

335
Furfilmed
MICROFILMED
APR 1965

meter

~~17694 518~~

#98365

Camp meter

#84741

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	Cars.	Pass.
July 6 -	2	8
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" 8 -	11	34

EL CAPITAN P.L.

Reference Points - 7+62³¹ to 110+84⁰² 5¹⁰

Reference Pnts. Alternate Line Sta.

36+83³⁹ to 47+54⁵³ 22-23

Reference Pnts. Alternate Line Sta.

50+45⁴⁷ to 60+37⁵¹ 24

X Sections 102+25 to 106+00 25-26

Topography at Cape Horn about
Station 106 to 108. 27-30

X Sections (extended) Sta 62+06 to
Sta. 64+57 32-33

4

- 1+31.40 16°20' Rt.

- 4+05.58 13°0' Lt.

- 4+67.20 16°30' Lt.

- 6+17.71 9°05' Rt.

- 7+62.31 On "C" Axis

5121³⁰ 3° 21' 44"

4104³⁵ 13° 10' 84"

1+94⁶² 9° 07' 84"

0+72¹⁴ 12° 40' 44"

0+00 2° 49' 44"

12+37²⁴ 18°20'RH.

11+33⁸⁰ 7°0'RH.

9+01³⁷ 4°58'RH.

8+02⁵⁰ 37°20'RH.

6+29⁰⁶ 19°34'RH.

77

19+71⁶⁸ 6°30' Lt

19+02³⁸ 27°30' Rt

17+81³² 24°00' Lt.

15+83⁵⁴ 40°0' Rt.

13+65⁸⁵ 26°14' Lt.

00⁰⁰

19. $26+0537$ $5^{\circ}00'Lt$

19. $24+5523$ $14^{\circ}46'RA$

17. $22+7641$ $12^{\circ}07'RA$

12. $21+4588$ $18^{\circ}34'Lt$

20+2425 $4^{\circ}14'Lt$

Dec 9, 1937

9



Dec. 9, 1937

10

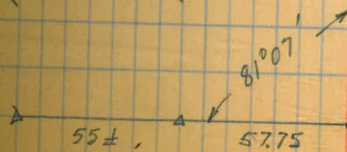
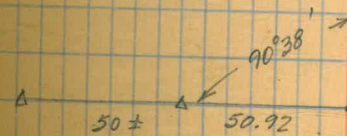
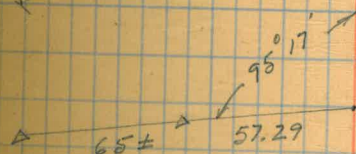
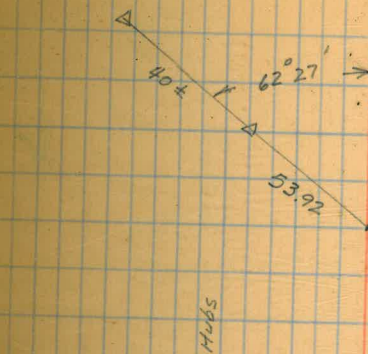
32+9550 5°42' Rt

31+7572 19°50' Rt

30+8461 28°40' Lt

29+6966 26°00' Rt

27+9298 6°50' Lt



36+83³² 13° 16' Lt. Line Change Starts.

36+10³³ 5° 00' Lt.

35+42⁵⁸ 4° 10' Rt.

34+63²⁸ 9° 06' Lt.

33+98⁵⁸ 17° 50' Rt.

41+91⁴² 8°10' Rt.

~
41+16²¹ 34°20' Rt.

40+03²² 24°10' Lt.

38+91⁴³ 6°10' Rt.

37+99⁸⁵ 16°08' Lt.

47+54.58 Alt. Line
47+55.12 Log. Line = \rightarrow
47+03⁰¹ 11°50' Rt.

46+10³³ 11°20' Rt.

44+73⁸³ 16°30' Lt.

43+84⁸³ 23°40' Rt.

42+83⁹³ 34°00' Lt.

56+95⁰⁴ 9°50' R.

54+59⁹⁴ 20°26' Lt.

52+97⁰⁶ 12°15' R.

51+74¹⁸ 12°10' Lt.

50+45⁴⁷ 24°50' R.

63+47⁶⁸ 46°10' Lt

62+53⁴⁸ 6°45' Rt.

61+74³⁷ 7°40' Rt.

60+80²⁵ 22°34' Lt

59+17³⁶ 24°50' Lt

71+23²⁶ 25°40' RT.

69+47²⁷ 24°40' Lt.

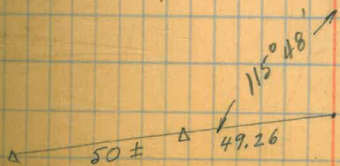
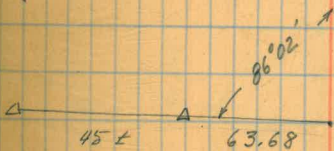
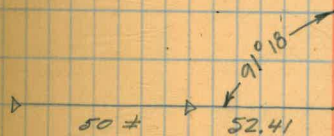
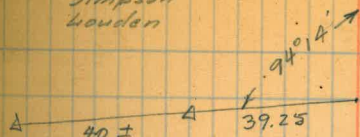
67+85⁶⁰ 12°20' RT.

65+69²¹ 4°30' Lt.

64+98¹⁰ 44°10' RT.

R.P.s Dec 9, 1931
Converse
Elliott
Simpson
Louden

16¹⁶



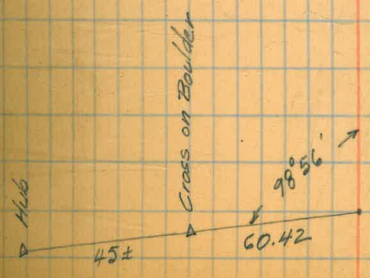
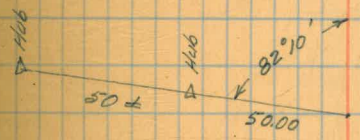
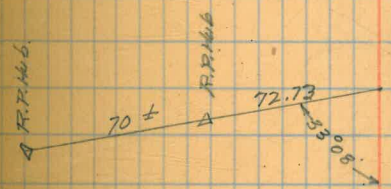
79+58¹⁰ 11°40' Lt.

78+68³⁰ 0°29' Lt.

77+10³² 23°17' Rt.

74+49⁶⁶ 28°50' Lt.

72+54⁷⁰ 22°0' Rt.



83+49⁵² 20°30' Lt.

82+78⁰³ 14°08' Rt.

82+07²³ 9°40' Lt.

81+03⁶⁹ 13°30' Rt.

80+10³⁴ 2°04' Lt.

87+82⁰⁶ 13°52' Lt.

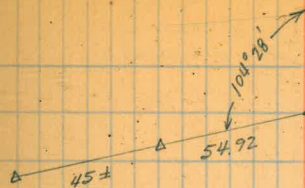
86+89⁴⁹ 17°50' Rt.

86+29⁵⁶ 6°26' Rt.

85+69⁴⁷ 1°50' Lt.

84+78⁹⁰ 12°20' Rt.

19¹⁹



T.P.'s set Dec. 9, 1932

Converse
Elliott
Simpson
Lowden

20
20

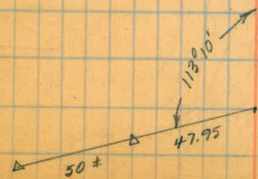
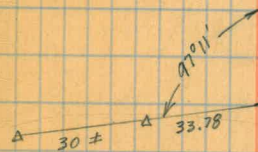
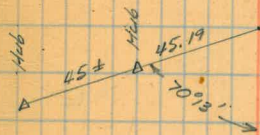
93+89¹⁰ 15°30' Rt.

92+93⁴⁵ 16°00' Lt.

91+92⁴⁵ 9°30' Lt.

91+18²⁸ 12°20' Lt.

89+68⁴⁸ 2°46' Rt.



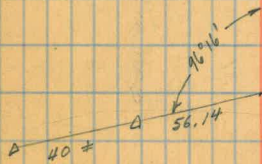
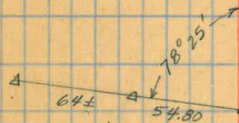
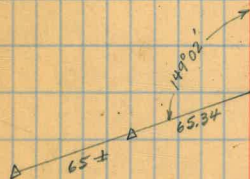
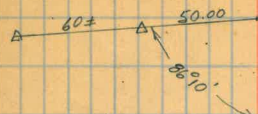
9. $103+65^{13}$ $22^{\circ}54' RL$

9. $101+84^{34}$ $38^{\circ}34' RL$

9. $100+15^{53}$ $5^{\circ}0' RL$

$98+81^{25}$ $4^{\circ}18' RL$

$95+93^{81}$ $9^{\circ}10' Lt$



Alternate Line

$39+85^{96}$ $9^{\circ}40' Lt.$

$37+46^{87}$ $3^{\circ}45' Lt.$

$36+83^{39}$ $25^{\circ}0' Lt.$

↑
Alternate Line

Original Line
↓

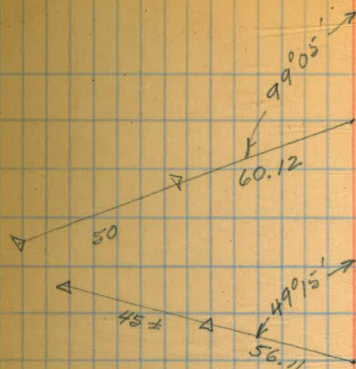
$110+84^{02}$ $6^{\circ}06' Lt.$

$107+46^{64}$ $78^{\circ}36' Lt.$

Clear
Warm

Dec 9, 1932

22
22



Alternate line

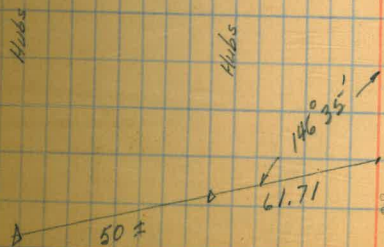
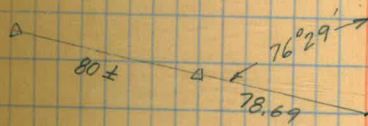
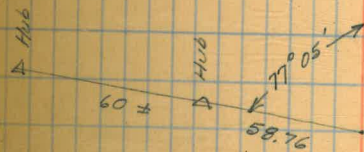
47+54⁵³ E.C. =
47+55¹² location line

47+03⁰⁴ 16° 41' Rt.

44+89¹² 12° 40' Lt.

41+78⁷⁶ 25° 50' Rt.

23
23



Alternate Line

60+32.97 Located Line
 60+37.51 =

59+24.58- 36°30' Lt

56+97.89 27°37' Rt

54+36.85 20°24' Lt

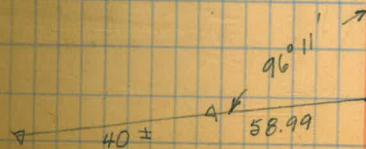
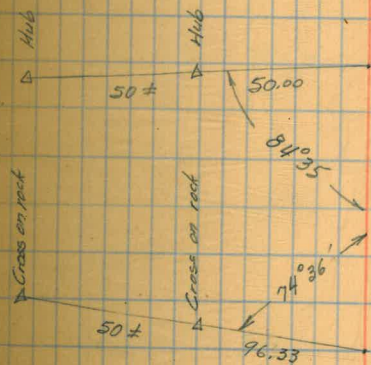
50+45.47 19°06' Rt

T.P.s Set Dec 9 1934

Converse
 Elliott
 Simpson
 Wooster

24

24



1/15/32

Gold-Rain
Converse Chief Level
Simpson Notes
Elliot tape
Bowden rod
25
25

L Rod

Note: All Rod Readings
are Plus or minus
from ϕ elevations

From Sta
102+25 101+75 + 0.5

103+00

+ 25

+ 50

+ 75

104

+ 25

105

164.
+1.5 0.0 -0.7 -0.7 -1.3
15 4 18 26 Fence

171.
+1.3 0.0 -0.1 -1.5 -1.4 16
15 3 6 21 27.5 Fence

154.
+1.0 0.0 -0.9 -1.0 -1.1
15 4 23 29 Fence

143.
+2.2 +1.0 0.0 -0.1 -0.6 -1.0 -0.8 F
15 5 3 4 21 29

134.
+1.2 +0.9 0.0 -0.5 -0.6 -0.4
15 6 4 20 27 Fence

126.
+1.1 0.0 -0.6 -0.5 -0.1
15 2 19 27 Fence

117.
+0.8 +0.6 0.0 +0.2 +0.8
15 3 18 27 Fence

110.
+0.6 +0.3 0.0 +0.2 +1.3
15 6 16 24 Fence

Note: figures in brackets by P.C.G.

L Rod

Lf

L

Rf

106

+1.0	0.0	-0.8
15	14	7

0.0

+0.1
13

+1.3 Fence
18

Topo. at Cape Horn

Weather
Cold. Raining

Jan 15 1931

27
27

Sta.	Shot No.	Dist.	Rod or Vert L	Azimuth from back tangent		Corrected Distance	Difference	
				Hor. L			in ground Elevs.	Elev.
Sta. 106+78.93 H.I. +5.6 from Sta. 107+00 - 5.3 to ground.	1	25	-4.8	182°	50	25	+0.5	
	2	17	-5.0	171°		17	+0.3	
	3	17	+20°46'	169°		14.9	+5.6	
	4	20	+20°31'	157°		17.6	+6.6	
	5	18	+26°45'	136°		14.4	+7.2	
	6	13	-1.7	139°		13	+3.6	
	7	4	-4.4	58°		4	+0.9	
	8	23	-4.1	15°		23	+1.2	
	9	44	-3.8	12°		44	+1.5	
	10	44	+0.2	16°		44	+5.5	
	11	50	-4.0	9°		50	+1.3	
	12	50	-1.8	15°		50	+3.5	
	13	75	-1.5	15°		75	+3.8	
	14	75	+1.9	20°	Foot of ledge	75	+7.2	
	15	77	+18°34'-77.4	24°	Top of ledge	69.2	+15.5	
	16	61	+14°08'	20°		57.4	+14.4	
	17	40	+17°40'	20°		36.3	+11.6	
	18	24	+21°55'	23°		20.7	+8.3	
	19	21	+33°57'	83°	Base of rock	14.4	+9.7	
	20	27	+36°11'	72°		17.5	+12.9	
	21	26	+29°06'	44°		20	+11.0	
	22	41	+25°35'	36°		33.4	+16.0	
	23	59	+23°48'	35°		49.4	+21.8	
	24	77	+22°07'-4.0A	33°		66.1	+22.9	

Jan 15-1932
Gold-Rain

28
28

Transit Sta.	Shot No.	Dist	Red or Vert. L	Azimuth from back tangent		Corrected Dist.	Difference in elev.	Elev.
-53	25	86	+32°16'	38°		61.5	+38.8	
	26	76	+53°15' +4.0'	54°	Top of rock			
	27	73	+51°05'	93°	"			
	28	46	+50°54' +4.0'	98°	"			
	29	31	+43°49'	145°				
	30	51	+41°11' -2.0H	127°				
	31	58	+36°24' -5.0H	143°				
	32	73	+42°24'	128°				
	33	38	+20°37'	167°		33.3	+12.5	
	34	55	+18°34' -7.0	159°		49.4	+9.6	
	35	55	13' higher than shot #34	157°		55	+22.6	
	36	56	-5.4	173°		56	-0.1	
	37	35	-5.4	185°	outside edge of road	35	-0.1	
	38	65	-5.5	192°	"	65	-0.2	
	39	50	-5.3	205°	"	50	+0.0	
	40	16	-4.6	275°	"	16	+0.7	
	41	35	-4.4	334°	"	35	+0.9	
	42	32	-8.3	293°	Toe slope	32	-3.0	
	43	23	-8.8	265°	"	23	-3.5	
	44	58	-9.4	217°	"	58	-4.1	
	45	75	-10.7	194°	"	75	-5.4	
T.P. -> Transit at "B"	Transit Pnt. B	89	-5.6	173°28'		89	-0.3	
HI. +4.2 from Sta. 107+00 -4.7 to ground.	1	29	-4.8	3°		29	-0.1	New elev.

Transit Sta.	Shot No.	Dist.	Tad or Vert. L	Az. from Ad	Correct Dist	DIFF.	Elev
47	2	28	-4.5	51°	28	+0.2	
	3	31	+4.5	51°	31	+9.8	
	4	38	+13°53'	44°	35.8	+8.8	
	5	38	12' higher than shot #4	44°	38	+20.8	
	6	38	+16°12'	31°	35.	+10.2	
	7	42	14' higher than shot #6	31°	42	+24.2	
	8	32	-4.5	65°	32	+0.2	
	9	46	-3.4	68°	46	+1.3	
	10	48	-4.4	75°	48	+0.3	
	11	63	+4°16'	72°	63	+4.7	
	12	66	-2.7	79°	66	+20	
	13	89	-3.2	90°	89	+1.5	
	14	92	+2°47'	79°	92	+4.5	
	15	109	+15°21' -30H	69°	101.4	+24.8	
	16	99	+20°40' -80H	64°	86.7	+24.7	
	17	85	+16°04' -50H	69°	78.5	+17.6	
	18	69	+23°27'	62°	58.0	+25.2	
	19	80	+28°51' -80H	55°	61.4	+25.8	
	20	70	+31°49'	53°			
	21	78	+33°41'	40°			
	22	104	+30°57'	43°			
	23	114	+28°28' -70H	52°	88.1	+40.8	
	24	121	+23°18' -30H	63°	102	+40.9	
	25	99	-3.0	107°	99	+1.7	Edge Road

Shot No.	Dist.	Prod or Vert. L	Az. from A		Dist	Diff. El.	Elev.
26	61	-4.1	98°	Edge Tol.	61	+0.6	
27	20	-4.5	114°	"	20	+0.2	
28	6	-9.8	206°	Toe slope	6	-5.1	
29	27	-10.3	150°	" "	27	-5.6	
30	50	-8.8	128°	" "	50	-4.1	
31	37	-8.6	119°	" "	37	-3.9	
32	94	-8.5	126°	" "	94	-3.8	

X Sections Extended to Cover
Road Line Change

Jan 15, 1931
Gold-Fran

Conversa Chief type
Elliott Notes
Simpson Level
Louden Rod

32

72

ht.

RT

Note: All readings refer +3.9
40 ft. to original elevations.

62+06²³

+3.2
40 ft.

62+25

+15 +4.3
45 30 ft.

62+53

+8.3
45 ft.

62+81

+6.7
50 ft.

63+05

+6.4
50 ft.

63+20

+7.1
50 ft.

63+40

+7.6
50 ft.

63+60

Jan 15, 1931
Rain.

33
33

63+82

9
+9.1
50 ¢

64+00

+7.9
50 ¢

64+57

+6.6
50 ¢

34

34

Proposed location of Road Crossing
chocolate creek at old Flume crossing

Location ξ Profile.

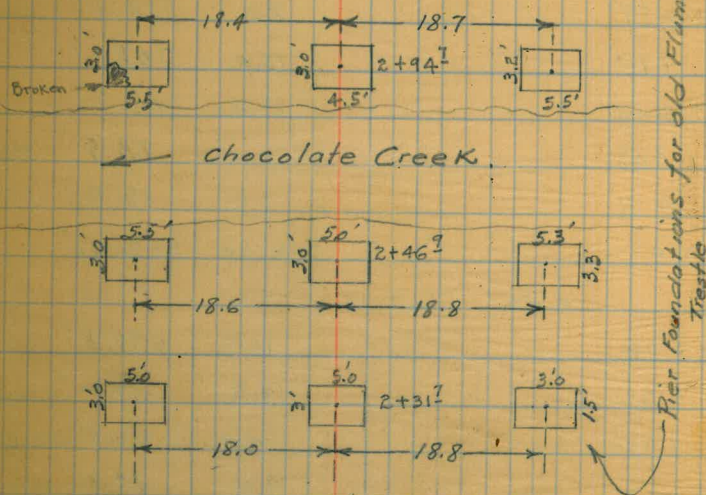
B.M.	7.46	763.23	755.77
0+00		1.5	761.7
0+30		3.3	759.9
+50		6.4	756.8
+75		9.9	753.3
T.P.		7.46	755.77
	1.80	757.57	
1+00		9.7	747.9
+16		12.0	745.6
+24		7.8	749.8
+35		15.0	742.6
T.P.		12.94	744.63
	0.57	745.20	
T.P.		12.83	732.37
	1.30	733.67	
1+40		+1.5	735.2
+50		4.4	729.3
+58		5.0	728.7
+75		13.8	719.9
T.P.		13.02	720.65

Jan. 31-1934.
Converse
Simpson
Soper
Remmen.

ξ

0+14

35
35



Large Boulder
2+13 ← 12' X 16' X 10' ±



Large Boulder
1+25

0 0+00

T.P.			720.65		
	0.45	721.10			
1+87			7.0	714.1	
+97			13.0	708.1	
2+03			13.4	707.7	
+08			6.6	14.5	Top of Boulder
+17			8.2	12.9	" " "
T.P.			12.62	708.48	
	0.66	709.14			
2+22			10.3	698.8	
+31 ^Z			9.9	99.2	Top of pier on ϕ
+31 ^Z			10.8	98.3	Natural Ground elev. at pier on ϕ
"			9.8	99.3	Top of pier North of ϕ
"			11.3	97.8	Natural Ground elev. at N. pier
"			9.7	99.4	Top of pier South of ϕ
"			11.8	97.3	Natural Ground elev. at S. Pier
T.P.			11.87	697.27	
	4.08	701.35			
2+46 ^Z			4.1	697.3	Top of pier on ϕ .
"			8.0	93.1	Natural Ground elev. at pier on ϕ .
"			4.1	97.3	Top of pier North of ϕ .
"			7.1	94.3	Natural Ground elev. at N. pier
"			4.1	97.3	Top of pier South of ϕ .
"			7.5	93.9	Natural Ground elev. at S. Pier

	701.35 ✓		
2. + 65		8.2	693.4 ✓
+ 67		10.2	91.2 ² = west edge of creek channel
+ 87		11.1	90.3 = East " " " "
+ 92		9.3	92.1
2 + 94.3		4.1	97.3 = Top of pier on \$
"		7.4	94.0 = Natural ground at \$ pier
"		4.1	97.3 = Top of pier North of \$
"		6.5	94.9 = Natural Ground at North pier
"		4.1	97.3 = Top of pier South of \$
"		6.9	94.5 = Natural Ground at South pier
3 + 00		5.2	96.2
T.P.		0.35	701.00 ✓
	12.45		713.45 ✓
3 + 15		9.7	703.7
+ 25		2.6	710.8
T.P.		0.20	713.25 ✓
	12.53		725.78 ✓
T.P.		0.25	725.53 ✓
	12.67		738.20 ✓
3 + 50		6.8	731.4
+ 56		5.6	732.6
T.P.		0.16	738.04 ✓

738.04 ✓

12.65 750.69 ✓

3 + 67
+ 75
+ 84

10.2 740.5
10.3 740.4
1.2 749.5

0.9 749.8 = check on Flag Set at elev. 750.0

T.P.

12.02 762.21 ✓

0.50 750.19 ✓

4 + 00
4 + 14⁷²

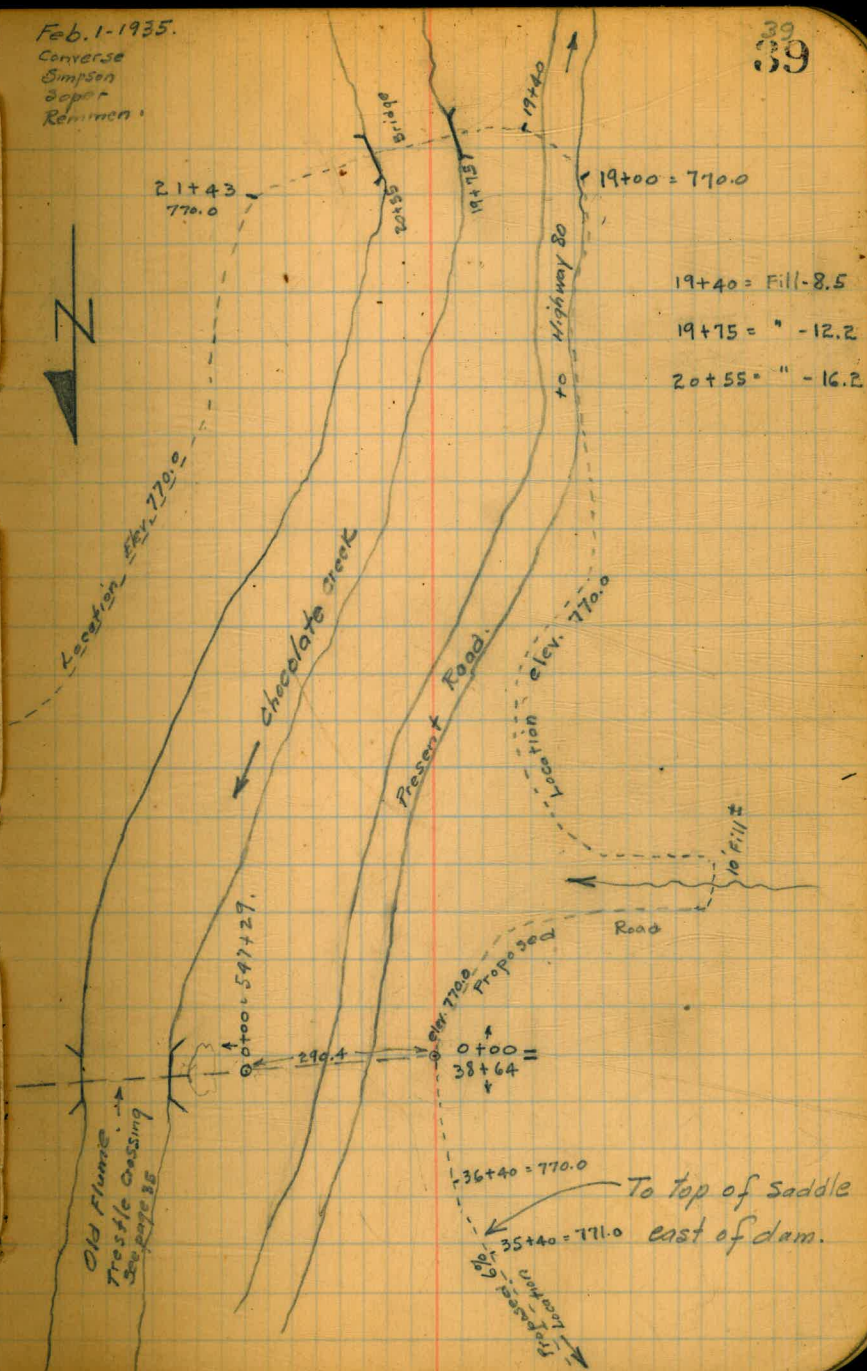
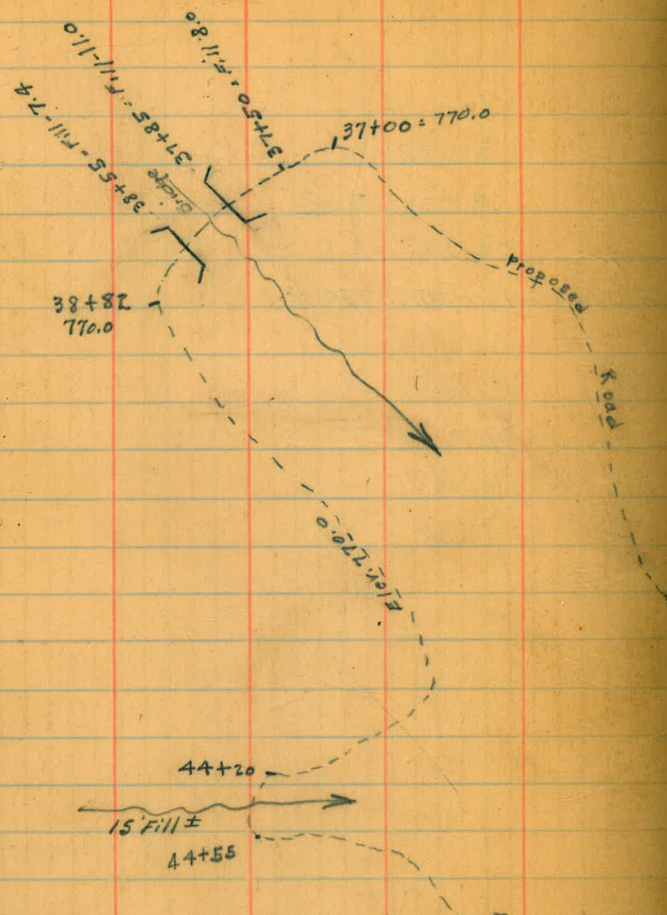
7.4 754.8
1.1 761.1

Proposed Road Locations - chocolate Creek.

Feb. 1-1935.

Converse
Simpson
Super
Remmon

39
39



19+40 = Fill - 8.5
19+75 = " - 12.2
20+55 = " - 16.2

Note - Top of Dam to top saddle
6% grade = 1850'
5% " = 2120'
3970'
3864
7834

36+40 = 770.0
35+40 = 771.0
To top of Saddle east of dam.

Proposed Location of 6% Road From
Axis of Dam at South Side, Down to County
Road.

Feb. 13-1935

Converse
Simpson
Soper
Emmett.

41

Sta.	Angle	Mag. Bear.	Calc. Bear.
		S 86° 35' W	S 87° 37' W ✓

1+73.48 ✓
1+74.41 A 2° 25' 30" Lf
4° 51'
2° 25' 30"

S 88° 50' W N 89° 57' 30" W ✓

1+51.15 ✓ E.C.

1+13.50 B 21° 50' Lf
43° 40' 30"
21° 50' 15"

1/2 Δ = 10-55.08 ✓

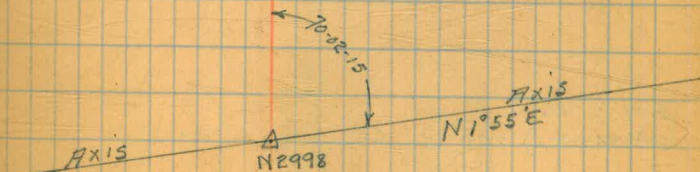
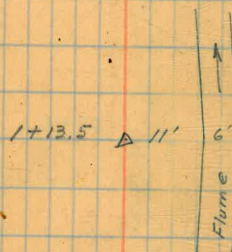
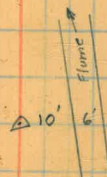
R = 200
T = 38.58 ✓
E = 3.7 ✓
L = 76.23 ✓

0+74.92 ✓ B.C.
38.12
2+13.04

N 66° 30' W N 68° 07' 15" W ✓

0+00 = N 2998 70-02-20
E 5000 140-04-30

N. 1° 55' E



Sta. Angle
A+68.38 E.C.

Mag. Bear. Calc. Bear.

4+37.14 ✓
4+39.42 Δ 18°03'
36°06' Lf.
18°03'

N 71°10' W N 69°58'20" W ✓

1/2 Δ = 9-01-30

R=200
T=31.77
E=2.5
L=63.01 ✓

A+05.37 B.C.

69.18 ✓

N 51°30' W N 51°55'20" W ✓

A+02.56 E.C.

3+69.31 ✓ 27°46'15"
3+70.24 Δ 55°32' Rt.
27°46'

1/2 Δ = 13-53 ✓

R=140
T=34.60 ✓
E=4.2
L=67.85 ✓

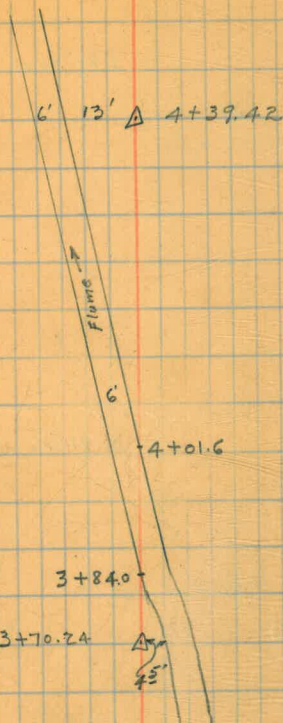
3+34.71 B.C.

66.06 ✓

N 80°45' W N 79°41'20" W ✓

3+03.25 ✓ 12°41'30"
3+04.18 Δ 25°23'15" Rt.
12°41'38"

S 86°35' W S 87°37' W



VERY ROCKY



33.92
3+34.71
3+68.63

Feb. 13-1935

43

Sta.	Angle	Mag. Bear.	Calc. Bear.
10+04.79 ✓	7°04'15"	580°30'W	581°30'55"W ✓
40+07.10 Δ	14°08'30"		
	7°04'15"		

Lf.

Δ 10+07.10
Pt. on Large Boulder.

443.19 ✓

587°00'W 588°35'10"W ✓

5+61.10 ✓	11°50'10"		
5+63.91 Δ	23°41'		
	11°50'30"		

Lf.

Rocky

Δ 5+63.91

Very

43.89 ✓

N 81°10'W N 79°34'20"W ✓

5+17.21 ✓	9°36'		
5+20.02 Δ	19°12'		
	9°36'		

Lf.



20.0 Δ 5+20.02

N 71°10'W N 69°55'20"W

80.60 ✓

Feb. 13-1935.

44
44

Sta. Angle Mag. Bear. Calc. Bear.

15+77.07 ✓ E.C.

564°00'W 563°45'40"W ✓

15+42.43 ✓ 41°37'30"
15+47.39 Δ 83°15'30" Lt.
41°37'45"

1/2 Δ = 20-48-52

R = 100 ✓
T = 38.02 ✓
E = 7.10 ✓
L = 72.66 ✓

Δ

15+04.41 B.C.

127.39

N75°20'W N74°36'35"W ✓

14+66.19 ✓ E.C.

14+17.19 ✓ 28°41'15"
14+20.00 Δ 57°23' Rt.
28°41'30"

1/2 Δ = 14-20-45

R = 200 ✓
T = 51.15 ✓
E = 6.4 ✓
L = 100.15 ✓

Δ 14+20.00

13+66.04 ✓ B.C.

238.70

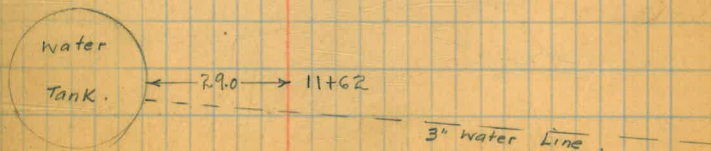
576°15'W 576°41'55"W ✓

11+78.49 ✓ 4°49'
11+81.30 Δ 9°38' Lt.
4°49'

Δ 11+81.30

580°30'W 581°30'55"W

174.20



Feb. 13 - 1935

45
45

Sta.	Angle	Mag. Bear.	Calc. Bear.
17+65.07	E.G.	N26°20'W	N26°03'35"W

74.08
33.80 ✓
17+65.07 Δ 52°07' Rt.
26°03'30"

 $\frac{1}{2}\Delta = 13-01-45$

R = 1.40
T = 32.40
E = 3.7
L = 63.67 ✓

Δ 17+65.04

17+01.40 B.G.

95.70
NS2°45'W N52°07'05"W

16+89.09 E.G.

+60.56 ✓
16+69.34 Δ 132°14'30" Rt.
91°07'15"
91°07'15"

 $\frac{1}{2}\Delta = 45-33-38$

R = 50
T = 50.99
E = 21.33 ✓
L = 79.52 ✓

Δ 16+69.34

16+09.57 B.G.

68.73
S35°45'W S36°45'40"W

16+03.83 E.G.

15+92.27 ✓
16+00.61 Δ 54°00' Lf.
27°00'
27°00'

 $\frac{1}{2}\Delta = 13-30$

R = 50
T = 17.00
E = 1.4
L = 23.56 ✓

Δ 16+00.61

15+80.27 B.G.

54°00'W S63°45'40"W

54°00'W
S63°45'40"W

Feb. 13 - 1935

46
46

Sta. Angle. Mag. Bear. Calc. Bear.

20+24.82 E.C.

19+80.28 ✓ 28°59'30"

20+12.65

57°58'30"

L.f.

28°59'15"

581°00'W 581°27'20" ✓

1/2 Δ = 14-29-38

20+30 ← 9' → ○ Power Pole.

R = 180

T = 46.53

E = 5.9

L = 91.07 ✓

20+85 19+33.75 B.C.

N70°30'W N69°33'25" ✓

06.43 ✓

15°18'

19+38.80 Δ

26°36'40"

L.f.

15°18'20"

N57°20'W N56°15'05" ✓

56.63 ✓

11°05'15"

18+59.00

22°11'

L.f.

11°05'30"

N45°30'W N45°09'35" ✓

06.75 ✓

19°06'

18+39.12 Δ

38°12'

L.f.

19°06'

N26°20'W N26°03'35" W

Feb. 4. 1935.

47

Sta.	Angle	Mag. Bear.	Calc. Bear.
22+58.27	E.G.		
31.33 22+66.13	103°19'15" Δ 20°38' Rt. 103°19'	N 50°15' W	N 49°18'10" W ✓ ½Δ = 51-39-30
21+68.11	B.G.		
116 84.6 21+68.10	E.G.	S 26°50' W	S 27°22'50" W ✓
47.10 21+91.46	20°15'30" Δ 4°31'30" Lt. 20°15'45"		½Δ = 10-07-52
21+25.66	B.G.		
45.99		S 47°00' W	S 47°38'35" W ✓
01.11 21+25.47	15°35'30" Δ 3°11'30" Lt. 15°35'45"		
52.08		S 62°45' W	S 63°14'20" W ✓
49.08 20+23.44	18°13' Δ 36°26' Lt. 18°13'		
20.79		S 81°00' W	S 81°27'20" W ✓

R = 50 ✓
T = 63.22 ✓
E = 30.6 ✓
L = 90.16 ✓

R = 120 ✓
T = 21.44 ✓
E = 1.9 ✓ = 21+46.88
L = 421.44 ✓

Δ

Δ

Δ

Δ

Feb. 14. 1935

48

Sta. Angle. Mag. Bear. Calc. Bear.

24+75.12 ✓ 13°58'
~~25+55.62~~ Δ 27°56' Lt.
 13°58'

N70°45'W N69°38'55"W ✓

↓
 70.30
 24+31.00 ✓ E.C.

N56°10'W N56°00'55"W ✓

24+07.07 ✓ 41°01'
~~24+85.32~~ Δ 82°02' Rt.

 $\frac{1}{2}\Delta = 20-30-30$

R=70.0 ✓
 T=26.18 ✓
 E=4.74 ✓ = 24+05.95
 L=50.11 ✓

↓
 64.80
 23+80.89 B.C.

S82°15'W S82°58'05"W ✓

23+78.30 ✓ E.C.

23+49.44 ✓ 61°57'45"
~~24+20.52~~ Δ 123°56' Lt.
 61°58'

 $\frac{1}{2}\Delta = 30-59$

R=60 ✓
 T=36.03 ✓
 E=10.0 ✓
 L=64.89 ✓

± 8' Ext.

↓
 69.30
 23+13.41 B.C.

N35°40'W N35°03'55"W ✓

22+80.14 ✓ 14°14'10"
~~23+51.22~~ Δ 28°28'30" Rt.
 14°14'15"

N50°15'W N49°18'10"W ✓

85.09 ✓

Feb. 14 - 1935

49

Sta.	Angle.	Mag. Bear.	Calc. Bear.
26 + 78.30 27 + 58.80	6°03'30" Δ 12°06'50" Lf. 6°03'25"	N68°15'W	N67°55'40"W
49.84			
26 + 28.46 27 + 08.96	20°13'30" Δ 40°27' Lf. 20°13'30"	N61°30'W	N61°52'15"W
50.94			
25 + 78.02 26 + 58.52	5°55' Δ 11°49'50" Rt. 5°54'55"	N42°00'W	N41°38'45"
51.60			
25 + 26.42 26 + 06.92	22°25'15" Δ 44°50'30" Rt. 22°25'15"	N48°30'W	N47°33'40"W
51.30			
		N70°45'W	N69°58'55"W

Δ

Δ

Δ

Δ

Feb. 15-1935.

50

Sta. Angle Maq. Bear. Calc. Bear. ✓
 30+99.74 ✓ 32°09'45"
 31+80.24 Δ 64°19'30" Lf.
 32°09'45"

N71°45'W N.71-08-05W ✓

28+66.59 ✓ 12°35'30"
 29+47.09 Δ 25°11' Rt.
 12°35'30"

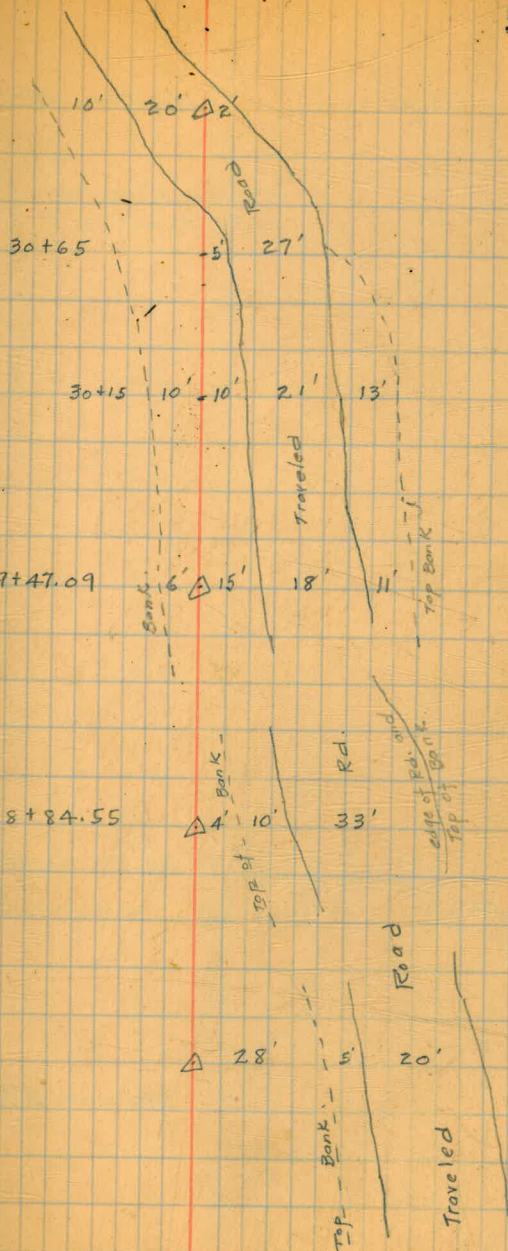
N84°50'W N.83-43-35W ✓

28+04.05 ✓ 7°29'30"
 28+84.55 Δ 14°58'50" Lf.
 7°29'25"

N77°10'W N.76-14-10W ✓

27+28.16 ✓ 8°18'20"
 28+08.66 Δ 16°37' Lf.
 8°18'30"

N68°15'W N.67-55-40W ✓



Feb. 15 - 1935,

51

Sta.	Angle	Mag. Bear.	Calc. Bear.
------	-------	------------	-------------

22+76.41 P.I. Pipe Line Survey
~~32+28.84~~ = Δ
 32+48.34 \checkmark Δ

576°00'W 576-42-10W \checkmark

148.60 \checkmark

R.P.
 Set Nail in North Side
 of 12" Live Oak Tree.

22+76.41
 = 33+28.84 Δ

31+80.24 Δ

Tie to P.I. Sta. 22+76.41 Δ
 Pipe Line Survey Δ 20' Δ

Travelled

Profile Levels on Road Location on
South Side, From Co. Road East of City
Camp to Top of Dam.

March-6-1935.

Simpson
Soper
Remmen.

53

B.M. 3.99 773.66 769.67

Grades.

0+00. 3.2 770.5 771.0

+11 3.5 70.2

+31 10.0 63.7

+34 7.7 66.0

+50 9.2 64.5 767.8

+65 11.3 62.4

0+74⁹ B.C. 10.5 63.2 766.7

1+13⁰⁴ Ext 6.6 67.1 763.8

1+51¹⁵ E.C. 9.5 64.2 761.3

1+73⁴⁸ Δ 12.7 61.0 759.9

T.P. 12.64 761.02

0.93 761.95

2+00 6.2 55.8 758.2

+25 9.2 52.8 on Flume, Bench 756.6

+50 9.4 52.6 " " " 755.0

3+03²⁵ Δ 9.2 52.8 " " " 751.6

3+34⁷¹ B.C. 14.6 47.4 749.6

+58 19.1 42.9

3+68⁶ Ext. 14.7 47.3 747.4

" 8.5 53.5 = Flow line of Flume opposite sta. 3+68 E

T.P. 12.84 749.11

0.26 749.37

Note: Large Boulder on South Side
of E of Sta. 0+60

March 6-1935

52

749.37

4+00	12.5	736.9	745.4
+01	5.2	44.2	
+02 ⁵⁶ E.C.	5.0	44.4	
+05 ²⁷ B.C.	5.8	43.6	
+15	7.8	41.6	
+31	0.6	48.8	
+36 ⁸⁷ Ext.	1.4	48.0	743.0
+68 ²⁸ E.C.	3.1	46.3	741.0
5+00	8.6	40.8	739.0
+17 ²¹ D	9.7	39.7	736.9
+42	12.6	36.8	
T.P.	12.14	737.23	

0.31 737.54

5+61 ¹⁰ D	1.1	36.4	735.1
+86	0.8	36.7	
6+00	4.1	33.4	732.6
+20	8.1	29.4	
+50	4.8	32.7	729.4
+75	8.6	28.9	
7+00	10.8	26.7	726.2
T.P.	12.19	725.35	

3.70 729.05

+15	7.6	21.4	
+30	2.6	26.4	

March 6-1935

54

	729.05		Grades	
7+50		3.0	726.0 ✓	723.0
+73		10.7	18.6 ✓	
8+00		9.4	19.6 ✓	719.8
+25		12.5	16.5 ✓	718.7
+50		13.1	15.9 ✓	716.6
+75		13.9	15.1 ✓	715.0
9+00		11.8	17.2 ✓	713.4
+30		6.6	22.4 ✓	711.5
+50		5.3	23.7 ✓	710.7
+60		6.0	23.0 ✓	
B.M.		9.35	719.70	Rec. Elev. 719.70
9+82		12.5	16.5 ✓	708.7
10+02		16.1	12.9 ✓	
+02		5.1	23.9 ✓	705.7
+10		11.1	17.9 ✓	
T.P.		9.35	719.70	
	3.22			722.92
+50		4.9	18.0 ✓	703.8
+70		14.4	08.5 ✓	707.5
T.P.		12.66	710.26	
	0.31			710.57
+83		3.7	06.9 ✓	
+85		7.7	702.9 ✓	
11+00		16.1	694.5 ✓	700.6

March-6-1935

55
55

710.57

11+08	19.6	691.0	
+25	14.3	96.3	
+50	11.0	699.6	
+78 ²⁹ Δ	10.2	700.4	
12+00	10.9	699.7	
T.P.	12.70	697.87	

0.74 698.61

+50	8.9	89.7	
+77	11.8	86.8	
13+00	10.3	88.3	
+25	9.0	89.6	
+50	11.3	87.3	
T.P.	12.91	685.70	

1.10 686.80

+66 ⁰⁹ B.C.	2.0	84.8	
+75	6.0	80.8	
14+00	4.6	82.2	✓
+25	3.6	83.2	✓
+50	5.2	81.6	✓
+66 ¹⁹ E.C.	7.1	79.7	✓
+75	8.6	78.2	✓
T.P.	12.41	674.39	

3.90 678.29

+97	11.1	67.2	
-----	------	------	--

	678.29		
15+04.41 B.C.		10.0	668.3
+16		4.1	74.2
+25		3.0	75.3
+50		2.9	75.4
+75		3.6	74.7
+77 ⁰⁷ E.C.		1.7	76.6
+80 ²⁷ B.C.		2.6	75.7
+92 ⁰⁵ Ext.		5.1	673.2
16+03 ⁸³ E.C.		8.7	69.6
+09 ⁵⁷ B.C.		9.9	68.4
B.M.		9.64	668.65 668.64
	9.64	678.28	
T.P.		12.54	665.74
	0.48	666.22	
16+25		2.3	63.9
+40		10.6	55.6
+50		11.4	54.8
+62		6.0	60.2
+75		3.5	62.7
16+89 ⁰⁹ E.C.		3.7	62.5
17+01 ⁴⁰ B.C.		3.8	62.4
+20		7.1	59.1
+33 ²⁴ Ext.		8.0	58.2
17+65 ⁰⁷ E.C.		10.4	55.8

Rec. Elev.
668.64

Ravine

March 6-1935

57

57

666.22

18+06.75 A		12.0	654.2 ✓
T.P.		12.56	653.66 ✓
	1.34		
	0.34		
	655.00		
18+56.63 A		3.6	51.4 ✓
+82		3.2	51.8 ✓
19+06.43 A		6.5	48.5 ✓
+33.75 B.C.		7.2	47.8 ✓
+79.29 Ext.		8.1	46.9 ✓
20+00		8.4	46.6 ✓
+24.82 E.C.		11.7	43.3 ✓
Set B.M.		8.64	646.36 3. Nails
	0.16	646.52	
20+79.08 A		5.6	40.9 ✓
+75		7.2	39.3 ✓
21+01.11 A		9.6	36.9 ✓
+25.66 B.C.		10.3	36.2 ✓
21+46.88 Ext.		11.4	35.1 ✓
T.P.		12.90	633.62 ✓
	0.25	633.87	
21+68.10 E.C.		1.7	32.2 ✓
21+68.11 B.C.			
+75		2.8	31.1 ✓
+95		7.6	26.3 ✓
22+00		11.2	22.7 ✓

in South side of Power Pole #173292
12' Rt of Sta. 19+97

March 6-1935

58
58

633.87

22+05	12.8	621.1	Rivine
+10	8.9	25.0	
+25	6.4	27.5	
+50	5.2	28.7	
+58.27 E.C.	6.9	27.0	
+68	9.6	24.3	
+80.14 Δ	7.1	26.8	
23+00	7.3	26.6	
+13.41 B.C.	7.8	26.1	
+25	7.6	26.3	
+50	8.8	25.1	
T.P.	12.74	621.13	

0.30 621.43

+65	+2.5	23.9	
+75	1.8	19.6	
+78 ³⁰ E.C.	2.4	19.0	
24+05.95 Ext.	5.8	15.6	
+31.00 E.C.	7.9	13.5	
+53	10.7	10.7	
+68	3.1	18.3	on Boulder
+75.12 Δ	8.2	13.2	
+83	7.1	14.3	
T.P.	13.03	608.40	

0.16 608.56

March 6 - 1935

59

608.56

25+26.42 Δ		1.3	607.3 ✓
+35		+0.7	09.3 ✓ on large
+45		7.3	01.3 ✓
+78.02 Δ		2.9	05.7 ✓
26+00		2.2	06.4 ✓
+11		5.3	03.3 ✓
+28.46 Δ		6.5	02.1 ✓
+56		6.8	01.8 ✓
+78.30 Δ		8.8	599.8 ✓
T.P.		8.11	600.45 ✓
	3.39		603.84 ✓
27+00		4.5	599.3 ✓
+15		3.6	600.2 ✓
+28.16 Δ		6.5	597.3 ✓
+70		5.4	98.4 ✓
28+04.05 Δ		6.2	97.6 ✓
+17		4.8	99.0 ✓
+21		14.4	89.4 ✓
T.P.		12.20	591.64 ✓
	0.87		592.51 ✓
Set B.M.		6.20	586.31 ✓ Top of
	0.35		586.66 ✓
28+40		+0.2	86.9 ✓
+66.59 Δ		0.1	86.6 ✓
"		5.9	80.8 ✓ on Present

Boulder.

Large Boulder at N. edge of Road
35' Rt. of Sta. 28+70

Traveled Rd. 20' Rt. Sta. 28+66.59

March-G-1935

60

586.66

29+00		+1.5	588.2	
+16		2.2	84.5	
+35		0.7	86.0	
+50		3.8	82.9	
30+00		8.2	78.5	= South
+50		10.5	76.2	= 4
30+99 ⁷⁴	A	12.1	74.6	= North
T.P.		12.88	573.78	
	0.18		573.96	
31+50		2.2	71.8	4
32+00		5.8	68.2	"
T.P.		10.99	562.97	
	5.76		568.73	
B.M.		0.02	568.71	check on

edge of Present Traveled Rd.

" " " "

" " " "

B.M. at City Camp Rec. Elev. 568.88,
Pipe Line Survey B.M. #4

Grades on 6.4% Road Location
From City Camp to Top of Dam.

61

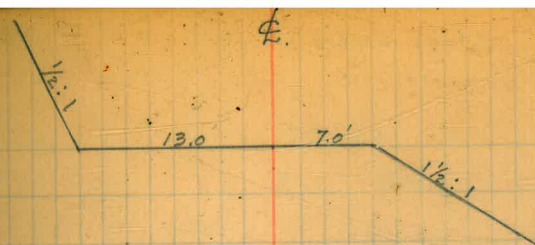
0+00	771.0	12+00	694.2	24+00	-617.4
+50	767.8	+50	91.0	+50	-14.2
1+00	64.6	13+00	87.8	25+00	-11.0
+50	61.4	+50	84.6	+50	-07.8
2+00	58.2	14+00	81.4	26+00	-04.6
+50	55.0	+50	78.2	+50	-601.4
3+00	51.8	15+00	75.0	27+00	-598.2
+50	48.6	+50	71.8	+50	95.0
4+00	45.4	16+00	68.6	28+00	91.8
+50	42.2	+50	65.4	+50	88.6
5+00	39.0	17+00	62.2	29+00	85.4
+50	35.8	+50	59.0	+50	82.2
6+00	32.6	18+00	55.8	30+00	579.0
+50	29.4	+50	52.6		
7+00	26.2	19+00	49.4		
+50 ✓	23.0	+50	46.2		
8+00 ✓	19.8	20+00	43.0		
+50 ✓	16.6	+50	39.8		
9+00 ✓	13.4	21+00	36.6		
+50 ✓	10.2	+50	33.4		
10+00 ✓	07.0	22+00	30.2		
+50 ✓	03.8	+50	27.0		
11+00 ✓	700.6	23+00	23.8		
+50	699.0	+50	20.6		
	697.4				

Slope Stakes on 6.4% Road From Top of Dorr at
South Abutment to County Road East of City
Camp.

March-9-1925

Simpson
Saper
Remmen,

622



B.M.			646.36		
	12.18	658.54	¢ Elev.	Grade	
17+33.24			0.3	658.2	660.07
+65.07			2.7	55.8	658.04
18+06.75			4.3	54.2	655.37
+25			5.2	53.3	654.2
+56.63			7.1	51.4	652.18
+80			6.7	51.8	650.68
19+06.43			10.0	48.5	648.99
+33.75			10.7	47.8	647.24
T.P.			12.18	646.36	
	2.59	648.95			

Lf.	¢	Rt.
C-7 ² 17 ⁰	Grade 2 ⁶	F16 ³ 27
C-8 ⁶ 17 ³	Grade 3 ⁰	F14 ⁹ 23
C-3 ⁷ 14 ⁸	Grade 2 ⁵	F10 ¹ 21
	Grade 2 ⁹	
C-5 ² 15 ⁶	C-4 ⁷ 13	Grade 1 ³
	C-4 ⁹ 15 ⁶	Grade 2.7
C-5 ² 15 ⁶	Grade 1 ⁰	F-3 ⁵ 15 ³
	C-6 ⁴ 16 ²	Grade 2 ⁵
		F14 ⁹ 14 ⁴
		F14 ⁹ 9 ¹

	648.95		\$ Elev.	Grade	Lf.	\$	Rt.
19+79.29		2.1	646.9	644.43	C-6 ³		Grade 12 ¹
20+00		2.3	646.7	643.0	C-7 ³		Grade 12 ¹
+24.82		5.7	43.3	641.41	C-7 ⁹		Grade 7 ⁵
+49.08		8.1	40.9	639.86	C-5 ⁹		Grade F 2 ⁴ 2 ⁵ 10 ⁶
+75		9.7	39.3	638.2	C-6 ⁶		Grade F 1 ⁹ 3 ¹ 98 ⁵
21+01.11		12.1	36.9	636.53	C-5 ⁷		Grade F-5 ¹ 12 14 ⁶
T.P.	504		638.66	633.62			
21+25.66		2.5	36.2	634.96	C-7 ³		Grade F-4 ⁵ 3 ² 13 ⁸
+46.88		3.6	35.1	633.60	C-18 ⁹		Grade F-16 ¹ 2 ³ 31 ²
+75		7.6	31.1	631.80	C-13 ⁹		Grade F-12 ⁸ 19 ⁵ 26 ²

Slope Stakes Cont'd.

T.P.		633.62	Grade.
220	635.82		
22+00	13.1	622.7	630.2
+25	8.3	627.5	628.6
+50	7.1	628.7	627.0
+80.14	9.0	626.8	625.07
23+13.41	9.7	626.1	622.94
T.P.	14.69	621.12	
7.88	629.01		
+25	2.7	626.3	622.2
+50	3.9	625.1	620.6
+78.30	10.0	619.0	618.79
24+05.95	13.4	615.6	617.02
	7.88	621.13	
0.59	621.72		

March-13-1935

Simpson
Soper
Remmen.

64

Lf.	¢	Rt.
Grade 14°	L-15	F-7 18
C-2° 14	Grade 62	F-4° 13
C-5° 15	C-12	Grade 3.2
		F-12 9
C-8° 17	C-12	Grade 52
		F-8 19
C-7° 16	C-12	Grade 11
C-8° 17	C-4	C-2° 8
C-7° 16	C-4	C-2° 8
C-4° 15	C-4	Grade 28
		F-0° 79
C-3° 14	Grade 42	F-3° 115

Slope stakes Cont'd.

March-19-1935

65

Station	621.72	± Elev.	Grade	Adj.	±	Rt.	
24+31.0	8.2	613.5	615.42	C-4 ⁰ 15 ⁰	Grade 5 [±]	F-8 ³ 19 [±]	
+75.12	8.5	613.2	612.59	C-8 ⁶ 17 ³	C-7 ¹ 6 ⁰	Grade 1 ²	F-18 ² 34 ³
25+00	11.1	610.6	611.00	C-12 ⁰ 19 ⁰	C-9 ¹ 11	Grade 0 ⁸	F-19 ⁰ 35 ⁵
+26.42	14.4	607.3	609.31	C-5 ⁷ 15 ²	Grade 3 ⁶	F-17 ⁶ 33 ⁴	
T.P.	8.88	609.33	600.45				
25+50	8.7	600.6	607.8		Grade 13 ⁰	F-16 ² 20 ⁰	F-25 ⁰ 44 ⁵
+78.02	3.6	605.7	606.01	C-7 ⁶ 16 ⁸	Rock C-6 ⁰ 6 ⁰	Grade 2 ²	F-11 ¹ 23 ⁶
26+00	3.3	606.0	604.6		C-7 ⁴ 16 ⁷	Grade 2 ¹	F-10 ⁴ 22 ⁶
+28.46	7.2	602.1	602.78	C-6 ³ 16 ²	Grade 1 ⁴	F-14 ⁰ 28 ⁰	
+55			601.08		C-8 ⁷ 17 ⁴	Grade 4 ⁶	F-8 ⁴ 19 ⁶
+78.30		599.8	599.59		C-9 ⁹ 18 ⁰	Grade 0 ⁵	F-6 ⁹ 17 ⁴

Slope Stakes Contd.

March-19-1935

66

Station	ℒ Elev.	Grade	Lf.	ℒ	Rf.	
27+00	599.2	598.2	C-10 ⁵ 18 ²	C ¹	Grade F-3 ² 3 ⁶ 12 ⁶	
+28.16	597.2	596.9	C-7 ⁸ 16 ²	C ²	Grade F-4 ³ 0 ² 13 ⁴	
+65	598.0	594.04	C-11 ⁸ 18 ²	C ³	Grade 6 ²	
28+04.05	597.6	591.54	C-15 ⁰ 20 ⁵	C ⁴	C-A ² Grade F-9 ² 3 ⁵ 5 ² 14 ² F-9 ² 21 ²	
+35	589.56		C-19 ⁸ 22 ²	C-11 ³ 4 ⁰	Grade F-7 ⁶ 9 ⁰ F-8 ² 19 ⁴	
+66.59	586.6	587.54	C-22 ⁸ 24 ⁴	C-13 ³ 6 ⁰	Grade F-6 ¹ 11 ⁰ F-6 ² 17 ⁰	
29+00	588.8	585.4	C-21 ⁹ 24 ⁰	C-14 ¹ 5 ⁰	C ⁵ Grade F-4 ² 3 ¹ 10 ² F-5 ⁴ 15 ¹	
+25	585.4	583.8	C-21 ² 23 ⁰	C-15 ⁵ 8 ⁰	C ⁶ Grade F-4 ² 2 ³ 11 ² F-4 ³ 13 ⁴	
+50	582.7	582.2	C-22 ⁶ 24 ³	C-16 ⁴ 10 ⁰	C ⁷ Grade F-3 ¹ 0 ⁵ 9 ² F-3 ¹ 11 ⁶	
+75	580.3	580.6	C-22 ¹ 24 ⁰	C-18 ³ 15 ⁰	C-6 ⁵ 9 ⁵	Grade F-2 ⁰ 7 ⁰ F-2 ² 10 ²
30+00	578.5	579.0	C-6 ⁰ 16 ⁰	C-4 ² 14 ²	Grade F-1 ² 8 ²	

Station	ℒ Elev.	Grade	Lf.	ℒ	Rt.	
30+25	577.3	577.4	C-21 ⁹ 24°	C-17 ⁵ 13°	C-47 11°	Grade 7°
30+50 End.				Grade 13	Grade 7	
<u>East from Sta. 17+33.24.</u>						
17+01.40	662.4	662.1		C-14 ³ 20°	Grade 05	F-17 ⁵ 31°
16+75	662.7	663.8	C-9 ⁰ 17°	Grade 14		F-17 ⁷ 26°
16+50	654.8	665.4		Grade 17°		F-18 ⁵ 15°
16+25	663.9	667.0		Grade 22°	F-46 13°	F-7 ³ 18°
16+09.57	668.4	668.0		C-76 16°		Grade 05
						F-2 ⁰ 10°

Slope stakes in Book 459 page 9.

4/1/35

X Sec Road

J.W.W.
H.W.K. Res
+ 200

68

		Area Sq ft	Av End Area	Cu ft		Area Sq ft	
17+34	$\frac{6.5}{4.0}$ cut	13.0		21400	$\frac{8.0}{4.0}$	16.0	4365.
17+65	$\frac{7.0}{4.5}$ cut	15.8	14.4 x 31	446.		16.0 x 25	400.
18+00	$\frac{7.0}{3.5}$	12.2		21+25	$\frac{8.0}{4.0}$	16.0	
18+00	$\frac{10.5}{4.5}$	23.6				17.0 x 22	374.
18+25	$\frac{9.5}{4.0}$	19.0	21.3 x 25	533.	$\frac{8.0}{4.5}$	18.0	
			27.05 x 22	866.		21.0 x 21	441.
18+57	$\frac{13.5}{5.2}$	25.8		21+68	$\frac{8.0}{6.0}$	24.0	
			38.4 x 23	883		22.5 x 32	720.
18+80	$\frac{17.0}{4.9}$	41.7		22+00	$\frac{6.0}{7.0}$	21.0	
			32.55 x 26	846.		28.5 x 15	428.
19+06	$\frac{9.0}{5.2}$	23.4		22+15	$\frac{12.0}{6.0}$	36.0	
			34.1 x 37	1262.		21.0 x 10	210
19+43	$\frac{14.0}{6.4}$	44.8		22+25	$\frac{6.0}{2.0}$	6.0	
			27.4 x			5.0 x 25	125
19+43	$\frac{8.0}{2.5}$	10.0		22+50	$\frac{4.0}{2.0}$	4.0	
			13.8 x 37	514		14.5 x 30	435.
19+80	$\frac{14.0}{2.5}$	17.5		22+80	$\frac{10.0}{5.0}$	25.0	
			15.5 x 20	310.		20.0 x 33.	660.
20+00	$\frac{9.0}{3.0}$	13.5		23+13	$\frac{10.0}{3.0}$	15.0	
			10.7 x 25	268.		18.8 x 12	226.
20+45	$\frac{6.0}{2.0}$	8.0		23+25	$\frac{9.0}{3.0}$ cut & 2.0 R	22.5	
			11.0 x 25	275.		26.2 x 25	655.
20+50	$\frac{8.0}{3.0}$	14.0		23+50	$\frac{8}{5.0}$ cut & 2.5	30.0	
			13.0 x 25	325		18.5 x 28	518.
20+75	$\frac{8.0}{3.0}$	12.0		23+78	$\frac{7.0}{2.0}$	7.0	
			14.0 x 25	350.		10.5 x 22	305.
				1365			12862.

Road to S. end Dam from B of Camp.

4+35 G.C. & N.H.

Sta 0 to Sta 45 no 1/2 mile Part of clearing not Camp

Sta	8.0 out	4.0 cut	16.0	14.0 x 20 = 280.0
5+45	8.0	3.0	12.0	6.0 x 5 = 30.0
5+65	0	0	0	0
5+70	0	0	0	0
5+79	0	0	0	0
5+79	9.0	4.5	20.25	18.875 x 26 = 491.0
6+05	10.0	3.5	17.5	18.875 x 20 = 377.5
6+25	9.0	4.5	20.25	23.625 x 25 = 590.6
6+50	9.0	6.0	27.0	24.75 x 30 = 742.5
6+80	9.0	5.0	22.5	33.75 x 45 = 1688.8
6+85	15.0	6.0	45.0	47 x 15 = 705.0
7+00	14.0	7.0	49.0	24.5 x 10 = 245.0
7+10	0	0	0	20 x 10 = 200.0
7+20	4.0	2.0	4.0	24.0
7+25	0	0	0	4.0

3832.4 cu ft

7+35	0	0.0	20.0 x 3 = 60.0
7+38	10.0	8.0	40.0
7+50	9.0	5.0	22.5
7+60	13.0	6.5	42.25
7+70	9.0	4.5	20.25
8+00	12.0	4.0	24.0
8+25	8.0	5.0	20.0
8+30	0	0	0
8+40	0	0	0
8+45	6.0	5.0	15.0
8+60	4.0	2.0	4.0
8+85	8.0	5.0	20.0
9+10	8.0	8.0	32.0
9+30	5.0	5.0	12.5

3832.4
60.0
375.0
323.8
312.5
663.8
550.0
50.0
37.5
142.5
300.0
650.0
445.0
1744.5

9+35	$\frac{0}{0}$	0	6.25x5	31.2	7144.5
10+70	$\frac{0}{0}$	0	0	0	
10+75	$\frac{6}{2}$	6.0	3x5	15.0	
10+85	$\frac{80}{7.0}$	28.0	17x10	170.0	
10+90	$\frac{11.0}{4.0}$	22.0	25x15	375.0	
10+15	$\frac{12.0}{4.5}$	27.0	24.5x15	367.5	
10+25	$\frac{9.0}{5.0}$	22.5	24.75x10	247.5	
11+75	$\frac{9.0}{4.5}$	20.25	21.375x50	1068.8	
12+00	$\frac{9.5}{5.0}$	23.75	22x25	550.	
12+25	$\frac{7.0}{5.5}$	19.25	21.5x25	537.5	
+50	$\frac{10.0}{4.0}$	20.0	19.625x25	490.6	
+75	$\frac{80}{20}$	8.0	14.x25	350.0	
+75	$\frac{0}{0}$	0.0			
12+90	$\frac{0}{0}$	0.0			
				0	
				11947.6	

12+90	$\frac{6}{2}$	6.0			11947.6
13+00	$\frac{10}{4.5}$	22.5	14.25x10	142.5	71
13+20	$\frac{9}{4}$	18.0	20.25x20	405.0	
13+50	$\frac{10}{4.0}$	22.5	20x30	600.0	
13+75	$\frac{8}{4.5}$	18.0	20x25	500.0	
14+00	$\frac{9.0}{3.5}$	15.75	16.875x25	421.9	
14+50	$\frac{11.0}{3.0}$	16.50	16.125x50	806.2	
14+65	$\frac{14.0}{3.0}$	21.0	18.75x15	281.2	
14+90	$\frac{11}{5.0}$	27.5	24.25x25	606.2	
15+10	$\frac{6}{4.0}$	12.0	19.75x20	395.0	
15+25	$\frac{18.0}{4.0}$	36.0	24x15	360.0	
15+50	$\frac{12}{3.0}$	18.0	27x25	675.0	
+70	$\frac{80}{20}$	8.0	15x20	300.0	
+75	$\frac{0}{0}$	0.0	6x5	30.0	
				0	
				17470.6	

Station	Fill	Area	Cu ft
16+10 to 16+40	0	13.5 x 10	135.0
16+40 to 16+50	27.0	34.5 x 25	862.5
16+50 to 16+75	42.0	41 x 25	1025.0
16+75 to 17+00	40.0	33.75 x 35	1181.25
17+00 to 17+35	27.5		
17+35 to 17+65	22.0	24.75 x 30 = 296.5 - 46.9968 = 249.5032	249.5
17+65 to 18+00	20.0	" " "	"
18+00 to 18+10	20.0	" " "	"
18+10 to 18+25	18.0	" " "	"
18+25 to 18+57	32.5	" " "	"

Cu ft.
17470.6 ✓

Same as A/1

10 days at Cu 770.00 747.00 29.69
 " 1st 1/2 22 " " 717.00
 1524.
 to May 2nd Total → 1834

May 2 1935 statn. Condt of Const. Road E of Camp to Top Dam. Send 72

Station	Fill	Area	Cu ft	Notes
Sta 0 to 5+45				No Fix. Part of Clearing along Thru
5+45 - 6+50				Same as Page 70. = 1769.1
6+50 to 6+80	27.0	29 x 30	870.	2.0 out 6.0 cut on side
6+80 to 7+00	31.5	45 x 20	900.	
7+00 to 7+00	33			
7+00 to 7+06	6	19.5 x 6	117.	
7+06 to 7+10	0	3 x 4	12.	
7+10 to 7+25	0			
7+25 to 7+30	9	4.5 x 5	22.	
7+30 to 7+30	2			
7+30 to 7+35	6	4 x 5	20.	
7+35 to 7+35	75			
7+35 to 7+50	30	52.5 x 15	787.	
7+50 to 7+60	42	36 x 10	360	
7+60 to 8+00	26	34 x 40	1360	
8+00 to 8+25	20	23 x 25	575	
8+25 to 8+30	0	10 x 5	50	
8+30 to 8+40	0			
8+40 to 8+42	28	14 x 2	28	
8+42 to 8+50	12	20 x 8	160.	
8+50 to 8+60	4	8 x 10	80	
8+60 to 8+70	18	11 x 10	110	
8+70 to 9+00	40.5	29 x 30	870.	
9+00 to 9+10	32	36 x 10	360	
9+10 to 9+28	30	31 x 18	558	
			9008	

9+28	$\frac{8}{5} + (5 \times 2) = 30$		25.5 x 2	9.08
9+30	7 x 3	21	10.5 x 5	51.
9+35	0	0		52.5
10+70	0	0	25 x 5	125.
10+75	$\frac{10 \times 5}{7+3} = 10$	50		700
10+85	$\frac{10 \times 5}{18/10} = 27.8$	90	70 x 10	840
11+00	$\frac{11}{2}$	22	56 x 15	550
11+25	$\frac{9}{5}$	22.2	22 x 25	650.
11+50	$\frac{12}{5}$	30	26 x 25	1035.
11+80	$\frac{13}{6}$	39.	34.5 x 30	780.
12+00	$\frac{13}{6}$	39	39 x 20	740
+20	$\frac{10}{7}$	35	37 x 20	825
+50	$\frac{10}{2}$	20	27.5 x 30	375
+75	$\frac{10}{2}$	10	15. x 25	25.
+80	0	0	5 x 5	-
+90	0	0	-	-
+90	$\frac{8}{5}$	12	-	-
13+00	$\frac{10}{4.5}$	22.2	17 x 10	110
+10	$\frac{11}{5}$	27.2	25 x 10	250
+12	$\frac{6}{4}$	12	20 x 2	40.
+35	$\frac{14}{6}$	42	27 x 23	621.
+40	$\frac{8}{5}$	20	31 x 5	155
+48	$\frac{10}{4}$	20	20 x 8	160
+50	$\frac{14}{6}$	42	31 x 2	62
+75	$\frac{12}{4.5}$	27	34.5 x 25	861
14+00	$\frac{8}{4}$	16	21.5 x 25	537.

18612.

14+00	$\frac{8}{4}$	16		18612
+30	$\frac{11}{4.5}$	24.75	20 x 30	600
+50	$\frac{16}{4.5}$	36.	20 x 30	600
+50	$\frac{11}{3}$	16.5	-	-
+60	$\frac{13}{3}$	19.5	18 x 10	180
+90	$\frac{15}{4}$	34	27 x 30	810.
15+25	$\frac{8}{7}$	28	31 x 35	1085.
+40	$\frac{18}{4}$	36	32 x 15	480
+50	$\frac{12}{3}$	18	27 x 10	270
+70	$\frac{9}{3}$	13.5	16 x 20	320.
+80	0	0	67 x 10	67
16+09	0	0	-	-
16+35	0	0	17.5 x 10	175.
16+45	$\frac{10}{7}$	35	45.5 x 30	1365
16+75	$\frac{14}{8}$	56	53 x 25	1325
17+00	$\frac{10}{10}$	50	46 x 33	1518
17+33	$\frac{12}{7}$	42	42 x 32	1344
+65	$\frac{14}{6}$	42	31 x 35	1085
18+00	$\frac{10}{4}$	20	-	-

18 to 30 Name as previous Sections

29 836 = 1105
 795
 310
 29 836 = 1105
 795
 310
 29 836 = 1105
 795
 310

8+50

9.

+30

11+25

+50

+78

12

+50

13

+50

L.

$$\begin{array}{r} C. 20.6 \\ \hline 23.3 \end{array}$$

$$\begin{array}{r} C. 13.0 \\ \hline 19.5 \end{array}$$

$$\begin{array}{r} C. 13.0 \\ \hline 19.5 \end{array}$$

$$\begin{array}{r} C. 9.6 \\ \hline 17.8 \end{array}$$

$$\begin{array}{r} C. 7.1 \\ \hline 14.7 \end{array}$$

$$\begin{array}{r} C. 8.9 \text{ (17 in cut)} \\ \hline 21.2 \end{array}$$

$$\begin{array}{r} C. 8.6 \text{ (17 in cut)} \\ \hline 21.3 \end{array}$$

$$\begin{array}{r} C. 8.6 \\ \hline 16 \end{array}$$

$$\begin{array}{r} C. 8.6 \\ \hline 16.3 \end{array}$$

$$\begin{array}{r} C. 8.6 \\ \hline 16.3 \end{array}$$

R.

$$\begin{array}{r} F. 9.0 \\ \hline 20.5 \end{array}$$

$$\begin{array}{r} F. 15.6 \\ \hline 30.4 \end{array}$$

$$\begin{array}{r} F. 18.4 \\ \hline 34.6 \end{array}$$

$$\begin{array}{r} 0.0 \\ \hline 7 \end{array}$$

$$\begin{array}{r} F. 9.0 \\ \hline 20.5 \end{array}$$

0.0

0.0

$$\begin{array}{r} 0.0 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 0.0 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 0.0 \\ \hline 7 \end{array}$$

14700

14450

+66

15710 t

+50

15772

C. 7.0
16.5C. 4.4 (15' in cut)
17.2C. 3.6 (15' in cut)
20.30.0 (8' in cut)
8C. 8.4 (25' in cut)
29.2C. 9.4 (21' in cut)
25.7F. 18.2
34.3

0.0

0.0

0.0

0.0

0.0

Profile of River Channel West
From Tunnel Outlet Portal.

Jan. 7-1934
Simpson
Soper
Remmen.

76

0+00 = West Edge of Apron at Outlet Portal

B.M. 6.41 570.06 563.65

T.P. 12.01 558.05

0.66 558.71

0+00 12.8 45.9

1+00 13.7 45.0

2+00 13.8 44.9

+60 14.4 44.3

+70 12.4 46.3

+93 13.0 45.7 = Flow

= Sump.

Line at East end of 12"X12" wooden culvert thru roadway fill, Not being used at present.

+95 10.4 48.3 = Flow

Line at East end of 12"X12" wooden culvert thru Rdwy. fill, Now being used.

2+95 11.4 47.3 = toe of Rdwy. fill.

T.P. 0.66 558.05

6.72 564.77

B.M. 1.13 563.64 = check on B.M. Elev. 563.65.

3+17 0.0 64.8 = East edge of Rd.

+30 0.3 64.5 = West " " "

564.77
T.P. 12.85 551.92

1.64 553.56

3+58 6.4 47.2 Flow Line at west end of 12" X 12' wooden culvert, now being used.

Note: West end of the lower wooden culvert inaccessible.

3+52 4.6 49.0 Stream bed at toe of Rd-wy. Fill.

4+00 5.2 48.4

5+00 6.7 47.0

6+00 8.3 45.3

T.P. 6.38 547.18

7.34 554.52

7+00 9.6 44.9

8+00 9.2 45.3

9+00 8.7 45.8

10+00 8.7 45.8

11+00 9.4 45.1

T.P. 7.36 747.16

7.46 554.62

12+00 10.0 44.6

13+00 9.4 45.2

+20 9.9 44.7

14+00 10.1 44.5

= inter-section of River channel and spillway channel.

T.P.			545.43	
	5.43	550.86		
25+88			4.1	546.8 = East edge of Rd.
26+03			4.8	46.1 = West
+12			11.8	39.1 = Stream bed at toe of Rwy. Fill.
+12			12.0	38.9 = Flow line at west end of 24' G.I. culvert (Lowestone)
27+00			12.5	38.4
T.P.			12.38	538.48
	3.84	542.32		
28+00			5.3	37.0
29+00			6.1	36.2
30+00			6.6	35.7
31+00			7.0	35.3
32+00			7.8	34.5 = opposite Res. Engr's, office.

Estimate of solid rock
to be blasted on Road from City
Camp to top of Dam. Sept. 14, 1935
Hill - Converse

From Sta. 0+00 to Sta. 5+50 no rock has
been attempted. Estimate of rock in
this section is 50% of excavation.

5+50 to 6+00 30 y³

6+50 to 6+75 50

7+00 " 7+35 100

7+35 " 7+45 25

7+45 " 8+00 20

8+00 " 8+15 6

La Mesa Pipe at 8+15.

8+35 " 30 y³

8+55 " 50

8+85 " 9+00 10

9+10 " 15

9+20 to ± 10+75 slope = 25°. All of road in
cut and solid rock. See profile
for ground elevation

12+75 " 12+90 25 y³

11+50 " 12+75 D.G. 8 holes 5' deep.

12+00 " 12+50 " 5 " 5' "

14+00 " 14+65 " 6 " 5' "

14+90 " 6 y³

15
60
750

18x7x

80

15+50 to 16+10 Slope 20°. All of road
in cut and solid rock.

See profile for ground elev.

16+75 - 17+30 D.G. 6 holes 6' deep

22+25 - 22+60 20 y³ rock.

23+40 " 10 y³

+50 3

23+78 - 24+00 8

24+05 " 2

24+30 - 24+50 15

24+52 - 24+95 55

25+25 - 25+50 25

25+75 - 26+00 60

26+10 - 26+75 65

27+05 " 5

27+25 " 3

27+63 - 27+78 3

28+05 - 28+40 10 40 D.G.

28+40 - 28+90 50 Note from 28+50 to

29+75 6 end of road. hard D.G.

30+10 2 but is being re-

30+30 36 moved by hand.

37+55 15

37+15 12

37+05 8

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 the
stake is located by the double entry method in
left column and top row. The number in the

IMPROVED TABLES

AND

INFORMATION

To find T, tangent and External for curve of
any other degree divide by degree of curve and
add correction found in column of corrections.
Degree of curve with a given T may be found
by dividing tangent (or external) opposite T 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.

to

From

65

75

5

6

7

7

7

8

8

8

8

8

8

8

8

8

8

8

8

8

8

8

8

8

8

DIRECTIONS FOR USE OF TABLES

TABLE No. 1.

Distance of slope stake from side or shoulder stake for any width roadway, slope $1\frac{1}{2}$ 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 from side stake to slope stake. If ground is not level estimate the difference in elevation between the side stake and slope stake, lower target by this amount if cut, elevate if fill. Add this amount to cut or fill and find distance in table. Set up rod at this point, and line of sight should cut target. If it does not make the slight adjustment necessary.

TABLE No. 9.

To find Tangent and External for curve of any other degree, divide by degree of curve and add correction found in column of corrections.

Degree of curve with a given I may be found by dividing tangent, (or external), opposite I 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.

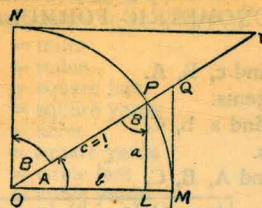


TABLE II
TRIGONOMETRIC FORMULÆ.

$$\begin{aligned} \angle A &= \angle MOP & \angle B &= \angle PON = \angle OPL \\ R &= OB = c = 1 \\ \sin A &= \frac{a}{c} = \frac{a}{1} = a = \cos B = LP \\ \cos A &= \frac{b}{c} = \frac{b}{1} = b = \sin B = OL \\ \tan A &= \frac{a}{b} = \frac{MQ}{OM} = \frac{MQ}{1} = MQ = \cot B = MQ \\ \cot A &= \frac{NT}{ON} = \frac{NT}{1} = NT = \tan B = NT \\ \sec A &= \frac{OQ}{OM} = \frac{OQ}{1} = OQ = \csc B = OQ \\ \csc A &= \frac{OT}{ON} = \frac{OT}{1} = OT = \sec B = OT \\ \text{vers } A &= \frac{LM}{OP} = LM = \text{covers } B \# \\ \text{covers } A &= \frac{OP - LP}{OP} = OP - LP = \text{vers } B \\ \text{exsec } A &= PQ = \text{coexsec } B \\ \text{coexsec } A &= PT = \text{exsec } B \\ \sin \frac{1}{2} A &= \sqrt{\frac{1 - \cos A}{2}} & \cos \frac{1}{2} A &= \sqrt{\frac{1 + \cos A}{2}} \\ \sin 2A &= 2 \sin A \cos A & \cos 2A &= \cos^2 A - \sin^2 A \\ \text{Law of Sines} & \frac{\sin A}{a} = \frac{\sin B}{B} = \frac{\sin C}{C} \\ \text{Law of Cosines} & c^2 = a^2 + b^2 - 2ab \cos C \\ \text{Law of Tangents} & \frac{a+b}{a-b} = \frac{\tan \frac{1}{2}(A+B)}{\tan \frac{1}{2}(A-B)} \end{aligned}$$

TABLE VI
SINES, COSINES, TANGENTS, COTANGENTS

deg	sin 0'	tan 0'	sin 10'	tan 10'	sin 20'	tan 20'	sin 30'	tan 30'	sin 40'	tan 40'	sin 50'	tan 50'	sin 60'	tan 60'
0	0000	0000	0029	0029	0058	0058	0087	0087	0116	0116	0145	0145	0175	0175
1	175	0175	0204	0204	0233	0233	0262	0262	0291	0291	0320	0320	0349	0349
2	349	349	378	378	407	407	436	437	465	466	494	495	523	524
3	523	524	552	553	581	582	610	612	640	641	669	670	706	706
4	698	699	727	729	756	758	785	787	814	816	843	844	876	876
5	872	875	901	904	929	934	958	963	987	992	1016	1022	1045	1045
6	1045	1051	1074	1080	1103	1110	1132	1139	1161	1169	1190	1198	1219	1219
7	219	228	248	257	279	287	305	317	334	346	363	376	392	392
8	392	405	421	435	449	465	478	495	507	524	536	554	569	569
9	564	584	593	614	622	644	650	673	679	703	708	733	738	738
10	736	763	765	793	794	823	822	853	851	883	880	914	914	914
11	908	944	937	974	965	2004	994	2035	2022	2065	2051	2095	2095	2095
12	2079	2126	2108	2156	2136	186	2164	217	193	247	221	278	277	277
13	250	309	278	339	306	370	334	401	363	432	391	462	462	462
14	419	493	447	524	476	555	504	586	532	617	560	648	648	648
15	588	679	616	711	644	742	672	773	700	805	728	836	836	836
16	756	867	784	899	812	931	840	962	868	994	896	1026	1026	1026
17	924	3057	952	3089	939	3121	3007	3153	3035	3185	3062	3217	3217	3217
18	3090	249	3118	281	3145	314	173	346	201	378	228	411	411	411
19	256	443	283	476	311	508	338	541	365	574	393	607	607	607
20	420	640	448	673	475	706	502	739	529	772	557	805	805	805
21	584	839	611	872	638	906	665	939	692	973	719	1006	1006	1006
22	746	4040	773	4074	800	4108	827	4142	854	4176	881	4210	4210	4210
23	907	245	934	279	961	314	987	348	1014	383	1041	417	417	417
24	1067	452	1094	487	1120	522	1147	557	1173	592	1200	628	628	628
25	226	663	253	699	279	734	305	770	331	806	358	841	841	841
26	384	877	410	913	436	950	462	986	488	1022	514	1059	1059	1059
27	540	5095	566	5132	592	5169	617	5206	643	243	669	280	280	280
28	695	317	720	354	746	392	772	430	797	467	823	505	505	505
29	848	543	874	581	899	619	924	658	950	696	975	735	735	735
30	5000	774	5025	5812	5050	851	5075	890	5100	930	5125	969	969	969
31	150	6009	175	6048	200	6088	225	6128	250	6168	275	6208	6208	6208
32	299	249	324	289	348	330	5373	371	398	412	422	453	453	453
33	446	494	471	536	495	577	519	619	544	661	568	703	703	703
34	592	745	616	787	640	830	664	873	688	916	712	959	959	959
35	736	7002	760	7046	783	7089	807	7133	831	7177	854	7221	7221	7221
36	878	265	901	310	925	355	948	400	972	445	995	490	490	490
37	6018	536	6041	581	6065	627	6088	673	6111	720	6134	766	766	766
38	157	813	180	860	202	907	225	954	248	1002	271	1050	1050	1050
39	293	8098	316	8146	338	8195	361	8243	383	292	406	342	342	342
40	428	391	450	441	472	491	494	541	517	591	539	642	642	642
41	561	693	583	744	604	796	626	847	648	899	670	952	952	952
42	691	9004	713	9057	734	9110	756	9163	777	9217	799	9271	9271	9271
43	820	325	841	380	862	435	884	490	905	545	926	601	601	601
44	947	657	967	713	988	770	7009	827	7030	884	7050	942	942	942
45	7071	1.0000	7092	1.0058	7112	1.0117	133	1.0176	153	1.0235	173	1.0295	193	1.0354
60'	60'	50'	50'	40'	40'	30'	30'	20'	20'	10'	10'	10'	10'	10'
cos	cot	cos	cot	cos	cot	cos	cot	cos	cot	cos	cot	cos	cot	cos

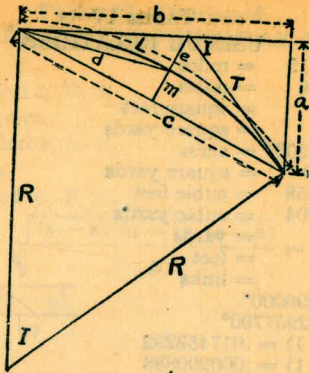


TABLE V
CURVE FORMULAE FOR SIMPLE CURVES
COMPILED BY J. CALVIN LOCKE, C.E.

- (1) $c = \sqrt{2Ra}$ (2) $c = \sqrt{a^2 + b^2}$
 (3) $c = \sqrt{2R(R - \sqrt{(R+b)(R-b)})} = \sqrt{2R(R - \sqrt{R^2 - b^2})}$
 (4) $c = 2\sqrt{m(2R - m)}$
 (5) $c = 2R \sin \frac{1}{2} I$ (6) $c = 2T \cos \frac{1}{2} I$
 (7) $e = R \operatorname{exsec} \frac{1}{2} I$
 (8) $e = R \tan \frac{1}{2} I \tan \frac{1}{4} I$ (9) $e = T \tan \frac{1}{4} I$
 (10) $b = \sqrt{a(2R - a)}$
 (11) $b = \sqrt{\left(c + \frac{c^2}{2R}\right)\left(c - \frac{c^2}{2R}\right)} = \sqrt{c^2 - \frac{c^4}{4R^2}}$
 (12) $b = R \sin I$ (13) $b = a \cot \frac{1}{2} I$
 (14) $R = \frac{a^2 + b^2}{2a} = \frac{c^2}{2a}$ (15) $R = \frac{d^2}{2m} = \frac{c^2 + 4m^2}{8m}$
 (16) $d = \sqrt{R(2R - \sqrt{(2R+c)(2R-c)})} = \sqrt{R(2R - \sqrt{4R^2 - c^2})}$
 (17) $d = \sqrt{2Rm}$ (18) $d = 2R \sin \frac{1}{4} I$ (19) $m = \frac{d^2}{2R}$
 (20) $m = R \mp \sqrt{\left(R + \frac{c}{2}\right)\left(R - \frac{c}{2}\right)} = R \mp \sqrt{R^2 - \frac{c^2}{4}}$
 (21) $m = R \operatorname{vers} \frac{1}{2} I$ (22) $m = R \sin \frac{1}{2} I \tan \frac{1}{4} I$ (23) $m = \frac{1}{2} c \tan \frac{1}{4} I$
 (24) $a = \frac{c^2}{2R}$ (25) $a = R - \sqrt{(R+b)(R-b)} = R - \sqrt{R^2 - b^2}$
 (26) $a = 2R(\sin^2 \frac{1}{2} I)^2$ (27) $a = R \operatorname{vers} I$ (28) $a = R \sin I \tan \frac{1}{2} I$
 (29) $a = b \tan \frac{1}{2} I$ (30) $a = T \sin I$ (31) $T = R \tan \frac{1}{2} I$
 (32) $I = \frac{L}{R} \times 57.295780$ (33) $R = \frac{L}{I} \times 57.295780$
 (34) $L = IR \times 0.01745329$ (35) $L = \frac{8d - c}{3}$
 (36) $\text{Area Seg.} = \frac{LR - R^2 \sin I}{2} = \frac{LR - Rb}{2}$

56-20
23-17

33-08

$\frac{C 25.0}{21.5}$

2.1

⊕

$\frac{C 7.0}{14.5}$

9'

11'

Sta 10+40

-6.4% Road from Dam, East to Flume
0+00 = 771.0
0+50 = 769.4
1+00 = 767.8
then 6.4%
Length = 320.0'

July 25 1936

Survey
Label
Reminon

92
46
2

208.7
2) 43560.00
4
408) 3560
3264
4167) 29600
29169