

Center Claridon Nor.

DIETZGEN
 TRADE MARK

ENGINEERS'
FIELD BOOK

No. 400

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	H
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 $1\frac{1}{2}$ see inside of back cover.

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(8)
Property of
Geauga Co. Surveyor
Chardon Ohio

Survey of Chardon Center

Note See index next page

Iron pipe was set at
all PI in POT after
pavement was laid.

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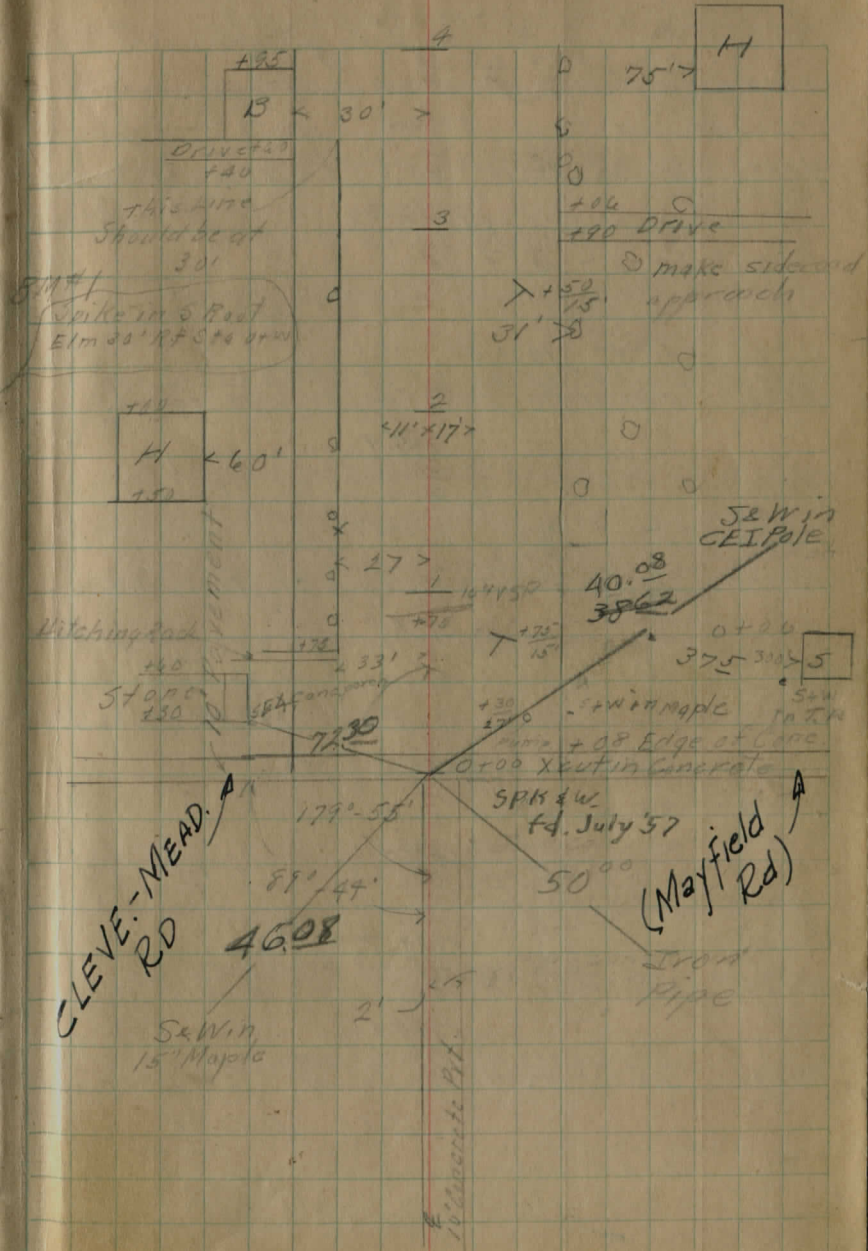
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Sta	B.S.	HI	FS	Elev	BM
	5.30	1332.28		1326.95	
			1.29	1330.99	
	10.08	1341.07			
			2.90	1338.17	
	2.24	1340.43			
			11.86	1328.57	
	1.40	1330.17			
			7.20	1322.97	BM
	3.67	1326.64	1319.9	1322.97	
100' Down South Rd					
50'		5.6			
0+00		1321.7			
	5.8	5.9	3.5	2.1	
	100	50	50	100	
1+00		1321.3			
	5.8	5.3	5.5	6.6	4.3
	25	5	5	7	22
1+50		1321.6			
	5.3	5.2	5.2	5.9	3.6
	25	7	7	10	19
2+00		1320.9			
	5.8	5.2	5.7	6.0	3.2
	25	13	6	7	12
			7.02	1319.62	
	0.67	1320.24			



(1320-3)

510 BS H 1319.0 FS Elev BM
3+00 1.2 0.9 6.0 6.6 1.8 2.2 0.9 0.2
25 19 14 12 2 9 11 25

4+00 3.2 4.1 4.5 4.1 4.6 3.2 3.4 1.8 1.5
25 13 12 2 6 9 11 18 25

5+00 7.0 7.2 8.2 8.7 8.6 8.0 8.3 9.1 7.2 6.6 5.2 4.7
25 17 15 13 9 4 5 4 10 14 18 25

10.87 1309.92

6+00 1.09 1310.51 1309.1
17 2.3 3.4 2.8 3.1 2.4 2.7 3.4 2.9 2.6 2.0 2.07
25 18 15 13 5 6 5 6 13 19 25

7+00 5.7 5.5 6.0 5.3 5.1 5.1 5.0 5.2 4.3 4.0
25 16 14 12 4 3 4 5 17 20 25

8+00 6.1 7.6 8.2 7.3 6.8 6.7 7.2 7.0 7.4 6.3 6.0
25 15 14 12 4 4 6 7 16 20 25

9+00 9.1 9.2 9.0 9.0 8.7 8.0 8.2 8.2 8.1 6.7 6.7
25 15 14 12 4 5 6 7 14 22 25

8.42 1302.09 1302.07

9+70 1.09 1302.18 1300.8
3.3 2.7 1.4 2.7
50 FL 2 FL

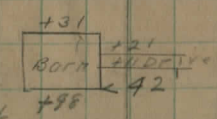
10+00 2.8 3.2 1.7 2.4 2.7 2.4 1.0
25 16 4 6 7 9 25

11+00 5.3 6.2 7.1 6.3 5.5 5.7 6.2 5.8 4.5 3.2
25 20 18 13 6 6 9 10 20 25

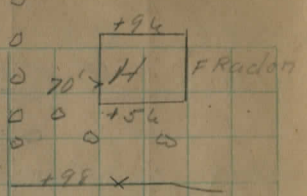
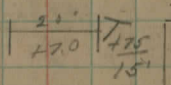
12+00 5.8 9.0 10.1 8.1 8.1 8.0 6.0
25 20 14 14 2 7 14 25

11.10 1291.08

0.04 1291.12



cancel
1'



DRIVE
175
15 in of Pipe
Build new 18'
VSPH side
90° to L+

BH#2
Spike in West
Rest Maple Sta
10+30 30' Pt.

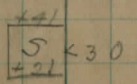
7
13x4'

+30
14'

< 29' > +57

25'0' Barn Shed

0 Apple



+58
15'

1291.12

Sta 135 H 1291.55 ELEV 1311
 13+00 $\frac{0.8}{2.5} \frac{1.3}{14} \frac{3.0}{14} \frac{2.0}{11} \frac{1.0}{2} \frac{2.7}{10} \frac{3.5}{15} \frac{2.0}{17} \frac{2.0}{25}$

1285.8

14+00 $\frac{5.2}{2.5} \frac{6.1}{15} \frac{6.8}{14} \frac{5.8}{9} \frac{5.3}{2} \frac{6.0}{7} \frac{6.1}{12} \frac{5.3}{17} \frac{4.1}{25}$

1283.5

15+00 $\frac{8.2}{2.5} \frac{8.0}{14} \frac{8.5}{12} \frac{8.0}{8} \frac{7.4}{2} \frac{7.7}{9} \frac{8.8}{12} \frac{8.0}{14} \frac{8.2}{2.5}$

1283.6

15+42 $\frac{13.6}{100} \frac{16.4}{50} \frac{10.4}{10} \frac{7.6}{2} \frac{10.4 FL}{11}$

1283.6

16+00 $\frac{8.8}{2.5} \frac{8.5}{13} \frac{9.1}{12} \frac{8.5}{10} \frac{7.4}{2} \frac{8.3}{9} \frac{9.1}{11} \frac{8.4}{12} \frac{7.7}{2.5}$

1283.8

16+60 $\frac{7.7}{2.5} \frac{7.7}{13} \frac{8.9}{11} \frac{8.3}{10} \frac{7.3}{2} \frac{8.0}{10} \frac{8.7}{12} \frac{7.4}{13} \frac{7.2}{2.5}$

7.74 1283.36

2.35 1285.71 1283.3
 17+00 $\frac{2.6}{2.5} \frac{2.9}{13} \frac{4.0}{12} \frac{3.1}{10} \frac{2.4}{2} \frac{2.9}{10} \frac{3.7}{11} \frac{2.6}{12} \frac{2.0}{2.5}$

1281.2

18+00 $\frac{4.0}{2.5} \frac{4.5}{13} \frac{5.8}{10} \frac{5.1}{9} \frac{4.5}{2} \frac{5.0}{9} \frac{5.5}{10} \frac{4.4}{12} \frac{3.5}{2.5}$

1279.0

19+00 $\frac{5.7}{2.0} \frac{6.8}{11} \frac{7.8}{10} \frac{7.3}{6} \frac{6.7}{2} \frac{7.1}{9} \frac{7.7}{10} \frac{6.4}{12} \frac{5.2}{2.5}$

6.03 1279.68

1276.4

20+00 $\frac{7.8}{2.5} \frac{8.4}{11} \frac{9.8}{9} \frac{9.4}{8} \frac{9.3}{2} \frac{9.4}{8} \frac{8.8}{11} \frac{8.4}{13} \frac{7.2}{2.5}$

11.65 1274.06

3.32 1277.38

3

Build new 18"

VSP

17

16

+75
15'+42
10'

15

old 12" CI Pipe

BMT #3
 Spike in East Root
 Maple 25' Lt Sta

19+50

14
12' x 10'+64
15'

0

0

0

0

+55
DRIVE

+51

610' x 11'

+25

J. Rowley

+25'

+40

75'

+35
DRIVE
+20

13

12

11

+80
15'

B

(1277.4)

5th	B5	14	1272.8	F5	Elev	BM
21+00	$\frac{1.7}{25}$	$\frac{2.9}{12}$	$\frac{5.4}{8}$	$\frac{4.9}{5}$	$\frac{4.6}{2}$	$\frac{4.7}{9}$
	$\frac{5.1}{10}$	$\frac{2.9}{15}$	$\frac{1.7}{25}$			

22+00	$\frac{8.4}{25}$	$\frac{7.1}{13}$	$\frac{7.5}{11}$	$\frac{6.5}{2}$	$\frac{6.6}{9}$	$\frac{7.9}{10}$	$\frac{6.3}{25}$
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22+92	$\frac{11.7}{100}$	$\frac{10.9}{35}$	$\frac{10.6}{9}$	$\frac{12.6}{9}$	$\frac{26.5}{8}$	$\frac{1271.1}{2}$	$\frac{6.3}{11}$	$\frac{6.5}{12}$	$\frac{6.2}{12}$	$\frac{10.9}{12}$
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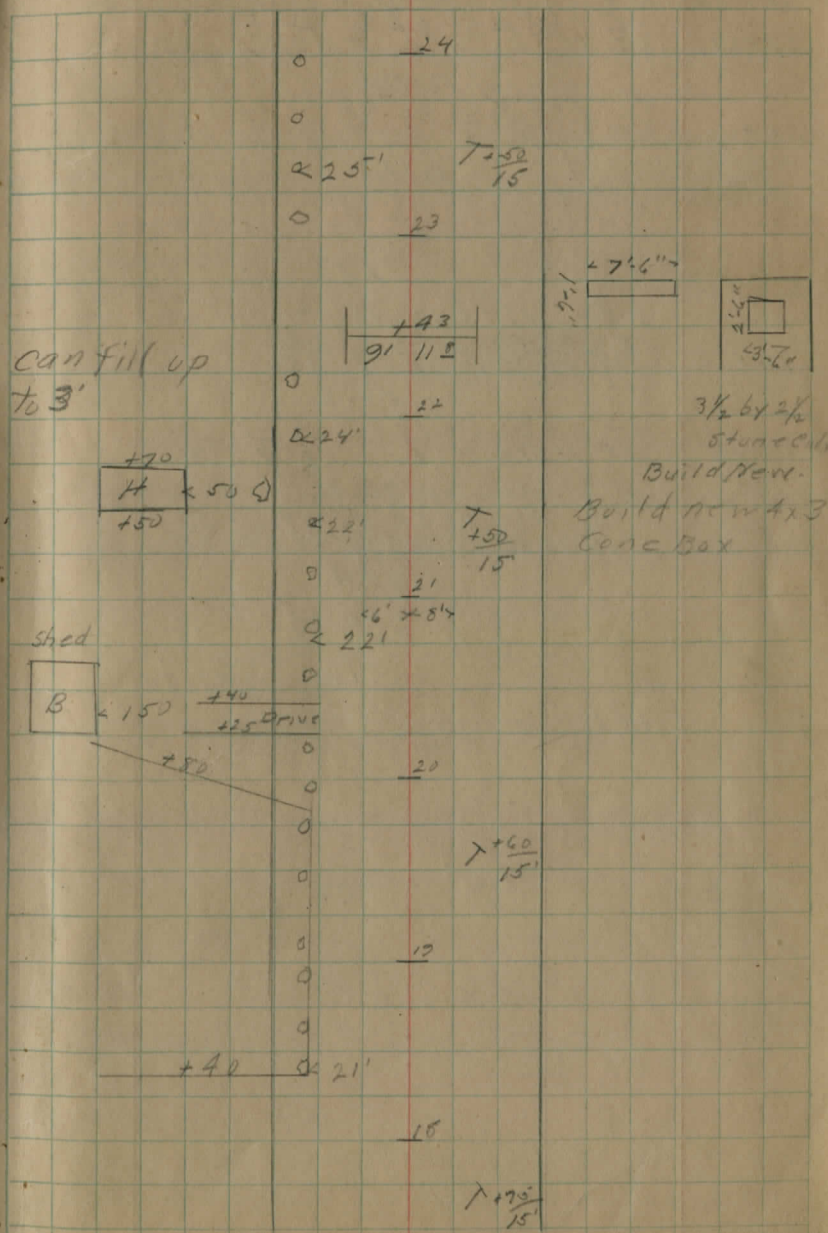
23+00	$\frac{7.9}{25}$	$\frac{6.9}{11}$	$\frac{7.4}{10}$	$\frac{6.6}{8}$	$\frac{6.3}{2}$	$\frac{6.4}{7}$	$\frac{7.4}{9}$	$\frac{7.0}{11}$	$\frac{7.5}{25}$
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24+00	$\frac{1.5}{25}$	$\frac{2.0}{10}$	$\frac{5.0}{12}$	$\frac{5.6}{9}$	$\frac{4.6}{7}$	$\frac{4.2}{8}$	$\frac{4.8}{7}$	$\frac{5.3}{9}$	$\frac{1.9}{15}$	$\frac{2.1}{25}$
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0.74 1276.64

25+00	$\frac{8.85}{25}$	$\frac{5.2}{17}$	$\frac{5.2}{9}$	$\frac{6.2}{9}$	$\frac{5.4}{7}$	$\frac{7.2}{2}$	$\frac{8.4}{9}$	$\frac{9.2}{14}$	$\frac{6.5}{14}$	$\frac{6.6}{25}$
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26+00	$\frac{4.4}{25}$	$\frac{5.2}{14}$	$\frac{6.6}{8}$	$\frac{5.9}{5}$	$\frac{5.0}{2}$	$\frac{5.3}{8}$	$\frac{6.6}{10}$	$\frac{5.1}{15}$	$\frac{5.3}{25}$
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(1285.2)

Sta 135 H1 1280.0 FS Elev 8901
34+00 6.0 4.1 4.9 4.1 5.2 5.2 5.4 4.3 5.5 4.6
2.5 16 13 11 9 9 6 9 12 25

1279.5

35+00 7.0 6.9 7.3 6.0 5.7 5.9 7.2 6.6 5.7
2.5 15 14 11 9 8 11 14 25

1279.8

35+20 12.2 10.6 8.4 FL 5.4 7.8 FL
7.0 5.0 8 2 13

1279.8

36+00 6.5 5.9 6.2 5.7 5.4 5.3 6.2 5.6 4.8
2.5 16 13 11 9 6 9 10 25

1281.1

37+00 9.2 9.5 9.8 4.5 4.1 4.2 4.9 2.4 1.9
2.5 15 14 12 8 6 8 16 25

0.89 1284.28

6.66 1290.94 1284.1

38+00 6.0 6.4 7.8 7.3 6.8 7.1 7.6 4.2 2.9
2.5 20 15 12 8 5 9 14 25

1286.9

39+00 4.2 4.9 4.0 4.5 4.0 1.6
2.5 16 8 8 12 25

1287.23, 19

40+00 4.8 4.1 4.6 4.1 3.7 4.0 4.5 3.0 1.8
2.5 16 14 11 8 6 9 13 25

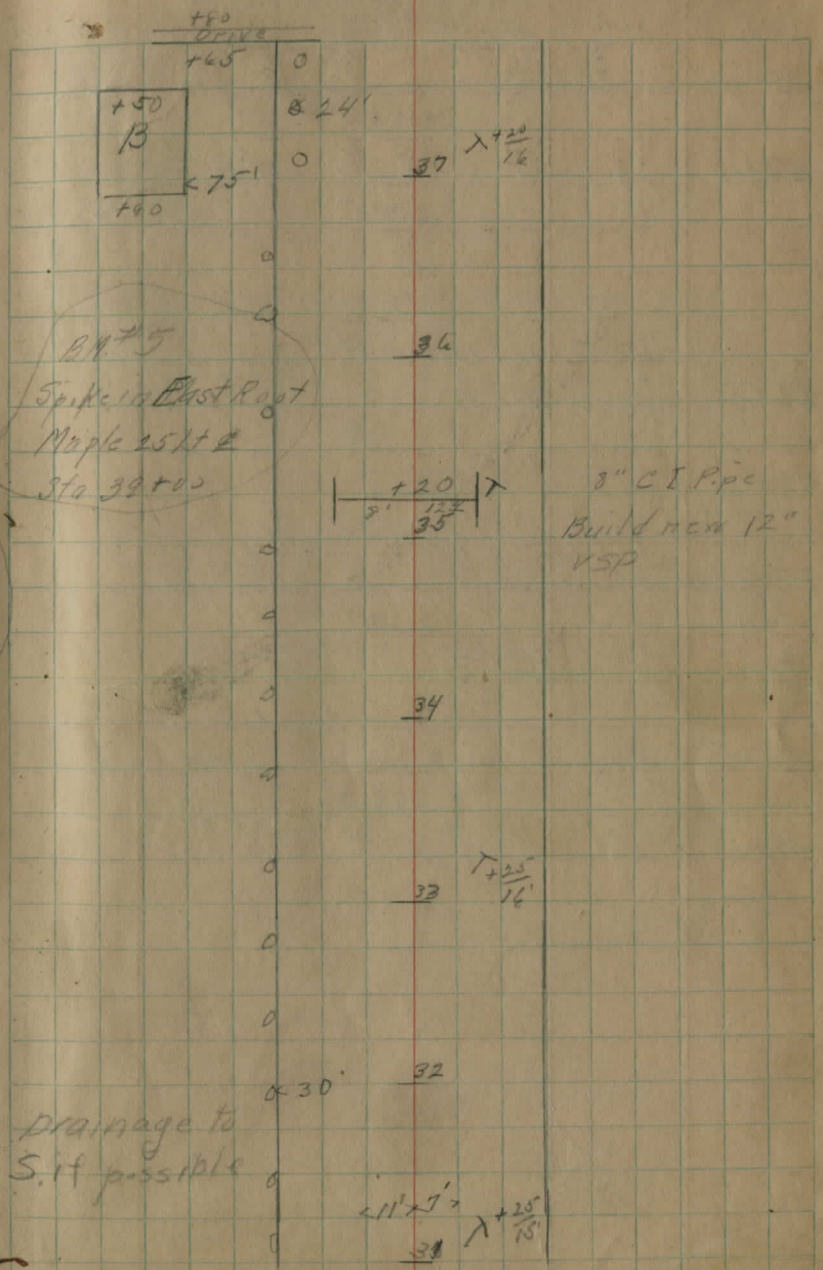
1287.25

1286.7

41+00 5.3 4.5 4.2 3.8 4.2 3.5 2.3
2.5 19 8 10 12 13 25

3.65 1287.29

1.87 1289.16



drainage to S. if possible

11' x 7' x +25' / 15'

1270.3

57+ BS H7 F10y BM
 50+00 $\frac{5.2}{25} \frac{5.8}{16} \frac{6.6}{12} \frac{5.8}{9} \frac{5.7}{2} \frac{5.9}{5} \frac{7.9}{9} \frac{5.5}{11} \frac{8.3}{25}$

1262.2

51+00 $\frac{8.2}{25} \frac{8.4}{13} \frac{9.0}{11} \frac{8.3}{9} \frac{8.1}{2} \frac{8.4}{5} \frac{9.4}{9} \frac{8.1}{11} \frac{6.7}{25}$

1260.5

52+00 $\frac{10.3}{25} \frac{10.1}{14} \frac{10.7}{13} \frac{9.8}{11} \frac{9.8}{2} \frac{9.9}{5} \frac{10.7}{9} \frac{10.0}{9} \frac{9.2}{25}$

9.55 1260.72

3.07 1263.79 1259.7

53+00 $\frac{5.2}{25} \frac{4.5}{14} \frac{5.0}{13} \frac{4.5}{11} \frac{4.1}{2} \frac{4.0}{7} \frac{4.5}{9} \frac{4.1}{10} \frac{3.9}{25}$

1259.0

54+00 $\frac{6.6}{25} \frac{5.5}{14} \frac{5.9}{12} \frac{5.1}{9} \frac{4.8}{2} \frac{4.9}{9} \frac{5.4}{11} \frac{4.7}{12} \frac{4.7}{25}$

8.9 7.6
 700 50

1258.8

55+00 $\frac{5.7}{25} \frac{5.6}{13} \frac{6.0}{12} \frac{5.4}{9} \frac{5.0}{2} \frac{5.2}{9} \frac{5.5}{11} \frac{5.1}{12} \frac{4.4}{25}$

1258.9

56+00 $\frac{5.8}{25} \frac{5.9}{14} \frac{6.3}{13} \frac{5.5}{11} \frac{4.9}{2} \frac{5.2}{11} \frac{6.0}{13} \frac{5.3}{14} \frac{4.3}{25}$

1258.7

57+00 $\frac{6.1}{25} \frac{6.0}{13} \frac{6.3}{12} \frac{5.6}{10} \frac{5.1}{2} \frac{5.4}{12} \frac{6.1}{15} \frac{5.5}{16} \frac{5.1}{25}$

4.17 1259.62

4.10 1263.72

D

0 51 $\nearrow + \frac{90}{22}$
 0
 0
 0
 0 50
 0
 0
 0
 0 49
 0
 0 27' $\nearrow + \frac{60}{20} 0$
 0 48
 0
 0 27' 28' x 8'
 0
 0
 0 46 $\nearrow + \frac{10}{22}$
 0
 0
 0
 0 45
 0 27' 46' x 9' $\nearrow + \frac{50}{22}$
 0

1243.7

Sta B5 H1 FS Elev BM
 58+00 $\frac{5.8}{25}$ $\frac{6.2}{11}$ $\frac{5.3}{8}$ $\frac{4.8}{2}$ $\frac{5.4}{12}$ $\frac{6.8}{14}$ $\frac{5.6}{15}$ $\frac{5.1}{25}$

1259.3

59+00 $\frac{5.2}{25}$ $\frac{5.8}{14}$ $\frac{6.2}{13}$ $\frac{5.1}{9}$ $\frac{4.4}{2}$ $\frac{5.9}{11}$ $\frac{6.4}{14}$ $\frac{5.4}{15}$ $\frac{4.6}{25}$

1258.6

60+00 $\frac{6.1}{25}$ $\frac{6.0}{15}$ $\frac{6.3}{14}$ $\frac{5.7}{10}$ $\frac{5.1}{2}$ $\frac{5.7}{11}$ $\frac{6.5}{14}$ $\frac{5.9}{15}$ $\frac{5.4}{25}$

1258.5

61+00 $\frac{5.5}{25}$ $\frac{5.6}{11}$ $\frac{6.4}{10}$ $\frac{5.7}{9}$ $\frac{5.2}{2}$ $\frac{5.7}{12}$ $\frac{6.7}{14}$ $\frac{6.1}{18}$ $\frac{6.0}{25}$

5.46 1258.26

3.75 1262.01 1258.0

62+00 $\frac{3.6}{25}$ $\frac{4.1}{13}$ $\frac{4.2}{9}$ $\frac{4.3}{6}$ $\frac{4.0}{2}$ $\frac{4.4}{12}$ $\frac{5.2}{14}$ $\frac{4.3}{25}$

1257.1

63+00 $\frac{4.4}{100}$ $\frac{4.4}{25}$ $\frac{4.3}{11}$ $\frac{5.1}{8}$ $\frac{4.9}{2}$ $\frac{5.2}{11}$ $\frac{5.7}{15}$ $\frac{4.7}{17}$ $\frac{4.7}{25}$

ERoad

1256.8

64+00 $\frac{4.5}{25}$ $\frac{5.2}{13}$ $\frac{6.3}{10}$ $\frac{5.8}{9}$ $\frac{5.2}{2}$ $\frac{5.6}{10}$ $\frac{6.2}{12}$ $\frac{5.3}{14}$ $\frac{5.0}{25}$

1256.1

65+00 $\frac{5.3}{25}$ $\frac{6.0}{12}$ $\frac{6.8}{11}$ $\frac{6.35}{9}$ $\frac{5.9}{2}$ $\frac{6.2}{9}$ $\frac{6.8}{11}$ $\frac{6.0}{12}$ $\frac{6.0}{25}$

4.80 1257.21

1.88 1259.09

56

 $\frac{+30}{22}$

57

BM #7
 Spike in West Root
 Hickory 30° Rt Sta
 61+25

56

 $\frac{55}{40 \times 107}$

+50

Flow

52

Build new
 12" VSP
 Remove old
 8" VSP

 $\frac{53}{40 \times 87}$

52

1259.1

Sta	BS	HI 1255.75						Elev	BM
66+00	3.5	3.4	4.2	3.8	3.4	3.8	4.2	3.4	3.0
	25	12	11	9	2	7	11	14	25

1255.0

67+00	3.6	4.0	5.1	4.3	4.1	4.3	5.2	4.3	3.9
	25	12	11	9	2	8	10	11	25

1253.5

68+00	4.9	5.9	6.7	6.1	5.6	5.9	6.7	5.7	5.3
	25	12	11	9	2	6	10	12	25

1251.5

69+00	6.1	7.7	8.4	8.0	7.6	7.7	8.6	7.5	6.5
	25	14	12	10	2	6	9	11	25

1250.2

70+00	9.0	9.2	9.8	9.2	8.9	9.0	9.7	8.9	8.2	8.4
	25	13	12	11	2	7	9	11	16	25

7.34 1251.75

1.43 1253.18

2.20 1250.98

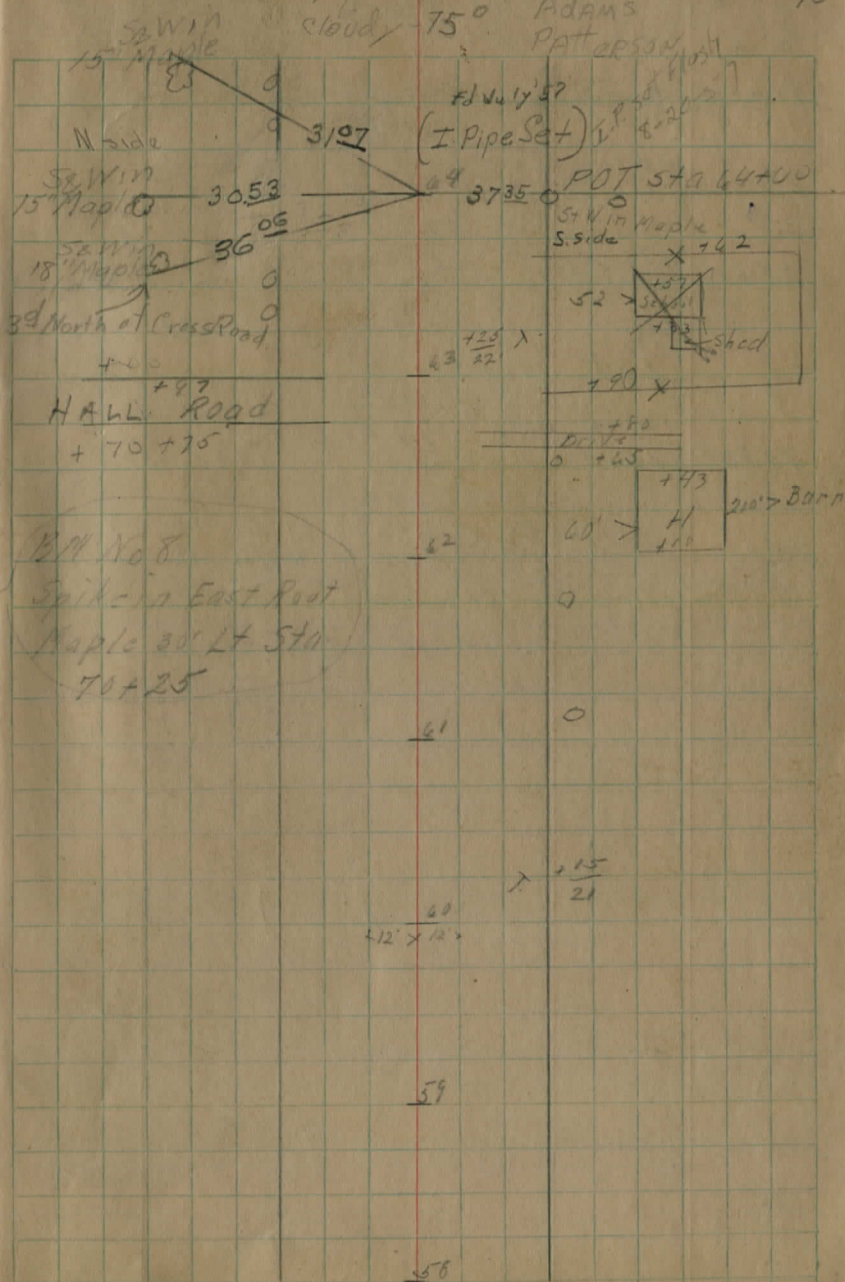
NE side August 20, '57 CAJFIELD

cloudy -75°

ADAMS

PATTERSON

10



1253.2

1249.2

Sta	BS	HI	FS	Elev	BM
71+00	4.0	4.2	4.5	4.0	4.4
	17	13	12	10	8
	15	17	13	12	10
	17	13	12	10	8
	10	11	15	17	25

1247.9

72+00	5.1	5.4	6.0	6.4	5.8	5.3	5.6	6.3	5.7	5.1
	25	19	14	12	11	10	8	9	10	25

1246.7

73+00	5.8	6.3	7.2	7.7	7.1	6.5	6.8	7.6	6.9	7.2	6.6	6.8
	25	18	13	12	10	8	10	12	14	16	28	

5.81

1247.37

1.85

1249.22

1245.3

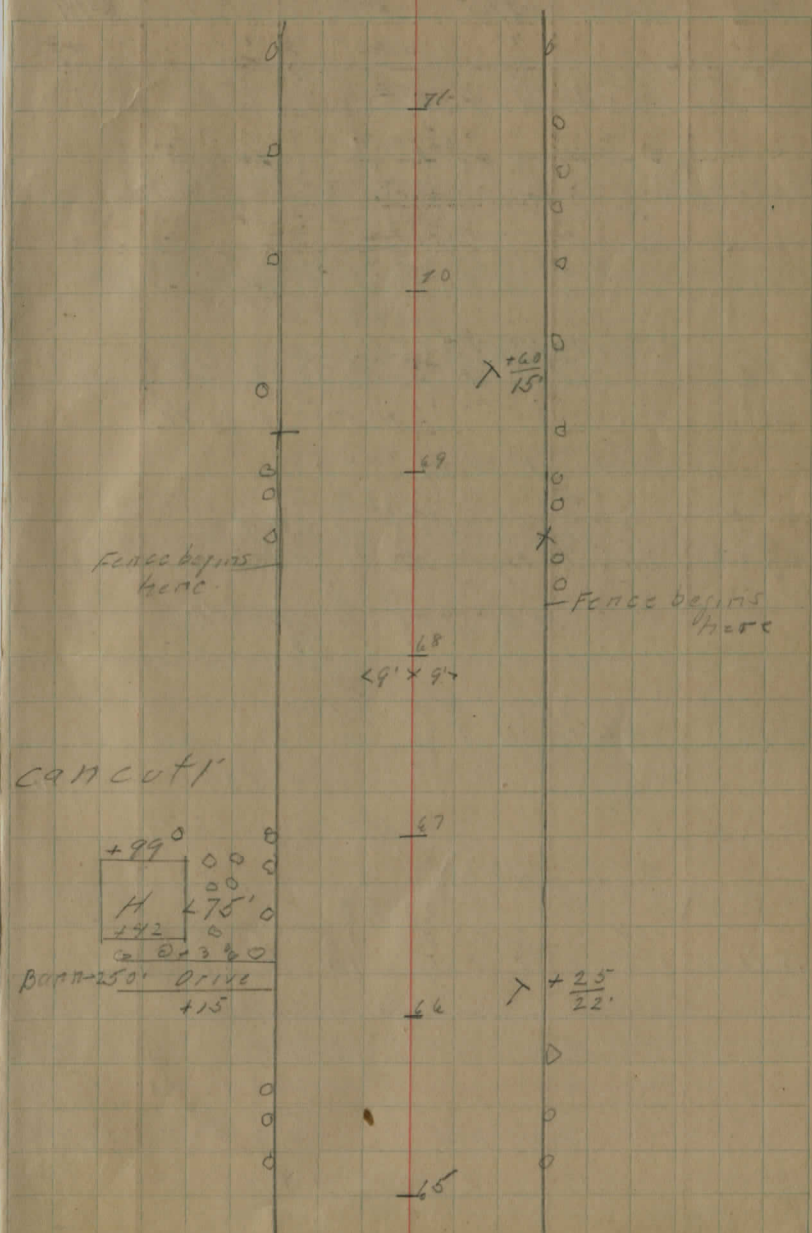
74+00	3.0	3.4	4.3	5.1	4.5	3.9	4.4	5.3	4.2	3.6	3.6
	25	15	12	11	9	8	7	10	13	17	17

1243.8

75+00	5.0	5.2	6.4	6.0	5.4	5.8	6.7	5.5	4.9	4.4
	25	18	9	8	8	10	12	18	25	

T.P. on top stake Sta 76+00 5.21 1244.01

0.27 1244.28



1244.3

Sta BS HI FS Elev BM

1242.2

76+00	1.3	1.3	3.3	2.8	2.1	2.4	2.2	1.7	2.1	2.2
	25	18	11	9	4	8	10	12	14	25

1240.2

77+00	2.7	3.0	4.1	5.3	4.8	4.1	4.6	5.3	3.7	2.8
	25	18	13	12	9	2	8	10	14	25

1237.5

78+00	5.1	5.6	6.8	6.9	7.3	7.1	7.3	8.4	6.5	6.7	5.0	4.8	
	25	19	16	15	11	9	2	10	11	14	17	21	25

1234.8

79+00	8.7	9.2	11.4	10.3	9.5	13.2	11.2	10.2	9.2			
	25	14	12	9	2	11	13	14	25			

11.50 1232.75

1.88 1234.66

1232.2

80+00	2.1	3.0	4.2	5.4	2.5	3.0	3.7	2.8	1.5			
	25	15	13	12	2	7	12	14	25			

1229.2

81+00	4.5	5.0	6.6	5.7	5.5	6.0	7.4	4.7	4.2			
	25	16	13	13	2	7	13	14	25			

1224.8

82+00	6.3	6.5	10.3	9.7	9.2	10.1	10.2	6.2	5.6			
	25	20	11	8	2	10	13	20	25			

5.96 1228.70

11.89 1222.77

0.89 1223.66

1219.7

83+00	10.4	0.0	5.5	4.2	4.0	4.5	5.9	4.4	4.8			
	25	18	8	7	2	14	16	17	25			

12

Sta 77+00
Referenced
6/9/36

P.O.T.

I. Pipe
Set

180°-00'

30'

68-88

SEW
5" inside
8" Apple
X+87

BM 79

BM Spikain

East Root Locust

30' Lt & 87g

82+00

74
24x97

X+12

30'

30'

X+82

72

X+10
16'

1228.7

Sta BS H1 FS Elev BM

1215.1

84+00	6.9	8.9	8.8	8.4	9.1	10.8	9.5	8.7
	25	10.7	6	4	14	17	18	25

12.14 1211.52

1.11 1212.63

1210.3

85+00	1.7	2.2	2.8	2.3	2.2	3.1	2.5	2.4
	25	7	7	4	7.3	14	7	25

1208.0

86+00	4.9	4.8	4.6	4.7	5.0	5.7		
	25	17	9	8	10	25		

1207.6

86+30	9.2	8.7	7.9	7.5	5.0	4.9	4.2	7.5
	100	50	6	5.5	4	10	10	11

1207.0

87+00	6.7	5.6	5.8	6.3	6.9			
	25	8	8	12	25			

8.38 1204.25 1204.14

chuck 0.09 on Bench.

27'

13

85

corrected by MBR.

BM #10 spike in
E root Maple 30' Lt of
E Elev - 1211.41

X + 50
25'

84

40 7 0

B x 250'

83

BM #10 spike in
E root Maple
30' Lt of
5' offset + 75

82

X + 50
22'

FENCE + 12

81

80

X + 50
21'

79

21' x 11'

1212.6
Sta BS H 1207.7 FS Elev BM.

88+00	5.4 25	5.6 11	5.5 9	4.9 8	5.0 8	4.3 10	4.6 11	2.1 25
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1209.9
88+75

18 25	2.7 11	3.2 10	2.7 8	2.7 10	2.0 17	3.0 25
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1209.1
89+00

2.5 25	2.5 13	3.8 9	3.5 8	3.9 10	3.1 12	2.5 25	1.22	1209.63
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1207.0
90+00

4.8 25	6.2 11	6.6 10	5.6 8	5.7 8	6.3 9	5.7 11	5.3 25
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8.48 1204.15 1209.76

Check 0.19 in Bench.

Bench from 0+00 to here

Back up from Sta

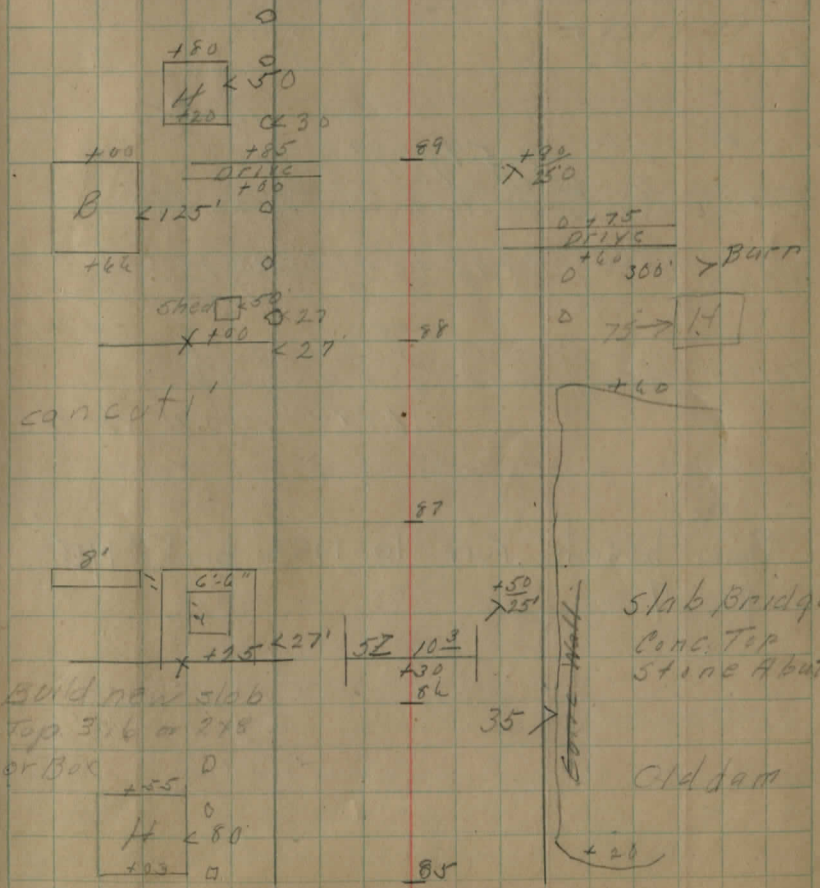
144+40 to 91+00

BM #10
Spike in East Road
Maple 30' Lt. of
Sta 88+75
Elev 1211.16

91 \nearrow $\frac{+25}{22'}$

corrected by MBR
Elev from North
= 1211.16

90



Sta B5 H1 1195.5 FS Elev BM

97+00	7.7	8.3	7.5	7.2	7.6	8.1	7.4	7.0
	25	9	7	2	10	12	13	25

1197.3

96+00	5.1	5.9	6.5	6.8	5.4	5.1	6.2	5.3	4.4
	25	11	10	7	2	6	10	12	25

1198.5

95+00	4.9	4.7	4.2	4.2	5.1	4.1	3.3	
	25	9	8	9	11	13	25	

1198.8

94+00	6.0	5.4	4.5	3.8	4.1	4.6	4.0	3.3
	25	13	11	2	8	11	12	25

1199.4

93+53	9.8	7.5	3.1	3.3	3.4	5.4		
	50	10	10	2	8	8		

3.60 1199.08

6.82 1205.90 1199.8

93+00	7.3	6.9	6.4	6.1	6.2	7.0	6.0	5.1	
	25	11	10	7	2	8	12	14	25

1201.9

92+00	2.7	2.6	3.4	4.9	4.3	4.0	4.1	5.6	2.3	1.6
	27	14	12	10	9	2	7	10	17	25

1204.6

91+00	2.2	1.7	2.3	1.7	1.3	1.2	1.8	0.9	1.5
	25	11	10	8	2	2	11	12	25

1.94 1203.96 1203.86

See levels run 10-1953 book #175
pg 7

H. 485
Krum H+60 0 0
27'

0 0 0 +30
Drive
Buck 25' 150' +10
Gate

0 0 0
0 0 0
0 0 0
0 0 0
0 0 0
94

0 x 250 0 0 | 10' 8" | +53

3" #11
Spike in East
Root Maple
30' Lt Sta 92+00
93

92
29 x 7

98
x 20
17

97
29 x 167

96

cancel 1

↑ +40
21

8" CI Pipe
x 30 use 12" VP
20' Build new

1170.45

Sta	BS	HI 1162.0			FS	Elev			B.M.
110+00	5.8	7.0	8.1	8.3	8.5	8.9	9.1	8.3	6.9
	25	12	9	7	8	8	11	12	25

109+00	3.3	3.7	4.4	3.8	3.7	3.9	4.3	3.7	2.6
	25	12	9	6	8	8	11	14	25

108+00	0.7	1.3	0.6	0.5	0.7	1.5	0.6	0.0	
	25	9	6	8	9	12	14	25	

0.65 1169.80

107+00	11.03	1180.83	1172.2						
	9.0	9.0	9.3	8.6	8.6	8.7	9.2	8.4	7.9
	25	12	9	6	8	9	13	17	25

106+00	6.0	6.3	6.7	6.1	6.0	6.9	6.1	5.5	
	25	11	9	7	8	9	11	13	25

R.R.	20	1.80	North rail	1.64	1.56
	21	1.83	South "	1.88	1.73

1.48 1179.35

8.80 1189.15

105+15	2.2	2.8	10.4	8.6	8.6	10.1	2.3	
	27	11	8	5	8	6	10	21

105+00	6.8	8.0	9.4	8.3	8.3	8.2	8.4	7.2
	25	14	11	8	8	4	7	9

1180.83
1.66
1179.17

Build new 4x8
Slab Top+25
32'

111

Stone
Course

11'-9"

Slab Top

8'-5"

10

5

5

Conc. Slab Top
Stone Abut
and Headers

110

B.M. #13

30' Pt Sta

105+50

109

B.M. Nail in

Centre Road

Post

+20
33'

108

8'x9'

107

super E. N.
oil can make
V.C. to fit.

106

shed
centre road post

BR Post +30
15'
111' + 285'

B+0

B.M.

#14 = 1155.45 = Elm 30' Lt Sta 116+00

#12 = 1195.00 = Maple 30' Rt 100+75

#? = 1165.08 = Maple 30' Rt 121+80

⊕ (± 5, end Graber house = 113+32⁶⁵

⊕ bidge (N. of Graber's) = 117+79

	1159.81																
Sta	BS		141		1156.1		FS		Elev		BM.						
121+00	0.5	2.2	3.5	3.1	3.1	3.1	3.5	3.5	2.5	14	10	8	8	9	11	2.5	
120+00	5.3	6.2	6.1	4.6	4.6	4.5	7.1	7.3	2.5	23	13	7	4	5	10	2.5	
119+00	6.6	7.2	7.2	5.0	4.5	4.5	6.1	5.2	5.4	2.5	24	13	9	4	8	13	2.5
118+00	7.9	7.5	4.0	3.7	3.3	8.5	8.5	2.5	12	9	4	7	8	20			

North Abut

2 on Bridge Floor 3.6 - 1156.2
 4.4 E Bridge Seat 4.5 W Bridge Seat
 47.3 12.5 Bottom Stream

South Abut

2 on Bridge Floor 3.6 - 1156.2
 7.4 E Bridge Seat 4.5 W Bridge Seat
 Upper Stone Course 1'-6" above
 Bridge Seat.

2.93 1156.88

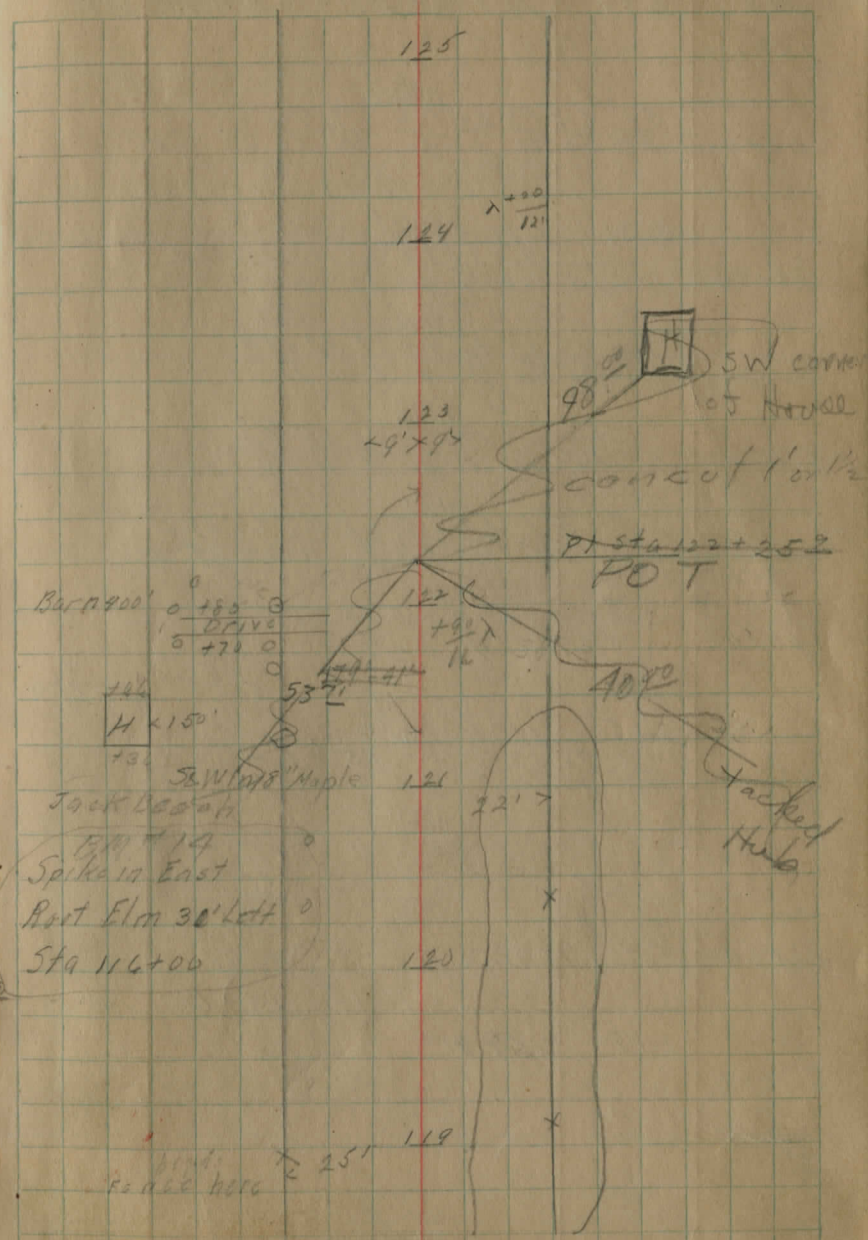
	1159.48																
117+00	1.4	7.0	7.5	5.0	4.9	4.9	7.0	7.7	7.7	2.5	18	13	7	4	8	12	2.5

1155.5

116+00	4.6	4.8	4.8	4.6	4.0	4.2	4.9	4.3	4.3	2.5	15	12	11	4	7	7	2.5
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4.03 1155.45

9.53 1164.98



1190.4

Sta BS HI 1186.8 Elev BM
 137+00 $\frac{2.4}{25} \frac{2.9}{16} \frac{4.8}{12} \frac{4.0}{6} \frac{3.8}{8} \frac{4.3}{7} \frac{4.8}{10} \frac{3.5}{13} \frac{4.0}{25}$

136+00 $\frac{5.5}{25} \frac{5.8}{16} \frac{6.0}{11} \frac{7.3}{8} \frac{7.0}{8} \frac{7.5}{7} \frac{8.0}{9} \frac{5.4}{15} \frac{5.0}{25}$

8.70 1181.86

1.99 1190.57 1185.58

8.71 1181.86

135+00 $\frac{2.0}{25} \frac{3.5}{14} \frac{4.7}{10} \frac{4.0}{8} \frac{3.4}{8} \frac{3.6}{7} \frac{4.5}{12} \frac{3.8}{14} \frac{3.6}{25}$

134+00 $\frac{3.7}{25} \frac{4.7}{16} \frac{7.0}{10} \frac{6.3}{8} \frac{5.9}{8} \frac{6.5}{10} \frac{2.0}{11} \frac{5.3}{15} \frac{5.0}{25}$

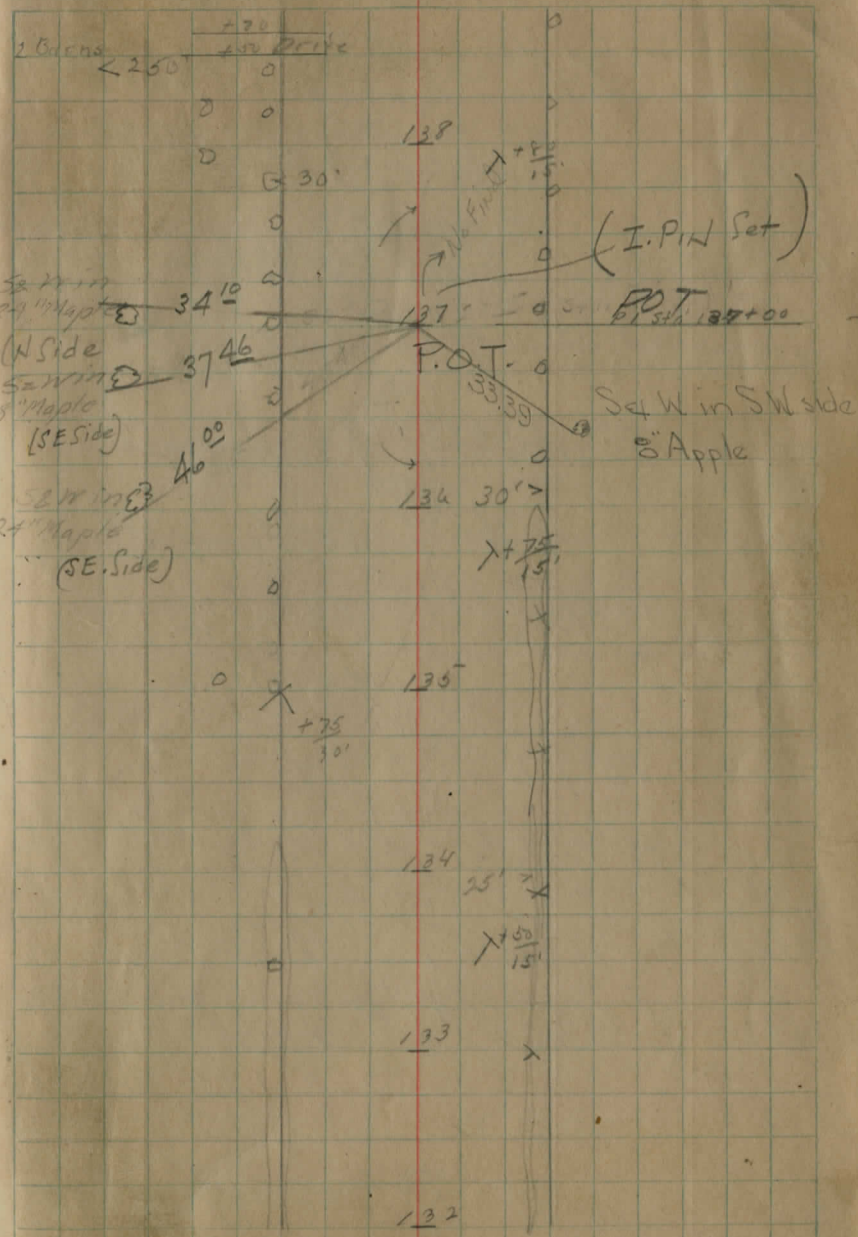
133+00 $\frac{7.9}{25} \frac{7.8}{20} \frac{8.8}{14} \frac{11.0}{10} \frac{9.7}{7} \frac{10.1}{9} \frac{10.7}{12} \frac{8.2}{17} \frac{7.7}{25}$

10.82 1173.34

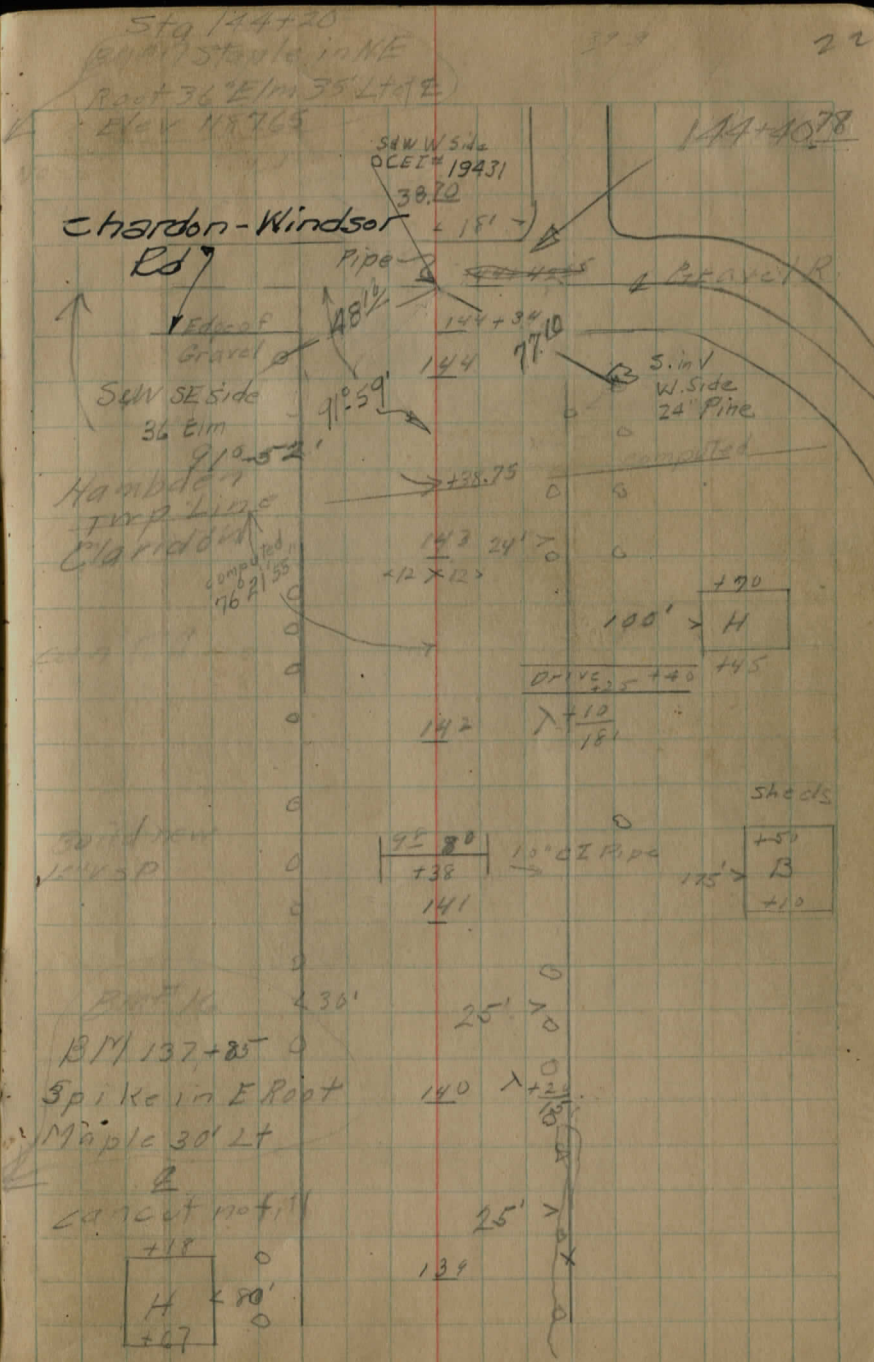
132+00 $\frac{3.5}{25} \frac{4.5}{12} \frac{4.9}{11} \frac{4.3}{7} \frac{4.0}{7} \frac{4.6}{8} \frac{4.3}{11} \frac{4.4}{12} \frac{4.4}{25}$

131+00 $\frac{5.8}{25} \frac{5.4}{11} \frac{6.4}{10} \frac{5.5}{8} \frac{5.4}{8} \frac{5.7}{9} \frac{6.1}{11} \frac{6.0}{12} \frac{6.6}{25}$

130+61 $\frac{7.5}{10} \frac{5.9}{8} \frac{8.5}{10} \frac{8.9}{10} \frac{11.0}{100}$



Sta	BS	HI	FS	Elev	BM				
	2.31	1189.96	1186.2		1187.65				
144+42	$\frac{2.8}{50}$	$\frac{3.9}{2}$	$\frac{5.5}{50}$						
		1187.3							
144+22	$\frac{3.6}{25}$	$\frac{2.9}{10}$	$\frac{2.7}{4}$	$\frac{3.4}{12}$	$\frac{4.2}{21}$	$\frac{4.2}{25}$			
		1187.4							
144+00	$\frac{3.8}{25}$	$\frac{2.6}{2}$	$\frac{2.9}{10}$	$\frac{3.2}{20}$	$\frac{2.8}{25}$				
		1185.0							
143+00	$\frac{4.8}{25}$	$\frac{5.2}{16}$	$\frac{6.1}{12}$	$\frac{5.4}{9}$	$\frac{5.9}{12}$	$\frac{4.1}{14}$	$\frac{3.3}{18}$	$\frac{3.3}{25}$	
		1183.6							
142+00	$\frac{6.0}{25}$	$\frac{6.0}{18}$	$\frac{7.4}{13}$	$\frac{6.8}{11}$	$\frac{6.4}{8}$	$\frac{6.7}{9}$	$\frac{7.1}{10}$	$\frac{6.7}{11}$	$\frac{6.0}{25}$
		1183.2							
141+38	$\frac{7.7}{8}$	$\frac{6.8}{2}$	$\frac{7.9}{10}$	$\frac{7.2}{50}$	$\frac{8.2}{100}$				
		1183.5							
141+00	$\frac{6.6}{25}$	$\frac{6.9}{15}$	$\frac{7.5}{14}$	$\frac{6.9}{11}$	$\frac{6.8}{8}$	$\frac{7.3}{10}$	$\frac{6.9}{11}$	$\frac{7.8}{25}$	
		1183.5							
		6.40		1183.56					
		7.00		1180.56					
140+00	$\frac{4.2}{25}$	$\frac{4.7}{17}$	$\frac{6.4}{14}$	$\frac{5.8}{8}$	$\frac{5.6}{7}$	$\frac{6.2}{10}$	$\frac{6.3}{15}$	$\frac{4.3}{25}$	
		1186.4							
139+60	$\frac{3.8}{25}$	$\frac{4.8}{15}$	$\frac{5.5}{12}$	$\frac{4.7}{7}$	$\frac{4.2}{2}$	$\frac{4.7}{8}$	$\frac{5.3}{11}$	$\frac{4.5}{15}$	$\frac{4.5}{25}$
		1185.7							
139+00	$\frac{3.8}{25}$	$\frac{4.2}{19}$	$\frac{5.2}{13}$	$\frac{5.0}{9}$	$\frac{4.9}{2}$	$\frac{5.1}{6}$	$\frac{5.6}{8}$	$\frac{4.6}{12}$	$\frac{4.5}{25}$
		1185.7							
138+00	$\frac{3.8}{25}$	$\frac{4.7}{22}$	$\frac{5.6}{12}$	$\frac{5.1}{11}$	$\frac{4.9}{4}$	$\frac{5.3}{6}$	$\frac{5.7}{8}$	$\frac{6.3}{25}$	
		1.98		1188.58					

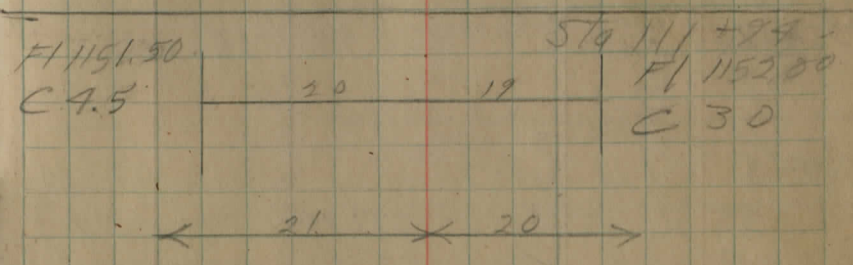
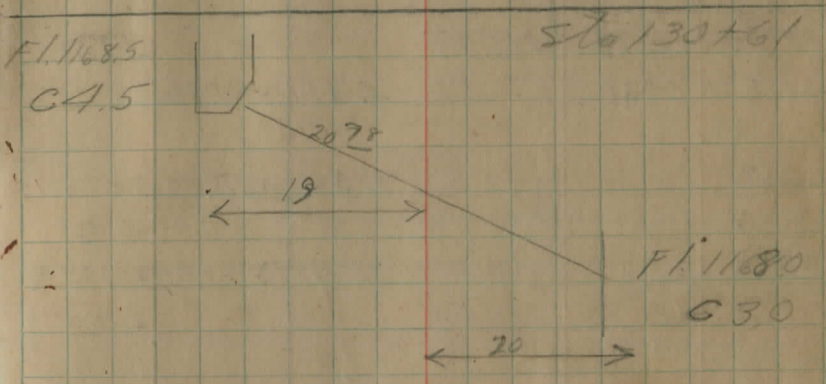
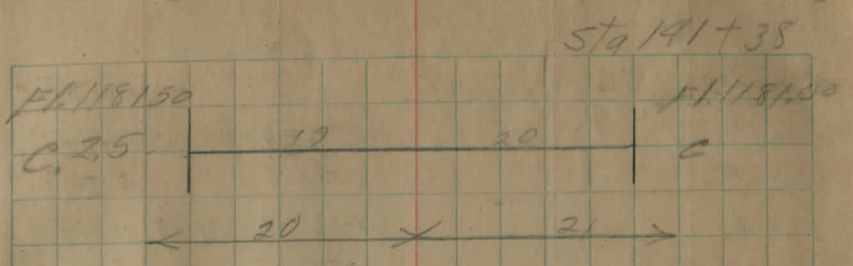


6/1/23
 66 Ground
 CRand

BM # 17	144	1189.09		1187.65
Flow R		8.21	1180.88	1181.00
Stake R		5.71		C 2.5
Flow L		7.97	1181.62	1181.50
Stake L		4.97		C 2.5

BM # 16	2.45	1191.03		1188.58
	0.66	1182.24	2.45	1181.58
Flow R		14.36	1167.58	1168.00
Stake R		11.30		C 3.0
Flow L		13.62	1168.62	1168.50
Stake L		9.12		C 4.5

BM # 14	9.65	1165.10		1153.45
Flow R		13.10	1152.00	
Stake R		10.10		C 3.0
Flow L		13.60	1151.50	
Stake L		9.10		C 4.5



6/20/39

M. W. W. W.
E. Parks
6. Cantfield
K. Hoffner

BM #2	2.35	1304.44		1302.09
Flon R	6.32	1298.12	1298.0	
Stake R		232	C 4.0	
Flon L	7.06	1297.38	1297.5	
Stake L		456	C 2.5	

BM #3	5.85	1285.53		1279.68
Flon R	4.91	1282.82	1282.5	
Stake R		191	C 3.0	
Flon L	6.65	1278.88	1279.0	
Stake L		2.65	C 4.0	

BM #3	0.92	1280.60		1279.68
Flon R	-	13.98	1266.62	1266.50
Stake R		998	C 4.0	
Flon L	14.72	1265.88	1266.00	
Stake L		1212	C 2.0	

BM #5	1.15	1288.90		1287.75
Flon R	11.78	1277.12	1277.00	
Stake R		828	C 3.5	
Flon L	12.52	1276.38	1276.5	
Stake L		1152	C 1.0	

24

Sta 9+70

Fl 1297.5	17	16	Fl 1298.0
C 2.5			C 4.0
← 18 × 17 →			

			Sta 15+42
Fl 1279.0			Fl 1280.5
C	20	19	C 3.0
← 21 × 20 →			

			Sta 22+43
Fl 1266.0	22	21	Fl 1266.5
C 2.0			C 4.0
← 23 × 22 →			

			Sta 35+20
Fl 1276.5			Fl 1277.0
C 1.0	20	19	C 3.5
← 21 × 20 →			

6/24/29

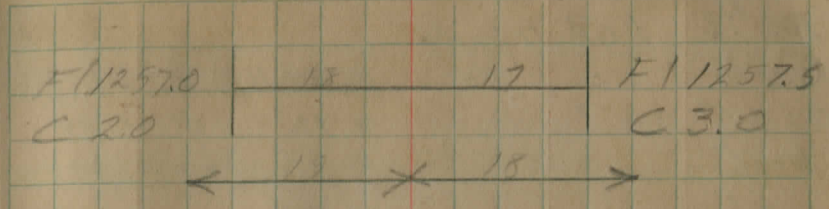
B.M.#6	1.09	1270.72		1269.68
	3.00	1264.43	9.29	1261.93
Flow R Stake R		6.81	1259.62	1259.50
			3.81	C 3.0
Flow L Stake L		7.55	1256.88	1257.0
			5.55	C 2.0

6/24/29

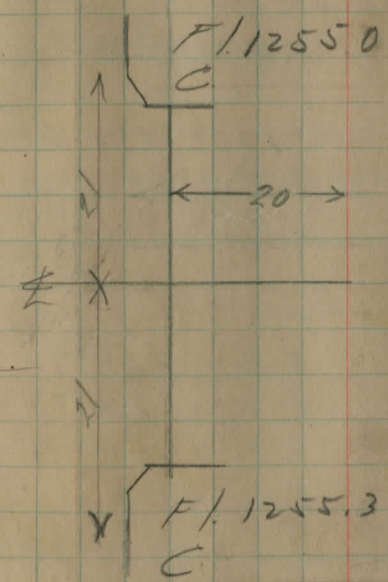
B.M.#7	3.80	1262.06		1258.26
Flow N Stake N		7.06	1255.00	
			3.56	C 3.50
Flow S Stake S		6.76	1255.30	
			3.26	C 3.5

B.M.#	0.46	1211.87		1211.41
Flow E Stake E		9.00	1202.87	1202.75
		4.00		C 5.0
Flow N Stake N		9.77	1202.10	1202.00
		5.77		C 4.0

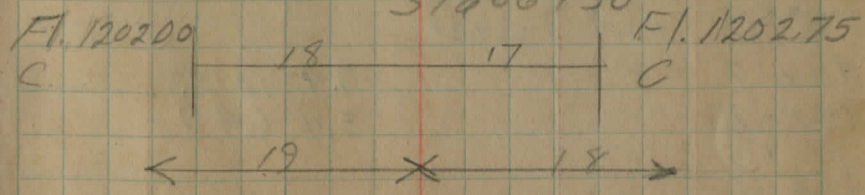
Sta 53+00



Sta 62+85



Sta 86+30



6/26/29

B.M. 12	1.44	1196.44		1195.00
Flow R			6.32	1190.12
Stake R			2.32	C 4.0
Flow L			7.06	1189.38
Stake L			5.56	C 1.5

B.M. 14	120540			120396
Flow R			8.72	1196.62
Stake R			5.22	C 3.5
Flow L			11.02	1194.38
Stake L			9.02	C 2.0

7/22/29

± US 322	4.4	1326.1		1321.7
Flow E			6.8	1319.3
Stake E			2.3	C 4.5
Flow W			9.2	1316.9
Stake W			5.2	C 4.0

7/30

B.M. 21	4.24	1327.21		1322.97
Flow E			7.4	1319.8
Stake E			3.4	C 4.0
± of US 322 East End			4.1	1323.1

26

Sta 99+41

FI 1189.5	20	19	FI 1190.0
C. 1.5			C. 4.0
← 21 * 20 →			

Sta 93+53

FI 1194.5	21	17	FI 1196.5
C 2.0			C 3.5
← 22 * 18 →			

Extra

Sta 0+20

← 39 * 43' →	
FI 1316.9	FI 1319.3
C 4.0	C 4.5
38	42'
20	↓
± US 322	

Sta	BS	HI	FS	Elev	B.M.
144+20					1187.65
	2.10	1189.75	3.80	1185.95	
	4.76	1190.71			
137+85			2.12	1188.59	1188.58
			12.89	1177.82	
	0.74	1178.56	7.85	1170.71	
130+50	2.03	1172.74	1.27	1171.47	1171.47
			7.30	1165.44	
121+80	1.03	1166.47	1.39	1165.08	1165.08
			10.90	1155.57	
116+00	5.45	1161.02	5.51	1155.51	1155.45
	10.73	1166.18	5.51	1160.67	
	12.21	1172.88	0.84	1172.04	
105+50	8.36	1180.40	1.05	1179.35	1179.35
	8.66	1188.01	0.00	1188.01	
100+75	8.31	1196.32	1.33	1194.99	1195.00
			1.10	1195.23	
	7.75	1202.98	1.07	1201.91	
92+00	9.23	1211.14	7.29	1203.85	1203.96
88+75	7.82	1211.78	0.61	1211.17	1204.16
	1.95	1206.11	4.01	1202.10	
	11.13	1213.23	0.28	1212.95	
82+00	11.53	1224.48	3.06	1221.42	1228.70

Sta	BM	Elev
	#17	144+20-1187.65
	#16	137+85-1188.58
	#15	130+50-1171.47
	#14	116+00-1155.45
	#13	105+50-1179.35
	#12	100+75-1195.00
	#11	92+00-1203.96
	#10	88+75-1204.16
	#9	82+00-1228.70
	#8	70+25-1250.98

Old B.M. #15 out. - Rt.
 New B.M. #15.
 S.E. corner E. Headwall of culvert. Sta. 130+50
 El. - 1171.47
 New B.M. Sta. 121+80, Lt.
 Spike in E. root of 16" Maple 30' Lt. El. Lt.
 El. - 1165.08

B.M. #13 out
 Reset in same point at same El.

B.M. #11 found on Lt. of # instead of Rt. as plans indicate.

Error Between B.M. #11 & B.M. #12. of 0.11 - Rem. closed circuit.

Error 2.01 Between B.M. #11 and B.M. #10.

Sta.	B.S.	Hi	F.S.	El	B.M.
BM#1	3.16	1326.13			1322.97

1			4.53	1321.60	
2			5.28	1320.85	
3			7.33	1318.80	
4	5.17	1321.34	9.96	1316.17	
			5.24	1316.10	
5			7.94	1313.40	
6			10.64	1310.70	
7	1.26	1309.68	12.92	1308.42	
			1.68	1308.00	
8			4.38	1305.30	
9			7.08	1302.60	
10			9.78	1299.90	
BM#2	0.74	1302.83	7.53	1302.15	1302.09
11			5.63	1297.20	
12			8.52	1294.31	
13			11.83	1291.00	
T.P.	1.91	1292.11	12.63	1290.20	

$\frac{F0.7}{23.6}$	$\frac{F0.7}{22.6}$		$\frac{C0.9}{25.0}$	$\frac{E1.2}{26.0}$
$\frac{C0.2}{16.4}$	$\frac{F0.3}{15.4}$	← Summit Sec	$\frac{C2.5}{27.4}$	$\frac{C2.6}{28.4}$
$\frac{C0.4}{16.6}$	$\frac{F0.2}{15.6}$	← " " (B+10) →	$\frac{C1.1}{25.3}$	$\frac{C1.6}{26.3}$
$\frac{C0.3}{24.8}$	$\frac{C0.1}{23.8}$	Basement →	$\frac{C2.7}{27.7}$	$\frac{C2.8}{28.7}$
$\frac{F0.5}{23.4}$	$\frac{F0.8}{22.4}$		$\frac{C2.2}{26.9}$	$\frac{C2.5}{27.9}$
$\frac{F2.3}{26.0}$	$\frac{F2.4}{20.0}$		$\frac{C0.5}{24.4}$	$\frac{C0.7}{25.4}$
$\frac{F3.0}{21.5}$	$\frac{F3.2}{20.5}$		$\frac{F2.1}{20.5}$	$\frac{F1.6}{21.5}$
$\frac{F2.7}{20.7}$	$\frac{F2.8}{19.7}$		$\frac{F0.8}{22.4}$	$\frac{F0.9}{23.4}$
$\frac{F0.9}{23.0}$	$\frac{F1.1}{22.0}$		$\frac{C1.1}{25.3}$	$\frac{C1.3}{26.3}$
$\frac{F0.5}{23.6}$	$\frac{F0.7}{22.6}$		$\frac{C1.2}{25.4}$	$\frac{C1.4}{26.4}$
$\frac{F0.7}{23.1}$	$\frac{F1.0}{22.1}$		$\frac{C1.7}{26.2}$	$\frac{C1.8}{27.2}$
$\frac{F0.6}{23.2}$	$\frac{F0.9}{22.2}$		$\frac{C1.8}{26.3}$	$\frac{C2.0}{27.3}$
$\frac{F0.8}{23.1}$	$\frac{F1.0}{22.1}$		$\frac{C0.5}{24.4}$	$\frac{C0.9}{25.4}$

129211

14		4.61	1287.50
15		7.22	1284.89
16		8.11	1284.00
	3.26	1286.48	8.89
17		3.11	1283.37
18		5.02	1281.46
19		7.56	1278.92
BM#3	6.80	1286.48	6.80
			1279.68
20		10.11	1276.37
	4.31	1280.88	9.91
21		6.88	1274.00
22		8.02	1272.86
23		7.73	1272.15
	9.61	1283.98	6.51
24		9.12	1274.86
25		6.28	1277.70
26		3.99	1279.99

$\frac{F1.7}{21.8}$	$\frac{F1.9}{20.8}$	$\frac{F0.9}{22.3}$	$\frac{F0.7}{23.3}$
$\frac{F2.5}{20.8}$	$\frac{F2.5}{19.8}$	$\frac{F1.7}{21.1}$	$\frac{F1.6}{22.1}$
$\frac{F0.8}{23.1}$	$\frac{F1.0}{22.1}$	$\frac{F0.7}{22.6}$	$\frac{F0.4}{23.6}$
$\frac{C0.0}{24.5}$	$\frac{F0.1}{23.5}$	$\frac{C0.3}{24.1}$	$\frac{C0.1}{25.1}$
$\frac{C0.7}{25.2}$	$\frac{C0.4}{24.2}$	$\frac{C0.5}{24.4}$	$\frac{C0.8}{25.4}$
$\frac{C1.8}{27.0}$	$\frac{C1.6}{26.0}$	$\frac{C1.8}{26.3}$	$\frac{C1.8}{27.3}$
$\frac{C2.3}{27.8}$	$\frac{C2.1}{26.8}$	$\frac{C2.1}{26.8}$	$\frac{C2.3}{27.8}$
$\frac{C1.7}{27.2}$	$\frac{C1.7}{26.2}$	$\frac{C1.9}{27.5}$	$\frac{C2.0}{27.5}$
$\frac{F3.2}{21.5}$	$\frac{F3.2}{20.5}$	$\frac{F1.8}{20.9}$	$\frac{F1.7}{21.9}$
$\frac{F3.2}{21.7}$	$\frac{F3.3}{20.7}$	$\frac{F3.2}{20.5}$	$\frac{F3.1}{21.5}$
$\frac{C1.3}{26.3}$	$\frac{C1.1}{25.3}$	$\frac{C0.5}{24.4}$	$\frac{C0.6}{25.4}$
$\frac{C2.9}{28.5}$	$\frac{C2.6}{27.5}$	$\frac{C1.1}{25.3}$	$\frac{C0.8}{26.3}$
$\frac{C1.3}{26.4}$	$\frac{C1.2}{25.4}$	$\frac{C0.1}{23.8}$	$\frac{C0.4}{24.8}$

1283.98

27 2.52 1281.46

28 1.90 1282.08

4.07 1285.21 2.84 1281.14

29 3.23 1281.98

BM#4 2.18 1283.03 1282.97

30 3.38 1281.77

31 1281.52

32 1281.35

33 1281.14

34 1280.93

35 1280.72

36 1281.11

37 1281.70

38 1284.90

39 1286.25

BM#5 1287.75

F0.4 23.9 F0.5 22.9

F0.6 22.7 F0.2 23.7

F1.0 22.8 F1.2 21.8

F0.7 22.6 F0.7 23.6

F0.2 24.2 F0.3 23.2

C0.8 24.8 C0.9 25.8

— 22

— 23.5 —

— 19.5

— 21 —

— 19.5

— 21.5 —

— 20

— 22 —

— 20

— 23 —

— 19

— 21 —

— 20

— 22 —

— 21

— 24 —

— 22.5

— 23.5 —

— 22

— 27 —

8/1
 BM#4 1.95 1284.92 1282.97

30 3.15 1281.77

31 3.36 1281.56

32 3.57 1281.35

33 3.78 1281.14

3.90 1284.63 4.19 1280.73

34 3.70 1280.93

35 3.91 1280.72

36 3.52 1281.11

37 2.93 1281.70

8.04 1291.98 0.69 1283.94

38 7.08 1284.90

39 5.03 1286.95

BM#5 4.29 1287.69 1287.75

40 6.49 1294.24 6.34 1287.90

41 6.62 1287.62

42 8.14 1286.10

F0.4 F0.6
 23.7 22.7

F2.4 F2.4
 21.0 20.0

F2.3 F2.2
 21.3 20.3

F1.9 F1.8
 21.9 20.9

F1.7 F1.8
 21.9 20.9

F2.5 F2.5
 20.8 19.8

F2.1 F2.2
 21.3 20.3

F0.4 F0.7
 23.6 22.6

C0.1 F0.1
 24.5 23.5

F0.3 F0.6
 23.7 22.7

F1.6 F1.5
 22.4 21.4

F1.5 F1.4
 22.5 21.5

F0.4 F0.6
 23.7 22.7

C0.3 C0.2
 24.1 25.1

F1.5 F1.4
 21.4 22.4

F1.3 F1.2
 21.7 22.7

F0.6 F0.4
 22.7 23.7

F0.2 F0.1
 23.3 24.3

F1.6 F1.4
 21.2 22.2

F0.7 F0.7
 22.6 23.6

C1.5 C1.7
 25.9 26.9

C3.1 C3.2
 28.3 29.3

C3.2 C3.3
 28.4 29.4

C1.3 C1.2
 25.6 26.6

C1.4 C1.7
 25.7 26.7

C2.5 C2.8
 27.9 28.9

43		3.17	1294.24	10.94	1283.35
44	3.04		1286.52	10.76	1283.48
		7.02			1279.50
45		11.02			1275.50
46	2.00		1276.16	12.36	1274.16
		4.10			1272.06
47		6.43			1269.73
48		8.20			1267.96
BM 6	1.08		1270.76	6.95	1269.71
49		4.57			1266.19
50		6.34			1264.42
51		8.11			1262.65
52		9.60			1261.16
	3.78		1263.94	10.60	1260.16
53		3.69			1260.25
		3.17			1260.77
54		4.04			1259.80
55		4.11			1259.83

$$\frac{C1.2}{26.0} \quad \frac{C0.9}{25.0}$$

$$\frac{F0.2}{24.2} \quad \frac{F0.3}{23.2}$$

$$\frac{F0.8}{23.4} \quad \frac{F0.5}{22.4}$$

$$\frac{F2.0}{21.0} \quad \frac{F2.0}{20.0}$$

$$\frac{F2.2}{21.0} \quad \frac{F2.4}{20}$$

$$\frac{C1.9}{21.5} \quad \frac{C2.1}{20.5}$$

$$\frac{F0.3}{23.9} \quad \frac{F0.5}{22.9}$$

$$\frac{C0.5}{23.2} \quad \frac{C0.4}{24.2}$$

$$\frac{F0.6}{23.3} \quad \frac{F0.9}{22.3}$$

$$\frac{F1.0}{22.8} \quad \frac{F1.2}{21.8}$$

$$\frac{F1.5}{22.2} \quad \frac{F1.6}{21.2}$$

$$\frac{F2.0}{21.5} \quad \frac{F2.1}{20.5}$$

$$\frac{F2.1}{21.8} \quad \frac{F1.9}{20.8}$$

$$\frac{C2.9}{28.0} \quad \frac{C3.5}{29.0}$$

$$\frac{C3.9}{29.4} \quad \frac{C4.3}{30.4}$$

$$\frac{C3.7}{29.2} \quad \frac{C4.2}{30.2}$$

$$\frac{F0.2}{23.3} \quad \frac{C0.1}{24.3}$$

$$\frac{F0.8}{22.4} \quad \frac{F0.6}{23.4}$$

$$\frac{C0.2}{23.9} \quad \frac{C0.3}{24.9}$$

$$\frac{C1.6}{26.0} \quad \frac{C1.9}{27.0}$$

$$\frac{C2.7}{27.7} \quad \frac{C3.0}{28.7}$$

$$\frac{C1.2}{25.4} \quad \frac{C1.4}{26.4}$$

$$\frac{F0.5}{23.9} \quad \frac{C0.0}{23.9}$$

$$\frac{F0.7}{22.6} \quad \frac{F0.5}{23.6}$$

$$\frac{F0.6}{22.7} \quad \frac{F0.3}{23.7}$$

$$\frac{F0.5}{23.9} \quad \frac{F0.2}{23.9}$$

New BM Sta 53+85⁰¹ SW. 405 E. Head wall.

BS HI FS
BM 2.98 1263.75 1260.71/260.77

56 3.98 1259.77

57 4.05 1259.70

58 4.12 1259.63

4.84 1262.97 5.62 1258.13

59 3.40 1259.57

60 3.59 1259.38

61 4.04 1258.93

BM#7 3.92 1262.22 4.67 1258.30 1258.26

62 3.86 1258.36

63 4.45 1257.97

64 4.98 1257.20

65 5.59 1256.63

4.26 1260.39 6.09 1256.18

66 4.33 1256.06

67 5.09 1255.30

New BM Sta 53+84.5W 4 of E.H.W.

F2.3 24.2 F2.3 26.2 F0.6 22.9 F0.4 23.7

F2.0 21.0 F2.0 20.0 F1.7 24.8 F1.1 22.8

F1.5 21.5 F2.1 20.5 F1.1 22.0 F0.9 23.0

F1.0 23.0 F1.1 22.0 F0.8 22.4 F0.7 23.4

F1.5 22.2 F1.6 21.2 F1.2 21.8 F1.3 22.8

F0.5 23.4 F0.8 22.4 F1.3 21.7 F1.2 22.7

Sta 61+25 Hickory 30' Rt #

C0.1 24.6 F0.0 23.6 F0.8 22.4 F0.6 23.4

C0.4 25.1 C0.3 24.1 F0.9 23.0 F0.1 24.0

C0.4 24.9 C0.2 23.9 F0.1 23.5 C0.0 24.5

F0.5 23.7 F0.6 22.7 F0.6 22.7 F0.2 23.7

F0.2 24.0 F0.4 23.0 C0.0 23.0 C0.2 24.6

C0.5 24.8 C0.1 23.8 C0.1 23.6 C0.1 24.8

1260.39

68 6.26/254.13

69 3.59 1256.92 6.06/254.33
4.16/252.76

70 5.53/251.39

BA 8 2.65 1253.63 5.86/251.06 1250.98

71 3.61/250.02

72 4.98/248.65

73 6.35/247.28

74 1.70 1249.18 6.15/247.48
3.27/245.91

75 4.64/244.54

76 6.10/243.08

77 2.17 1245.47 5.88/243.30
4.95/241.02

78 7.44/238.33

79 9.92/235.55

80 0.81/236.47 9.81/235.66
2.70/233.77

CO.7 24.6 CO.0 23.6 FO.3 23.2 FO.1 24.2

CO.3 24.9 CO.2 23.9 FO.2 23.3 CO.0 24.3

FI.1 23.0 FI.1 22.0 FO.7 22.6 FO.5 23.6

70+25 Maple 30' LT Z

FO.8 23.3 FO.7 22.3 FO.2 23.3 CO.1 24.3

FO.6 23.6 FO.7 22.6 FO.8 22.9 FO.6 23.4

CO.2 24.5 FO.4 23.5 FO.8 22.4 FO.7 23.4

CO.3 24.9 CO.2 23.9 FO.2 23.3 FO.1 24.3

CO.2 25.2 CO.4 24.2 CO.2 23.8 CO.3 24.8

CO.2 24.6 CO.0 23.6 CO.0 23.6 CO.3 24.6

CO.7 25.4 CO.5 24.4 CO.4 24.2 CO.6 25.2

CO.7 25.7 CO.7 24.7 C.1.3 25.6 C.1.6 26.6

CO.11 24.8 FO.1 23.5 CO.0 23.6 CO.1 24.6

FI.1 22.1 FI.3 27.9 FI.0 22.1 FO.8 23.1

1236.47

81 6.95/1229.52

BM9 2.04/1230.74 7.74/1228.73 1228.70

82 5.44/1225.30

83 10.14/1220.60

0.97/1225.38 6.33/1224.41

84 9.48/1215.90

1.15/1218.45 8.08/1217.30

84+96 6.31/1212.74

86 8.95/1209.50

E.H.W. 5.67/1214.53 9.59/1208.86

87 8.95/1208.58

88 5.37/1209.16

BM10 3.07/1211.46 1211.41

89

90

91

0.71/1205.40

92

C0.7/25.4 C0.5/24.4 C0.9/25.0 C1.0/26.0

82+00 Locust 30' Lt Z

C3.2/29.0 C3.7/28.4 C3.7/29.2 C3.9/30.2

C3.8/29.7 C3.4/28.7 C1.3/25.6 C1.7/26.6

C1.4/26.1 C1.0/25.1 F1.6/21.2 F1.3/22.2

F0.4/23.6 F0.7/22.6 F1.8/20.9 F1.6/21.9

F0.7/23.0 F1.1/22.0 F1.8/20.9 F1.8/21.9

F2.2/21.0 F2.0/20.0 F2.4/20.0 F2.4/21.0

88+75 Maple 30' Lt Z

C0.6/25.5 C0.6/24.5 C0.5/23.8 C0.5/24.8

F0.3/24.0 F0.4/23.0 F0.7/23.7 F0.5/23.7

F1.3/22.5 F1.4/22.5 C0.0/23.6 C0.1/24.6

C0.6/25.5 C0.6/24.5 C1.4/23.7 C1.8/26.7

1205.90

BM11

1.15 1204.25 1203.96

92700 Maple 30' RT Σ

93	1200.88
94	1199.50
95	1198.50
96	1197.50
97	1196.50
98	1195.50
99	1194.50
100	1193.50

20.	22.
19.	23.
22.	24.
23.	24.
21.	22.
21.	20.
21.	19.
20.	22.

BM12

1195.00

100775 Maple 30' RT Σ

101	1191.88
102	1189.00
103	1185.50
104	1182.00

22.	27.
20.	26.
22.	23.
25.	28.

BM 17 2.59 1190.24 1187.65

144 4.21 1186.03

143 4.62 1185.62

142 4.97 1185.27

141 4.90 1185.34

6.24 1190.40 6.08 1184.16

140 4.57 1185.83

139 4.01 1186.39

138 3.61 1186.79

BM 16 2.24 1190.82 1.81 1188.59 1188.58

137 4.60 1186.22

136 6.28 1184.54

135 8.95 1181.87

9.06 1181.76

134 1179.05

133 1176.73

144+20 E 107 35' Lt. E

C0.4 24.9 C0.2 23.9

C2.0 26.6 C2.3 27.6

F0.5 23.6 F0.7 22.6

C0.8 27.8 C0.9 25.8

F1.2 22.5 F1.4 21.5

E1.3 21.7 F1.1 22.7

F2.0 21.5 F2.1 20.5

79.7 F2.8 20.7

C0.7 25.4 C0.5 24.4

C0.2 27.0 C0.5 25.0

C0.4 24.9 C0.2 23.9

C0.1 23.8 F0.4 24.8

F0.6 23.1 F1.0 22.1

F2.4 20.0 F2.3 21.0

137+85 Maple 30' Lt E

C2.1 27.8 C2.1 26.8

C0.1 23.8 C0.2 24.8

C0.9 25.2 C0.4 24.2

C0.8 24.8 C0.8 25.8

F1.0 24.0 F0.4 23.0

F1.4 21.5 F1.3 22.5

25

23

23

23

132

1173.81

131

1172.20

BM15

1171.47

21

20

21

20

130730 SE cor E Hd. wall,

	BS	HI	FS
BM 10	2.25	1213.41	1211.16
88			4.25 / 1209.16
89			3.87 / 1209.54
90			5.41 / 1208.00
91			7.91 / 1205.50
	3.33	1207.23	9.51 / 1203.90
BM 11	3.28	1207.24	3.28 / 1203.95 / 1203.96
92			4.24 / 1203.00
93			6.36 / 1200.88
94			7.74 / 1199.50
	4.29	1203.79	7.74 / 1199.50
95			5.29 / 1198.50
96			6.29 / 1197.50
97			7.29 / 1196.50
98			8.29 / 1195.50
	3.70	1197.90	9.59 / 1194.20
99			3.40 / 1194.50

$\frac{C21.0}{22.7}$			$\frac{C1.5}{26.7}$
$\frac{C2.3}{25.5}$			$\frac{C0.2}{24.8}$
$\frac{F0.7}{24.0}$			$\frac{F0.7}{23.7}$
$\frac{F1.6}{22.5}$			$\frac{F0.2}{24.6}$
$\frac{C0.3}{25.5}$			$\frac{F1.5}{26.7}$
$\frac{F1.9}{21.6}$	$\frac{F2.0}{20.6}$	$\frac{F0.9}{22.3}$	$\frac{F0.7}{23.3}$
$\frac{F2.4}{20.8}$	$\frac{F2.5}{19.8}$	$\frac{F0.7}{23.3}$	$\frac{C0.0}{24.3}$
$\frac{F0.6}{23.9}$	$\frac{F0.5}{22.9}$	$\frac{C1.0}{25.1}$	$\frac{C1.3}{26.1}$
$\frac{C0.1}{24.6}$	$\frac{C0.0}{23.6}$	$\frac{C0.9}{25.0}$	$\frac{C1.2}{26.0}$
$\frac{F2.1}{22.2}$	$\frac{F1.6}{21.2}$	$\frac{C0.7}{24.7}$	$\frac{C0.4}{25.7}$
$\frac{F0.9}{23.1}$	$\frac{F1.0}{22.1}$	$\frac{F1.6}{21.2}$	$\frac{F1.3}{22.2}$
$\frac{F3.4}{21.9}$	$\frac{F3.4}{20.9}$	$\frac{F2.4}{20.0}$	$\frac{F2.2}{21.0}$

1197.90

100		4.40	1193.50
BM12	2.75	1197.90	2.75 1195.15 1195.00
101			1191.88
102			1189.00
	9.90	1189.25	1179.35 ←
103		3.75	1185.50
104		7.25	1182.00
		9.90	1179.35
105			1178.85
BM13	2.34	1181.69	1179.35
106		4.02	1177.67
107		7.69	1174.00
	3.42	1175.61	9.50 1172.19
108		5.28	1170.33
109		8.95	1166.66
	3.01	1170.27	8.35 1167.26
110		7.27	1163.00
111		10.49	1159.76
		11.25	1159.02

F2.1 21.5	F2.1 20.5	F0.6 22.7	F0.3 23.7
--------------	--------------	--------------	--------------

100+75 Maple 30' RT &

C0.1 24.8	C0.1 23.8	C0.6 24.5	C0.7 25.8
C0.9 25.7	C0.7 24.7	C3.3 28.6	C3.4 29.6

105+50 Trl post 30' RT &

F2.6 20.7	F2.8 19.7	F2.8 19.7	F2.6 20.7
F1.8 21.5	F2.1 20.5	F1.1 22.0	F0.9 23.0
F0.5 23.0	F0.7 22.6	C0.0 23.6	C0.2 24.6
C0.6 25.5	C0.6 24.5	C1.4 25.7	C1.5 26.7
C2.0 27.0	C1.6 26.0	C0.4 24.2	C0.5 23.2
F2.3 21.0	F2.4 20.0	F2.5 19.8	F2.4 20.8

SW cor E Hd Wall Sta 111+75

	10.04	1169.06		1159.02	
112+05			9.52	1159.54	
113			7.93	1161.63	
114			7.43	1161.63	
115			10.06	1159.00	
	2.77	1163.76	8.07	1160.99	
BM14	8.28	1163.73	8.28	1155.48	1155.45
116			6.95	1156.78	
	6.42	1160.60	9.55	1154.18	
117			4.49	1156.11	
118			4.43	1156.17	
119			4.50	1156.10	
	11.70	1166.77	5.53	1155.07	
120				1156.25	
121				1157.92	
B.M.(New)			1.72	1165.05	1165.08
122				1161.00	
123				1163.63	

$\frac{F6.8}{27.5}$	$\frac{F6.2}{26.5}$	$\frac{F3.3}{20.1}$	$\frac{F3.1}{21.2}$
$\frac{C2.1}{27.5}$	$\frac{C1.9}{26.5}$	$\frac{C4.2}{29.9}$	$\frac{C4.8}{30.7}$
$\frac{C1.7}{26.7}$	$\frac{C1.4}{25.7}$	$\frac{C3.7}{28.6}$	$\frac{C3.9}{29.6}$
$\frac{C2.0}{27.3}$	$\frac{C1.8}{26.3}$	$\frac{F0.6}{22.7}$	$\frac{F0.4}{23.7}$
116400	Flm	30' Lt	±
$\frac{F1.7}{22.1}$	$\frac{F1.7}{21.1}$	$\frac{F0.9}{22.3}$	$\frac{F0.3}{23.3}$
$\frac{F3.4}{22.1}$	$\frac{F3.5}{21.7}$	$\frac{F3.4}{20.9}$	$\frac{F3.4}{21.9}$
$\frac{F2.5}{25.1}$	$\frac{F5.0}{24.1}$	$\frac{F5.2}{24.5}$	$\frac{F4.5}{25.5}$
$\frac{F3.0}{21.5}$	$\frac{F3.2}{20.5}$	$\frac{F4.3}{22.7}$	$\frac{F4.1}{23.7}$
	19.5	21.5	
	24.5	20.5	
171+80	Maple	30' Lt	±
	28.0	26.5	
	29.5	29.0	

124 1165.98

125 1166.66

126 1167.74

127 1168.82

128 1169.91

129 1170.83

130 1171.40

BMP#15 1171.47

131 1172.70

132 1173.81

133 1176.23

134 1179.05

22.5 21.

23. 22.

23.5 21.5

23.5 22.

23 22

23 22

22. 21.5

130 + 50 SE CORNER Hd Wall

21. 20.

21. 20.5

23.5 23.

25.5 23.

8/22/29

BMI¹² 1.59 1196.59 119500

101 4.71 1191.88

102 7.59 1189.00

43

C0.5
24.5

23.5

special

27.7

C17
28.7

C0.1
23.8

22.8

special

26.7

C22
27.7

BM 13 8.31 1187.66 1179.25

105 8.81 1178.95

BM 0.91 1165.99 1165.08

120 9.24 1156.25

121 7.57 1157.92

122 4.49 1161.00

123 1.86 1163.63

6.28 1170.74 1.03 1164.46

124 5.24 1165.48

125 4.08 1166.66

126 3.00 1167.74

5.42 1172.99 3.17 1167.57

127 4.17 1168.82

128 3.08 1169.91

129 2.16 1170.83

5.28 1175.75 2.32 1170.67

130 4.55 1171.40

$\frac{C7.1}{34.9}$ $\frac{C7.1}{38.9}$ Special

$\frac{C2.2}{26.8}$ $\frac{C2.4}{27.8}$

$\frac{F1.3}{22.4}$ $\frac{F1.5}{21.4}$

$\frac{F3.1}{20.3}$ $\frac{F3.0}{21.3}$

$\frac{C2.4}{27.6}$ $\frac{C2.0}{27.6}$

$\frac{F1.0}{22.1}$ $\frac{F0.9}{23.1}$

$\frac{C3.4}{29.7}$ $\frac{C3.4}{28.7}$

$\frac{C2.1}{26.8}$ $\frac{C2.2}{27.8}$

$\frac{C0.9}{25.7}$ $\frac{C0.7}{24.7}$

$\frac{C0.2}{23.9}$ $\frac{C0.3}{24.9}$

$\frac{F0.3}{23.9}$ $\frac{F0.5}{22.9}$

$\frac{F1.1}{22.0}$ $\frac{F1.0}{23.0}$

$\frac{F0.1}{24.3}$ $\frac{F0.2}{23.3}$

$\frac{F0.9}{22.3}$ $\frac{F0.8}{23.3}$

$\frac{C0.5}{24.9}$ $\frac{C0.2}{23.9}$

$\frac{F0.9}{22.3}$ $\frac{F0.6}{23.3}$

$\frac{C0.9}{25.7}$ $\frac{C0.7}{24.7}$

$\frac{F0.9}{22.3}$ $\frac{F0.8}{23.3}$

$\frac{C0.4}{24.9}$ $\frac{C0.2}{23.9}$

$\frac{F0.7}{22.6}$ $\frac{F0.6}{23.6}$

$\frac{C0.2}{24.6}$ $\frac{C0.0}{23.6}$

$\frac{F1.1}{22.0}$ $\frac{F1.0}{23.0}$

$\frac{F0.1}{24.3}$ $\frac{F0.2}{23.3}$

$\frac{F1.5}{21.4}$ $\frac{F1.7}{22.4}$

B.M. 4.44 1175.91 4.44 1171.51/1171.47

131 3.71/1172.20

132 2.10/1173.81

1015 1183.56 2.50/1173.41

137 7.33/1176.23

134 4.51/1179.05

135 1.69/1181.87

11.11 1191.44 3.23/1180.33

2.78/1188.66/1188.58

$\frac{F1.3}{22.4}$ $\frac{F1.5}{21.4}$

$\frac{F0.7}{23.3}$ $\frac{F0.9}{22.3}$

$\frac{C0.3}{25.1}$ $\frac{C0.3}{24.1}$

$\frac{C1.6}{26.9}$ $\frac{C1.5}{25.9}$

— 22.5

$\frac{F1.9}{20.8}$ $\frac{F1.9}{21.8}$

$\frac{F2.1}{20.5}$ $\frac{F2.0}{21.5}$

$\frac{C0.4}{24.2}$ $\frac{C0.5}{25.2}$

$\frac{C0.3}{24.1}$ $\frac{C0.5}{25.1}$

— 21 $\frac{F1.2}{21}$

Widening + Super elev.

BM 0.59 1195.59 1195.00

100+52²⁵

101+02²⁵

101+50

102+00

102+27²²

102+77⁰²

Sta 100+75 BM #12

1192.67 2.92 2.92 1192.67

1192.23 3.36 3.91 1191.68

1191.54 4.05 5.12 1190.47

1189.72 5.87 6.72 1188.87

1188.48 7.11 7.66 1187.93

1186.18 9.41 9.41 1186.18

Location
 South Hamden Road Clarendon
 Lammons Cor. Southeastly

Curve Data
 $\Delta = 33^{\circ}12'$
 $D = 38'$
 $T = 44.95'$
 $E = 6.6'$
 $L = 87.37'$
 Shortage = 2.53'

Note: Measurement
 taken on tangent

Sta 0+45.00 Det. Rt. $33^{\circ}12'$

Iron
 set

Sta 0+00 X Road to Sissors Cor.

Iron
 set

Note: P.I. on Clarendon center N. Improvement
 is .5 to 1.0 ft north of Δ at S Hamden
 Point moved in line

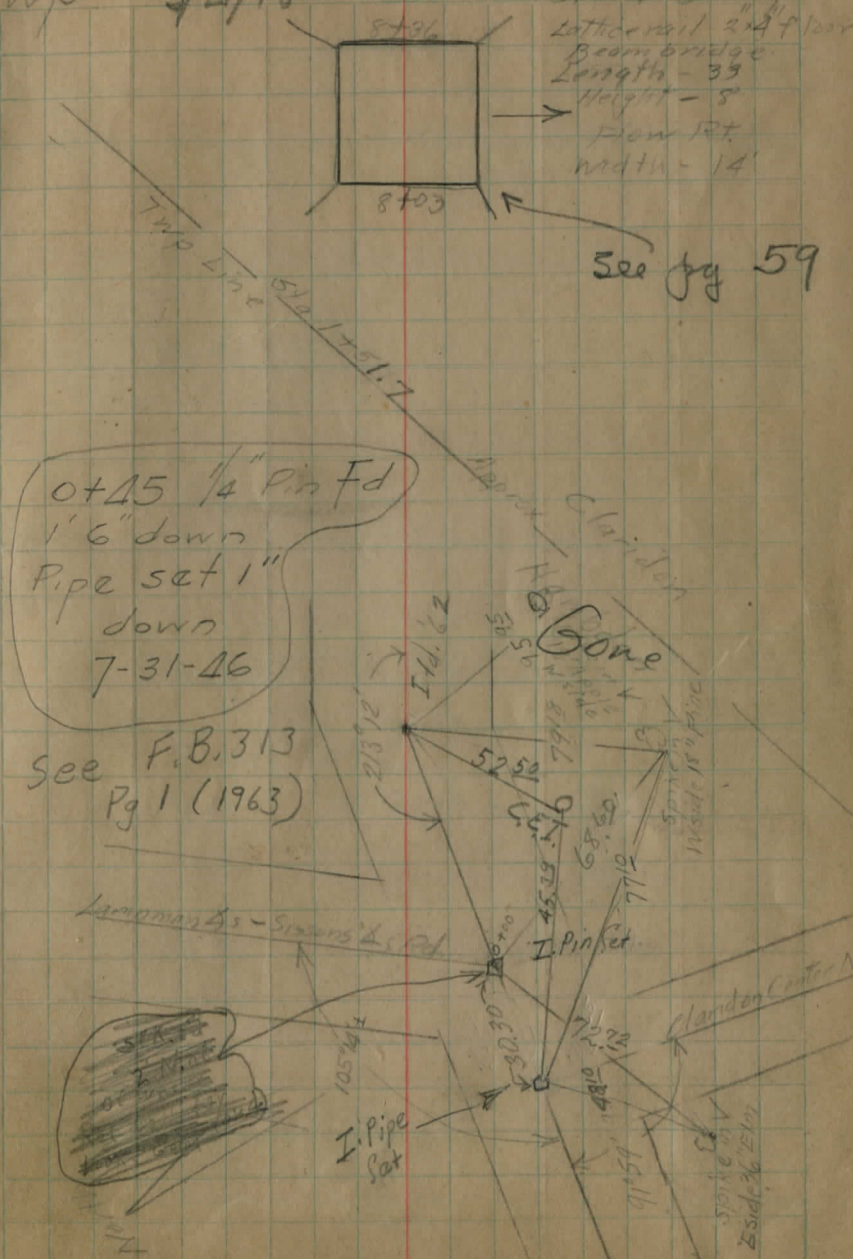
E. a but mit
 undermined
 3/21/48

47

Twp

Steel Bridge
 Lattice rail 2nd floor
 Beam bridge
 Length - 39'
 Height - 8'
 Flow FT.
 width - 14'

See pg 59



0+45 $\frac{1}{4}$ " Pin Fd
 1' 6" down
 Pipe set 1"
 down
 7-31-46

see F.B. 313
 Pg 1 (1963)

Lammons Cor. - Sissors Cor.

Clarendon Center N.

Sissors Cor.
 S side 36' E 10'

Sta 36+36.40 P.O.T.

Iron Set

Sta 35+63.10

Iron Set

Rt Asto Iron on Sabo M' Coy Prop line

Sta 29+00 Prop line 23 N Janicki-Sabo Line

Sta 24+46 Prop line 40 N Kalster-Janicki Line

Sta 20+77 Prop line 54 ft N Rt Asto Iron Russell-Kalster prop line.

Sta 16+58.45 Det Lt. 0°42'

Iron Set

SPK N side
CEI # 589351

81.24

I.P. set Flush

7-31-46

Fd 7-12-57

Fd 5-6-62

91.60

SPK Pulled out
2-62

Spk HE root

24" W.Ch. 79.50

36.45

SPK W side

30 DIM

Iron Pipe

12" Cor IP
Mvlt

22+60

Good Fall
539'E

22+60

32', 12" pipe required
W.C.M., 12/26/33

Spk E root
IF Elm

36.65

Spk S W root

30' 11/2"

28.65

199.8'

Spk Fd Flush

7-31-46

33.85
SEW
W side
CEI
#18042

Fd
7-12-57

8-250 | 4657.00 188 mi.
 42240
 +3200
 42240

Note: See FB 307 pg 77 for ASB work.
 SR608 to CH 44

Sta 55+18.80 POT Iron set
 = 8+61.80

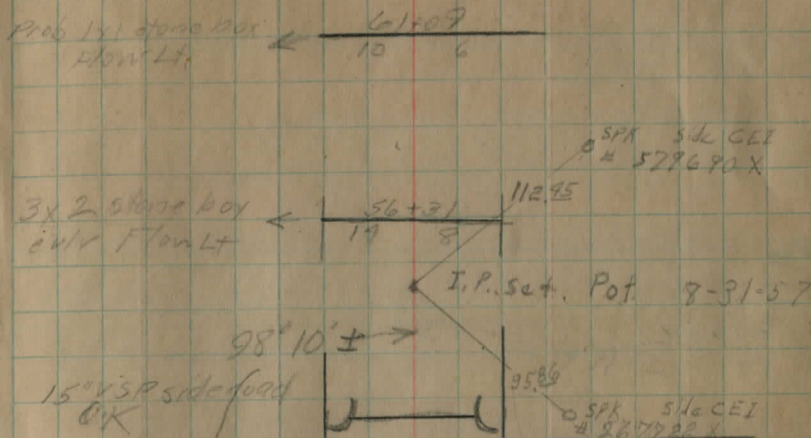
Sta 46+57 \neq Old State Road. (approx)

Sta 45+77⁶⁰ Def. Lt. 47° 01' Iron set

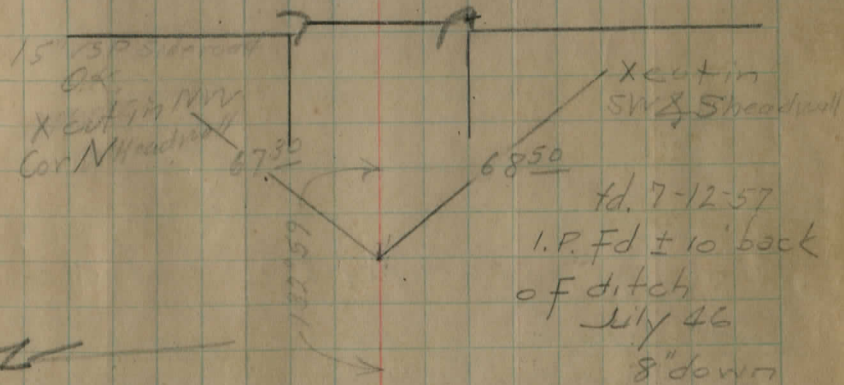
Curve Data
 $\Delta = 47^\circ 01' Lt.$
 $D = 20'$
 $T = 124.61$
 $E = 25.9$
 $L = 235.08$
 $PC = 44+52.99$
 $PT = 46+88.07$
 $Shortage = 14.1$

Note: chaining was made along tangent

Note: \neq of curve follows road as now travelled



Old State Rd 46+57 ←



10° O.P. Flow Lt. ← 42+37 / 6 14

$$\frac{96}{75} + \frac{70}{70} \frac{10}{10}$$

$$= 50 + 13.10$$

POT

Iron
Set

$$= 32 + 19.58$$

Should be $78 + 76.58$ W.C.M. Aug. 15, 1933. Found 100' Error

$$77 + 76.58$$

POT

Iron
Set

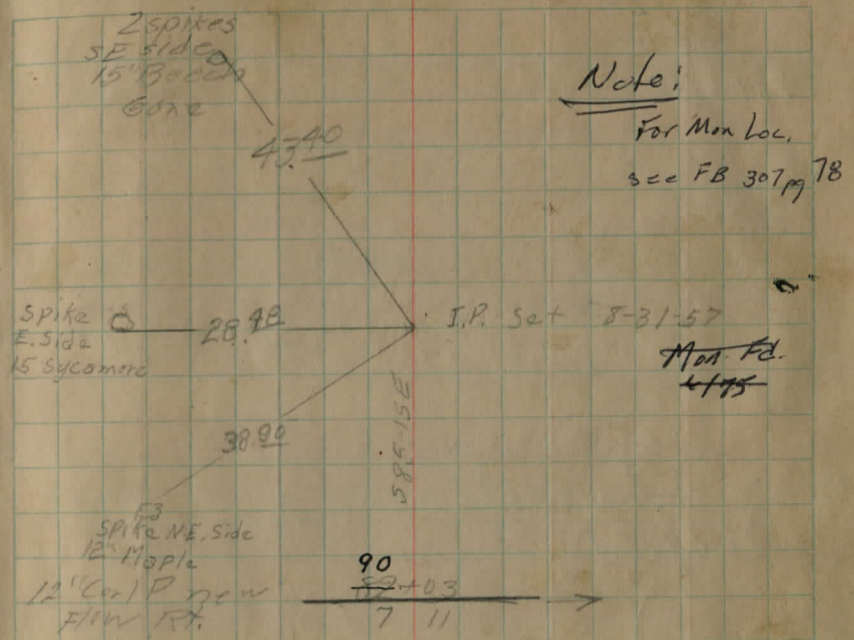
Equation sta 77 + 76.58 should be sta 78 + 76.58
error between 67 + 85 and 78 + 76.58

$$71 + 18.80$$

POT

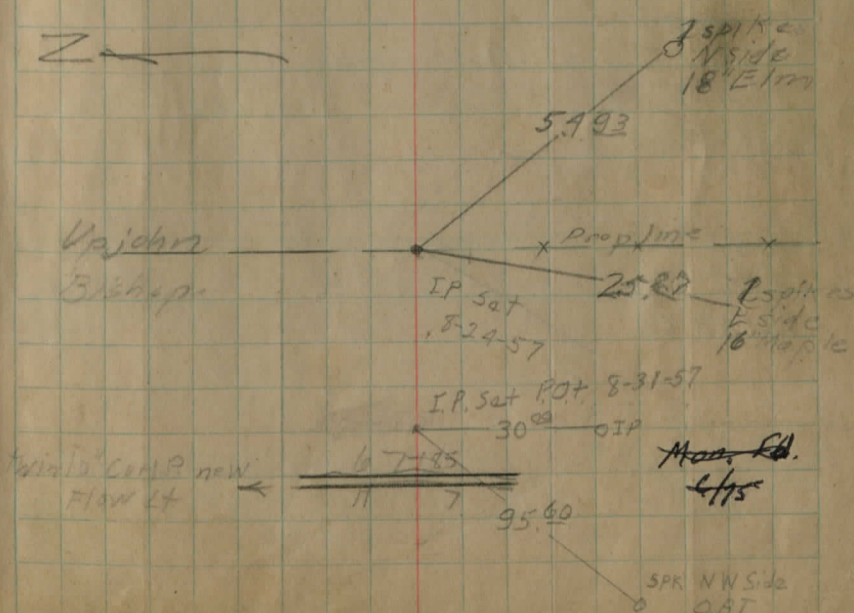
Iron
Set

$$= 24 + 61.80$$



Note:
For Mon Loc,
see FB 307 pg 78

Z



125
Sta 74+0.50 End of Imp.
= 78+52.50 ± Town Line Rd 3' Net Sta 0+00
77.52 ± of Town Line Imp.

1414
4738.3C
1250.
2758.3
2111.2
4471.6
3163.0
7006.0

11466 mi

2.37 miles

5380 | 12493
 | 1056
 | 1933
 | 6841
 | 3490

18-095
 167

12+42.8

66+78

113
Sta 72+35.25 P.O.T. Iron Set

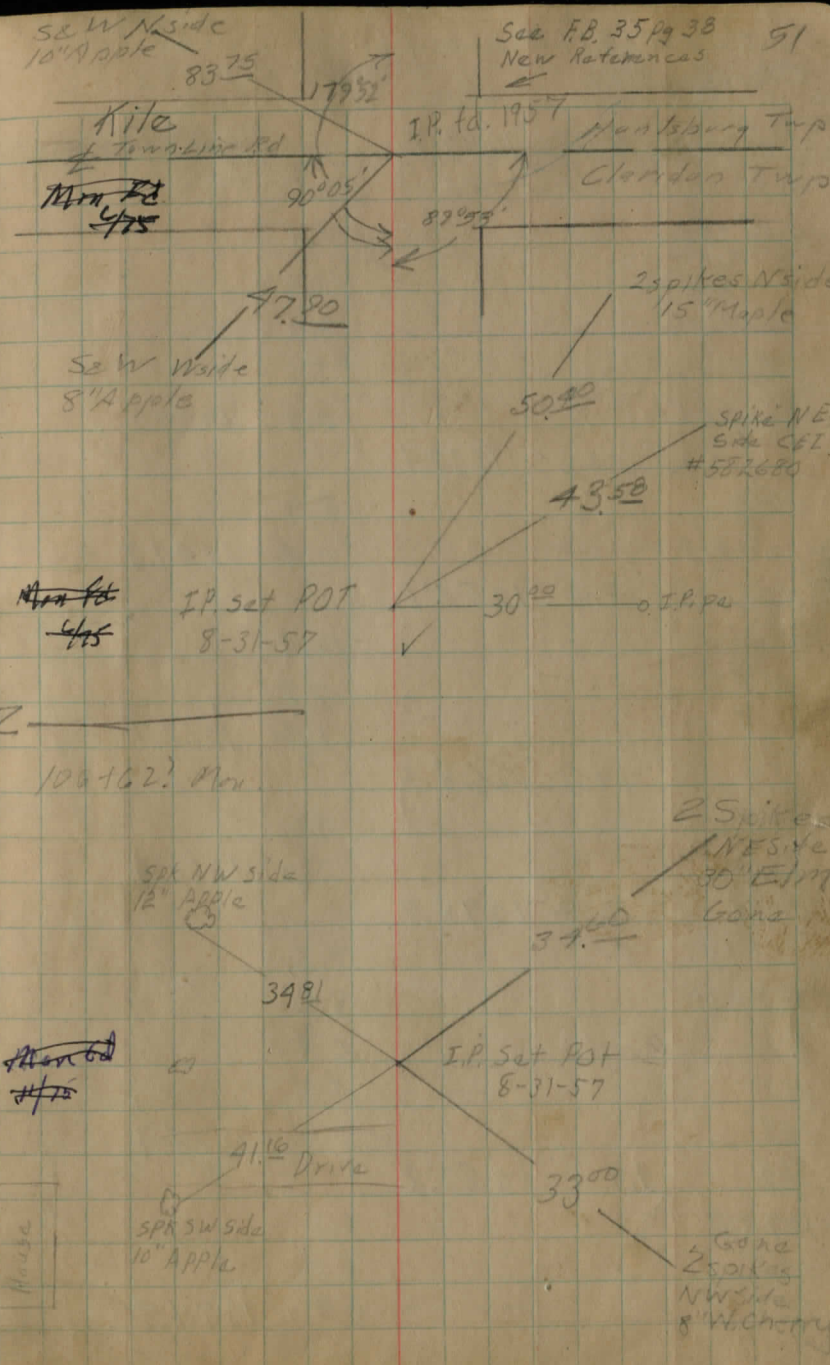
= 66+78.29

110
Sta 67+10 ± Upjohn-Sovary Prop line
Sta 67+01 Riti-Brown Prop. line

105
Sta 64+05.75 P.O.T. Iron Set

= 58+48.75

104
Sta 63+34 Zilira-Rati Prop line



Co. Hwy. #13, (S. Hambden Rd.) Aug. 16, 1933
 Claridon Twp. H.I. - Marks, Dietz E1

125+09.5	5.6	1227.7	1222.1
125+30			6.9
125+50			9.1
126+10			12.0
100' North			3.2
100' South			9.6
123+50 T.P.	14.8	1242.1	0.4 1227.3
122			8.9
120+15			0.4 1241.7
120+15	13.4	1255.1	
120			12.4
119			7.9
117			1.4 1253.7
117	14.7	1268.4	
115+25			9.6
114			2.0 1266.4
114	12.4	1278.8	
113+55			9.6
113+20			8.3
112			6.3
111			4.7
108			0.7 1278.1
108	4.7	1282.8	
107+10			3.1
105			3.8
103			4.9 1277.9

Field Book #35

Co. Hwy 13
 I.P. at intersection T.L.R. of

	+	H.I.	-	El.
103	0.9	1278.8		1277.9
101+75			3.0	
101			3.6	
99			5.0	
98			5.5	
97			5.3	
95			11.4	1267.4
95	0.5	1267.9		
93+50			6.8	

92+00

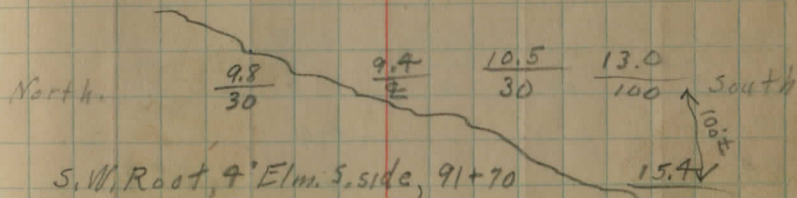
9.4

B.M. 10.3 1257.6
 Aug. 17, 1933, Marks, Dietz.

B.M. 2.8 1260.4

90+03				
89+70			5.3	
89			7.0	
87+55			12.7	1247.7
87+55	0.0	1247.7		
86			4.7	
82			17.1	1230.6
82	0.3	1230.9		
79			6.9	
77			10.3	
75			12.9	1218.0

	N.					S	
98+60	$\frac{7.9}{160}$	$\frac{7.1}{90}$	$\frac{6.8}{70}$	$\frac{5.5}{17}$	$\frac{5.2}{\cancel{2}}$	$\frac{5.8}{20}$	Location for 12" or 15" Pipe



$\frac{6.4}{7 \text{ F.L.}}$	$\frac{5.0}{\cancel{2}}$	$\frac{6.5}{11 \text{ F.L.}}$	$\frac{7.1}{40}$	$\frac{8.5}{90}$
			Ditch	surface

	+	H.I.	-	EI,
75	1.2	1219.2		1218.0
73			3.5	
71			4.8	
69			5.7	
67+85				
67			5.5	1213.7
67	1.2	1214.9		
66+25			0.1	
65			1.4	
63			4.7	
61+40			6.5	
61+09				
59+90			4.4	
59			6.5	1208.4
59	3.2	1211.6		
57			4.8	
56+31			4.4	
55			4.6	
53+90			3.4	
53			4.2	
51			5.9	1205.7
51	3.4	1209.1		
49			4.8	
47			5.2	
46+57			4.7	1204.4
45+68			4.5	1204.6

W

$\frac{10.5}{D}$	$\frac{9.6}{200}$	$\frac{9.0}{100}$	$\frac{8.0}{100}$	$\frac{7.4}{11}$	$\frac{5.9}{2}$	$\frac{7.3}{7}$	$\frac{6.7}{20}$	2-12" Pipes
	F							S.
		Ditch		Field				

$\frac{10.9}{200}$	$\frac{10.1}{100}$	$\frac{9.4}{10}$	$\frac{6.0}{2}$	$\frac{9.0}{6}$	$\frac{7.7}{60}$	Req. 24" pipe
			Field			

$\frac{7.8}{F400D}$	$\frac{9.5}{F}$	$\frac{5.7}{D}$	$\frac{8.5}{200}$	$\frac{8.0}{100}$	$\frac{7.4}{14}$	$\frac{4.4}{2}$	$\frac{7.3}{8}$	$\frac{5.7}{60}$
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(Old State Rd)
 Rec. 1205.00, Grade, Plan of E. Clar. N'y Rd.

North	$\frac{5.0}{100}$	$\frac{4.7}{2}$	$\frac{4.4}{100}$	South	Old State Road.
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←

Profile Levels S Hampden Road.

Hampden's Cor. Southeastly 1187.65

BM #1	1.48	1189.13		
0+10			3.0	86.1
West 100'			0.9	88.2
1			6.9	82.2
2			9.6	79.5
	0.67	1178.51	11.29	1177.84
3			1.2	77.3
4			4.0	74.5
5			8.9	69.6
	1.82	1168.92	11.91	1167.10
			3.7	65.2
			4.9	64.0
			4.1	64.8
8+03 Floor			3.8	65.1
8+36 Floor			4.0	64.9
Flow			11.0	59.9
BM #2			5.16	1163.76
9			2.9	66.0
10			1.9	67.0
	9.54	1178.26	0.20	1168.72
11			7.3	71.0
12			1.6	76.7
	11.56	1189.26	0.56	1177.70
13			8.2	81.1
14			5.6	83.7
15			3.0	86.3

3/10/54

Tehey
Goodrich
Pomeroy

55

Claniden Twp.

Spike NE Foot 36' Elm 70' SW Sta 0+00
= BM #17 Claniden Center N Imp.
road north $\frac{100}{3.3}$ south road

X cut Southernly Corner W Abot. Bridge 8' SW Sta 8+04

		1189.26		
16			1.1	88.2
	5.86	1194.15	0.67	1188.59
17			5.4	89.1
18			5.0	89.5
BM#3			6.31	1188.14
19			4.7	89.8
20			4.0	90.5
21			4.2	90.3
	4.84	1195.61	3.68	1190.77
22			5.2	90.4
22+60			4.8	90.8
23			4.7	90.9
24			4.5	91.1
25			3.4	92.2
26			3.8	91.8
BM#4	2.28	1193.56	4.93	1191.25
27			3.4	90.2
28			4.4	89.2
29			4.5	89.1
30			5.2	88.4
31			4.6	89.0
32			3.3	90.3
	13.03	1203.23	3.36	1190.20
33			11.0	92.2
34			7.1	96.1
35			2.0	91.2
	10.23	1213.32	0.14	1203.09

Spike SW root 30' Elm 75' Lt + Sta 18+10

Fl 7.1 Fl 6.6

Spike SW root 14' Elm 25' Lt + Sta 26+60

1213.32

36		7.2	1206.1
37		4.1	1209.2
814 ²⁵		0.73	1212.59
38		7.0	1206.3
39		7.8	1205.5
	2.01	1206.69	8.64 1204.68
40		2.9	1203.8
41		4.8	01.9
42		5.1	00.6
42+27		5.0	01.7
43		4.8	01.9
	5.48	1208.17	4.00 1202.69
44		4.4	03.8
45		2.8	05.4
46		3.3	04.9
+57	Old State Road	3.4	04.8
East		3.3	04.9
BM #6		3.11	1205.06
+40	Culvert		
BM #7		0.58	1207.59 1208.19

2 Horiz spikes NE side 6" W cherry 40' Rt ± Sta 37+50

$\frac{11}{7.1}$ $\frac{11}{6.9}$

$\frac{100}{3.8}$ $\frac{100}{2.9}$

X cut in SW Δ S Headwall

$\frac{11}{6.5}$ $\frac{11}{5.9}$

Spike in 5 foot 8" Locust 480' N ± 46+75
E side of Old State Rd

Stakes of Clariden Center North
P.M. 5/26/39 Fair - warm Quit 47 to
Pomeroy - Richards Willman

5/31/39 Fair warm windy Began 47 to
Pomeroy Cladse Willman Quit 124 to

6/1/39 Cloudy Muggy Began 124 to
Pomeroy Cladse Willman

105+75³⁵ South fail BrO

2 to

0 to 09

0 to

58
Resurfacing A39

Spk (set)
North edge Pav't.

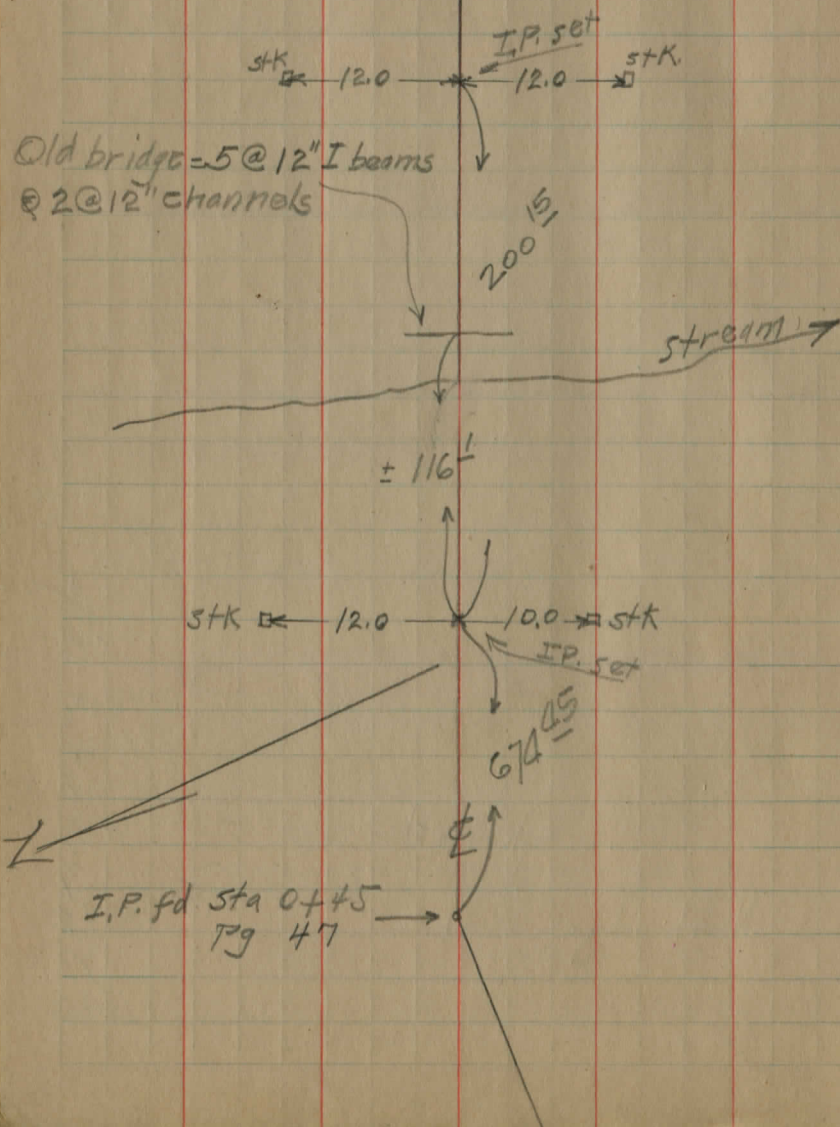
Stakes set at 100 ft

Chardon-Windsor C.H. #13, Sec. D

Bridge Replacement 4/8/48

Tin Top Spk. fd
Sta. 16+58± (pg 48)

J. Maynard
J. Randles



116.1
674.45
790.55
735.55

4-16-48 AM
Maynard
Pome Coy

Test hole #1 = line of W exist. W abut
± 17' S of rd.

3/8" rod shoved in 1' with S.M. weight

0"-6" gravel (0" = gd level)

6"-25" sandy yellow clay

25"-64" gravel

64"-82" still blue clay

B.M.	6.33	1170.09	1163.76
		9.5	1160.6
		10.1	1160.0

Hole #2 = ± 12.5' N of rd on E abut
4' H₂O to ground
ground down 18" = blue clay

4.6	65.5
4.7	65.4

Structure # 13-D-10.15 60

48
18

#1 = +6' back of edgeack

12" x 32' I beams

X Fd S end W abut
ground hole #1
H₂O level

#2 = +1' into creek

W end exist bridge
E " " "

4-17-48
Pom - Jack

BM	6.20	1169.96	1163.76
		11.9	1155.1 ✓
		3.3	66.7
		5.3	64.7
		4.7	65.3
		1.6	68.4
TP		1.05	1168.91 ✓

Set at W I.P. Ang fm \perp W (to Lt)

Ang	Stadia	Rd	
126-50	250'	10+96	1159.0
139-30	430	11+96	1158.0

H₂O over rd to \perp 110' W of W.I.P.

T.P.	4.85	1173.76 ✓	1168.91 ✓
------	------	-----------	-----------

Set at 245' (stadia) 75-03 (Rt) fm \perp

T.P.	7.97	1172.78	8.95	1164.81
------	------	---------	------	---------

Ang Lt	Stad	Rd	
from \perp 200'			
W of IP	to Lt		
185°-00	190	11+0	1161.8

BM	8.18	1171.94 ✓	1163.76
----	------	-----------	---------

X = E I.P.

Set at X 185' (stadia) 79-33

100' E on \perp	3.45	1166.4
-------------------	------	--------

Structure #13-D-10.15 ⁶¹

X Wabot Sand
F.L. S edge bridge
E I.P. \perp
W I.P. \perp

100' W of W.I.P.

200' W of W.I.P.

W fence stk N side

$\Delta = Lt$

$\Delta = Rt$

low banks 1'-2'

W fence stk N side

W from \perp 200' W of W.I.P.

Trila. why

rit fm \perp W to point of

150' E on \perp	1.56	1170.3
-------------------	------	--------

1171.94 ✓

Set at y backsight on X
angs to Rt ✓

T.P. 5.21 1172.77 4.38 1167.56 ✓

Ang Station Rod

87-145 106.5 15.00 1157.8 ✓

147-50 230 13.6 1159.2 ✓

← 15' W of X main chan
& trib W

T.P. 13.07 1181.98 1168.91

T.P. 8.65 1189.56 1.07 1180.91

BM No Find

T.P. 2.90 1182.76 9.70 1179.86

11.56

8.2

19.76 FL (East)

→ 1163.00

Creek &

~~89.50
87.65~~

Big Elm

E. Hdwl Bridge on #3 at ctr rail post

4-20-48 + H.I. - E
From M.
100

CHECK LEVELS

B.M.	9.09	1172.85	1163.76
		13.36	59.49 ✓
		15.56	57.3 ✓
		12.70	60.15 ✓
		13.20	59.6 ✓
		17.10	55.7 ✓
		13.42	59.43 ✓
		14.1	1158.7 ✓

B.M.	8.12	1171.88	1163.76
B.M. set		6.62	1165.26
T.P.	13.15	82.71	2.32 69.56
T.P.	11.20	93.91	10.0 82.71
B.M. # 3 pg 56		5.79	1188.12 (1188.14)

63
STRUCTURE #13-D-10.15

H₂O level at end ridge
FL " " "
H₂O level 75' S. of CONFLUENCE
FL " " " (1000±0.5 ft. from ...)
FL, N. Side Bridge
H₂O level 1st Turn S. of Bridge
± FL " " " " "

Spk. SW side 15" Elm ± 40' NE of bridge
A
Taken out gone

4-20-08

FL

B.M	5.50	1169.26 ✓	1163.76	
T.P.	5.15	1165.81 ✓ 8.60	1160.66 ✓	
Set at B	Ang to rt			
ang	Stadia Rod			
52-46	47'	7.59	58.22	57.72
173-46	202	8.18	57.63	57.13
186-16	205	traverse		
T.P.	3.69	1164.72 ✓ 4.78	1161.03	
Set at C	all ang Lt			
142-18	165	7.52	57.20	56.7
171-36	178	7.76	56.96	55.7
161-20	358	7.85	56.87	54.6

e about stks 8-4-48
on line front E footer 5' off N & S

B.M 1.20 1166.47 1165.27 66.47
55.75

N stk

10.72
6.22
C 4.50
10.72
7.5
3.22

S stk

6.24
C 4.5

STRUCT. NO 13-D-10.15

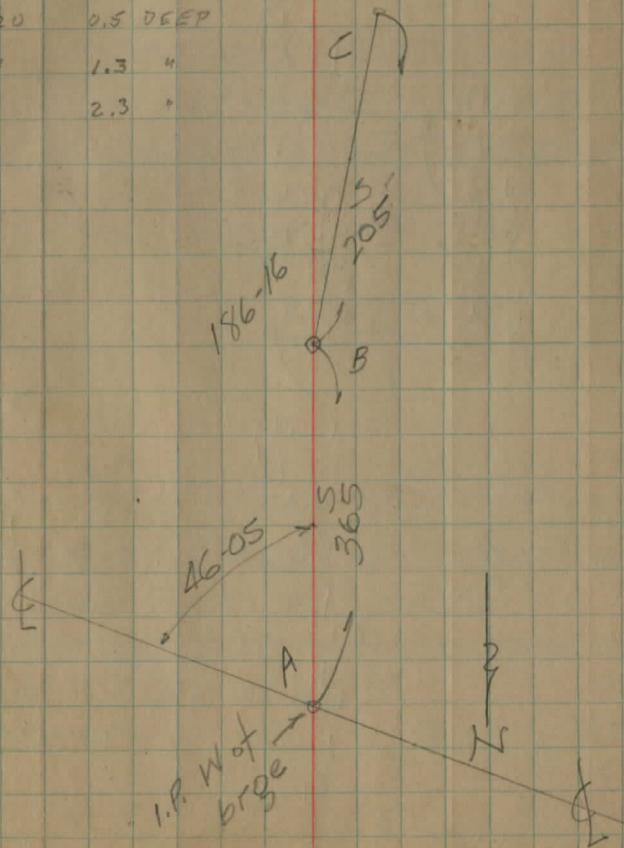
69

2nd level

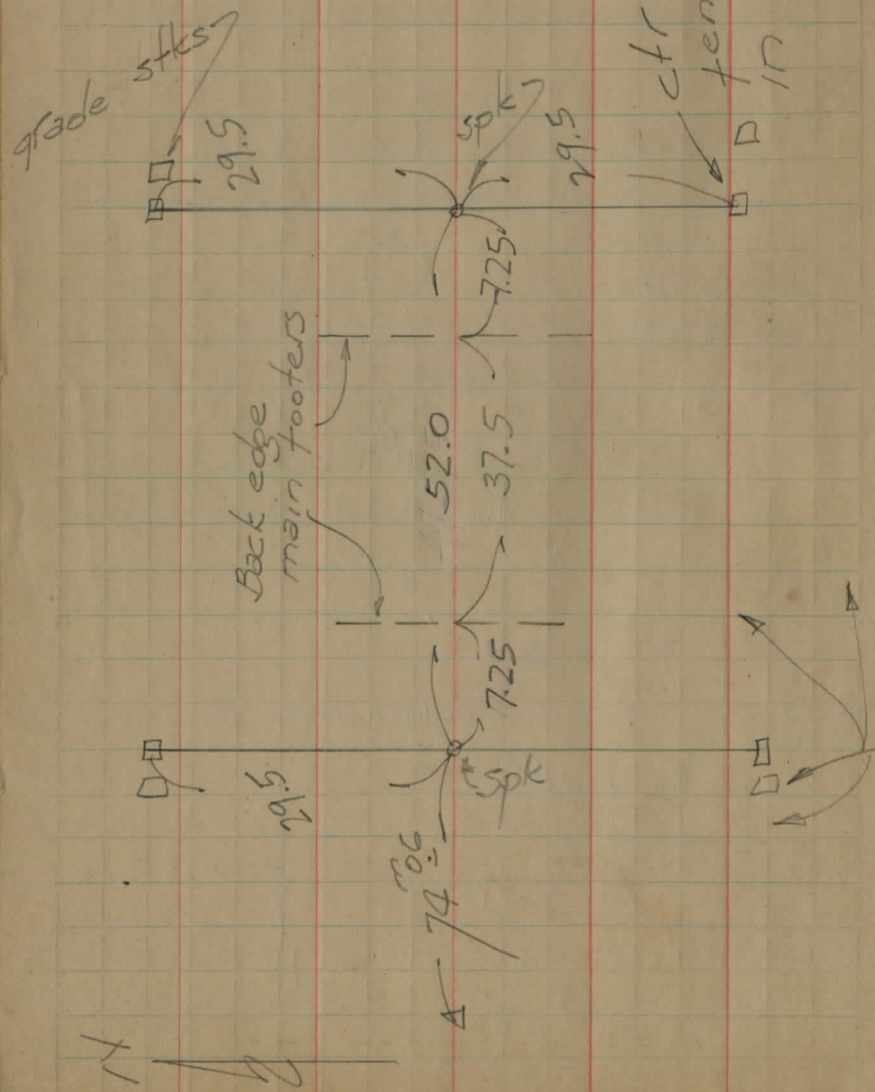
H₂O 0.5 DEEP
" " "

66.47
6.24
60.23

H₂O 0.5 DEEP
" 1.3 "
" 2.3 "



7-14-48
Tom Maynard
Temple



E footer + 3' below H₂O
W footer at H₂O level

Stakes For
Euyahog~~o~~ River
Bridge; Chardon -
Windsor Rd
July 1948

No 13-D-10.15

Cut 7'-6" From top of grade
stks (all 4) to top of
footer

BM	5.20	1170.47	1165.27
H ₂ O level		12.88	1157.59

7-14-48 — 59.3

7-31-48 after channel
opened up

7-14-48

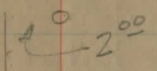
BM	5.17	70.44		116527
			7.90	
			9.1	
			5.05	65.54
			4.95	65.64
			8.78	
			8.52	
BM			6.68	1163.76 1163.76
			7.19	cut 7'-6"
			7.19	" "
			7.19	" "
			7.19	" "
			11.1	59.3
T.P.	3.82	66.38	7.88	62.56
			7.09	59.29
			7.5	58.9
H ₂ O = 3' deep ± 36' upstream				
			8.5	57.9 H ₂ O
			8.8	57.6 FL
160' S of Ford			5.7	60.7
T.P.	5.04	64.85	6.57	59.81
160' S of Ford		old	5.9	59.0
200'			4.6	60.3
300'			5.3	59.6
360'			4.8	60.1
390'	H ₂ O	runs ± S	7.93	56.92
390'	H ₂ O	1.5 deep		55.4

see pg 64 for
stks set 8-4-48

Done 8-7-48 66

Spk SW side	15" Elm	
Gd NE	+	at stks (line
" SE	+	"
± E	abut	
± W	"	
Gd NW	+	"
" SW	+	"
stk SW	+	
" NW	+	
		70.44 top
		1155.75 footer
		14.69
H ₂ O level		7.19
H ₂ O at Ford ± 200' S of bidge		7.50
FL ± " " " "		
± 110' below ford		
" " " "		
E ←		South → W
3.7	4.0	4.4 3.6 3.1 2.7 3.4 3.3
		mid
		north
4.6	4.3	4.0 3.8 3.5 3.3 3.0 3.0 2.5
		mid

S.H. Mon Top of hill



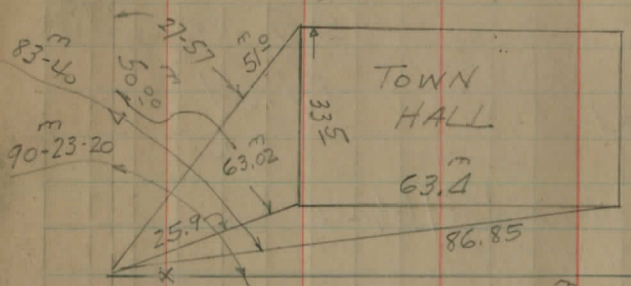
Xs chiseled in conc. walk both front & s

I.P. set Hedge walk

105 N of marg

to X ← 129

47



TOWN HALL

63.4

33.5

86.85

129.10

I.P. set Hedge walk
m Walk 1.5' Not marg.
90-24
180-27
271-10

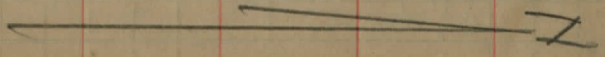
our line = sedge

150

±149

3/8 bolt set

S.H. Mon.



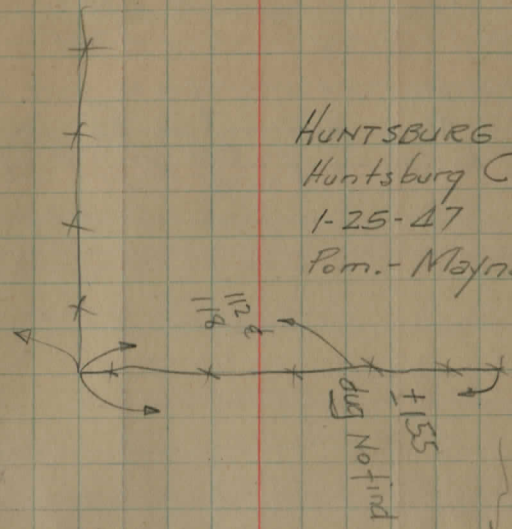
HUNTSBURG TWP. TR.

Huntsburg Ctr.

1-25-47

Pom. - Maynard

±151



Dug No find

±155

to cc

Indet occ
H line Pease

occ

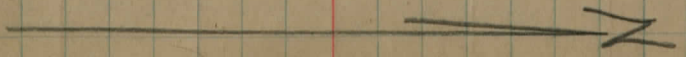
1' Not N edge Elm

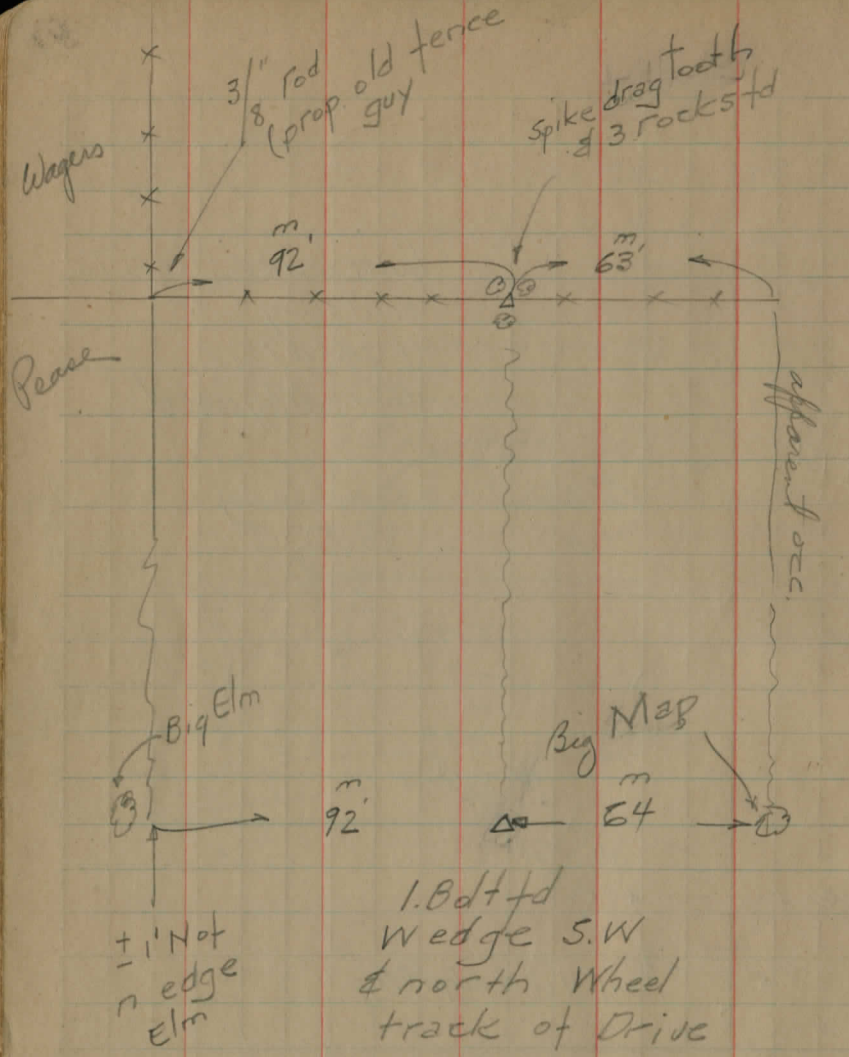
MIDDLEFIELD - MADISON RD

I.P.s Fd

131+94.6 & 137+69.1

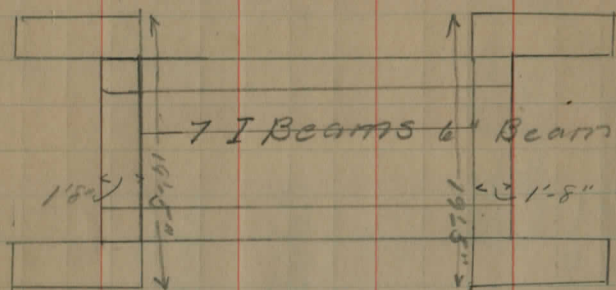
See next pg



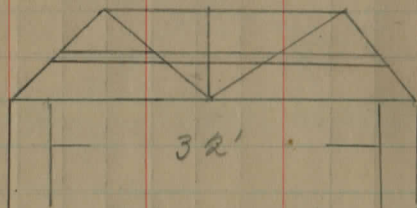


Probably same as PAGE 19

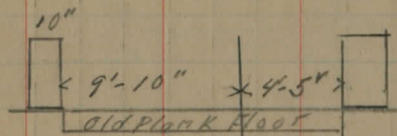
Bridge Sta 117479



8' average. Abut



Section TRUSS



Road

Borings # 13 3/1/58

70

6"
7'

8"

6 1/2" 25+0
7'

5 1/2"
7'

6"

5 1/2" 10+0
8'

Claridon Center Cemetery

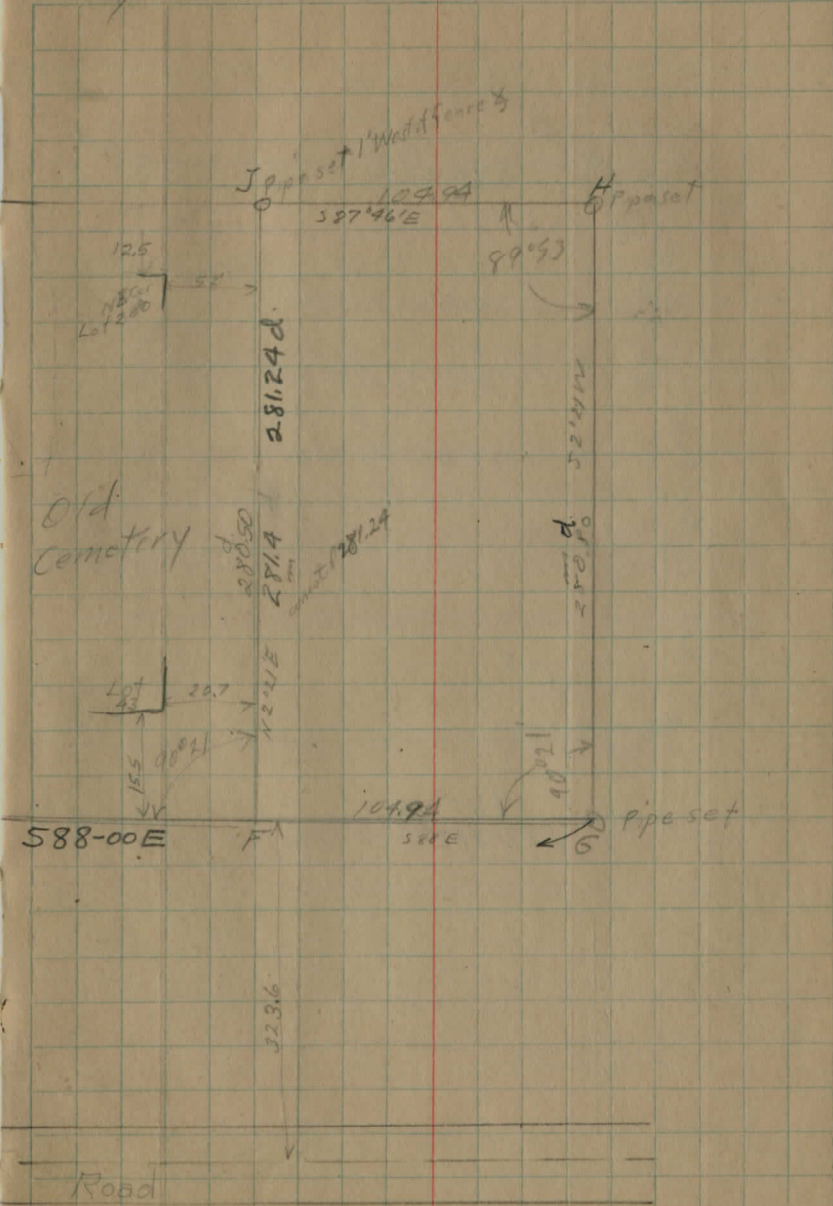
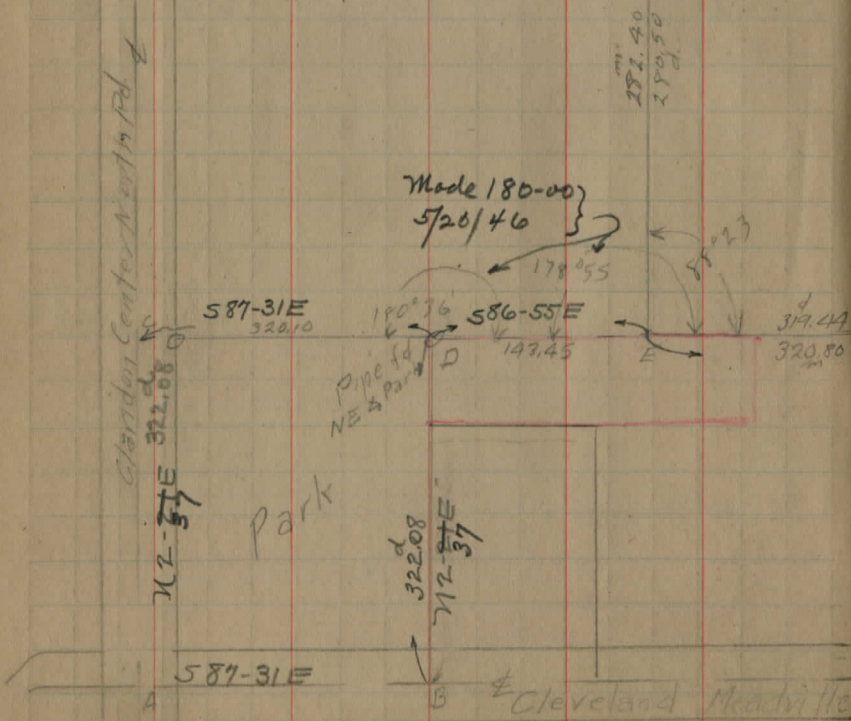
Survey

11/10/37

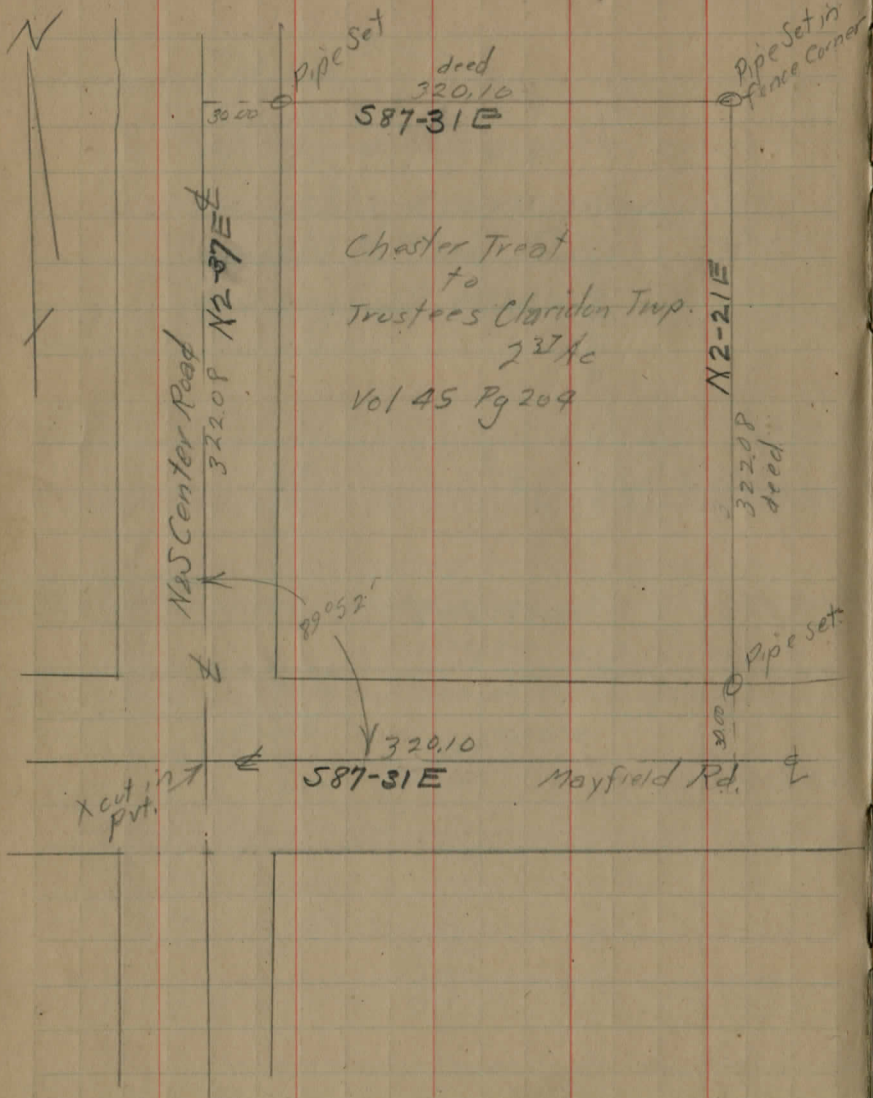
Richey
Krumm
Bobb

71

5/20/46
See pg 69, also
"Claridon Center file"
for staking Cemetery lines
parallel to Park lines
per original deeds.



Survey of Claridon Center Park



9/30/35

Rishoy
Beardsley

22

$$\begin{array}{r} 290.10 \\ 120 \\ \hline 170.10 \end{array}$$

	BS	HI	FS	
BM11	6.32	1210.28		1203.96
	8.01	1215.88	2.41	1207.87
BM10	4.72	1215.88	4.72	1211.16
	12.76	1222.35	5.79	1210.09
	9.82	1231.51	0.66	1221.69
BM9			3.06	1228.45
BM9	3.06	1231.51		1228.45
	0.29	1219.60	12.20	1219.31
	5.45	1214.04	11.01	1208.59
BM10	2.88	1214.04	2.88	1211.16
	1.19	1208.54	6.69	1207.35
BM11			4.60	1203.94

73
Checking TBM's
11, 10, 9.

Closed circuit

SE cor E Hd Wall 86+30

1195.59	95.59	95.59
<u>91.54</u>	<u>90.47</u>	<u>89.72</u>
4.05	5.12	5.87

95.59	95.59
<u>88.98</u>	<u>88.87</u>
7.11	6.72

95.59	95.59	95.59
<u>86.18</u>	<u>86.18</u>	<u>87.92</u>
9.41	9.41	7.66

Apr 6 Dick Grau Sprague Reynolds
1 day each 40⁰⁰ Din.

" 7 " " " " "

" 8 " " " " "

" 9 " " " " "

Burton Cinder Road.

1 day Apr. 13 Dick Grau Sprague Reynolds 40⁰⁰ Din

Pay Roll for April.

Burton 2 1/2 days = 20⁰⁰ Paid

County 5 days = 40⁰⁰ Paid

Clar. North 10 1/2 " = 85⁰⁰ Pd 920

" South 4 " = 33⁰⁰

180⁰⁰

Pay Roll for May

County 26⁴⁰ General

" 25⁵⁰ Chapin 3 Paid

Mumson 20⁰⁰ Not Paid

Clard Smith 12⁴⁰ } Paid

" North 80⁰⁰ }

764⁵⁰

Pay roll for June

5 days = \$2⁰⁰ Pd

Per Co 158²⁵ Pd

Bain 13⁵⁴ Pd.

Pay for to July 10

Mumson 20⁰⁰ dul. Pd

Clardon 40⁰⁰ paid Paid

County 44²⁴ County Paid

Dur Reynolds 3⁷⁵

Chester 33⁰⁰ Twp. Pd.

Pay to July 29

Russell diagonal 13³⁰ Paid

East Clardon South 16⁰⁰ Paid

Thompson Gravel 16⁰⁰ Paid.

General County 42⁵⁵ Paid

88.68

Pay to Aug 12, 25 Co.

County 74⁰⁰ ~~dul~~ 396

County 12-10 ~~dul~~

59.3
57.6
1.7

BM. Claridon Center

Tack on S Root of 20" Elm
N.E. Cor Intersection

BM. 1323.91

End of Job.

Staple in NE Root of Elm

Walters Elev 1187.67
1187.78
1187.45

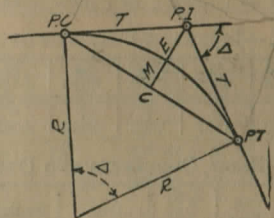
Oak S side 100'

Bar:

1339.55

DIETZGEN'S RAILROAD CURVE AND REDUCTION TABLES

Copyright, 1914, by Eugene Dietzgen Co., New York City



CURVE FORMULAS

$$\text{Radius} = R = \frac{50}{\sin. D/2} \quad (1) \text{ Degree of Curve} = D \text{ and } \sin. \frac{D}{2} = \frac{50}{R} \quad (2)$$

$$\text{Tangent} = T = R \tan \frac{\Delta}{2} \quad (3) \text{ Length of Curve} = L = 100 \frac{\Delta}{D} \quad (4)$$

$$\text{Middle ordinate} = M = R(1 - \cos. \frac{\Delta}{2}) \quad (5) = R \text{vers } \frac{\Delta}{2} \quad (6)$$

$$\text{External} = E = T \tan \frac{\Delta}{4} \quad (7) = R \div \cos. \frac{\Delta}{2} - R \quad (8) = R \text{exsec } \frac{\Delta}{2} \quad (9)$$

$$\text{Long Chord} = C = 2 R \sin. \frac{\Delta}{2} \quad (10) \quad \Delta = \text{Central Angle}$$

EXPLANATION AND USE OF TABLES

Stations.—Given P. I.—Sta. 161+60.35 to find Sta. of P. C. and P. T. $\Delta=62^\circ 10'$ $D=8^\circ 20'$. From Table IV for 1° curve $T=3454.1$ and $\div 8\frac{2}{3}=414.49$ ft. From Table V correction=.36 or $T=414.85$ ft. P. C.—Sta. P.I.— $T=157+45.50$. Also from (4) $L=746.00$ and P. T.—Sta. P. C. + $L=164+91.50$.

Offsets.—Tangent offsets vary (approximately) directly with D and with square of the distance. Thus tangent offset for Sta. 158 on above curve is 2.16 ft. found as follows. From Table III tangent offset for 100 ft. = 7.27 ft. Distance = 158—Sta. P. C. = 54.50, hence offset = $7.27 (54.50 \div 100)^2 = 2.16$ ft. Also square of any distance divided by twice the radius equals (approximately) the distance from tangent to curve. Thus $(54.50)^2 \div (2 \times 688.26) = 2.16$ ft.

Deflections.—Deflection angle = $\frac{1}{2} D$ for 100 ft., $\frac{1}{4} D$ for 50 ft., etc. For c ft. = (in minutes) $.3 \times C \times D^\circ$ or = defl. for 1 ft. from Table III $\times C$. For Sta. 158 of above curve = $.3 \times 54.5 \times 8\frac{2}{3} = 136.2'$ or $2^\circ 16.2'$, or = $2.50 \times 54.5 = 136.2'$ from Table III. For Sta. 159 deflection angle = $2^\circ 16.2' + 8^\circ 20' \div 2 = 6^\circ 26.2'$, etc.

Externals.—May be found in similar manner to tangents. Thus E for curve above is 91.37. For from Table IV for 1° curve $E=960.6$ for $8^\circ 20' = 960.6 \div 8\frac{2}{3} = 91.27$ and from Table V correction=.10 or $E=91.37$ ft. Or suppose $\Delta=32^\circ$ and E is measured and found to be 42 ft. What is D ? From Table IV $E=230.9$ and $\div 42=5.5$ or $D=5^\circ 30'$.

TABLE I.—MINUTES IN DECIMALS OF A DEGREE.

1'	.0167	11'	.1833	21'	.3500	31'	.5167	41'	.6833	51'	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

TABLE II.—INCHES IN DECIMALS OF A FOOT.

1-16	3-32	1/4	3-16	1/2	5-16	3/8	1/2	5/8	3/4	7/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729
1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

TABLE III.—RADI, ORDINATES AND DEFLECTIONS.

Deg.	Radius	Mid. Ord.	Tan. Offset	Def. for 1 Foot	Deg.	Radius	Mid. Ord.	Tan. Offset	Def. for 1 Foot
0° 10'	34377.5	.036	.145	0.05'	7°	819.02	1.528	6.105	2.10'
20	17188.8	.073	.291	0.10	20'	781.84	1.600	6.395	2.20
30	11459.2	.109	.436	0.15	30	764.49	1.637	6.540	2.25
40	8594.42	.145	.582	0.20	40	747.89	1.673	6.685	2.30
50	6875.55	.182	.727	0.25					
1	5729.65	.218	.873	0.30	8	716.78	1.746	6.976	2.40
10	4911.15	.255	1.018	0.35	20	688.16	1.819	7.266	2.50
20	4297.28	.291	1.164	0.40	30	674.69	1.855	7.411	2.55
30	3819.83	.327	1.309	0.45	40	661.74	1.892	7.556	2.60
40	3437.87	.364	1.454	0.50	9	637.28	1.965	7.846	2.70
50	3125.36	.400	1.600	0.55	20	614.56	2.037	8.136	2.80
2	2864.93	.436	1.745	0.60	30	603.80	2.074	8.281	2.85
10	2644.58	.473	1.891	0.65	40	593.42	2.110	8.426	2.90
20	2455.70	.509	2.036	0.70	10	573.69	2.183	8.716	3.00
30	2292.01	.545	2.181	0.75	20	546.44	2.292	9.150	3.15
40	2148.79	.582	2.327	0.80	11	521.67	2.402	9.585	3.30
50	2022.41	.618	2.472	0.85	12	499.06	2.511	10.02	3.45
3	1910.08	.655	2.618	0.90	13	478.34	2.620	10.45	3.60
10	1809.57	.691	2.763	0.95	30	459.28	2.730	10.89	3.75
20	1719.12	.727	2.908	1.00	13	441.68	2.839	11.32	3.90
30	1637.28	.764	3.054	1.05	14	425.40	2.949	11.75	4.05
40	1562.88	.800	3.199	1.10	14	410.28	3.058	12.18	4.20
50	1494.95	.836	3.345	1.15	30	396.20	3.168	12.62	4.35
4	1432.69	.873	3.490	1.20	15	383.07	3.277	13.05	4.50
10	1375.40	.909	3.635	1.25	30	370.78	3.387	13.49	4.65
20	1322.53	.945	3.718	1.30	16	359.27	3.496	13.92	4.80
30	1273.57	.982	3.926	1.35	30	348.45	3.606	14.35	4.95
40	1228.11	1.018	4.071	1.40	17	338.27	3.716	14.78	5.10
50	1185.78	1.055	4.217	1.45	18	319.62	3.935	15.64	5.40
5	1146.28	1.091	4.362	1.50	19	302.94	4.155	16.51	5.70
10	1109.33	1.127	4.507	1.55	20	287.94	4.374	17.37	6.00
20	1074.68	1.164	4.653	1.60	21	274.37	4.594	18.22	6.30
30	1042.14	1.200	4.798	1.65	22	262.04	4.814	19.08	6.60
40	1011.51	1.237	4.943	1.70	23	250.79	5.035	19.94	6.90
50	982.64	1.273	5.088	1.75	24	240.49	5.255	20.79	7.20
6	955.37	1.309	5.234	1.80	25	231.01	5.476	21.64	7.50
10	929.57	1.346	5.379	1.85	26	222.27	5.697	22.50	7.80
20	905.13	1.382	5.524	1.90	27	214.18	5.918	23.35	8.10
30	881.95	1.418	5.669	1.95	28	206.68	6.139	24.19	8.40
40	859.92	1.455	5.814	2.00	29	199.70	6.360	25.04	8.70
					30	193.18	6.583	25.88	9.00

Note. Chord Deflection=2 times tangent deflection.

TABLE IV.—TANGENTS AND EXTERNALS TO A 1° CURVE.

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
1°	50.00	.22	11°	551.70	26.50	21°	1061.9	97.57
10'	58.34	.39	10'	560.11	27.31	10'	1070.6	99.16
20	66.67	.56	20	568.53	28.14	20	1079.2	100.75
30	75.01	.49	30	576.95	28.97	30	1087.8	102.35
40	83.34	.61	40	585.38	29.82	40	1096.4	103.97
50	91.68	.73	50	593.79	30.68	50	1105.1	105.60
2	100.01	.87	12	602.21	31.56	22	1113.7	107.24
10	108.35	1.02	10	610.64	32.45	10	1122.4	108.90
20	116.68	1.19	20	619.07	33.35	20	1131.0	110.57
30	125.02	1.36	30	627.50	34.26	30	1139.7	112.25
40	133.36	1.55	40	635.93	35.18	40	1148.4	113.95
50	141.70	1.75	50	644.37	36.12	50	1157.0	115.66
3	150.04	1.96	13	652.81	37.07	23	1165.7	117.38
10	158.38	2.19	10	661.25	38.03	10	1174.4	119.12
20	166.72	2.43	20	669.70	39.01	20	1183.1	120.87
30	175.06	2.67	30	678.15	39.99	30	1191.8	122.63
40	183.40	2.93	40	686.60	40.99	40	1200.5	124.41
50	191.74	3.21	50	695.06	42.00	50	1209.2	126.20
4	200.08	3.49	14	703.51	43.03	24	1217.9	128.00
10	208.43	3.79	10	711.97	44.07	10	1226.6	129.82
20	216.77	4.10	20	720.44	45.12	20	1235.3	131.65
30	225.12	4.42	30	728.90	46.18	30	1244.0	133.50
40	233.47	4.76	40	737.37	47.25	40	1252.8	135.35
50	241.81	5.10	50	745.85	48.34	50	1261.5	137.23
5	250.16	5.46	15	754.32	49.44	25	1270.2	139.11
10	258.51	5.83	10	762.80	50.55	10	1279.0	141.01
20	266.86	6.21	20	771.29	51.68	20	1287.7	142.93
30	275.21	6.61	30	779.77	52.89	30	1296.5	144.85
40	283.57	7.01	40	788.26	53.97	40	1305.3	146.79
50	291.92	7.43	50	796.75	55.13	50	1314.0	148.75
6	300.28	7.86	16	805.25	56.31	26	1322.8	150.71
10	308.64	8.31	10	813.75	57.50	10	1331.6	152.69
20	316.99	8.76	20	822.25	58.70	20	1340.4	154.69
30	325.35	9.23	30	830.76	59.91	30	1349.2	156.70
40	333.71	9.71	40	839.27	61.14	40	1358.0	158.72
50	342.08	10.20	50	847.78	62.38	50	1366.8	160.76
7	350.44	10.71	17	856.30	63.63	27	1375.6	162.81
10	358.81	11.22	10	864.82	64.90	10	1384.4	164.86
20	367.17	11.75	20	873.35	66.18	20	1393.2	166.95
30	375.54	12.29	30	881.88	67.47	30	1402.0	169.04
40	383.91	12.85	40	890.41	68.77	40	1410.9	171.15
50	392.28	13.41	50	898.95	70.09	50	1419.7	173.27
8	400.66	13.99	18	907.49	71.42	28	1428.6	175.41
10	409.03	14.58	10	916.03	72.76	10	1437.4	177.55
20	417.41	15.18	20	924.58	74.12	20	1446.3	179.72
30	425.79	15.80	30	933.13	75.49	30	1455.1	181.89
40	434.17	16.43	40	941.69	76.86	40	1464.0	184.08
50	442.55	17.07	50	950.25	78.26	50	1472.9	186.29
9	450.93	17.72	19	958.81	79.67	29	1481.8	188.51
10	459.32	18.38	10	967.38	81.09	10	1490.7	190.74
20	467.71	19.06	20	975.96	82.53	20	1499.6	192.99
30	476.10	19.75	30	984.53	83.97	30	1508.5	195.25
40	484.49	20.45	40	993.12	85.43	40	1517.4	197.53
50	492.88	21.16	50	1001.7	86.90	50	1526.3	199.82
10	501.28	21.89	20	1010.3	88.39	30	1535.3	202.12
10	509.68	22.62	10	1018.9	89.89	10	1544.2	204.44
20	518.08	23.38	20	1027.5	91.40	20	1553.1	206.77
30	526.48	24.14	30	1036.1	92.92	30	1562.1	209.12
40	534.89	24.91	40	1044.7	94.46	40	1571.0	211.48
50	543.29	25.70	50	1053.3	96.01	50	1580.0	213.86

TABLE IV.—TANGENTS AND EXTERNALS TO A 1° CURVE.

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
31°	1589.0	216.3	41°	2142.2	387.4	51°	2732.9	618.4
10'	1598.0	218.7	10'	2151.7	390.7	10'	2743.1	622.8
20	1606.9	221.1	20	2161.2	394.1	20	2753.4	627.2
30	1615.9	223.5	30	2170.8	397.4	30	2763.7	631.7
40	1624.9	226.0	40	2180.3	400.8	40	2773.9	636.2
50	1633.9	228.4	50	2189.9	404.2	50	2784.2	640.7
32	1643.0	230.9	42	2199.4	407.6	52	2794.5	645.2
10	1652.0	233.4	10	2209.0	411.1	10	2804.9	649.7
20	1661.0	235.9	20	2218.6	414.5	20	2815.2	654.3
30	1670.0	238.4	30	2228.1	418.0	30	2825.6	658.8
40	1679.1	241.0	40	2237.7	421.4	40	2835.9	663.4
50	1688.1	243.5	50	2247.3	425.0	50	2846.3	668.0
33	1697.2	246.1	43	2257.0	428.5	53	2856.7	672.7
10	1706.3	248.7	10	2266.6	432.0	10	2867.1	677.3
20	1715.3	251.3	20	2276.2	435.6	20	2877.5	682.0
30	1724.4	253.9	30	2285.9	439.2	30	2888.0	686.7
40	1733.5	256.5	40	2295.6	442.8	40	2898.4	691.4
50	1742.6	259.1	50	2305.2	446.4	50	2908.9	696.1
34	1751.7	261.8	44	2314.9	450.0	54	2919.4	700.9
10	1760.8	264.5	10	2324.6	453.6	10	2929.9	705.7
20	1770.0	267.2	20	2334.3	457.3	20	2940.4	710.5
30	1779.1	269.9	30	2344.1	461.0	30	2951.0	715.3
40	1788.2	272.6	40	2353.8	464.6	40	2961.5	720.1
50	1797.4	275.3	50	2363.5	468.4	50	2972.1	725.0
35	1806.6	278.1	45	2373.3	472.1	55	2982.7	729.9
10	1815.7	280.8	10	2383.1	475.8	10	2993.3	734.8
20	1824.9	283.6	20	2392.8	479.6	20	3003.9	739.7
30	1834.1	286.4	30	2402.6	483.4	30	3014.5	744.6
40	1843.3	289.2	40	2412.4	487.2	40	3025.2	749.6
50	1852.5	292.0	50	2422.3	491.0	50	3035.8	754.6
36	1861.7	294.9	46	2432.1	494.8	56	3046.5	759.6
10	1870.9	297.7	10	2441.9	498.7	10	3057.2	764.6
20	1880.1	300.6	20	2451.8	502.5	20	3067.9	769.7
30	1889.4	303.5	30	2461.7	506.4	30	3078.7	774.7
40	1898.6	306.4	40	2471.5	510.3	40	3089.4	779.8
50	1907.9	309.3	50	2481.4	514.3	50	3100.2	784.9
37	1917.1	312.2	47	2491.3	518.2	57	3110.9	790.1
10	1926.4	315.2	10	2501.2	522.2	10	3121.7	795.2
20	1935.7	318.1	20	2511.2	526.1	20	3132.6	800.4
30	1945.0	321.1	30	2521.1	530.1	30	3143.4	805.6
40	1954.3	324.1	40	2531.1	534.2	40	3154.2	810.9
50	1963.6	327.1	50	2541.0	538.2	50	3165.1	816.1
38	1972.9	330.2	48	2551.0	542.2	58	3176.0	821.4
10	1982.2	333.2	10	2561.0	546.3	10	3186.9	826.7
20	1991.5	336.3	20	2571.0	550.4	20	3197.8	832.0
30	2000.9	339.3	30	2581.0	554.5	30	3208.8	837.3
40	2010.2	342.4	40	2591.0	558.6	40	3219.7	842.7
50	2019.6	345.5	50	2601.1	562.8	50	3230.7	848.1
39	2029.0	348.6	49	2611.2	566.9	59	3241.7	853.5
10	2038.4	351.8	10	2621.2	571.1	10	3252.7	858.9
20	2047.8	354.9	20	2631.3	575.3	20	3263.7	864.3
30	2157.2	358.1	30	2641.4	579.5	30	3274.8	869.8
40	2066.6	361.3	40	2651.5	583.8	40	3285.8	875.3
50	2076.0	364.5	50	2661.6	588.0	50	3296.9	880.8
40	2085.4	367.7	50	2671.8	592.3	60	3308.0	886.4
10	2094.9	371.0	10	2681.9	596.6	10	3319.1	892.0
20	2104.3	374.2	20	2692.1	600.9	20	3330.3	897.5
30	2113.8	377.5	30	2702.3	605.3	30	3341.4	903.2
40	2123.3	380.8	40	2712.5	609.6	40	3352.6	908.8
50	2132.7	384.1	50	2722.7	614.0	50	3363.8	914.5

TABLE IV.—TANGENTS AND EXTERNALS TO A 1° CURVE.

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
61°	3875.0	920.2	71°	4086.9	1308.2	81°	4893.6	1805.3
10'	3886.3	925.9	10'	4099.5	1315.6	10'	4908.0	1814.7
20	3897.5	931.6	20	4112.1	1322.9	20	4922.5	1824.1
30	3908.8	937.3	30	4124.8	1330.3	30	4937.0	1833.6
40	3920.1	943.1	40	4137.4	1337.7	40	4951.5	1843.1
50	3931.4	948.9	50	4150.1	1345.1	50	4966.1	1852.6
62	3442.7	954.8	72	4162.8	1352.6	82	4980.7	1862.2
10	3454.1	960.6	10	4175.6	1360.1	10	4995.4	1871.8
20	3465.4	966.5	20	4188.5	1367.6	20	5010.0	1881.5
30	3476.8	972.4	30	4201.2	1375.2	30	5024.8	1891.2
40	3488.3	978.3	40	4214.0	1382.8	40	5039.5	1900.9
50	3499.7	984.3	50	4226.8	1390.4	50	5054.3	1910.7
63	3511.1	990.2	73	4239.7	1398.0	83	5069.2	1920.5
10	3522.6	996.2	10	4252.6	1405.7	10	5084.0	1930.4
20	3534.1	1002.3	20	4265.6	1413.5	20	5099.0	1940.3
30	3545.6	1008.3	30	4278.5	1421.2	30	5113.9	1950.3
40	3557.2	1014.4	40	4291.5	1429.0	40	5128.9	1960.2
50	3568.7	1020.5	50	4304.6	1436.8	50	5143.9	1970.3
64	3580.3	1026.6	74	4317.6	1444.6	84	5159.0	1980.4
10	3591.9	1032.8	10	4330.7	1452.5	10	5174.1	1990.5
20	3603.5	1039.0	20	4343.8	1460.4	20	5189.3	2000.6
30	3615.1	1045.2	30	4356.9	1468.4	30	5204.4	2010.8
40	3626.8	1051.4	40	4370.1	1476.4	40	5219.7	2021.1
50	3638.5	1057.7	50	4383.3	1484.4	50	5234.9	2031.4
65	3650.2	1063.9	75	4396.5	1492.4	85	5250.3	2041.7
10	3661.9	1070.2	10	4409.8	1500.5	10	5265.6	2052.1
20	3673.7	1076.6	20	4423.1	1508.6	20	5281.0	2062.5
30	3685.4	1082.9	30	4436.4	1516.7	30	5296.4	2073.0
40	3697.2	1089.3	40	4449.7	1524.9	40	5311.9	2083.5
50	3709.0	1095.7	50	4463.1	1533.1	50	5327.4	2094.1
66	3720.9	1102.2	76	4476.5	1541.4	86	5343.0	2104.7
10	3732.7	1108.6	10	4489.9	1549.7	10	5358.6	2115.3
20	3744.6	1115.1	20	4503.4	1558.0	20	5374.2	2126.0
30	3756.5	1121.7	30	4516.9	1566.3	30	5389.9	2136.7
40	3768.5	1128.2	40	4530.4	1574.7	40	5405.6	2147.5
50	3780.4	1134.8	50	4544.0	1583.1	50	5421.4	2158.4
67	3792.4	1141.4	77	4557.6	1591.6	87	5437.2	2169.2
10	3804.4	1148.0	10	4571.2	1600.1	10	5453.1	2180.2
20	3816.4	1154.7	20	4584.8	1608.6	20	5469.0	2191.1
30	3828.4	1161.3	30	4598.5	1617.1	30	5484.9	2202.2
40	3840.5	1168.1	40	4612.2	1625.7	40	5500.9	2213.2
50	3852.6	1174.8	50	4626.0	1634.4	50	5517.0	2224.3
68	3864.7	1181.6	78	4639.8	1643.0	88	5533.1	2235.5
10	3876.8	1188.4	10	4653.6	1651.7	10	5549.2	2246.7
20	3888.9	1195.2	20	4667.4	1660.5	20	5565.4	2258.0
30	3901.2	1202.0	30	4681.3	1669.2	30	5581.6	2269.3
40	3913.4	1208.9	40	4695.2	1678.1	40	5597.8	2280.6
50	3925.6	1215.8	50	4709.2	1686.9	50	5614.2	2292.0
69	3937.9	1222.7	79	4723.2	1695.8	89	5630.5	2303.5
10	3950.2	1229.7	10	4737.2	1704.7	10	5646.9	2315.0
20	3962.5	1236.7	20	4751.2	1713.7	20	5663.4	2326.6
30	3974.8	1243.7	30	4765.3	1722.7	30	5679.9	2338.2
40	3987.2	1250.8	40	4779.4	1731.7	40	5696.4	2349.8
50	3999.5	1257.9	50	4793.6	1740.8	50	5713.0	2361.5
70	4011.9	1265.0	80	4807.7	1749.9	90	5729.7	2373.3
10	4024.4	1272.1	10	4822.0	1759.0	10	5746.3	2385.1
20	4036.8	1279.3	20	4836.2	1768.2	20	5763.1	2397.0
30	4049.3	1286.5	30	4850.5	1777.4	30	5779.9	2408.9
40	4061.8							

TABLE IV.—TANGENTS AND EXTERNALS TO A 1° CURVE.

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
91°	5830.5	2444.9	101°	6950.6	3278.1	111°	8336.7	4386.1
10'	5847.5	2457.1	10'	6971.3	3294.1	10'	8362.7	4407.6
20	5864.6	2469.3	20	6992.0	3310.1	20	8388.9	4429.2
30	5881.7	2481.5	30	7012.7	3326.1	30	8415.1	4450.9
40	5898.8	2493.8	40	7033.6	3342.3	40	8441.5	4472.7
50	5916.0	2506.1	50	7054.5	3358.5	50	8468.0	4494.6
92	5933.2	2518.5	102	7075.5	3374.9	112	8494.6	4516.6
10	5950.5	2531.0	10	7096.6	3391.2	10	8521.3	4538.8
20	5967.9	2543.5	20	7117.8	3407.7	20	8548.1	4561.1
30	5985.3	2556.0	30	7139.0	3424.3	30	8575.0	4583.4
40	6002.7	2568.6	40	7160.3	3440.9	40	8602.1	4606.0
50	6020.2	2581.3	50	7181.7	3457.6	50	8629.3	4628.6
93	6037.8	2594.0	103	7203.2	3474.4	113	8656.6	4651.3
10	6055.4	2606.8	10	7224.7	3491.3	10	8684.0	4674.2
20	6073.1	2619.7	20	7246.3	3508.2	20	8711.5	4697.2
30	6090.8	2632.6	30	7268.0	3525.2	30	8739.2	4720.3
40	6108.6	2645.5	40	7289.8	3542.4	40	8767.0	4743.6
50	6126.4	2658.5	50	7311.7	3559.6	50	8794.9	4766.9
94	6144.3	2671.6	104	7333.6	3576.8	114	8822.9	4790.4
10	6162.2	2684.7	10	7355.6	3594.2	10	8851.0	4814.1
20	6180.2	2697.9	20	7377.8	3611.7	20	8879.3	4837.8
30	6198.3	2711.2	30	7399.9	3629.2	30	8907.7	4861.7
40	6216.4	2724.5	40	7422.2	3646.8	40	8936.3	4885.7
50	6234.6	2737.9	50	7444.6	3664.5	50	8965.0	4909.9
95	6252.8	2751.3	105	7467.0	3682.3	115	8993.8	4934.1
10	6271.1	2764.8	10	7489.6	3700.2	10	9022.7	4958.6
20	6289.4	2778.3	20	7512.2	3718.2	20	9051.7	4983.1
30	6307.9	2792.0	30	7534.9	3736.2	30	9080.9	5007.8
40	6326.3	2805.6	40	7557.7	3754.4	40	9110.3	5032.6
50	6344.8	2819.4	50	7580.5	3772.6	50	9139.8	5057.6
96	6363.4	2833.2	106	7603.5	3791.0	116	9169.4	5082.7
10	6382.1	2847.0	10	7626.6	3809.4	10	9199.1	5107.9
20	6400.8	2861.0	20	7649.7	3827.9	20	9229.0	5133.3
30	6419.5	2875.0	30	7672.9	3846.5	30	9259.0	5158.8
40	6438.4	2889.0	40	7696.3	3865.2	40	9289.2	5184.5
50	6457.3	2903.1	50	7719.7	3884.0	50	9319.5	5210.3
97	6476.2	2917.3	107	7743.2	3902.9	117	9349.9	5236.2
10	6495.2	2931.6	10	7766.8	3921.9	10	9380.5	5262.3
20	6514.3	2945.9	20	7790.5	3940.9	20	9411.3	5288.6
30	6533.4	2960.3	30	7814.3	3960.1	30	9442.2	5315.0
40	6552.6	2974.7	40	7838.1	3979.4	40	9473.2	5341.5
50	6571.9	2989.2	50	7862.1	3998.7	50	9504.4	5368.2
98	6591.2	3003.8	108	7886.2	4018.2	118	9535.7	5395.1
10	6610.6	3018.4	10	7910.4	4037.8	10	9567.2	5422.1
20	6630.1	3033.1	20	7934.6	4057.4	20	9598.9	5449.2
30	6649.6	3047.9	30	7959.0	4077.2	30	9630.7	5476.5
40	6669.2	3062.8	40	7983.5	4097.1	40	9662.6	5504.0
50	6688.8	3077.7	50	8008.0	4117.0	50	9694.7	5531.7
99	6708.6	3092.7	109	8032.7	4137.1	119	9727.0	5559.4
10	6728.4	3107.7	10	8057.4	4157.3	10	9759.4	5587.4
20	6748.2	3122.9	20	8082.3	4177.5	20	9792.0	5615.5
30	6768.1	3138.1	30	8107.3	4197.9	30	9824.8	5643.8
40	6788.1	3153.3	40	8132.3	4218.4	40	9857.7	5672.3
50	6808.2	3168.7	50	8157.5	4239.0	50	9890.8	5700.9
100	6828.3	3184.1	110	8182.8	4259.7	120	9924.0	5729.7
10	6848.5	3199.6	10	8208.2	4280.5	10	9957.5	5758.6
20	6868.8	3215.1	20	8233.7	4301.4	20	9991.0	5787.7
30	6889.2	3230.8	30	8259.3	4322.4	30	10025.0	5817.0
40	6909.6	3246.5	40	8285.0	4343.6	40	10059.0	5846.5
50	6930.1	3262.3	50	8310.8	4364.8	50	10093.0	5876.1

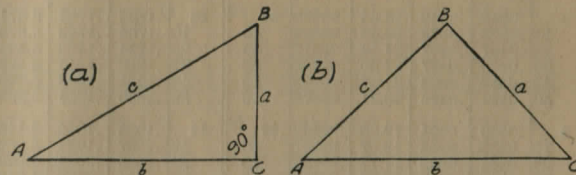
SLOPE REDUCTIONS.

When distances are measured on a slope they may be reduced to the equivalent horizontal distance by the following approximate rule:— subtract from the slope distance the square of the rise divided by twice the slope distance. Thus for a slope distance of 250.3 ft. and a rise of 15 ft. correction= $15^2 \div 2 \times 250.3 = .45$ (by slide rule) or horizontal distance= $250.3 - .45 = 249.85$. When vertical angle= $V. A.$ is measured horizontal distance= $\text{slope distance} - \text{slope distance} (1 - \text{Cos. } V. A.)$. Thus for slope distance of 248.7 ft. and $V. A.$ of $4^\circ 20'$ from Table VIII $\text{Cos.} = .99714$ and correction= $1 - .99714 = .00286$ per foot or total of $.286 \times 2\frac{1}{2}$ (near enough) = .57 and horizontal distance= $248.7 - .57 = 248.13$ ft.

See fig. (a).

TRIGONOMETRICAL FORMULAS.

- sin. $A = \frac{a}{c}$
- cos. $A = \frac{b}{c}$
- tan. $A = \frac{a}{b}$
- cot. $A = \frac{b}{a}$
- sec. $A = \frac{c}{b}$
- cosec. $A = \frac{c}{a}$



FORMULA FOR SOLVING TRIANGLES.

Given	Sought.	Right triangles. See fig. (a).
a, c	A, B, b	$\sin. A = \frac{a}{c}, \cos. B = \frac{a}{c}, b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan. A = \frac{a}{b}, \cot. B = \frac{a}{b}, c = \sqrt{a^2 + b^2}$
A, a	B, b, c	$B = 90^\circ - A, b = a \cot. A, c = \frac{a}{\sin. A}$
A, b	B, a, c	$B = 90^\circ - A, a = b \tan. A, c = \frac{b}{\cos. A}$
A, c	B, a, b	$B = 90^\circ - A, a = c \sin. A, b = c \cos. A$
Given	Sought.	Oblique triangles. See fig. (b).
A, B, a	b	$b = \frac{a \sin. B}{\sin. A}$
A, a, b	B	$\sin. B = \frac{b \sin. A}{a}$
a, b, C	$A - B$	$\tan. \frac{1}{2}(A - B) = \frac{(a-b) \tan. \frac{1}{2}(A+B)}{a+b}$
a, b, c	A	$\left\{ \begin{aligned} &\text{If } s = \frac{1}{2}(a+b+c), \sin. \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{bc}} \\ &\cos. \frac{1}{2}A = \sqrt{\frac{s(s-a)}{bc}}, \tan. \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{s(s-a)}} \\ &\sin. A = 2\sqrt{\frac{s(s-a)(s-b)(s-c)}{bc}} \end{aligned} \right.$
A, B, C, a	area	$\text{area} = \frac{a^2 \sin. B \sin. C}{2 \sin. A}$
A, b, c	area	$\text{area} = \frac{1}{2}bc \sin. A$
a, b, c	area	$s = \frac{1}{2}(a+b+c), \text{area} = \sqrt{s(s-a)(s-b)(s-c)}$

TABLE VIII.—NATURAL TRIGONOMETRICAL FUNCTIONS.

Angle	Sine.	Tan.	Cotg.	Cosin.	Angle	Sine.	Tan.	Cotg.	Cosin.	
0	0	0	∞	1	90	1	∞	0	0	
10	.0029	.0029	343.8	.99998	50	.7660	.7660	1.2843	.6428	
20	.0058	.0058	171.9	.99996	40	.6428	.6428	1.5557	.7660	
30	.0087	.0087	114.6	.99993	30	.5196	.5196	1.9613	.8660	
40	.0116	.0116	85.94	.99989	20	.3997	.3997	2.5000	.9397	
50	.0145	.0145	68.75	.99989	10	.2918	.2918	3.4122	.9848	
1	.0175	.0175	57.29	.99985	89	.9848	.9848	0.2918	.1564	
10	.0204	.0204	49.10	.99979	50	.7660	.7660	1.2843	.6428	
20	.0233	.0233	42.96	.99973	40	.6428	.6428	1.5557	.7660	
30	.0262	.0262	38.19	.99966	30	.5196	.5196	1.9613	.8660	
40	.0291	.0291	34.37	.99958	20	.3997	.3997	2.5000	.9397	
50	.0320	.0320	31.24	.99949	10	.2918	.2918	3.4122	.9848	
2	.0349	.0349	28.64	.99939	88	.9848	.9848	0.2918	.1564	
10	.0378	.0378	26.43	.99929	50	.7660	.7660	1.2843	.6428	
20	.0407	.0407	24.54	.99917	40	.6428	.6428	1.5557	.7660	
30	.0436	.0437	22.90	.99905	30	.5196	.5196	1.9613	.8660	
40	.0465	.0466	21.47	.99892	20	.3997	.3997	2.5000	.9397	
50	.0494	.0495	20.21	.99878	10	.2918	.2918	3.4122	.9848	
3	.0523	.0524	19.08	.99863	87	.9848	.9848	0.2918	.1564	
10	.0552	.0553	18.07	.99847	50	.7660	.7660	1.2843	.6428	
20	.0581	.0582	17.17	.99831	40	.6428	.6428	1.5557	.7660	
30	.0610	.0612	16.35	.99813	30	.5196	.5196	1.9613	.8660	
40	.0640	.0641	15.60	.99795	20	.3997	.3997	2.5000	.9397	
50	.0669	.0670	14.92	.99776	10	.2918	.2918	3.4122	.9848	
4	.0698	.0699	14.30	.99756	86	.9848	.9848	0.2918	.1564	
10	.0727	.0729	13.73	.99736	50	.7660	.7660	1.2843	.6428	
20	.0756	.0758	13.20	.99714	40	.6428	.6428	1.5557	.7660	
30	.0785	.0787	12.71	.99692	30	.5196	.5196	1.9613	.8660	
40	.0814	.0816	12.25	.99668	20	.3997	.3997	2.5000	.9397	
50	.0843	.0846	11.83	.99644	10	.2918	.2918	3.4122	.9848	
5	.0872	.0875	11.43	.99619	85	.9848	.9848	0.2918	.1564	
10	.0901	.0904	11.06	.99594	50	.7660	.7660	1.2843	.6428	
20	.0929	.0934	10.71	.99567	40	.6428	.6428	1.5557	.7660	
30	.0958	.0963	10.39	.99540	30	.5196	.5196	1.9613	.8660	
40	.0987	.0992	10.08	.99511	20	.3997	.3997	2.5000	.9397	
50	.1016	.1022	9.788	.99482	10	.2918	.2918	3.4122	.9848	
6	.1045	.1051	9.514	.99452	84	.9848	.9848	0.2918	.1564	
10	.1074	.1080	9.255	.99421	50	.7660	.7660	1.2843	.6428	
20	.1103	.1110	9.010	.99390	40	.6428	.6428	1.5557	.7660	
30	.1132	.1139	8.777	.99357	30	.5196	.5196	1.9613	.8660	
40	.1161	.1169	8.556	.99324	20	.3997	.3997	2.5000	.9397	
50	.1190	.1198	8.345	.99290	10	.2918	.2918	3.4122	.9848	
7	.1219	.1228	8.144	.99255	83	.9848	.9848	0.2918	.1564	
10	.1248	.1257	7.953	.99219	50	.7660	.7660	1.2843	.6428	
20	.1276	.1287	7.770	.99182	40	.6428	.6428	1.5557	.7660	
30	.1305	.1317	7.596	.99144	30	.5196	.5196	1.9613	.8660	
40	.1334	.1346	7.429	.99106	20	.3997	.3997	2.5000	.9397	
50	.1363	.1376	7.269	.99067	10	.2918	.2918	3.4122	.9848	
	Cosin.	Cotg.	Tan.	Sine.	Angle.	Cosin.	Cotg.	Tan.	Sine.	Angle.

TABLE VIII.—NATURAL TRIGONOMETRICAL FUNCTIONS.

Angle	Sine.	Tan.	Cotg.	Cosin.	Angle	Sine.	Tan.	Cotg.	Cosin.	
16	.2756	.2867	3.487	.96126	74	.9613	3.487	.2867	.2756	
10	.2784	.2899	3.450	.96046	50	.7660	1.2843	.6428	.7660	
20	.2812	.2931	3.412	.95964	40	.6428	1.5557	.7660	.6428	
30	.2840	.2962	3.376	.95882	30	.5196	1.9613	.8660	.5196	
40	.2868	.2994	3.340	.95799	20	.3997	2.5000	.9397	.3997	
50	.2896	.3026	3.305	.95715	10	.2918	3.4122	.9848	.2918	
17	.2924	.3057	3.271	.95615	73	.9562	3.271	.3057	.2924	
10	.2952	.3089	3.237	.95545	50	.7660	1.2843	.6428	.7660	
20	.2979	.3121	3.204	.95499	40	.6428	1.5557	.7660	.6428	
30	.3007	.3153	3.172	.95472	30	.5196	1.9613	.8660	.5196	
40	.3035	.3185	3.140	.95484	20	.3997	2.5000	.9397	.3997	
50	.3062	.3217	3.108	.95495	10	.2918	3.4122	.9848	.2918	
18	.3090	.3249	3.078	.95406	72	.9541	3.078	.3249	.3090	
10	.3118	.3281	3.048	.95350	50	.7660	1.2843	.6428	.7660	
20	.3145	.3314	3.018	.95324	40	.6428	1.5557	.7660	.6428	
30	.3173	.3346	2.989	.95323	30	.5196	1.9613	.8660	.5196	
40	.3201	.3378	2.960	.95340	20	.3997	2.5000	.9397	.3997	
50	.3228	.3411	2.932	.95366	10	.2918	3.4122	.9848	.2918	
19	.3256	.3443	2.904	.95352	71	.9536	2.904	.3443	.3256	
10	.3283	.3476	2.877	.95347	50	.7660	1.2843	.6428	.7660	
20	.3311	.3508	2.850	.95361	40	.6428	1.5557	.7660	.6428	
30	.3338	.3541	2.824	.95424	30	.5196	1.9613	.8660	.5196	
40	.3365	.3574	2.798	.95407	20	.3997	2.5000	.9397	.3997	
50	.3393	.3607	2.773	.95408	10	.2918	3.4122	.9848	.2918	
20	.3420	.3640	2.747	.95369	70	.9537	2.747	.3640	.3420	
10	.3448	.3673	2.723	.95369	50	.7660	1.2843	.6428	.7660	
20	.3475	.3706	2.699	.95379	40	.6428	1.5557	.7660	.6428	
30	.3502	.3739	2.675	.95367	30	.5196	1.9613	.8660	.5196	
40	.3529	.3772	2.651	.95355	20	.3997	2.5000	.9397	.3997	
50	.3557	.3805	2.628	.95362	10	.2918	3.4122	.9848	.2918	
21	.3584	.3839	2.605	.95358	69	.9536	2.605	.3839	.3584	
10	.3611	.3872	2.583	.95353	50	.7660	1.2843	.6428	.7660	
20	.3638	.3906	2.560	.95348	40	.6428	1.5557	.7660	.6428	
30	.3665	.3939	2.539	.95304	30	.5196	1.9613	.8660	.5196	
40	.3692	.3973	2.517	.95295	20	.3997	2.5000	.9397	.3997	
50	.3719	.4006	2.496	.95287	10	.2918	3.4122	.9848	.2918	
22	.3746	.4040	2.475	.95218	68	.9522	2.475	.4040	.3746	
10	.3773	.4074	2.455	.95209	50	.7660	1.2843	.6428	.7660	
20	.3800	.4108	2.434	.95249	40	.6428	1.5557	.7660	.6428	
30	.3827	.4142	2.414	.95238	30	.5196	1.9613	.8660	.5196	
40	.3854	.4176	2.394	.95226	20	.3997	2.5000	.9397	.3997	
50	.3881	.4210	2.375	.95216	10	.2918	3.4122	.9848	.2918	
23	.3907	.4245	2.356	.95205	67	.9521	2.356	.4245	.3907	
10	.3934	.4279	2.337	.95196	50	.7660	1.2843	.6428	.7660	
20	.3961	.4314	2.318	.95182	40	.6428	1.5557	.7660	.6428	
30	.3987	.4348	2.300	.95176	30	.5196	1.9613	.8660	.5196	
40	.4014	.4383	2.282	.95159	20	.3997	2.5000	.9397	.3997	
50	.4041	.4417	2.264	.95147	10	.2918	3.4122	.9848	.2918	
	Cosin.	Cotg.	Tan.	Sine.	Angle.	Cosin.	Cotg.	Tan.	Sine.	Angle.

TABLE VIII.—NATURAL TRIGONOMETRICAL FUNCTIONS.

Angle	Sine.	Tan.	Cotg.	Cosin.	Angle	Sine.	Tan.	Cotg.	Cosin.		
32	.5299	.6249	1.600	.84805	58						
10	.5324	.6289	1.590	.84650	50	30	.6225	.7954	1.257	.78261	
20	.5348	.6330	1.580	.84495	40	40	.6248	.8002	1.250	.78079	
30	.5373	.6371	1.570	.84339	30	50	.6271	.8050	1.242	.77897	
40	.5398	.6412	1.560	.84182	20	39	.6293	.8098	1.235	.77715	
50	.5422	.6453	1.550	.84025	10	10	.6316	.8146	1.228	.77531	
33	.5446	.6494	1.540	.83867	57	20	.6338	.8195	1.220	.77347	
10	.5471	.6536	1.530	.83708	50	30	.6361	.8243	1.213	.77162	
20	.5495	.6577	1.520	.83549	40	40	.6383	.8292	1.206	.76977	
30	.5519	.6619	1.511	.83389	30	50	.6406	.8342	1.199	.76791	
40	.5544	.6661	1.501	.83228	20	40	.6428	.8391	1.192	.76604	
50	.5568	.6703	1.491	.83066	10	10	.6450	.8441	1.185	.76417	
34	.5592	.6745	1.483	.82904	56	20	.6472	.8491	1.178	.76229	
10	.5616	.6787	1.473	.82741	50	30	.6494	.8541	1.171	.76041	
20	.5640	.6830	1.464	.82577	40	40	.6517	.8591	1.164	.75851	
30	.5664	.6873	1.455	.82413	30	50	.6539	.8642	1.157	.75661	
40	.5688	.6916	1.446	.82248	20	41	.6561	.8693	1.150	.75471	
50	.5712	.6959	1.437	.82082	10	10	.6583	.8744	1.144	.75280	
35	.5736	.7002	1.428	.81915	55	20	.6604	.8796	1.137	.75088	
10	.5760	.7046	1.419	.81748	50	30	.6626	.8847	1.130	.74896	
20	.5783	.7089	1.411	.81580	40	40	.6648	.8899	1.124	.74703	
30	.5807	.7133	1.402	.81412	30	50	.6670	.8952	1.117	.74509	
40	.5831	.7177	1.393	.81242	20	42	.6691	.9004	1.111	.74314	
50	.5854	.7221	1.385	.81072	10	10	.6713	.9057	1.104	.74120	
36	.5878	.7265	1.376	.80902	54	20	.6734	.9110	1.098	.73924	
10	.5901	.7310	1.368	.80730	50	30	.6756	.9163	1.091	.73728	
20	.5925	.7355	1.360	.80558	40	40	.6777	.9217	1.085	.73531	
30	.5948	.7400	1.351	.80386	30	50	.6799	.9271	1.079	.73333	
40	.5972	.7445	1.343	.80212	20	43	.6820	.9325	1.072	.73135	
50	.5995	.7490	1.335	.80038	10	10	.6841	.9380	1.066	.72937	
37	.6018	.7536	1.327	.79864	53	20	.6862	.9435	1.060	.72737	
10	.6041	.7581	1.319	.79688	50	30	.6884	.9490	1.054	.72537	
20	.6065	.7627	1.311	.79512	40	40	.6905	.9545	1.048	.72337	
30	.6088	.7673	1.303	.79335	30	50	.6926	.9601	1.042	.72136	
40	.6111	.7720	1.295	.79158	20	44	.6947	.9657	1.036	.71934	
50	.6134	.7766	1.288	.78980	10	10	.6967	.9713	1.030	.71732	
38	.6157	.7813	1.280	.78801	52	20	.6988	.9770	1.024	.71529	
10	.6180	.7860	1.272	.78622	50	30	.7009	.9827	1.018	.71325	
20	.6202	.7907	1.265	.78442	40	40	.7030	.9884	1.012	.71121	
					30	50	.7050	.9942	1.006	.70916	
							.7071	1.	1.	.70711	
										45	
										°	
	Cosin.	Cotg.	Tan.	Sine.	Angle.		Cosin.	Cotg.	Tan.	Sine.	Angle.

TABLE IX.—CALCULATION OF EARTHWORK.

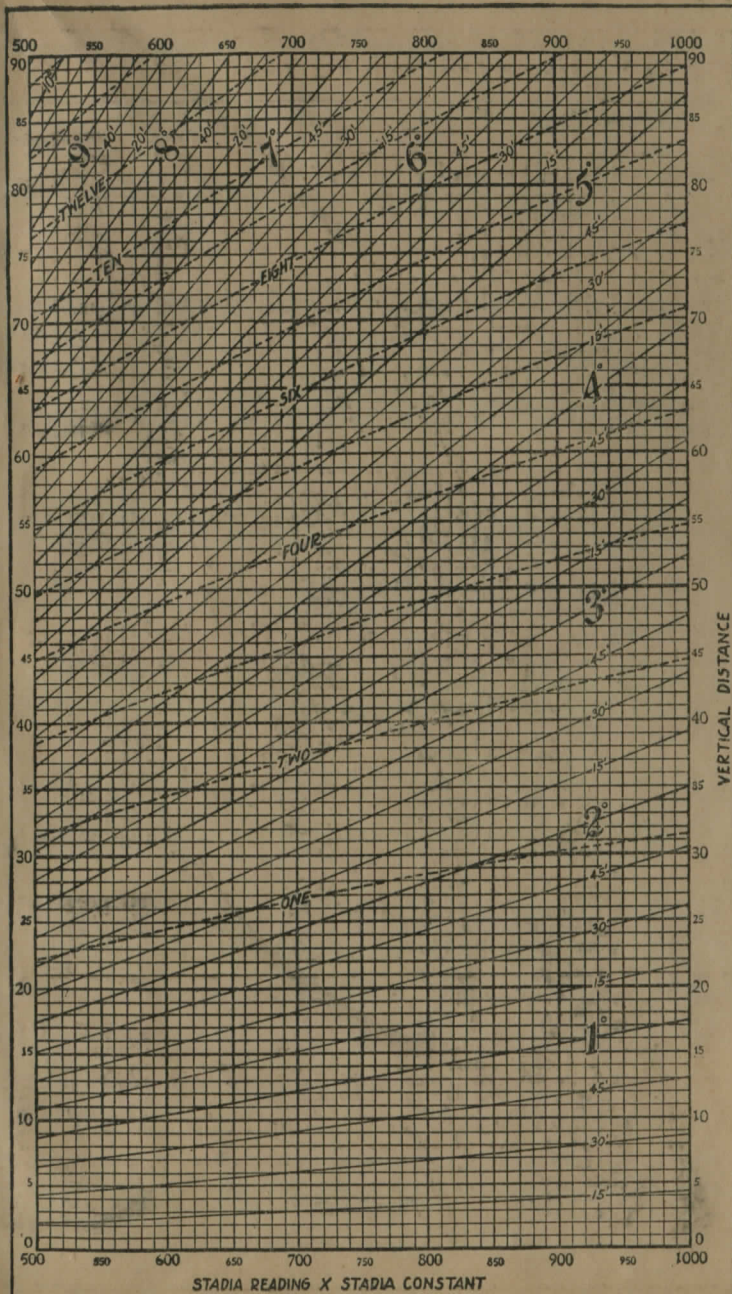
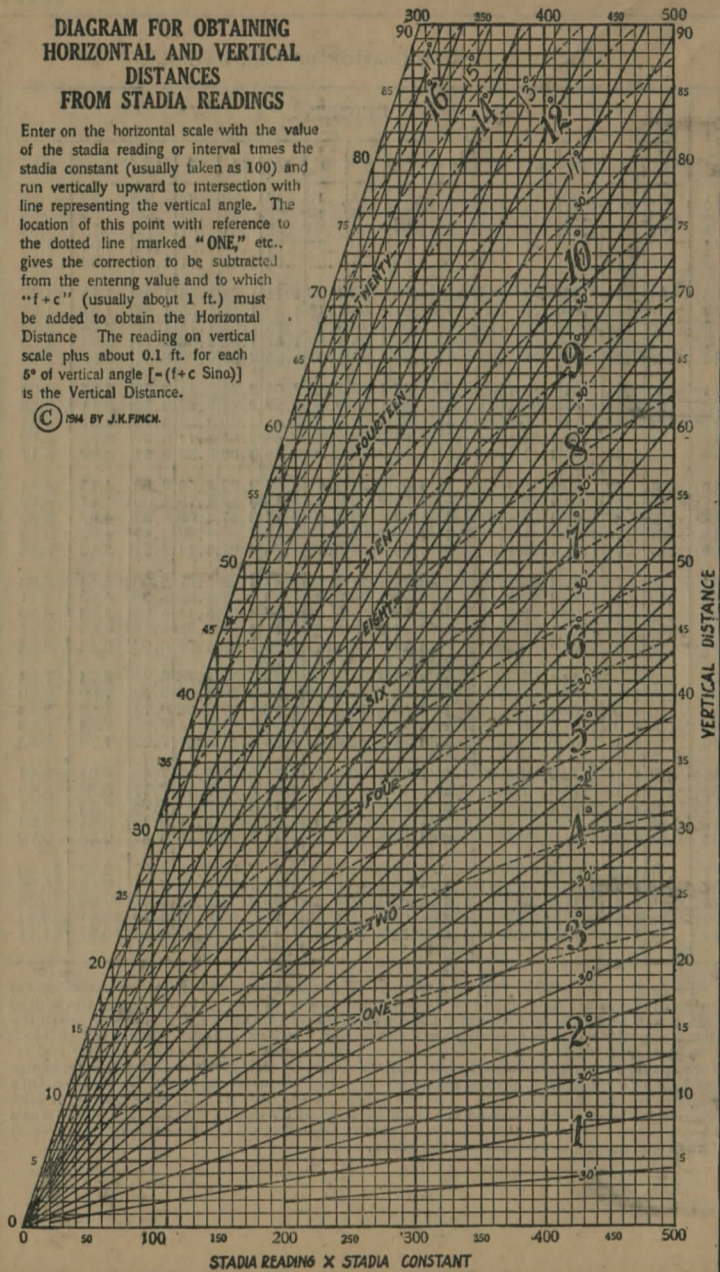
Width	HEIGHT														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	.02	.04	.06	.07	.09	.11	.13	.15	.17	.18	.20	.22	.24	.26	.28
2	.04	.07	.11	.15	.18	.22	.26	.30	.33	.37	.41	.44	.48	.52	.56
3	.06	.11	.17	.22	.28	.33	.39	.44	.50	.56	.61	.67	.72	.78	.83
4	.07	.15	.22	.30	.37	.44	.52	.59	.67	.74	.81	.89	.96	1.04	1.11
5	.09	.19	.28	.37	.46	.56	.65	.74	.83	.93	1.02	1.11	1.20	1.30	1.39
6	.11	.22	.33	.44	.56	.67	.78	.89	1.00	1.11	1.22	1.33	1.44	1.55	1.67
7	.13	.26	.39	.52	.65	.78	.91	1.04	1.16	1.30	1.42	1.55	1.68	1.81	1.94
8	.15	.30	.44	.59	.74	.89	1.04	1.19	1.33	1.48	1.63	1.78	1.92	2.08	2.22
9	.17	.33	.50	.67	.83	1.00	1.17	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50
10	.18	.37	.56	.74	.93	1.11	1.30	1.48	1.67	1.85	2.04	2.22	2.41	2.59	2.78
11	.20	.41	.61	.82	1.02	1.22	1.43	1.63	1.83	2.04	2.24	2.44	2.65	2.85	3.06
12	.22	.44	.67	.89	1.11	1.33	1.56	1.78	2.00	2.22	2.44	2.67	2.89	3.11	3.33
13	.24	.48	.72	.96	1.20	1.44	1.68	1.92	2.16	2.41	2.65	2.89	3.13	3.37	3.61
14	.26	.52	.78	1.04	1.30	1.55	1.81	2.08	2.33	2.59	2.85	3.11	3.37	3.63	3.89
15	.28	.56	.83	1.11	1.39	1.67	1.94	2.22	2.50	2.78	3.06	3.33	3.61	3.89	4.17
16	.30	.59	.89	1.18	1.48	1.78	2.07	2.37	2.67	2.96	3.26	3.56	3.85	4.15	4.44
17	.31	.63	.94	1.26	1.57	1.89	2.20	2.52	2.83	3.13	3.46	3.78	4.09	4.41	4.72
18	.33	.67	1.00	1.33	1.67	2.00	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00
19	.35	.70	1.06	1.41	1.76	2.11	2.46	2.82	3.17	3.52	3.87	4.22	4.57	4.92	5.28
20	.37	.74	1.11	1.48	1.85	2.22	2.59	2.96	3.33	3.70	4.07	4.44	4.81	5.18	5.56
21	.39	.78	1.17	1.55	1.94	2.33	2.72	3.11	3.50	3.89	4.28	4.67	5.06	5.44	5.83
22	.41	.81	1.22	1.63	2.04	2.44	2.85	3.26	3.67	4.07	4.48	4.89	5.30	5.70	6.11
23	.43	.85	1.28	1.70	2.13	2.56	2.98	3.41	3.83	4.26	4.68	5.11	5.54	5.96	6.39
24	.44	.89	1.33	1.78	2.22	2.67	3.11	3.50	4.00	4.44	4.89	5.33	5.78	6.22	6.67
25	.46	.92	1.39	1.85	2.31	2.78	3.24	3.70	4.17	4.63	5.09	5.56	6.02	6.48	6.94
26	.48	.96	1.44	1.92	2.41	2.89	3.37	3.85	4.33	4.82	5.30	5.78	6.26	6.74	7.24
27	.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50
28	.52	1.04	1.55	2.07	2.59	3.11	3.63	4.15	4.67	5.18	5.70	6.22	6.74	7.26	7.78
29	.54	1.07	1.61	2.15	2.68	3.22	3.76	4.30	4.83	5.37	5.91	6.44	6.98	7.52	8.06
30	.56	1.11	1.67	2.22	2.78	3.33	3.89	4.44	5.00	5.55	6.11	6.67	7.22	7.78	8.33
31	.57	1.15	1.72	2.30	2.87	3.44	4.02	4.59	5.17	5.74	6.32	6.89	7.46	8.04	8.61
32	.59	1.18	1.78	2.37	2.96	3.56	4.15	4.74	5.33	5.92	6.52	7.11	7.70	8.30	8.89
33	.61	1.22	1.83	2.44	3.05	3.67	4.28	4.89	5.50	6.11	6.72	7.33	7.94	8.55	9.17
34	.63	1.26	1.89	2.52	3.15	3.78	4.40	5.04	5.67	6.29	6.93	7.56	8.18	8.81	9.44
35	.65	1.30	1.94	2.59	3.24	3.89	4.53	5.18	5.83	6.48	7.13	7.78	8.42	9.08	9.72
36	.67	1.33	2.00	2.67	3.33	4.00	4.66	5.33	6.00	6.67	7.33	8.00	8.67	9.33	10.00
37	.68	1.37	2.06	2.74	3.42	4.11	4.79	5.48	6.17	6.85	7.54	8.22	8.91	9.59	10.28
38	.70	1.41	2.11	2.82	3.52	4.22	4.92	5.63	6.33	7.03	7.74	8.44	9.15	9.85	10.56
39	.72	1.44	2.17	2.89	3.61	4.33	5.05	5.78	6.50	7.22	7.95	8.67	9.39	10.11	10.83
40	.74	1.48	2.22	2.96	3.70	4.44	5.18	5.92	6.67	7.41	8.15	8.89	9.63	10.37	11.11

Table gives cu. yds. in 1 ft. of a triangle of given width and height. Corrections for tenths of width are one tenth the values found under each height considering the widths from 1 to 9 as tenths and similarly the corrections for tenths of height are one tenth the figures opposite width considering the heights from 1 to 9 as tenths. Thus if w = 16.2 and h = 5.3, cu. yds. = 1.48 + .028 + .089 = 1.597 cu. yds. or practically 160 cu. yds. per 100 ft. If w exceeds 40 ft., use one half and multiply result by 2, if both w and h are large use one half of each and multiply result by 4. Any cross-section may be divided into triangles by the following rule. To the triangle of the sum of the outside cuts (or fills) = h, and $\frac{1}{2}$ the roadbed = w, add the triangles formed by taking the distance out to each break in turn (=w's) by the difference between the cuts (or fills) on each side of it (=h's) always subtracting the outer from the inner.

DIAGRAM FOR OBTAINING HORIZONTAL AND VERTICAL DISTANCES FROM STADIA READINGS

Enter on the horizontal scale with the value of the stadia reading or interval times the stadia constant (usually taken as 100) and run vertically upward to intersection with line representing the vertical angle. The location of this point with reference to the dotted line marked "ONE," etc., gives the correction to be subtracted from the entering value and to which "f+c" (usually about 1 ft.) must be added to obtain the Horizontal Distance. The reading on vertical scale plus about 0.1 ft. for each 5° of vertical angle [$-(f+c \sin \alpha)$] is the Vertical Distance.

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320.10
143.45
320.80
784.35

10505
5518
4987

7118 7876
5518 5518
2358
9870
5518
4352

5518
5194
10662

70.44
7.19

11335
2518
5817
5280
537

63.25

26

123613

400

1.97

31

31

1

1020

1

1020

1

146-48
33-12
180 60

1211.7

12104.4

9610

3

9017130.2

7

60 0170

5

2

390

2

23

365
46
1265.75

3265
6755
5-15
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26

11.50
10.51
12.03
12.07

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	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.3	8.5	8.6	8.8	8.9	9.1	9.2	9.4	0
1	9.5	9.8	10.0	10.3	10.5	10.8	11.0	11.2	11.4	1
2	11.0	11.3	11.5	11.6	11.8	12.0	12.2	12.4	12.6	2
3	12.5	12.8	13.0	13.1	13.3	13.4	13.6	13.8	14.0	3
4	14.0	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	16.2	16.4	16.5	16.7	5
6	17.0	17.2	17.3	17.5	17.6	17.7	17.9	18.0	18.2	6
7	18.5	18.7	18.8	19.0	19.1	19.2	19.4	19.5	19.7	7
8	20.0	20.2	20.3	20.5	20.6	20.7	20.9	21.0	21.2	8
9	21.5	21.7	21.8	22.0	22.1	22.2	22.4	22.5	22.7	9
10	23.0	23.2	23.3	23.5	23.6	23.7	23.9	24.0	24.2	10
11	24.5	24.7	24.8	25.0	25.1	25.2	25.4	25.5	25.7	11
12	26.0	26.2	26.3	26.5	26.6	26.7	26.9	27.0	27.2	12
13	27.5	27.7	27.8	28.0	28.1	28.2	28.4	28.5	28.7	13
14	29.0	29.2	29.3	29.5	29.6	29.7	29.9	30.0	30.2	14
15	30.5	30.7	30.8	31.0	31.1	31.2	31.4	31.5	31.7	15
16	32.0	32.2	32.3	32.5	32.6	32.7	32.9	33.0	33.2	16
17	33.5	33.7	33.8	34.0	34.1	34.2	34.4	34.5	34.7	17
18	35.0	35.2	35.3	35.5	35.6	35.7	35.9	36.0	36.2	18
19	36.5	36.7	36.8	37.0	37.1	37.2	37.4	37.5	37.7	19
20	38.0	38.2	38.3	38.5	38.6	38.7	38.9	39.0	39.2	20
21	39.5	39.7	39.8	40.0	40.1	40.2	40.4	40.5	40.7	21
22	41.0	41.2	41.3	41.5	41.6	41.7	41.9	42.0	42.2	22
23	42.5	42.7	42.8	43.0	43.1	43.2	43.4	43.5	43.7	23
24	44.0	44.2	44.3	44.5	44.6	44.7	44.9	45.0	45.2	24
25	45.5	45.7	45.8	46.0	46.1	46.2	46.4	46.5	46.7	25
26	47.0	47.2	47.3	47.5	47.6	47.7	47.9	48.0	48.2	26
27	48.5	48.7	48.8	49.0	49.1	49.2	49.4	49.5	49.7	27
28	50.0	50.2	50.3	50.5	50.6	50.7	50.9	51.0	51.2	28
29	51.5	51.7	51.8	52.0	52.1	52.2	52.4	52.5	52.7	29
30	53.0	53.2	53.3	53.5	53.6	53.7	53.9	54.0	54.2	30
31	54.5	54.7	54.8	55.0	55.1	55.2	55.4	55.5	55.7	31
32	56.0	56.2	56.3	56.5	56.6	56.7	56.9	57.0	57.2	32
33	57.5	57.7	57.8	58.0	58.1	58.2	58.4	58.5	58.7	33
34	59.0	59.2	59.3	59.5	59.6	59.7	59.9	60.0	60.2	34
35	60.5	60.7	60.8	61.0	61.1	61.2	61.4	61.5	61.7	35
36	62.0	62.2	62.3	62.5	62.6	62.7	62.9	63.0	63.2	36
37	63.5	63.7	63.8	64.0	64.1	64.2	64.4	64.5	64.7	37
38	65.0	65.2	65.3	65.5	65.6	65.7	65.9	66.0	66.2	38
39	66.5	66.7	66.8	67.0	67.1	67.2	67.4	67.5	67.7	39
40	68.0	68.2	68.3	68.5	68.6	68.7	68.9	69.0	69.2	40

PLEASE RETURN TO
GEAUGA COUNTY ENGINEER
COURT HOUSE
CLARDON O.
PHONE 250-X

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

