

W
627

1871

No. 421

EUGENE DIETZGEN CO.

DRAWING MATERIALS, MATHEMATICAL and SURVEYING INSTRUMENTS
Chicago New York San Francisco New Orleans Pittsburg Toronto

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.
Roadway 16 feet wide. Side Slopes 1 on 1.
For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	II
0	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	0
1	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	1
2	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	2
3	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	3
4	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	4
5	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	5
6	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	6
7	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	7
8	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	8
9	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	9
10	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	10
11	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	11
12	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	12
13	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	13
14	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	14
15	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	15
16	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	16
17	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	17
18	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	18
19	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	19
20	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	20
21	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	21
22	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	22
23	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	23
24	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	24
25	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	25
26	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	26
27	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	27
28	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	28
29	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	29
30	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	30
31	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	31
32	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	32
33	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	33
34	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	34
35	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	35
36	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	36
37	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	37
38	46.0	46.1	46.2	46.3	46.4	46.5	46.6	46.7	46.8	46.9	38
39	47.0	47.1	47.2	47.3	47.4	47.5	47.6	47.7	47.8	47.9	39
40	48.0	48.1	48.2	48.3	48.4	48.5	48.6	48.7	48.8	48.9	40

Example—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 30.6. For same slopes but other widths of roadbed, correct above figures by one-half difference in width of roadbed; thus in example above, for 20 ft. roadbed distance will be $30.6 + (20 - 16) \div 2$ or 2 ft. added to $30.6 = 32.6$. For slopes of 1 on 1½ see inside of back cover.

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of a high grade 50% Rag Paper
having a WATER RESISTING surface.

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Item 8

Survey For Pipe Line from El Monte Pumping Plant To Grantville.

With Transit at Highway BC. 99+35.22 we take the following angle and distance ties.
Angles measured Rt or Lt from the Highway.

Point	Hor. \angle	Distance	Remarks
①	45° 20 Lt	43.3	Cor. Res. & Pt. on Overflow line.
②	19° 18 Lt	96.4	Westerly Cor. Res.
③	21° 55 Lt	103.2	Northerly Cor. Pump Ho.
④	53 40 Lt	31.2	Power Pole near N. Cor. Res.
⑤	107 42 Rt	59.2	Point on Res. overflow line.
⑥	30 55 Rt	27.2	Cor. M.H.
⑦	16° 50 Rt	88.4	P.P. near Wly cor. Res.
⑧	24 07 Rt	41.1	24" Valve on 24" Supply line
⑨	18° 00 Rt	97.3	Point on 8" Steel Drain
⑩	15 35 Lt	100.8	Valve on same 8" "
⑪	30 10 Lt	64.3	12" Steel Pipe Not used.
⑫	27 55 Lt	69.5	12 " " " "
⑬	Sta. 2+90.8		cross 3" Steel Septic Tank Drain

Note For revised tie to 48' Line
see p 53, this book

Nov. 18, 1941.

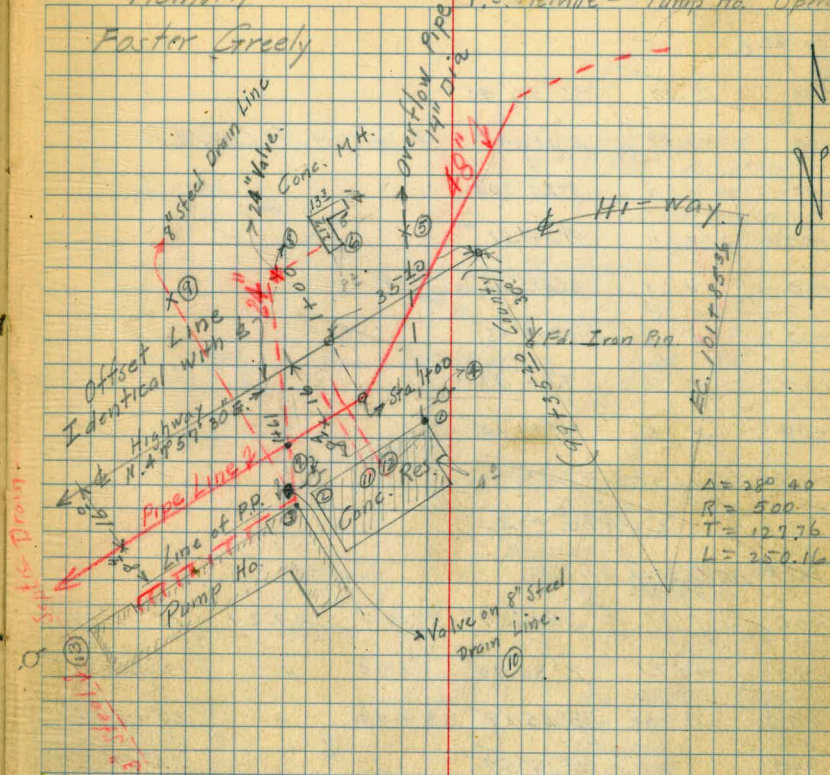
P.S. Barker

A. Gomez

Melhorn

Foster Greedy

V.C. Melville - Pump Ho. Operator.



Dimensions:

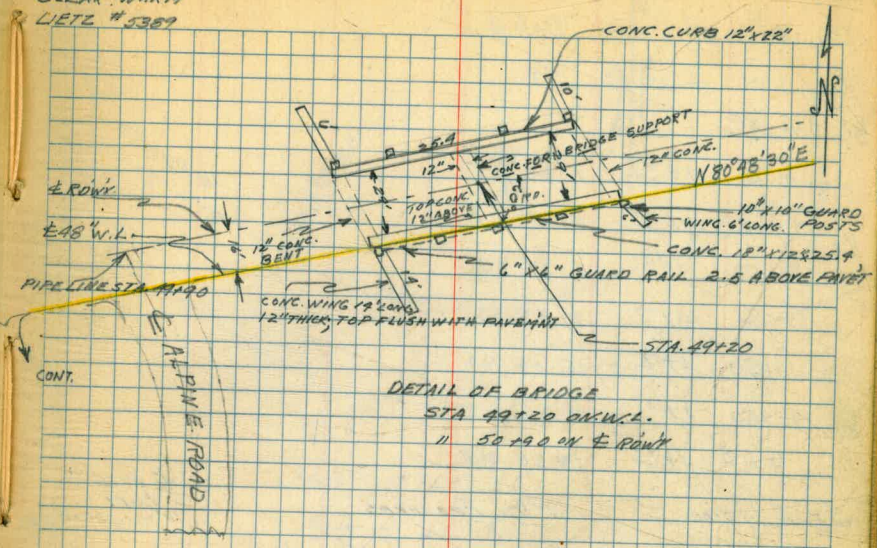
Pump Ho.	108'	long	
"	48	wide	NELY end
"	22	"	SWly "
Reservoir	40	"	outside to outside
	96.15'	(57) long	" (N Side)

USGS B.M. Elev 439.83 Set 3' NW of Res ✓
wall and 10' E of N.W.ly Cor at Res

Physical Features Along
Proposed Pipe Line Route.

Sta.	Description	From transit Line Left. Dist. Out.
3+10 to 4+00	cypress hedge	30'
3+58	power pole	24'
4+00 to 6+75	fence	29'
5+80	drive into corral (10' wide)	
6+50	power pole	23'
8+15	driveway (30' wide)	
8+95	" (20' wide)	
9+50	power pole	24'
7+85	anchor to pole	24'
10+25 to 18+00	barbwire fence	approaching evenly 29' to 21'
10+68	24" C.M. culvert	19' to E. end
12+50	power pole	24'
15+25	anchor	24'
+30	p. pole	24'
17+95	drive to barn (10' wide)	
18+12	24" culvert (Skew) 30' ET	12.5'
18+25	1/2 Water Line Crossing Road	
18+50	p. pole	24'
18+50	barb. fence row	24'
20+20	p. pole	24'
+40	anchor	14'
22+95	p. pole	24'
26+32	" "	24'
" "	fence row 26' out	
29+00	p. pole	25'
32+05	" "	27'

11/18/41 ALIGNMT 48" W.L. EL MONTE TO GRANITE (3)
P.S BARKER & PARTY
CLEAR-WARM
LIETZ # 5389

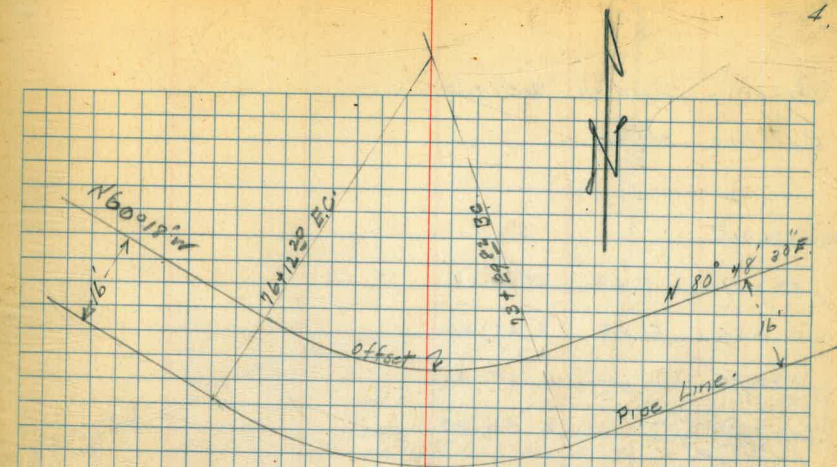


Sta. on Chardon Det. \neq
 Pipe line 16' offset RT.

BC 73+29.82

+50	19 40	1° 23' 25"
74+00	48 00	4° 50' 01"
+50	48 00	8 16 37
75+00	48 00	11 43 13
+50	48 00	15 09 49
76+00	48 00	18 36 22
+12 30	11 73	19 26 45

Sta (A) Line	Phy. Features	\neq Road to LEFT (10' right of E.P.P.)
1+90	driveway (15' wide)	
2+00 to 14+00	fence (barbwire)	30'
4+30	driveway 15' wide	
4+75	p. pole	23'
5+16	anchor	23'
7+30	p. pole	24'
9+66 \neq bridge (wood) break 450' \neq 6'	18' long 18' wide 3' guard rails	(F.L. -1.0)
9+88	p. pole	23'
10+27	anchor	24'
10+78	dead pepper tree	20'
12+05 to 15+00	row of pepper trees (1' diams)	17' out
14+14 \neq	drive to pheasant farm	(?)
15+65	2' dia. euclypt.	40'
14+10 to 25+00	ovalip & cypress (aver 2' diams)	32'
25+25	cypress (1.8" dia)	33'



$$\Delta = 38^{\circ} 53' 30''$$

$$\frac{\Delta}{2} = 19 26 45$$

Offset Data

$$R = 400$$

$$T = 141.22$$

$$L = 271.52$$

$$d/H = 4.297$$

\neq Pipe Data

$$R = 416.00$$

$$L = 282.38$$

$$d/H = 4.132$$

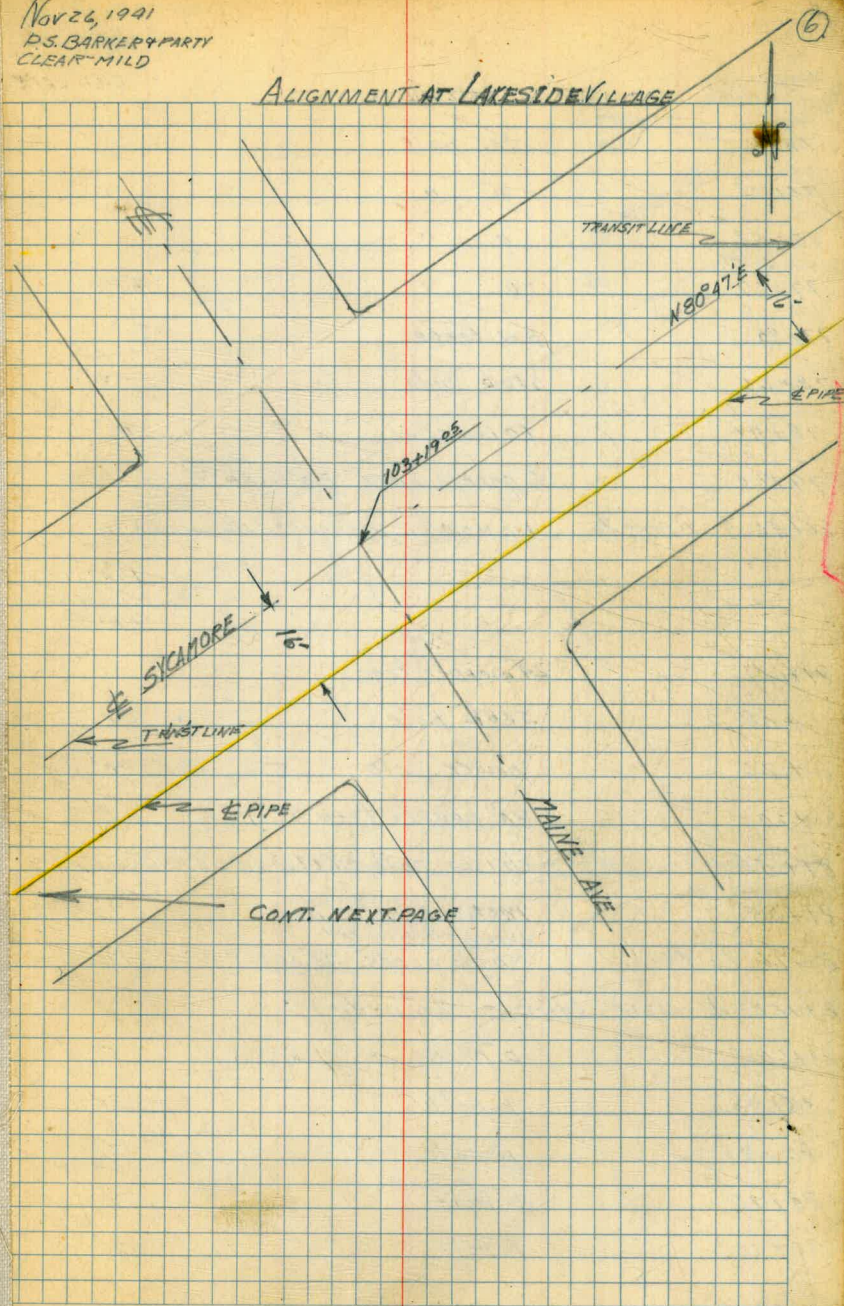
$$d/H = 3^{\circ} 26' 36''$$

$$\begin{array}{r} 9166 \\ 306090 \\ \hline 26 \end{array}$$

Sta.	Discrip.	E. Road. Left.
570		
51+25	p. pole	23'
51+49	driveway 20' wide	
52+05	driveway 12' wide	
52+57	p. pole	21'
52+66	driveway 17' wide	
54+63	p. pole	24'
+ 75	anchor	24
56+56	drive 17' wide	
56+74	p. pole	24
+ 86	anchor	24
57+90	cedar st (oil surface) (10' wide)	
58+23	manhole 04 E	
+ 26	p. pole	23'
60+50	p. pole	23'
61+30	p. pole	23'
62+31	drive (15' wide)	
63+90	p. pole	23'
64+40	drive (15' wide)	
65+18	drive	
66+32	p. pole	23'
+ 85	drive (15' wide)	
67+90	drive " "	
68+95	p. pole	31'
70+50	tel. pole	19'

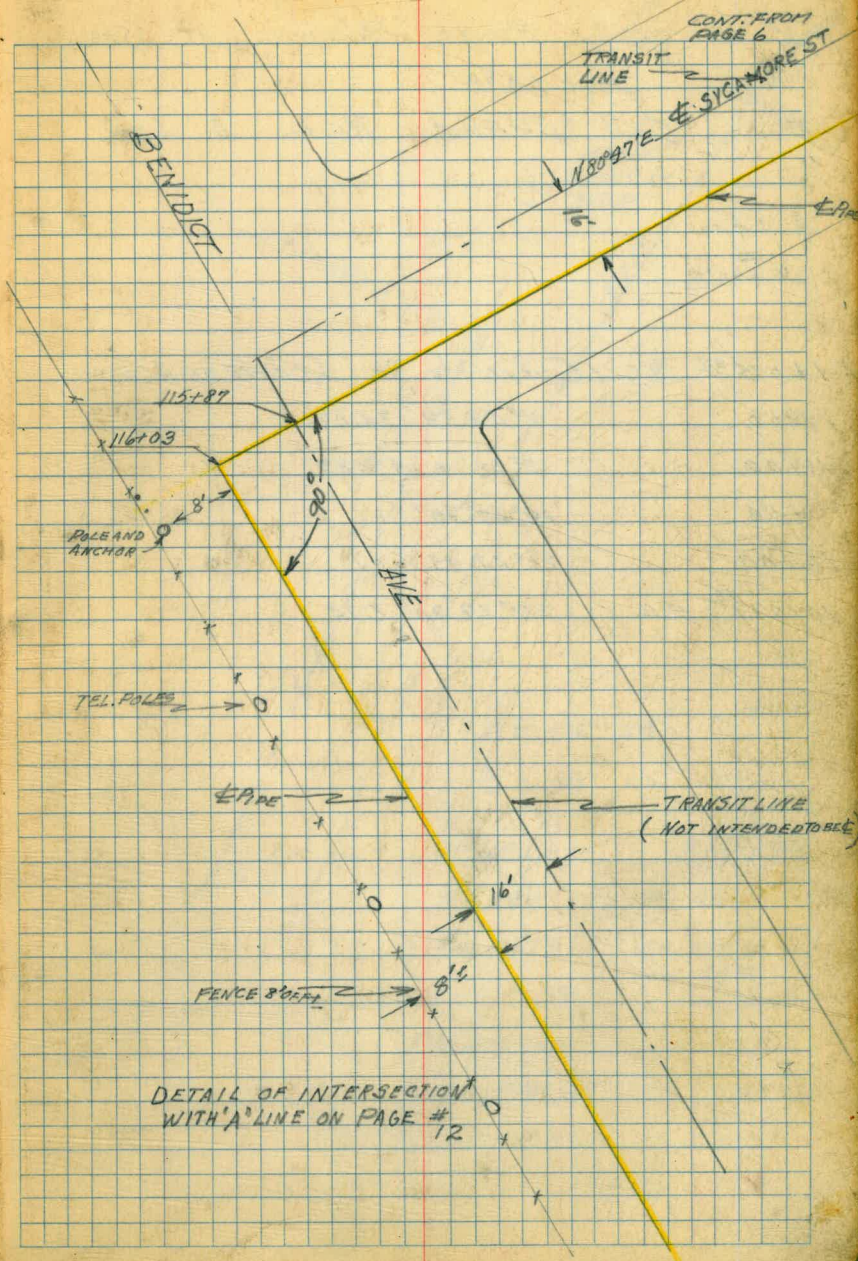
Nov 26, 1941
P.S. BARKER & PARTY
CLEAR MILD

ALIGNMENT AT LAKESIDE VILLAGE



STA	DESCRIPTION	DIST. LEFT
72+27	tel. pole	17'
73+78	" "	17'
75+58	" "	17'
77+19	" "	15' from transit line
77+85	b.w. fence	8' " " "
78+66	stub pole	13'
78+90	tel. pole	11'
79+50	to garage drive 30' wide 30' to building	
80+90	to drive to air & water dispenser (service) 10'	
		TRANSIT LINE Now 4' W. OF PAVEMENT EDGE
81+00	29" pepper tree	21'
+08	stub pole	20'
+20	power pole	20'
+30	30" pepper tree	18'
81+50	drive into station 50' wide (dirt)	
81+65	meter or valve box average diam 18"	2'
82+70 to 91+00	shade trees 30' apart	17'
83+50	to Road (dirt - 20' wide)	
83+60	p. pole	23' ✓
85+20	p. pole	20' ✓
86+91	p. pole	20' ✓
88+76	p. pole	20' ✓
90+70	p. pole	20'

Nov 26, 1941
P.S. BARKER

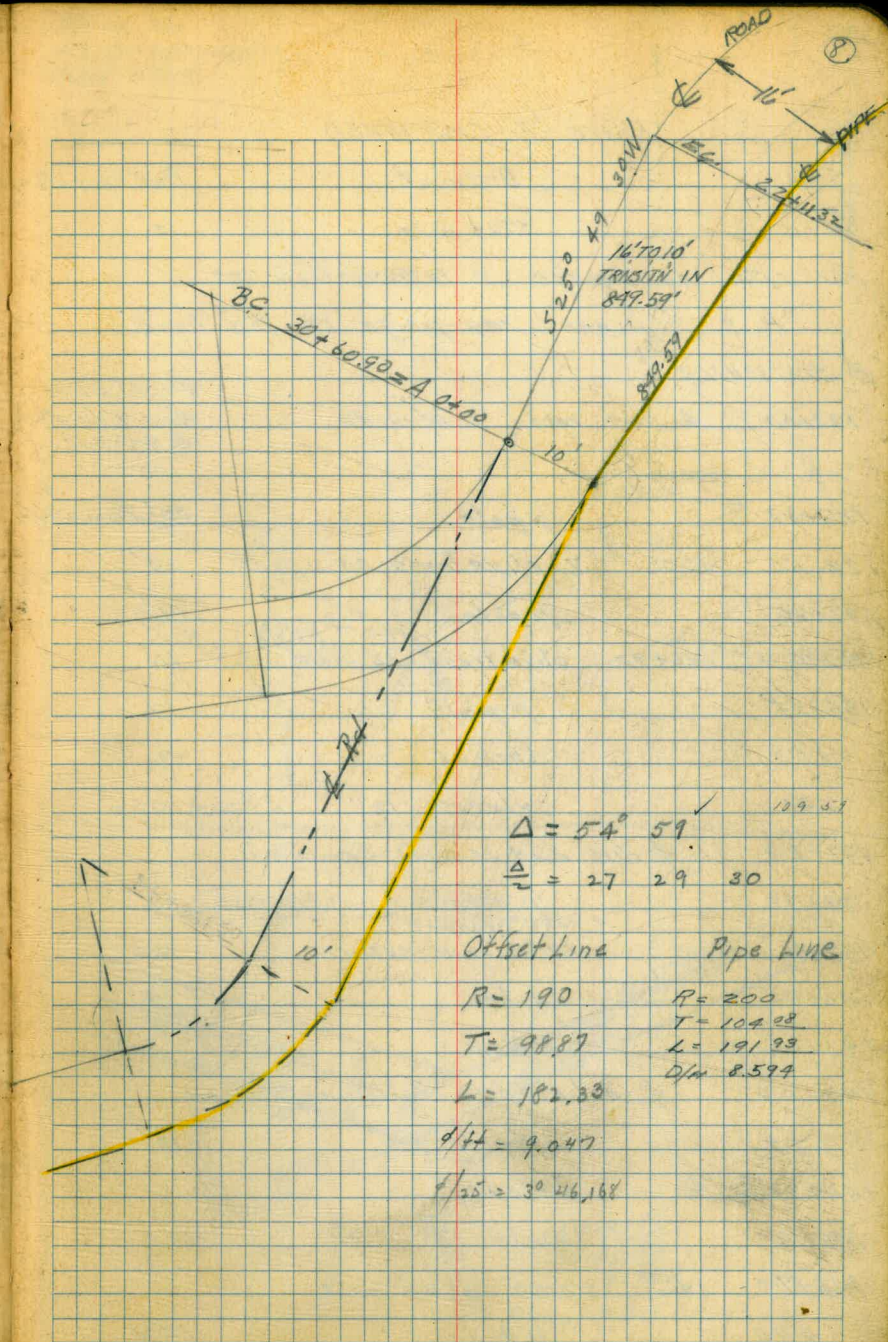


Alternate Route Beginning at Sta.
30 + 60.90
Call Alternate Route "A" Line

A 0 + 10
= 30 + 60.90

A 14 + 15.85 B.C. Curve to Rt. (CURVE ON & PIPE)

14 + 15.85	4° 53' 59" 34.07
15 + 00	12° 03' 12" 49.87
+ 50	19° 19' 30" "
16 + 00	26° 22' 45" "
16 + 07.78 E.C.	27° 29' 30" 7.75



ROUTE "A" CONTINUED

STA	Discript	Dist from offset
91+10	Stub pole	12'

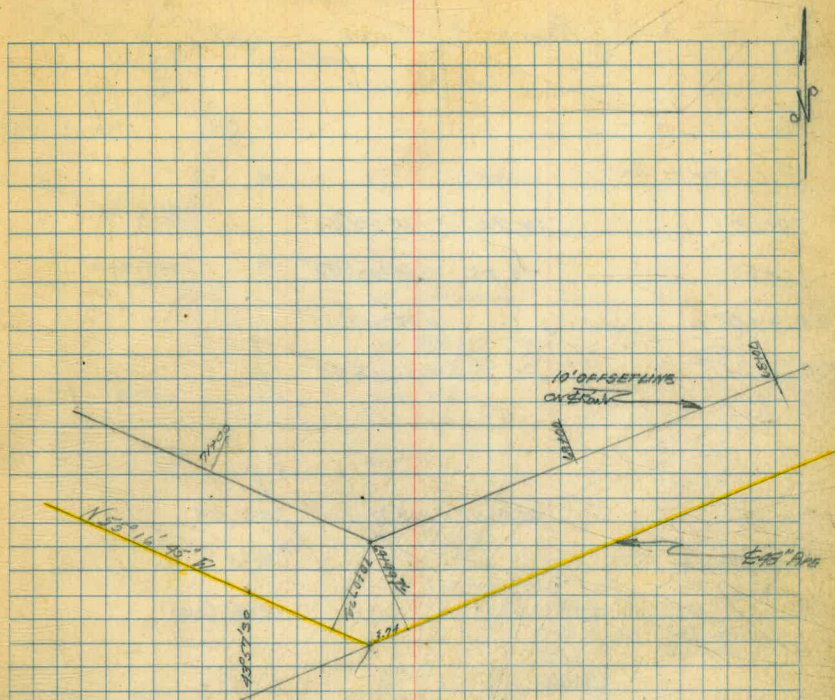
For detail on bridge & intersection of
"A" & "B" Lines see page 12, this book

"B" STATIONING

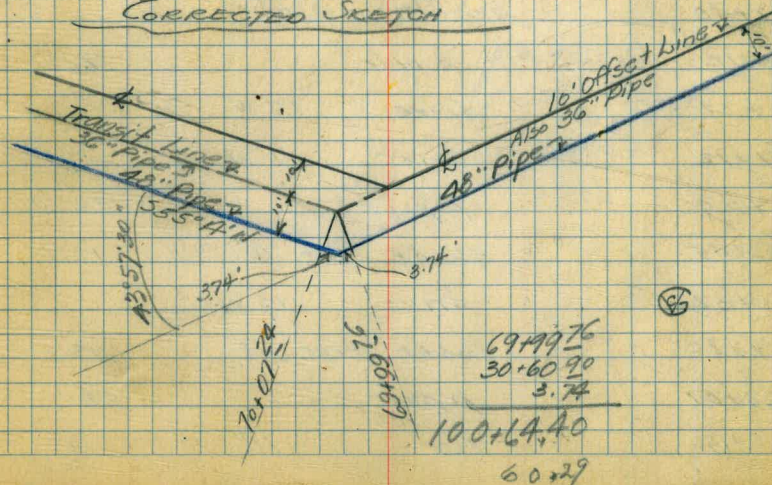
STA	Discript	Dist from offset
128+00	to dirt road 15' wide	10' Lt of Highway.
129+88	p. pole	22' from offset
129+60 - 3100	(7) olive trees 25' apart	20'
132+76	p. pole	19'
133+10 to 136+90	olive trees (No of trees) 12" diam.	16'
135+55	p. pole	17'
+80	anchor	17'
+90	culvert 12" 11' to S. edge	
137+29	to dirt road 15' wide (private)	
138+92	p. pole (conc. roadwall)	16'
139+81	12" c.m.p. culvert	11.5'
140+90	anchor	19'
141+26	p. pole	13'
143+00	to oil road to Bostonia 3d w. p. e	
+32	p. pole	13'
144+33	to driveway	
145+19	p. pole	12.5'
146+85	to wire 20' wide	
+90	p. pole	12.0'

Nov. 24, 1941
P.S. BARKER & PARTY
CLEAR-WAY.

(7)



CORRECTED SKETCH



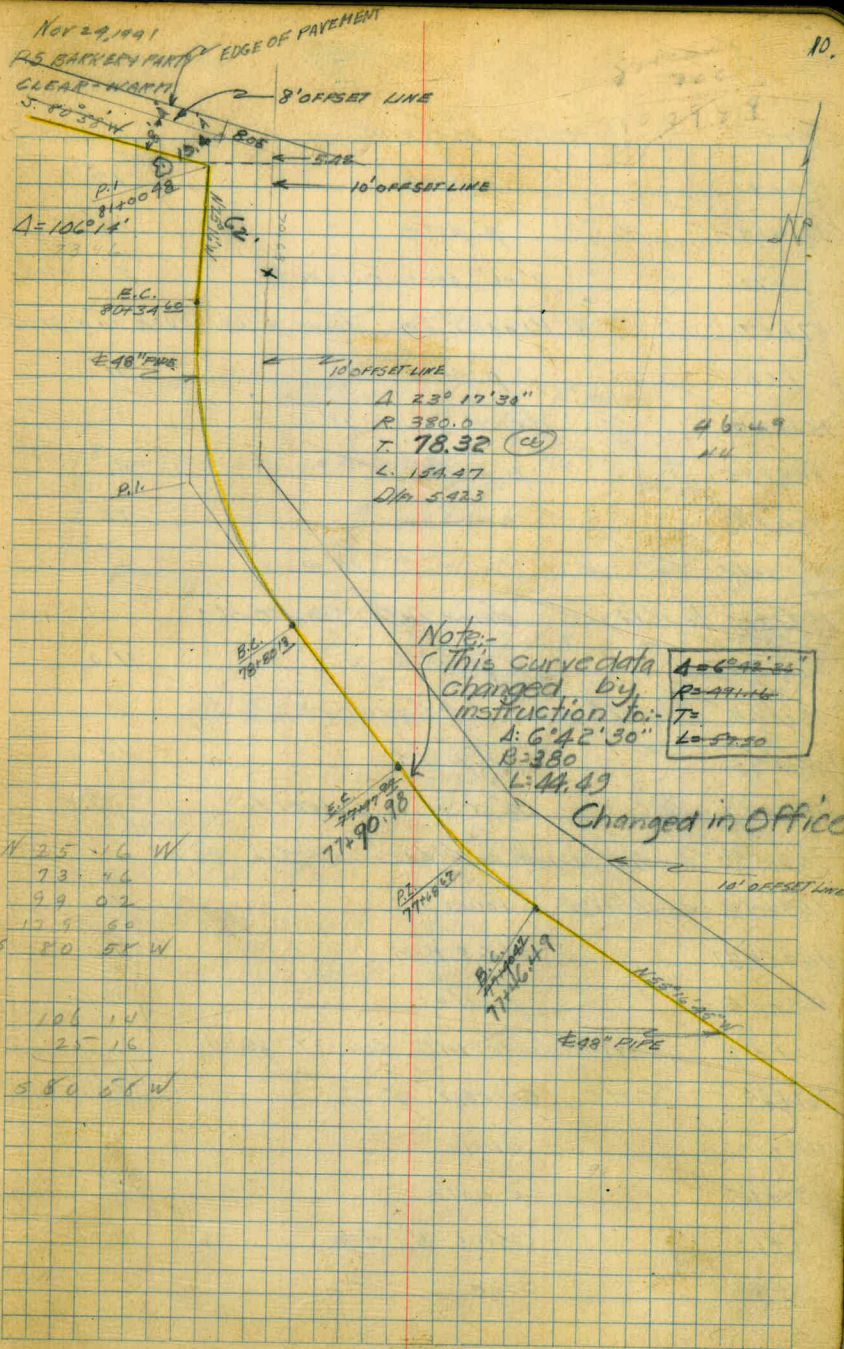
69+99.26
30+60.70
3.74
100+64.40
60+29

ROUTE "A" CONT.

B.C 78+80 ¹²	CHORD.		
79+00	19.86	10°29'59"	(Rt.)
+50	49.96	5°16'03"	
80+00	"	9°02'15"	
E.C +34 ¹⁰	34.58	11°38'45"	

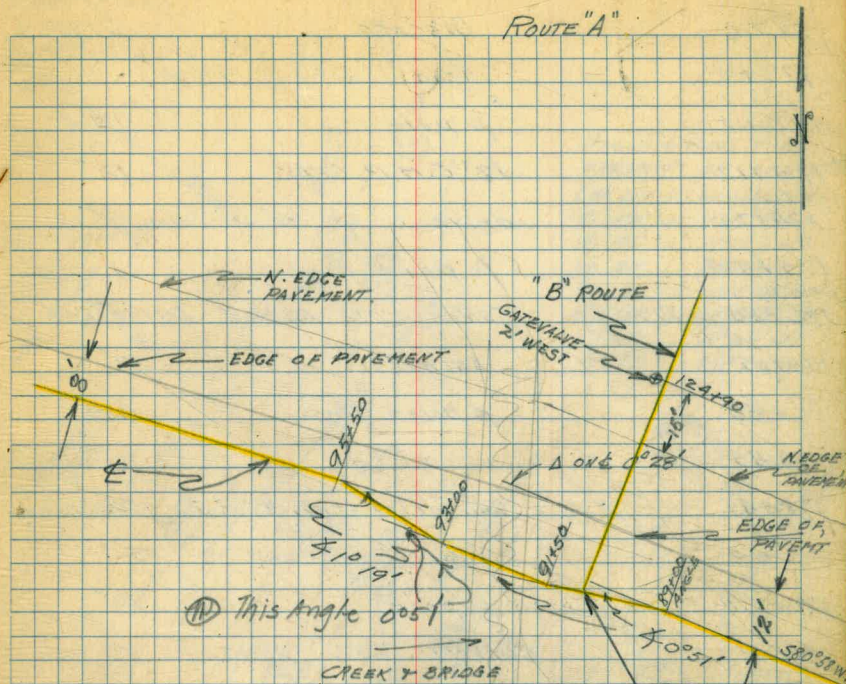
OFFSET CHORD 50' = 48.64
 19.35 (1st)
 33.62 (2nd)

STA	Discrip.	DIST LAST FROM 9' OFFSET LINE
148+49	p pole	11.0
149+40	drive (SKIDMORE RES) 15' wide	
150+12	p pole	12.0
+24	drive 17'w	
151+12	drive 17'w	
+50	p pole	12.0
152+45	shade Tree 18"	12.0
+52	drive 15'w.	
152+82	shade tree 18"	13.0
153+07	p pole	12.1
+16	tree 18"	13'



Nov 24, 1941
 P.S. BARKER & PARTY
 CLEAR-WARM

STA	DISCRIP	
155+91	Anchor	12'
156+12	p. pole	12'
+72	2'x6' conc. culvert	5' to end
157+17	€ Kanady Res. drive & conc curb on W. side	
+50	p. pole	11'
158+07	drive 18' w	
158+85	p. pole	11'
159+07	anchor	12'
+44	drive 15' w	
159+98 to 161+50	drive into service sta	
160+35	p. pole	11.0
161+65 €	oil road 20' wide	
+95	p. pole	12.0
162+22	18" C.M.P. culvert.	9.0
163+27 €	dirt drive into Lakeside Sch. 36' w	
163+50 to 165+25	lawn	7.0
164+31	U.S.G.S. B.M	11.0
165+16	p. pole	11.0
+40	dirt drive into school 30' w	
167+89	C.M.C. culvert 3'	8'
168+10	p. pole	14'
170+65	p. pole	12'
+68	cactus 6" diam.	10'
+98	drive 15' w	

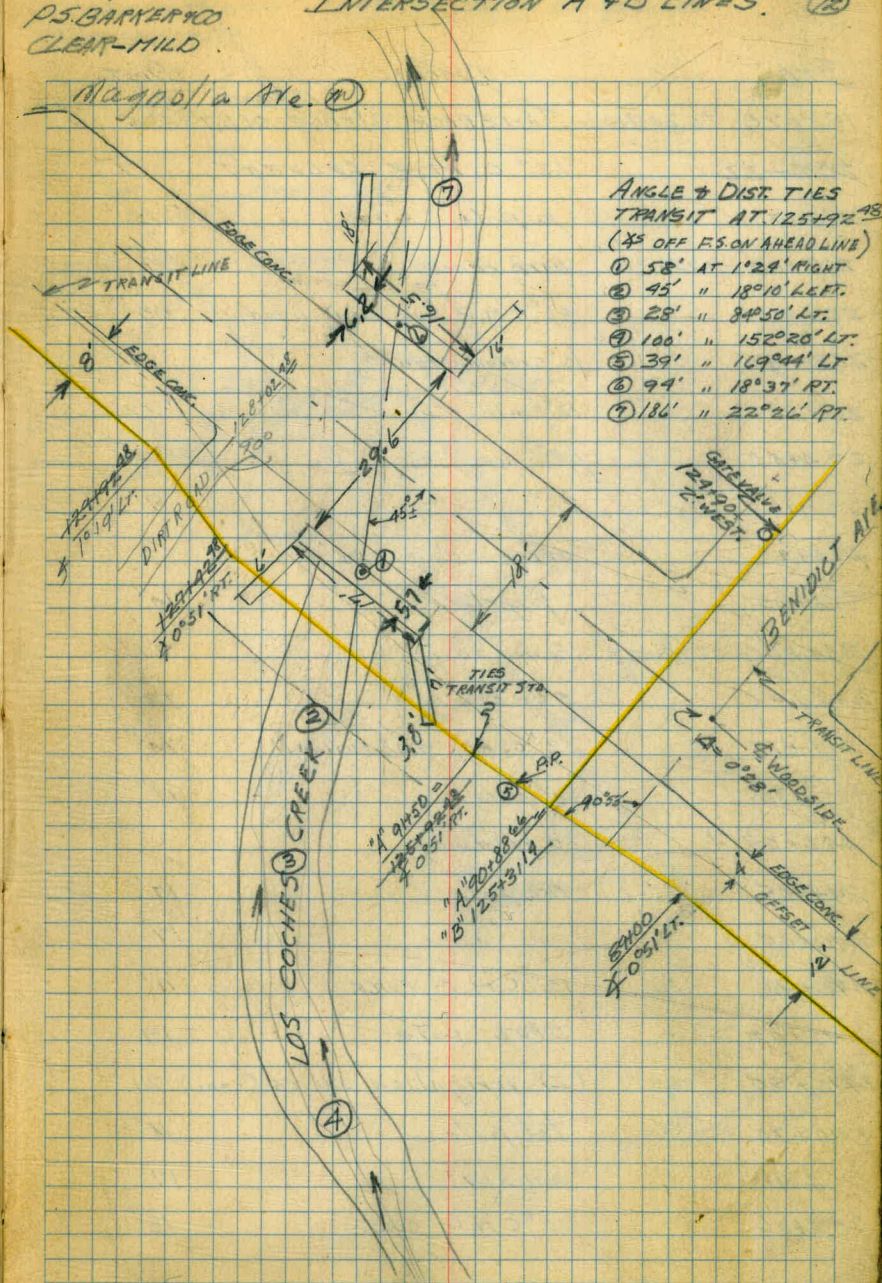


Note
 Add 30 to 60.90
 to stations shown above
 for final corrected stationing.

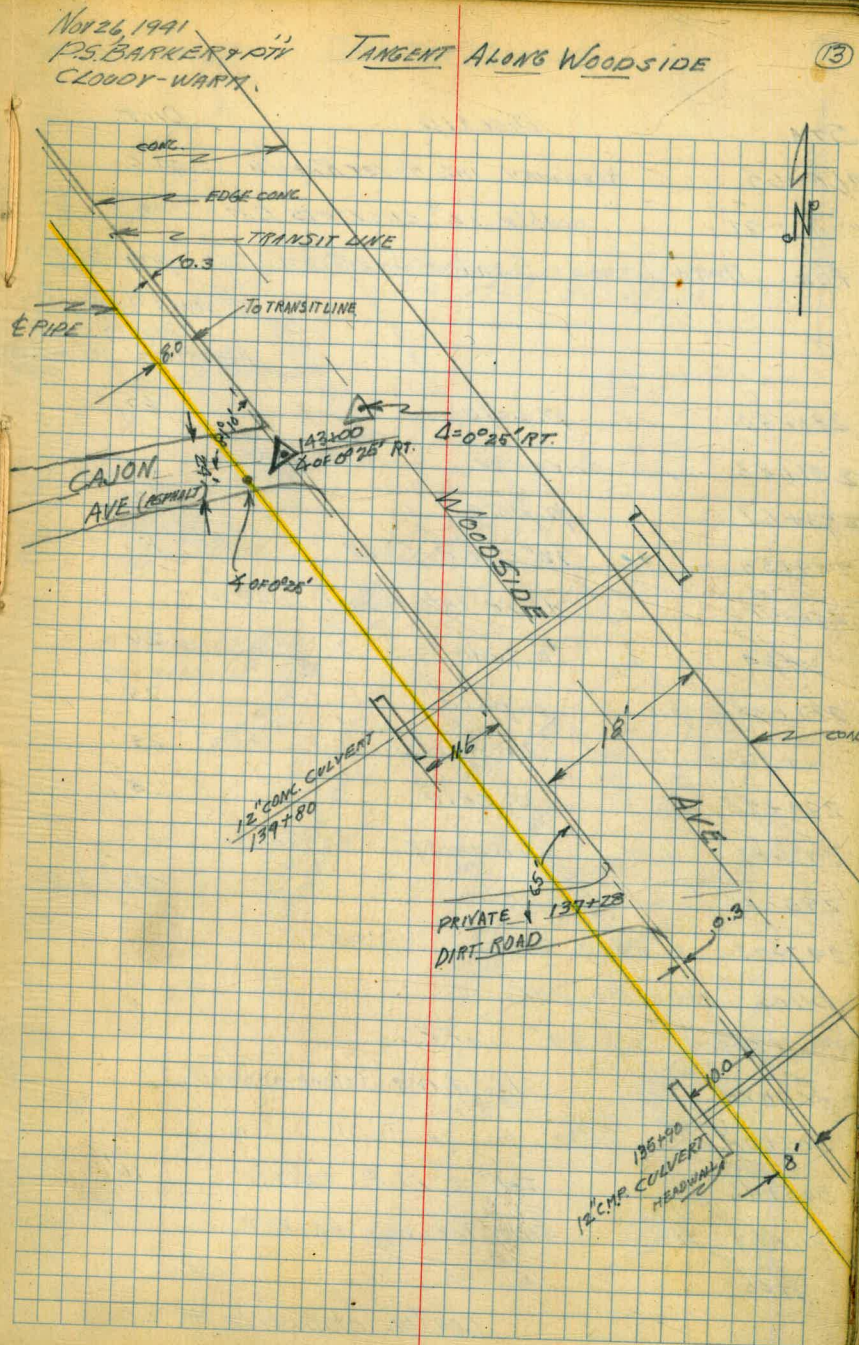
Nov 26, 1941
 P.S. BARKER NO.
 CLEAR-MILD

INTERSECTION "A" + "B" LINES. (12)

STA	Discrip.	DIST
172+81	Road (oil) 20'w	
173+21	p. pole	12.0
174+12	12" C.M.P. CULV.	10'
174+75	drive 30'w	
175+74	p. pole	13'
176+50 to 177+50	CONANT OIL PLANT DRIVEWAY	
178+15	Anchor	17
+35	p. pole + trans	12
+45	" " "	"
178+45	24" water line crosses pavement	
+93	2.5x6' conc. culv.	5'
180+21	p. pole	13'
+81	? CULVERT 3'x6' conc.	5'
181+67	p. pole	16'
182+00	drive into Riverview Sta City of S.D.	
183+00 to +50	hard rock embankment 8' high 4' off.	
185+93	12" C.M.P. CULVERT.	10'
186+13	p. pole	10'
187+40 ⁸⁸⁺⁷⁵	EMBANKMENT 9' off 8 to 10' high.	
190+00	" 13' 20' high	
191+40	6' to bedrock	
193+65	power pole	18'
195+35	p. pole	15'
196+50	drive 22' w.	



STA	DISCRIP	OFF OFFSET DIST.
198+20 to 209+00	TAMERACK HEDGE OLD TREES (18" diams)	16'
202+22	12" C.M.P. CULVERT	7'
208+07	p. pole	15'
219+00 - 225+30	barb fence	14'
223+65	36" C.M.P. Cul. conc. head.	13'
222+40	6" Cottonwood	13'
223+50	12" " "	12'
224+50	18" " "	12'
224+68	29"	9'
225+90	drive 15'w	
228+25	p pole	10'
230+00 to 275+00	fence	21'
230+40	stub	13'
241+13	12" conc. headwall	10'
+85	tel. pole	18'
242+09	30 roadway	
244+05	tel. pole	17'
246+60	" "	17'
246+98	12" C.M.P. CULV.	11'
247+02	stub pole	19'
247+00	(2) irrigation valves (conc)	21'
249+30	tel. pole	18'
+41	anchor	19'
259+06	12" C.M.P. CULV.	13'

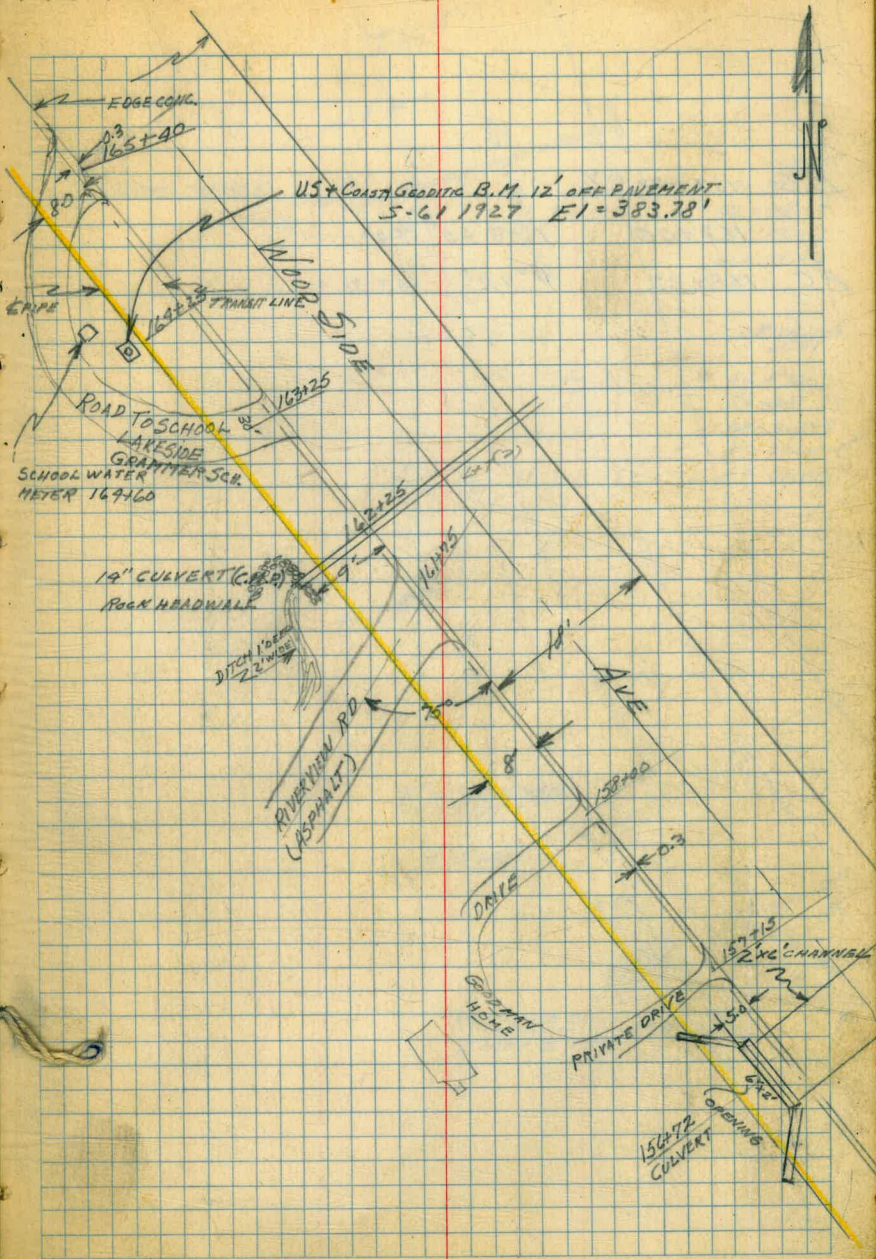


Nov 26, 1941
P.S. BARKER & CO.

TANGENT ON WOODSIDE.

(14)

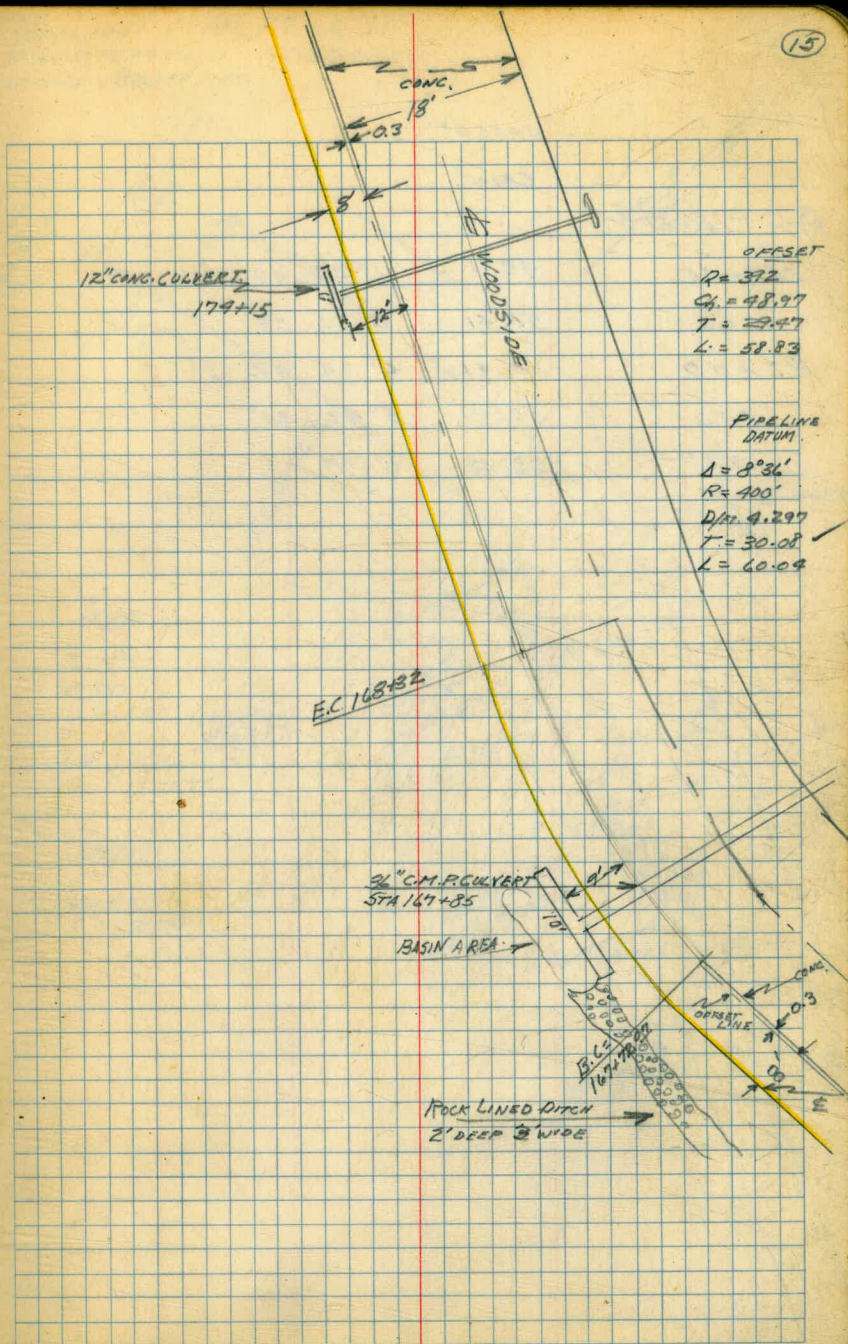
STA	DISCRIP.	DIST.
260+65	roadway into Haver Ranch 15' gate	
274+91	double 12" CULVERTS C.M.P. 11'	
For Detail on Santee Junction see page 22-23-20		
± NOW 1' to Pt. OF TRANSIT LINE MEASURED FROM OFFSET		
281+90	p. pole	25'
281+83	driveway 17' wide	
283+61	p. pole	26'
284+55	12" C.M.P. CULV.	16'
285+11	drive into school 25' w.	
+34	p. pole	26'
287+35	p. pole	25'
+56	anchor	25'
290+25	p. pole	28'
292+83	driveway 15' wide	
293+25	pole	33'
297+72	± Road (oil) 25'	
poles are 35' OFF		
fence is 39' OFF.		
303+74	15' drive (stone approach)	
305+08	" " " "	
305+46	24" C.M.P. CULV.	16'
311+03	drive for veg. market.	
+60	" " " "	
contin. opposite # 20		



B.C. 167+72.07

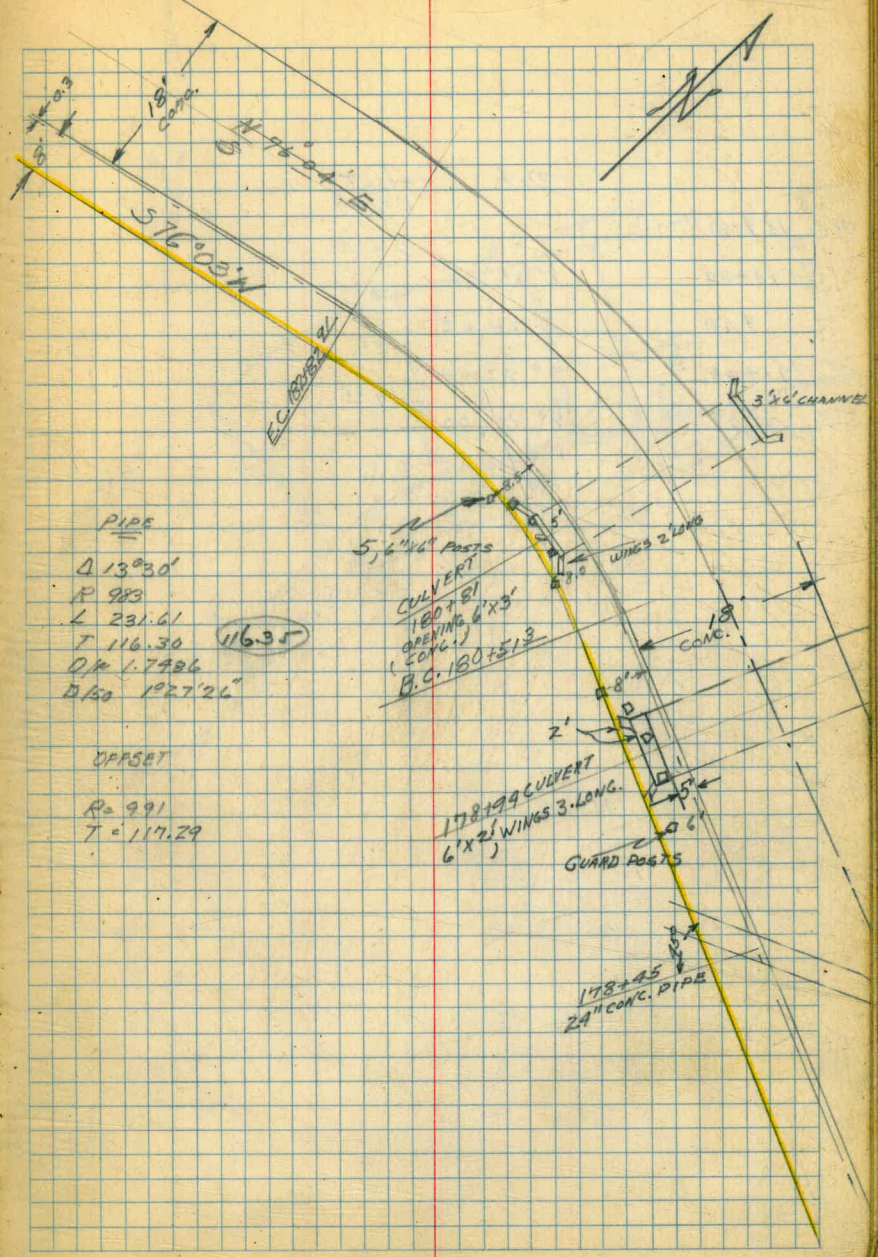
168+00 $1^{\circ}59'30''$ CH = 31.4

E.C. 168+32 $4^{\circ}18'$ CH = 31.4



Nov 26, 1941 - CONT. NOV 27, 1941
 P.S. BARKERT PARTY CLOUDY-COOL
 CLOUDY-SUNNY 3:PM.

	OFFSET		
	Chord		
B.C - 180+51 ³			
181+00	49.11	1° 25' 09"	
+50	50.41	2° 52' 35"	
182+00	50.41	4° 20' 02"	
+50	50.41	5° 47' 30"	
182+82 ²	33.15	6° 45'	

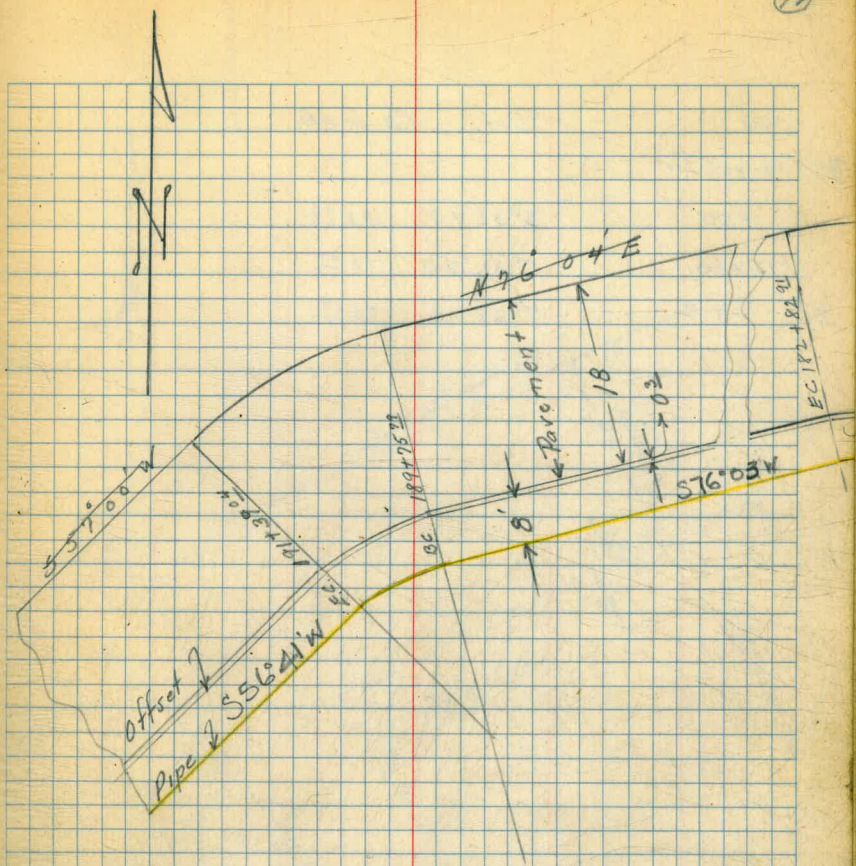


PIPE
 Δ 13° 30'
 P 983
 L 231.61
 T 116.30 **(116.35)**
 D.P. 1.7486
 D/50 1° 27' 26"

OFFSET
 R = 991
 T = 117.29

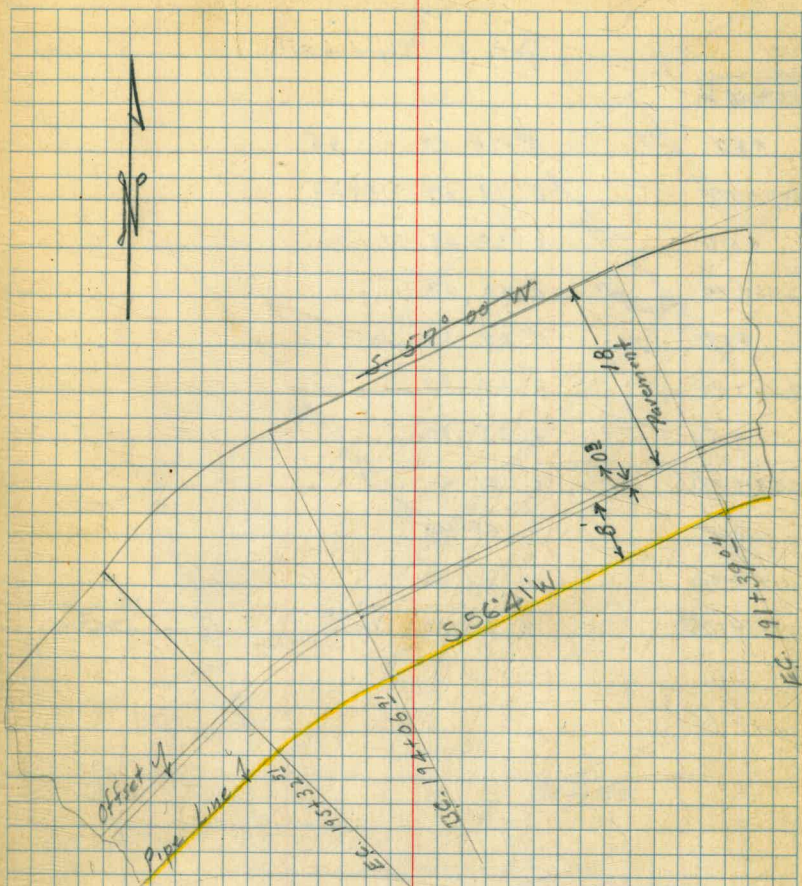
5, 6'x6' POSTS
 CULVERT
 180+51
 OPENING 6'x5'
 (2 CONC.)
 B.C. 180+51.3
 WINGS 2 LONG
 18' CONC.
 178+199 CULVERT
 6'x2' WINGS 3 LONG
 GUARD POSTS
 178+45
 24" CONC. PIPE
 3'x6' CHANNEL

	Def.	Offset Chord
BC. 189+25.29		24.60
190+00	1° 26' 06"	50.82
+50	4 24' 02"	50.82
191+00	7° 22' 00"	39.68
E.C. +39.04	9° 41' 00"	



Pipe	offset
$\Delta = 19^\circ 22'$	$\Delta = 19^\circ 22'$
$\frac{d}{2} = 9.41$	
$R = 483.9$	$R = 491.2$
$L = 163.25$	$L = 165.25$
$T = 82.41 \checkmark$	$T = 83.31$
$d/4 = 3.5587$	
$d/50 = 2^\circ 59' 56''$	

Sta	Def.	Ch on off.
BC 194+06 $\frac{1}{2}$		
+50	2° 33' 40"	13.79
195+00	5° 31' 20"	50.82
E.C. +32 $\frac{1}{2}$	2° 27' 00"	33.04



Pipe Line
 $\Delta = 14^\circ 54'$
 $\frac{R}{2} = 7.27$
 $R = 145.40$ $T = 63.46$
 $L = 125.68$
 $1/x = 3.5589$
 $d/50 = 20.57' 36''$

Offset

$R = 491.5$

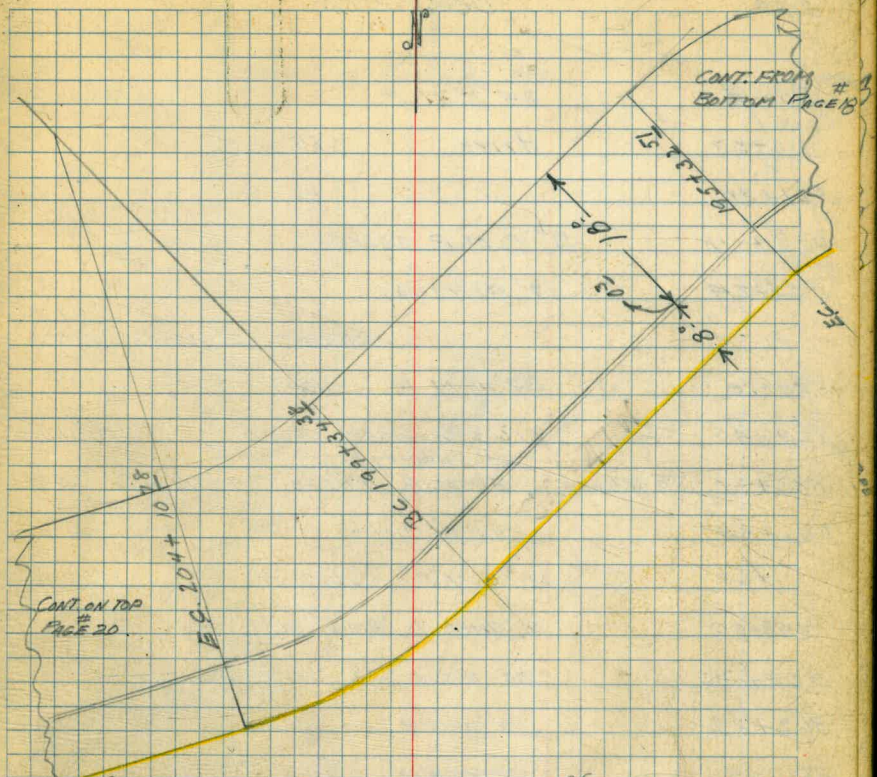
$T = 127.68$

$L = 64.22$

~~9~~
~~2~~
~~1~~

BC 199134 ³⁸

	Def. &	Chord or Off.
+50	0° 04 50	15.45
200+00	0 19 59	49.93
+50	0 35 08	"
201+00	0 50 17	"
+50	1° 05 30	"
202+00	1 20 40	"
+50	1 35 50	"
203+00	1 51 00	"
+50	2 06 10	"
204+00	2 21 20	"
+10 ⁷⁸	2 24 30	10.78

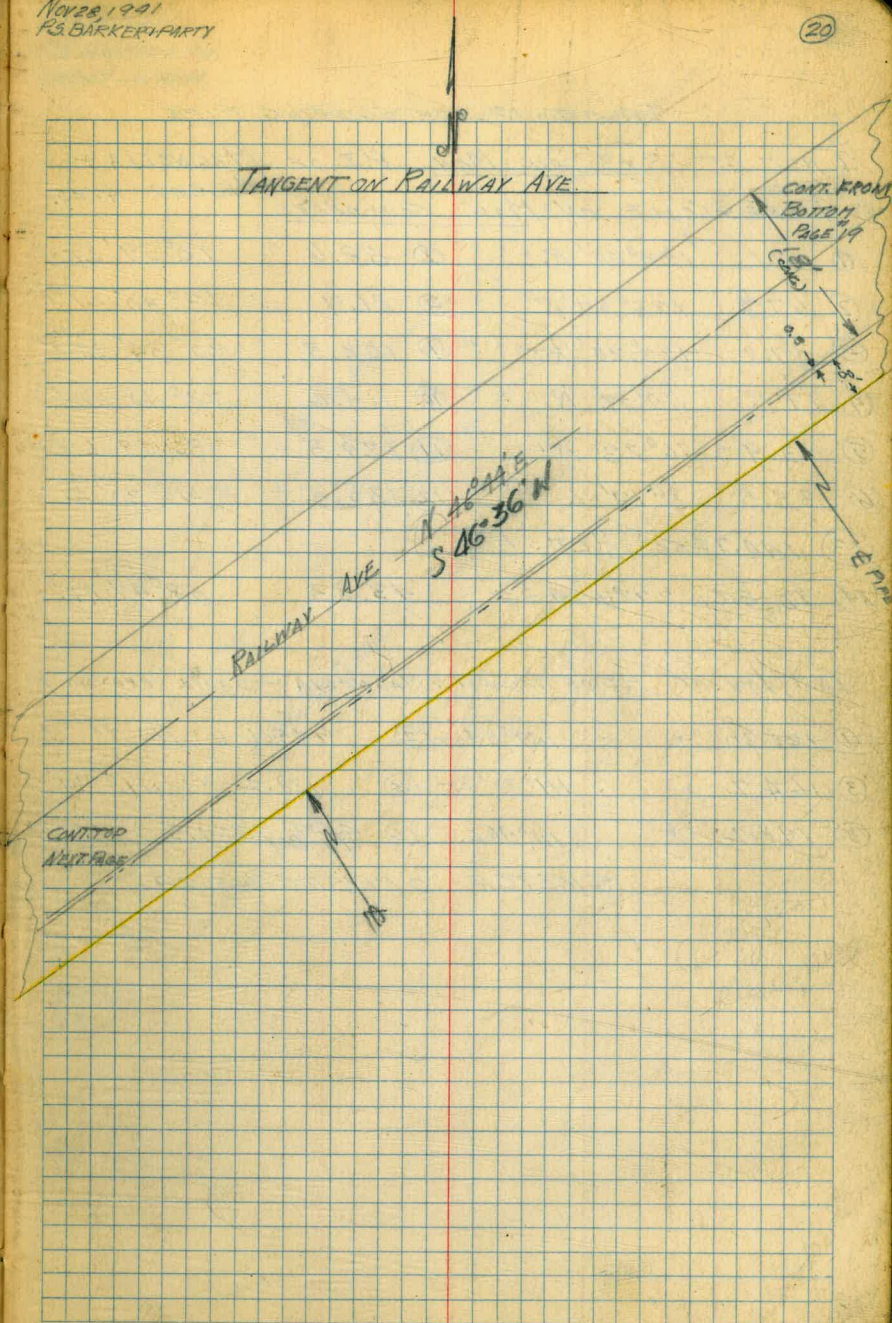


Pipe Line	Offset
$\Delta = 4^\circ 49'$	
$R = 5667$	$TR = 5659$
$\frac{P}{R} = 2 24.30$	
$T = 238.34 \checkmark$	$T = 238.00$
$L = 476.40 \checkmark$	$L = 475.77$
$\frac{1}{4} \Delta = 30.33'$	
$\frac{1}{50} = 0^\circ 15' 10''$	

Nov 28, 1941
R.S. BARKER PARTY

(20)

STA.	DESCRIPTION	DIST.
315+15	24" C.M.P.	15'
317+07	drive 14' wide	
321+80	" 15' "	
322+11	18" C.M.P. CULVERT	16'
325+24	17' driveway	
OFFSET LINE NOW 5' LEFT OF		
328+70	24" C.M.P. CULV.	15'
328+95		
329+00	oil surfaced road, 20' wide 50' spacing to 330 then 25'	
330+30 TO 360+00	EUCALIP. TREES 24" diam.	25'
336+55	power pole	26'
+67	18" C.M.P. CULVERT	15'
343+00	20' drive to Bourillard Rd.	
360+22	20' drive to Love Residence.	
362+34	16' drive	
363+65	driveway 15' W.	
	80' right o-way	
368+60	Bridge (conc) 61' long; 27' wide	
	see F.B. #601 For detail	
369+40	drive 17'	
	cond. opposite #25	



TIES TO LOCATE EXISTING PIPE

INST. AT 3"X3" CONG. MON. P.I. OF MAGNOLIA & MISSOURI AVES.
FORESIGHT ON MAG. SOUTHWARD

- | | | | |
|---------------------|------------|------------|-----------|
| ① 117.1 | 123°00' R. | ② 58.6 | 10°59' LT |
| ② 67.6 | 125°57' R. | ③ 81.7 | 13°30' LT |
| ③ 37.8 | 123°20' RT | ④ 102.5 | 20°34' LT |
| ④ 17.6 | 110°32' R. | ⑤ 114.6 | 23°40' LT |
| ⑤ 13.9 | 16°23' R. | ⑥ 124.5 | 36°08' LV |
| ⑥ 35.5 | 8°13' L | ⑦ 135.0 | 46°20' L |
| ⑧ 140.7 | 50°15' LT | | |
| ⑨ TO E.C. 278+24.52 | 43.33 | 58°47' RT. | |

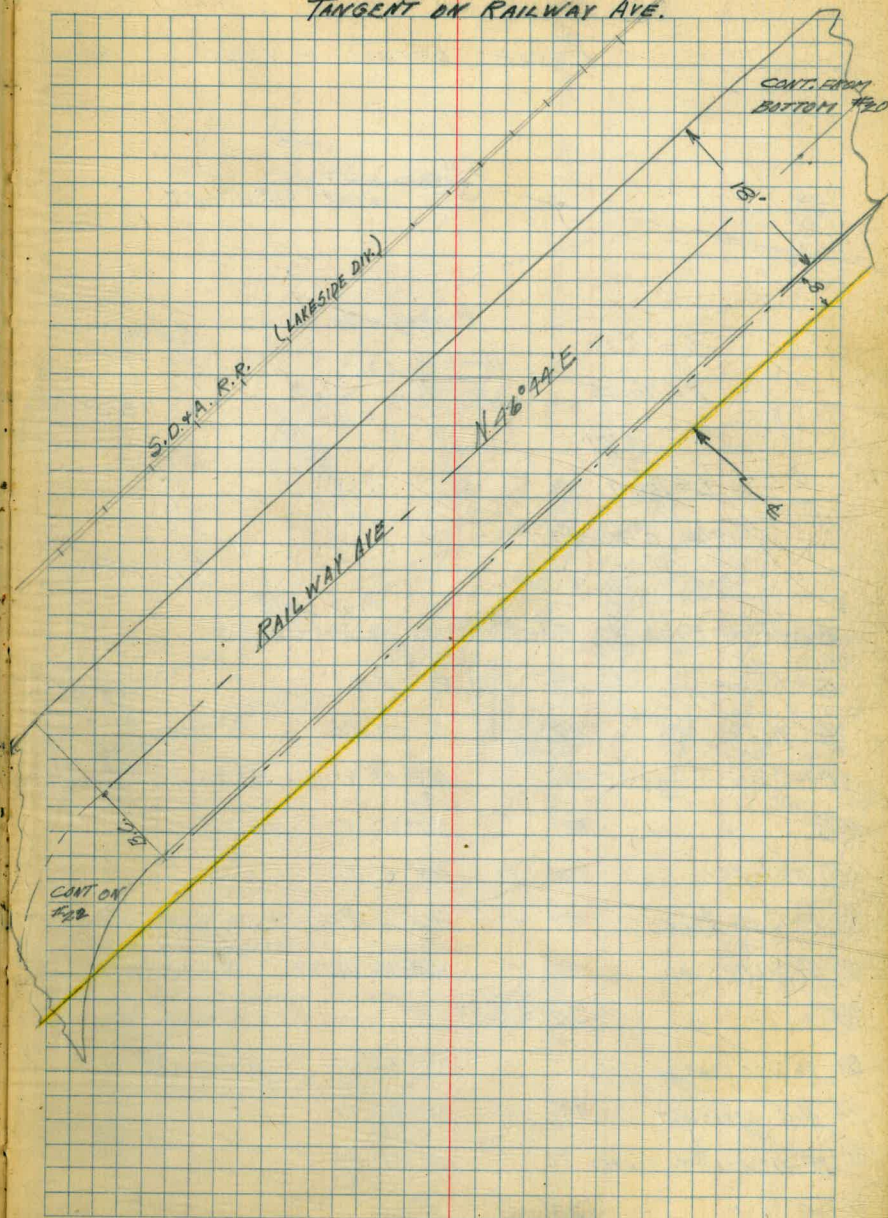
INST NOW AT P.I. OF RAILWAY & MAGNOLIA - SAME FORESIGHT

- | | | | |
|----------|------------|-------------------------|------------|
| ① 125.30 | 109°54' LT | ② 145.6 | 110°48' LT |
| ③ 164.7 | 111°30' LT | ④ 188.2 | 111°34' LT |
| ⑤ 198.2 | 111°46' L. | ⑥ SENT
TH. BOX 224.5 | 111°51' |

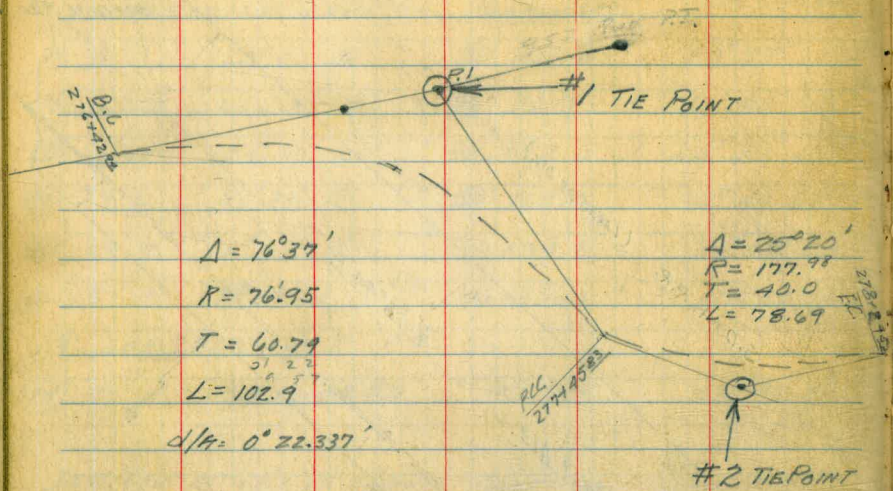
SKETCH OPPOSITE PAGE 24

Nov 23, 1941
P.S. BARKER & P.W.
CLEAR - WARM.

TANGENT ON RAILWAY AVE.



CURVE DETAIL & TIES.



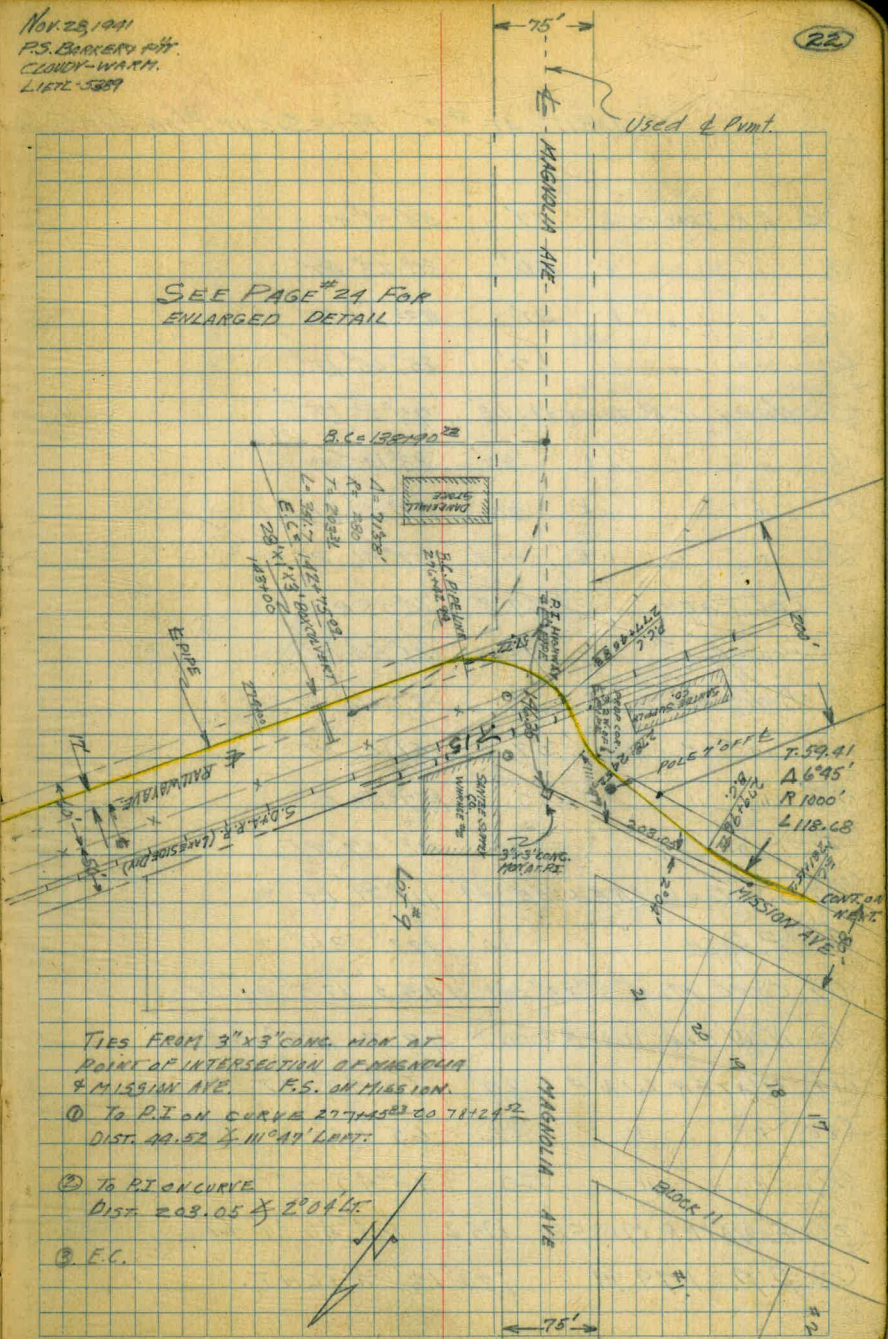
$\Delta = 76^{\circ}37'$
 $R = 76.95$
 $T = 60.79$
 $L = 102.9$
 $d/\mu = 0^{\circ}22.337'$

$\Delta = 25^{\circ}20'$
 $R = 177.98$
 $T = 40.0$
 $L = 78.69$

TRANSIT AT #1 TIE PT. FORESIGHT ON ~~RAILROAD~~ HIGHWAY EAST

			Pipe Line	
①	CONG. HIGHWAY	30'	36°56' RT.	
②	" " "	29'	76°27' RT.	
③	" " "	44'	107°19' RT.	44.52
④	" " "	83'	122°26' RT.	293.05
⑤	TEL. POLE	34'	159°14' RT.	✓
⑥	POWER POLE	77'	178°11' RT.	✓
⑦	OILED ROAD	72'	152°07' RT.	✓
⑧	" " "	51.22 (P.I.)	180°	✓
⑨	POWER POLE	47'	87°55' LT.	✓
⑩	R.R. CROSSARM	47'	92°47' LT.	✓
⑪	OIL ROAD TO SANTEE	36'	23°38' LT.	✓
⑫	" " "	23'	90°52' LT.	✓
⑬	N.W. COR DANCEHALL	122.5'	100°54' RT.	✓

Nov. 25, 1941
 P.S. BARKER & CO.
 CLOUDY-WORTH.
 LITZ-5389



TIES FROM 3" X 3" CONG. NICK AT
 POINT OF INTERSECTION OF MAGNOLIA
 & MISSION AVE. P.S. ON MISSION.

① To P.I. ON CURVE 27744522.00 71124.52
 DIST. 44.52 X 111°47' LEFT.

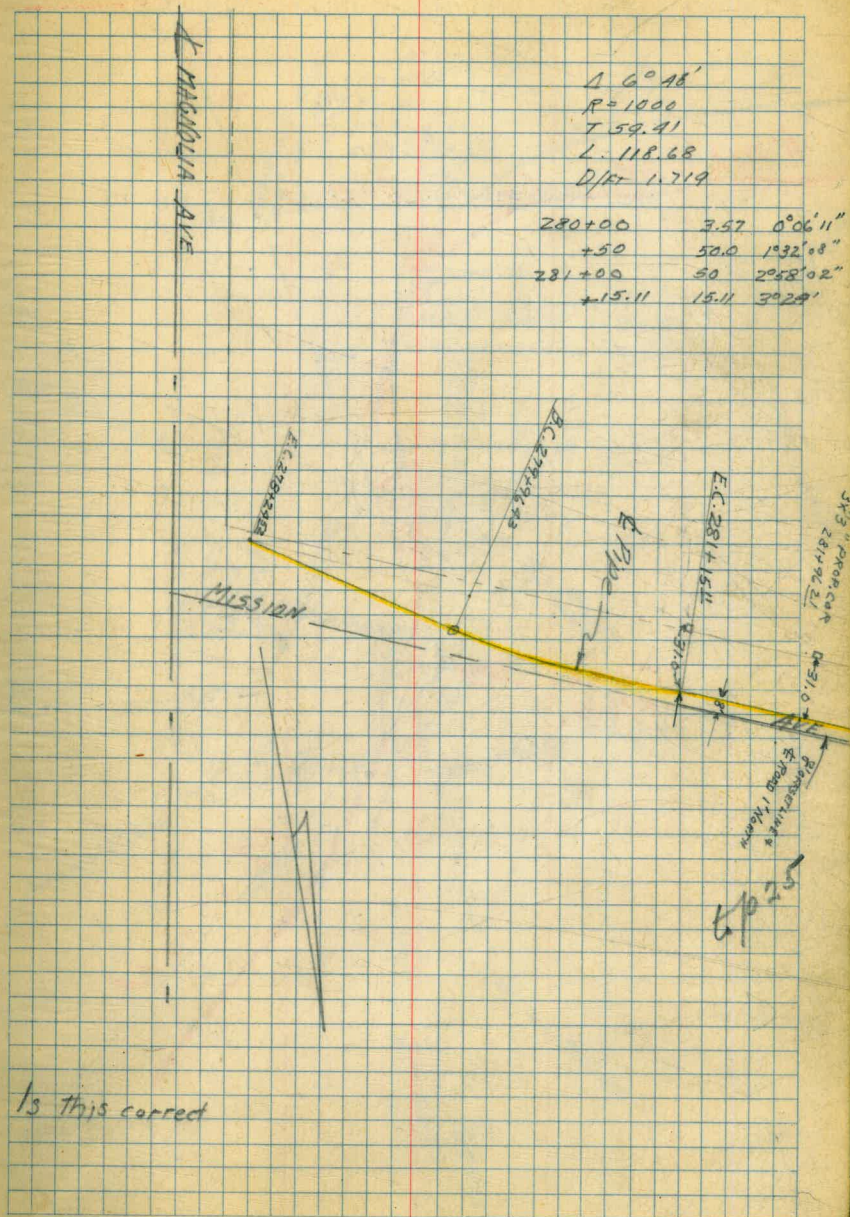
② To P.I. ON CURVE
 DIST. 203.05 X 2°04' LT.

③ E.C.

TO A POINT PARALLEL
TO MAIN AVE SOUTH.

TRANSIT AT #2 FORESIGHT

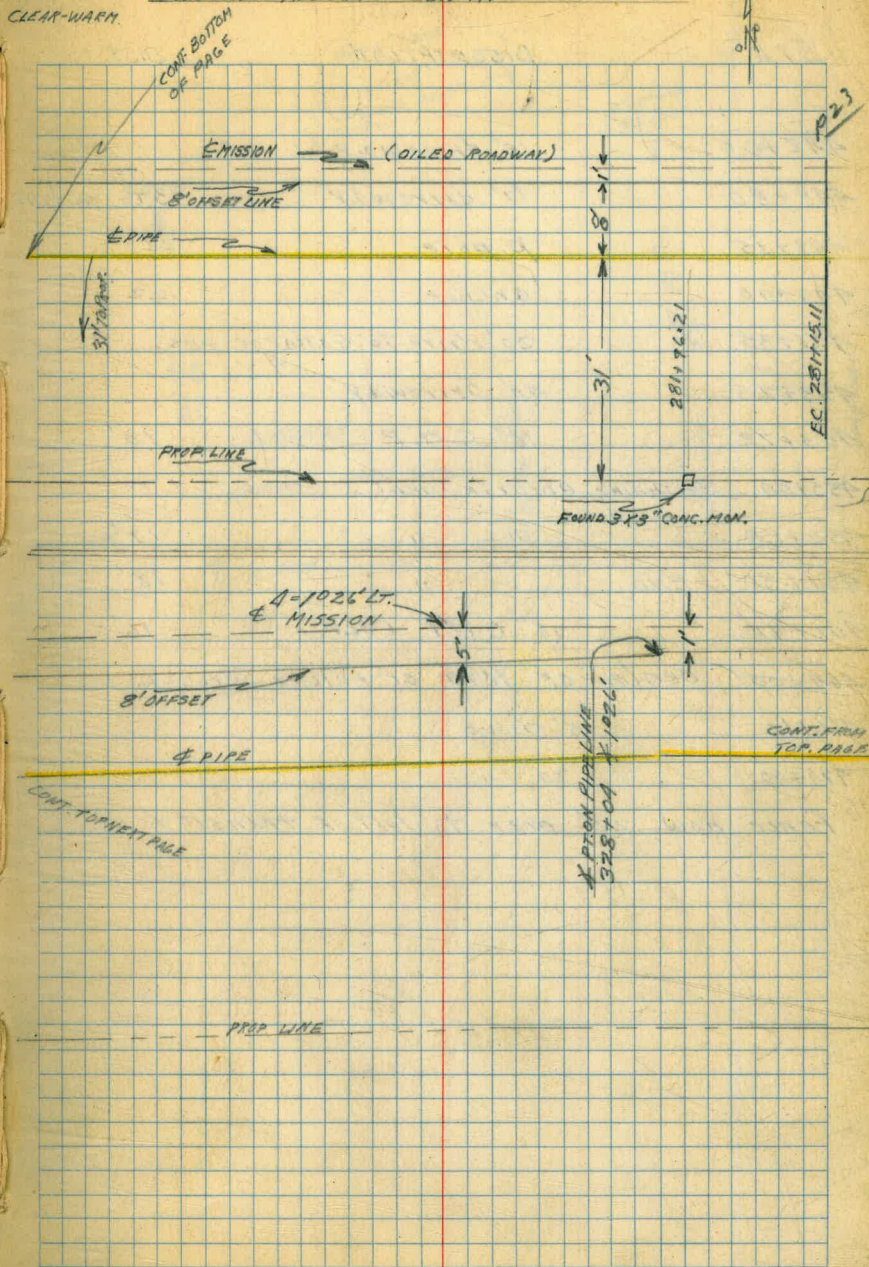
①	P.R. TRACKS E	87'	54°38' RT	✓
②	" "	40'	30°23' RT	✓
③	" "	31'	53°15' LT	✓
④	" "	67'	85°05' LT	✓
⑤	NORTH P.R. TRACKS E	63'	97°33' LT	✓
⑥	" "	27'	83°19' LT	✓
⑦	" "	30'	99°52' RT	✓
⑧	" "	74'	62°56' RT	✓
⑨	TEL. POLE	69.8	70°58' RT	✓
⑩	POWER "	48.5	131°50' RT	✓
⑪	FOIL ROAD	71'	147°17' RT	✓
⑫	" "	57'	151°15' RT	✓
⑬	" "	35'	157°51' RT	✓
⑭	PROP. COR.	38.50	118°37' RT	✓
⑮	S.W. COR. WAREHOUSE	44'	111°59' LT	✓
⑯	P. POLE	30'	122°53' LT	✓
⑰	CONC. MON 3" x 3" LAT	44.53'	175°09' LT	✓
⑱	N.W. COR. WAREHOUSE	42.2	153°53' LT	✓
⑲	WATER LINE	39'	60°40' LT	✓
⑳	" "	82'	65°15' LT	✓
㉑	" "	125'	75°45' LT	✓
㉒	WATER METER	175.2	134°46'30" LT	✓
㉓	P.P.	179.79	121°13' RIGHT	✓



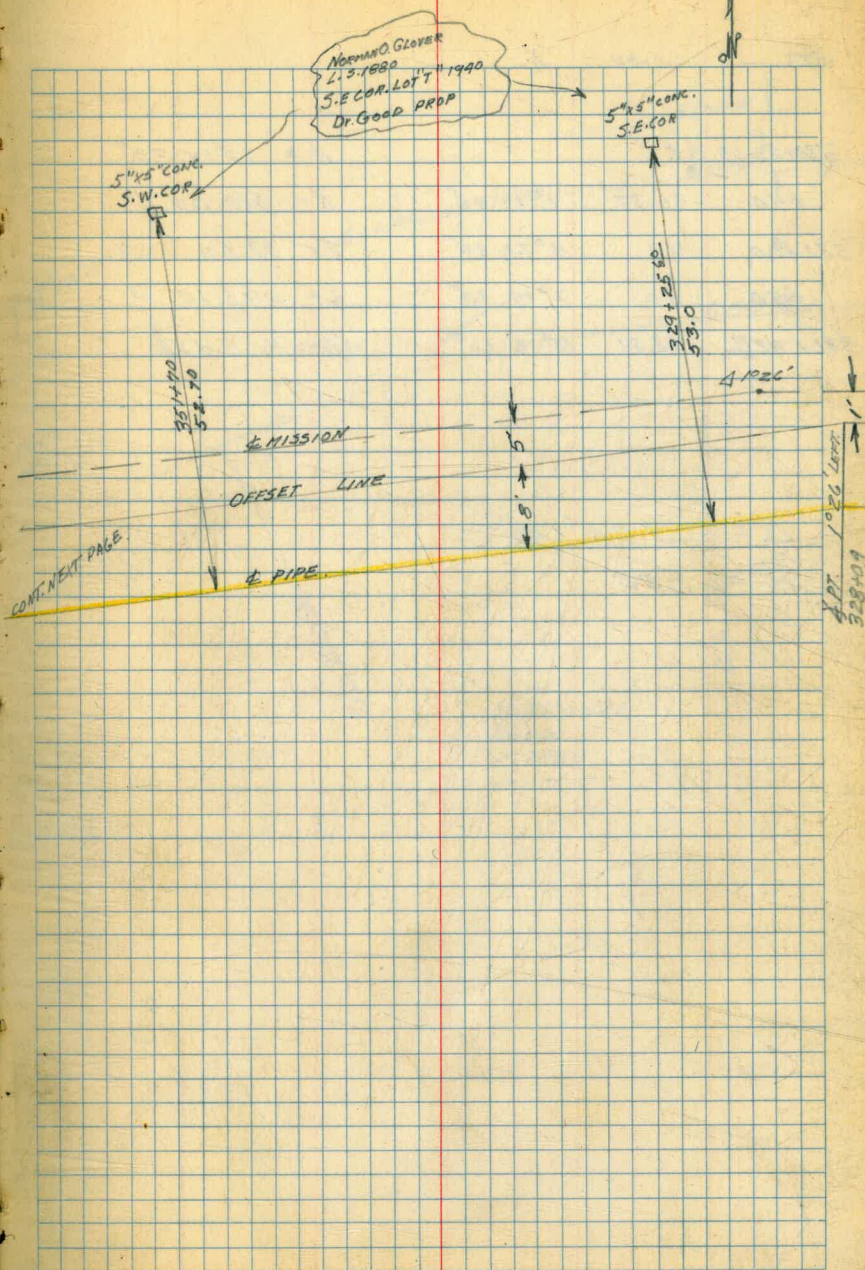
STA	Description	FROM	5' LT OF E
373+35	drive		
381+00	E Road (dirt)		
381+21	p. pole	20'	
+44	pepper tree 18" dia.	22'	
383+93	drive 20' wide		
386+45	protruding 18" pepper tree	23'	
391+90	15' driveway.		
397+95	16' drive		
402+95	E Bridge over creek		
	12' long - 32' wide conc headwall/wings		
	OFFSET STILL 5.0 LT OF E		
409+30	24" C.M.P. CULV.	20'	
412+75 + 413+00	(3) 18" EUCALYPT TREES	25'	
414+80	20' drive		
415+98	p. pole	26'	
419+00	E 23' Road to hills		
	ditch parallels line 20' out		
	fence " " 25' out		
	p. poles " " 25' out		
435+20	bridge 5' C.M.P. CULV. CONC & stone headwalls	13' out.	
437+47	" (2) 4'x4' conc. openings to haul 11/ton		

DEC. 2, 1941
 PS. BARKER.
 CLEAR-WARM.

TANGENT ALONG MISSION AVE.

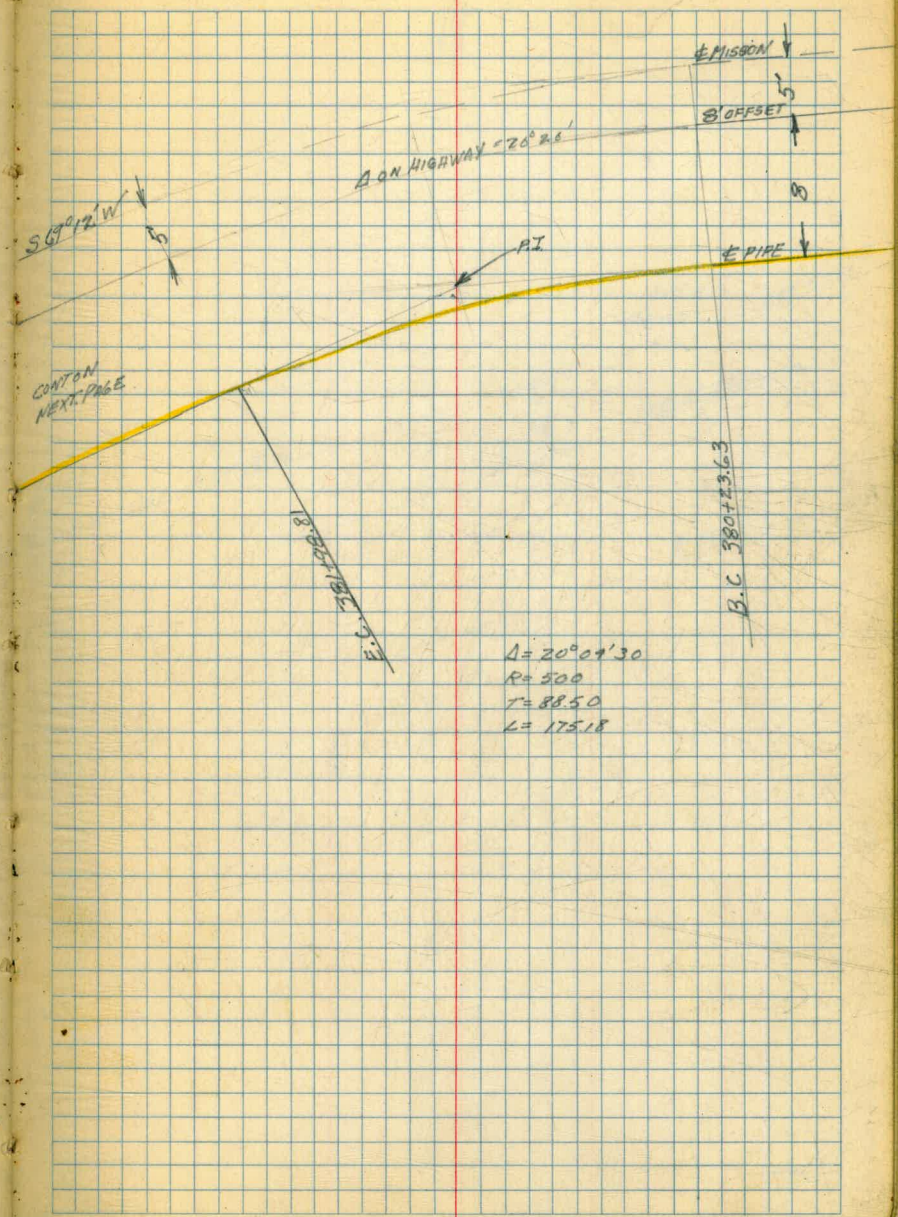


STA	DISCRIPTION	DIST.
442+00	15' driveway	
448+80	17' driveway	33' to TRAN. LINE
449+75	p. pole	22'
449+90	anchor	22'
451+35	20' drive to Gallagher res.	
453+25	40' driveway	
453+72	18" C.M.P.	13'
455+00	Beginning embankment.	20'
458+68	" "	17'
461+50	END " "	18'
461+91	18" C.M.P. CULV.	16'
464+00	center of Yard of Future Ser. sta.	
466+60	15' drive	
470+80	20' "	
Fence now 22' over to left of transit line.		



STA	CHORD	Δ	
380+23.63 B.C.		$\Delta = 20^{\circ}04'30''$	
+50	26.37	$1^{\circ}30'40''$	$R = 500.00$
381+00	50	$4^{\circ}22'30''$	$T = 88.50$
+50	50	$7^{\circ}14'20''$	$L = 175.18$
381+98.2	78.81	$14^{\circ}02'15''$	$d/c = 3.438$

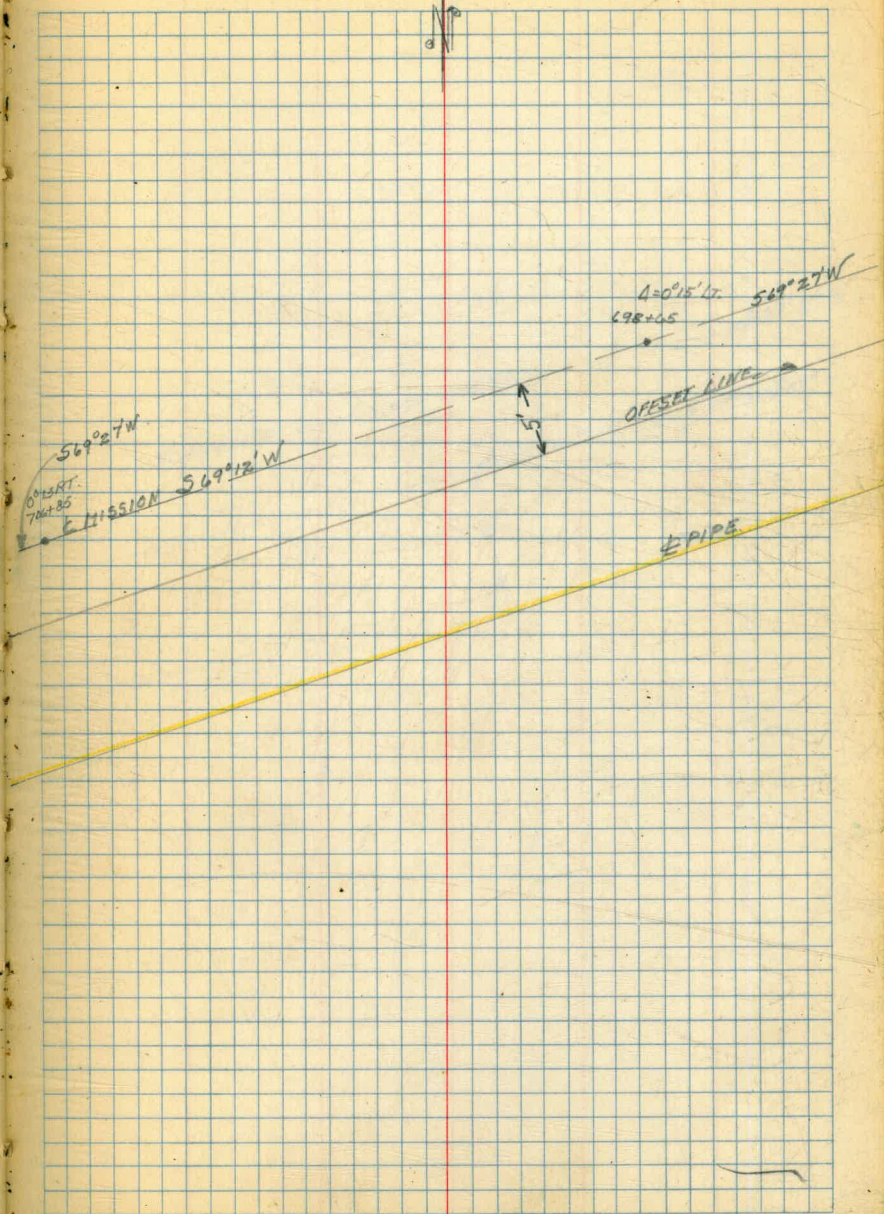
$\Delta = 20^{\circ}04'30''$
 $R = 500$

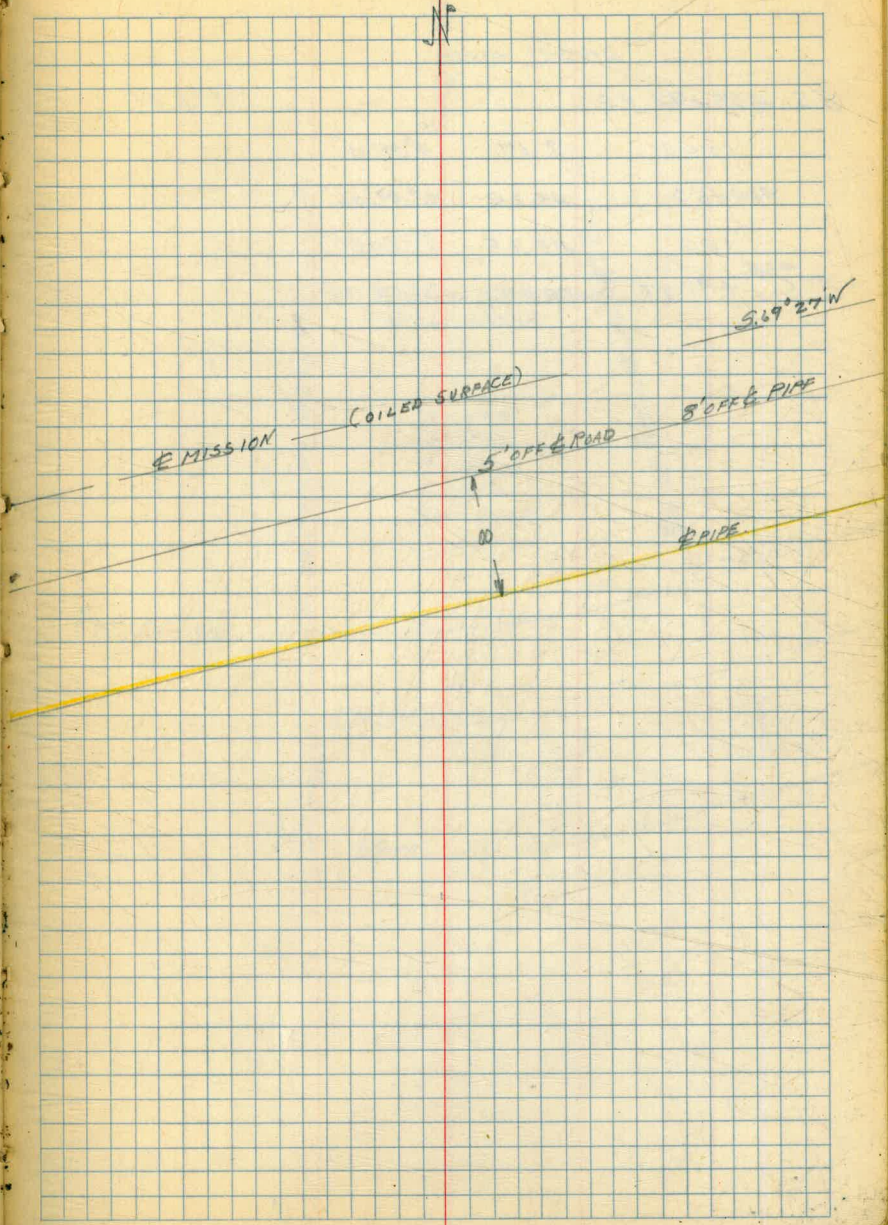


$\Delta = 20^{\circ}04'30''$
 $R = 500$
 $T = 88.50$
 $L = 175.18$

DEC. 31 1991
P.S. BARKER

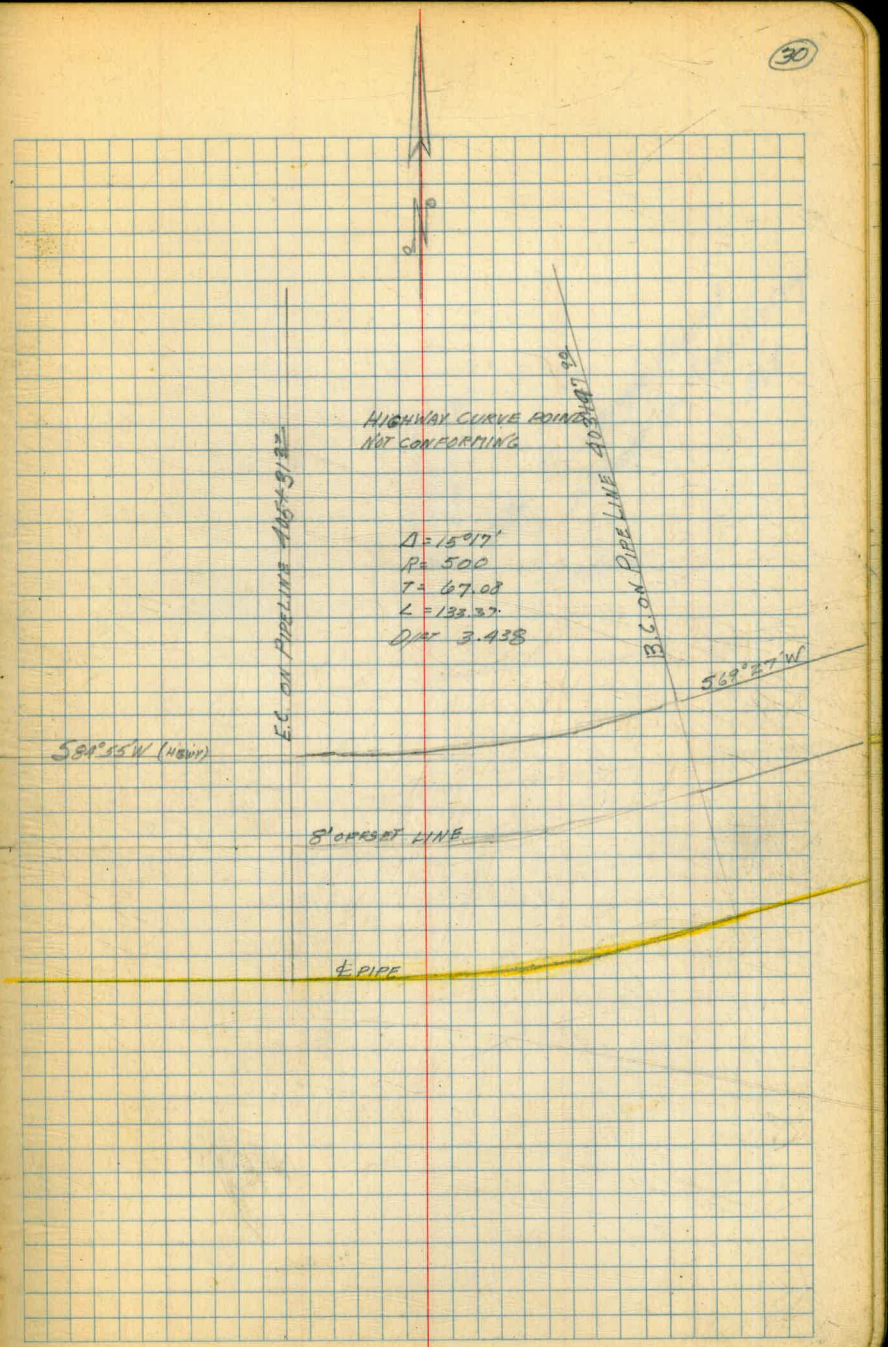
(28)





OFFSET DATUM

P.C. 403+97.90		T=66.01
+00	2.87	0°07'13"
404+50	49.20	2°59'06"
+00	49.20	5°50'59"
E.C. ⁴⁰⁵ +31.27	30.77	7°38'30"



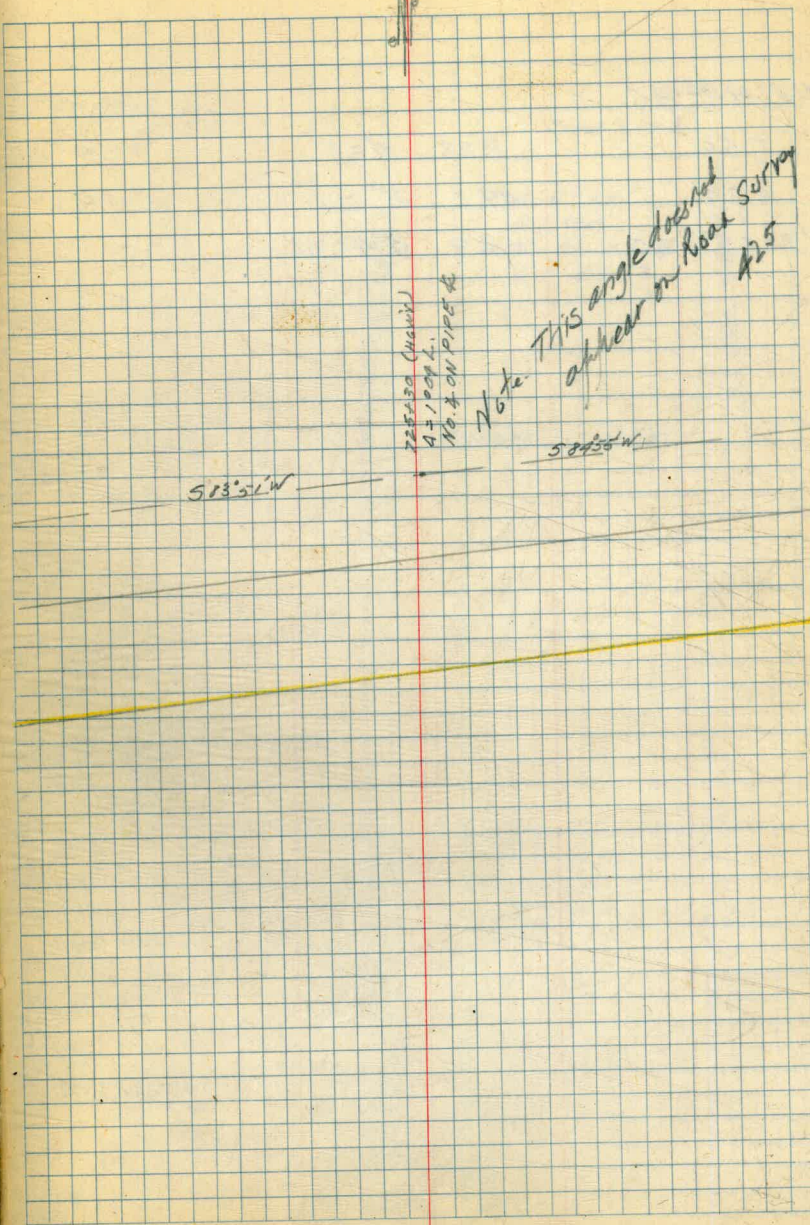


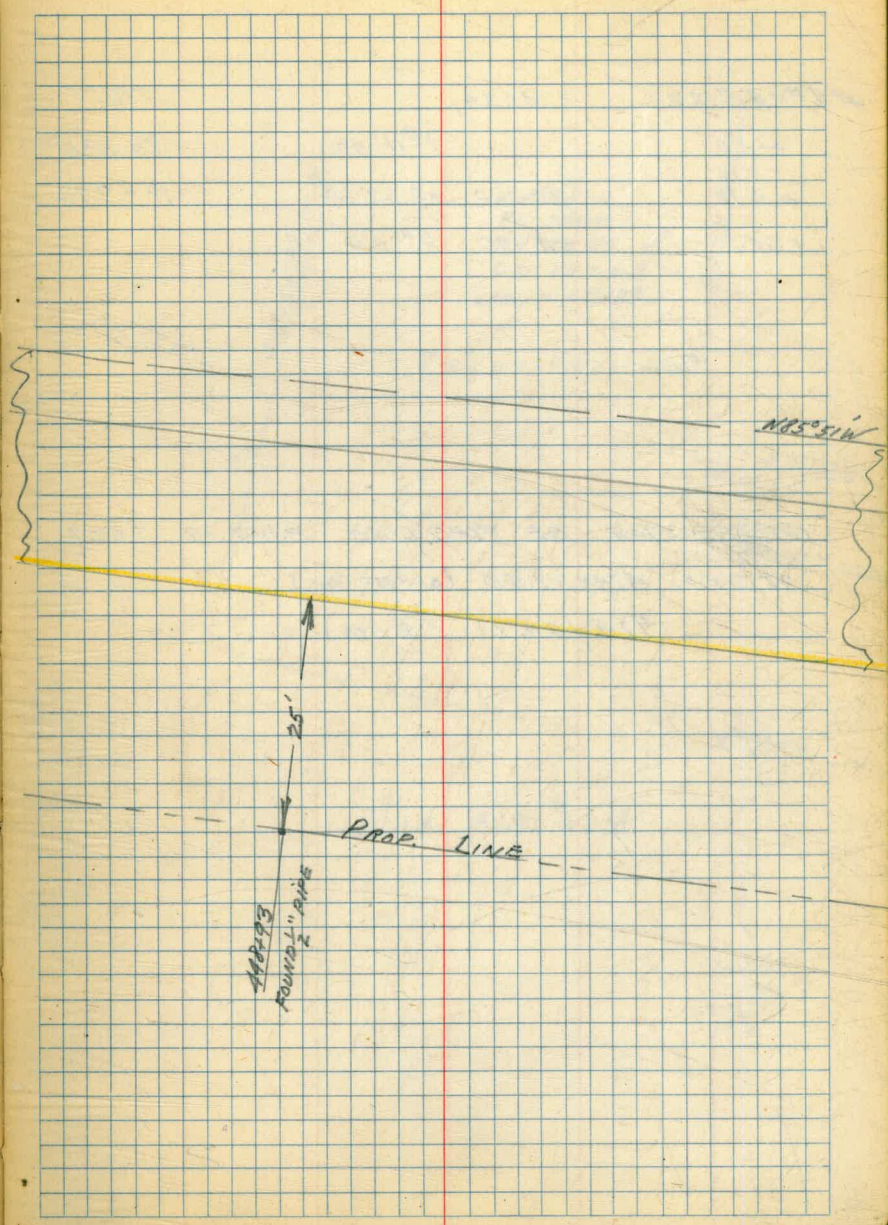
228130 (hand)
A = 100 ft.
No. 4 ON PIPE &

Note This angle does not
appear on boat survey
42.5

5035'W

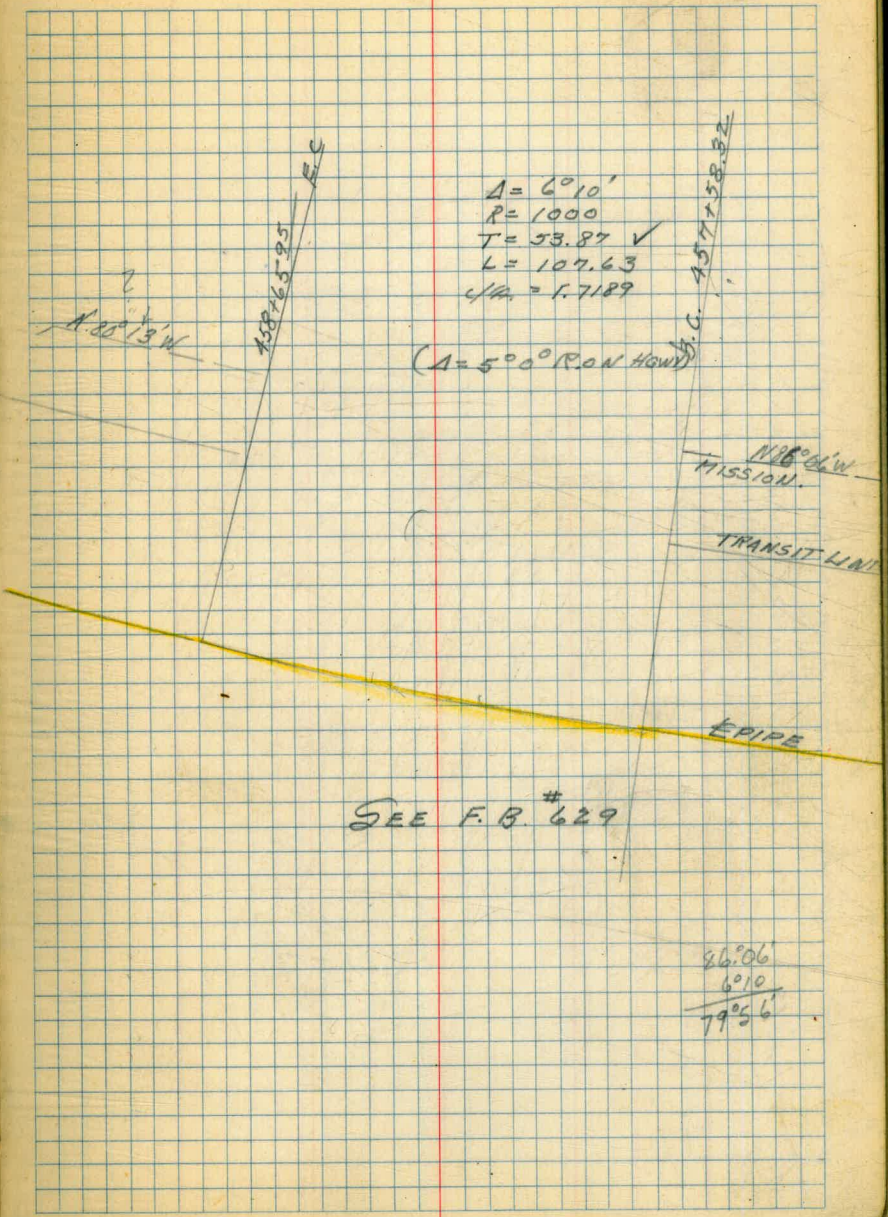
5035'W





Station	Offset	Angle	Notes
457+58.32	41.39		OFFSET
+00		1°11'30"	T=53.44
+50	49.60	2°37'30"	R=992
+65.95	15.80	3°05'	

INTERSECTION OF PIPE LINE PAGE 17 #629
 AT STA. 474+37.50 (OFFSET STA)
 474+09.21 (E STA)

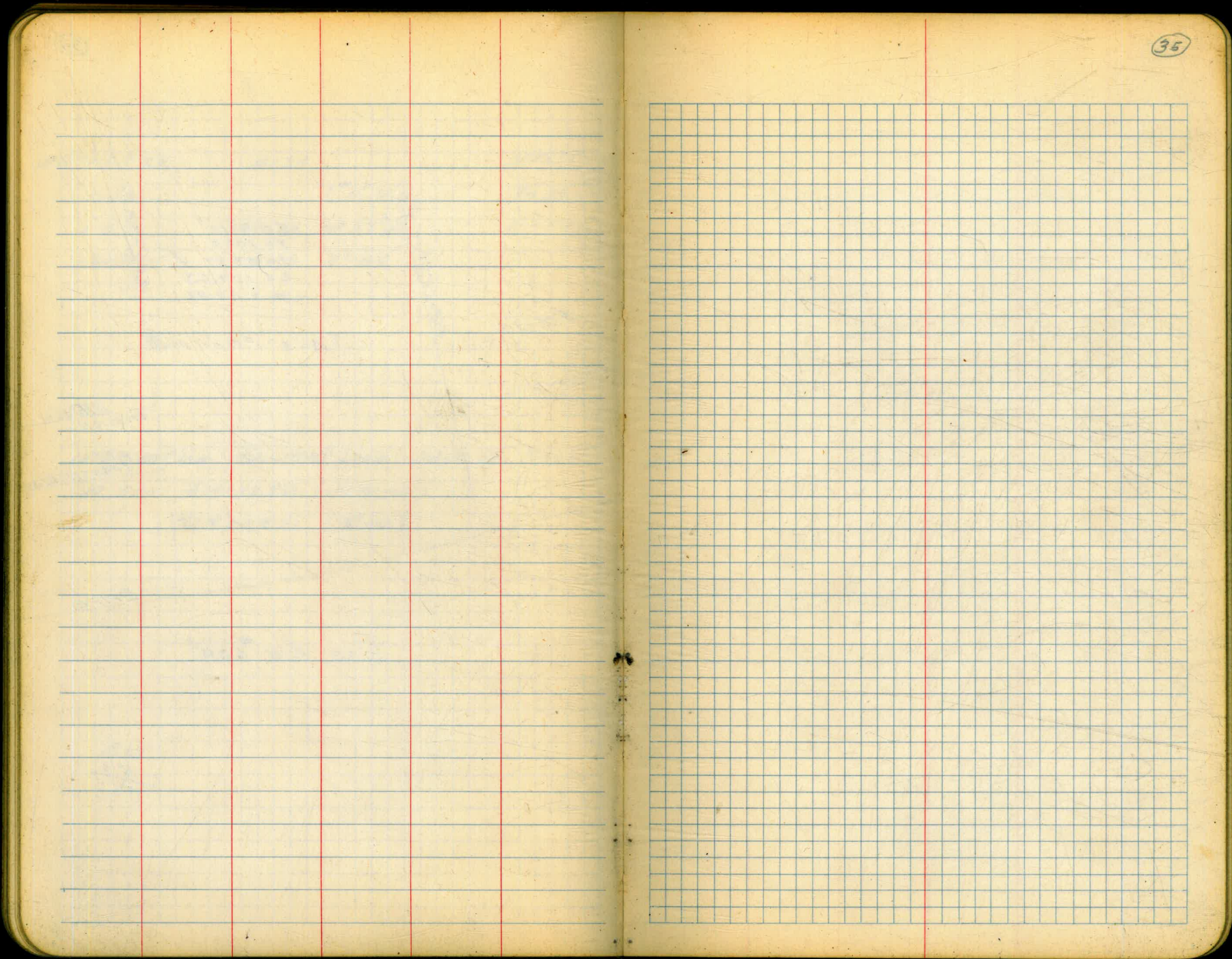


A = 6°10'
 R = 1000
 T = 53.87 ✓
 L = 107.63
 e/A = 1.7189

(A = 5°00' (R.O.N. HOW))

SEE F.B. #629

26.06
 6.10
 79.56



Blank lined page with four vertical red margin lines.

Blank grid page with a vertical red margin line on the left side.

Stadia Survey for Pipe Line From
 P.I. 418+83.58 to Murry Res. via
 Tunnel. Bearing of Back Line
 Taken as $S 83^{\circ} 42' 30'' W$ & Lt
 From Prolongation $47^{\circ} 21' 30''$
 Bearing of Line P.I. to #1 = $S 36^{\circ} 21' W$
 Needle set $S 36^{\circ} 21' W$ Elev. P.I. 309.20.

T.O.	B.S. Dist (Rod)	Vert. Δ	Diff. elev.	F.S. Azimuth	F.S. Dist
P.I. 418+83.58					
#1	460	$-0^{\circ} 57'$	+8.2 7.6	$36^{\circ} 21'$	462.0
#2	570	$-0^{\circ} 40'$	+6.3 6.6	$36^{\circ} 21'$	570
#3	475	$-2^{\circ} 17'$	+18.7 19.0	$36^{\circ} 21'$	475
#4	544	$-0^{\circ} 26'$	+4.1 ✓	$33^{\circ} 48'$	546
#5	485	$-0^{\circ} 58'$	+8.2 ✓	$33^{\circ} 48'$	485
#6	407	$-1^{\circ} 45'$	+12.3 ✓	$16^{\circ} 57'$	406
#7	536	$-3^{\circ} 09'$	+29.6 ✓	$347^{\circ} 14'$	536
#8	459	$-1^{\circ} 39'$	+19.3 ✓	$328^{\circ} 48'$	457

continued on next.

Dec. 9, 1941
 P. Barker & Party
 Lietz #5389

(37)

Cloudy-Rainy.

Barker T
 Whitlock Atlas
 Gentry J
 Barker Jr. Brookhook
 Graepel & Brookhook

Stadia Slide Rule Used
 in determining elev's

Sketch of Alignment Page #41

Vert. Δ	Elev.	Bearing	Remarks
	309.2		P.I. for Pipe Current Road
+10'		$S 36^{\circ} 21' W$	B.C. is 418+41.66
	316.8 317.4		
+0°40'		$S 36^{\circ} 21' W$	
	323.4 323.7		
+2°16'		$S 36^{\circ} 21' W$	
	342.4 ✓		Mag. Bearing $S 33^{\circ} 30' W$
+0°27'		$S 33^{\circ} 48' W$	
	346.5 ✓		
+0°58'		$S 33^{\circ} 48' W$	
	354.7 ✓		
+1°44'		$S 16^{\circ} 57' W$	
	367.0 ✓		
+3°10'		$S 12^{\circ} 46' E$	$S 13^{\circ} E$ (needle)
	396.6 ✓		
+1°40'		$S 31^{\circ} 12' E$	$S 31^{\circ} 30' E$
	409.9		

Station	B.S. Dist (Rod)	Vert. Δ	Diff. Elev.	F.S. Azim.	F.S. Dist.
#8					
#9	712	-2°00'	+24.9'	340°54'	714
#10	497	-2°37'	+22.5'	348°27'	497
#11	418	-2°49'	+20.6'	318°30'	416
#12	541	-7°11'	+67.4'	1053'	543
#13	591	-8°13'	+89.8'	359°51'	594

From Sta #13 this same line was extended to a point directly in line with the power pole line. The Δ was turned: interior rt 52°36' desired Δ of intersection 95°40' starting at elev 580±. Point #12A was set 132' back from #13 at elev 580±. Δ of 31°54' R: turned & line cont.

#12	458	-4°05'	+32.7'	359°51'	
#12A	276	-20°18'	+90.5'	31°45'	278
#13A	153	-12°22'	+32.5'	31°45'	157
#14					

cont. next page

Vert. Δ	Elev.	Bearing	Remarks.
	407.9 ✓		
+2°01'		S 19°06' E	S 18°45' E (needle)
	439.8 ✓		
+2°37'		S 11°33' E	S 11°30' E (needle)
	457.3 ✓		
+2°50'		S 41°30' E	S 42° E
	477.9 ✓		
+7°13'		S 1°53' W	205' to canyon level with #11 #12 in nest of rocks,
	545.3 ✓		
+8°15'		S 0°09' E	South (needle)
	629.1 ✓		
	545.3		
No		S 0°09' E	
	578.0 ✓		
+20°16'		S 31°45' W	
	668.5 ✓		
+12°30'		" "	
	701.0 ✓		Under Pole line Δ of 95°36' ✓ ed.

#	B.S. Dist	±-Vert	DIFF Elev	Azimuth	F.S. Dist
# 14	1035	-11°30'	+202.2	31°45'	1038
# 15	360	-7°30'	+46.5	31°45'	357
# 16	750	-0°04'	---	" "	750
# 17	275	+7°23'	-21.0	" "	278
# 18	550	Not Recorded	-106.0	" "	550
# 19	720	+6°26'	^{80.2} -79.2	" "	720
# 20	215	-5°16'	+19.6	" "	217
# 21	518	-0°56'	^{8.4} +8.1	" "	518
# 22	700	+3°19'	-40.4	" "	700
# 23	690	+1°52'	-22.5	" "	690
# 24	690	+3°08'	-37.7	" "	690
# 25	782	2°01'	-27.3	" "	782
# 26					

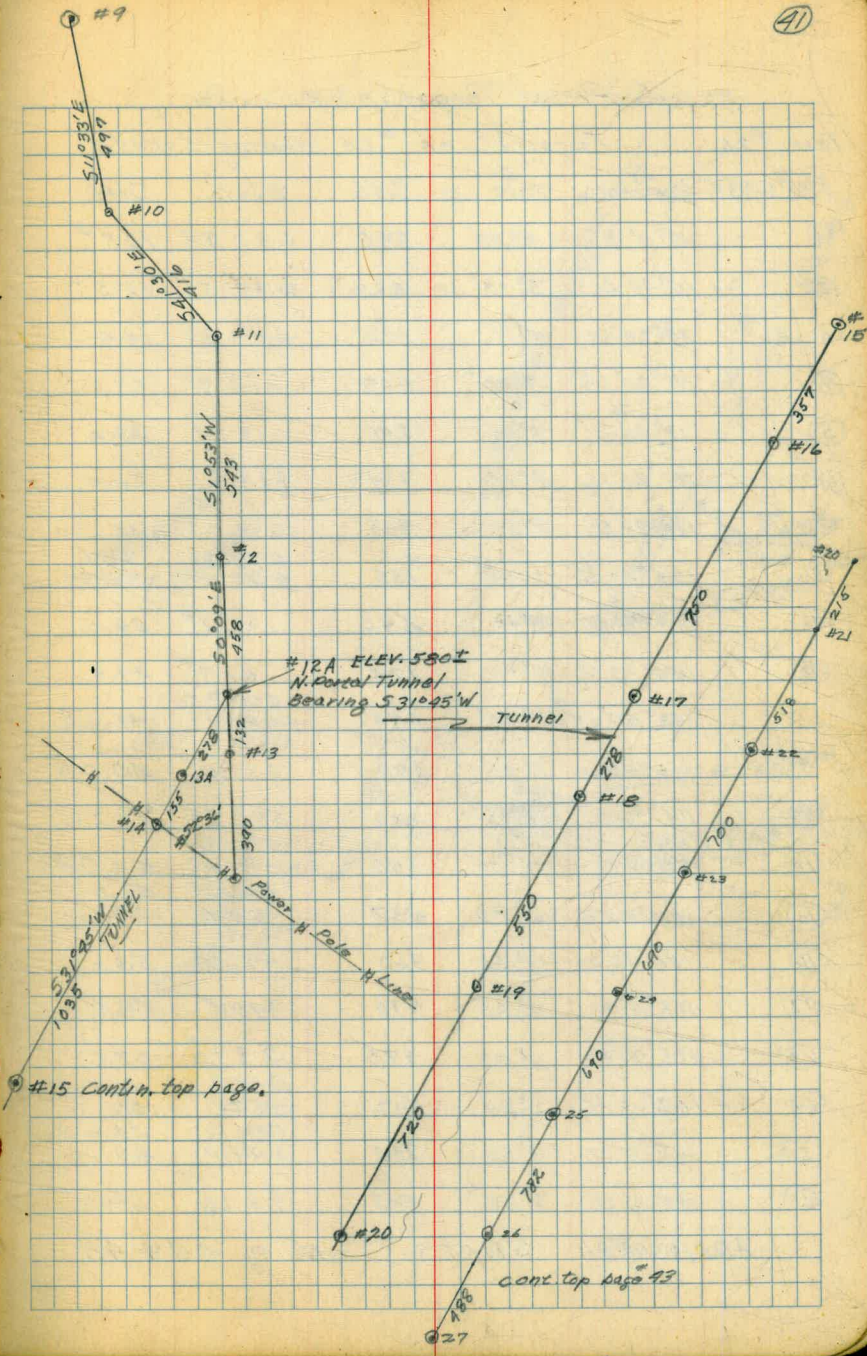
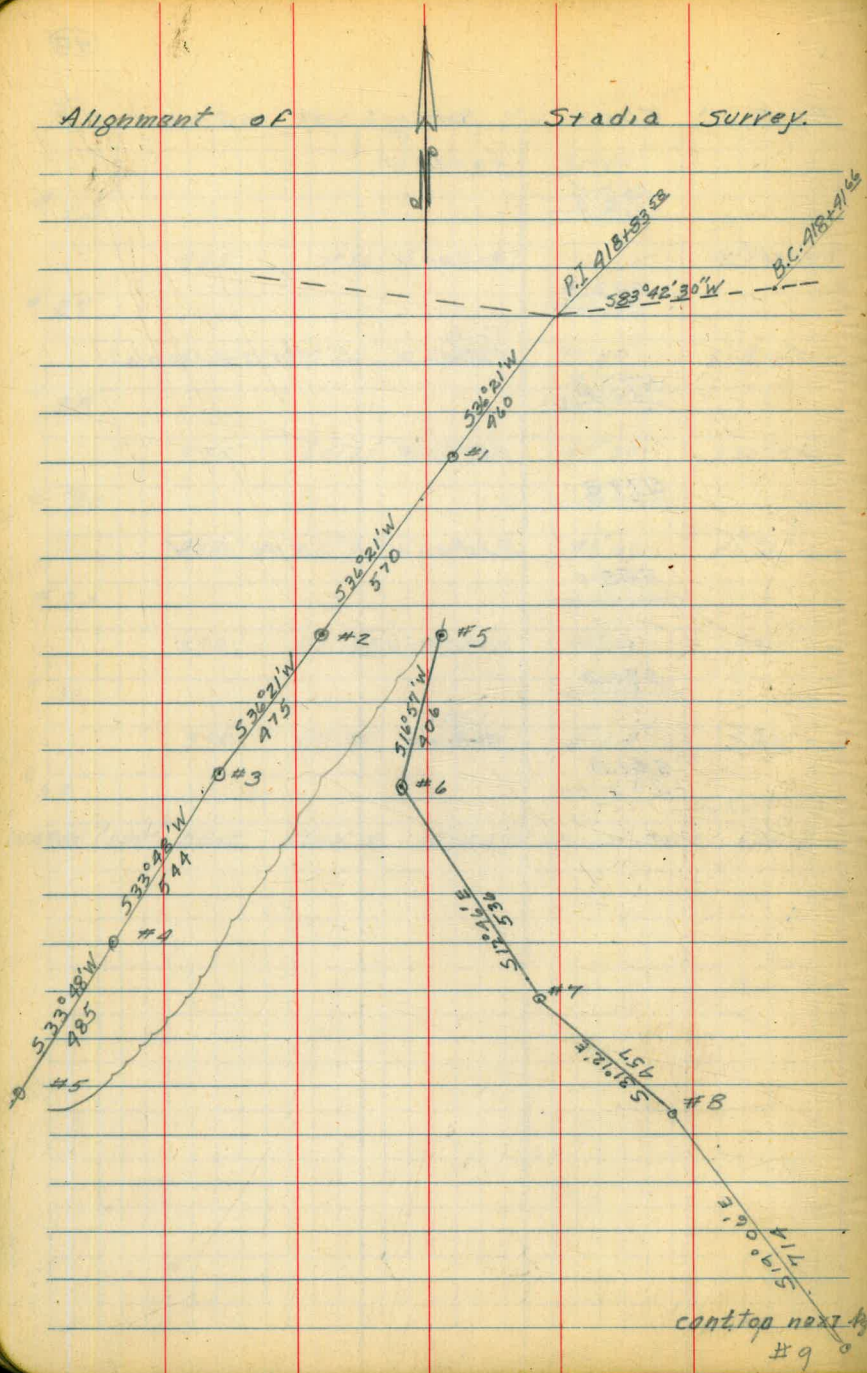
± + F.S.	Flay	Bearing	Remarks
	701.0		Under p. pole line 45°36'
+11°25'		S31°45'W	
	903.2		
+7°28'		S31°45'W	
	947.7		
Level		" "	
	949.7		
-4°57'		" "	
	928.7		
-11°18'		" "	
	822.7		
-6°24'		" "	
	742.5 743.5		
+5°14'		" "	Line passes over hill; + reading
	762.1		
	763.7		
+0°52'		" "	
	770.5		
	771.2		
-3°17'		" "	
	730.1		
	730.8		
-1°53'		" "	
	707.6		
	708.3		
-3°10'		" "	
	669.9		
	670.6		
-2°0'		" "	
	642.6		
	643.9		

	B.S. Dist.	Vert. \pm	Diff. in Elev.	Azim.	F.S. Dist.
				31°45'	
# 26	485	7°10'	60.3 ✓	" "	488
# 27	615	0°25'	4.5 ✓ 5.6	97°04'	613
# 28	875	Level	—	97°09'	870
# 29	860	10°35'	-8.8 ✓	42°06'	862
# 30	637	+1°31'	-17.0 ✓	42°06'	635
# 31	990	+0°35'	10.1 ✓ -9.5	0°14'	990
# 32					107.0 \pm -6°30'
water level shot elev. at 10:00 A.M. Dec. 12, 1941 = 530.1					

F.S. \pm	Elev.	Bearing	Remarks
	642.5 642.5	S31°45'W	
-7°08'	582.3 582.3	S31°45'W	
-0°31'	577.8 577.8	N82°56'W	N89°15'W (wood la.)
Level	577.8 577.8	N82°56'W	
-0°36'	569.0 569.0	S42°06'W	S40°30'W
-1°34'	552.0 552.0	S42°06'W	
-0°33'	541.3 541.3	S0°14'W	
	542.1 542.1		

Alignment of

Stadia Survey.

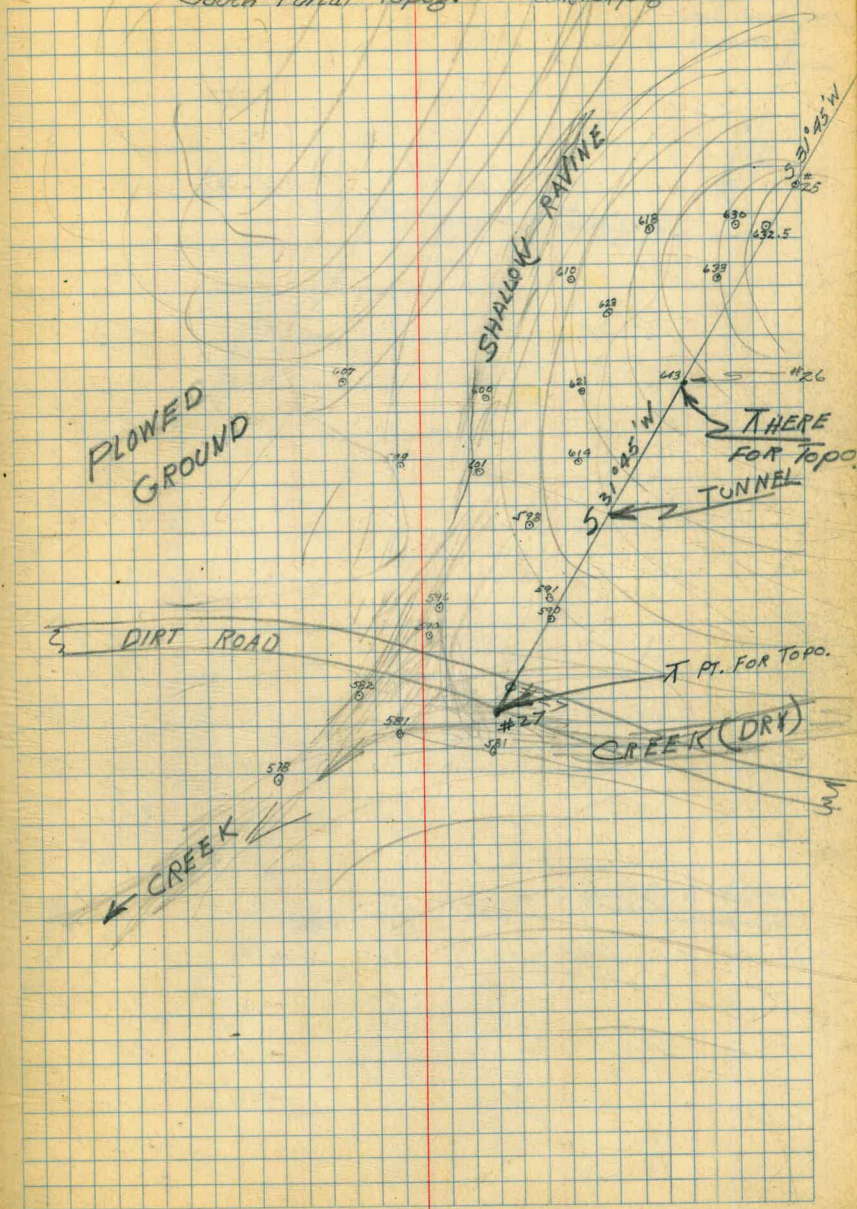


S. Portal Topography

TRAN. #26	Foresight on #25 Bearing $531^{\circ}45'W$				
Elev 643	Horizontal	Vert - \pm	Dist.	Elev.	DIFF.
①	$0^{\circ}0'$	$2^{\circ}30'$	240	632.5	10.5
②	$10^{\circ}40'Lt$	$3^{\circ}13'$	222	630.5	12.5
③	$10^{\circ}20'Lt$	$4^{\circ}10'$	145	633.0	10.0
④	$41^{\circ}20'Lt$	$7^{\circ}00'$	207	618.0	25.0
⑤	$77^{\circ}30'Lt$	$9^{\circ}45'$	200	610.0	33.0
⑥	$77^{\circ}20'Lt$	$8^{\circ}30'$	134	623.0	20.0
⑦	$125^{\circ}40'Lt$	$9^{\circ}30'$	265	600.0	43.0
⑧	$125^{\circ}00'Lt$	$9^{\circ}00'$	135	622.2 620.5	20.8 22.5
⑨	$119^{\circ}40'Lt$	$4^{\circ}40'$	450	607	36.0
⑩	$154^{\circ}30'Lt$	$10^{\circ}00'$	172	614	29.0
⑪	$143^{\circ}40'Lt$	$8^{\circ}20'$	295	600.7 601	42.3
⑫	$135^{\circ}40'Lt$	$6^{\circ}30'$	390	599.0	44.0
⑬	$161^{\circ}40'L$	$9^{\circ}15'$	280	598.5	44.51
⑭	$177^{\circ}20'L$	$9^{\circ}00'$	340	590.5	52.5
⑮	$154^{\circ}20'Lt$	$6^{\circ}30'$	437	594	40.0
⑯	$180^{\circ}40'Lt$	$8^{\circ}30'$	360	596	47
⑰	$163^{\circ}10'Lt$	$6^{\circ}30'$	470	590.0	53.0
⑱	$176^{\circ}40'Lt$	$6^{\circ}00'$	595	581.0	62.0
⑲	$162^{\circ}15'Lt$	$5^{\circ}50'$	592	583.0	60.0
⑳	$165^{\circ}10'Lt$	$4^{\circ}50'$	750	582 580.0	61 63.0
㉑	$182^{\circ}10'Lt$	$6^{\circ}35'$	545	581.0	62.0

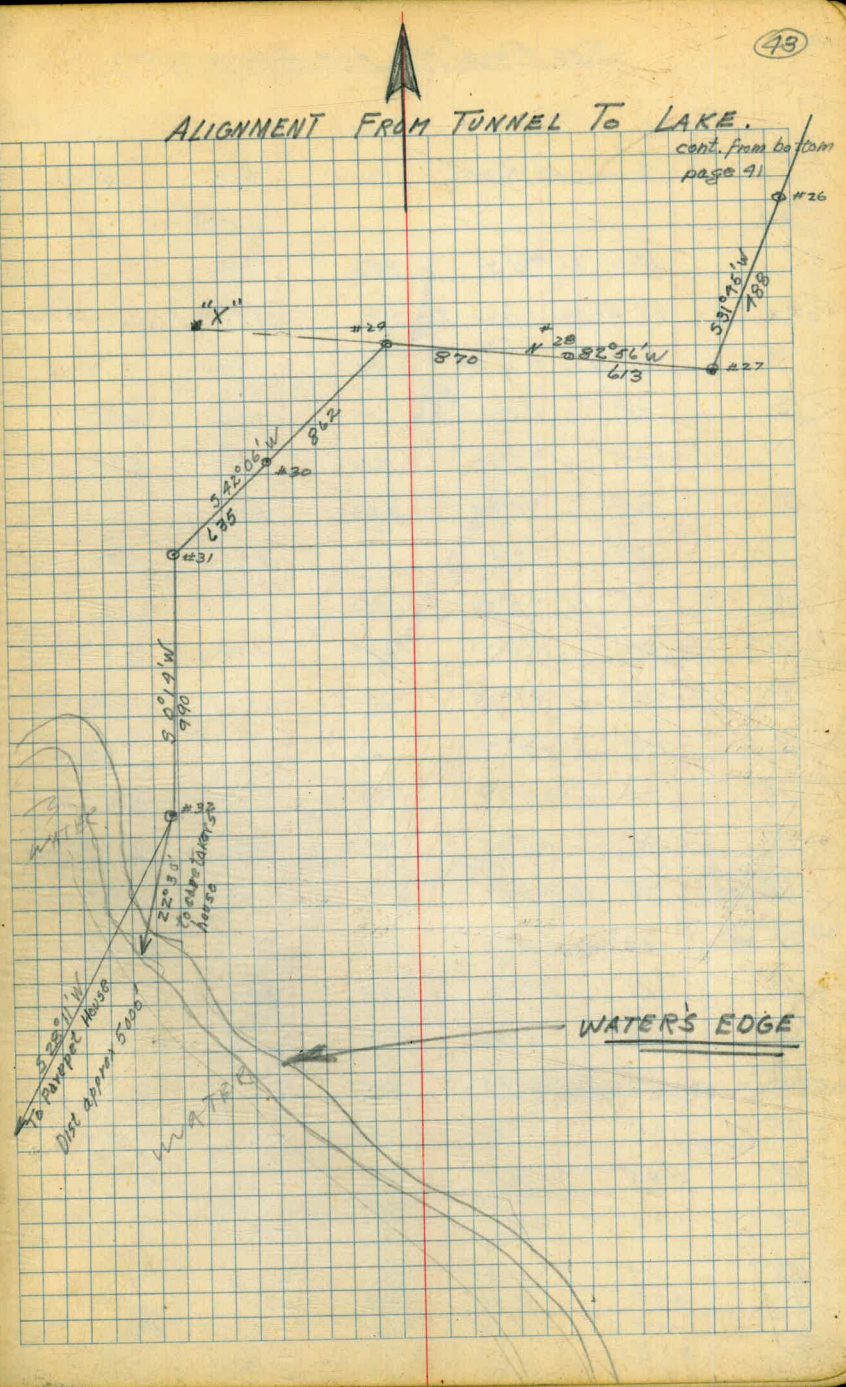
ADDITIONAL SHOTS ON Pg. 44 & 45

South Portal Topog. cont. on page 44



ALIGNMENT FROM TUNNEL TO LAKE.

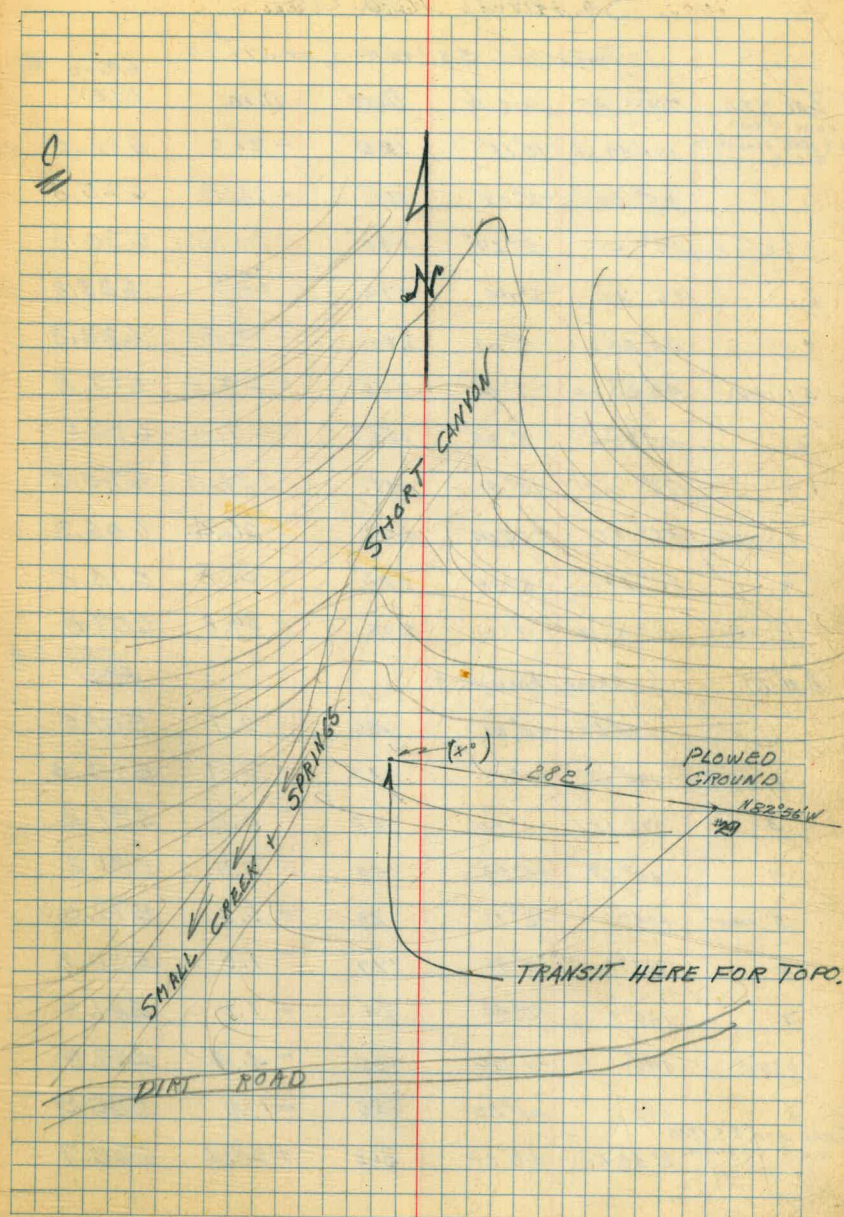
cont. from bottom page 41



SEE PAGE #51 FOR ADDITIONAL TOPO.

Topog. Possible Portal South #2

Lat	Horizontal	Vert	Dist.	DIFF	ELEV.
#29				577.8	
	0°00' Lt.	-0°51'	282	4.2	
Tot x & s 4 from line x-29 573.6 FORESIGHT ON #29					
①	20°00' Lt	+2°00'	70'	+2.45	576.1
②	20° "	+2°00'	204'	+9.14	580.7
③	20° "	+2°00'	120'	+4.19	577.8
④	20° "	+2°04'	242'	+8.8	582.4
⑤	65° "	+2°49'	52'	+2.6	576.2
⑥	65° Lt.	+2°33'	142'	+6.4	580.0
⑦	65° "	+2°31'	98'	+4.3	577.9
⑧	65° "	+2°38'	194'	+8.9	582.5
⑨	120° "	+2°39'	41'	+1.8	575.4
⑩	120° "	+3°17'	136'	+7.8	581.4
⑪	120° "	+2°35'	108'	+4.9	578.5
⑫	120° Lt.	+3°06'	197'	+10.3	583.9
⑬	155° "	+2°00'	49'	+1.7	575.3
⑭	155° "	+0°18'	138'	+0.7	574.3
⑮	155° "	+0°22'	100'	+0.6	574.2
⑯	155° "	+0°33'	202'	+1.9	575.5
⑰	193° "	-1°20'	48'	-1.1	572.5
⑱	195° "	-3°15'	135'	-7.7	565.9
⑲	195° "	+2°00'	90'	-3.1	570.5
⑳	195° "	-0°55'	206'	-3.2	570.4
㉑	218° "	-3°54'	151'	-10.1	563.5
㉒	232°20'	-4°13'	185'	-13.0	560.0
㉓	234°30'	-3°23'	241'	-14.4	559.2
㉔	247°40'	-2°25'	265'	-15.8	557.8



SO. PORTAL TOPO. CONT.

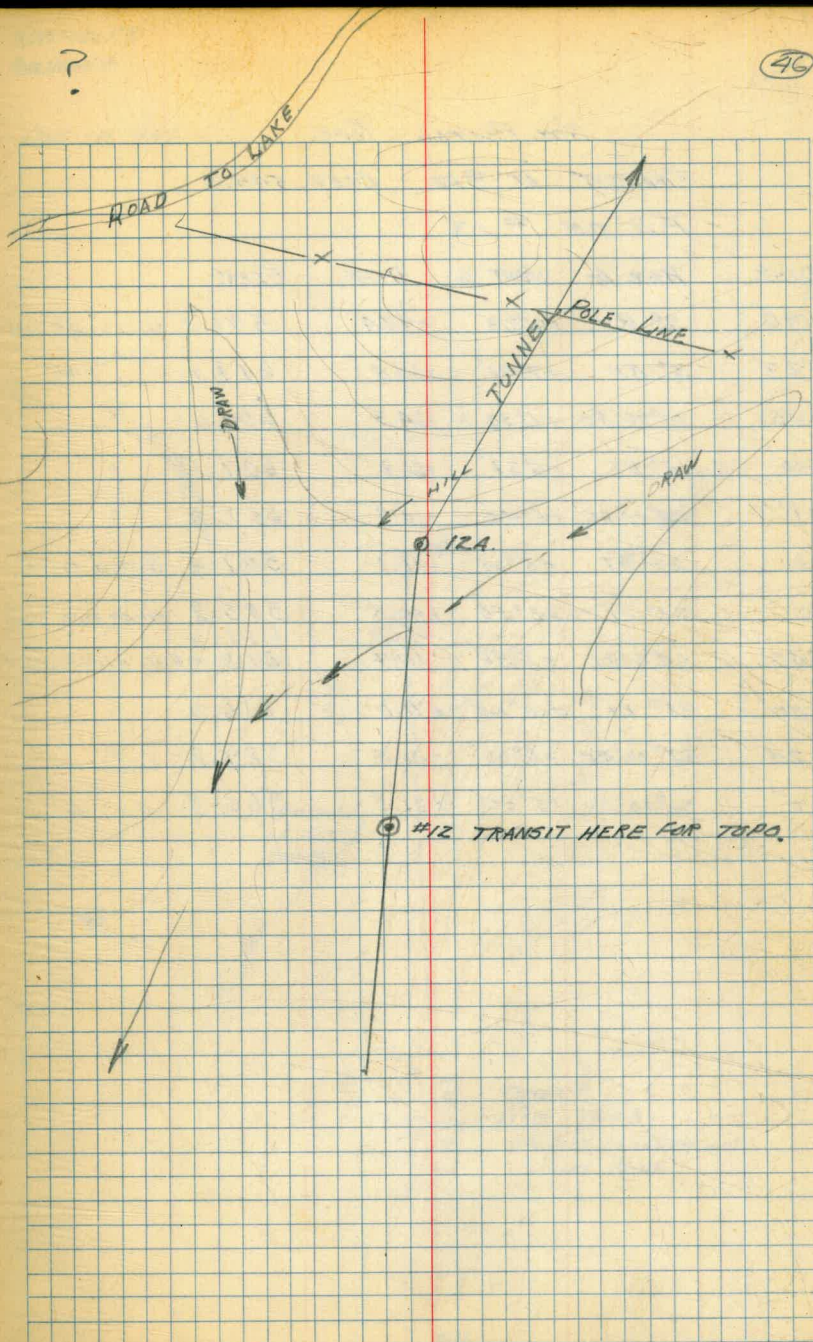
Foresight $53^{\circ}45'W$ (on STA 25)

Lat #26	Horiz. α	Vert. α	Dist.	Diff.	ELEV.
conc. L' mon. L.S. 1880 copper; N.O.G.	$171^{\circ}49'LT$	$-10^{\circ}18'$	125'	-22.0	620.6
1	$25^{\circ}LT$	$-6^{\circ}02'$	161'	-16.8	625.8
2 (Bottom Creek)	$25^{\circ}LT$	$-5^{\circ}29'$	230'	-21.8	620.8
3	$26^{\circ}LT$	$-2^{\circ}49'$	279'	-13.8	628.8
4	$40^{\circ}30'LT$	$-1^{\circ}04'$	280'	-19.8	622.8
5 (creek)	$40^{\circ}30'LT$	$-7^{\circ}00'$	206'	-24.8	617.8
6	$40^{\circ}30'LT$	$-2^{\circ}35'$	155'	-7.0	635.6
7	$85^{\circ}LT$	$-8^{\circ}41'$	198'	-22.0	620.6
8, creek	$86^{\circ}LT$	$-10^{\circ}00'$	209'	-36.4	606.2
9	$85^{\circ}LT$	$-5^{\circ}38'$	288'	-27.8	614.8
10, creek	$103^{\circ}30'LT$	$-9^{\circ}30'$	235'	-34.8	607.8
Lat #27	(same Foresight)				582.30 582
1	$170^{\circ}LT$	$-0^{\circ}21'$	46'	-0.7	581.6
2 creek bed	$170^{\circ}LT$	$-2^{\circ}18'$	72'	-2.9	579.4
3	$170^{\circ}LT$	$-0^{\circ}30'$	102'	-0.9	581.4
4	$155^{\circ}LT$	$-0^{\circ}23'$	95'	-0.7	581.6
5 creek	155°	$-2^{\circ}30'$	80'	-3.3	579.0
6	155°	$-0^{\circ}40'$	127'	-1.5	580.8
7	140°	$-0^{\circ}40'$	84'	-1.0	581.3
8 creek	140°	$-1^{\circ}55'$	130'	-4.4	577.9
9	140°	$-0^{\circ}30'$	155'	-1.4	580.9
L' conc. mon. L.S. 1880 N.O.G. copper	$20^{\circ}50'LT$	$+6^{\circ}04'$	363'	+38.4	620.7

642.6
12.8
22.8

ADDITIONAL TOPO See #42

Lat #12	North Portal Topog. Tunnel	Foresight on #13			
Horiz. \angle	Vert. \angle	DIST.	DIFF.	ELEV	
1	0°0'	+9°01'	160'	+32.1	577.4
2	4°50' LT	+2°44'	441'	+21.0	566.3
3	0°26' RT	+2°19'	423'	+17.1	562.4
4	10°15' LT	+2°23'	450'	+18.6	563.9
5	10°48' LT	+3°36'	478'	+30.0	575.3
6	11°31' L	+4°46'	518'	+42.0	587.3
7	6°43' RT	+2°33'	423'	+18.8	564.1
8	16°52' LT	+6°17'	463'	+50.6	595.9
9	11°0' RT	+2°13'	423'	+16.4	561.7
10	13°34' RT	+3°01'	402'	+21.2	566.5
11	15°09' LT	+2°50'	443'	+21.9	567.2
12	14°14' LT	+1°11'	339'	+7.0	552.3
13	23° RT	+3°24'	411'	+24.3	569.6
14	6°53' LT	-1°03'	358'	-6.6	538.7
15 (mid. both draws)	2°41' LT	-0°56'	341'	-5.6	539.7
16	15°46' RT	+1°07'	350'	+6.8	552.1
17	2°04' RT	+0°30'	373'	+3.3	548.6
18	14°46' RT	-0°06'	271'	-0.2	545.1
19	10°37' LT	-5°00'	240'	-20.9	524.4
20	4°28' RT	-1°26'	278'	-6.8	538.5
21	10°31' LT	-14°02'	102'	-31.5	513.8
22	105° LT	-17°28'	156'	-44.5	500.8
23	127° 26' L	-13°03'	232'	-51.0	494.3



Nov. PARTIAL TOPO.

TRANSIT AT #12 ELEV. 545.3

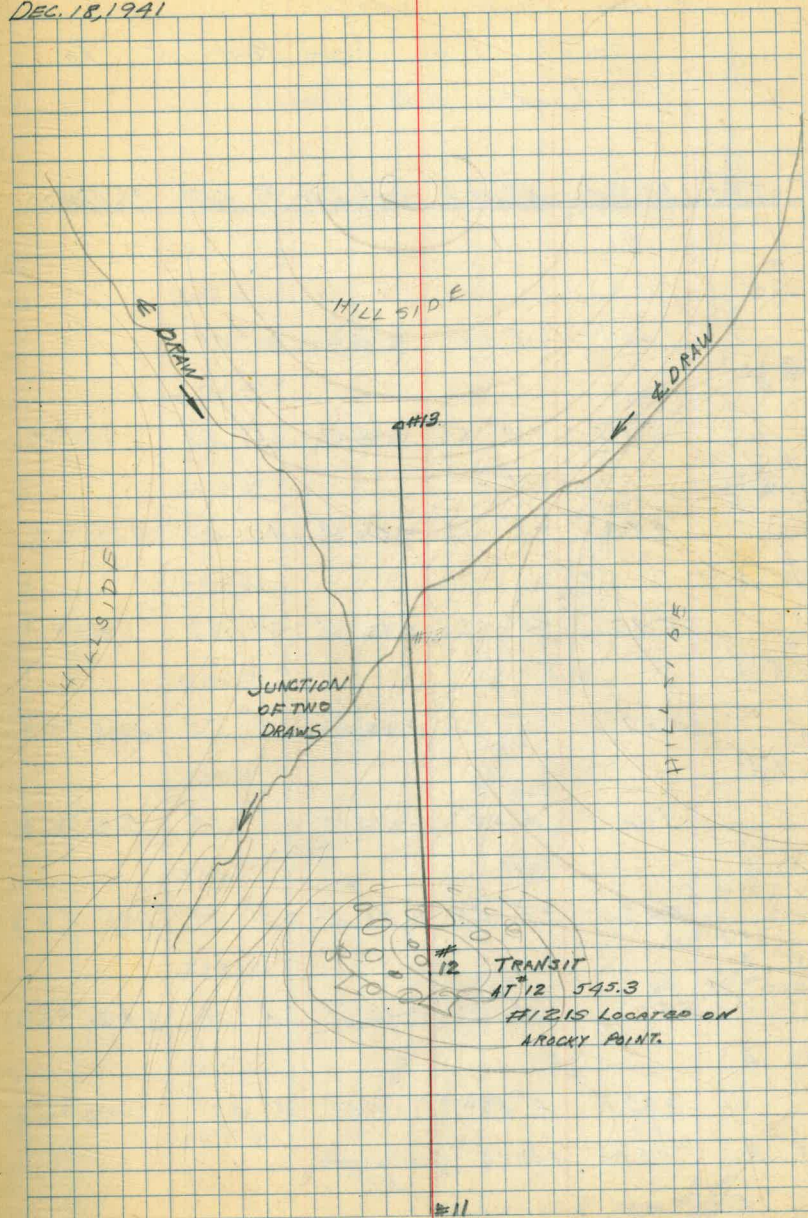
F.S. ON #13

DIST.	HOR. &	VERT &	DIFF	ELEV.	
190'	2° RT.	+5°28'	+46.4	591.7	HILLSIDE WEST
543'	5° RT	+7°01'	+65.8	611.1	OF #12A
545'	10°00' RT.	+6°50'	+64.3	609.6	"
540'	15° RT	+6°37'	+61.8	607.1	"
561'	20°00' RT.	+6°42'	+64.9	610.2	"
533'	23° RT	+5°00'	+46.1	591.4	BOTTOM DRAW
500'	28° RT	+5°50'	+50.5	595.8	OTHER SIDE DRAW
440'	34°0' RT	+8°42'	+67.7	611.3	613.0 ON W. HILLSIDE
400'	38° RT	+10°25'	+71.0	616.3	"
329'	37°30' RT	+8°00'	+44.5	589.8	"
210'	36°30' RT	+5°55'	+21.5	566.8	"

WHITLOCK &
MELHORN &

DEC. 18, 1941

(47)



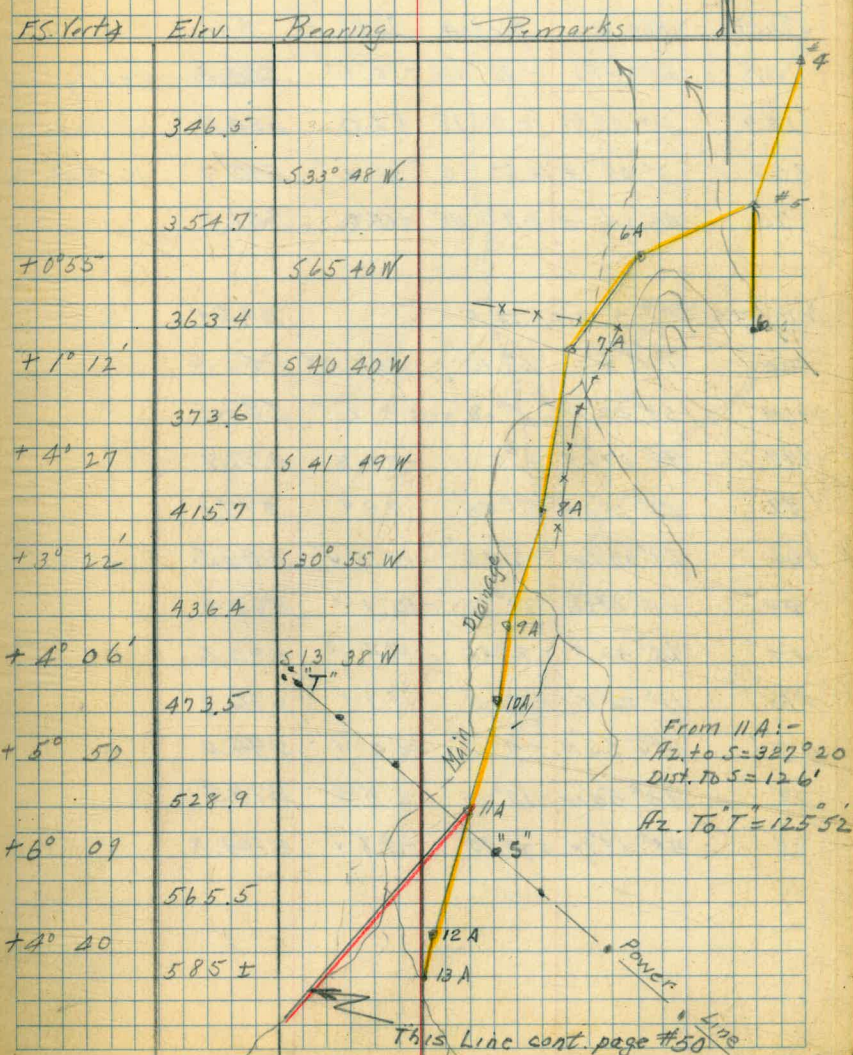
Stadia Survey Cont'd.

Branch Line from Point #5 to
Locate NW Portal.

Point Sta	BS Dist.	*Vert*	Diff Elev	FS Azim.	FS Dist.
# 4					
	485	-0° 58'	+ 8.2	33° 48'	
# 5	545	-0° 57'	+ 8.7	65° 40'	546
# 6A	483	-1° 12'	+ 10.2	40° 40'	485
# 7A	540	-4° 28'	+ 42.1	21° 49'	540
# 8A	360	-3° 26'	+ 20.7	30° 55'	361
# 9A	516	-4° 05'	+ 37.1	13° 38'	518
10 A	512	-5° 50'	+ 55.4	23° 14'	548
11 A	341	-6° 10'	+ 36.6	23° 14'	342
12 A	240	4° 50'	+ 19.5	9° 47'	242°
13 A	5ft above gully.				

Dec. 13, '15
F.S. Barker Sr.
F.S. Barker Jr.
A. Gomez.
G. Foster.

(48)



2ND. N. PORTAL.

Stats for Topog at Portal

T at 12 A. FS. on 13A 565.5

45 RT + Left for topog.

Dist.	Hor. \angle	Vert \angle	Diff El.	Elev.	
40	60°37' RT	-18°40'	-12.1'	553.4	Gully
109	50°50' RT	+0°18'	+1.0'	564.5	Across Gully
308	3°05' LT	+5°50'	+31.2'	596.7	10' East "
73	49°20' LT	+11°45'	+15.7	581.2	

Tot 13A FS on 12A 585±

200 1°18' LT. -6°10' -21.4' 563.6

119 58°22' LT +1°04' +2.2' 587.2

198 9°07' LT -8°0' -27.3 557.7

82 28°15' LT -5°48' -7.9' 577.1

166 19°02' LT. -6°48' -19.5' 565.5

89' 14°06' LT. -10°32' -16.1' 568.9

92' 12°50' R -2°45' -4.4' 580.6

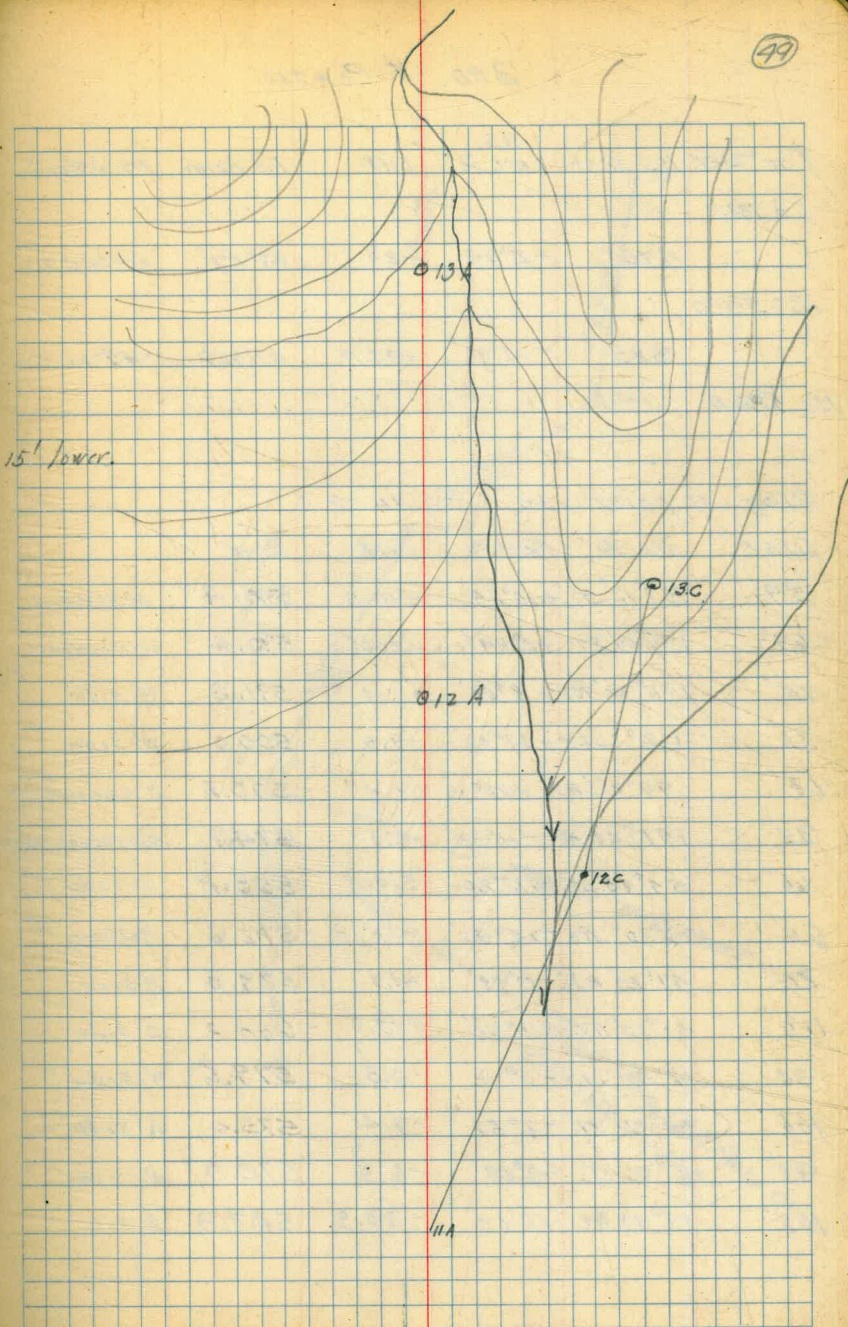
215' 11°20' R -2°10' -8.1' 576.9

57' 46°36' R +9°16' +4.0' 594.0

37' 93°50' LT -10°15' -6.5' 578.5

73' 98°14' LT. +7°40' +9.8' 594.8

99

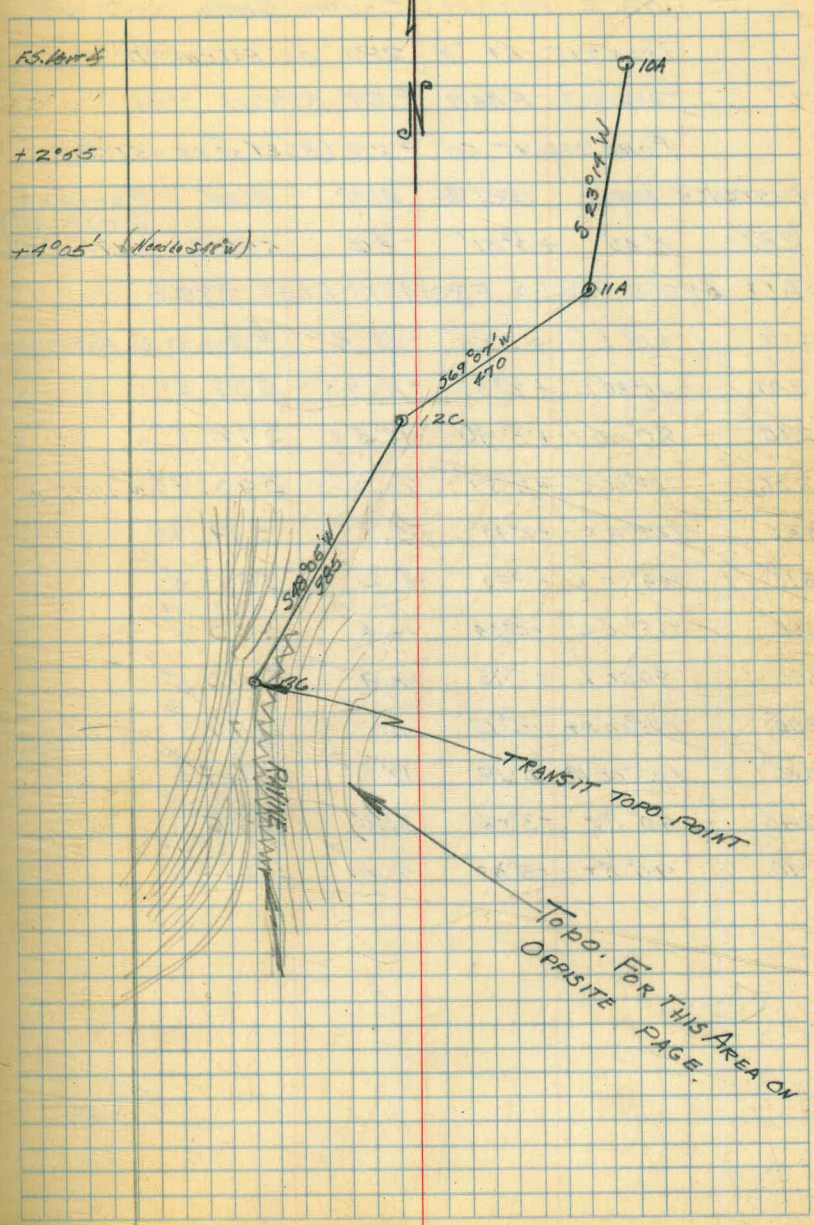


3RD. N. PORTAL

Top. Elev.	B.S. Dist	B.S. Vert. $\frac{1}{2}$	DIFF	F.S. Azim.	F.S. DIST.
11A 528.9			42.1	154°	472
	470	-2°54'	+24.1	69°07'	472
12C 553.0					
	385	-4°06'	+27.4	48°05'	387
13C 580.4					

Topog. at point 13C. F.S. on 12.C

DIST	Hor. $\frac{1}{2}$	Vert. $\frac{1}{2}$	DIFF.	Elev.	
59'	157°42' LT	+10°24'	+10.0	590.4	ON West Side
63'	176°14' RT	+0°39'	LEVEL	590.4	Bottom draw
75'	148°00' RT + 8°50'	+11.4		591.8	E. side
31'	113°20' LT + 19°00'	+9.6		590.0	W. side
68'	99°20' RT + 13°35'	+15.4		595.8	E. side rail
35'	101°20' RT - 10°33'	-6.3		574.1	Bottom of rail
60'	54°45' LT + 13°20'	+13.4		593.8	W. side
56'	16°30' RT - 14°40'	+13.8		576.6	Bottom
80'	47°20' RT - 0°49'	-1.1		579.3	E. side
110'	61°10' RT + 10°30'	+19.9		600.3	E. side
38'	12°50' LT - 1°11'	-0.8		579.6	W. side
108'	30°20' RT - 3°57'	-7.4		573.0	E. side
93'	3°30' LT - 4°05'	-6.5		573.9	W. side
105'	19°00' RT - 10°50'	-32.5		547.9	Bottom



No. 2 Portal (South End.)

TRANSIT AT "X" 282' ON EXTENDED
TANGENT FROM #29 STADIA STA.

FORESIGHT ON #29 (ELEV OF 29 = 577.8)

DISTANCE	HOR. &	VERT &	DIFF.	ELEV.	REMARKS
282	0°00'	+0°51'	-4.2	573.6	TRANSIT AT "X" SIGHT ON "29"
ALL SHOTS TAKEN FROM "X" ELEV 573.6					
317'	20° L	+1°53'	+10.4 ✓	584.0 ✓	ON PLOWED GROUND
291'	46°30' L	+2°50'	+11.9 ✓	585.5 ✓	" " "
290'	80°00' L	+3°40'	+18.5 ✓	592.1 ✓	" " "
320'	103°00' L	+3°37'	+20.3 ✓	593.9 ✓	" " "
340'	123°00' L	+2°40'	+15.8 ✓	589.4 ✓	" " "
315'	144°00' L	+1°30'	+8.2 ✓	581.8 ✓	" " "
280'	165°00' L	+2°04'	+10.2 ✓ 11.4	583.8 ✓ 585.0	" " "
300'	190°00' L	+1°43'	+8.9 ✓	582.5 ✓	" " "
300'	195°20' RT	-0°15'	-1.3 ✓ 3.1	572.3 ✓ 576.7	" " "
280'	123°00' RT	-2°28'	-12.0 ✓	561.6 ✓ 585.6	" " "
245'	90° RT	-3°03'	-13.0 ✓	560.6 ✓ 586.6	" " "
140'	90° RT	-3°03'	-7.4 ✓	566.2 ✓ 581.0	" " "

700

WHITLOCK T
MELHORN #
TOPO. TAKEN DEC. 18, 1941

24" Pipe - Sta. 11+67 19'4"

Top Culv 3.9

± Road 2.5 - Sta 10+50

± Road 2.0

Top Culv. 3.4

24" C.M.P. - Sta 18+12

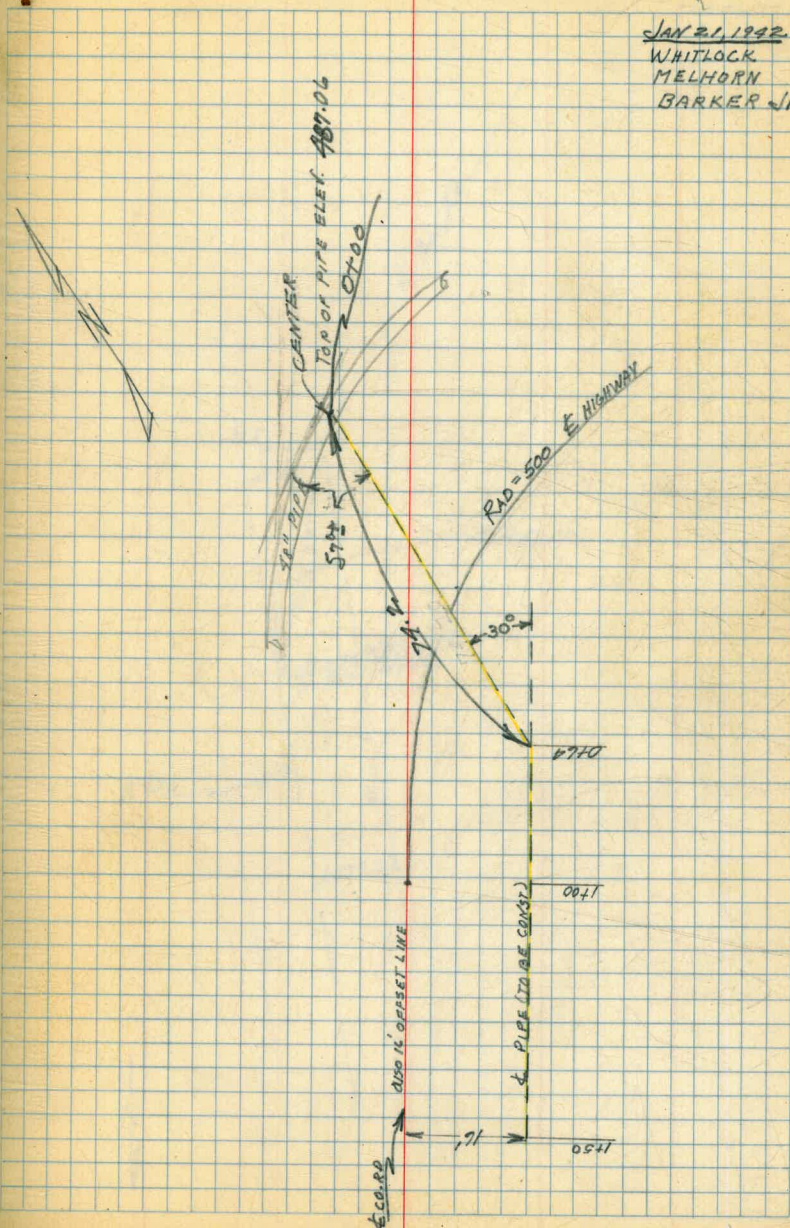
F.L. Culv - 6.2

± Sta 18+00 - 3.5

INTERSECTION AT 0+00

AND 48" EXISTING PIPE LINE AT EL MONTE

JAN 21, 1942
 WHITLOCK
 MELHORN
 BARKER JR



439.83 (A)
~~489.83~~ B.M. - U.S.G.S

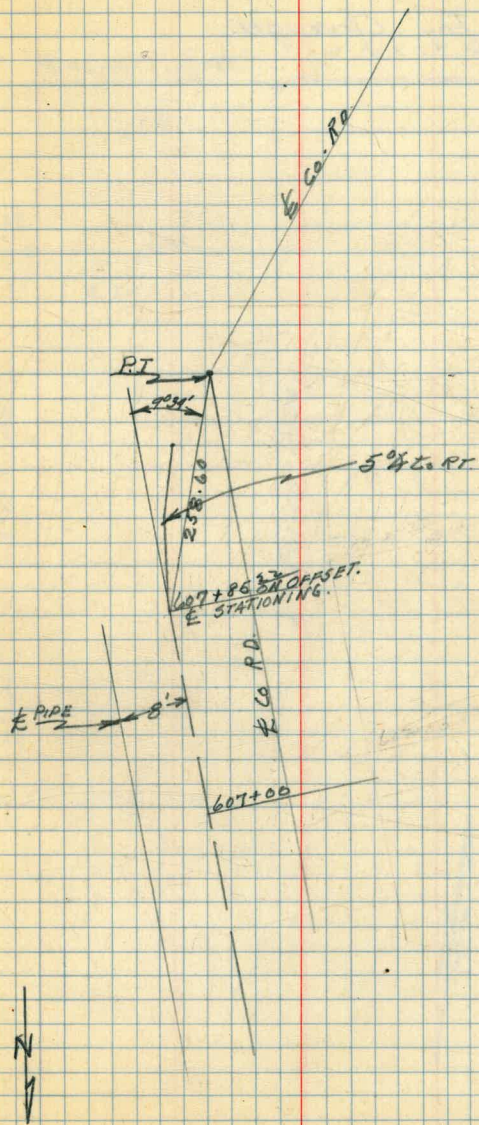
75.43 445.76
 495.26

TOP. PIPE 0+00 8.20 437.06 (A)
 487.06

437.06
 - 612
 430.94

PIPE LINE Tie To Co. Rd. P.T. STA

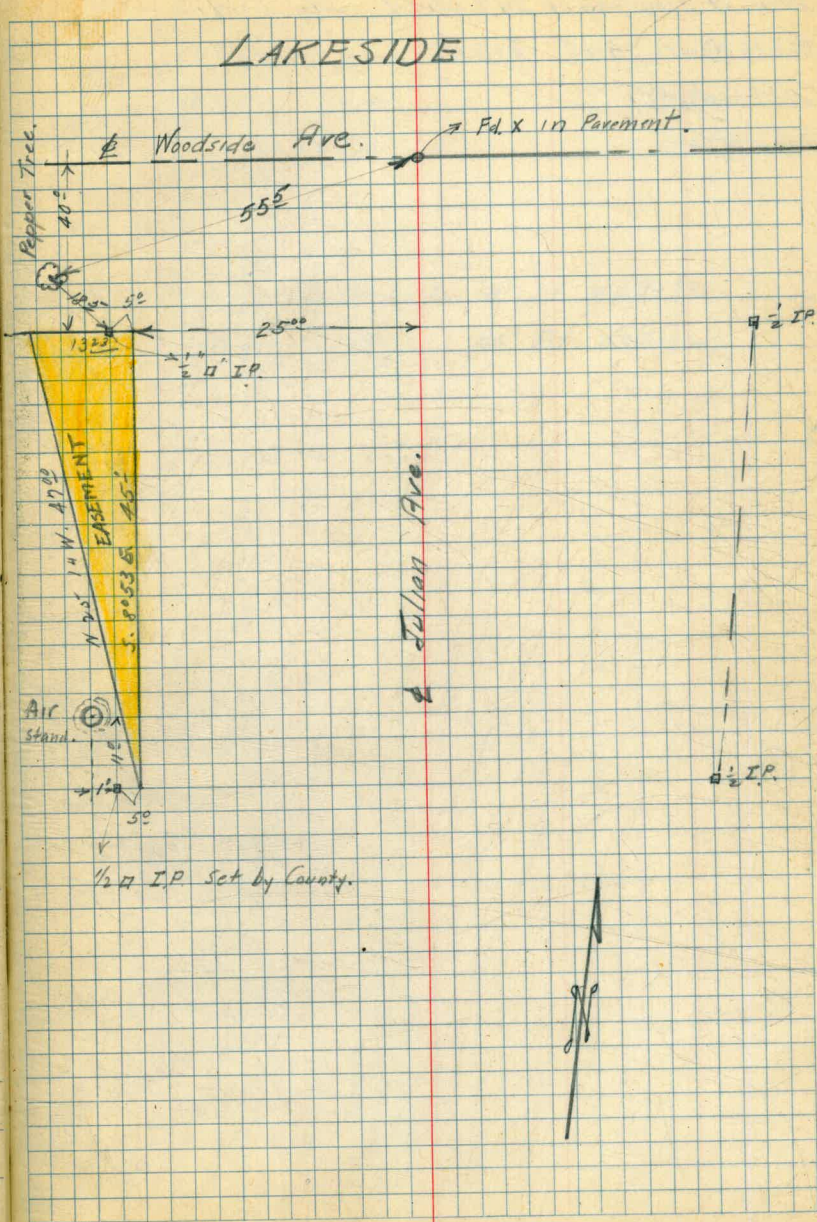
JAN 25, 1942



Sketch Showing Easement to
be obtained from Leslie J.
and Fay Cleverger.

Feb 11, 1942.
P.S. Barker.
Earl Messersmith.

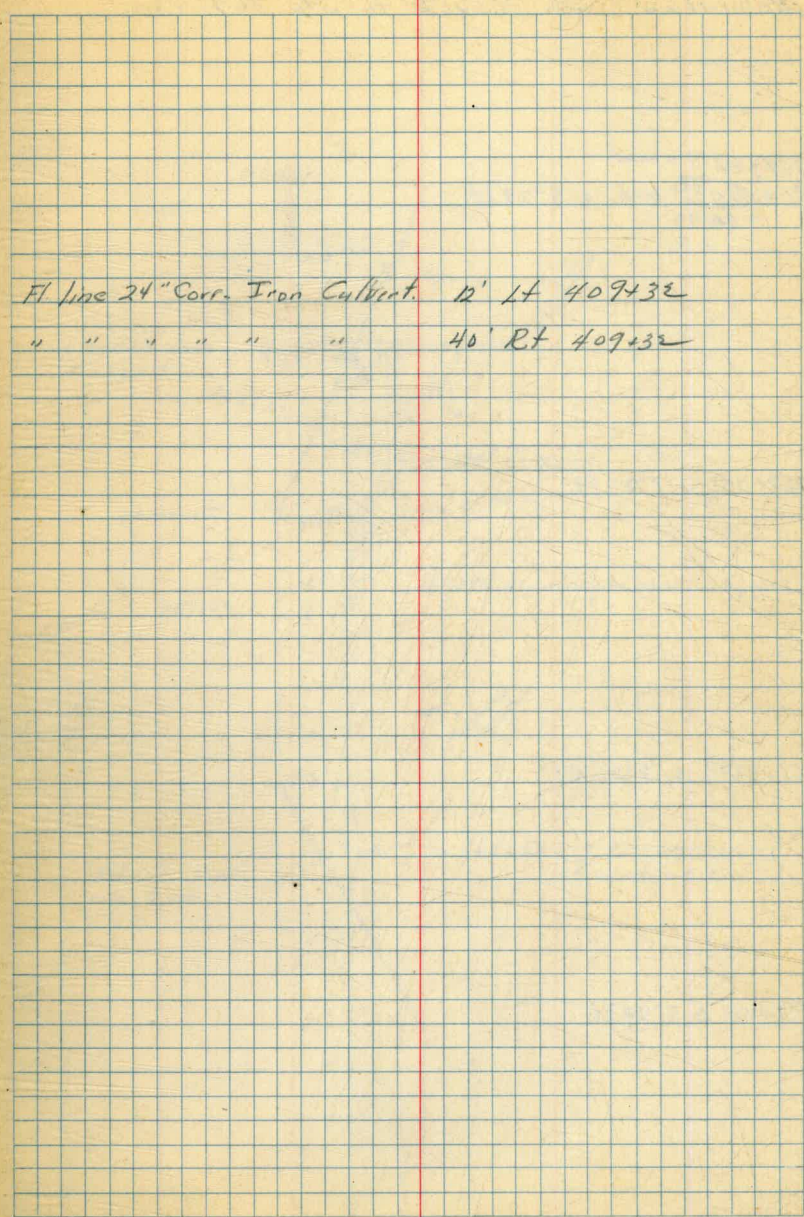
55



9/14/42
Hill
Super
King
Davis

Elev. of Flowline of 24" Culvert, Sta 409+32

408+50 (8' off)	4.15	313.95	309.8	
409+00 (8' off)		4.2	309.8	Rec. 309.9
409+50 (8' off)		4.1	309.7	Rec. 309.9
		8.0	306.0	
		8.5	305.5	



Fl. line 24" Corr. Iron Culvert 12' Lt 409+32
 " " " " " " 40' Rt 409+32

Relocation - Sta 365+50 to Sta 369+42⁴⁰

369+42⁴⁰ ahead
369+45⁵⁰ back Δ 8°29' LT
+44.90
WB

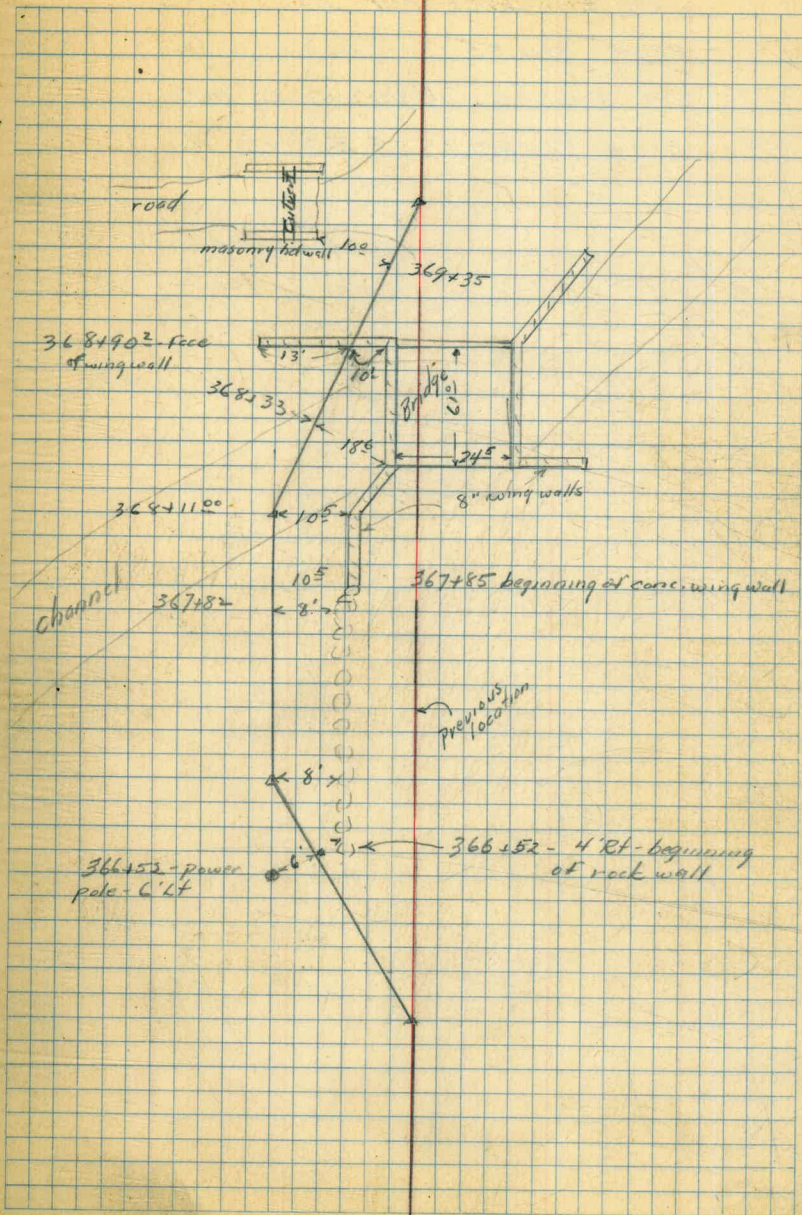
368+11⁰⁰ Δ 8°29' RT

366+83⁹⁰ Δ 8°29' RT

365+50 Δ 8°29' LT

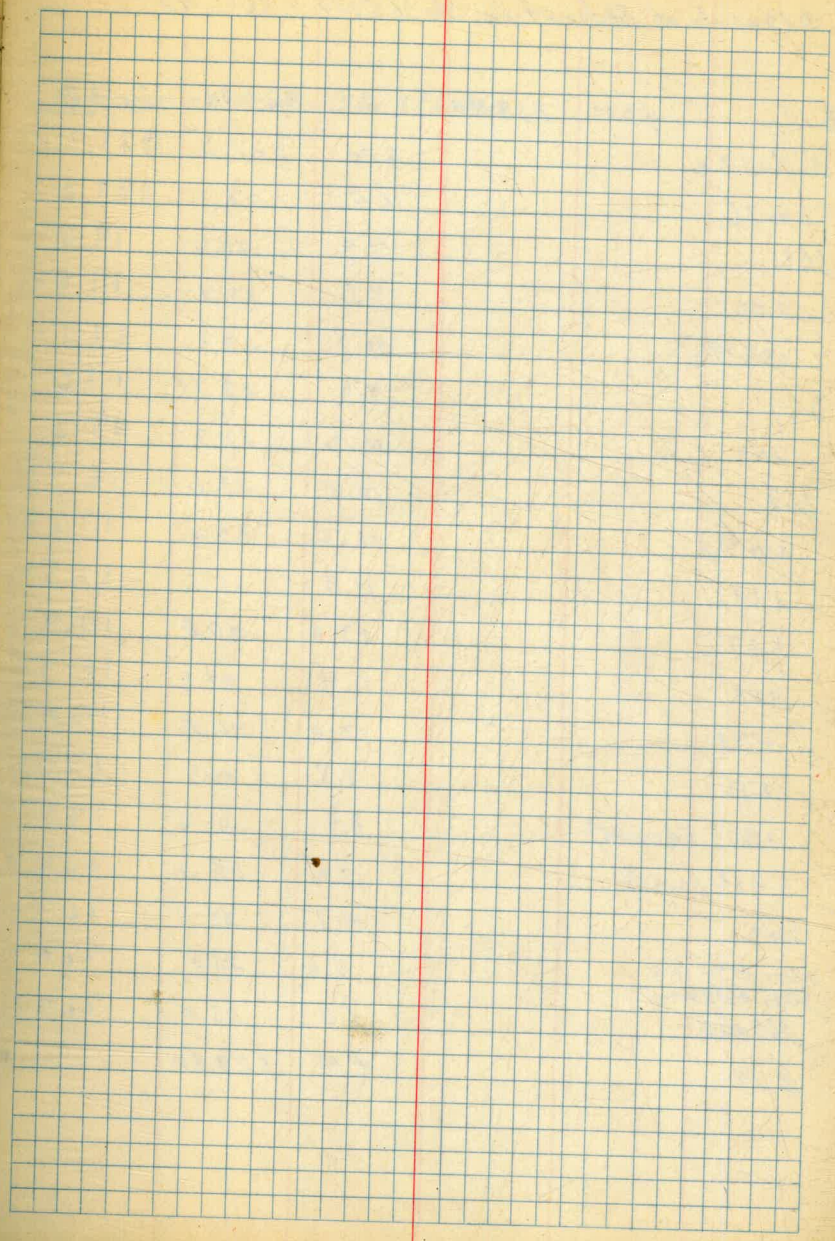
9/14/82
Bill
Soper
King
Davis

57



Stadia Survey For PIPELINE
FROM Sta #5 To MULLOY RES.
via Tunnel. Bearing of back
LINE TAKEN AS $533^{\circ}48'W$.

645



VSGS, MA.

Profile of Relocation, Sta 365+50 - 369+42.46

B.M.	4.05	333.45		329.40	Station
365+50 a			6.2	327.3	321.2 ✓
+76			6.4	27.1	321.0 -
366			7.9	25.6	19.5 ✓
+50			9.6	23.9	17.8 ✓
+83.90 a			9.7	23.8	17.7 ✓
367			9.8	23.7	17.6 ✓
+50			10.2	23.3	17.2 -
368			10.5	23.0	16.9 ✓
+11.00 a			10.2	23.3	17.2 -
+17			11.9	21.6	15.5 ✓
+37			13.0	20.5	14.4 ✓
+50			12.5	21.0	14.9 ✓
+73			12.0	21.5	14.4 ✓
+78			9.8	23.7	17.6 ✓
+90 ² (ground)			8.9	24.6	18.5 ✓
+90 ² (wall)			5.2	28.3	22.2 ✓
369			4.7	28.8	22.7 ✓
369+45 ⁵⁰ - bank			5.0	28.5	22.4 ✓
369+42 ⁵⁰ - ahead			5.0	28.5	22.4 ✓
369+50			5.0	28.5	22.4 ✓
B.M.	4.05	329.40			

9/14/42
H.H.
Soper
King
Davis

59

N.W. Cor. of bridge, Sta 368+90

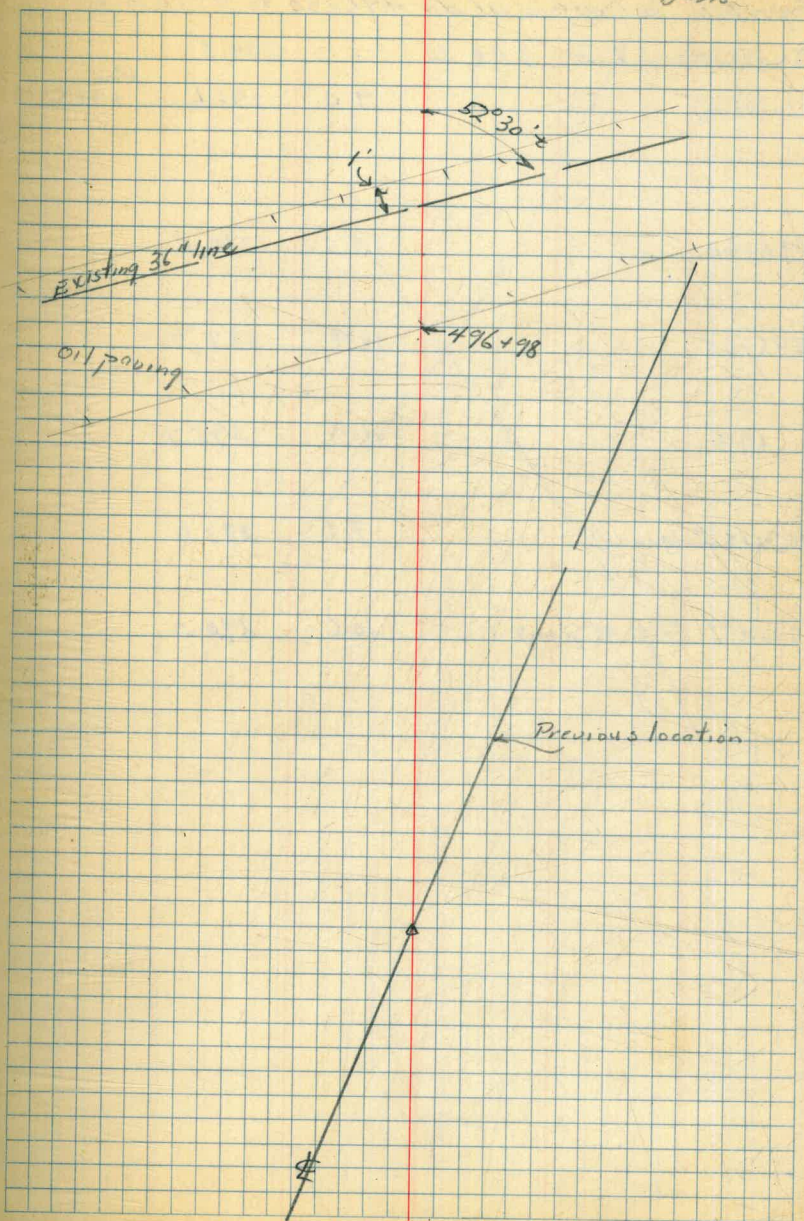
Relocation - Sta 496+60 - 497+18⁵³

Note: existing pipe exposed for 8' with no indication of a joint in pipe.

497+18⁵³ = ϕ existing 36" line @ 52° 30' ±

See page 62

496+60° @ 30° 00' ±



~~Profile, relocation at Sta 496+60 to 497+18⁵³~~

496+00 (8' off) 6.3 300.6 294.3

496+50 (±) 9.0 291.6 Rec. 291.5

496+60 10.1 290.5

496+65 10.9 289.7

493 4.9 295.7

497+18⁵³ (ground) 7.6 293.0

497+18⁵³ (top 36" pipe) 10.6 290.0

9/14/42
Hill
Soper
King
Davis

Page 64

Relocation - 495+70 - 496+85?

496+85? \pm 36" pipeline

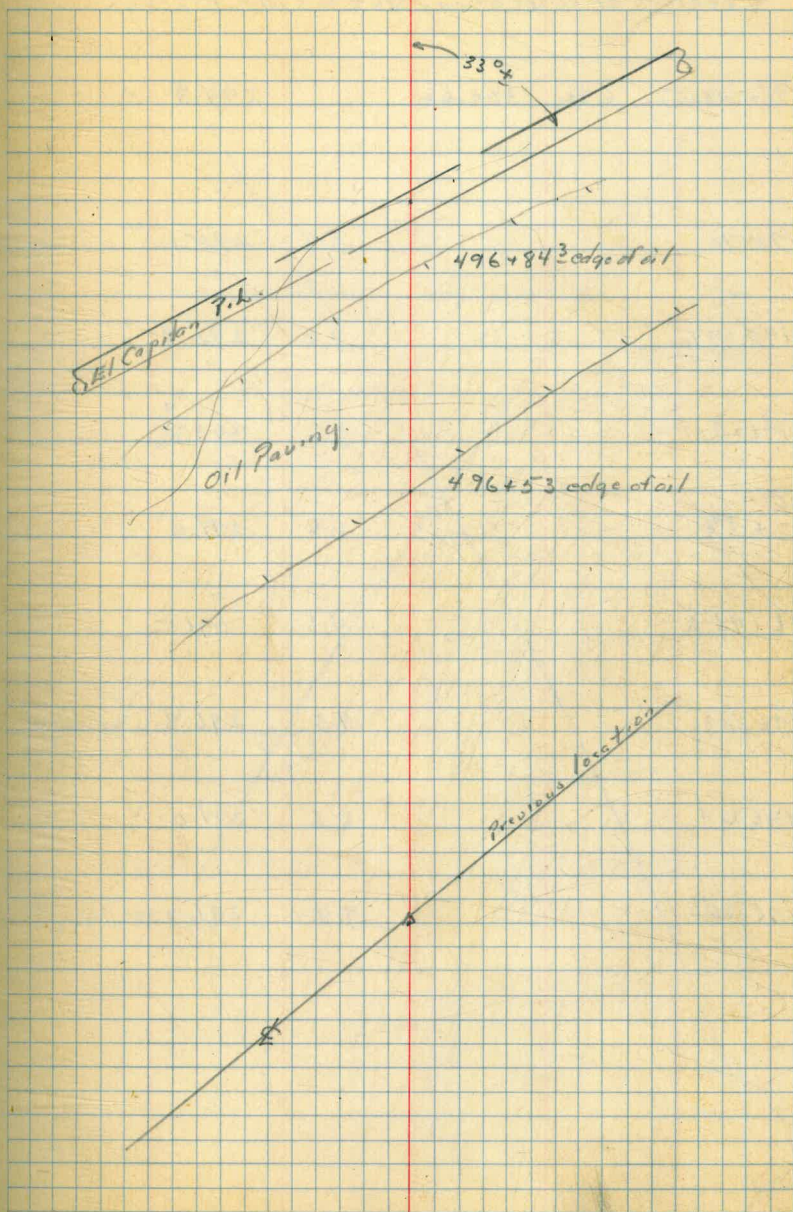
496+48 Δ 45°00' RT

495+70 Δ 45°00' LT

10/5/42

62

Hill
Soper
King
Davis



Profile of relocation, sta 495+70 - 496+85

496+00 (80 ft)	6.32	300.62	294.3	✓
495+70		5.4	295.2	✓
495+97		7.8	292.8	✓
496+30		7.2	293.5	✓
+38		6.6	294.0	✓
496+48 Δ		4.1	296.5	✓
496+53		4.3	296.3	✓
496+84		6.6	294.0	✓
496+85		9.4	291.2	✓

edge of oil paving

" " " "

Top of 36" pipe

10/26/42

65

Mill

Super

King

Dair's

Profile - Relocation 495+70 - 496+86²⁴

496+00 (8' offset)	5.26	299.56 ✓	294.3
495+70	4.4	295.2 ✓	
496+00	7.5	292.1 ✓	
496+04	6.0	293.6 ✓	
496+46	5.6	294.0 ✓	
496+54 A	3.6	296.0 ✓	
+58 ⁴ edge of oil pipe	3.5	296.1 ✓	
496+86 ²⁴	5.9	293.7 ✓	
496+86 ²⁴	8.7	290.9 ✓	

Top of 36" I.D. pipe

5.12-43
H. H.
H. H.
H. H.
H. H.

B.M.

10' offset Profile - El Monte P.L.

B.M.	4.69	437.40 438.40	432.71 432.71	
2+89.40			32.2 33.2	423.4
3+00			32.2 32.2	423.4
+50			32.1 32.1	423.3
4+00			32.0 32.0	423.2
+50			31.8 32.8	423.0
5+00			31.7 32.7	422.9
+50			31.5 32.5	422.8
6+00			31.3 32.3	422.7
T.P.	4.40	435.38 436.38	430.98 431.98	
+50			31.2 32.2	422.5
7+00			31.1 32.1	422.4
+50			31.0 32.0	422.3
8+00			31.1 32.1	422.2
+50			30.9 31.9	422.0
9+00			30.9 31.9	421.9
+50			30.7 31.7	421.8
10+00			30.6 31.6	421.7
+50			30.6 31.6	421.6
11+00			30.5 31.5	421.9
+50			30.6 31.6	421.6
12+00			30.7 31.7	421.9
+50			30.9 31.9	422.1
13+00			31.2 32.2	422.4
+50			31.6 32.6	422.8

City D.M. in hedge 3' 2" P.P. #77578 U.S.G.S. Mon.
City Datum used
start +48" Pipe

- 8.8
- 8.8
- 8.8
- 8.8
- 8.8
- 8.7
- 8.6
- 8.7
- 8.7
- 8.7
- 8.9
- 8.9
- 9.0
- 8.9
- 8.9
- 9.0
- 9.0
- 9.1
- 9.0
- 8.8
- 8.8
- 8.8
- 8.8

Note B.M. elev. used
for location in error by
1.0'. Our datum corrected
to coincide with profile
drawings.

		435.38			
		436.38			
14+00			3.4	32.0 32.0	422.3
+50			3.0	32.4 32.4	423.7
15+00			2.5	32.9 32.9	424.1
T.P.	9.90	442.42 443.42	2.86	432.52 433.52	
+50			9.1	33.3 34.3	424.5
16+00			8.7	33.7 34.7	425.0
+50			8.9	34.0 35.0	425.4
17+00			8.0	34.9 35.9	425.8
+50			7.5	34.9 35.9	426.3
18+00			6.6	35.8 36.8	426.7
P.C. 18+31 ²⁰			6.2	36.2 37.2	
+50			6.0	36.9 37.9	427.1
19+00			5.8	36.6 37.6	427.5
+50			5.5	36.9 37.9	428.0
20+00			5.2	37.2 38.2	428.4
+50			4.9	37.5 38.5	429.0
21+00			4.6	37.8 38.8	429.6
+50			4.1	38.3 39.3	430.2
22+00			3.3	39.1 40.1	430.8
E.C. 22+11 ²⁰			3.1	39.1 40.3	430.9
+50			2.1	40.3 41.3	432.6
23+00			0.4	42.0 43.0	434.7
T.P.	12.34	454.36 455.36	0.40	442.02 443.02	
+50			10.2	442 45.7	436.9
24+00			7.8	46.6 47.6	439.0

8.7
8.7
8.8
8.8
8.7
8.6
8.6
8.6
9.1
9.3
9.1
8.9
8.8
8.5
8.2
8.1
8.3
8.2
7.7
7.3
N. 10' offset Sta 23+00
7.3
7.4

		454.36		490	
		455.36		50.0	441.2
+50			5.9	51.4	
25+00			3.0	52.4	443.3
				52.8	
+50			0.6	54.8	445.3
				453.67	
T.P.	12.60	466.27	0.69	454.67	
		467.27		56.2	
26+00			10.1	57.2	447.3
				58.5	
+50			7.8	59.5	449.8
				60.7	
27+00			5.6	61.7	451.9
				62.9	
+50			3.4	63.9	453.8
				65.0	
28+00			1.3	66.0	455.7
				466.04	
T.P.	9.51	475.55	0.23	467.04	
		476.55		66.8	
+50			8.8	67.8	457.6
				68.3	
29+00			7.3	69.3	459.5
				69.9	
+25			6.7	69.9	460.9
				69.4	
+50			6.2	70.4	460.8
				70.2	
30+00			5.4	71.2	461.5
				70.6	
+50			5.0	71.6	462.2
				70.7	
31+00			4.9	71.7	462.9
				70.7	
+50			4.9	71.7	462.5
				70.4	
32+00			5.2	71.4	462.1
				70.1	
+50			5.5	71.1	461.8
				69.5	
33+00			6.1	70.5	461.4
				464.83	
T.P.	5.43	470.26	10.72	465.83	
		471.26		66.7	
+50			3.6	67.7	458.1
				66.4	
E			3.9	66.4	
				64.0	
34+00			6.3	65.0	455.4

			7.8	
			8.1	
			8.3	
			8.6	
			8.7	
			8.8	
			8.8	
			9.1	
			9.3	
			9.2	
			8.8	Elev
			8.5	685
			8.6	
			8.7	
			8.4	New line
			7.8	♀ 707
			8.2	♀ 710
			8.3	♀ 701
			check on @ 32+50 -0.5	
			8.3	♀ 697
			8.1	♀ 694
			8.3	
			8.6	

Profile E-10' offsets

470.26
~~471.25~~

E	6.8	63.5	
+50	8.8	61.5 62.5	454.0
E	9.1	61.2	
35+00	9.9	60.4 61.4	452.5
E	10.1	60.2	
+50	10.8	59.5 60.5	451.1
E	11.2	59.1	
+75	11.1	59.2 60.2	450.4
E	11.5	58.8	
36+00	11.6	58.7 59.7	450.1
E	11.9	58.4	
+50	12.9	57.9 58.9	449.9
E	12.8	57.5	
37+00	13.0	57.3 58.3	448.7
E	13.7	56.6	
T.P.	7.59	462.67 463.67	

Cut

7.5
7.9
8.4
8.8
8.6
8.5
8.6
Min. P. Pale-Rt. ONE/4st. 35+85

L. ♀ R.

Stadia survey thru Mission Gorge

Point	Dist	Vert. Ang.	Horiz. Ang.	HL	Elev. Red
	10.5	304.8		299.3	
	1290	317.15	0.25	304.25	
	10.35	325.61	1.89	315.26	
			3.97	321.64	Elev. 0.0
0-1	251	-1°15'	0	5.6	Red
*0-2	615	+9°06'	0°	5.6	
*2-3	156'	0°	80°22'R	5.0	
*3-4	187'	0°	50°09'L	5.0	
*4-5	135'	0°	51°07'L	4.9	
*5-6	176'	0°	21°15'L	4.8	
*6-7	135'	0°	23°50'L	5.3	
7-8	501'	0°	28°06'L	5.0	
7-9	465'	0°	4°19'L	5.0	
7-10	682'	0°	3°06'R	5.0	
7-11	895'	0°	19°00'R	5.0	
*7-12	1018'	0°	22°38'R	5.0	
12-13	160'	0°	76°07'L	5.1	
*12-14	117'	0°	81°42'R	5.1	
*14-15	104'	0°	14°55'L	4.9	
*15-16	110'	0°	31°34'L	4.9	
*16-17	99'	0°	2°52'L	5.1	
*17-18	141'	0	21°8'L	5.1	
18-19	155'	0	16°26'L	4.7	

Plot sheet stake at Pl. sta. 196+00

Elev	Calc.	Angle	Dist	Calc.	Angle	Dist
316.2	327.6	+6°30'	316.2	314.5	-1°	316.2
417.7	444.5	+15°	417.7	394.6	-13°	417.7
	448.4	+16°	417.7	411.9	-11°	417.7
	440.7	+13°		396.4	-12°	417.7
	446.4	+16°		383.3	-19°	417.7
	454.1	+20°		381.3	-20°	417.7
	448.3	+17°		371.3	-17°	417.7
	437.1	+11°		372.8	-14°	417.7
	439.0	+12°		390.9	-15°	417.7
	446.4	+16°		400.1	-10°	417.7
	446.4	+16°		407.0	-15°	417.7
	426.4	+5°		412.5	-3°	417.7
	450.2	+18°		397.3	-22°	417.7
	454.1	+20°		383.3	-15°	417.7
	432.6	+15°		387.10	-17°	417.7
404.9	370.5	-16°		443.3	+21°	417.7
	436.4	+20°		365.6	-19°	417.7
400.0	436.4	+20°		363.6	-20°	417.7

	D.S.	Vert. L	Horiz. L	H.J.
* 19-20	131'	0	6° 15' Lt.	4.9
* 20-21	116'	0	17° 36' Lt.	4.9
* 21-22	156'	0	7° 28' Lt.	4.8
* 22-23	136'	0	20° 28' Lt.	5.0
* 23-24	96'	0	21° 27' Lt.	4.9
24-25	238'	0	6° 45' Lt.	4.8
24-26	245'	0	11° 10' Rt.	4.8
24-27	830'	0	35° 11' Rt.	4.8
24-28	1040'	0	30° Rt.	4.8
24-29	1100'	0	39° 12' Rt.	4.8
24-30	1701'	0	54° 12' Rt.	4.8
* 24-31	2441'	0	64° 30' Rt.	4.8
* 31-32	125'	0	6° 05' Rt.	4.7
* 32-33	130'	0	20° 25' Lt.	4.1
* 33-34	105'	0	23° 5' Lt.	4.7
34-35	195'	0	39° 20' Lt.	5.0
35-36	241'	0	8° 17' Lt.	5.0
* 36-37	521'	0	0° 26' Lt.	5.0
* 37-38	171'	0	2° 20' Lt.	4.5
37-39	310'	0	15° Lt.	4.5
37-40	392'	0	12° 15' Rt.	4.5
* 37-41	575'	0	11° 46' Rt.	4.5
* 41-42	901' (896.1)	-4° 15'	5° 20' Rt.	4.5
* 42-43	379'	0	10° 10' Lt.	5.0
* 43-44	262' (253.4)	-10° 27'	71° 47' Rt.	4.8
44-45	228'	0	68° 55' Lt.	4.9

Elev.	Calc.	Angle	H.J.	Correction
398	436.4 / 100	+21°	398	-21° 359.6 Calc.
397	437.4 / 100	+22°	397	-22° 356.6 Calc.
397	411.5 / 100	+22°	397	-22° 380.8
397	503.0 / 100	+30°	397	-40° 360.9
397	437.4 / 100	+22°	397	-27° 360.7
399	443.5 / 100	+24°	399	-22° 358.6 Calc.
399	441.4 / 100	+23°	399	-19° 369.6 Calc.
399	443.5 / 100	+24°	399	-27° 348.0 Calc.
399	477.7 / 100	+36°	399	-35° 329.0 Calc.
399	456.7 / 100	+30°	399	Calc. 370.10 - 30° Rock ledges
399	459.0 / 100	+31°	399	-31° 339.0 Calc.
399	411.5 / 100	+32°	399	-32° 336.5 Calc.
399	503.0 / 100	+22°	399	-54° 331.5 Calc.
399	466.5 / 100	+34°	399	-53° 327.10 Calc.
392	456.9 / 100	+35°	392	-36° 374.9
389.3	444.7 / 100	+29°	389.3	-25° 25-10
386.3	444.0 / 100	+30°	386.3	-21° 347.9
390	?	+33°	390	-20° 353.6 Calc.
390	Rock Wall 60'-10'	+20°	390	-22° 348.6 Calc.
390	432.4 / 100	+23°	390	-31° 324.6 Calc.
384.6	437.8 / 100	+28°	384.6	-30° 321.6 Calc.
379.3	437.0 / 100	+36°	379.3	-56° Rock 343.0 / 50
379.3	415.6 / 50	+36°	379.3	-29° 313.9
369.3	424.7 / 100	+29°	369.3	-29° 316.1
371.5	426.9 / 100	+29°	371.5	-19° 370.5
304.9	332.3 / 100	+19°	304.9	+15° 273.1
299.9	328.6 / 100	+16°	299.9	0.0 253.2 / 100
253.2	380.0 / 100	+15°	253.2	

246.2 Top Pipe B.O. #32

Alt. Stadia Line

P.T	Dist	Vert L	Horiz L	H.I
* 2 ^A -3 ^A	437'	0	109° 09' Lt	4.9
* 3 ^A -4 ^A	192'	0	28° 20' Rt	4.4
* 4 ^A -5 ^A	154'	0	17° 22' Rt	5.1
* 5 ^A -6 ^A	(2976) 306'	79° 34'	73° 09' Rt	5.0
* 6 ^A -7 ^A	(26115) 271'	-10° 48'	26° 06' Rt	5.1

Elev	Calc.	Angle	Elev	Calc.	Angle	Elev
417.6	$\frac{385.1}{100}$	-18°	417.6	$\frac{420.9}{100}$	+18°	420.9
417.6	$\frac{394.7}{100}$	-14°	417.6	$\frac{421.5}{100}$	+5°	421.5
417.6	$\frac{396.3}{100}$	-12°	417.6	$\frac{440.7}{100}$	+13°	440.7
467.7	$\frac{471.2}{100}$	+2°	467.7	- Saddle	+6°	478.2
417.8	$\frac{435.4}{100}$	+10°	417.8	$\frac{398.1}{100}$	-11°	398.1

Grades at El Monte hookup

R.M	5.35	+58.06	432.71	
2+89.49	10' offs	5.9	32.2	23.4
2+52.7	10' offs	6.3	31.8	24.20
2+20.7	10' offs	5.9	32.2	24.20
1+89	10' offs	6.1	32.0	24.14
1+57	10' offs	5.8	32.3	24.14
1+28	10' offs	5.9	32.2	22.08
1+09.12	10' offs	5.6	32.5	22.08
0+98.28	10' offs	5.5	32.6	20.00
0+77.17	10' offs	5.3	32.8	20.00
0+61.63	10' offs	5.2	32.8	20.28
0+45.78	10' offs	5.1	33.0	20.28
0+29.92	10' offs	5.4	32.7	21.94
0+18.00	10' offs	5.2	32.9	21.94
	10' offs	5.5	32.6	23.62
	10' offs	5.1	33.0	23.62
	10' offs	5.5	32.6	24.81
	10' offs	4.8	33.2	24.81
	10' offs	5.1	33.0	26.57
	10' offs	4.5	33.6	26.57
	10' offs	4.6	33.5	26.00
	10' offs	4.1	34.0	26.00
	10' offs	4.0	34.1	26.05
	10' offs	3.6	34.5	26.05
	10' offs	3.6	34.5	26.10
	10' offs	3.7	34.4	26.10

8/25/63 Hill
Otter
Remmen

73

USGS, at pump plant

8.8
7.6
8.0
7.9
8.2
10.1
10.4
12.6
12.8
12.5
12.7
10.7
10.9
9.0
9.4
7.8
8.4
7.4
8.0
7.5
8.0
8.0
8.4
8.4
8.8

El Monte
Ventura meter Tube
Elev

H. H.
King
8-31

	4.78	32.49	432.71	
0+05		5.4	32.1	Grado 29.6
0+28		5.6	31.9	29.8
0+46 A		6.9	30.6	29.9
0+75		6.2	31.3	30.2
1+00		6.1	31.4	30.4
1+25		6.0	31.5	30.6
1+36		5.8	31.7	30.7

U.S.G.S El Monte P. Plant

2.5

2.1

0.7

1.1

1.0

0.9

1.0

Profile Grades - El Monte P.L.

B.M.	H.I.	Elev.	Grade
1.21	463.88		462.67
34		0.1	63.8 55.4
♀		0.0	63.9
+50		2.4	61.5 54.0
-0		2.5	61.4
35		3.5	60.4 52.5
♀		3.7	60.2
+50		4.4	59.5 51.1
♀		4.8	59.1
+75		4.7	59.2 50.4
♀		5.3	58.6
36		5.2	58.7 50.1
♂		5.6	58.3
+50		6.0	57.9 49.4
♀		6.4	57.5
37		6.6	57.3 48.7
♀		6.9	57.0
+50		7.6	56.3 48.0
♀		7.8	56.1
38		8.6	55.3 47.4
♀		8.9	55.0
+50		9.3	54.6 46.7
♀		9.4	54.5
39		9.6	54.3 46.0
♀		9.9	54.0

KING
OTTEN
12-27-43

75

Cut

R# 35785 No. 1 in P.Pole

8.4

7.5

7.9

8.4

8.8

8.6

8.5

8.6

8.3

7.9

7.9

8.3

	463.88		Elev.	Grade
39 + 50		9.8	54.1	45.4
⊕		10.0	53.9	
40		9.9	54.0	44.7
⊕		9.7	54.2	
+ 100		10.6	53.3	
+ 152		14.1	49.7	
+ 228		13.8	50.1	
+ 25 across page		11.5	52.4	
+ 300		10.1	53.8	44.5
40 + 40		10.0	53.9	
⊕		8.95	454.93	
T.P.	5.02	459.95		
41		6.1	53.8	44.8
+ 8		6.8	53.1	
PRE		6.0	53.9	44.9
+ 172		6.7	53.2	
+ 8		6.0	53.9	45.2
+ 50		6.4	53.5	
⊕		6.2	53.7	45.5
+ 94.94		6.4	53.5	
42 + 50		6.2	53.7	45.9
⊕		6.2	53.7	
43		5.6	54.3	46.1
⊕		5.6	54.3	
+ 50		4.9	54.0	46.4
⊕		5.0	54.9	

Cut

8.7

9.3

40 + 25

⊕

Elev. Gr.

10.2 - 53.7 - 44.4 9.3

12.0 - 51.9

9.3

N. in Bridge - LT 40 + 40

9.0

9.0

8.7

8.2

7.8

8.2

7.6

	459.95			
44		4.1	55.8	47.2
Σ		4.2	55.7	
+50		3.5	56.4	48.0
ϕ		3.0	56.9	
PC 44+84.09		2.7	57.2	48.5
ϕ		2.5	57.4	
45		2.4	57.5	48.8
ϕ		2.1	57.8	
+50		2.5	57.4	49.6
ϕ		2.0	57.9	
46		3.0	56.9	48.5
ϕ		2.3	57.6	
+50		4.1	55.8	47.4
ϕ		3.5	56.4	
EC 46+76.01 = 46+72.88 Ahead		4.7	55.2	46.8
ϕ		4.4	55.5	
47		5.3	54.6	46.3
ϕ		5.2	54.7	
+50		6.2	53.7	45.2
ϕ		6.3	53.6	
48		7.3	52.6	44.1
ϕ		7.1	52.8	
+50		8.1	51.8	43.0
ϕ		8.4	51.5	
49		8.9	51.0	41.9
ϕ		9.3	50.6	

8.6

8.4

8.7

8.7

7.8

8.4

8.4

8.4

8.3

8.5

8.5

8.8

9.1

	45995			
49 +50		9.8	50.1	41.3
Q		10.2	49.7	
50		10.6	49.3	40.6
Q		11.0	48.9	
+50		11.4	48.5	40.0
Q		11.7	48.2	
T.P.	1.56	449.78	11.73	448.22
51		2.0	47.8	39.3
Q		2.3	47.5	
+50		2.7	47.1	38.7
Q		2.9	46.9	
52		3.4	46.4	38.0
Q		3.6	46.2	
+50		4.0	45.8	37.4
Q		4.2	45.6	
53		4.6	45.2	36.7
Q		4.8	45.0	
+50		5.1	44.7	36.1
Q		5.3	44.5	
54		5.5	44.3	35.4
Q		5.8	44.0	
+50		6.0	43.8	35.3
Q		6.2	43.6	
T.P.		6.31	443.47	

8.8
8.7
8.5
8.5
8.4
8.4
8.4
8.5
8.6
8.9
8.5
Top M.H. El Capitan P.L. X ON RING - RT 55+

Gubrey & Whiles
Di #1 - Box 316-A
El Cajon

B.M.

432.71

DIRECTIONS FOR USE OF TABLES

TABLE No. 1.

Distance of slope stake from side or shoulder stake for any width roadway, slope 1% to 1. If ground is nearly level, the cut or fill at side stake is located by the double entry method in left column and top row. The number in body of table in same row and column gives distance

**IMPROVED TABLES
AND
INFORMATION**

TABLE No. 2.

To find tangent and external for curve of any other degree, divide by degree of curve and add connection found in column of connections. Degree of curve with a given L may be found by dividing tangent (or external), opposite L by given tangent (or external). The distance from a point on the tangent to the curve is very nearly the square of the tangent length divided by twice the radius.

TABLE II—Continued
TRIGONOMETRIC FORMULAE (continued)

In any triangle:

Given a, b, C; to find c, B, A.

Use Law of Sines.

Given A, B, c; to find a, b, C.

Use Law of Sines.

Given a, b, c; to find A, B, C.

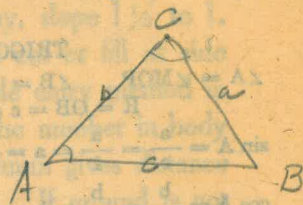
$$\text{Let } \frac{a+b+c}{2} = s, \sqrt{\frac{(s-a)(s-b)(s-c)}{s}} = r$$

$$\cos \frac{1}{2} A = \sqrt{\frac{s(s-a)}{bc}}$$

$$\tan \frac{1}{2} A = \frac{r}{s-a}$$

$$\tan \frac{1}{2} B = \frac{r}{s-b}$$

$$\tan \frac{1}{2} C = \frac{r}{s-c}$$



Area of a triangle:

$$\text{Area} = \frac{1}{2} ab \sin C$$

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$$

PRISMOIDAL FORMULA.

$$\text{Vol.} = \frac{h}{6} (B+b+4M)$$

h = altitude; b, B = bases; M = midsection

TABLE III
INCHES AND FRACTIONS OF AN INCH IN DECIMALS OF A FOOT

	0	1	2	3	4	5	6	7	8	9	10	11
$\frac{1}{16}$	.0052	.0885	.1719	.2552	.3385	.4219	.5052	.5885	.6719	.7552	.8385	.9219
$\frac{1}{8}$	.0104	.0938	.1771	.2604	.3438	.4271	.5104	.5938	.6771	.7604	.8438	.9271
$\frac{3}{16}$	.0156	.0990	.1823	.2656	.3490	.4323	.5156	.5990	.6823	.7656	.8490	.9323
$\frac{1}{4}$	.0208	.1042	.1875	.2708	.3542	.4375	.5208	.6042	.6875	.7708	.8542	.9375
$\frac{5}{16}$	.0260	.1094	.1927	.2760	.3594	.4427	.5260	.6094	.6927	.7760	.8594	.9427
$\frac{3}{8}$	.0313	.1146	.1979	.2813	.3646	.4479	.5313	.6146	.6979	.7813	.8646	.9479
$\frac{7}{16}$	.0365	.1198	.2031	.2865	.3698	.4531	.5365	.6198	.7031	.7865	.8698	.9531
$\frac{1}{2}$	.0417	.1250	.2083	.2917	.3750	.4583	.5417	.6250	.7083	.7917	.8750	.9583
$\frac{9}{16}$	.0469	.1302	.2135	.2969	.3803	.4635	.5469	.6302	.7135	.7969	.8802	.9635
$\frac{5}{8}$	.0521	.1354	.2188	.3021	.3854	.4688	.5521	.6354	.7188	.8021	.8854	.9688
$\frac{11}{16}$	.0573	.1406	.2240	.3073	.3906	.4740	.5573	.6406	.7240	.8073	.8906	.9740
$\frac{3}{4}$	.0625	.1458	.2292	.3125	.3958	.4792	.5625	.6458	.7292	.8125	.8958	.9792
$\frac{13}{16}$	.0677	.1510	.2344	.3177	.4010	.4844	.5677	.6510	.7344	.8177	.9010	.9844
$\frac{7}{8}$	.0729	.1563	.2396	.3229	.4063	.4896	.5729	.6563	.7396	.8229	.9063	.9896
$\frac{15}{16}$	.0781	.1615	.2448	.3281	.4115	.4948	.5781	.6615	.7448	.8281	.9115	.9948
1	.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167	1.0000
	0	1	2	3	4	5	6	7	8	9	10	11

TABLE IV
USEFUL RELATIONS.

Lineal feet	×.00019	= miles
Lineal yards	×.0006	= miles
Square inches	×.007	= square feet
Square feet	×.111	= square yards
Square yards	×.0002067	= acres
Acres	×4840	= square yards
Cubic inches	×.00058	= cubic feet
Cubic feet	×.03704	= cubic yards
Links	×.22	= yards
Links	×.66	= feet
Feet	×1.5	= links

$$360^\circ = 21600' = 1296000''$$

$$\text{Radius} = \text{arc of } 57.2957790''$$

$$\text{Arc of } 1^\circ (\text{radius} = 1) = .017453292$$

$$\text{Arc of } 1' (\text{radius} = 1) = .000290888$$

$$\text{Arc of } 1'' (\text{radius} = 1) = .000004848$$

$$\pi = 3.141592654$$

$$\sqrt{\frac{1}{\pi}} = 0.564190$$

$$\frac{\pi}{4} = 0.785398163$$

$$\sqrt[3]{\frac{6}{\pi}} = 1.240700982$$

$$\frac{\pi}{6} = 0.523598776$$

$$\pi^2 = 9.869604401$$

$$\sqrt{\frac{4}{\pi}} = 1.128379167$$

$$\frac{1}{\pi^2} = 0.101321184$$

$$\frac{\pi}{6} = 0.523598776$$

$$\sqrt{\pi} = 1.772453851$$

$$\frac{4\pi}{3} = 4.188790205$$

$$\frac{1}{\pi} = 0.3183099$$

Curvature of Earth's surface = about 0.7 feet in 1 mile

Curvature in feet = 0.667 (Dist. in miles)²

Difference between arc and chord length, 0.05 feet in 11½ miles

$$\text{Probable error of a single observation} = 0.6754 \sqrt{\frac{Mv^2}{n-1}}$$

Error in chaining of 0.01 feet in 100 feet:

Due to—

1. Length of tape error of 0.01 feet
2. Alignment. One end 1.4 feet out of line
3. Sag of tape at centre of 0.61 feet.
4. Temperature difference of 15°
5. Difference of pull of 15 lbs.

STADIA REDUCTION FORMULAE.

Horizontal Distance = R - R sin² a + C cos a

Vertical Distance = R ½ sin 2 a + C sin a

$$R = \text{Reading} \times \frac{\text{distance from Object glass to cross hairs}}{\text{distance between cross hairs}}$$

C = distance from Object glass to cross hairs + distance from Object glass to center of instrument.

a = angle of elevation for mid Reading

5320
00019
47520
5280
100320
1760
.0006
10560
12
.007
.084

24

6380

70 63
34 60
10523
11.644

99 + 00
81 + 69.80
17 + 30.20

31 55
69 21
99 76
154 47

11.644 + 30.20
60 | 698.66
98
60
386
300
760.00
200
200

30 + 60.90
22 + 11.32
8 49.1

70°

356 + 19.5
333 + 45.65
22 + 73.88
8 49.58
1424.30

7 694.19 Road

90' / 268

89 60
31 95
58 15
7 00
65 19

73° 57' 30"

2.1 69 2.1 + 25

321.68
306
15.6
60 22.1
91 22.1
51' 89 + 00

91 + 50
73100

81 + 00.40
30 60.90
11 11 61.38

254.4
49
4.5
2.1
62.4

1019 130
51

276 + 42.94
5290
3257 9000

15° 38' RT.

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.
Roadway 16 feet wide. Side Slopes 1 on 1 1/2
For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.2	8.3	8.5	8.6	8.8	8.9	9.1	9.2	9.4	0
1	9.5	9.7	9.8	10.0	10.1	10.3	10.4	10.6	10.7	10.9	1
2	11.0	11.2	11.3	11.5	11.6	11.8	11.9	12.1	12.2	12.4	2
3	12.5	12.7	12.8	13.0	13.1	13.3	13.4	13.6	13.7	13.9	3
4	14.0	14.2	14.3	14.5	14.6	14.8	14.9	15.1	15.2	15.4	4
5	15.5	15.7	15.8	16.0	16.1	16.3	16.4	16.6	16.7	16.9	5
6	17.0	17.2	17.3	17.5	17.6	17.8	17.9	18.1	18.2	18.4	6
7	18.5	18.7	18.8	19.0	19.1	19.3	19.4	19.6	19.7	19.9	7
8	20.0	20.2	20.3	20.5	20.6	20.8	20.9	21.1	21.2	21.4	8
9	21.5	21.7	21.8	22.0	22.1	22.3	22.4	22.6	22.7	22.9	9
10	23.0	23.2	23.3	23.5	23.6	23.8	23.9	24.1	24.2	24.4	10
11	24.5	24.7	24.8	25.0	25.1	25.3	25.4	25.6	25.7	25.9	11
12	26.0	25.2	26.3	26.5	26.6	26.8	26.9	27.1	27.2	27.4	12
13	27.5	27.7	27.8	28.0	28.1	28.3	28.4	28.6	28.7	28.9	13
14	29.0	29.2	29.3	29.5	29.6	29.8	29.9	30.1	30.2	30.4	14
15	30.5	30.7	30.8	31.0	31.1	31.3	31.4	31.6	31.7	31.9	15
16	32.0	32.2	32.3	32.5	32.6	32.8	32.9	33.1	33.2	33.4	16
17	33.5	33.7	33.8	34.0	34.1	34.3	34.4	34.6	34.7	34.9	17
18	35.0	35.2	35.3	35.5	35.6	35.8	35.9	36.1	36.2	36.4	18
19	36.5	36.7	36.8	37.0	37.1	37.3	37.4	37.6	37.7	37.9	19
20	38.0	38.2	38.3	38.5	38.6	38.8	38.9	39.1	39.2	39.4	20
21	39.5	39.7	39.8	40.0	40.1	40.3	40.4	40.6	40.7	40.9	21
22	41.0	41.2	41.3	41.5	41.6	41.8	41.9	42.1	42.2	42.4	22
23	42.5	42.7	42.8	43.0	43.1	43.3	43.4	43.6	43.7	43.9	23
24	44.0	44.2	44.3	44.5	44.6	44.8	44.9	45.1	45.2	45.4	24
25	45.5	45.7	45.8	46.0	46.1	46.3	46.4	46.6	46.7	46.9	25
26	47.0	47.2	47.3	47.5	47.6	47.8	47.9	48.1	48.2	48.4	26
27	48.5	48.7	48.8	49.0	49.1	49.3	49.4	49.6	49.7	49.9	27
28	50.0	50.2	50.3	50.5	50.6	50.8	50.9	51.1	51.2	51.4	28
29	51.5	51.7	51.8	52.0	52.1	52.3	52.4	52.6	52.7	52.9	29
30	53.0	53.2	53.3	53.5	53.6	53.8	53.9	54.1	54.2	54.4	30
31	54.5	54.7	54.8	55.0	55.1	55.3	55.4	55.6	55.7	55.9	31
32	56.0	56.2	56.3	56.5	56.6	56.8	56.9	57.1	57.2	57.4	32
33	57.5	57.7	57.8	58.0	58.1	58.3	58.4	58.6	58.7	58.9	33
34	59.0	59.2	59.3	59.5	59.6	59.8	59.9	60.1	60.2	60.4	34
35	60.5	60.7	60.8	61.0	61.1	61.3	61.4	61.6	61.7	61.9	35
36	62.0	62.2	62.3	62.5	62.6	62.8	62.9	63.1	63.2	63.4	36
37	63.5	63.7	63.8	64.0	64.1	64.3	64.4	64.6	64.7	64.9	37
38	65.0	65.2	65.3	65.5	65.6	65.8	65.9	66.1	66.2	66.4	38
39	66.5	66.7	66.8	67.0	67.1	67.3	67.4	67.6	67.7	67.9	39
40	68.0	68.2	68.3	68.5	68.6	68.8	68.9	69.1	69.2	69.4	40

Example—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 41.9. For same slopes but other widths of roadbed correct above figures by one-half difference in width of roadbed; thus in example above for 20 ft. roadbed distance will be 41.9 + (20 - 16) + 2 or 2 ft. added to 41.9 = 43.9. For slopes of 1 on 1 see inside of front cover.