

FIELD BOOK

360

KEUFFEL & ESSER CO.

DRAWING MATERIALS

AND

SURVEYING INSTRUMENTS.

NEW YORK.

CHICAGO. ST. LOUIS. SAN FRANCISCO. MONTREAL.

TABLES FOR EXCAVATIONS AND EMBANKMENTS.

PLEASE RETURN TO
 DISTANCES FROM CENTER OF ROADWAY TO CURB CROSS SECTIONING.
 ROADWAY AS SHOWN IN CROSS SECTIONING.
 FOR SINGLE TRACK EXCAVATION

COURT HOUSE
 CHARDON, O.
 PHONE 250-X

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

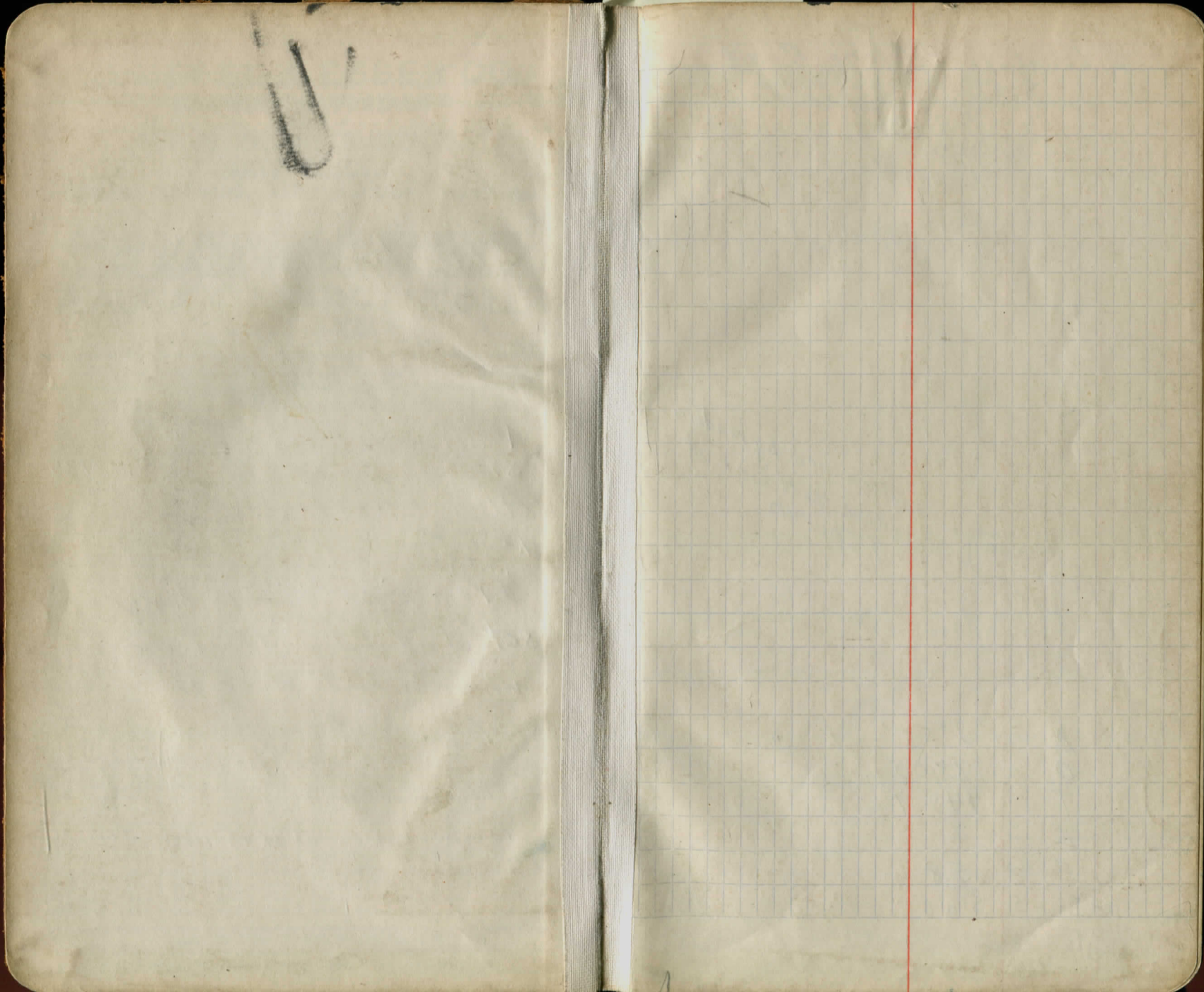
Calculated by Julien A. Hall, M. Am. Soc. C. E.

For Keith's Railroad Curve Tables see end of book.

Book 37

Please return to
 County Surveyors Office
 Court House
 Chardon Ohio
 1929-30

Pettibone Road - Sec's A B C D
 Slopes - pg. 73 - 79 T.H. 185
 Align. - pg. 1 - 34, 58-59
 X-Sections - pg. 40-57, 60-61 pg 64
 B.Ms.
 Iron pipe (3/4" by 18") were
 set at all PI and POT except
 where noted after the
 completion of the pavement
 12/8/30 Richey
 SEC A, STAKING MAY '34 Page 35
 Summit Dr. 21 SR 43 (1973) Page 36

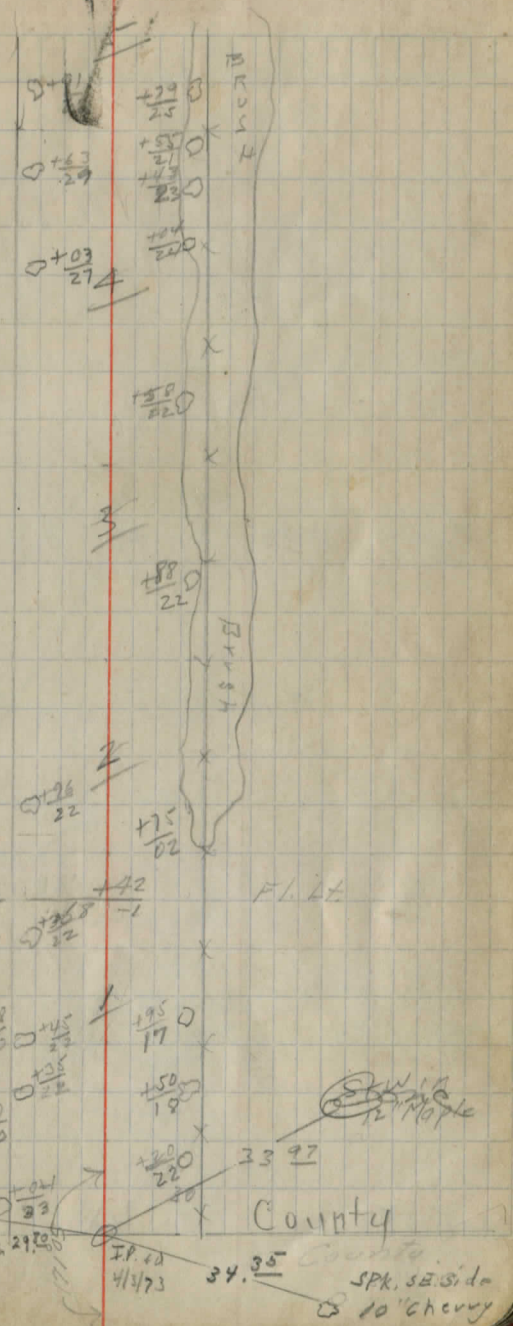


Nov 1929

Location Petitione Road

Note: - County line determined by random
Line from State Road to N Line of
J. Church

- $\Delta = 8^{\circ}55'$ Lt.
- $D = 3000'$
- $T = 148.9$
- $L =$
- $E = 5.8$
- P.I. = Sta 0+00 Beginning of Imp
- P.T. = Sta 1+48.9



15

+10
725
700 → H
+69
75

$$\begin{array}{r} 2+45 \\ 19 \end{array}$$

$$\begin{array}{r} +30 \\ 170 \end{array}$$
14

$$\begin{array}{r} 0+30 \\ 22 \end{array}$$
13

$$\begin{array}{r} 0+73 \\ 21 \end{array}$$

$$\begin{array}{r} 15 \\ 12 \end{array}$$

8" VSP in good condition

+10
DRIVE
+90
0
+90
12
+30
55

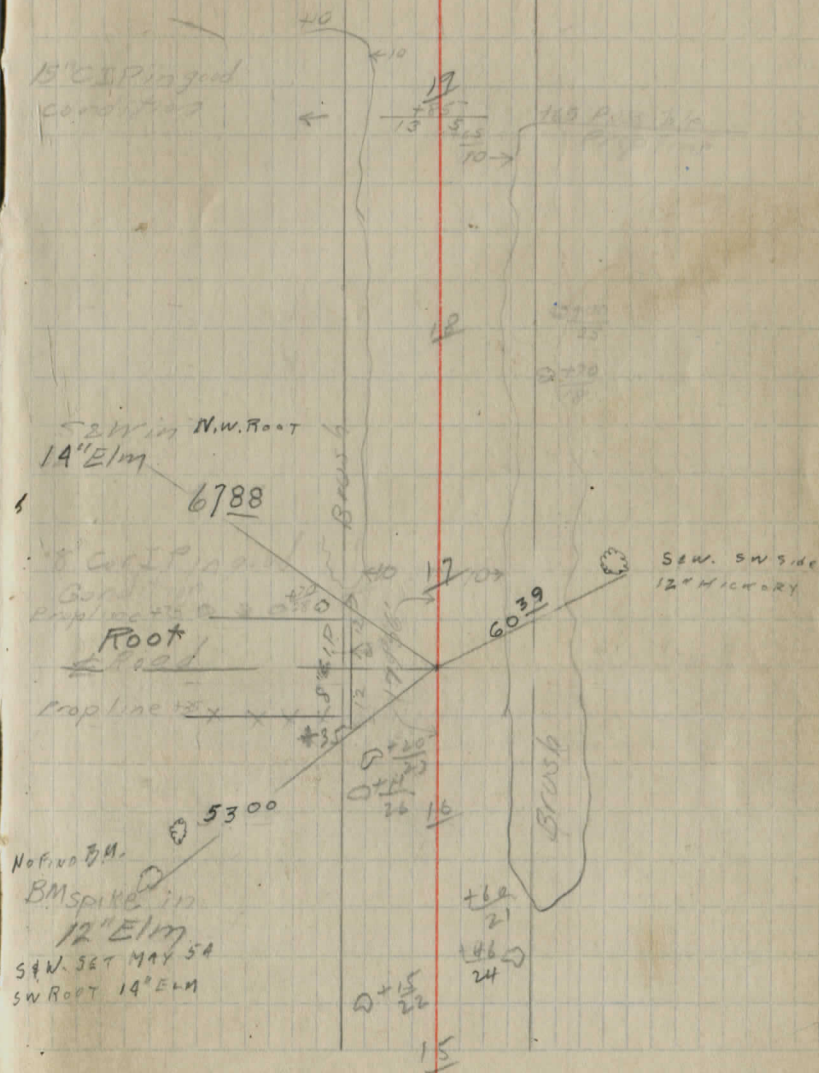
1110

Sta 16+55.65

PI Det L + 0°04'

Iron
PIPE
MAY '54

20

15' CIP in good
condition

Brush

← 15

→ 20

~~25~~

~~29~~

~~23~~

~~23~~

~~21~~

~~20~~

3029

$\frac{0}{+2}$
 100 → H
 0 + 90
 0

$\frac{0+45}{50}$

282726

$\frac{0}{+25}$
 B. F. O. S. K.

25

Sta 30-51.60

PI DEPT 0° 31'

Iron Pipe
Set
rd May '54

35

X 51.45
15

34

X

.14 → X

23 Prop Line
X X X

33

G 45
18

32

Spike

CEI # 524728
Spike NE side 8" upTacked
Hub

3500

74.28'

76.85'

66.38'

150
DRIVE
+ 40B
JOHN VORBEL

31

103.1'

3540

30

Tacked
Hub207.75
No FIND
SpikeBMSpike
24' Elm

40

0178
30

woods

39

0170
27

Chas A
Henry

26 →

0155
27

125 x Δ Iron
25.1

15°C IP in
fair condition

18 →

38

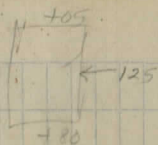
0120
24

37

36

18 →

35



$$\frac{0+35}{35}$$

$$\frac{0+75}{75}$$

$$\frac{0+20}{30}$$

45 20 →

$$\frac{0+20}{20}$$

$$\frac{0+25}{25}$$

+25 end of woods

$$\frac{0+25}{25}$$

$$\frac{0+20}{20}$$

44

$$\frac{0+28}{28}$$

$$\frac{0+27}{27}$$

$$\frac{0+20}{20}$$

Woods

$$\frac{0+15}{15}$$

$$\frac{0+15}{15}$$

$$\frac{0+20}{20}$$

43

18 →

$$\frac{0+90}{90}$$

$$\frac{0+10}{10}$$

$$\frac{0+15}{15}$$

$$\frac{0+15}{15}$$

$$\frac{0+15}{15}$$

42

19 →

$$\frac{0+65}{65}$$

$$\frac{0+10}{10}$$

$$\frac{0+10}{10}$$

$$\frac{0+30}{35}$$

41

19 →

$$\frac{0+25}{25}$$

$$\frac{0+25}{25}$$

Woods

40

$$\frac{0+25}{25}$$

$$\begin{array}{r} 50 \\ 15 \ 9 \cdot 1 \rightarrow \\ + 73 \\ \hline 27 \end{array} \quad \begin{array}{l} 10'' \text{ C.I.P.} \\ \text{in for curve} \end{array}$$

$$\begin{array}{r} T=27 \\ 18 \\ \hline 23 \end{array}$$

$$\begin{array}{r} +40 \\ 30 \\ \hline +26 \\ 38 \\ \hline +15 \\ 35 \end{array}$$

ch₂
S 86° 30' E

$$\begin{array}{r} 126 \\ 59 \\ \hline 14 \ 8 \cdot 1 \rightarrow \\ + 93 \end{array} \quad \begin{array}{l} 6'' \text{ C.I.T.} \\ \text{Fast cross} \end{array}$$

CE 1 # 524165
SPK N.W. Side

$$\begin{array}{r} 126 \\ 59 \\ \hline 14 \ 8 \cdot 1 \rightarrow \\ + 93 \end{array}$$

$$\begin{array}{r} 126 \\ 59 \\ \hline 14 \ 8 \cdot 1 \rightarrow \\ + 93 \end{array}$$

CE 1 # 524166
SPK S. Side

$$\begin{array}{r} 126 \\ 59 \\ \hline 14 \ 8 \cdot 1 \rightarrow \\ + 93 \end{array}$$

Sta 45+56⁴⁵ P.I. Ref L10°19'

Iron P. PK
SOT
FLM 1/59

$$\begin{array}{r} 126 \\ 59 \\ \hline 14 \ 8 \cdot 1 \rightarrow \\ + 93 \end{array}$$

$$\begin{array}{r} 126 \\ 59 \\ \hline 14 \ 8 \cdot 1 \rightarrow \\ + 93 \end{array}$$

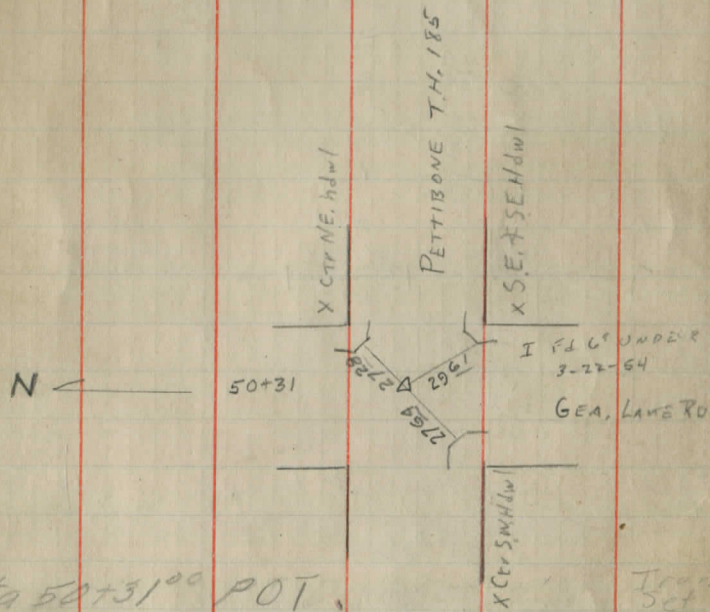
$$\begin{array}{r} 126 \\ 59 \\ \hline 14 \ 8 \cdot 1 \rightarrow \\ + 93 \end{array}$$

SW₁ N. Root 36" MAP 60

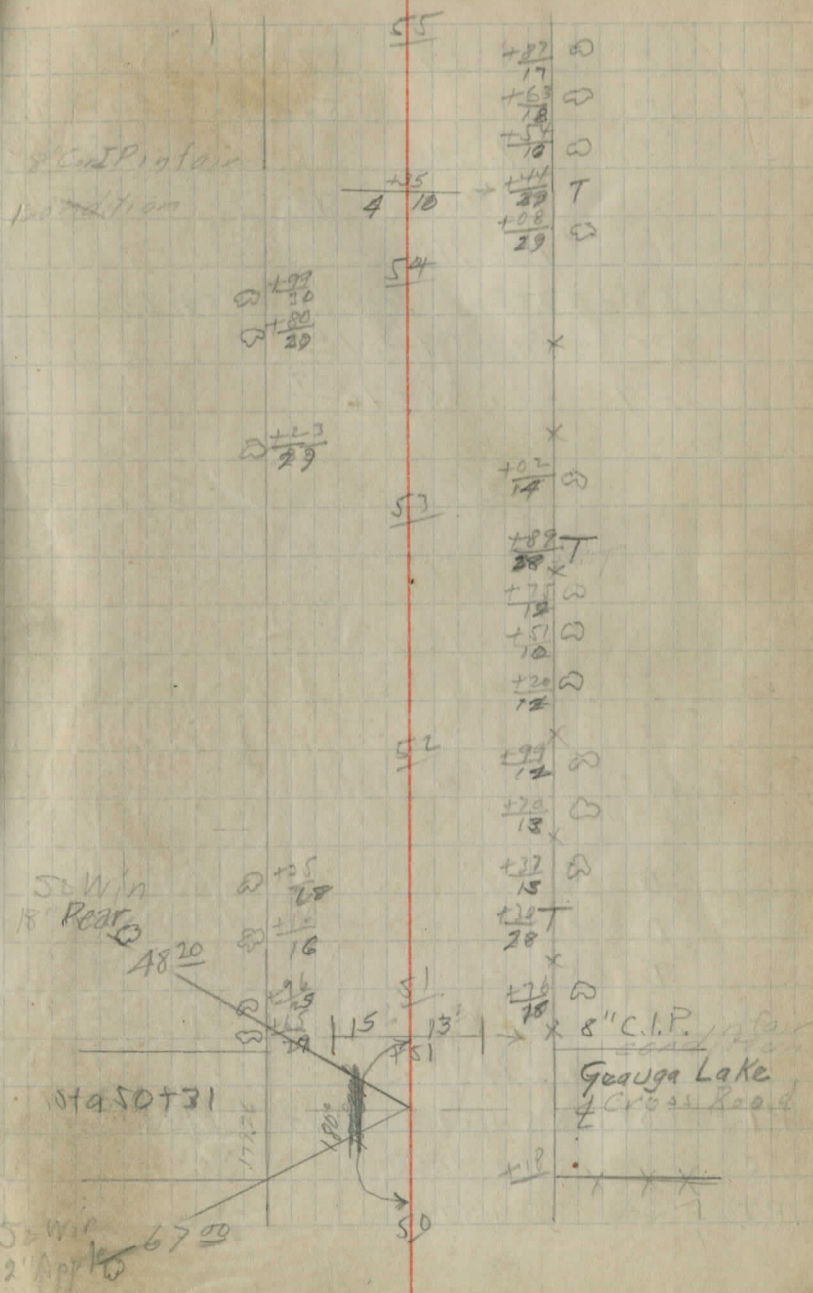
Gone
58 1/2" dia
30" dia

43 3/4

47 6/7



Sta 50+31 POT



55
 +22 0
 17 0
 +63 0
 18 0
 54 0
 +44 7
 29 0
 +08 0
 29

54
 +99 0
 20 0
 +80 0
 29

53
 +113 0
 29

X
 +02 0
 14

52
 +89 0
 28 X
 +75 0
 12 0
 +51 0
 10 0
 +20 0
 12

X
 +99 0
 12 0
 +70 0
 13 X

+32 0
 15 0
 +24 0
 28 X

X
 +76 0
 20 X

8" C.I.P.
 Georgia Lake
 & Cross Road

SE Win 4820
 R' Rear 4820
 +25 0
 28
 +16 0
 16

Sta 50+31

SE Win 6700
 12' App 6700

$$61+46.63 = 0^{\circ}00'$$

$$\Delta = 25^{\circ}13'$$

$$D = 280$$

$$T = 45.77$$

$$E = 5.0$$

$$L = 90.06$$

$$P.I. Sta 61+92.90$$

$$P.C. = 61+46.63$$

$$P.T. = 62+36.69$$

$$61+50 = 0^{\circ}28'$$

$$61+75 = 4^{\circ}08'$$

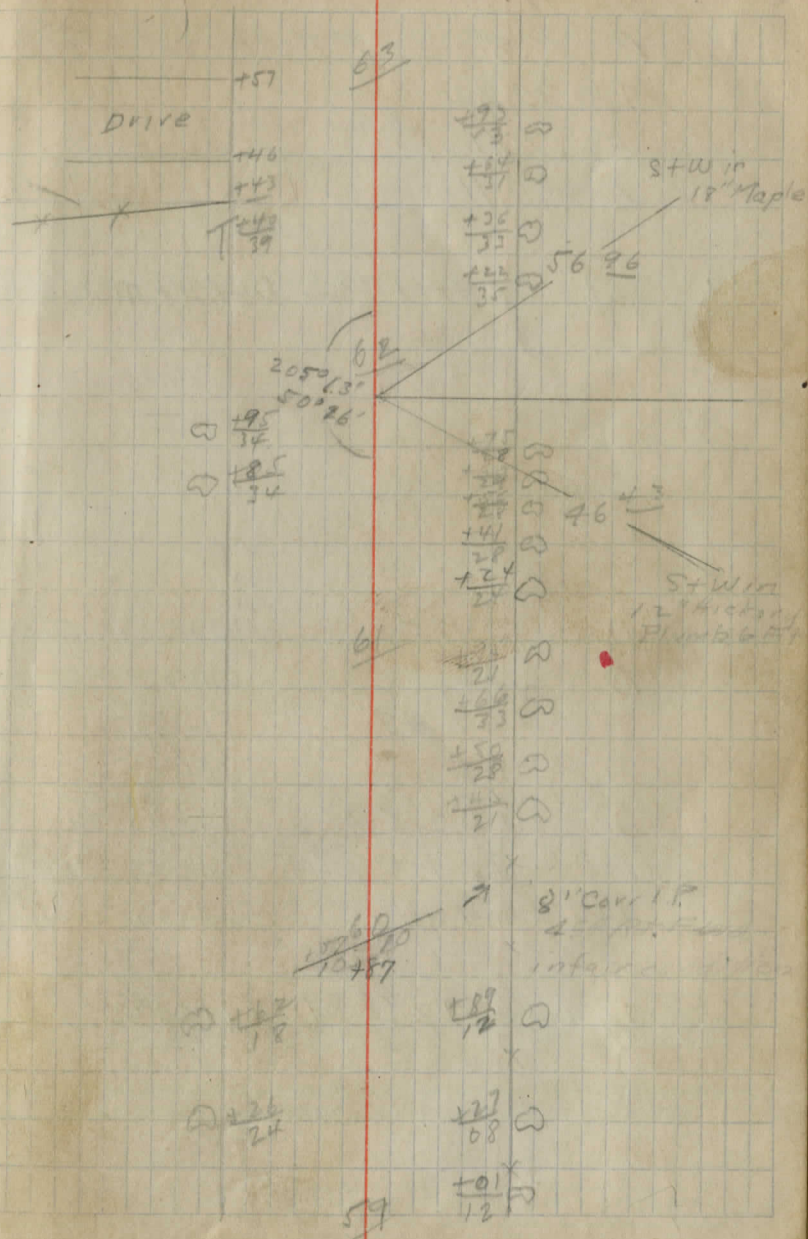
$$62+00 = 7^{\circ}48'$$

$$62+25 = 11^{\circ}28'$$

$$62+36.69 = 12^{\circ}36'$$

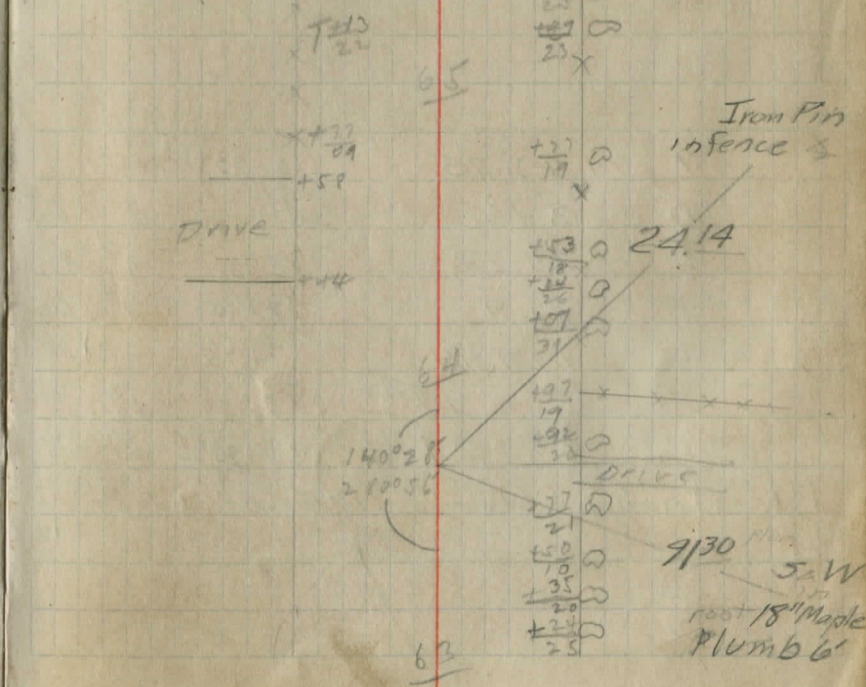
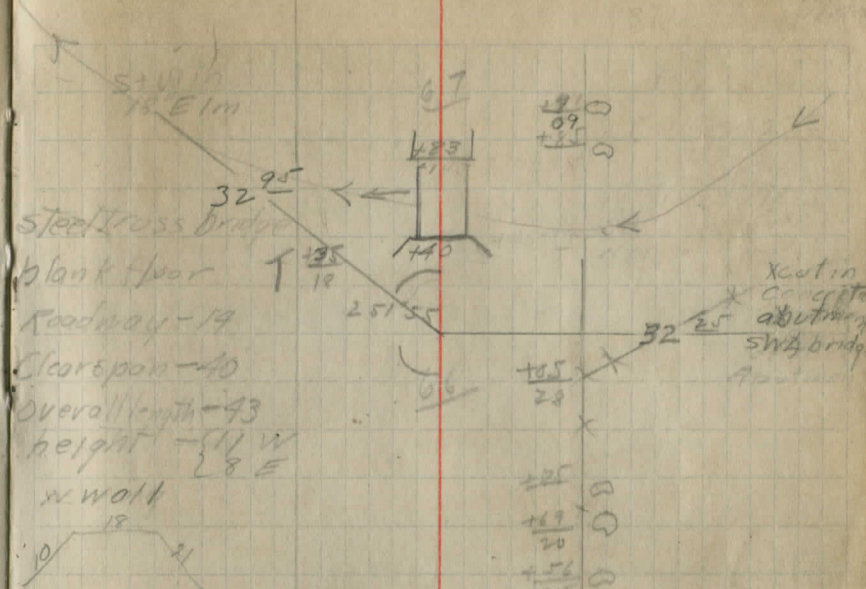
$$Dot Pt. 25^{\circ}13' Iron 50'$$

Note:
Relocation from Sta 61+15.56
to Sta 68+22.61
Use Location B (see page 58)



$\Delta = 71^{\circ}55'$ $PC = 65+88.08$
 $D = 138'$ $PT = 66+40.12$
 $T = 30.12$
 $E = 27$
 $L = 52.11$

P.I. Sta $66+18.20$ Def Rt. $71^{\circ}55'$ ^{Iron} _{set}



$\Delta = 39^{\circ}32'$ $63+09.28 = 0^{\circ}00'$
 $D = 32'$ $63+25 = 2^{\circ}24'$
 $T = 62.47$ $63+50 = 6^{\circ}24'$
 $E = 11.2$ $63+75 = 10^{\circ}24'$
 $L = 123.54$ $64+50 = 14^{\circ}24'$
 $PC = 63+09.28$ $64+25 = 18^{\circ}24'$
 $PT = 64+33.52$ $64+50 = 19^{\circ}06'$

P.I. Sta $63+72.45$ Def Lt. $39^{\circ}32'$ ^{Iron} _{set}

9/30
 5-W
 root 18" Maple
 Plumb 6'

P.I. Sta 74+40.97 $\Delta = 21^\circ 33'$

$$\Delta = 21^\circ 33' 4$$

$$D = 13^\circ$$

Curve
T = 83.88

74+0
E = 7.9

$$L = 165.77$$

$$PC = 73+57.09$$

$$PT = 75+22.86$$

$$73+57.09 = 0^\circ 00'$$

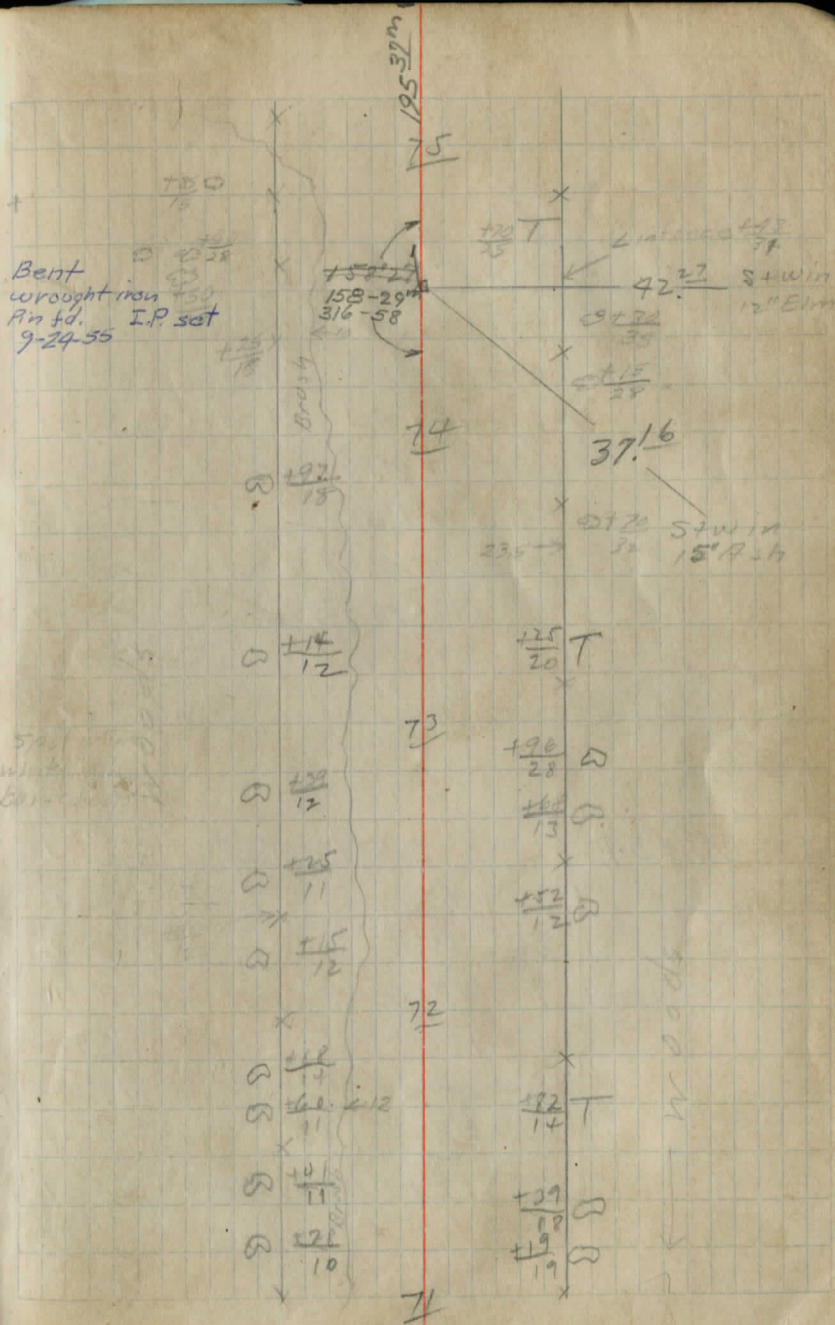
$$74+00 = 2^\circ 47'$$

$$74+50 = 6^\circ 02'$$

$$75+00 = 9^\circ 17'$$

$$75+22.86 = 13^\circ 46'$$

Bent
wrought iron
Rin hd. I.P. set
9-29-55

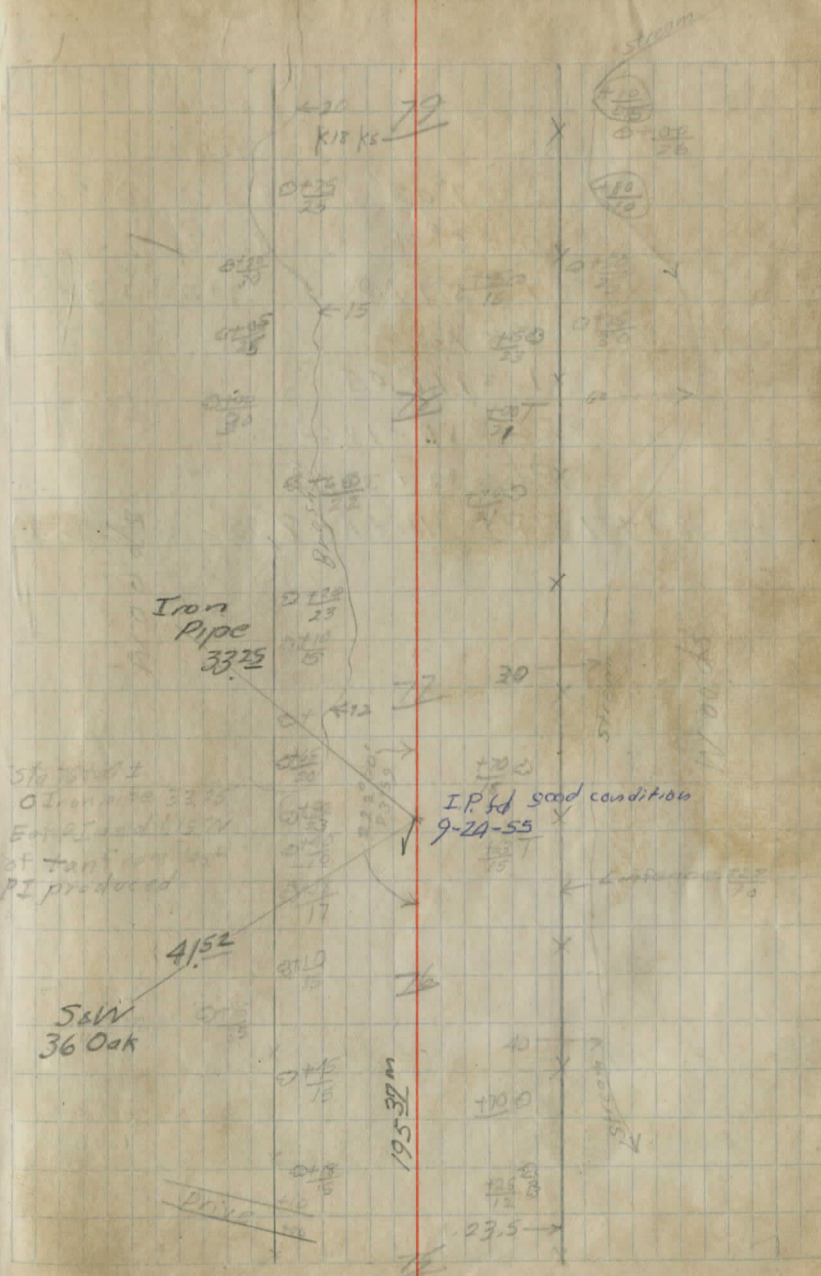


$\Delta = 42^\circ$	75150	= 0°-02
D = 26	775	= 3-17
T = 84.59	67+00	= 6-32
E = 15.6	+25	= 9-47
L = 161.54	+50	= 13-02
PC = 75+49.76	+75	= 16-17
PT = 77+11.30	77+00	= 19-32
	77+11.30	= 21-00

Sta 76+34.35

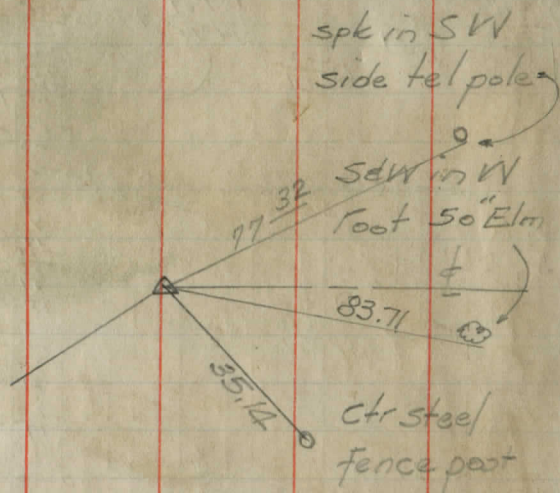
Det Rt 42°00'

Curve Data	$\Delta = 42^\circ 00'$	76+61.03	17°06
	D = 30'	775	2°06
	T = 73.32	76+00	5°51
	E = 13.6	775	9°36
	L = 140.00		13°21
	PC = 75+61.03		17°06
	PT = 77+01.03	77+00	20°51
		77+01.03	21°00

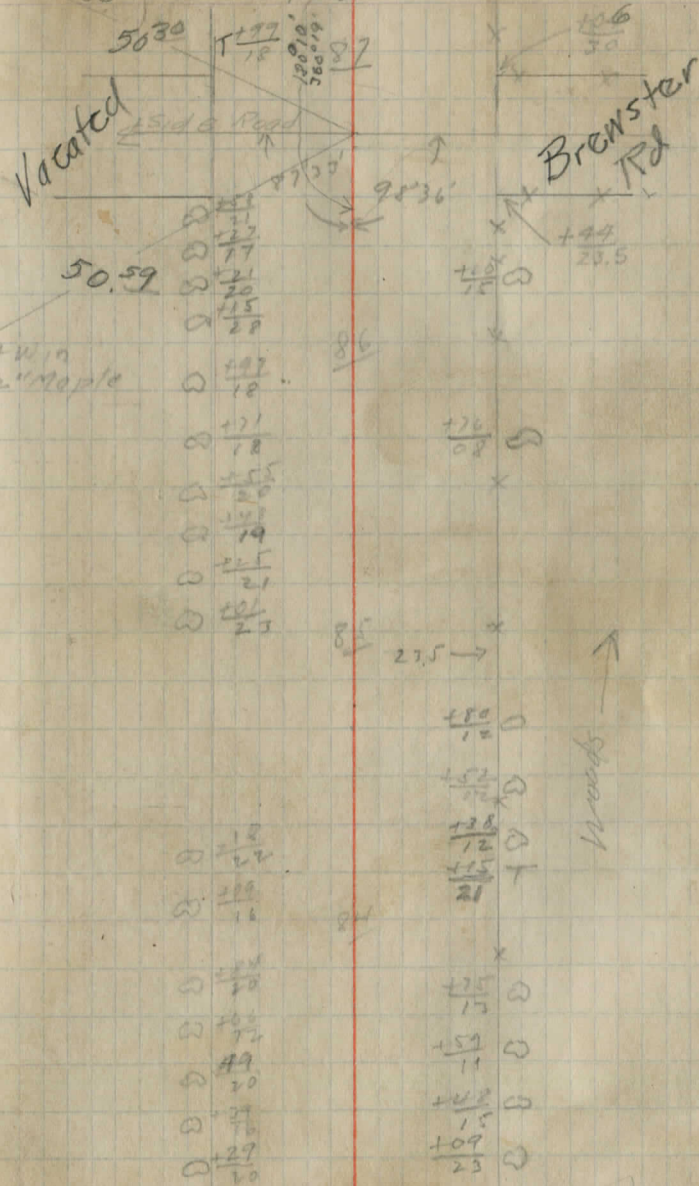


P.I. Sta 86-74.68 Det. Rt. 0°10' Left

86+74.68
I.P. 2" down
10-18-54



5+36 Maple stump



$$T \frac{+61}{20}$$

$$\begin{array}{r} +30 \\ H \leftarrow 400 \\ +90 \end{array}$$

$$T \frac{+46}{19}$$

$$O \frac{+101}{18}$$

$$T \frac{+22}{19}$$

$$O \frac{+12}{21}$$

$$O \frac{+77}{24}$$

$$O \frac{+11}{31}$$

$$\frac{91}{30} \rightarrow X$$

$$\frac{+81}{20} O$$

$$\frac{+61}{20} O$$

$$\frac{+37^X}{20} O$$

$$\frac{+14}{20} O$$

$$\frac{90}{20}$$

$$\frac{+89}{22} O$$

$$\frac{+66}{21} O$$

$$\frac{+15}{21} O$$

$$\frac{+10}{29.80} O$$

$$\frac{+95}{21} O$$

$$\rightarrow 70' \rightarrow X$$

$$\frac{+26}{19} O$$

$$\frac{+15}{22} O$$

$$\frac{+93}{23} O$$

$$\frac{+57}{20} O$$

$$\frac{+66}{19} O$$

$$\frac{+52}{22} O$$

$$\frac{+16^X}{36} O$$

$$\frac{87}{36}$$

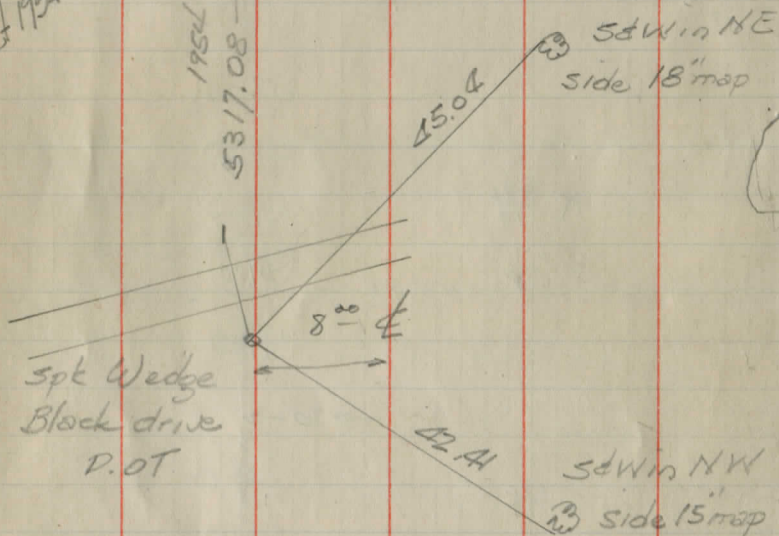
Iron Pin

112+09.79 0 8° Δ

overhanging branches on ϕ

03-1954

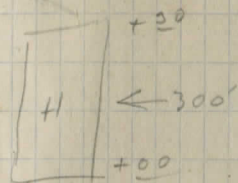
1954
5317.08 → 0+0



0 8° Δ I.P. to ϕ Brewster

P.O.T. Sta 91+20 49

No Iron 50' x cut in road



T $\frac{+22}{24}$

95

X +75 L map of 1000' on

$\frac{+92}{14}$ O

$\frac{+62}{18}$ O

X

94

305 $\frac{+83}{18}$ O

X

30 →

93

X

91+12 $\frac{+67}{+57}$

$\frac{+75}{17}$ O

T $\frac{+28}{20}$

$\frac{+12}{16}$ O

92

X

$\frac{+88}{18}$ O 91+38

Tackled Hub

$\frac{+27}{19}$ O

P.O.T. 91+20 49

$\frac{+23}{17}$ O

91

$\frac{+03}{18}$ O

3364

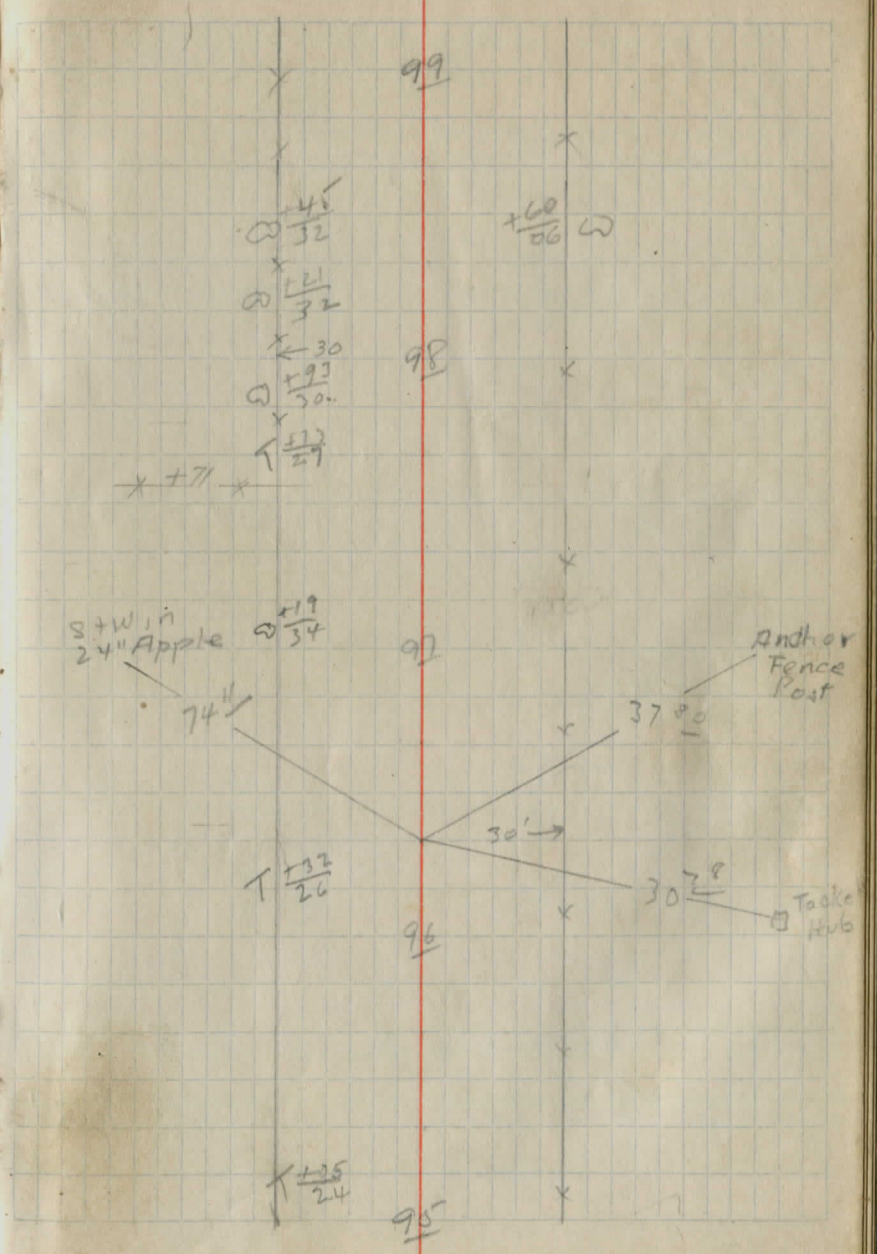
Tack Hub

4385
58 W
15" Maple

oct 54 45 to 5th
46 to last sth

P.O.T. Sta 96 + 53.85

No Iron 6.4
x out in rock



Woods

$$\begin{array}{r} \times \\ \text{D} \frac{+91}{32} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \frac{+57}{28} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \frac{+15}{31} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \frac{+05}{26} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{T} \frac{+85}{27} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{Y} +10 \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{Drive} +10 \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{X} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \leftarrow 27 \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{Y} +50 \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \leftarrow 200 \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{Y} +23 \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{T} \frac{+43}{27} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \frac{+09}{26} \\ \hline \end{array}$$

Woods

$$\begin{array}{r} \times \\ \rightarrow +75 \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{Y} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{Y} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{Y} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{Y} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{T} \frac{+03}{24} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{Y} \\ \hline \end{array}$$

103

$$\begin{array}{r} \times \\ \text{D} \frac{+55}{27} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \frac{+45}{27} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \frac{+25}{20} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \frac{+30}{28} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \frac{+44}{28} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \frac{+95}{20} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \frac{+68}{20} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \frac{+24}{24} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

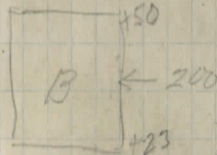
$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \frac{+19}{22} \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ \text{D} \\ \hline \end{array}$$

Woods



101

100

3'

15'

+82

99

in fair condition

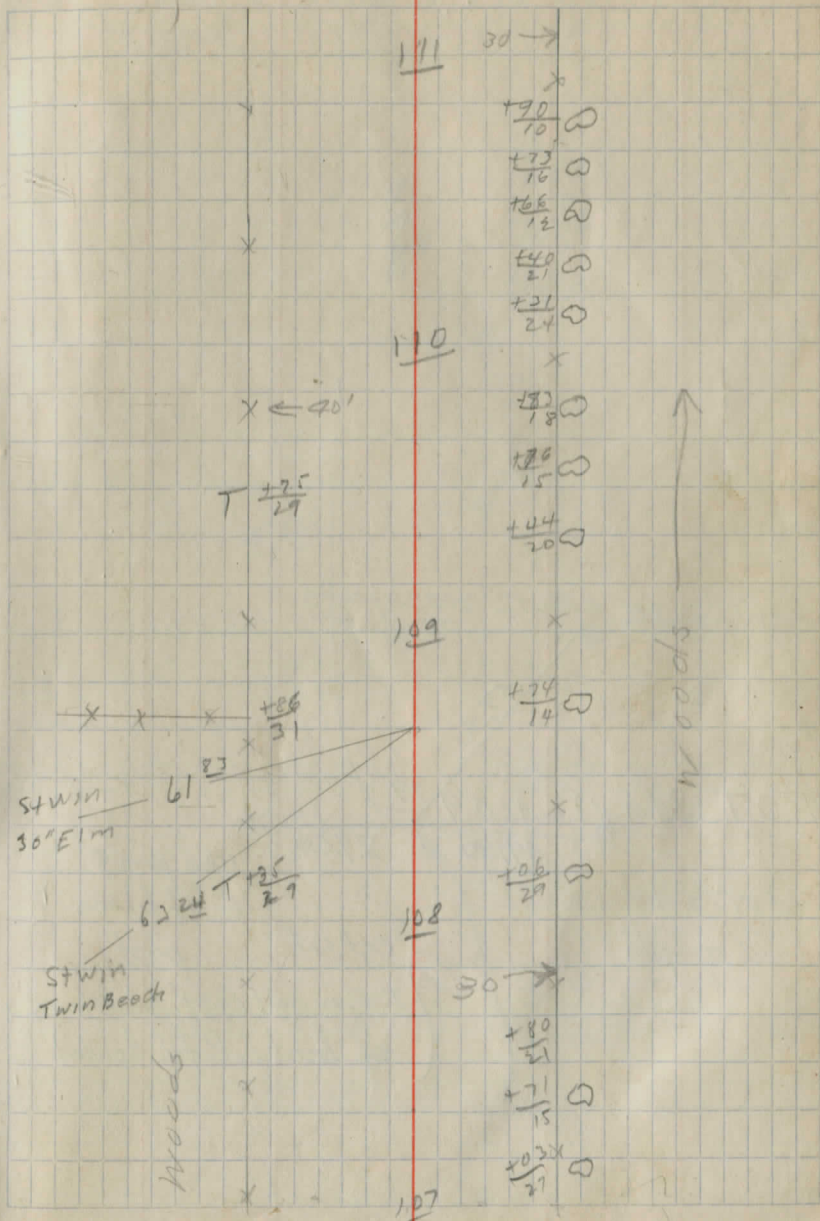
3 x 4 stone Box
F. R.

x Prop line

+504 No. 15

P.O.T. Sta 108 + 8600

No Iron Set



in '54
2A19.4

P.O.T. Sta 119 + 79.06

Iron
set ←

Gone (can
see 112+09.79 to
136+29.24)

Stump
ash

Stump
8" Maple

Oct '54

72.20

60.58

TV 180
25

T 148
25

← 35

123

122

121

120

119

109
14

100

184
01

100
06

127
15

192
06

149
27

107
13

194
14

179
24

Drive

Brush

Brush

Oct '54
Fd bent
over

Ivory
Pine
in fence
↓

30.00

1800

5 →

0 →

'54
m
2419.4

$$\begin{array}{r} x \\ T + 92 \\ \hline 25 \\ x \end{array} \quad \begin{array}{l} 127 \\ \\ \\ \end{array} \quad \begin{array}{l} + 66 \\ \hline 11 \end{array} \quad \odot$$

$$\begin{array}{r} x \\ \leftarrow 25 \\ \hline 126 \\ x \end{array} \quad \begin{array}{l} \\ \\ \\ \end{array} \quad \begin{array}{l} + 14 \\ \hline 11 \end{array} \quad \odot$$

Brush

$$\begin{array}{r} T + 141 \\ \hline 24 \\ x \end{array} \quad \begin{array}{l} \\ \\ \\ \end{array} \quad \begin{array}{l} + 16 \\ \hline 11 \end{array} \quad \odot$$

$$\begin{array}{r} x \\ 11 \rightarrow \\ \hline 125 \\ x \end{array} \quad \begin{array}{l} \\ \\ \\ \end{array} \quad \begin{array}{l} + 8 \\ \hline 14 \end{array} \quad \odot$$

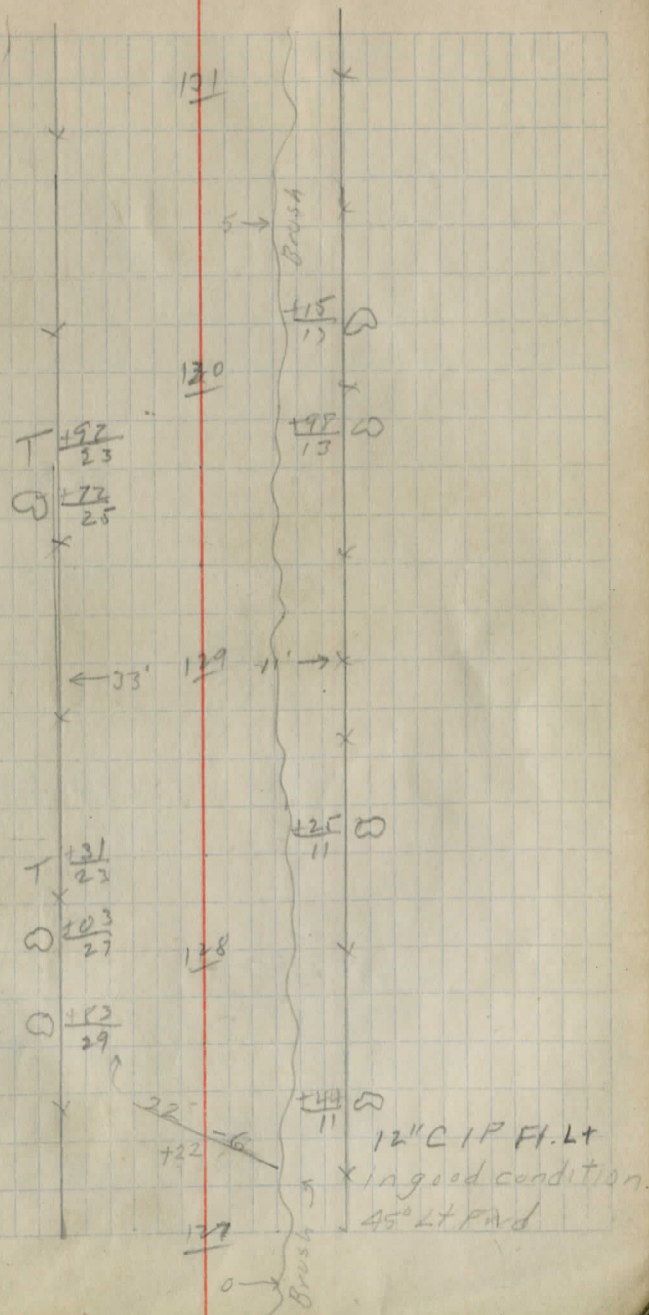
$$\begin{array}{r} x \\ \hline 14 \end{array} \quad \begin{array}{l} \\ \\ \\ \end{array} \quad \begin{array}{l} + 56 \\ \hline 14 \end{array} \quad \odot$$

$$\begin{array}{r} x \\ T + 199 \\ \hline 24 \\ x \end{array} \quad \begin{array}{l} \\ \\ \\ \end{array} \quad \begin{array}{l} 124 \\ \\ \\ \end{array} \quad \begin{array}{l} + 65 \\ \\ \\ \end{array} \quad \odot$$

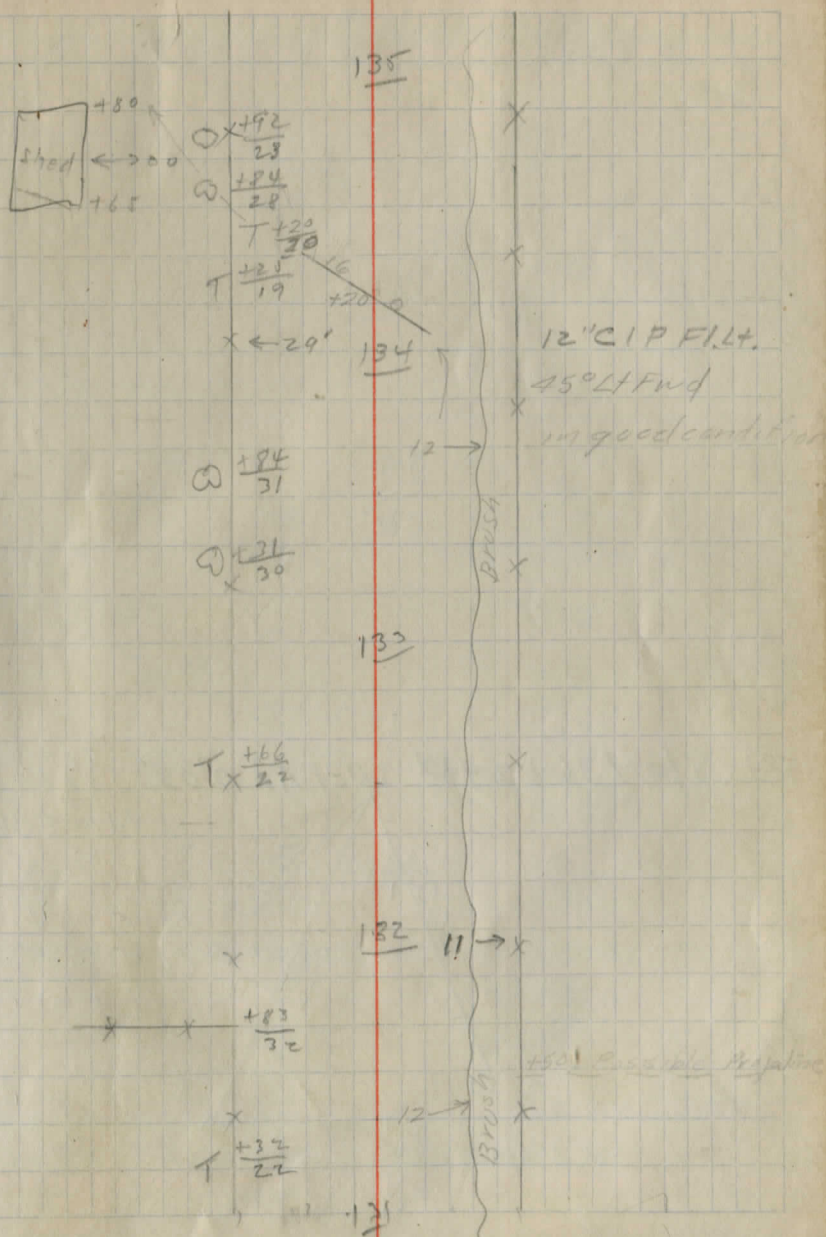
$$\begin{array}{r} \odot + 55 \\ \hline 51 \\ x \end{array} \quad \begin{array}{l} \\ \\ \\ \end{array} \quad \begin{array}{l} + 46 \\ \hline 20 \end{array} \quad \begin{array}{l} 100 \rightarrow \\ \\ \\ \end{array} \quad \begin{array}{|c|} \hline 14 \\ \hline \end{array}$$

$$\begin{array}{r} x \\ \hline 123 \\ x \end{array} \quad \begin{array}{l} \\ \\ \\ \end{array} \quad \begin{array}{l} + 16 \\ \\ \\ \end{array} \quad \odot$$

m '54
2419.1



m '50
2019.4



m 1954
767.41

PI. Sta 136+29.24

Det Rt 0°09' Iron set
Fd 10-18-51

26.93

24.11
87.62

SE Win NW
CEI (hoose pole)

SE Win NE side
24" Maple

m (54)
2419.4

P/Z
I.P.

139 24 → 0+20
22

16 → 0

0+80
25
+20
22
0+55
33

+300
12

0+85
74

138

19 →

+250
15

+55
70

0+75
72

+30
70

0+75
75

+20
70

0+75
78

+20
70

0+75
81

137

17 →

+220
70

0+75
77

0+75
78

0+75
81

0+75
84

+20
70

0+75
87

0+75
90

GONE

SE Win
15" Walnut

30 34

T+20
24
0+75
25

+35
30

0+75
22
0+75
24

GONE

30 21
SE Win
15" Apple

+20
28

0+75
26

DRIVE

+95
22

+67
22

+67
22

+67
22

+67
22

+67
22

+67
22

+67
22

+67
22

+67
22

+67
22

+67
22

139
70

240
70

448
14

135

$$\frac{87.50}{20}$$

$$\frac{87.90}{20}$$

$$\frac{87.50}{22}$$

143

$$\frac{87.25}{22}$$

$$\frac{87.50}{20}$$

$$\frac{87.25}{25}$$

$$\frac{87.50}{24}$$

$$\frac{87.50}{25}$$

$$\frac{87.50}{29}$$

$$\frac{87.50}{28}$$

$$\frac{87.50}{28}$$

$$\frac{87.50}{27}$$

$$\frac{87.50}{22}$$

$$\frac{87.50}{25}$$

$$\frac{87.50}{25}$$

$$\frac{87.50}{25}$$

$$\frac{87.50}{25}$$

$$\frac{87.50}{19}$$

142

$$\frac{87.25}{26}$$

$$\frac{87.50}{25}$$

$$\frac{220}{5}$$

141

140

$$\frac{17.76}{767.21}$$

139

15" VSD in good
condition
El. 4.

12 →

$$\frac{87.35}{22}$$

$$\frac{87.20}{22}$$

12 →

2.716 miles

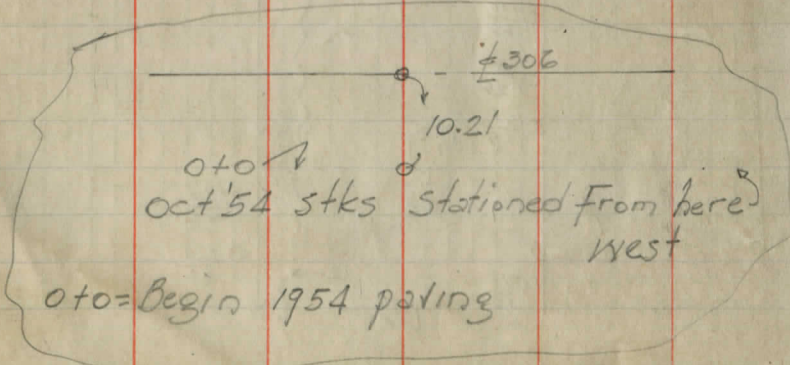
$$\begin{array}{r} 5280 \overline{) 14338.83} \\ \underline{1056} \\ 3778 \\ \underline{3696} \\ 828 \\ \underline{528} \\ 3003 \end{array}$$

Sta 143+97.06

End of Improvement

Note Sta 143+97.06 = Sta 52+48.02 of

Chilledhead Imp.



O+O Begin oil mat

10+70 end oil mat

18'-17' wide

18+40 beg oil mat ± 17'

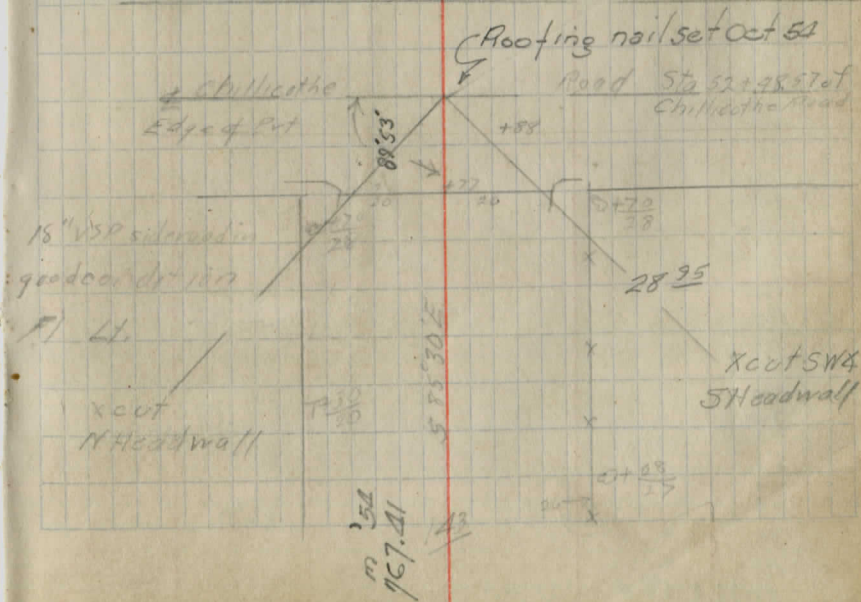
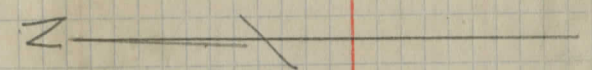
22+50 end " "

3176.6

34+0 - 36+50 rock outcrop

7+57.2
 42.8

10.21 Roof to O+O



00+00 OF THIS STAKING EQUALS STA 8+66⁸⁵

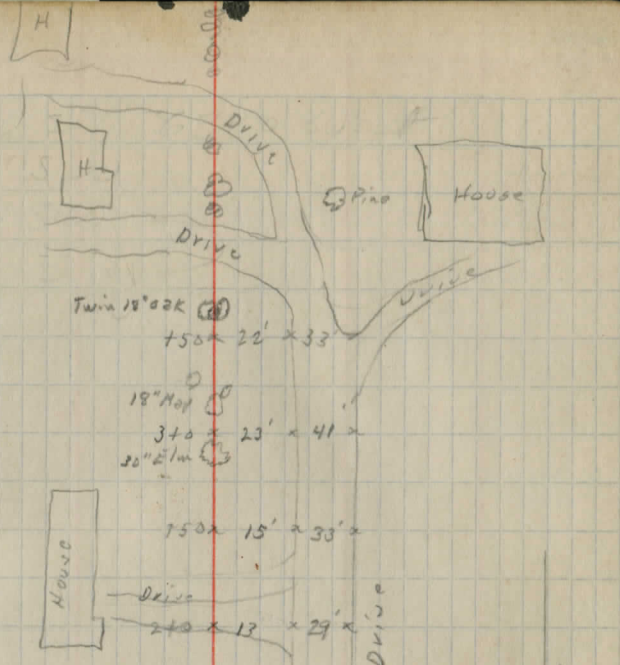
PER PAGE 2 THIS BOOK

STA	STAKES	(OFFSET MARKED) ON ALL STAKES	SOUTH STAKES
0+0	14' North		14' South
1+0			
2+0			14'
3+0			14'
4+0			14'
5+0			15'
6+0			15'
7+0			15'
8+			15'
9	15' N		
10	"		
11	"		
12	"		
13	"		
14	"		
15	"		
16	"		
17	"		
18	"		
19	"		
20	"		
21	"		
22	"		
23	"		
24	"		
25	"		
26	"		
27	"		
28	"		
29	"		
30	"		
31	"		
32	"		
33	"		
34+10	"		
35	"		
36	"		
37	"		
38			16'S
39	"		
40	"		
41+34.4	18' N	(30' W. of POINT I)	

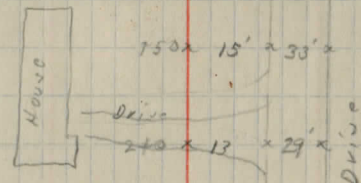
10.30

11.70

13.50



Twin 18" oak (2)
 150 x 22' x 33'
 18" Map (1)
 340 x 23' x 41'
 20" Elm (3)

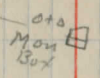


Measmts taken
 from County line

150 x 10' x 23'
 110 x 7' x 21'
 150 x 3' x 17'

Summit
 4/3/53

SR 43



Greene Co.
 Cuyahoga Co.

Petibone Road

IP

y

h

h

h

h

h

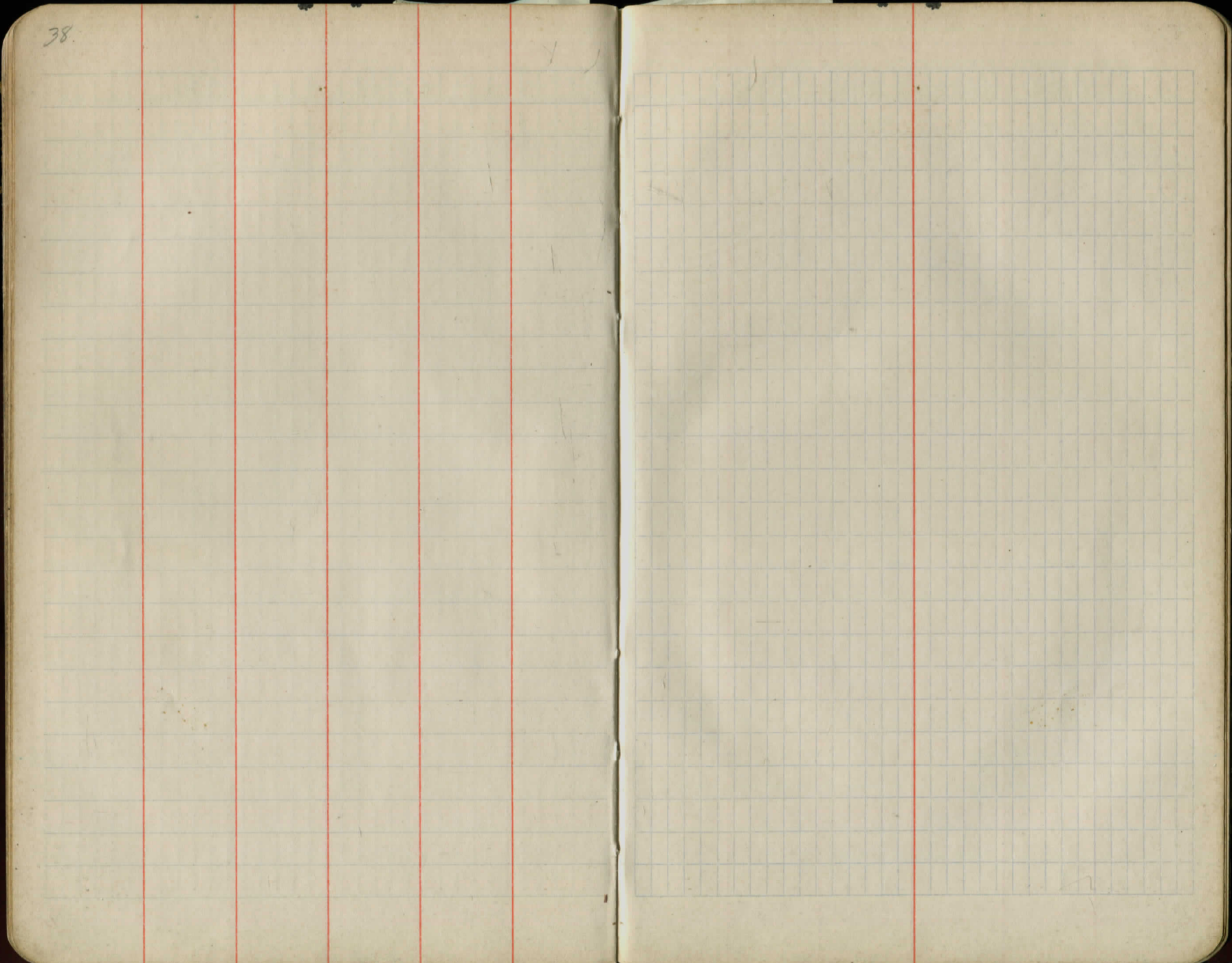
h

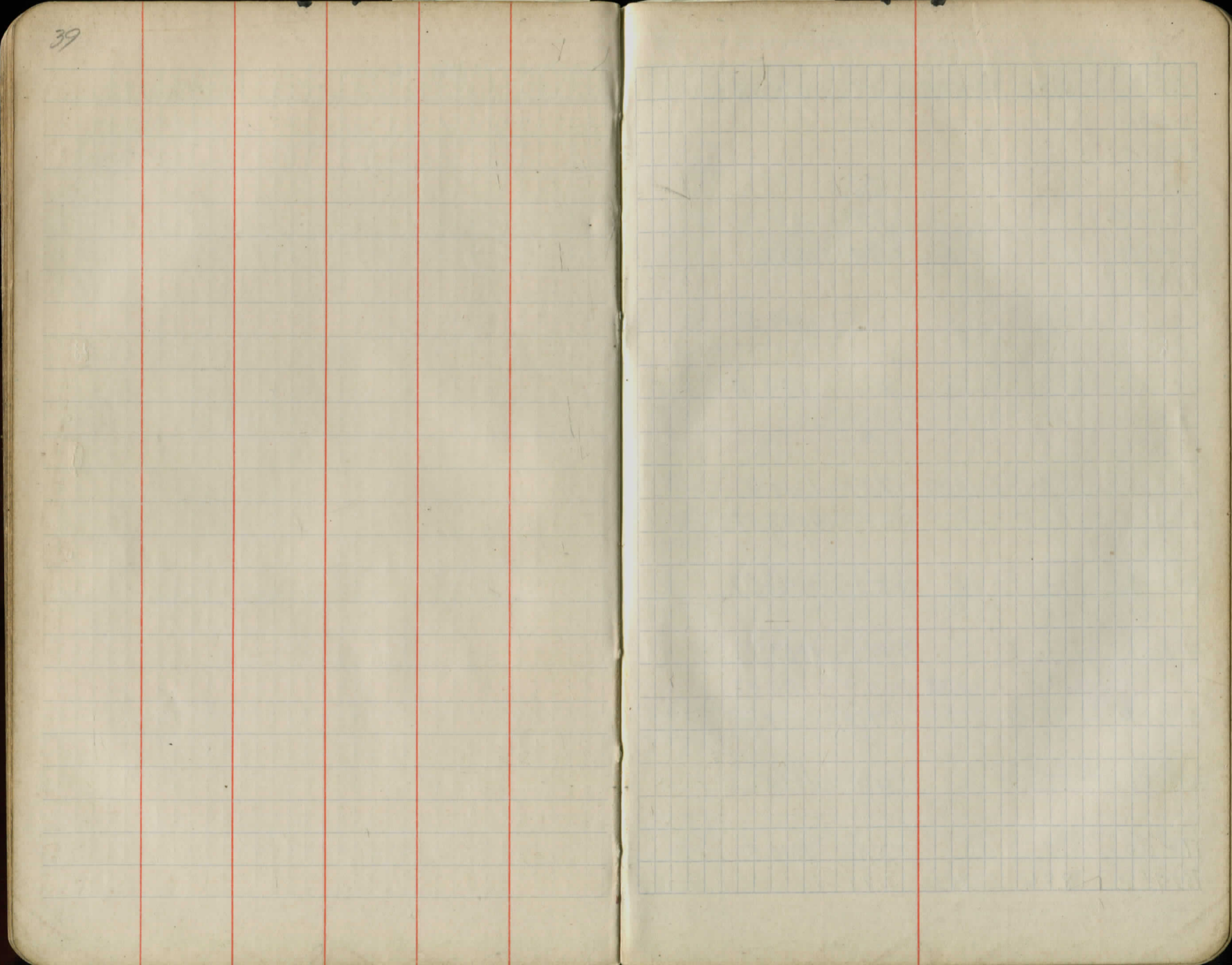
h

h

h

h





Cross Section

BM#1	0.92	1016.00		1015.08
0-20			3.5	
0-50				
0-100			7.6	
0-200			9.9	
0+00			4.4	1011.6
0+50			7.0	1009.00
1+00			8.0	1008.00
1+42				
	5.35	1013.37	7.98	1008.02
2+00			6.3	1007.07
3+00			5.1	1008.27
4+00			4.2	1009.17
	6.90	1019.33	0.94	1012.43
5+00			7.3	1012.0
6+00			4.7	1014.6
7+00			3.8	1015.5
BM#2	8.82	1025.22	2.93	1016.40 1016.40

Spike in root 24' Maple 35' Lt ± Sta 0+05

$$\frac{30}{1.5} \quad \frac{21}{1.7} \quad \frac{10}{4.8} \quad \frac{5-8}{4.6} \quad \frac{12}{3.7} \quad \frac{30}{4.5}$$

$$\frac{22}{4.4} \quad \frac{16}{5.5} \quad \frac{12}{7.6} \quad \frac{9}{7.1} \quad \frac{5}{6.2} \quad \frac{3}{7.4} \quad \frac{6.5}{6.0} \quad \frac{30}{6.5}$$

$$\frac{30}{8.3} \quad \frac{16}{8.1} \quad \frac{15}{8.6} \quad \frac{12}{8.0} \quad \frac{7}{7.7} \quad \frac{3}{8.6} \quad \frac{5.5}{8.0} \quad \frac{30}{8.2}$$

$$\frac{100}{10.9} \quad \frac{50}{10.9} \quad \frac{A.1.8}{30} \quad \frac{E.1-1}{8.9}$$

$$\frac{30}{5.9} \quad \frac{18}{5.5} \quad \frac{16}{6.3} \quad \frac{14}{5.4} \quad \frac{9}{5.1} \quad \frac{2}{5.7} \quad \frac{3}{5.4} \quad \frac{30}{5.2}$$

$$\frac{30}{5.4} \quad \frac{16}{5.7} \quad \frac{15}{6.2} \quad \frac{11}{5.2} \quad \frac{3}{5.6} \quad \frac{5}{6.1} \quad \frac{6}{5.4} \quad \frac{11}{4.7} \quad \frac{30}{4.2}$$

$$\frac{20}{2.5} \quad \frac{28}{2.1} \quad \frac{18}{2.4} \quad \frac{13}{5.2} \quad \frac{18}{4.0} \quad \frac{4}{4.6} \quad \frac{6}{5.3} \quad \frac{8}{4.7} \quad \frac{12}{3.8} \quad \frac{16}{3.0} \quad \frac{20}{2.3}$$

$$\frac{20}{5.3} \quad \frac{23}{5.1} \quad \frac{17}{2.4} \quad \frac{15}{9.0} \quad \frac{12}{7.6} \quad \frac{5}{7.0} \quad \frac{3}{7.6} \quad \frac{5}{9.0} \quad \frac{7}{7.8} \quad \frac{10}{6.8} \quad \frac{16}{5.3} \quad \frac{30}{4.6}$$

$$\frac{30}{4.8} \quad \frac{20}{4.4} \quad \frac{12}{5.4} \quad \frac{10}{5.9} \quad \frac{7}{5.2} \quad \frac{6}{5.0} \quad \frac{8}{5.7} \quad \frac{9}{5.0} \quad \frac{12}{5.3} \quad \frac{17}{4.1} \quad \frac{22}{3.6} \quad \frac{28}{3.9}$$

$$\frac{30}{5.1} \quad \frac{7}{3.8} \quad \frac{6}{4.4} \quad \frac{9}{4.0} \quad \frac{11}{3.2} \quad \frac{22}{4.2}$$

Spike in root of 30" Oak 25' Lt of Sta 7+00

1025.22

8+00		7.1	1018.1
1 st rail 8+28		5.01	1020.21
2 nd "		5.00	
3 rd "		4.85	
4 th " 8+41		4.84	1020.38
9+00		4.5	1020.7
9+60± top pipe		5.1	1020.1
10+00		2.1	1023.1
11+00		5.0	1020.2
	2.04	1023.63	3.63
12+00		3.8	1019.83
13+00		5.0	1018.63
14+00		5.4	1018.2
15+00		6.0	1017.6
	4.26	1022.48	5.41
			1018.22

$$\begin{array}{r} 30-18 \\ \hline 65 \end{array} \quad \begin{array}{r} 11 \\ \hline 50 \end{array} \quad \begin{array}{r} 3 \\ \hline 69 \end{array} \quad \begin{array}{r} 8 \\ \hline 71 \end{array} \quad \begin{array}{r} 17 \\ \hline 62 \end{array} \quad \begin{array}{r} 30 \\ \hline 53 \end{array}$$

$$\begin{array}{r} 30 \\ \hline 20 \end{array} \quad \begin{array}{r} 20 \\ \hline 1.8 \end{array} \quad \begin{array}{r} 19 \\ \hline 53 \end{array} \quad \begin{array}{r} 8 \\ \hline 48 \end{array} \quad \begin{array}{r} 16 \\ \hline 46 \end{array} \quad \begin{array}{r} 20-70 \\ \hline 59 \end{array}$$

Top pipe on R 15' Plot L 569+60±

$$\begin{array}{r} 30 \\ \hline 1.3 \end{array} \quad \begin{array}{r} 25 \\ \hline 0.9 \end{array} \quad \begin{array}{r} 17 \\ \hline 2.0 \end{array} \quad \begin{array}{r} 14 \\ \hline 31 \end{array} \quad \begin{array}{r} 5 \\ \hline 1.8 \end{array} \quad \begin{array}{r} 5 \\ \hline 2.9 \end{array} \quad \begin{array}{r} 8 \\ \hline 1.4 \end{array} \quad \begin{array}{r} 17 \\ \hline 11 \end{array} \quad \begin{array}{r} 2.3 \\ \hline -0.1 \end{array} \quad \begin{array}{r} 7.0 \\ \hline -0.3 \end{array}$$

$$\begin{array}{r} 30 \\ \hline 3.7 \end{array} \quad \begin{array}{r} 23 \\ \hline 4.1 \end{array} \quad \begin{array}{r} 15 \\ \hline 4.9 \end{array} \quad \begin{array}{r} 12 \\ \hline 5.2 \end{array} \quad \begin{array}{r} 11 \\ \hline 5.2 \end{array} \quad \begin{array}{r} 5 \\ \hline 5.0 \end{array} \quad \begin{array}{r} 8 \\ \hline 3.7 \end{array} \quad \begin{array}{r} 17 \\ \hline 4.0 \end{array} \quad \begin{array}{r} 30 \\ \hline 3.7 \end{array}$$

$$\begin{array}{r} 30 \\ \hline 3.4 \end{array} \quad \begin{array}{r} 7 \\ \hline 3.6 \end{array} \quad \begin{array}{r} 4 \\ \hline 4.1 \end{array} \quad \begin{array}{r} 11 \\ \hline 4.9 \end{array} \quad \begin{array}{r} 16 \\ \hline 3.6 \end{array} \quad \begin{array}{r} 30 \\ \hline 3.5 \end{array}$$

$$\begin{array}{r} 30 \\ \hline 4.9 \end{array} \quad \begin{array}{r} 7 \\ \hline 4.8 \end{array} \quad \begin{array}{r} 5 \\ \hline 6.0 \end{array} \quad \begin{array}{r} 4 \\ \hline 5.3 \end{array} \quad \begin{array}{r} 7 \\ \hline 5.0 \end{array} \quad \begin{array}{r} 13 \\ \hline 5.6 \end{array} \quad \begin{array}{r} 15 \\ \hline 4.9 \end{array} \quad \begin{array}{r} 30 \\ \hline 4.7 \end{array}$$

$$\begin{array}{r} 30 \\ \hline 4.2 \end{array} \quad \begin{array}{r} 9 \\ \hline 4.8 \end{array} \quad \begin{array}{r} 6 \\ \hline 6.3 \end{array} \quad \begin{array}{r} 2 \\ \hline 3.2 \end{array} \quad \begin{array}{r} 7 \\ \hline 5.0 \end{array} \quad \begin{array}{r} 13 \\ \hline 6.1 \end{array} \quad \begin{array}{r} 16 \\ \hline 5.5 \end{array} \quad \begin{array}{r} 30 \\ \hline 5.6 \end{array}$$

$$\begin{array}{r} 30 \\ \hline 3.4 \end{array} \quad \begin{array}{r} 17 \\ \hline 3.8 \end{array} \quad \begin{array}{r} 9 \\ \hline 5.8 \end{array} \quad \begin{array}{r} 7 \\ \hline 6.8 \end{array} \quad \begin{array}{r} 10 \\ \hline 5.9 \end{array} \quad \begin{array}{r} 13 \\ \hline 6.4 \end{array} \quad \begin{array}{r} 30 \\ \hline 5.3 \end{array} \quad \begin{array}{r} 30 \\ \hline 5.0 \end{array}$$

42.

102248

B4#3 4.74 102247 4.74 1017.74 1017.73
 16+00 4.6 1017.9

17+00 4.5 1018.0

18+00 4.3 1018.2

18+85 4.5 1018.0

6.08 102409 4.46 1018.01

18+85

19+00 5.9 1018.2

20+00 5.8 1018.3

21+00 5.7 1018.4

22+00 4.9 1019.2

23+00 4.5 1019.6

5.71 102618 3.62 1020.47

24+00 5.7 1020.5

25+00 4.9 1021.3

Spikeln root 12" Walnut + 25 + 25 + 16 + 20
 $\frac{30}{47} \frac{17}{52} \frac{10-9}{57} \frac{5}{52} \frac{5}{47} \frac{10}{50} \frac{12}{20} \frac{17-30}{83}$

$\frac{30}{45} \frac{12}{52} \frac{10}{60} \frac{8}{49} \frac{4}{46} \frac{9}{60} \frac{10}{50} \frac{30}{53}$

$\frac{30}{20} \frac{12}{23} \frac{11-10}{52} \frac{8}{42} \frac{4}{46} \frac{8}{39} \frac{14}{36} \frac{20}{36}$

6.18
6.3

6.5
6.0

Top bell CIP 5 18185

$\frac{100}{7.9} \frac{50}{7.8}$

$\frac{30}{6.4} \frac{15}{6.7} \frac{14}{6.9} \frac{10}{6.9} \frac{8}{6.1} \frac{5}{6.1} \frac{9}{7.1} \frac{11}{6.2} \frac{8.0}{6.7}$

$\frac{20}{4.2} \frac{12}{4.7} \frac{7}{7.1} \frac{4}{5.8} \frac{11}{5.9} \frac{14}{6.8} \frac{15}{6.2} \frac{22}{4.8} \frac{30}{4.7}$

$\frac{30}{4.1} \frac{11}{4.0} \frac{8}{6.1} \frac{5}{5.3} \frac{9}{5.6} \frac{11}{6.6} \frac{13}{6.0} \frac{30}{4.9}$

$\frac{20}{5.2} \frac{10}{5.4} \frac{8}{5.9} \frac{6}{5.2} \frac{7}{5.4} \frac{10}{6.2} \frac{11}{5.7} \frac{30}{5.4}$

$\frac{20}{5.0} \frac{10}{4.7} \frac{7}{5.0} \frac{4}{4.5} \frac{7}{5.0} \frac{9}{5.8} \frac{11}{5.1} \frac{30}{5.0}$

$\frac{20}{7.2} \frac{9}{5.7} \frac{5}{6.9} \frac{3}{5.7} \frac{7}{5.8} \frac{10}{6.9} \frac{12}{6.4} \frac{18-20}{6.9}$

$\frac{20}{4.0} \frac{19}{4.6} \frac{8}{4.9} \frac{5}{3.8} \frac{3}{4.9} \frac{8}{4.9} \frac{10}{5.9} \frac{12}{5.2} \frac{19}{5.7} \frac{30}{5.8}$

43

1026.18

26+00 3.5 1022.7

11.01 1034.33 2.86 1023.32

27+00 9.7 1024.6

28+00 5.9 1028.4

8.75 1039.08 4.00 1030.33

BM #4 4.56 1038.99 4.56 1034.52 1034.43

29+00 7.4 1031.6

30+00 5.7 1033.3

31+00 4.6 1034.4

3.82 1036.63 6.18 1032.81

32+00 4.2 1032.4

33+00 5.1 1031.5

34+00 5.5 1031.1

T.P. 5.17 1031.46

30	24	7	4	3	5	10	12	13	17	21	30
0.3	2.2	4.1	3.7		3.2	3.6	4.7	2.9	3.6	4.6	

30	23	8	4	2	7	4	8	11	13	16	23	30
5.7	5.6	7.1	9.7	10.2	9.7	9.5	9.2	11.1	9.0	8.9	5.3	5.5

30	18	9	5	4	8	11	14	21	30
4	3.4	4.3	6.5	6.1	6.0	7.1	5.1	2.7	2.5

Spike in root of 24" Elm 30' R to F Sta 28+50

30	9	6	5	6	9	16	30
7.2	6.7	8.0	7.6	7.8	8.9	5.3	4.2

30	11	8	7	4	7	10	30
5.1	4.8	6.7	5.9	5.7	6.5	5.0	3.9

30	11	8	7	6	12	30
3.9	3.5	5.2	4.7	5.5	2.8	2.4

30	13	9	7	6	7	12	30
4.2	3.9	5.2	4.6	4.4	4.9	3.6	2.3

30	11	8	6	6	8	10	30
6.7	5.6	6.2	5.3	5.3	5.9	5.2	5.4

30	10	8	4	7	10	16	30
6.0	6.2	6.5	5.7	5.4	6.5	6.0	5.8

20+10 Rock 15' R to +E

44

Dec 20 Richey Goodview
Rand
Barton

103146

T.P. 4.45 1035.91

35+00 5.7 1030.2

36+00 7.8 1028.1

37+00 9.1 1026.8

4.91 1031.95 8.87 1027.04

38+00 5.5 1026.45

38+18 5.6 1026.35

39+00 4.8 1027.15

BM# 5 9.13 1032.13 3.94 1028.01 1028.00

40+00 5.3 1028.83

41+00 4.9 1032.23

7.66 1043.77 10.2 1036.11

42+00 7.5 1036.21

43+00 5.0 1038.77

44+00 4.7 1039.07

$$\frac{20}{2.6} \frac{8}{5.1} \frac{5}{6.7} \frac{3}{5.8} \quad \frac{7}{5.9} \frac{10}{6.7} \frac{15}{5.3} \frac{30}{5.5}$$

$$\frac{20}{3.2} \frac{11}{4.7} \frac{3}{8.5} \frac{1}{7.9} \quad \frac{10}{8.0} \frac{12}{8.8} \frac{17}{7.1} \frac{30}{7.4}$$

$$\frac{20}{4.2} \frac{26}{4.7} \frac{10}{7.4} \frac{3}{9.8} \frac{1}{9.1} \quad \frac{12}{9.0} \frac{14}{9.7} \frac{16}{9.1} \frac{30}{9.2}$$

$$\frac{20}{3.5} \frac{6}{5.0} \frac{3}{6.5} \frac{1}{5.8} \quad \frac{7}{5.6} \frac{11}{6.8} \frac{13}{5.6} \frac{30}{8.9}$$

$$\frac{11}{9.3} \quad \frac{12}{7.9} \frac{50}{12.6}$$

1024.6
1024.0

$$\frac{38}{2.5} \frac{8}{4.8} \frac{5}{6.2} \frac{2}{4.7} \quad \frac{8}{4.8} \frac{12}{6.2} \frac{17-19}{8.5} \frac{30}{7.7}$$

Spike in spot of 18" E/M 30' RT of Sta 29+70

$$\frac{30}{3.6} \frac{12}{7.4} \frac{7}{10.2} \frac{5}{8.4} \quad \frac{8}{8.6} \frac{10}{8.7} \frac{12}{7.6} \frac{30}{7.8}$$

$$\frac{30}{6.6} \frac{11}{7.2} \frac{8}{6.3} \frac{5}{5.2} \quad \frac{6}{4.8} \frac{9}{6.1} \frac{13}{7.7} \frac{30}{7.7}$$

$$\frac{20}{3.3} \frac{11}{5.5} \frac{7}{8.7} \frac{5}{7.5} \quad \frac{7}{7.7} \frac{9}{8.4} \frac{12}{6.4} \frac{14-30}{5.7}$$

$$\frac{30}{4.7} \frac{11}{5.4} \frac{9}{7.1} \frac{6}{3.2} \quad \frac{8}{5.4} \frac{11}{6.2} \frac{12}{6.0} \frac{30}{5.7}$$

$$\frac{30}{5.8} \frac{10}{5.3} \frac{8-7}{5.0} \frac{5}{4.1} \quad \frac{7}{4.6} \frac{11}{6.0} \frac{15}{5.5} \frac{30}{4.3}$$

200# per sq. ft.

1800# per lin ft.

24

36000

4700

24 20700

144 00

16820700

102

15

1043.77

45+00 3.6 1040.17

5.78 1046.76 2.79 1040.78

45+70 4.8 1041.96

46+00 5.8 1040.96

46+93 7.5 1039.26

47+00 7.5 1039.26

BM #6 3.96 1046.76 3.96 1042.80 1042.73

48+00 7.5 1039.26

3.56 1042.95 7.37 1039.39

49+00 4.3 1038.65

49+98 5.8 1037.15

50+00 5.8 1037.15

50+31 6.5 1036.45

50+51 6.7 1036.7

T.P. 5.65 1043.88 5.52 1037.43

BM #7 3.59 1039.42 1039.50

30	11	6	7	7	11	12	30
52	16	40	43	56	48	22	22

30	12	8	8	10	14	30
35	37	52	55	64	47	

30	11	7	5	7	9	13	17	30
51	44	67	61	67	70	48	46	48

114	118	50
9.7	9.9	12.4

30	10	7	4	9	10	11	30
52	53	57	76	77	85	78	54

split 10' out 18' from 30' Lt & 57' 47' 35'

30	11	7	4	10	12	18	30
54	54	51	76	81	66	57	62

30	11	8	6	7	9	12	30
58	43	55	46	47	54	46	48

115	119	50
6.9	8.5	10.3

30	15	12	9	16	30
24	6.9	5.6	8.5	46	5.4

30	10	50	51	100	200
2.9	4.3	4.8	8.6	9.6	10.5

386 39.1

343 33.3

115
7.5

113	50
9.4	10.5

35.4

33.5

split 10' out 31' from 30' Lt & 57' 54' 40'

BM #7	4.88	1044.38	1039.50	
51+00			6.9	1037.48
52+00			6.9	1037.98
BM #7	3.89	1043.39	1039.50	
53+00			4.4	1038.99
54+00			5.0	1038.39
54+35			4.8	1038.59
55+00			5.2	1038.19
55+70			4.9	1038.49
56+00			5.5	1037.89
57+00			9.6	1039.49
	2.51	1033.44	12.26	1031.13
BM #8	1.41	1033.39	1.41	1032.03
58+00			10.2	1023.2
	0.37	1021.34	12.22	1020.97
58+50			6.8	1014.54

$$\frac{30}{20} \quad \frac{16}{82} \quad \frac{11}{8.7} \quad \frac{7}{70} \quad \frac{5}{73} \quad \frac{7}{81} \quad \frac{11}{68} \quad \frac{30}{76}$$

$$\frac{30}{52} \quad \frac{14}{50} \quad \frac{10}{76} \quad \frac{7}{86} \quad \frac{1}{52} \quad \frac{6}{73} \quad \frac{11}{52} \quad \frac{29}{52} \quad \frac{30}{87}$$

$$\frac{30}{37} \quad \frac{17}{35} \quad \frac{2}{62} \quad \frac{2}{47} \quad \frac{3}{40} \quad \frac{3}{47} \quad \frac{5}{53} \quad \frac{2}{38} \quad \frac{30}{35}$$

$$\frac{30}{47} \quad \frac{12}{53} \quad \frac{9}{63} \quad \frac{6}{53} \quad \frac{1}{47} \quad \frac{6}{34} \quad \frac{8}{63} \quad \frac{11}{58} \quad \frac{30}{60}$$

$$\frac{E1.4}{6.5} = 370$$

$$\frac{E1.0}{6.5} = \frac{50}{7.4} = \frac{100}{90} = 36.5$$

$$\frac{30}{43} \quad \frac{18}{50} \quad \frac{10}{60} \quad \frac{7}{33} \quad \frac{6}{46} \quad \frac{7}{59} \quad \frac{10}{56} \quad \frac{30}{56}$$

$$\frac{30}{23} \quad \frac{14}{44} \quad \frac{12}{36} \quad \frac{3}{47} \quad \frac{2}{52} \quad \frac{5}{50} \quad \frac{8}{48} \quad \frac{30}{30}$$

$$\frac{30}{34} \quad \frac{17}{43} \quad \frac{11}{63} \quad \frac{3}{52} \quad \frac{4}{68} \quad \frac{7}{50} \quad \frac{30}{32}$$

$$\frac{30}{60} \quad \frac{18}{63} \quad \frac{11}{102} \quad \frac{2}{99} \quad \frac{3}{110} \quad \frac{11}{65} \quad \frac{30}{60}$$

Sp. c. min. #30 1/2 Cherry 25.84 of L 57.5 7+90
level $\frac{30}{12} \quad \frac{11}{11.4} \quad \frac{9}{10.7} \quad \frac{3}{9.9} \quad \frac{3}{10.2} \quad \frac{6}{11.9} \quad \frac{16}{25} \quad \frac{30}{30}$

$$1011 \quad \frac{32}{77} \quad \frac{20}{0.4} \quad \frac{16}{75} \quad \frac{10}{62} \quad \frac{3}{78} \quad \frac{5}{51} \quad \frac{20}{40} \quad \frac{30}{0.3} \quad \text{some}$$

1028.4

		1021.34		
59400		14.3	1007.0	
	0.76	1009.78	12.32	1008.02
	0.20	997.29	12.69	997.09
59487		2.0	995.29	
60400		3.2	994.1	
60470		12.0	985.29	
	0.60	985.46	12.43	984.86
61400		6.3	979.2	
61459	7.19	985.41	7.19	978.27 978.22
	0.57	972.92	13.06	972.35
61450		14	971.32	
62400		7.4	965.5	
	1.52	961.38	13.06	959.84
63400		5.6	955.8	
63450		9.2	952.18	
64400		11.4	950.0	
	1.87	952.25	11.00	950.38
65400		4.8	947.4	

40	30	15	12	11	3	6	17	30
35	52	112	159	147	133	140	149	139

1217.8

2120	4.12	25	10
28	4.6	58	125

92.7

1244	32	12	7	5	5	2	11	25	38
	27	-0.3	40	32	32	43	31	46	14.3
	1000.2	997.5							

1013	40	20	5	3	8	13	30
	21	2.1	12.4	11.7	12.2	7.7	11.3

32	21	13	10	4	7	30
20	2.1	7.6	6.3	7.0	3.5	7.9

Springer cut 18" Hickory 30' St. of E. St. 6/15/55

40	18	6	13	5	11	13	27
40	0.5	2.7	1.5	3.0	-1.5	-1.9	-0.9

43	12	9	5	6	11	17	30
39	8.1	7.3	7.7	8.6	13	31	46

Top rock 14' 4" long St. 12+60 15' 2" 4

35	25	8	5	6	9	12	24	30
-7.5	-6.3	5.4	5.7	7.5	0.3	-3.0	-1.8	

40	30	18	9	7	7	10	11	12	30
40	-30	45	97	9.0	12	102	96	77	87

25	13	11	9	10	18	30
120	11.4	11.9	11.1	12	123	130

30	10	23	30
5.1	5.1	6.1	8.3

95225

66+00			5.9	946.45	
BM #10	3.28	95216	3.28	945.97	945.97
Floor W			2.3	947.9	
Seat W			3.3	948.9	
Floor E			2.0	950.2	
Seat E			3.4	948.8	
Floor W			1.35	938.7	
Floor E			11.0	941.2	
Floor E			11.4	940.8	
Floor E			10.7	941.5	
67+00			3.6	948.56	
68+00	11/3/30			949.0	
68+00			6.1	946.1	
4 1/2" water dibn's				946.0	
69+00			5.7	946.46	
	10.05	957.10	6.11	947.55	
70+00			8.5	948.60	
BM #11	7.38	957.09	7.38	947.72	949.71
71+00			5.9	951.19	
72+00			1.7	955.39	
	12.73	969.64	9.28	956.81	
73+00			7.7	962.14	

30

14

28

63

9.9

9.6

X cut in concrete abutment SW of bridge seat
15' 4" x 5' 6" 66+40

30

13

7

7

21

53

53

3.9

3.7

7.6

Total

30

13

7

3

7

9

15

58

51

70

62

66

71

95

Total

30

9

3

9

30

62

60

60

62

59

30

7

5

6

9

11

28

76

87

87

89

101

99

93

Spillway cut 36' deep 16' 30" wide 5' 6" 70+10
30 13 7 3 6 7 10 23 32
45 45 61 70 82 10 24 58 70 83

30

11

7

3

3

9

14

30

72

12

57

70

77

78

79

70

65

30

9

7

6

10

12

30

50

26

20

70

77

74

35

32

49

969.54

74+00 2.5 967.04

12.81 981.63 0.66 968.88

74+00 12.1 969.59

75+00 9.8 971.89

75+60 8.9 973.29

76+00 7.0 974.69

13.32 992.02 2.99 978.70

5M¹² 986 992.81 9.56 982.15

77+00 6.2 983.81

78+00 1.8 990.21

926 999.73 1.59 994.87

78+50 12.7 987.03

79+00 13.5 981.23

79+50 7.1 992.63

79+70 5.5 994.23

80+00 4.1 995.6

84¹³ 10.76 1022.08 1.43 998.30

18215

18832

30	8	7	4	5	4	10	25
72	22	36	25	30	34	24	16

30	23	11	7	5	4	6	10-30
35	39	58	12.7	119	12.7	120	14.7

3.0	18	14	11	8	2	4	23-30
53	75	84	100	93	104	97	12.4

33	13	9	7	6	22-30	
66	77	91	52	85	96	

35	20	11	8	5	5	8	14-30
0.7	44	37	77	71	76	71	50

Split into 30 Maple 35 L+E 57 76+10

30	24	4.9	6	9	82	87	75	22-30
70	41							

50	15	7	4	5	13	20
73	51	21	27	12	23	20

28	17	16	11	3	7	4	30
92	127	76	113	117	173	190	170

35	26	15	11	4	4	6	19	25
20	27	108	104	105	156	132	148	126

35	26	15	11	9	3	7	15	24	30
23	06	37	71	69	77	74	67	86	100

3.9	3.9	3.9	6	4.2	6.1	2.6	1.0
99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0

27-35	23	14	8	5	7	30
7.8	56	60	43	43	54	81

27-35	23	14	8	5	7	30
7.8	56	60	43	43	54	81

27-35	23	14	8	5	7	30
7.8	56	60	43	43	54	81

27-35	23	14	8	5	7	30
7.8	56	60	43	43	54	81

27-35	23	14	8	5	7	30
7.8	56	60	43	43	54	81

100908

80+50 7.7 1001.38

81+00 3.5 1005.6

12.32 1013.74 1.46 1007.62

81+50 9.3 1010.64

82+00 3.5 1016.44

12.34 1031.61 0.67 1019.27

83+00 6.3 1025.31

12.72 1042.61 1.72 1027.89

BM #14 2.67 1044.64 2.67 1037.94 103997

84+00 6.1 1036.54

Pick up 1056 84+35 2.5 1040.14

11.68 1054.34 -0.02 1042.66

85+00 8.6 1045.74

86+00 4.0 1050.34

9.45 1062.54 1.25 1053.09

86+74 6.3 1056.24

87+00 5.3 1057.24

10.95 1072.07 1.42 1061.12

88+00 3.7 1068.67

6.99 1078.26 0.10 1071.97

BM #15 1.56 1077.40 1077.38

30	26	24	16	8	7	8	18	23-30
13	167	100	91	65	75	93	92	155

34-30	27	12-13	11	9	6	7	10-11	27-40
107	82	35	43	34	38	44	26	106

30-18	8	6	6	7-8	18	12-17
17	106	93	100	92	134	170

30	22	18	10	5-6	22
53	78	48	79	22	82

Some slugs to 30

30	24	11	8	7	6	12	22	30
17	22	74	63	64	73	47	57	84

Spike in root 10" Maple 30' Lt & 5' to 83+80

20	17	9	7	4	7	12	23
23	28	69	62	82	71	38	43

30-15	10	8	3	6	10	23
68	141	88	91	109	73	75

30-17	12	10	3	6	8	22
13	50	44	45	58	25	22

100	30	30	100	200
1.8	35	59	47	20

30	17	7	6	15	21	32
2.3	30	37	38	77	53	53

30	21	9	6	8	12	18	20
89	10	42	39	39	48	20	24

Spike in root 48" Maple 35' Lt & 5' to 88+30

BW #15	12.68	1090.06		1077.38
88+75			10.5	1079.56
89+00			9.9	1086.16
89+70	Rock overlap		4.7	1085.36
90+00			3.1	1086.96
	12.38	1101.85	0.54	1082.52
91+00			8.1	1093.75
92+00			3.1	1078.8
TP	6.80	1107.80	0.85	1101.10
93+00			7.0	1100.80
94+00			5.8	1102.00
95+00			4.1	1103.7
96+00			3.6	1104.20
96+30			2.7	1105.10
	2.01	1105.46	4.35	1103.45
97+00			2.7	1102.76
97+30			2.4	1102.06

30	20	14	7	4	7	11	R	R	30
78	101	114	112	104	111	121	112	115	118

	30	14	10	10	12	20	10
	83	74	102	108	104	113	111

5-21-80

	30	14	10	4	5	9	12	78-30
	13	24	32	37	30	37	37	27

30	25	R	R	R	R	R	R	30
64	61	70	72	86	82	90	91	89

Rock 6' down

23	12	7	10	13	30
73	75	28	22	31	34

Top of 4' 11" 11" Henston - 25' R - 25' 927-40

30	25	19	9	7	12	20
52	52	72	37	73	58	65

	29	32	12	5	3	30
10-7	59	61	60	64	44	50

30	20	21	14	17	3	6	30
level 35	75	72	72	36	48	31	32

39	25	20	12	9	4	7	30
level 89	35	32	25	30	38	21	24

30	17	20	16-10	R	7	30
level 83	33	33	25	27	13	16

	30	25	10	4	6	30
level	67	31	18	22	09	

30-29	12	15-10	3	4	30
level 31	38	32	32	20	20

		1141.25			
BM #18	12.15	1141.24	12.15	1129.10	1129.09
107+00			8.1	1133.1	
	12.20	1153.23	0.91	1140.33	
108+00			8.8	1144.4	
109+60			31	1150.1	
	11.28	1163.85	0.66	1152.57	
109+00			12.0	1151.9	
BM #19	6.21	1163.87	6.21	1157.64	1157.66
110+00			6.6	1157.3	
	11.66	1173.47	2.06	1161.81	
111+00			9.9	1163.6	
112+25			7.7	1165.8	
113+00			6.2	1167.3	
113+00			4.0	1169.5	
114+00			7.0	1166.5	
115+00			8.2	1165.3	
BM #20			9.28	1164.19	1164.17

Splice in roof 15" Beech 35' Lt & 5 1/2 106+50

30-26	17	14	6	3	8	10	30
59	85	77	74	73	80	75	66

30	20	16	11	3	10	30
63	71	86	72	102	90	91

30	20	17	14	3	7	18	30
38	40	47	33	38	34	35	33

100/100

30	20	18	5	3	6	9	30
100	100	126	129	133	121	106	106

Splice inside 18" Maple 35' Lt & 5 1/2 109+90

30	25	22	20	7	6	30
58	66	92	79	81	88	67

30	22	18	15	6	5	8	30
80	89	74	87	107	117	85	76

30	24	20	18	7	4	8	30
85	78	92	74	84	94	72	79

30	25	21	18	5	1	3	14	30
44	76	85	80	80	86	37	41	46

100/100

25	25	19	9	6	10	30
48	61	49	38	62	33	28

30-26	23	22	18	5	3	10	30
66	75	80	73	69	79	59	57

30	21	18	7	4	14	30
88	88	76	77	81	72	72

Splice in roof 15" Maple 35' Lt & 5 1/2 105+30

BM [#] 20	2.71	1166.88		1164.17
116+00			2.8	1164.08
117+00			4.6	1162.3
117+80				
118+00			6.4	1160.5
119+00			6.1	1160.8
	0.46	1162.44	4.90	1161.28
120+00			3.1	1159.3
121+00			3.5	1158.9
122+00			5.6	1156.8
123+00			7.0	1155.4
BM [#] 27	0.22	1159.03	3.61	1158.83
BM [#] 21			3.24	1155.79
124+00			5.4	1153.6
125+00			6.3	1152.7
126+00			8.7	1150.3

$\frac{20}{50}$	$\frac{21}{86}$	$\frac{4}{27}$	$\frac{6}{24}$	$\frac{4}{30}$	$\frac{13}{18}$	$\frac{27}{08}$	—	—
—	$\frac{21-26}{45}$	$\frac{31}{49}$	$\frac{17}{52}$	$\frac{4}{43}$	$\frac{5}{49}$	$\frac{10}{37}$	$\frac{30}{31}$	—
		$\frac{25}{28}$	$\frac{41}{67}$	$\frac{41}{67}$				
					11602			
—	$\frac{30}{63}$	$\frac{18}{63}$	$\frac{15}{53}$	$\frac{3}{54}$	$\frac{5}{62}$	$\frac{12}{49}$	$\frac{30}{48}$	
$\frac{20}{56}$	$\frac{22}{61}$	$\frac{18}{59}$	$\frac{16}{64}$	$\frac{14}{53}$	$\frac{3}{53}$	$\frac{2}{67}$	$\frac{5}{33}$	$\frac{14}{30}$
								$\frac{30}{46}$
		$\frac{30-12}{17}$	$\frac{17}{32}$	$\frac{10}{24}$	$\frac{3}{21}$	$\frac{1}{52}$	$\frac{7}{11}$	$\frac{18-30}{88}$
$\frac{20}{51}$	$\frac{25}{56}$	$\frac{21}{53}$	$\frac{18}{43}$	$\frac{6}{45}$	$\frac{3}{50}$	$\frac{12}{21}$	$\frac{22-30}{32}$	
$\frac{20}{49}$	$\frac{24}{57}$	$\frac{21}{57}$	$\frac{12}{41}$	$\frac{7}{81}$	$\frac{5}{57}$	$\frac{20-30}{46}$	$\frac{30}{46}$	
$\frac{30}{65}$	$\frac{25}{70}$	$\frac{3}{80}$	$\frac{21}{73}$	$\frac{8}{74}$	$\frac{6}{84}$	$\frac{2}{72}$	$\frac{15}{57}$	$\frac{30}{53}$
Spite in rd 18" pipe 36'4" ± Sta 123+60								
$\frac{30-24}{48}$	$\frac{24}{87}$	$\frac{21}{73}$	$\frac{19}{51}$	$\frac{7}{43}$	$\frac{5}{41}$	$\frac{3}{41}$	$\frac{6}{52}$	$\frac{30-30}{58}$
$\frac{30-26}{70}$	$\frac{21}{98}$	$\frac{18}{59}$	$\frac{7}{48}$	$\frac{5}{46}$	$\frac{3}{77}$	$\frac{3}{52}$	$\frac{22}{57}$	$\frac{30}{56}$

115703

127+00	1.82	115240	8.45	115058
127+22			27	1149.7
127+40			33	1149.1
128+00			6.5	1145.9
129+00			2.4	1143.0
130+00	2.12	114328	11.24	1141.6
131+00			3.0	1140.3
131+00			2.1	
131+00			6.2	1137.1
132+00			7.6	1135.7
133+00			10.1	1133.2
134+00	4.3	113816	9.15	1134.1
134+00			4.7	1133.3
134+20				
135+00			9.7	1133.5
135+22	6.17	113808	2.7	1133.297

20	22	20	7	4	3	10	15	25	30
25	27	30	29	35	27	31	23	3.0	25

27	26	21
24	26	43

20	28	20	22	5	11	30	—
31	31	21	31	27	30	34	—

20	27	25	20	17	6	3	8	11	30
31	20	28	28	26	24	40	38	27	—

20	26	22	22	3	3	2	6	30	—
24	27	22	101	107	24	22	20	—	—

30	21	19	16	4	2	12	30
1.5	17	20	2.2	1.9	26	17	30

30	24	19	17	2	3	7	12	30
30	25	29	53	48	39	32	30	—

30	22	16	11	7	1	2	10	15	30
57	29	21	22	26	21	48	45	45	—

30	18	16	14	2	1	2	8	30	—
20	26	29	21	20	31	20	24	22	—

20	19	17	15	8	1	3	12	30
23	22	27	27	28	37	21	22	30

20	20	21	6	21
27	28	29	25	25

1130.3 1131.7

30	16	1	4	10	15	30
58	29	25	45	40	25	—

101 24 21 30 1 + 5% 135 + 30.7

136+00	1.2	1135.5	5.4	1132.7
136+70			8.3	1129.8
137+00			11.7	1126.4
	0.04	1126.20	11.92	1126.16
138+00			10.6	1115.6
	1.99	1115.28	12.36	1113.84
139+00			10.1	1105.2
	0.47	1107.12	8.35	1106.95
140+00			7.5	1099.9
141+00			10.8	1096.6
	8.45	1103.93	11.94	1095.48
141+89			8.0	1095.9
141+70			8.4	1095.5
142+00			8.3	1095.6
143+00			6.1	1097.8
143+50			6.7	1097.2
143+77			7.7	1096.2

$$\frac{50}{63} \frac{16}{57} \frac{9}{49} \frac{1}{42} \frac{13}{33} \frac{30}{30}$$

$$\frac{30}{50} \frac{20}{78} \frac{16}{72} \frac{15}{72} \frac{3}{72} \frac{3}{33} \frac{12}{21} \frac{30}{18}$$

$$\frac{30}{54} \frac{12}{76} \frac{14}{111} \frac{11}{109} \frac{3}{106} \frac{4}{75} \frac{12}{51} \frac{30}{30}$$

$$\frac{50}{71} \frac{16}{81} \frac{13}{111} \frac{10}{106} \frac{4}{109} \frac{7}{116} \frac{8}{103} \frac{15}{83} \frac{30}{94}$$

$$\frac{30}{53} \frac{21}{50} \frac{16}{65} \frac{12}{107} \frac{10}{79} \frac{3}{99} \frac{5}{101} \frac{7}{109} \frac{13}{70} \frac{30}{72}$$

$$\frac{30-23}{40} \frac{14}{41} \frac{13}{89} \frac{3}{80} \frac{5-6}{8.2} \frac{10}{8.4} \frac{30}{64}$$

$$\frac{30}{132} \frac{12}{125} \frac{11}{110} \frac{30}{132}$$

Investigation → $\frac{25}{12.5}$ $\frac{30}{11.8}$ $\frac{11}{120}$ level
10920 1091.9

$$\frac{30}{82} \frac{24}{77} \frac{12}{75} \frac{14}{98} \frac{10}{75} \frac{8}{99} \frac{14}{97} \frac{18-30}{112}$$

$$\frac{30-21}{65} \frac{10}{63} \frac{6}{94} \frac{6}{85} \frac{4}{86} \frac{8}{95} \frac{11}{80} \frac{14}{76} \frac{10}{56} \frac{30}{33}$$

$$\frac{30}{23} \frac{15}{22} \frac{7}{13} \frac{6}{68} \frac{3}{71} \frac{9}{65} \frac{11}{70} \frac{13}{57} \frac{18}{56} \frac{18}{23} \frac{30}{23}$$

$$\frac{30}{73} \frac{25}{76} \frac{17}{76} \frac{6}{77} \frac{10}{76} \frac{11}{72} \frac{15}{58} \frac{18}{22} \frac{25-30}{79}$$

$$\frac{6}{11.3} \frac{4}{8.1} \frac{6}{90} \frac{6}{27} \frac{4}{69} \frac{11}{102}$$

57

143+97

1103.23

85

1095.4

BM #23

2.02

1101.9 / 1101.83

BM #24

8.12

1025.81

150	30	70	150
16.3	100	70	3.7

Spike in root 18" Maple 25 ft E Sta 143+70

X-cut in concrete SW & N headwall

culvert 20 ft E Sta 143+75

98

11/3/31

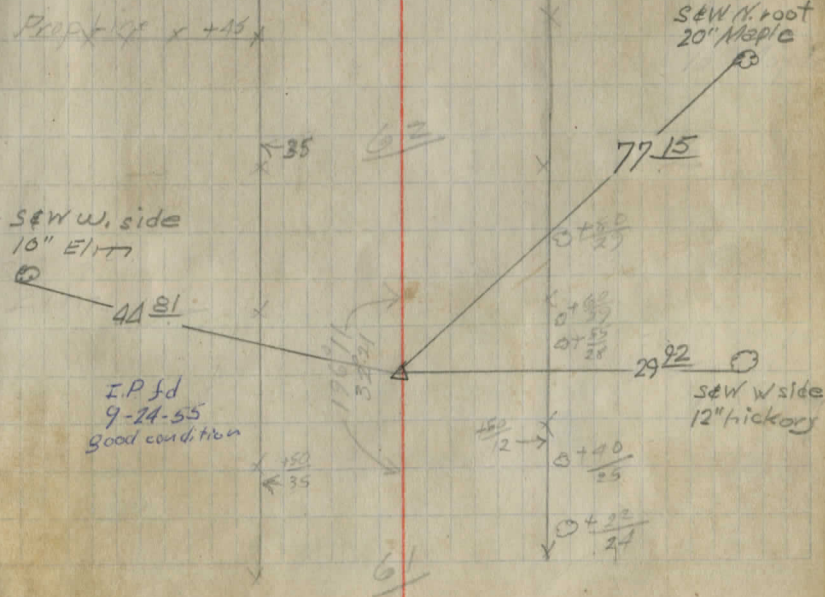
Hickory
C. pond
R. Good
R. Richy

Line B Location
Relocation Sta 61+15.56 to Sta 67+64.38
Side slopes set 30' RT or South

$\Delta = 16^{\circ}11' R$	61+15 = 0°00'
$D = 18^{\circ}$	750 = 3°06'
$T = 45.27$	+555 = 3°12'
$E = 3.2$	62+10 = 7°36'
$L = 89.91$	+555 = 8°06'
$PC = 61+15.56$	
$PT = 62+05.47$	

Sta 61+60.83 PI Det RT 16°11'

Sta 61+15.56 Line B =
Sta 61+15.56 Line A



Line B Cross Sections

Station	Distance	Section	Elevation
61+50	2.0' RT	970.8	of sections Line A
62+00	3.3 RT	965.5	
62+50	1.0 RT		
63+00	8.8 LT	956.0	
63+50	12.2 LT	953.5	
64+00	602	948.88	95490
63+75	40	950.70	
64+20	5.3	949.6	
64+50	25	945.40	
65+00	10.7	944.20	
65+25	28	945.1	
64+10	231	946.89	95169
65+57	8.5	943.19	
65+64	11.9	939.79	

X cot in concrete W abutment SW 8' seat

60' LT ± 5 to 65+65

30	12	7	2	12	17	18	25-30
19	3.5	2.9	5.0	4.2	9.1	5.1	4.7

50	22	14	12	2	12	18	26	35
6.0	4.9	5.3	5.9	5.0	5.2	5.9	7.0	8.5

30	14	7	30
67	69	23	104

50-35	30	16	25-30
9.5	11.2	12.3	9.1

30	20	30
10.3	9.7	10.5

30	30
7.8	8.5

30	20
11.5	11.5

951.67

65+93

10.7

948.99

66+80

8.7

942.99

66+20

5.9

945.70

67+00

5.0

946.69

McFarland 4 Barrell

BM 2.90

outlets N to S

11.07

11.52

11.60

11.58

Wend plank mat 18's

10.97

of N end

Wend mat 5 end

12.03

T.P. 1.19

4.32

Inlet N to S

11.35

11.30

11.15

11.25

10-19-54

 $\frac{30}{11.3}$ $\frac{30}{10.1}$ $\frac{30}{70}$ $\frac{30}{75}$ $\frac{30}{84}$ $\frac{16}{70}$ $\frac{9}{58}$ $\frac{10}{76}$ $\frac{13}{58}$ $\frac{30}{60}$ $\frac{30}{50}$ $\frac{20}{50}$ $\frac{17}{64}$ $\frac{15}{57}$ $\frac{2}{50}$ $\frac{4}{68}$ $\frac{10}{42}$ $\frac{28}{43}$

62

Y

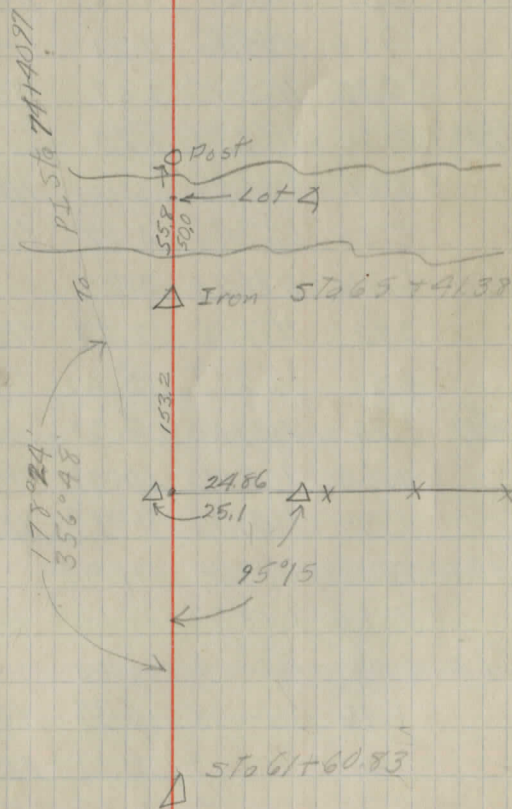
The right page of the notebook features a grid of 20 columns and 20 rows. A vertical red margin line is positioned on the left side of the grid, approximately one-fifth of the way across the page. The grid is composed of light blue lines on a cream-colored background.

63

Check Levels Between

4.3.11.29

BM ^F 4	2.75	1035.15		1034.40
	1.81	1022.11	12.21	1022.30
	2.14	1022.21	3.65	1022.97
	4.46	1022.43	4.50	1022.97
BM ^F 3			4.73	1027.10
				1027.3



69

2/26/29

Rand
Barton
Godrich

B.M. Level Circuit

B.M.#23

1101.89 1101.83

2.63 1104.46

12.70 1113.13 4.03 1100.43

12.12 1123.51 1.74 1111.39

12.86 1136.05 0.32 1123.19

B.M.#22

5.53 1138.50 3.08 1132.97

9.14 1146.51 1.13 1137.37

9.56 1154.86 1.21 1145.30

6.92 1160.10 1.68 1153.18

B.M.#21

2.51 1161.32 1.29 1158.81

8.07 1166.28 3.11 1158.21

5.80 1167.46 4.62 1161.66

B.M.#20

6.86 1171.03 3.29 1164.17

3.12 1171.88 2.27 1168.76

4.51 1163.97 12.42 1159.46

B.M.#19

1.74 1159.40 6.31 1157.66

1.50 1150.45 10.45 1148.95

1.39 1141.06 10.78 1132.67

B.M.#18

0.40 1129.49 11.97 1129.09

0.60 1118.63 11.46 1118.03

B.M.#17

2.16 1110.19 10.60 1108.03

1.16 1100.38 10.97 1099.22

9.62 1107.63 2.37 1098.01

2.75 1107.93 2.45 1105.18

0.42 1100.57 7.78 1100.15

SP 1110 171 post 15" maple ^{SW} Chillocothe + Pettibana
= B.M.#6 Chillocothe Road Survey

B.M.#24 set - see X sections

Spike in S Root 36" Elm 85' RT & Sta 135+30

Spike in N side 20' Apple 60' RT & Sta 123+85

Spike in SW Root 15" Maple 30' LT & Sta 115+80

Spike in side of 36" Maple 30' LT & Sta 109+90

Spike in S Root 12" Beech 35' LT & Sta 106+50

Spike in S Root 36" Maple 40' LT & Sta 102+20

B.M.#16 set See X sections

		981.78			
BM #9	3.56	981.78	3.56		978.22
	12.21	993.71	0.28	981.50	
	11.68	1004.80	0.59	993.12	
	11.76	1016.13	0.43	1004.37	
	12.01	1027.68	0.46	1015.67	
	13.08	1040.37	0.39	1027.29	
BM #8	8.39	1040.37	8.39		1031.98
	4.79	1043.03	2.13	1038.24	
BM #7	5.02	1044.52	3.53		1039.50
	7.97	1044.62	7.87	1034.65	
BM #6	3.72	1046.45	1.89		1042.73
	2.40	1041.57	7.28	1039.17	
	2.35	1032.75	11.17	1030.40	
BM #5	4.75	1032.75	4.75		1028.00
	6.41	1033.91	6.15	1026.00	
	5.53	1036.78	1.76	1031.25	
	2.45	1037.66	1.57	1035.21	
B.M. #4	0.94	1036.37	3.23		1031.13
	3.90	1030.19	9.08	1026.29	
	3.24	1024.97	8.46	1021.73	
	2.52	1023.00	4.49	1020.48	
	4.64	1022.66	4.98	1018.02	
BM #3	5.57	1023.30	4.93		1017.73
	5.37	1025.42	3.25	1020.95	
BM #2	2.58	1018.98	7.02		1016.40
	7.95	1016.89	10.13	1008.85	
BM #1			1.72		1015.08

Spike in root 12" hickory 30' Rt Sta. 61+55

Spike in NE root 30" Wild Cherry 25' Rt Sta. 57+91

Spike in root 24" Ash 30' Lt Sta. 54+00

Spike in root 18" Maple 30' Rt Sta. 47+35

Correct this BM elevation to 1042.80

Spike in root of 18" Elm 30' Rt. of Sta. 39+70

Spike in root of 24" Elm 30' rt. of Sta. 28+50

Spike Root 12" Walnut 25' Lt Sta. 16+20

Spike in root 30" Oak 25' Lt Sta. 7+00

Spike in root 24" Maple 35' Lt Sta. 0+05

67

BM #1 0.40 1015.48 1015.08

Flow R 9.48 1006.00

Stake R 9.33 6.33 C 3.0

Flow L 9.98 1005.50

Stake L 10.13 8.13 C 2.0

BM #3 4.64 1022.37 1017.73

Flow W 6.37 1016.00

Stake W 6.22 3.72 C 2.5

Flow E 6.87 1015.50

Stake E 7.02 4.02 C 3.0

BM #3 4.64 1022.37 1017.73

4.05 1022.69 3.73 1018.64

Flow R 6.99 1015.70

Stake R 6.84 4.34 C 2.5

Flow L 7.49 1015.20

Stake L 7.64 3.64 C 4.0

Sta 14+42

No 1

F 1005.50 16 14 F 1006.00

C 2.0 C 3.0

17 X 15

Sta 16+85

No 2

F 1015.50

C 3.0

17

9.91 Road

F 1016.00

C 2.5

Sta 18+85

No 3

F 1015.20 15 15 F 1015.70

C 4.0 C 2.5

16 X 16

BM # 5	4.08	1032.08		1028.00
	6.19	1031.05	7.22	1024.86
Flow R			7.05	1024.00
Stake R			7.20	6.70 C 0.5
Flow L			6.55	1024.90
Stake L			6.40	1.90 C 4.5

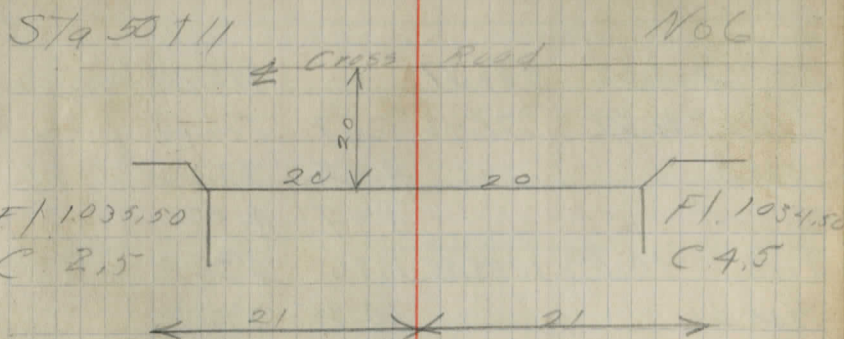
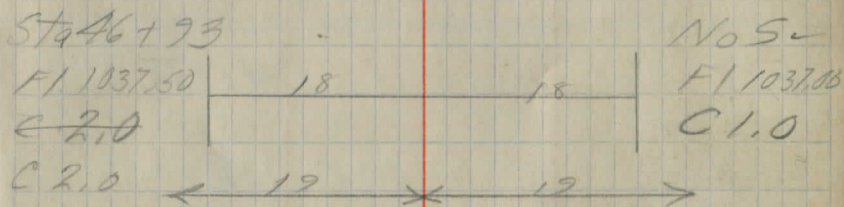
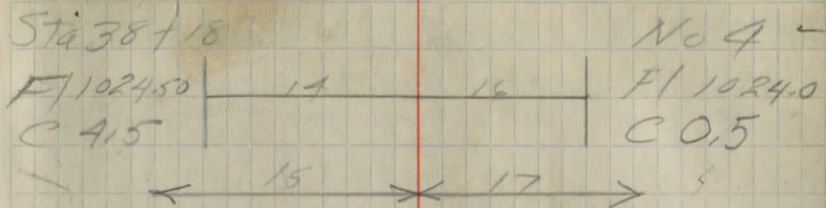
BM # 6	1.33	1044.13		1042.80
Flow R			7.13	1037.00
Stake R			7.28	6.28 C 1.0
Flow L			6.63	1037.50
Stake L			6.48	4.48 C 2.0

at Bottom
of this
Page

BM # 6	1.33	1044.13		1042.80
T.P.	4.12	1042.88	5.37	1038.76
Flow R			8.38	1034.50
Stake R			8.53	4.03 C 4.5
Flow L			7.38	1035.50
Stake L			7.23	4.73 C 2.5

Note for resetting Fl. let on 105.

BM # 6	1.33	1044.13		1042.80
Flow L			6.63	1037.50
Stake L			6.48	4.48 C 2.0



69

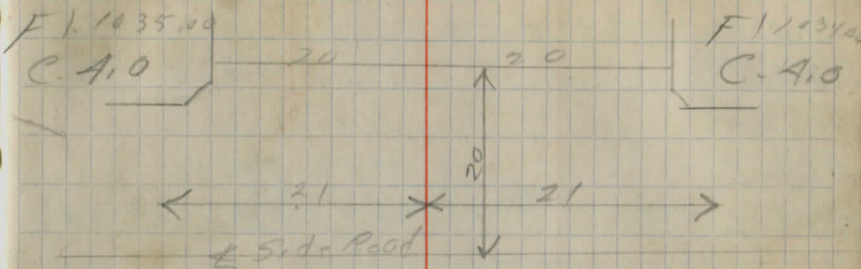
BM#6	1.33	1044.13		1042.80
T.P.	4.12	1042.88	5.37	1038.76
Flow R			9.88	1034.50
Stake R			9.03	5.03 C.A.0
Flow L			7.88	1035.00
Stake L			7.73	3.73 C.A.0

BM#7	3.02	1042.52		1039.50
Flow R			6.02	1036.50
Stake R			6.17	4.67 C.1.5
Flow L			5.52	1037.00
Stake L			5.37	3.37 C.2.0

BM#9	8.65	996.87		978.22
T.P.	11.22	997.42	0.67	996.20
Flow R			4.42	993.00
Stake R			4.57	4.57 C.0.0
T.P.	10.09	1005.85	1.76	995.76
Flow L			10.85	995.00
Stake L			10.70	1.20 C.9.5

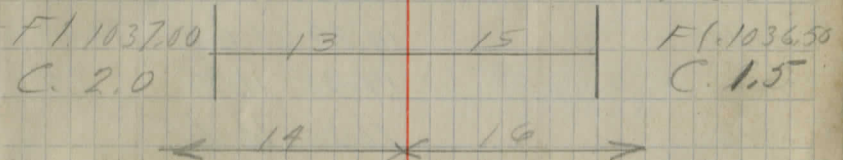
Sta 50+51

No 7



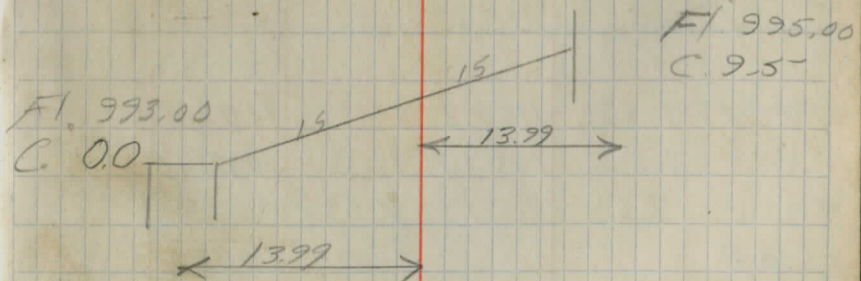
Sta 94+35

No 8



Sta 59+87

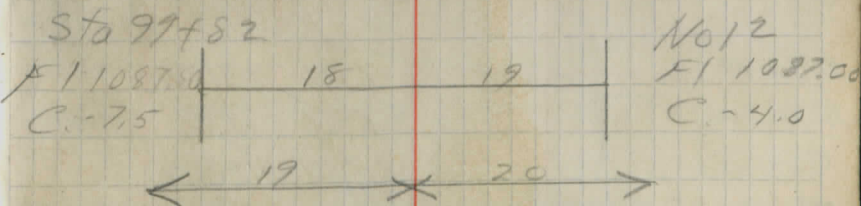
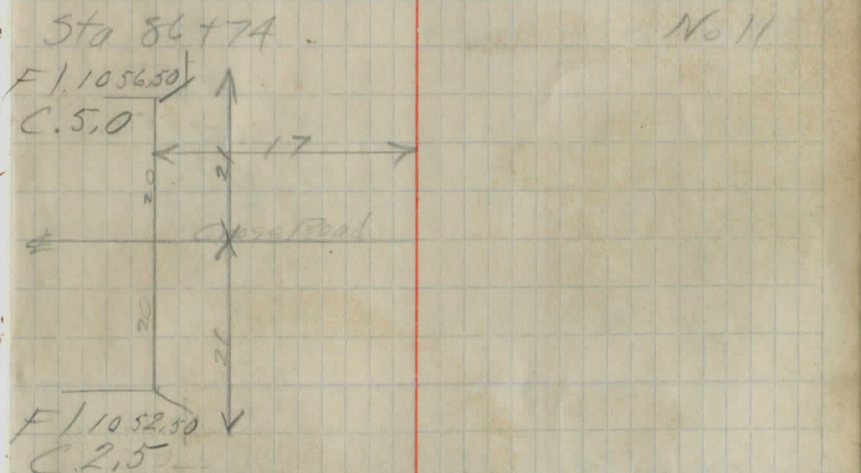
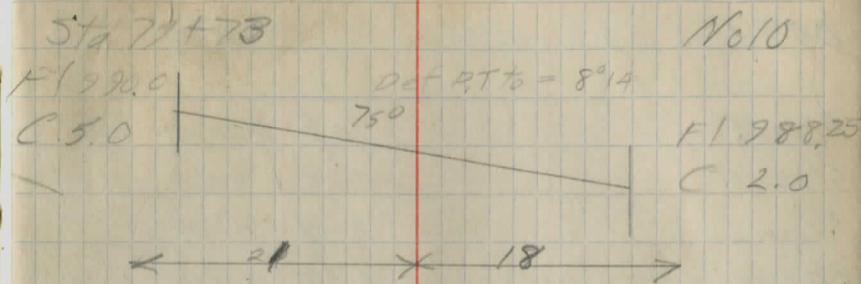
No 9



B.M. #13	0.93	999.25	998.32	
Flow R		11.00	988.25	
Stake R		11.15	915	C-20
Flow L		9.25	990.00	
Stake L		9.10	410	C-5.0

B.M. #15	0.47	1077.85	1077.38	
	1.56	1066.70	12.71	1065.14
Flow W		14.20	1052.50	
Stake W		14.35	11.85	C-2.5
Flow E		10.20	1056.50	
Stake E		10.05	5.05	C-5.0

B.M. #17	1.82	1109.85	1108.03	
	1.26	1099.74	11.37	1098.48
	5.33	1097.54	7.53	1092.21
Flow R		10.04	1087.00	
Stake R		10.19	6.19	C-4.0
Flow L		10.54	1087.50	
Stake L		10.39	2.89	C-7.5

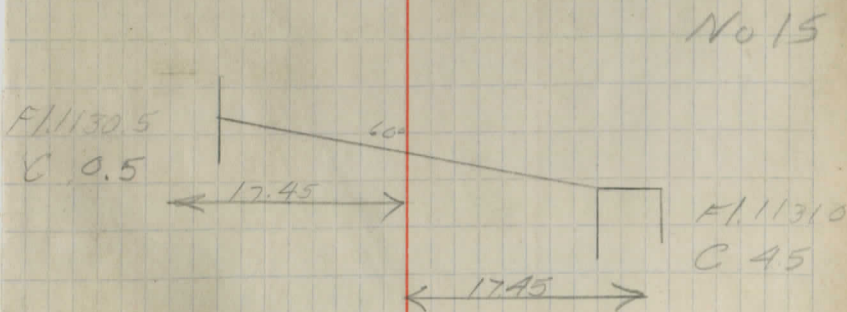
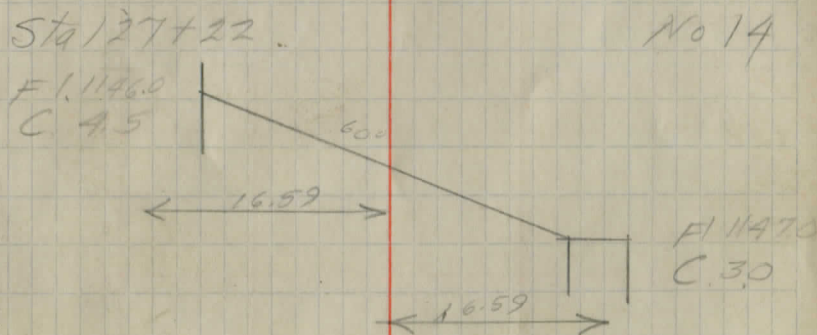
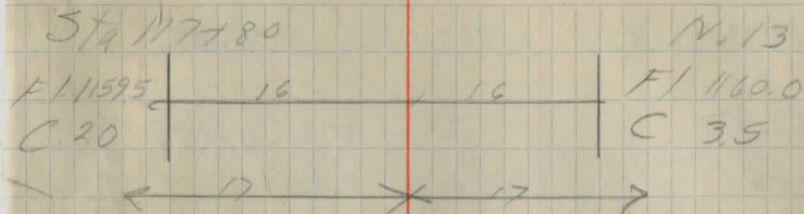


71

BM#20	292	116709	116417	
Flow R	70.9	1160.00		
Stake R	6.94	344	C3.5	
Flow L	7.59	1159.50		
Stake L	7.79	579	C20	

BM#21	060	115639	115579	
Flow R	9.39	1142.00		
Stake R	9.24	624	C30	
Flow L	10.39	1146.00		
Stake L	10.54	604	C45	

BM#22	484	1137.81	1132.97	
Flow R	6.81	1131.00		
Stake R	6.66	2.16	C45	
Flow L	7.31	1130.50		
Stake L	7.46	696	C0.5	



72

BM#24	3.99	109950	1075.81	
Flow R		8.00	1091.80	
Stake R		7.85	585	C20
Flow L		8.30	1091.50	
Stake L		8.45	645	C20

Sta 141+29

No 16

F/1091.5	17	17	F/1091.8
C.20			C.20

← 18 × 18 →

Range
County
Road

BM #1	0.94	1016.02		1015.08
0+00			5.01	1011.01
1+00			5.77	1009.31
T.P.	4.70	1012.64	2.08	1007.94
2+00			4.56	1008.08
T.P.	4.38	1013.15	3.97	1008.77
3+00			4.27	1008.88
T.P.	6.11	1015.22	4.04	1009.11
4+00			4.08	1011.14
T.P.	4.83	1016.89	3.16	1012.06
5+00			3.43	1013.46
T.P.	4.78	1019.42	2.25	1014.64
6+00			3.64	1015.78
7+00			1.32	1018.10
BM #2	7.68	1024.08	3.01	1016.41 (1016.40)
8+00			3.96	1020.12
T.P.	7.49	1022.21	3.36	1020.72
9+00			7.59	1020.62
10+00			6.30	1021.91
T.P.			2.69	1025.52
11+00				1021.34

	$\frac{C3.5}{27.1}$	$\frac{C3.3}{25.1}$	$\frac{C1.4}{22.3}$	$\frac{C1.1}{24.3}$	
(F1.8)	$\frac{F2.3}{18.7}$	$\frac{F2.4}{16.7}$	$\frac{F2.4}{16.7}$	$\frac{F2.3}{18.7}$	(F1.8)
(C0.3)	$\frac{F0.2}{22.1}$	$\frac{F0.1}{20.1}$	$\frac{F0.1}{20.7}$	$\frac{C0.0}{23.1}$	(C0.5)
Sta 2+00 to 8+00 9" ditch on Right	$\frac{F0.5}{21.3}$	$\frac{F0.6}{19.3}$	$\frac{F0.6}{19.3}$	$\frac{F0.4}{22.3}$	
	$\frac{C0.2}{22.1}$	$\frac{F0.1}{20.1}$	$\frac{F0.3}{19.8}$	$\frac{C0.0}{22.8}$	
	$\frac{C0.4}{19.1}$	$\frac{F2.1}{17.1}$	$\frac{C0.5}{20.9}$	$\frac{C0.7}{23.9}$	
	$\frac{F0.8}{20.9}$	$\frac{F0.9}{18.9}$	$\frac{F0.3}{19.8}$	$\frac{F0.1}{22.8}$	
	$\frac{F2.0}{19.3}$	$\frac{F2.0}{19.3}$	$\frac{F1.7}{19.7}$	$\frac{F2.0}{20.7}$	
	comes on R.R. track 18		$\frac{F1.0}{18.7}$	$\frac{F0.9}{21.7}$	
	$\frac{C2.5}{25.9}$	$\frac{C2.4}{23.8}$	on track 19.0		
	$\frac{C2.5}{25.5}$	$\frac{C2.2}{23.5}$	$\frac{C3.4}{25.2}$	$\frac{C3.6}{27.2}$	
onslope Hub Right	19.0		Sta 10+00 20.0		

7A

T.P.	1.73	1027.25		1025.52
11+00			5.91	1021.34
12+00			7.07	1020.18
T.P.	3.21	1023.48	6.98	1020.27
13+00			4.19	1019.29
14+00			4.48	1019.00
T.P.	3.85	1022.24	5.09	1018.39
15+00			3.24	1019.00
T.P.	4.50	1022.60	4.14	1018.10
16+00			3.60	1019.00
BM #3	4.64	1022.37	4.90	1017.70 (1017.73)
17+00			4.37	1019.00
T.P.	4.40	1022.64	4.13	1018.24
18+00			3.64	1019.10
T.P.	4.32	1022.75	4.21	1018.43
19+00			3.75	1019.10
20+00			3.38	1019.37
21+00			3.01	1019.74
T.P.	5.04	1024.27	3.52	1019.23
22+00			4.15	1020.12

$$\frac{F0.1}{21.5} \quad \frac{F0.5}{19.5} \quad \frac{C0.4}{20.2} \quad \frac{C0.4}{22.0}$$

$$\frac{C0.1}{22.1} \quad \frac{F0.1}{20.1} \quad \frac{F0.1}{20.1} \quad \frac{C0.1}{22.1}$$

$$\frac{F0.2}{21.2} \quad \frac{F0.7}{19.2} \quad \frac{F0.5}{19.5} \quad \frac{F0.4}{21.5}$$

$$\frac{C0.3}{22.3} \quad \frac{C0.1}{20.3} \quad \frac{F0.7}{19.2} \quad \frac{F0.6}{21.2}$$

STAIRS+00

$$\frac{C1.3}{26.0} \quad \frac{C1.2}{22.0} \quad \frac{F0.7}{19.2} \quad \frac{F0.2}{22.2}$$

Right+Left

2' Ditches

$$\frac{F1.6}{21.7} \quad \frac{F1.7}{19.7} \quad \frac{F1.8}{17.6} \quad \frac{F1.8}{21.6}$$

$$\frac{F0.3}{23.5} \quad \frac{F0.5}{19.5} \quad \frac{F0.8}{19.0} \quad \frac{F0.7}{23.0}$$

$$\frac{C1.6}{26.3} \quad \frac{C1.4}{22.3} \quad \frac{F0.2}{19.7} \quad \frac{F0.1}{23.9}$$

$$\frac{F0.9}{22.6} \quad \frac{F1.1}{19.6} \quad \frac{F1.3}{18.5} \quad \frac{F1.3}{22.3}$$

$$\frac{C0.7}{24.6} \quad \frac{C0.3}{20.6} \quad \frac{F0.3}{19.8} \quad \frac{C0.1}{23.8}$$

$$\frac{C0.4}{24.3} \quad \frac{C0.1}{20.3} \quad \frac{F0.9}{18.9} \quad \frac{F0.5}{22.9}$$

$$\frac{F1.2}{22.4} \quad \frac{F1.2}{18.4} \quad \frac{F1.5}{18.0} \quad \frac{F1.3}{22.0}$$

1024.27

23+00			3.69	1020.58
24+00			2.77	1021.50
T.P.	10.04	1029.42	4.89	1019.38
25+00			6.92	1022.50
26+00			5.52	1023.90
T.P.	5.66	1034.78	0.30	1029.12
27+00			8.69	1026.11
28+00			5.64	1029.14
B.M.#4	2.86	1037.29	0.30	1034.48 (1034.43)
29+00			4.72	1032.57
30+00			2.40	1034.89
B.M.#4	5.13	1039.56		1034.43
31+00			4.56	1035.00
32+00			5.56	1034.00
33+00			6.56	1033.00
T.P.	3.84	1035.51	7.89	1031.67
34+00			3.51	1032.00
35+00			4.51	1031.00

$\frac{F1.1}{22.2}$	$\frac{F1.4}{19.2}$	$\frac{F1.0}{18.7}$	$\frac{F0.6}{22.7}$
$\frac{F1.9}{19.7}$	$\frac{1.9}{17.4}$	$\frac{F2.1}{17.1}$	$\frac{F2.1}{19.1}$
$\frac{C0.4}{21.2}$	$\frac{F0.7}{19.2}$	$\frac{F1.7}{18.7}$	$\frac{F1.8}{19.7}$
$\frac{C2.1}{23.2}$	$\frac{F2.0}{23.2}$	$\frac{C0.7}{21.2}$	$\frac{C0.4}{23.2}$
$\frac{C2.8}{26.2}$	$\frac{C2.7}{24.2}$	$\frac{C3.1}{24.8}$	$\frac{C3.1}{26.8}$
$\frac{C1.7}{24.6}$	$\frac{C1.6}{22.6}$	$\frac{C1.7}{24.2}$	$\frac{C2.4}{26.2}$
$\frac{C0.0}{22.1}$	$\frac{F0.1}{20.1}$	$\frac{C1.8}{22.9}$	$\frac{C2.2}{24.9}$
$\frac{F0.7}{21.0}$	$\frac{F1.8}{19.5}$	$\frac{F0.3}{19.8}$	$\frac{C0.0}{21.8}$
$\frac{C0.4}{22.3}$	$\frac{C0.1}{20.3}$	$\frac{C1.5}{22.4}$	$\frac{C1.6}{24.4}$
$\frac{F1.2}{20.3}$	$\frac{F1.3}{19.3}$	$\frac{F0.6}{19.3}$	$\frac{F0.3}{21.3}$
$\frac{F2.2}{19.0}$	$\frac{F2.2}{17.0}$	$\frac{F1.8}{17.6}$	$\frac{F1.7}{19.6}$
$\frac{F1.3}{20.0}$	$\frac{F1.5}{19.0}$	$\frac{F1.4}{18.2}$	$\frac{F1.1}{20.2}$
$\frac{C0.6}{22.8}$	$\frac{C0.4}{20.8}$	$\frac{F0.5}{19.5}$	$\frac{F0.5}{21.5}$

Bond
Certificate

76		1035.51			
36+00			5.51	1030.00	
37+00			6.51	1029.00	
T.P.	8.23	1035.34	8.40	1027.11	
38+00			7.34	1028.00	
39+00			7.27	1028.07	
B.M. 25-	11.62	1039.62	7.33	1028.01	1028.00
40+00			9.33	1030.29	
41+00			6.04	1033.58	
T.P.	6.80	1042.87	3.55	1036.07	
42+00			6.15	1036.72	
43+00			3.74	1038.93	
T.P.	6.66	1044.89	4.64	1038.23	
44+00			4.68	1040.21	
45+00			3.54	1041.35	
B.M. 6			2.14	1042.75	1042.73
B.M. 6	2.76	1045.69		1042.73	
46			3.78	1041.91	
T.P.	3.27	1043.78	5.18	1040.51	
47			2.50	1041.28	

Rand
Gardrich
Campfield

$\frac{C24}{23.5}$	$\frac{C22}{23.5}$	$\frac{F13}{19.8}$	$\frac{F12}{20.3}$
$\frac{C23}{24.1}$	$\frac{C13}{22.1}$	$\frac{F21}{19.1}$	$\frac{F22}{19.1}$
$\frac{F06}{21.2}$	$\frac{F07}{19.2}$	$\frac{F20}{17.3}$	$\frac{F23}{19.3}$
$\frac{C06}{22.5}$	$\frac{C02}{20.5}$	$\frac{F16}{17.9}$	$\frac{F17}{19.9}$
$\frac{C08}{22.9}$	$\frac{C05}{20.9}$	$\frac{F10}{18.7}$	$\frac{F07}{20.7}$
$\frac{C25}{25.3}$	$\frac{C21}{23.3}$	$\frac{C06}{21.1}$	$\frac{C07}{23.1}$
$\frac{C12}{24.1}$	$\frac{C13}{22.1}$	$\frac{C13}{22.1}$	$\frac{C14}{24.1}$
$\frac{F07}{21.2}$	$\frac{F03}{19.8}$	$\frac{F13}{18.3}$	$\frac{F12}{20.3}$
$\frac{F19}{18.8}$	$\frac{F23}{18.8}$	$\frac{F18}{18.6}$	$\frac{F15}{19.6}$
$\frac{C20}{24.7}$	$\frac{C17}{22.7}$	$\frac{F01}{22.1}$	$\frac{C00}{22.1}$

Stakes set to sub grade

$\frac{C13}{23.1}$	$\frac{C06}{21.1}$	$\frac{F02}{19.9}$	$\frac{C02}{21.9}$
$\frac{F30}{19.5}$	$\frac{F30}{17.0}$	$\frac{F38}{18.1}$	$\frac{F34}{21.1}$

27					
T.P.	5.16	1044.56	4.38	1039.40	
48			4.50	1040.06	
49			5.72	1038.84	
50			6.80	1037.76	
51			6.81	1037.95	
T.P.	6.77	1044.05	7.28	1037.28	
52			5.25	1038.80	
53			4.42	1039.63	
54			4.35	1039.70	
T.P.	4.53	1042.74	5.84	1038.21	
55			3.34	1039.40	
B.M.#7			3.22	1039.52	1039.50
55+70			4.28	1038.49	
56			5.46	1037.28	
T.P.	2.56	1040.08	5.22	1037.52	
57			10.41	1029.67	
B.M.#8			8.09	1031.99	1031.78
58				1018.24	
58+50				1012.47	

stake set to sub grade

	C1.6 23.8	C1.1 27.8	C0.5 20.9	C0.8 22.9
	F0.1 24.0	F0.4 19.6	C1.1 28	F0.2 23.2
	F0.7 21.3	F0.6 19.3	P.O.D. 20.2	C0.3 22.2
22.5' Roadway Begins	C0.9 17.3	F0.6 15.8	F0.5 16.0	F0.1 18.0
	C1.2 19.3	C0.4 17.8	C0.8 17.0	C1.0 13.0
	C0.9 17.3	F0.4 15.8	C0.1 16.8	C0.7 18.8
	F0.8 16.5	F1.5 14.5	F2.1 19.5	F1.4 15.0
on curve	C0.0 16.0	14.0	20.5	F1.4 22.5
on curve	C1.8 19.0	17.0	20.5	C0.3 22.5
on curve	C2.7 22.0	20.0	19.5	C0.6 21.5
hill slope	C8.0 23.5	21.5	21.5	C8.3 23.5
on curve	35.0	33	22.5	24.5
on curve	38.0	36.5	15	17.0

78		1032.28	1031.98	
BM# 8	0.30	1032.28	1031.98	
58		14.04	1018.24	
58+50		19.81	1012.47	
T.P.	1.55	1021.10	12.73	1019.55
58+50		8.63	1012.47	
59		14.40	1006.70	
T.P.	1.49	1009.74	12.85	1008.25
59		3.04	1006.70	
T.P.	2.36	999.73	12.37	997.37
60		4.57	995.16	
T.P.	11.93	999.30	12.36	987.37
60+70		12.22	987.08	
T.P.	0.82	988.19	11.93	987.37
61		4.57	983.62	
T.P.	5.73	982.54	11.38	976.81
61+50		4.69	977.85	
BM# 9		4.35	978.19	978.22
62+00			972.08	
63+00			960.54	
BM# 70			948.88	

C14.3	35.0	35	27.5	C11.8	24.5	
C16.8	38.5	36.5		C39	17.0	
C41.7	20.9	78.0		C0.9	14	
F41.2	78.5	76.5	F32	15.7	F2.6	17.7
C96	240	22.0	20.0	C10	22.0	
F2.8	18.5	16.5	17.0	F4.0	12.0	
F3.6	23.5	21.5	26.0	C1.2	38.0	
	21	19.0	25.5	27.5		

Cont: in other Book

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	1/8	3-16	1/4	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. — Radii, Ordinates and Deflections.

Deg.	Radius	Mid. Ord.	Tan. Def.	Chd. Def.	Def. for 1 Foot	Deg.	Radius	Mid. Ord.	Tan. Def.	Chd. Def.	Def. for 1 Foot
0° 10'	34377.	.036	.145	.291	0.05'	7°	819.0	1.528	6.105	12.21	2.10'
20	17189.	.073	.291	.582	0.10	20'	781.8	1.600	6.395	12.79	2.20
30	11459.	.109	.436	.873	0.15	30	764.5	1.637	6.540	13.08	2.25
40	8594.4	.145	.582	1.164	0.20	40	747.9	1.673	6.685	13.37	2.30
50	6875.5	.182	.727	1.454	0.25	50	716.8	1.746	6.976	13.95	2.40
1 10	5729.6	.218	.873	1.745	0.30	20	688.2	1.819	7.266	14.53	2.50
20	4911.2	.255	1.018	2.036	0.35	30	674.7	1.855	7.411	14.82	2.55
30	4297.3	.291	1.164	2.327	0.40	40	661.7	1.892	7.556	15.11	2.60
40	3819.8	.327	1.309	2.618	0.45	9	637.3	1.965	7.846	15.69	2.70
50	3437.9	.364	1.454	2.909	0.50	20	614.6	2.037	8.136	16.27	2.80
1 10	3125.4	.400	1.600	3.200	0.55	30	603.8	2.074	8.281	16.56	2.85
20	2864.9	.436	1.745	3.490	0.60	40	598.4	2.110	8.426	16.85	2.90
30	2644.6	.473	1.891	3.781	0.65	10	573.7	2.183	8.716	17.43	3.00
40	2455.7	.509	2.036	4.072	0.70	30	546.4	2.292	9.150	18.30	3.15
50	2292.0	.545	2.181	4.363	0.75	11	521.7	2.402	9.585	19.16	3.30
1 10	2148.8	.582	2.327	4.654	0.80	30	499.1	2.511	10.02	20.04	3.45
20	2022.4	.618	2.472	4.945	0.85	12	478.3	2.620	10.45	20.91	3.60
30	1910.1	.655	2.618	5.235	0.90	30	459.3	2.730	10.89	21.77	3.75
40	1809.6	.691	2.763	5.526	0.95	13	441.7	2.839	11.32	22.64	3.90
50	1719.1	.727	2.908	5.817	1.00	30	425.4	2.949	11.75	23.51	4.05
1 10	1637.3	.764	3.054	6.108	1.05	14	410.3	3.058	12.18	24.37	4.20
20	1562.9	.800	3.199	6.398	1.10	30	396.2	3.168	12.62	25.24	4.35
30	1495.0	.836	3.345	6.689	1.15	15	383.1	3.277	13.05	26.11	4.50
40	1432.7	.873	3.490	6.980	1.20	30	370.8	3.387	13.49	26.97	4.65
50	1375.4	.909	3.635	7.271	1.25	16	359.3	3.496	13.92	27.84	4.80
1 10	1322.5	.945	3.781	7.561	1.30	30	348.5	3.606	14.35	28.70	4.95
20	1273.6	.982	3.926	7.852	1.35	17	338.3	3.716	14.78	29.56	5.10
30	1228.1	1.018	4.071	8.143	1.40	18	319.6	3.935	15.64	31.29	5.40
40	1185.8	1.055	4.217	8.433	1.45	19	302.9	4.155	16.51	33.01	5.70
50	1146.3	1.091	4.362	8.724	1.50	20	287.9	4.374	17.37	34.73	6.00
1 10	1109.3	1.127	4.507	9.014	1.55	21	274.4	4.594	18.22	36.44	6.30
20	1074.7	1.164	4.653	9.305	1.60	22	262.0	4.814	19.08	38.16	6.60
30	1042.1	1.200	4.798	9.596	1.65	23	250.8	5.035	19.94	39.87	6.90
40	1011.5	1.237	4.943	9.886	1.70	24	240.5	5.255	20.79	41.58	7.20
50	982.6	1.273	5.088	10.18	1.75	25	231.0	5.476	21.64	43.28	7.50
1 10	955.4	1.309	5.234	10.47	1.80	26	222.3	5.697	22.50	44.99	7.80
20	929.6	1.346	5.379	10.76	1.85	27	214.2	5.918	23.35	46.69	8.10
30	905.1	1.382	5.524	11.05	1.90	28	206.7	6.139	24.19	48.38	8.40
40	881.9	1.418	5.669	11.34	1.95	29	199.7	6.360	25.04	50.07	8.70
50	859.9	1.455	5.814	11.63	2.00	30	193.2	6.582	25.88	51.76	9.00

TABLE IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
1°	50.00	.22	11°	551.70	26.50	21°	1061.9	97.57
10'	58.34	.30	10'	560.11	27.31	10'	1070.6	99.16
20	66.67	.39	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	585.36	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.

Angle	Tangent	External	Angle	Tangent	External	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	2057.2	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.

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
61°	3375.0	920.2	71°	4086.9	1308.2	81°	4893.6	1805.3
10'	3386.3	925.9	10'	4099.5	1315.6	10'	4908.0	1814.7
20	3397.5	931.6	20	4112.1	1322.9	20	4922.5	1824.1
30	3408.8	937.3	30	4124.8	1330.3	30	4937.0	1833.6
40	3420.1	943.1	40	4137.4	1337.7	40	4951.5	1843.1
50	3431.4	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	2191.2
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	3889.0	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	2373.8
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	1293.6	40	4864.8	1786.7	40	5796.7	2420.9
50	4074.4	1300.9	50	4879.2	1796.0	50	5813.6	2432.9

TABLE IV. — Tangents and Externals to a 1° Curve.

Angle	Tangent	External	Angle	Tangent	External	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°	8392.7	4407.6
20	5864.6	2469.3	20	6992.0	3310.1	20	8398.9	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	6162.6	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	5288.5
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

Table V. Corrections for use with table IV,

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△		For Tangents Add													
ANGLE	CURVE	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°		.03	.06	.09	.13	.16	.19	.22	.25	.28	.31	.34	.38	.42	.46
15°		.04	.10	.14	.19	.24	.29	.34	.39	.45	.51	.53	.58	.63	.68
20°		.06	.13	.19	.26	.32	.39	.45	.51	.58	.65	.72	.79	.84	.90
25°		.08	.16	.24	.33	.40	.49	.58	.67	.75	.83	.90	.99	1.06	1.14
30°		.10	.19	.29	.39	.49	.59	.69	.79	.89	.99	1.09	1.20	1.29	1.39
35°		.11	.22	.34	.47	.58	.69	.79	.81	.92	1.04	1.29	1.42	1.54	1.66
40°		.13	.26	.40	.53	.67	.80	.93	1.06	1.20	1.34	1.49	1.64	1.79	1.94
45°		.15	.30	.44	.60	.76	.91	1.06	1.21	1.37	1.52	1.70	1.87	2.04	2.21
50°		.17	.34	.51	.68	.85	1.02	1.19	1.36	1.54	1.72	1.91	2.10	2.29	2.48
55°		.19	.38	.57	.76	.95	1.14	1.32	1.52	1.72	1.92	2.14	2.35	2.56	2.77
60°		.21	.42	.63	.84	1.05	1.27	1.49	1.71	1.94	2.17	2.38	2.60	2.83	3.07
65°		.23	.46	.69	.93	1.16	1.40	1.64	1.88	2.13	2.38	2.63	2.88	3.13	3.39
70°		.25	.51	.76	1.02	1.28	1.54	1.80	2.06	2.33	2.60	2.88	3.16	3.44	3.72
75°		.27	.56	.83	1.12	1.40	1.69	1.98	2.27	2.57	2.87	3.16	3.47	3.78	4.09
80°		.30	.61	.91	1.22	1.53	1.84	2.15	2.46	2.78	3.10	3.44	3.78	4.12	4.46
85°		.33	.66	1.00	1.33	1.68	2.02	2.36	2.70	3.05	3.40	3.77	4.14	4.55	4.89
90°		.36	.72	1.09	1.45	1.83	2.20	2.57	2.94	3.32	3.70	4.10	4.50	4.91	5.32
95°		.39	.79	1.19	1.55	2.00	2.40	2.80	3.20	3.61	4.02	4.49	4.98	5.38	5.83
100°		.43	.86	1.30	1.74	2.18	2.62	3.06	3.50	3.95	4.40	4.88	5.37	5.85	6.34

For Externals Add

ANGLE	CURVE	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°	
10°		.001	.003	.004	.006	.007	.008	.009	.011	.012	.014	.015	.017	.018	.020	
15°		.003	.007	.010	.014	.018	.023	.027	.029	.032	.035	.039	.043	.047	.051	
20°		.006	.011	.017	.022	.028	.034	.038	.045	.051	.057	.063	.070	.076	.083	
25°		.009	.018	.027	.036	.046	.056	.065	.074	.083	.093	.106	1.20	1.27	1.35	
30°		.013	.025	.038	.051	.065	.078	.090	.103	.116	.129	.149	.170	.179	.188	
35°		.018	.035	.054	.072	.086	.109	.131	.153	.175	.197	.217	.230	.247	.264	
40°		.023	.046	.070	.093	.117	.141	.172	.203	.234	.265	.277	.290	.315	.341	
45°		.030	.060	.093	.119	.153	.184	.216	.254	.289	.325	.351	.378	.411	.445	
50°		.037	.075	.116	.151	.189	.227	.266	.305	.345	.384	.425	.467	.508	.550	
55°		.046	.093	.142	.188	.236	.283	.331	.381	.420	.479	.530	.582	.641	.700	
60°		.056	.112	.168	.225	.283	.340	.398	.457	.516	.575	.636	.697	.774	.851	
65°		.067	.135	.204	.273	.343	.412	.483	.554	.625	.697	.771	.845	.922	1.01	
70°		.080	.159	.240	.321	.403	.485	.568	.652	.735	.819	.906	.994	1.08	1.17	
75°		.095	.182	.266	.353	.440	.528	.617	.707	.797	.877	.977	1.07	1.18	1.29	1.39
80°		.110	.220	.332	.445	.558	.671	.787	.903	1.02	1.13	1.25	1.38	1.50	1.62	
85°		.128	.259	.391	.524	.657	.790	.926	1.06	1.20	1.34	1.47	1.62	1.76	1.91	
90°		.149	.299	.450	.603	.756	.910	1.07	1.22	1.38	1.54	1.70	1.87	2.03	2.20	
95°		.174	.350	.522	.706	.885	1.06	1.25	1.43	1.62	1.80	1.99	2.18	2.38	2.58	
100°		.200	.401	.604	.809	1.01	1.22	1.43	1.64	1.85	2.06	2.28	2.50	2.73	2.96	

Table VI. Deflections for Sub Chords for Short Radius Curves.

Degree of Curve	Radius 50 sin. def. ang.	½ sub chord = sin of def. angle R				Length of arc for 100 ft.
		12.5 Ft.	15 Ft.	20 Ft.	25 Ft.	
		30°	193.18	1° 51'	2° 17'	
32°	181.39	1° 59'	2° 25'	3° 10'	3° 58'	101.33
34°	171.01	2° 06'	2° 33'	3° 21'	4° 12'	101.48
36°	161.80	2° 13'	2° 41'	3° 33'	4° 26'	101.66
38°	153.58	2° 20'	2° 49'	3° 44'	4° 40'	101.85
40°	146.19	2° 27'	2° 57'	3° 55'	4° 54'	102.06
42°	139.52	2° 34'	3° 05'	4° 07'	5° 08'	102.29
44°	133.47	2° 41'	3° 13'	4° 18'	5° 22'	102.53
46°	127.97	2° 48'	3° 21'	4° 29'	5° 36'	102.76
48°	122.92	2° 55'	3° 29'	4° 40'	5° 50'	103.00
50°	118.31	3° 02'	3° 38'	4° 51'	6° 04'	103.24
52°	114.06	3° 09'	3° 46'	5° 02'	6° 17'	103.54
54°	110.11	3° 16'	3° 54'	5° 13'	6° 31'	103.84
56°	106.50	3° 22'	4° 02'	5° 23'	6° 44'	104.14
58°	103.14	3° 29'	4° 10'	5° 34'	6° 57'	104.43
60°	100.00	3° 35'	4° 18'	5° 44'	7° 11'	104.72

CURVE FORMULAS.

$T = R \tan \frac{1}{2} I$	$R = T \cot. \frac{1}{2} I$	Chord def. = $\frac{\text{chord}^2}{R}$
$T = 50 \tan. \frac{1}{2} I$	$R = 50$	
$\text{Sin. D} = \frac{\text{Sin. D}}{50}$	Sin. D	No. chords = $\frac{1}{2} \frac{I}{D}$
$\text{Sin. D} = 50 \tan. \frac{1}{2} I$	$E = R \text{ ex. sec. } \frac{1}{2} I$	
	$E = T \tan \frac{1}{4} I$	Tan. def. = $\frac{1}{2} \text{ chord def.}$

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

Table IV. contains Tangents and External to a 1° curve. Tan. and Ext. to any other radius may be found, nearly enough, by dividing the Tan. or Ext. opposite the given Central Angle by the given degree of curve.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Tan. opposite the given Central Angle by the given Tangent.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Ext. opposite the given Central Angle by the given External.

To find Nat. Tan. and Nat. Ex. Sec. for any angle by Table IV.: Tan. or Ext. of twice the given angle divided by the radius of a 1° curve will be the Nat. Tan. or Nat. Ex. Sec.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.), and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance: Multiply the angle by .01745, and the product by the distance.

RIGHT ANGLE TRIANGLES. - Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt 10 $10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. 25. $25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875 = \text{Base}$.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

Natural Sines

DEG.	0'	10'	20'	30'	40'	50'	DEG.	0'	10'	20'	30'	40'	50'	DEG.	
0	0000	0029	0058	0087	0116	0145	89	40	6428	6450	6472	6494	6517	6539	49
1	0175	0204	0233	0262	0291	0320	88	41	6561	6583	6604	6626	6648	6670	48
2	0349	0378	0407	0436	0465	0494	87	42	6691	6713	6734	6756	6777	6799	47
3	0523	0552	0581	0610	0640	0669	86	43	6820	6841	6862	6884	6905	6926	46
4	0698	0727	0756	0785	0814	0843	85	44	6947	6967	6988	7009	7030	7050	45
5	0872	0901	0929	0958	0987	1016	84	45	7071	7092	7112	7133	7153	7173	44
6	1045	1074	1103	1132	1161	1190	83	46	7193	7214	7234	7254	7274	7294	43
7	1219	1248	1276	1305	1334	1363	82	47	7314	7333	7353	7373	7392	7412	42
8	1392	1421	1449	1478	1507	1536	81	48	7431	7451	7470	7490	7509	7528	41
9	1564	1593	1622	1650	1679	1708	80	49	7547	7566	7585	7604	7623	7642	40
10	1736	1765	1794	1822	1851	1880	79	50	7660	7679	7698	7716	7735	7753	39
11	1908	1937	1965	1994	2022	2051	78	51	7771	7790	7808	7826	7844	7862	38
12	2079	2108	2136	2164	2193	2221	77	52	7880	7898	7916	7934	7951	7969	37
13	2250	2278	2306	2334	2363	2391	76	53	7986	8004	8021	8039	8056	8073	36
14	2419	2447	2475	2504	2532	2560	75	54	8090	8107	8124	8141	8158	8175	35
15	2588	2616	2644	2672	2700	2728	74	55	8192	8208	8225	8241	8258	8274	34
16	2756	2784	2812	2840	2868	2896	73	56	8290	8307	8323	8339	8355	8371	33
17	2924	2952	2979	3007	3035	3062	72	57	8387	8403	8418	8434	8450	8465	32
18	3090	3118	3145	3173	3201	3228	71	58	8480	8496	8511	8526	8542	8557	31
19	3256	3283	3311	3338	3365	3393	70	59	8572	8587	8601	8616	8631	8646	30
20	3420	3448	3475	3502	3529	3557	69	60	8660	8675	8689	8704	8718	8732	29
21	3584	3611	3638	3665	3692	3719	68	61	8746	8760	8774	8788	8802	8816	28
22	3746	3773	3800	3827	3854	3881	67	62	8829	8843	8857	8870	8884	8897	27
23	3907	3934	3961	3987	4014	4041	66	63	8910	8923	8936	8949	8962	8975	26
24	4067	4094	4120	4147	4173	4200	65	64	8988	9001	9013	9026	9038	9051	25
25	4226	4253	4279	4305	4331	4358	64	65	9063	9075	9088	9100	9112	9124	24
26	4384	4410	4436	4462	4488	4514	63	66	9135	9147	9159	9171	9182	9194	23
27	4540	4566	4592	4617	4643	4669	62	67	9205	9216	9228	9239	9250	9261	22
28	4695	4720	4746	4772	4797	4823	61	68	9272	9283	9293	9304	9315	9325	21
29	4848	4874	4899	4924	4950	4975	60	69	9336	9346	9356	9367	9377	9387	20
30	5000	5025	5050	5075	5100	5125	59	70	9397	9407	9417	9426	9436	9446	19
31	5150	5175	5200	5225	5250	5275	58	71	9455	9465	9474	9483	9492	9502	18
32	5299	5324	5348	5373	5398	5422	57	72	9511	9520	9528	9537	9546	9555	17
33	5446	5471	5495	5519	5544	5568	56	73	9563	9572	9580	9588	9596	9605	16
34	5592	5616	5640	5664	5688	5712	55	74	9613	9621	9628	9636	9644	9652	15
35	5736	5760	5783	5807	5831	5854	54	75	9659	9667	9674	9681	9689	9696	14
36	5878	5901	5925	5948	5972	5995	53	76	9703	9710	9717	9724	9730	9737	13
37	6018	6041	6065	6088	6111	6134	52	77	9744	9750	9757	9763	9769	9775	12
38	6157	6180	6202	6225	6248	6271	51	78	9781	9787	9793	9799	9805	9811	11
39	6293	6316	6338	6361	6383	6406	50	79	9816	9822	9827	9833	9838	9843	10

DEG.	0'	10'	20'	30'	40'	50'	DEG.
80	9848	9853	9858	9863	9868	9872	9
81	9877	9881	9886	9890	9894	9898	8
82	9903	9907	9911	9914	9918	9922	7
83	9925	9929	9932	9936	9939	9942	6
84	9945	9948	9951	9954	9957	9959	5
85	9962	9964	9967	9969	9971	9974	4
86	9976	9978	9980	9981	9983	9985	3
87	9986	9988	9989	9990	9992	9993	2
88	9994	9995	9996	9997	9997	9998	1
89	9998	9999	9999	9999	1.0000	1.0000	0

Natural Cosines

Natural Tangents

deg.	0'	10'	20'	30'	40'	50'	deg.	0'	10'	20'	30'	40'	50'	deg.	
0	0000	0029	0058	0087	0116	0145	89	40	8391	8441	8491	8541	8591	8642	49
1	0175	0204	0233	0262	0291	0320	88	41	8693	8744	8796	8847	8899	8952	48
2	0349	0378	0407	0437	0466	0495	87	42	9004	9057	9110	9163	9217	9271	47
3	0524	0553	0582	0612	0641	0670	86	43	9325	9380	9435	9490	9545	9601	46
4	0699	0729	0758	0787	0816	0846	85	44	9657	9713	9770	9827	9884	9942	45
5	0875	0904	0934	0963	0992	1022	84	45	1.0000	1.0058	1.0117	1.0176	1.0235	1.0295	44
6	1051	1080	1110	1139	1169	1198	83	46	1.0355	1.0416	1.0477	1.0533	1.0599	1.0666	43
7	1228	1257	1287	1317	1346	1376	82	47	1.0724	1.0786	1.0850	1.0913	1.0977	1.1041	42
8	1405	1435	1465	1495	1524	1554	81	48	1.1106	1.1171	1.1237	1.1303	1.1369	1.1436	41
9	1584	1614	1644	1673	1703	1733	80	49	1.1504	1.1571	1.1640	1.1708	1.1778	1.1847	40
10	1763	1793	1823	1853	1883	1914	79	50	1.1918	1.1988	1.2059	1.2131	1.2203	1.2276	39
11	1944	1974	2004	2035	2065	2095	78	51	1.2340	1.2423	1.2497	1.2572	1.2647	1.2723	38
12	2126	2156	2186	2217	2247	2278	77	52	1.2799	1.2876	1.2954	1.3032	1.3111	1.3190	37
13	2309	2339	2370	2401	2432	2462	76	53	1.3270	1.3351	1.3432	1.3514	1.3597	1.3680	36
14	2493	2524	2555	2586	2617	2648	75	54	1.3764	1.3848	1.3934	1.4019	1.4106	1.4193	35
15	2679	2711	2742	2773	2805	2836	74	55	1.4281	1.4370	1.4460	1.4550	1.4641	1.4733	34
16	2867	2899	2931	2962	2994	3026	73	56	1.4826	1.4919	1.5013	1.5108	1.5204	1.5301	33
17	3057	3089	3121	3153	3185	3217	72	57	1.5399	1.5497	1.5597	1.5697	1.5798	1.5900	32
18	3249	3281	3314	3346	3378	3411	71	58	1.6003	1.6107	1.6212	1.6319	1.6426	1.6534	31
19	3443	3476	3508	3541	3574	3607	70	59	1.6643	1.6753	1.6864	1.6977	1.7090	1.7205	30
20	3640	3673	3706	3739	3772	3805	69	60	1.7321	1.7437	1.7556	1.7675	1.7797	1.7917	29
21	3839	3872	3906	3939	3973	4006	68	61	1.8040	1.8165	1.8291	1.8418	1.8546	1.8676	28
22	4040	4074	4108	4142	4176	4210	67	62	1.8807	1.8940	1.9074	1.9210	1.9347	1.9486	27
23	4245	4279	4314	4348	4383	4417	66	63	1.9626	1.9768	1.9912	2.0057	2.0204	2.0353	26
24	4452	4487	4522	4557	4592	4628	65	64	2.0503	2.0655	2.0809	2.0965	2.1123	2.1283	25
25	4663	4699	4734	4770	4806	4841	64	65	2.1445	2.1609	2.1775	2.1943	2.2113	2.2286	24
26	4877	4913	4950	4986	5022	5059	63	66	2.2490	2.2637	2.2817	2.2998	2.3183	2.3369	23
27	5095	5132	5169	5206	5243	5280	62	67	2.3559	2.3750	2.3945	2.4142	2.4342	2.4545	22
28	5317	5354	5392	5430	5467	5505	61	68	2.4751	2.4960	2.5172	2.5386	2.5605	2.5826	21
29	5543	5581	5619	5658	5696	5735	60	69	2.6051	2.6279	2.6511	2.6746	2.6985	2.7228	20
30	5774	5812	5851	5890	5930	5969	59	70	2.7475	2.7725	2.7980	2.8239	2.8502	2.8770	19
31	6009	6048	6088	6128	6168	6208	58	71	2.9042	2.9319	2.9600	2.9887	3.0178	3.0475	18
32	6249	6289	6330	6371	6412	6453	57	72	3.0777	3.1084	3.1397	3.1716	3.2041	3.2371	17
33	6494	6536	6577	6619	6661	6703	56	73	3.2709	3.3052	3.3402	3.3759	3.4124	3.4495	16
34	6745	6787	6830	6873	6916	6959	55	74	3.4874	3.5261	3.5656	3.6059	3.6470	3.6891	15
35	7002	7046	7089	7133	7177	7221	54	75	3.7321	3.7760	3.8208	3.8667	3.9136	3.9617	14
36	7265	7310	7355	7400	7445	7490	53	76	4.0108	4.0611	4.1126	4.1653	4.2193	4.2747	13
37	7536	7581	7627	7673	7720	7766	52	77	4.3315	4.3897	4.4494	4.5107	4.5736	4.6382	12
38	7813	7860	7907	7954	8002	8050	51	78	4.7046	4.7729	4.8430	4.9152	4.9894	5.0658	11
39	8098	8146	8195	8243	8292	8342	50	79	5.1446	5.2257	5.3093	5.3955	5.4845	5.5764	10

deg.	0'	10'	20'	30'	40'	50'	deg.
80	5.6713	5.7694	5.8708	5.9758	6.0844	6.1970	9
81	6.3138	6.4348	6.5606	6.6912	6.8269	6.9682	8
82	7.1154	7.2687	7.4287	7.5958	7.7704	7.9530	7
83	8.1443	8.3450	8.5555	8.7769	9.0098	9.2553	6
84	9.5144	9.7882	10.078	10.385	10.7111	11.059	5
85	11.430	11.826	12.250	12.706	13.197	13.727	4
86	14.300	14.924	15.605	16.350	17.169	18.075	3
87	19.081	20.206	21.470	22.903	24.542	26.432	2
88	28.636	31.242	34.368	38.189	42.964	49.104	1
89	57.290	68.750	85.940	114.588	171.885	343.770	0

Natural Cotangents

100 = 13
150 = 6-30
100 = 9
50 = 4-30
1' = 54

1 = 78

344 306
54 470

1376 736
1720 30

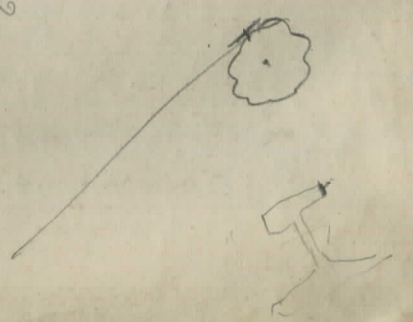
8576 608
59 275
297

13 11.7
6 78
78 936
719
9126

1-31
4 59
6-30

27
12 3.25
24 85

sta 66 + 00
Pettibone P. Road
67+00



1655.65
 796.85
 858.80
 7
 788.8
 6.27
 347
 200
 200
 1093
 1902.5
 Carmack
 Palmer E. Line
 431.182000 11' 2155
 40° 22'
 3051.60
 1635.65
 1395.95
 86.7468
 19.25
 105477.18
 789.5
 2185.5
 1385
 1355.5
 4556.45
 3051.60
 1304.85
 14.5
 1490.35
 26
 31.25
 64.55
 70.0

PLEASE RETURN TO
 GEauga COUNTY ENGINEER
 DISTANCES FROM CENTER LINE ROAD DIVISION CROSS-SECTIONING,
 ROADWAY 16 FEET WIDE, SIDE SLOPES 1 1/2 TO 1
 CHARDON, O.
 PHONE 250-X

	0	1	2	3	4	5	6	7	8	9	
0	7.0	7.2	7.3	7.5	7.6	7.8	7.9	8.1	8.2	8.4	0
1	8.5	8.7	8.8	9.0	9.1	9.3	9.4	9.6	9.7	9.9	1
2	10.0	10.2	10.3	10.5	10.6	10.8	10.9	11.1	11.2	11.4	2
3	11.5	11.7	11.8	12.0	12.1	12.3	12.4	12.6	12.7	12.9	3
4	13.0	13.2	13.3	13.5	13.6	13.8	13.9	14.1	14.2	14.4	4
5	14.5	14.7	14.8	15.0	15.1	15.3	15.4	15.6	15.7	15.9	5
6	16.0	16.2	16.3	16.5	16.6	16.8	16.9	17.1	17.2	17.4	6
7	17.5	17.7	17.8	18.0	18.1	18.3	18.4	18.6	18.7	18.9	7
8	19.0	19.2	19.3	19.5	19.6	19.8	19.9	20.1	20.2	20.4	8
9	20.5	20.7	20.8	21.0	21.1	21.3	21.4	21.6	21.7	21.9	9
10	22.0	22.2	22.3	22.5	22.6	22.8	22.9	23.1	23.2	23.4	10
11	23.5	23.7	23.8	24.0	24.1	24.3	24.4	24.6	24.7	24.9	11
12	25.0	25.2	25.3	25.5	25.6	25.8	25.9	26.1	26.2	26.4	12
13	26.5	26.7	26.8	27.0	27.1	27.3	27.4	27.6	27.7	27.9	13
14	28.0	28.2	28.3	28.5	28.6	28.8	28.9	29.1	29.2	29.4	14
15	29.5	29.7	29.8	30.0	30.1	30.3	30.4	30.6	30.7	30.9	15
16	31.0	31.2	31.3	31.5	31.6	31.8	31.9	32.1	32.2	32.4	16
17	32.5	32.7	32.8	33.0	33.1	33.3	33.4	33.6	33.7	33.9	17
18	34.0	34.2	34.3	34.5	34.6	34.8	34.9	35.1	35.2	35.4	18
19	35.5	35.7	35.8	36.0	36.1	36.3	36.4	36.6	36.7	36.9	19
20	37.0	37.2	37.3	37.5	37.6	37.8	37.9	38.1	38.2	38.4	20
21	38.5	38.7	38.8	39.0	39.1	39.3	39.4	39.6	39.7	39.9	21
22	40.0	40.2	40.3	40.5	40.6	40.8	40.9	41.1	41.2	41.4	22
23	41.5	41.7	41.8	42.0	42.1	42.3	42.4	42.6	42.7	42.9	23
24	43.0	43.2	43.3	43.5	43.6	43.8	43.9	44.1	44.2	44.4	24
25	44.5	44.7	44.8	45.0	45.1	45.3	45.4	45.6	45.7	45.9	25
26	46.0	46.2	46.3	46.5	46.6	46.8	46.9	47.1	47.2	47.4	26
27	47.5	47.7	47.8	48.0	48.1	48.3	48.4	48.6	48.7	48.9	27
28	49.0	49.2	49.3	49.5	49.6	49.8	49.9	50.1	50.2	50.4	28
29	50.5	50.7	50.8	51.0	51.1	51.3	51.4	51.6	51.7	51.9	29
30	52.0	52.2	52.3	52.5	52.6	52.8	52.9	53.1	53.2	53.4	30
31	53.5	53.7	53.8	54.0	54.1	54.3	54.4	54.6	54.7	54.9	31
32	55.0	55.2	55.3	55.5	55.6	55.8	55.9	56.1	56.2	56.4	32
33	56.5	56.7	56.8	57.0	57.1	57.3	57.4	57.6	57.7	57.9	33
34	58.0	58.2	58.3	58.5	58.6	58.8	58.9	59.1	59.2	59.4	34
35	59.5	59.7	59.8	60.0	60.1	60.3	60.4	60.6	60.7	60.9	35
36	61.0	61.2	61.3	61.5	61.6	61.8	61.9	62.1	62.2	62.4	36

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

MADE IN GERMANY.
R.

