canon
" E " " "
" XX " " "
" " " " "
" E " " "
" E " " "
" E " " "
" E " " "
" E " " "
" E " " "
} Back shots in gulch not visable @ #253

360 Line Xing to XX side

Shots on XX side Closing back To ✳ P52

360 XX side
" "
" "
" "
" "
" "

360 E side
" " "
" " "

Line back to E side

Sta	Az	Rod	Hor Dist	Vert ∠
T @ #256	4.90			
#256 to #257	305-30	0.79		D
T @ #257	4.92			
	209-13	1.55		"
#257 to #258	331-24	1.79		"
T @ #258	5.09			
	303-30	1.45		
	278-30	1.30		1
T @ #259	5.01			
#259 to #260	269-58	0.79		0
T @ #260	5.02			
#260 to #261	293-16	1.30		"
T @ #261	4.91			
#261 to #262	310-42	1.11		"
T @ #262	4.10			
#262 to #263	322-40	1.58		"
	4.70			
	341-50	1.65		"
	318-55	1.37		"
	300-50	2.13		"
	286-55	0.83		"
	240-10	0.78		"
	186-25	2.98		"

235
160
55

~~57~~
54

360 E side

" W "

" E "

X.ing ℄ wash

360 W

Finish this gulch or Box Canon

Take up Main Line again across Box Canon

BS on #258

360

"

"

"

(Inst at 263 (?)) GC

" ℄ head of gulch

"

"

"

"

"

Sta	Az	Rod	Hor Dist	Vert ∠
T@ #263	4.70			
#263 to #264	180-16	4.60 ✓		0
T@ #264	4.36			
#264 to #265	198-23	1.84 ✓		4
T@ #265	4.70			
#265 to #266	244-01	1.25 ✓		4
T@ #266	4.50			
	278-47	1.10 ✓		4
	280-08	1.95 ✓		11
	252-10	2.10 ✓		4
	249-45	2.60 ✓		4
	237-0	2.70 ✓		11
#266 to #267	217-39	4.84 ✓		4
T@ #267	4.71			
	92-0	1.10 ✓		-15-56
	248-25	1.00 ✓		0
	201-05	1.79 ✓		11
	196-20	2.32 ✓		4
#267 to #268	196-11	3.19 ✓		4
T@ #268	4.83			
	206-25	0.78 ✓		11
	209-25	1.49 ✓		4
	202-50	2.04 ✓		11
	199-10	3.15 ✓		4
#268 to #269	196-06	4.75 ✓		4

360

4

4

4

4

4

4

4

4

330 Fletcher lath no HUB

360

4

4

4

4

4

4

4

4

Sta	Az	Rod	Hor Dist	Vert ∠
⊼ @ #269	5.00			
#269 to 270	214-14	2.06		0
⊼ @ #270	5.08			
#270 to #271	239-25	0.65		"
⊼ @ #271	4.78			
	262-0	2.25		"
	236-45	2.10		"
#271 to #272	193-56	4.33		"
⊼ @ #272	4.75			
	235-10	2.55		"
	208-33	2.65		"
#272 to #273	201-07	5.18		"
	203-14	3.30		"
	204-05	3.88		"
	201-30	4.33		"
	119-30	0.89		-18°-52
⊼ @ #273	4.00			
	229-50	0.83		0
#273 to #274	220-11	2.10		"
	5.11			
	229-32	1.30		"
	209-07	1.41		-11-26
#2	135-36			

133 40
180
3-40

Fri Sept 16/21

360
"
"
"
"
"
"
"
"
"
"
" (GL)
330 Fletcher
360
"

"
On or near ℄ Damsite #3
(GL)

℄ Damsite #3 330 Fletcher Hub

135-36
133-40

Azm. Error Closure = 1°-56'

Sta	Az	Rod	Hor Dist	Vert L
13 to A#2	307-27	5.81		
	4.70			
π @ A#2				
#1 to #3	7-02	1.56		0
	1.62			
π @ #3				
#3 to #4	313-21	3.21		〃
	4.55			
π @ #4				
	299-06	2.68		〃
#4 to #5	317-59	5.48		〃
	4.56			
π @ #5				
#5 to #6	267-09	0.94		〃
	4.50			
π @ #6		2.56		〃
#6 to #7	220-03	2.56		〃
	4.40			
π @ #7				
	207-0	0.95		〃
	215-07	1.55		〃
#7 to #8	214-21	2.30		〃
	5.03			
π @ #8				
#8 to #9	202-57	2.31		〃
	4.33			
π @ #9				
#9 to #10	196-05	1.25		〃
	5.18			
π @ #10				
#10 to #11	189-51-30	1.40		〃

See p. 45 Book #2

4.14
4.69

56
57

Island #A S.E. of Barrite #2

BS on #13 Δ Sec BK #2 p #

360

KEITH'S RAILROAD CURVE TABLES.

Published by KEUFFEL & ESSER CO., New York.

Entered according to Act of Congress in the year 1883,
by W. Keuffel & H. Esser, in the office of the Librarian of Congress,
in Washington, D. C.

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.

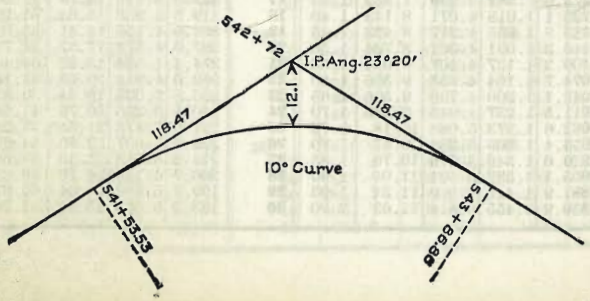
2° 19½′ = def. for sta.	542	I. P. = sta.	542+72
4° 49½′ = " " "	+50	Tan. =	1.18.47
7° 19½′ = " " "	543	B. C. = sta.	541+53.53
9° 49½′ = " " "	+50	L. C. =	2.33.33
11° 40′ = " " "	543+	E. C. = Sta.	543+86.86
	86.86		

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.)



Natural Tangents.

Deg.	0′	10′	20′	30′	40′	50′	Deg.	Deg.	0′	10′	20′	30′	40′	50′	Deg.
0	0000	0029	0058	0087	0116	0145	89	40	8391	8441	8491	8541	8591	8642	49
1	0175	0204	0233	0262	0291	0320	88	41	8693	8744	8796	8847	8899	8952	48
2	0349	0378	0407	0437	0466	0495	87	42	9004	9057	9110	9163	9217	9271	47
3	0524	0553	0582	0612	0641	0670	86	43	9325	9380	9435	9490	9545	9601	46
4	0699	0729	0758	0787	0816	0846	85	44	9657	9713	9770	9827	9884	9942	45
5	0875	0904	0934	0963	0992	1022	84	45	1.0000	1.0058	1.0117	1.0176	1.0235	1.0295	44
6	1051	1080	1110	1139	1169	1198	83	46	1.0355	1.0416	1.0477	1.0533	1.0599	1.0661	43
7	1228	1257	1287	1317	1346	1376	82	47	1.0724	1.0786	1.0850	1.0913	1.0977	1.1041	42
8	1405	1435	1465	1495	1524	1554	81	48	1.1106	1.1171	1.1237	1.1303	1.1369	1.1436	41
9	1584	1614	1644	1673	1703	1733	80	49	1.1504	1.1571	1.1640	1.1708	1.1778	1.1847	40
10	1763	1793	1823	1853	1883	1914	79	50	1.1918	1.1988	1.2059	1.2131	1.2203	1.2276	39
11	1944	1974	2004	2035	2065	2095	78	51	1.2349	1.2423	1.2497	1.2572	1.2647	1.2723	38
12	2126	2156	2186	2217	2247	2278	77	52	1.2799	1.2876	1.2954	1.3032	1.3111	1.3190	37
13	2309	2339	2370	2401	2432	2462	76	53	1.3270	1.3351	1.3452	1.3514	1.3597	1.3680	36
14	2493	2524	2555	2586	2617	2648	75	54	1.3764	1.3848	1.3934	1.4019	1.4106	1.4193	35
15	2679	2711	2742	2773	2805	2836	74	55	1.4281	1.4370	1.4460	1.4550	1.4641	1.4733	34
16	2867	2899	2931	2962	2994	3026	73	56	1.4826	1.4919	1.5013	1.5108	1.5204	1.5301	33
17	3057	3089	3121	3153	3185	3217	72	57	1.5399	1.5497	1.5597	1.5697	1.5798	1.5900	32
18	3249	3281	3314	3346	3378	3411	71	58	1.6003	1.6107	1.6212	1.6319	1.6426	1.6534	31
19	3443	3476	3508	3541	3574	3607	70	59	1.6643	1.6753	1.6864	1.6977	1.7090	1.7205	30
20	3640	3673	3706	3739	3772	3805	69	60	1.7321	1.7437	1.7556	1.7675	1.7797	1.7917	29
21	3839	3872	3906	3939	3973	4006	68	61	1.8040	1.8165	1.8291	1.8418	1.8546	1.8676	28
22	4040	4074	4108	4142	4176	4210	67	62	1.8807	1.8940	1.9074	1.9210	1.9347	1.9486	27
23	4245	4279	4314	4348	4383	4417	66	63	1.9626	1.9768	1.9912	2.0057	2.0204	2.0353	26
24	4452	4487	4522	4557	4592	4628	65	64	2.0503	2.0655	2.0809	2.0965	2.1123	2.1283	25
25	4663	4699	4734	4770	4806	4841	64	65	2.1445	2.1609	2.1775	2.1943	2.2113	2.2286	24
26	4877	4913	4950	4986	5022	5059	63	66	2.2460	2.2637	2.2817	2.2998	2.3183	2.3369	23
27	5095	5132	5169	5206	5243	5280	62	67	2.3559	2.3750	2.3945	2.4142	2.4342	2.4545	22
28	5317	5354	5392	5430	5467	5505	61	68	2.4751	2.4960	2.5172	2.5386	2.5605	2.5826	21
29	5543	5581	5619	5658	5696	5735	60	69	2.6051	2.6279	2.6511	2.6746	2.6985	2.7228	20
30	5774	5812	5851	5890	5930	5969	59	70	2.7475	2.7725	2.7980	2.8239	2.8502	2.8770	19
31	6009	6048	6088	6128	6168	6208	58	71	2.9042	2.9319	2.9600	2.9887	3.0178	3.0475	18
32	6249	6289	6330	6371	6412	6453	57	72	3.0777	3.1084	3.1397	3.1716	3.2041	3.2371	17
33	6494	6536	6577	6619	6661	6703	56	73	3.2709	3.3052	3.3402	3.3759	3.4124	3.4495	16
34	6745	6787	6830	6873	6916	6959	55	74	3.4874	3.5261	3.5656	3.6059	3.6470	3.6891	15
35	7002	7046	7089	7133	7177	7221	54	75	3.7321	3.7760	3.8208	3.8657	3.9136	3.9617	14
36	7265	7310	7355	7400	7445	7490	53	76	4.0108	4.0611	4.1126	4.1653	4.2193	4.2747	13
37	7536	7581	7627	7673	7720	7766	52	77	4.3315	4.3897	4.4494	4.5107	4.5736	4.6382	12
38	7813	7860	7907	7954	8002	8050	51	78	4.7046	4.7729	4.8430	4.9152	4.9894	5.0658	11
39	8098	8146	8195	8243	8292	8342	50	79	5.1446	5.2257	5.3093	5.3955	5.4845	5.5764	10
Deg.	60′	50′	40′	30′	20′	10′	Deg.	Deg.	60′	50′	40′	30′	20′	10′	Deg.

Deg.	0′	10′	20′	30′	40′	50′	Deg.
80	5.6713	5.7694	5.8708	5.9758	6.0844	6.1970	9
81	6.3138	6.4348	6.5606	6.6912	6.8269	6.9682	8
82	7.1154	7.2687	7.4287	7.5958	7.7704	7.9530	7
83	8.1443	8.3450	8.5555	8.7769	9.0098	9.2553	6
84	9.5144	9.7882	10.078	10.385	10.711	11.059	5
85	11.430	11.826	12.250	12.706	13.197	13.727	4
86	14.300	14.924	15.605	16.350	17.169	18.075	3
87	19.081	20.206	21.470	22.903	24.542	26.432	2
88	28.636	31.242	34.368	38.189	42.964	49.104	1
89	57.290	68.750	85.940	114.588	171.885	343.77	0
Deg.	60′	50′	40′	30′	20′	10′	Deg.

Natural Cotangents.

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.