

127

PRINTED BOOK

30/21

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

Book 127.

CH. 39 MULBERRY CORNERS ROAD

EAST TO TOWN LINE

1-28

CHESTER TWP

June, 1933

CHAGRIN RIVER BRIDGE

Mulberry Rd <sup>#39</sup> Sec. G pgs 43-  
Chester Twp Pgs 59-70; & pg 49

Levels on part Mulberry Rd  
#39-sec E Pg 57

Levels on culv'ts in Meadowbrook  
Estates #2 Pg. 29-31

Check Levels Mulberry Rd } Pg 71  
Sec. G } Bridge 1959

1  
7-55

7 HV  
one

rd  
EI  
5

rd  
R. Whitecomb

Hse  
rd

c. Part

rd  
apple

5-31-33  
R. Sperry  
Davidson  
Craw

Cold-Cloudy  
C.H. #39

NOTE: N.S. = STA. PER 1955 SURVEY

1000'

14+00  $\Delta$   $0^{\circ}51'30''$  Rt. } spk set  
0.53.30 (1955) } 6-2-55

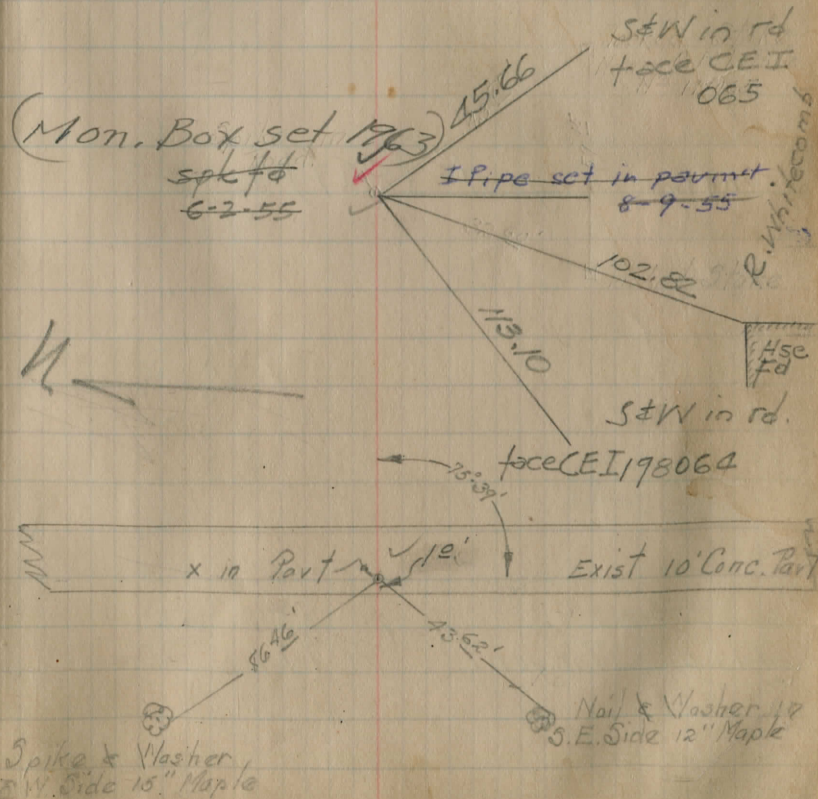
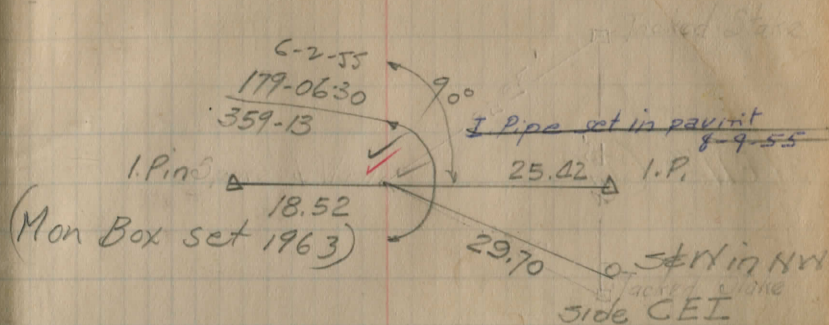
500'

9+00 Tangent (P.O.T.) } 1400'

900'

0+00  $\perp$  Chillicothe Road.

2852.41' E



57-12.5

(8834)  
37+11.76 (P.C.)

225.82'  
to PI

211.76'  
207.14'

35+04.72 Tangent (P.O.T.)

1100' m (55)  
1104.62'  
S 84° 00' E

24+00 Tangent (P.O.T.)

1000'

spt set (55) Nail  $\rightarrow$  302'  $\rightarrow$  Tacked Stake  
90'

45.08 Spike & Washer  
N.E. Side 18"  
Walnut  
SPRAY DRIVE  
Morr. Boxset 1963  
I Pin set in Pavmt  
8-9-55  
Spike set 24.57' S & W  
6-7-55 in W side  
CEI 898945  
11-19-55

m (55)  
1104.62'

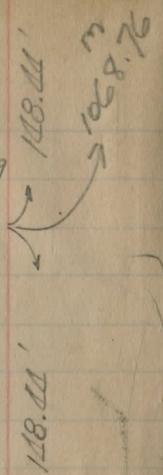
47.98 N & W in N.E.  
Side 42" maple  
37.25 NE 1/4 NE  
side 15"  
elm  
34.25 Nail & Washer  
NW Side  
5" Hickory  
BATTLE

Clear - Warm  
6-1-33

Sperry  
Davidson  
Grau

45+95<sup>45</sup> (P.I.) 11°-50' Lt.

$\Delta = 11^{\circ}50'$   
 $R = 1432.39$   
 $D = 4^{\circ}00'$   
 $L = 295.88'$   
OK →  $T = 148.44'$   
 $E = 7.67'$

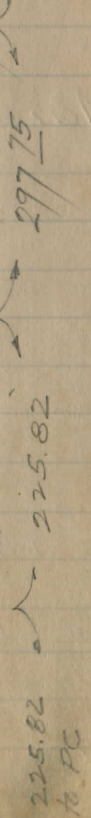


(5299)  
44+47<sup>01</sup> (P.C.)

N 60°-10' E  
297.75

(5074)  
41+49<sup>26</sup> (P.T.)

$\Delta = 35^{\circ}00'$   
 $R = 716.20$   
 $D = 8^{\circ}00'$   
 $L = 437.50$   
 $T = 225.82$   
 $E = 35.76'$



39+37<sup>58</sup> (P.I.) 35°-00' Lt.

6-3-1955

3

170-36-30  
341-13

Mon. Box set 1963  
I.P. set in pasture

I.P.  $\Delta$  34.42  $\checkmark$  spk  $\checkmark$  0 70.72 I.P.

$\Delta = 9^{\circ}23'30''$	Forward	4-4-45
$D = 3^{\circ}12' \checkmark R = 1790.49 \checkmark$	45+0 = 51.62 = 0°50'	3-52
$T = 147.07$	+50 1°-38'	3-04
PC 44+48.38	46+0 2-76	2-16
$L = 293.49$	+50 3-14	1-28
PT = 47+41.87	47+0 4-02	0-40
$E = 6.03$	+41.87 4-41.45	

Nail  $\rightarrow$  300'  $\rightarrow$  Tacked Stake

90°  
spk SW side  
8" thorn-apple? Deflections

41+49.26	= 17°-30'
41+00	= 15°-32'
40+00	= 11°-32'
39+00	= 7°-32'
38+00	= 3°
37+11.76	= 0°

Tacked Stake  
1/4 I.P. set  
6-55

FD July 69

in pasture +  
25' SW of  
culvert

(60<sup>87</sup>)  
56+89<sup>13</sup> (P.T.)

55+07<sup>62</sup> (P.I.) 15°-53' Rt

(25<sup>59</sup>)  
53+74<sup>21</sup> (P.C.)

(57<sup>16</sup>)  
7+42<sup>84</sup> (P.T.)

$\Delta = 15^{\circ}-53'$   
 $R = 954.93$   
 $D = 6^{\circ}-00'$   
 $T = 133.21$   
 $L = 264.72$   
 $E = 9.25$

N 64°-03' E  
40.87

133.21

133.21

N 48°-20' E  
631.57

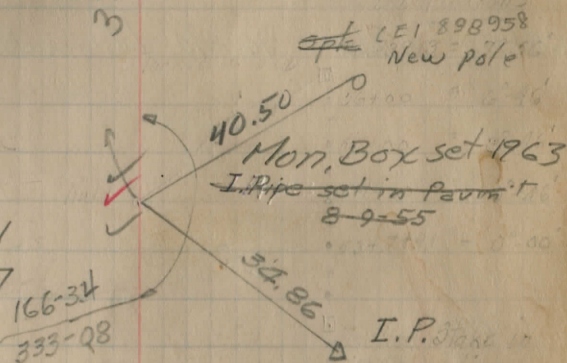
148.40

1068.76

$\Delta = 13^{\circ}-26'$  Rt  
 $D = 5-00$   
 $R = 1145.92$   
 $T = 134.95$   
 $PC = 55+28.61$   
 $L = 268.67$   
 $PT = 57+97.28$   
 $E = 7.92$

PC 55+28.61 6-43  
56+0 = 71.39' 1-47 2-56  
+50 3-02 3-41  
57 4-17 2-26  
+50 5-32 1-11  
PT = 57+97.28 6-43

383.6



Nail

Nail

6-2-33 Hot & Clear

Sperry Davidson Gray

(27<sup>35</sup>)

69+72<sup>65</sup> (P.T.)

560.03

$\Delta = 16^{\circ}40'$   
 $D = 8^{\circ}00'$   
 $R = 716.20'$   
 $T = 104.91'$   
 $L = 208.33'$   
 $E = 7.64'$

68+69<sup>33</sup> (P.I.)  $16^{\circ}40'$  Lt.

104.91

104.91

(35<sup>68</sup>)  
67+64<sup>32</sup> (P.C.)

N 64<sup>0</sup> 03' E

G 14<sup>32</sup>

Sta 60+50 to 62+00 = 50<sup>00</sup>

60+50 Tangent

N.S. 60+45.98

White line = + 59+0

4081

7141.23

Spr 527 757

3836

5

66+60.02 0-00  
67+0 1-30  
67+50 3-30  
68 5-30  
68+50 7-30  
68.95 8-24

N.S. 68+68.35

SPK

N.S. 67+64.93 IP  
E Pin set in pavement  
8-9-55  
(Mon. Box set 1963)

SEWCE1

#898965

Deflections

69+72<sup>65</sup> = 8<sup>0</sup>20'  
69+00 = 5<sup>0</sup>26'  
68+00 = 1<sup>0</sup>26'  
67+64<sup>32</sup> = 0<sup>0</sup>00'

75.12'

25.50

79.19

Tapped stake

SEW

CE1 #898964 3' up

N.S. 66+60.02

719.23

Spr SE 7.6. 6-2-58

Spk (55)

30.35

0 Spk in W side CE1

898960

(PC) <sup>(00<sup>21</sup>)</sup>  
78+99.29

121.69'

86.91

N 78° 09'

<sup>(87<sup>62</sup>)</sup>  
78+12<sup>38</sup> (PT)

113.31

76+75<sup>29</sup> (P1) 30°-46 Pt.

Δ = 30°-46 Pt.  
D = 11°-00  
T = 143.31  
R = 520.87  
L = 279.70  
E = 19.36

143.31

<sup>(67<sup>32</sup>)</sup>  
75+32<sup>68</sup> (PC)

560.03

N 47° 23'

N.S.  
77+95.09

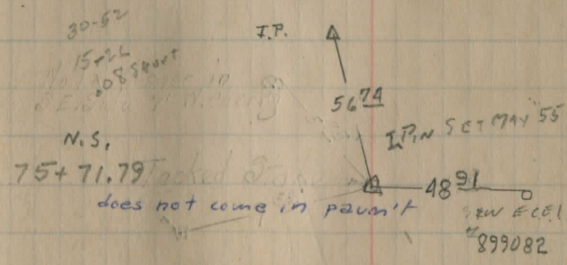
Iron

N.S.  
77+108.18

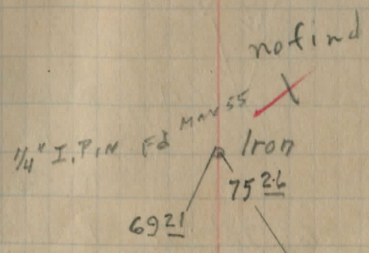
Iron

Deflections

- 78+1238 = 15°-23'
- 78+00 = 14°-42'
- 77+00 = 9°-12'
- 76+00 = 3°-42'
- 75+3268 = 0°-00'



N.S.  
74+28.48



- 108.18 = 15-23
- 77 = 14-56
- 76 = 12-11
- 75 = 9-26
- 74 = 6-41
- 73 = 3-56
- 72 = 1-11

SW 087-CE1 899483

SW 087-CE1

6-3-33 Warm & Partly Cloudy

Sperry  
Davidson  
Grau (50.34)  
86+19.66 (P.T.)

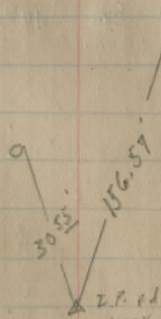
85+09.18 (P.I.) 11°-05' Lt.

$\Delta = 11^{\circ}-05' Lt$   
 $D = 5^{\circ}-00'$   
 $R = 1145.92'$   
 $T = 111.19$   
 $L = 221.67$   
 $E = 5.38$

Fd  
A-55

(20')  
83+97.99 (P.C.)

(P.T.) 61.62  
81+38.38  
SPK. SE.  
Side GET



$\Delta = 26^{\circ}-18'$   
 $D = 11^{\circ}-00'$   
 $R = 520.87'$   
 $T = 121.69'$   
 $L = 239.09'$   
 $E = 14.03$

80+20.22 (P.L.I.) 26° 18' Pt.

121.69

N.S.  
85+15.46

115.46 = 5-32-30  
85 = 5-09  
+50 = 3-54  
84 = 2-39  
+50 = 1-24  
83 = 0-09-19

Spk H side  
7" Map.  
71.45  
Nail & Washer N.E.  
Side 15" Maple  
Deflections

N.S. W side  
84+04.98  
33.49' Iron

Nail & Washer  
E. Side 12" Apple

E Pin set in pavement  
8-9-55  
Man Box set  
1963

86+19.67 = 5°-33'  
86+00 = 5°-03'  
85+00 = 2°-33'  
84+00 = 0°-03'  
83+97.99 = 0°-00'

1/4" Iron rod  
fd 9-1-46

N.S.  
82+93.79

+34.18 = 13-08-54  
80 = 11-16  
+50 = 8-31  
79 = 5-42  
+50 = 3-01  
78 = 0-16-06

N.S.  
80+34.18

Iron.

Spk NE side  
end Map.

SPK & Washer in  
S.E. Side 8" W. Cherry  
(Blaze & Y)

does not come in pavement

PIPE SET 4-29-55

79+16.78  
N.S.

94.20  
14.30  
Iron

Spk E. side  
18" Ch. (twin)

VERT SEW North Knee  
CHERRY CUMPA

Deflections

81+38.38 = 13°-09'  
81+00 = 11°-02'  
80+00 = 5°-32'  
79+00 = 0°-02'  
78+99.22 = 0°-00'

94+24<sup>19</sup> (P.I.)

89°-15' Rt.

586°-08'E

427.19  
212424  
277.95

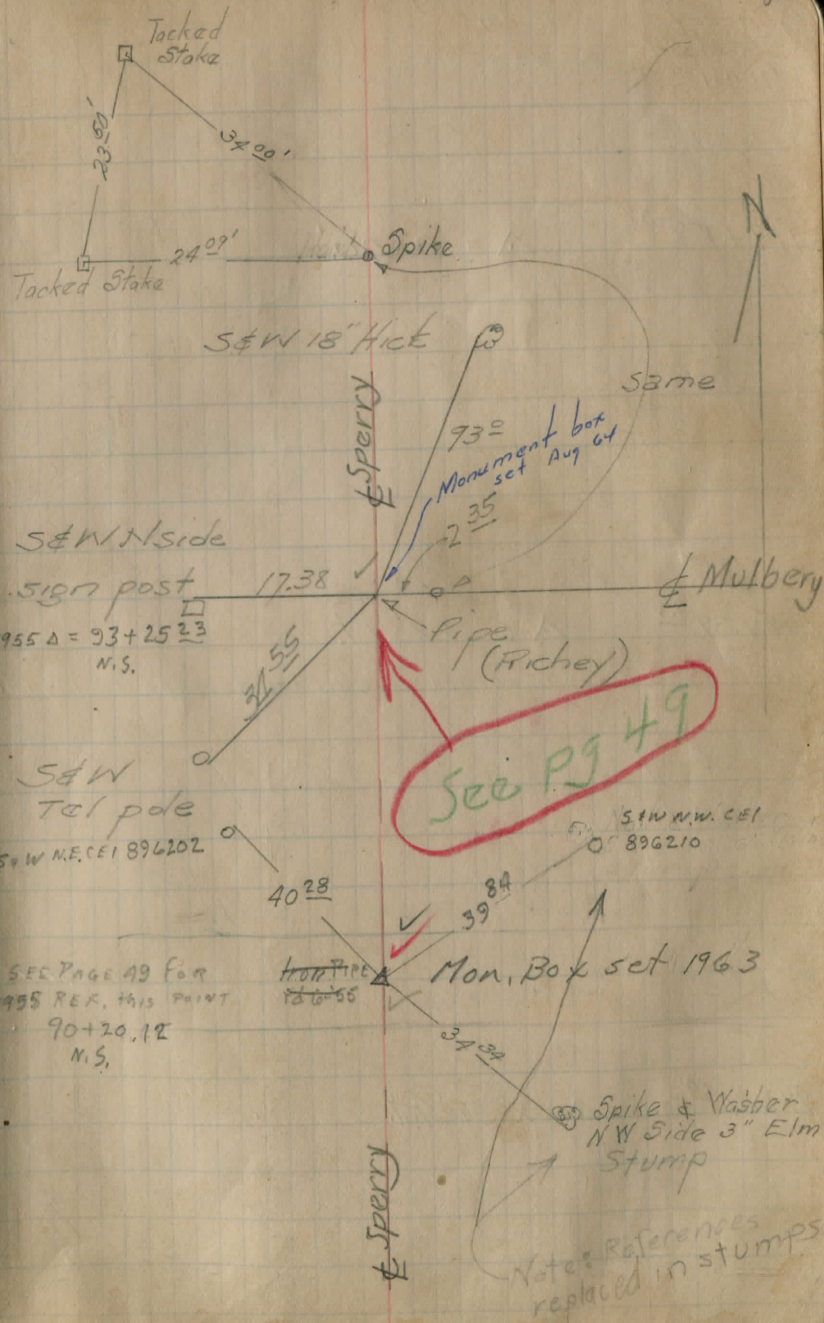
mon

N 32° 47' E

91+24<sup>24</sup> (P.I.)

89°-35' Lt.

586°-38'E



6-5-33  
A Sperry  
Davidson  
Grall

Partly Cloudy  
Warm

119+88<sup>37</sup>  $\Delta = 0^{\circ}-00'$

119+88.37  
108 39.93  

---

1148.44

584 = 42' E

108+39<sup>93</sup>  $\Delta 0^{\circ}-22' Lt.$

NOTE - 1933 PLANS IN DRAWER SHOW HEATH Rd. TO BE STA 109+00

10839.93  
97 31.10  

---

1108.83

584 = 20' E

97+31<sup>10</sup>  $\Delta 2^{\circ}-38' Rt.$

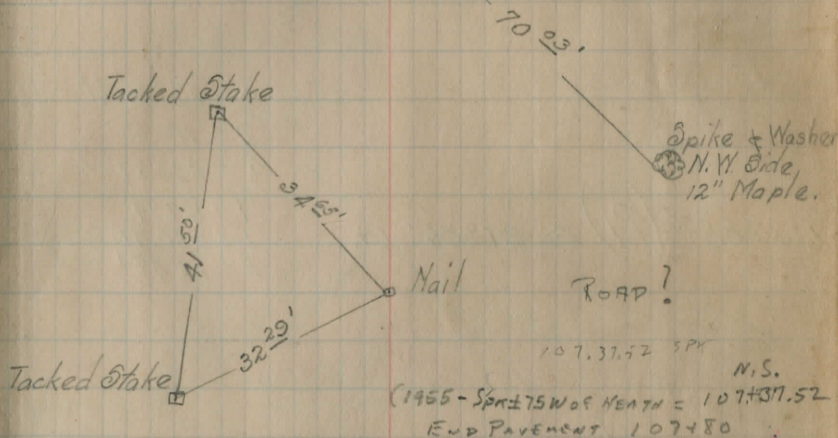
9731.1  
9424.2  

---

306.9

See F.B. 96 Pg. 60 for survey of Mulberry Rd.  
From Heath Rd to Fowlers Mills Rd.  
Sept. 55

$\pm 1080'$  E of  
Heath Rd. Iron  
I.P. td. Aug. 55



107.37.52 SPK N.S.  
(1955 - SPK  $\pm 75'$  W OF HEATH = 107+37.52  
END PAVEMENT 107+80

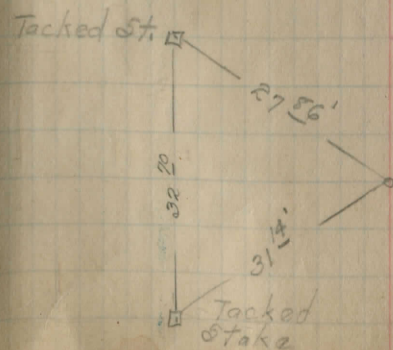
Note: 94+20.19 to  
119+88.37 made tang.  
for straightening of  
bridges 1945

See pg 9 for Re-  
vised  $\Delta$  Sperry Rd  
easterly to 119+88<sup>37</sup>  
1948

9731.10  
9424.19  

---

306.9



6-6-33

Clear & Hot

Sperry  
Davidson  
Grou

135+74<sup>58</sup> 58° 58' P<sub>9</sub> End of Project Town Line

(88<sup>49</sup>)  
135+11<sup>53</sup> (P.T.)

N 67° 42' E

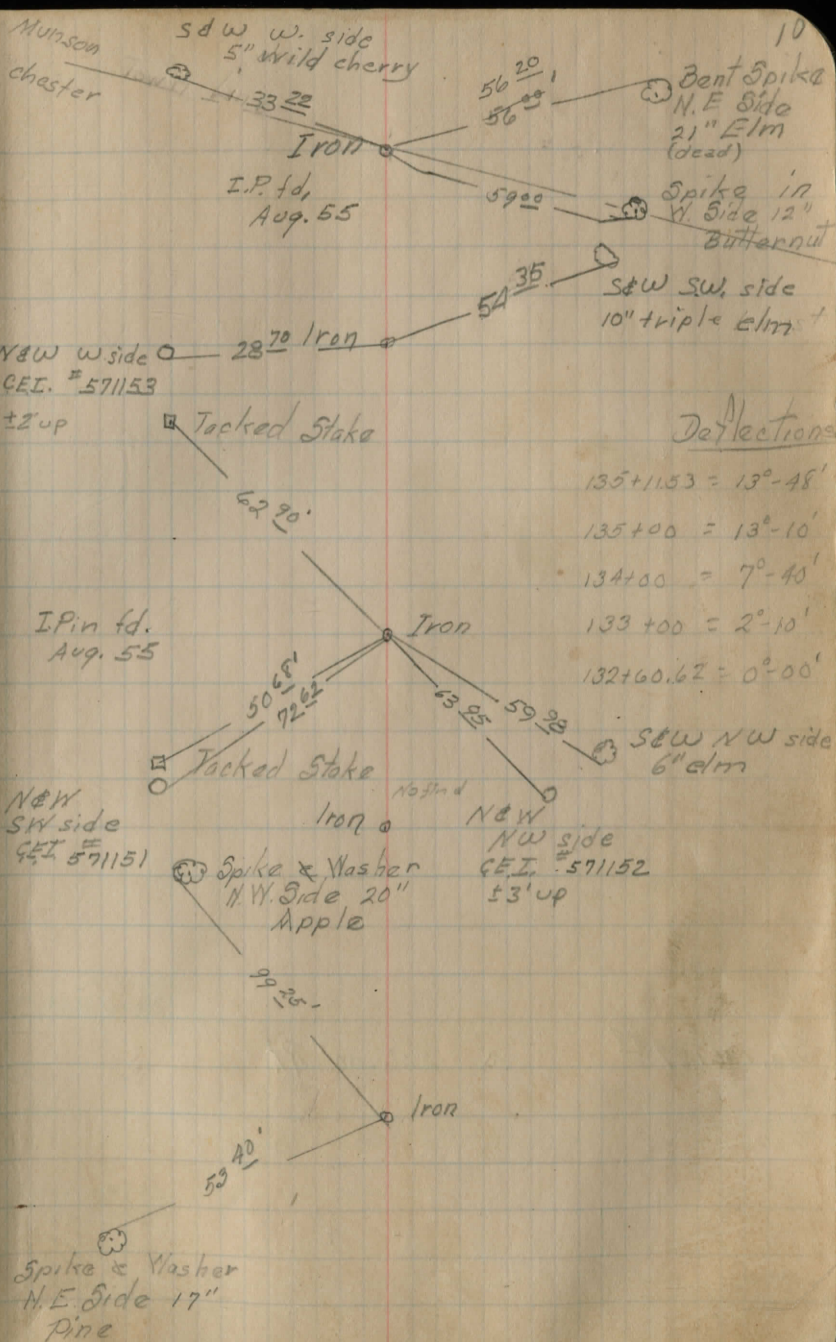
$\Delta = 27^{\circ} 36' \text{ Lt}$   
 $D = 19-00'$   
 $R = 520.87$   
 $T = 127.94$   
 $L = 250.91$   
 $E = 15.48'$

133+88<sup>56</sup> (P.I.)  $\Delta 27^{\circ} 36' \text{ Lt}$

(39<sup>38</sup>)  
132+60<sup>62</sup> (P.C.)

127+06<sup>75</sup>  $\Delta = 0^{\circ} - 00'$

S 84° 42' E



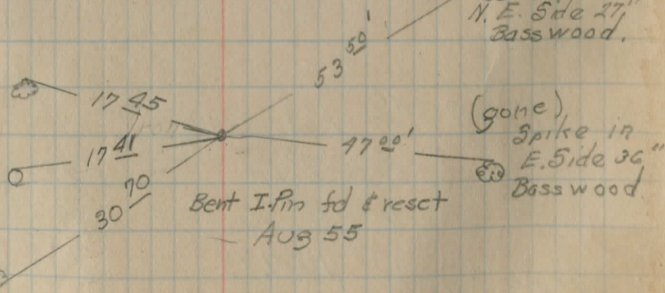
Sta. 136+87<sup>58</sup>

△ 26°-00' Rt

SW E. side  
12" Basswood

SW E. side  
C.F.I. #

SW SW side  
10" Basswood



10/7/33

12

Location Line B Relocation Sta 44+10 to Sta 57+

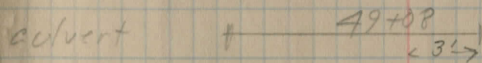
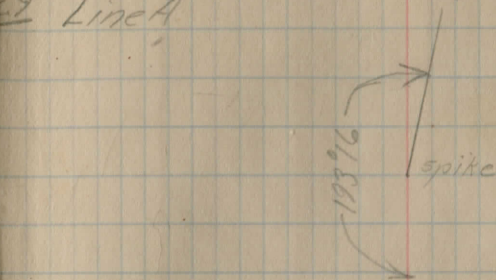
47.11' PT+  
Sta 56+82.50

Note: - Sta 57+92.56 Line B = Sta 57+97.29 Line A

4.73' station

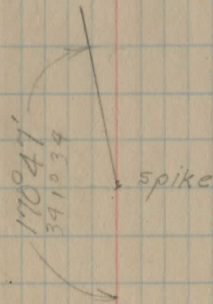
Sta 56+82.50 PI Def Rt 13%<sup>6</sup>

Curve Data	$\Delta - 13^{\circ}16'$	55+71.45 - 0°00'
	D - 6°	56+00 - 0°51'
	T - 111.05	57+00 - 3°51'
	E - 6.4	57+92.56 - 6°38'
	L - 221.11	
	PC - 55+71.45	
	PT - 57+92.56	



Sta 45+95.45 PI Def Lt 9°13'

Curve Data	$\Delta - 9^{\circ}13'$	44+10.70 - 0°00'
	D - 2°30'	45+00 - 1°07'
	T - 184.75	46+00 - 2°22'
	E - 7.4	47+00 - 3°37'
	L - 368.66	47+79.36 - 4°36'
	PC - 44+10.70	
	PT - 47+79.36	





Sperry  
Davidson  
Grau

PROFILE.

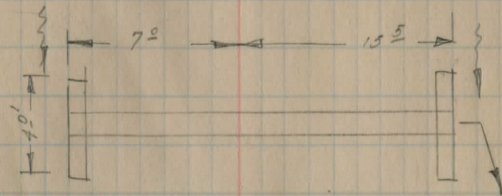
6-6-33  
Clear & Hotter

B.M. 4.17 1138.95 1134.78

Staple in S.E. Root Maple Stump. Sta 206+ on Chillicothe Rd.

0+00 6.31 32.64

0+64 Culvt 2x2x22<sup>e</sup> Stone Box  
if New Build  
Poor Condition (Hillside Hdw)  
on Lt



5.25 33.70

2.9 3.2 4.0 7.3 4.7 5.1 5.25 5.8 4.8 7.9 8.1 5.8 6.6  
30 26 13 FL Hdw 6.0 14.5 Hdw. FL. 20 23.5 30

1+00 5.0 33.95

2+00 2.8 36.15

T.P. 10.53 1149.28 0.20 1138.75

3+00 10.1 39.2

B.M. 5.30 1143.98

Spike & Washer South Post 24" Hickory Sta 3+60 Lt 25

4+00 7.1 42.2

5+00 3.7 45.6

6+00 1.1 48.2

T.P. 4.08 1153.31 0.05 1149.23

1153.31

7+00		2.5	1149.8
8+00		2.0	51.3
9+00		2.3	51.0
10+00		4.5	48.8
11+00		6.7	46.6
12+00		8.3	45.0
13+00		9.8	43.5
14+00		12.1	41.2
T.P.	0.20	11.98	1141.33
6-7-33	Clear-Hot		
15+00		2.8	38.7
16+00		5.0	36.5
17+00		7.6	33.9
+50		9.5	32.0
18+00		13.1	28.4
T.P.	0.81	13.09	1128.44
			1129.25

1129.25

19+00 6.9 22.4

20+00 9.6 19.7

21+00 11.3 18.0

22+00 12.7 16.6

T.P. 0.43 1116.63 13.05 1116.20

23+00 1.7 14.9

24+00 4.7 11.9

25+00 8.5 08.1

26+00 10.6 06.0

27+00 12.1 04.5

T.P. 3.65 1107.31 12.97 1103.66

28+00 4.9 1102.7

29+35 Water Cross Over. Suggest 10" Pipe.

29+00 5.9 01.4

B.M. 3.60 1103.71

30+00 5.9 01.4

Spike &amp; Washer S.W. Root 30" Maple 29+10 Lt. 28'

1107.31

31+50 5.6 01.7

32+00 6.7 00.6

31+90  $\pm$  10 Vit Pipe Culvert  
Filled with Dirt 6.6 00.7

33+00 6.6 00.7

34+00 7.1 00.2

35+00 7.3 1100.0

+50 8.8 1098.5

36+00 11.3 1096.0

T.P. 0.05 1094.41 12.95 1094.36

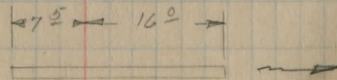
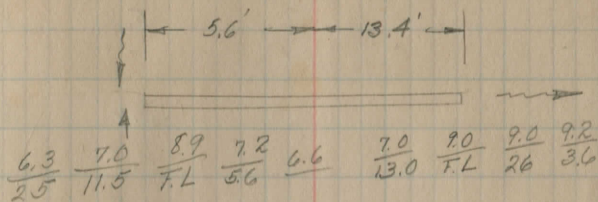
37+00 2.5 91.9

38+00 7.7 86.7

39+00 12.9 1081.5

4.15 1085.80 12.74 1081.65

39+60  $\pm$  10" Vit P. Culvert  
Good Condition 115.4 80.4



7.6 5.0 6.1 8.5 5.9 5.4 6.0 9.3 9.5  
30 19.5 10.0 F.L. 7 14 F.L. 30

1085.80

40+00		5.5	1080.3
41+00		5.2	80.6
42+00		3.7	82.1
43+00		0.8	85.0
44+00		3.1	82.7
45+00		3.4	82.4
T.P.	5.46	1088.06	3.20 1082.60
44+85	12" C.I.P. & Vit. P. Culvt. abandon and carry flow to East		
B.M.		3.74	1084.32
46+00		6.0	82.1
+50		8.0	80.1
47+00		10.8	77.3
T.P.	0.12	1075.36	12.82 1075.24
48+00		6.0	69.4
49+00		7.7	65.7

Spike in W Side of E. Twin of Twin Osage 45+53  
Rt. 23'

1075.36

49+07 12" Vit Pipe Culvert 9.7 1065.7  
Fair Condition

50+00 9.2 66.2

51+00 9.7 65.7

52+00 10.8 64.6

+40 12" Corr. I.P. & Vit P. Culvert 11.1 64.3  
Good Condition

53+00 11.1 64.3

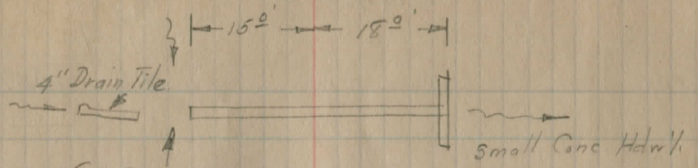
54+00 11.0 64.4

55+00 11.6 1063.8

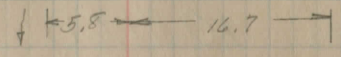
T.P. 2.00 1064.48 12.88 1062.48

56+00 3.5 61.0

57+00 4.5 60.0



11.9 12.0 14.8 14.8 11.5 10.5 9.7 10.9 13.3 16.7 17.7 15.1 19.0  
30 18.0 17.0 F.L. 13 11.0 14 18 F.L. 18 30 30  
Bank Ditch



9.4 9.9 11.5 12.8 11.4 11.1 11.9 13.0 14.0 17.4  
36 20 6.5 F.L. 5.8 15 16.7 16.7 30  
F.L.

5507.62

5240

267.62

5507.62

4907

600.62

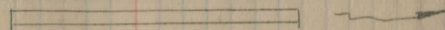
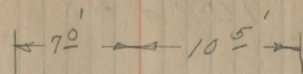
1064.48

20

58+00			4.7	1059.8
59+00			3.3	61.2
725			2.9	61.6
60+00			5.7	58.8
Sta 60+50 to 62+00 - 50 <sup>00'</sup> ?				
62+00			7.4	57.1
T.P.	0.03	1051.68	12.83	1051.65
63+00			3.3	48.4
64+00			11.1	40.6
T.P.	0.99	1039.98	12.69	1038.99
65+00			5.9	35.1
66+00			11.2	28.8
T.P.	0.11	1027.02	13.07	1026.91
67+00			1.8	25.2
68+00			4.2	22.5

1027.02

68+31	12" Vit. Pipe	1.5	1022.5
	Partly Fill with Dirt.		
69+00		5.6	22.4
70+00		7.9	19.1
71+00		10.4	16.6
72+00		11.8	15.2
B.M. No. 17	2.00	1017.80	11.22
73+00		4.5	13.3
74+00		5.5	12.3
75+00		8.0	09.8
T.P.	0.99	1006.48	12.31
76+00		3.6	1002.9
77+00		10.1	996.4
78+00		13.0	993.5
79+00		12.6	993.9
80+00		7.4	999.1
+50		7.1	999.4



L	$\frac{5.8}{20}$	$\frac{5.4}{10}$	$\frac{6.9}{90-FL.}$	$\frac{5.0}{7.0}$	4.5	$\frac{5.1}{9}$	$\frac{7.0}{10.5}$	$\frac{8.1}{FL.}$	$\frac{7.7}{2.3}$	$\frac{8.6}{3.6}$
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Spike & Washer in N. Post 15" Poplar Rt. 20' to 71+70

1006.48

22

81+00			9.6	996.9
82+00			12.1	994.4
T.P.	1.75	997.43	10.80	995.68
B.M.			1.85	995.58
83+00			5.0	992.4
84+00			8.6	988.8
+50			11.0	986.4
T.P.	0.21	984.78	12.86	984.57
85+00			2.2	982.6
86+00			11.4	973.4
T.P.	0.09	972.18	12.69	972.09
87+00			9.1	963.1
T.P.	0.15	959.43	12.90	959.28
88+00			2.3	957.1
89+00			6.0	953.4

Spike &amp; Washer in N.W. Root 18" Maple Sta 82+04 Pt. 22'

14.6  
6.9  
75.5  
959.43

90+00			7.0	952.4
91+40				
91+80			6.2	953.2
92+00			7.5	951.6
93+00			10.4	949.0
94+00			12.1	947.3
95+00			12.7	946.7
T.P.	0.12	946.75	12.80	946.63
96+00			0.7	946.1
97+00			0.7	946.1
98+00			4.6	942.2
99+00			12.5	934.3
			12.75	934.0
T.P.	0.14	934.23	12.66	934.09
			1.3	932.9
			15.5	918.7

8" Drain Tile Under Road on Skew and Continues through Field (Suggest C.B. on Rt)

Floor at W. End of Bridge

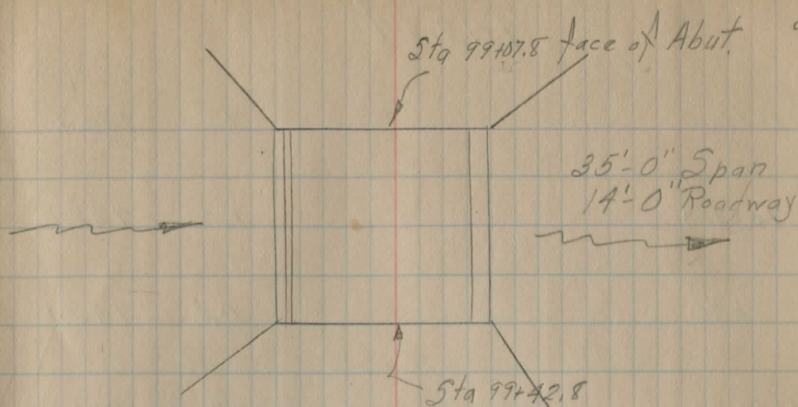
Floor at E. End of Bridge

F.L. of River

934.23

Bridge over East Branch  
of Chagrin River  
Steel Truss with Wood Floor  
Conc & Stone Abuts

B.M.		2.25	✓ 931.78
100+00		4.2	930.0
101+00		7.0	927.2
102+00		7.9	926.3
103+00		8.5	925.7
104+00		6.3	927.9
105+00		3.7	930.5
106+00		✓ 0.9	933.5
T.P.	10.99	945.14	0.08 934.15



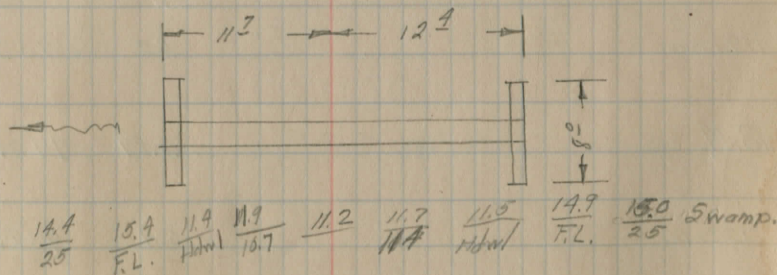
X in S. End of Bridge Seat on East Abut 99+43

See BM next pg

107+00	9.0	936.1
108+00	3.0	942.1
+50	0.0	945.1
109+00	3.7	941.4
+50	8.2	936.9
110+00	9.8	935.3
B. 17.	8.07	937.07
111+00	11.1	934.0
+42		
2 <sup>5</sup> x 2 <sup>2</sup> Stone & Conc. Box.		
Not Large Enough		
Clean Outlet & Inlet.	11.2	933.9
112+00	11.7	933.4

= HEATH RD PER 1933 PLAN IN DRAWER.

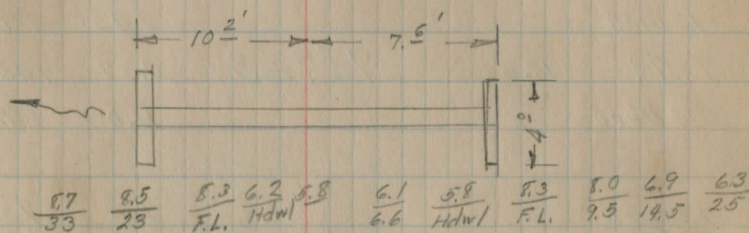
Spike &amp; Washer in S.E. Post 27" Maple Sta 109+52 H. 33'



945.14

113+00		10.6	934.5	
114+00		11.0	934.1	
115+00		6.4	938.7	
T.P.	6.50	945.39	6.25	938.89
116+00		5.6	939.8	
117+00		2.7	942.7	
118+00		6.0	939.4	
+28	Stone & Conc. Box	5.8	939.6	
119+00		5.8	938.6	
B.M.		2.89	942.50	
120+00		6.4	939.0	
121+00		6.0	939.4	

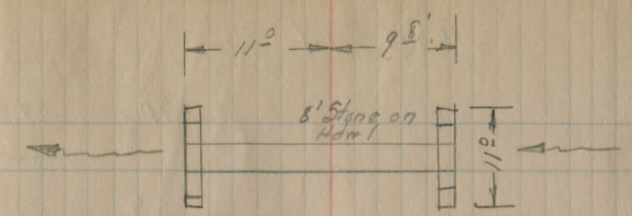
26



Spike &amp; Washer in N. Root 16" Walnut 119+55 Pt. 28'

945.39

121+35 3x3 Stone Box. 5.1 948.3  
Poor Condition



122+00 4.8 948.6

123+00 4.8 941.1

124+00 3.1 942.3

125+00 1.4 941.0

T.P. 12.61 957.63 0.37 945.02

126+00 11.0 946.6

127+00 2.4 955.2

T.P. 12.60 969.90 0.23 957.10

128+00 10.9 959.0

129+00 7.0 962.9

130+00 0.0 969.9

T.P. 12.77 982.44 0.23 969.67

131+00 1.1 981.3

T.P. 12.79 995.14 0.09 982.35

9.6/36 9.3/23 9.3 F.L. 4.0 Hdwl 5.2/9 5.1 5.2/7.8 4.0 Hdwl 9.6 F.L.-12 8.1/15 7.3/25 7.0/30

995.14

132+00			70	988.1
133+00			2.3	992.8
T.P.	12.58	1007.50	0.22	994.92
134+00			8.6	998.9
T.P.	12.94	1020.19	0.25	1007.25
135+00			11.6	08.6

135+74 <sup>58</sup>			3.6	16.6
				1015.96
			3.43	1016.76

B.M.			6.56	1013.63
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SEE PAGES 5420 - THEN GUESS THE STATION

Spika & Washen N. Root 24" Elm. 136+19 Rt 45'

7-9-59 Ditch Levels In  
 H. Patterson  
 D. Ridener  
 P. Evans  
 Chester Twp "Meadowbrook Estates"  
 #2

	+	H/I	-	Elav.
B.M. #1	2.16	102.16		100.00
Inlet F/L			9.2	92.96
" Top Pipe			7.8	94.36
4 Road Bell and outlet F/L			6.1	96.06
" Top-pipe			9.4	92.96
+50			7.8	94.36
+10			8.8	93.36
+50			9.0	93.16
1+50			9.7	92.36
2+0			9.9	92.26
2+50			10.2	91.96
3+00			10.5	91.66
3+50			11.7	90.46
TP	2.41	99.25	5.32	96.84
BM #2			2.05	97.20
Inlet F/L			7.1	92.15
Inlet Top pipe			5.8	93.45
4 Road Bell and outlet F/L			4.5	94.75
" Top pipe			7.3	91.95
+50			5.8	93.45
+100			7.1	92.15
+150			7.6	91.65
2+00			7.5	91.75
2+50			7.5	91.75
2+50			8.2	91.05

Hort Spk N Side CEI #133149 4th Pole SE from + With  
 Kirkwood Dr on Cranwood Dr.

No Apparent Ditch - overflows Thru Field

Hort spk N. Side CEI #133162

99.25

3+00			9.0	90.25
T.P.	3.60	101.35	1.50	97.75
T.P.	5.28	98.32	8.31	93.04
BM #3			3.49	94.83
Bell and Inlet F/L			7.9	90.42
" Top pipe			6.1	92.22
& Rd.			5.2	93.12
outlet F/L			8.3	90.02
" Top pipe			6.8	91.52
+50			8.8	89.52
1+00			9.1	89.22
1+50			9.8	88.52
T.P.	1.84	95.16	5.00	93.32
T.P.	5.00	89.83	10.33	84.83
B.M. #4			4.33	85.50
Bell and Inlet F/L			9.2	80.63
" Top pipe			6.6	83.23
& Rd.			5.0	84.83
outlet F/L			9.4	80.43
" Top Pipe			7.4	82.43
+50			9.9	79.93
1+06			10.1	79.73
1+50			10.6	79.23
T.P.	4.01	93.34	0.53	89.33
T.P.	4.89	88.27	9.96	83.38

This Point ± 50' South of 12" Field Drain tile

Hort Spk N. Side CEI # 133166

Hort Spk S. Side CEI # 133187 last Pole on Kirkwood Dr.

	+	HI	-	Elev.
		88.27		
BM <sup>#</sup> 5			5.33	82.94
Ball and Inlet F/L			10.1	78.17
" Top pipe			8.1	80.17
4 Rd			5.1	83.17
Outlet F/L			9.4	78.87
" Top Pipe			7.4	80.87
7.50			10.0	78.27
17.06			10.5	77.77
17.50			11.5	76.77
T.P.	9.28	94.83	2.72	85.55
T.P.	11.82	99.95	7.20	87.63
T.P.	8.44	102.22	5.67	93.78
BM <sup>#</sup> 1			2.02	100.20



Foreman's Record -

Aug 14<sup>th</sup>

Fair

Started work Grubbing at  
East end 8 men working  
Grading outfit on job  
Tractor Blower 2 Ton Truck  
cut Brush sta 135+00 To  
Sta 120+00

15<sup>th</sup>

Fair

8 men worked on cleanup  
-1- Tractor -1- Truck -

16<sup>th</sup>

Fair

Started Grading Sta 135+74  
To Sta 126+00 - Two Men  
Blowing Stumps Truck &  
5 men working on cleanup

17<sup>th</sup>

Fair

Grading outfit worked Sta 135+74  
To Sta 126+00 6 men Truck  
worked on cleanup

Aug 18<sup>th</sup>

Fair

Grading outfit worked Sta 135+74  
To Sta 126+00 2 men working on  
cleanup 5 men working on Backslopes

21<sup>st</sup>

Fair

Grading outfit worked Sta 135+74  
To Sta 126+00 10 men working  
on Backslopes

22<sup>nd</sup>

Fair

Grading outfit worked Sta 135+74  
To Sta 126+00 10 men working on  
Backslopes

23<sup>rd</sup>

Cloudy in A.M. Fair in P.M.

Grading outfit worked Sta 135+74  
To Sta 122+00 11 men worked  
on Backslopes

Aug 24<sup>th</sup> Cloudy A.M. Fair in P.M.  
Grading outfit worked STA 135+75  
To STA 122+00 11 men working  
on Backslopes

25<sup>th</sup> Fair  
Grading outfit worked STA 135+75  
To STA 122+00 11 men worked  
on Backslopes

28<sup>th</sup> Cloudy  
Grading outfit worked STA  
118+00 To STA 125+00  
Put in 15" culvert STA 118+25  
11 men working

29<sup>th</sup> Fair  
Grading outfit worked STA 116+00  
To STA 125+00 13 men working  
on Ditches

30<sup>th</sup> Fair  
Grading outfit worked STA 116+00  
To STA 125+00 13 men working

Aug 31<sup>st</sup> Cloudy in A.M. Fair in P.M.  
Grading outfit worked STA 125+00  
To STA 115+00 13 men working

Sep 1<sup>st</sup> Fair  
Grading outfit worked  
STA 106+00 To 112+00  
Put in Driveway Pipe  
STA 115+90 — 114+10  
13 men working

Sep 5<sup>th</sup> Fair  
Grading outfit worked on cut  
STA 108+00 Truck and 6 men  
worked on cut STA 99+00  
8 men working on Backslope

Sep 6<sup>th</sup> Fair  
Grading outfit worked STA 108+00  
Truck and 6 men worked on cut  
STA 99+00 8 men worked on Backslopes

Sep 7<sup>th</sup>

Fair

Grading outfit worked sta 108+00  
Truck and 6 men worked on cut  
sta 99+00 8 men worked on  
Backslopes sta 108+00

8<sup>th</sup>

Fair

Grading outfit worked sta 99+00  
To 108+00 Truck and 6 men  
working on cut sta 99+00  
7 men worked on Backslopes

9<sup>th</sup>

Fair

Grading outfit worked sta 99+00  
To sta 108+00. 6 men and truck  
worked on cut sta 99+00  
6 men worked on Backslopes

11<sup>th</sup>

Rain 9 A.M.

Grading outfit worked sta 99+00  
13 men worked in Ditches  
2 1/2 hrs  
Put in corr pipe sta 103+21  
32' - 12" from Chester Turn. Trustees

12<sup>th</sup>

Fair

Grading outfit worked on fine grade  
sta 125+00 To sta 125+74 - 5 men  
and truck worked on cut sta 99+00  
8 men worked on Ditch sta 103+21  
To sta 104+00 - L

13<sup>th</sup>

Fair

Grading outfit worked on fine grade  
sta 125+74 To sta 108+00 Put in  
Driveway pipe sta 101+90 - A -  
Laid storm sewer sta 125+96  
To sta 127+11 = 125' of 12" tile  
Truck and 5 men worked on cut  
sta 99+00 8 men worked on  
Ditches

14<sup>th</sup>

Cloudy light Rain in A.M.

Grading outfit worked sta 99+00  
To sta 105+00. Truck and 8 men  
worked on cut sta 99+00  
Put in Driveway pipe sta  
104+00 - L - 12"

Sep 15<sup>th</sup> Cloudy  
Grading outfit worked Sta 94+00  
To Sta 105+00 Truck and 12 men  
worked on cut Sta 99+00

Sep 16<sup>th</sup> fair  
Grading outfit worked Sta 105+00  
To Sta 94+00 Truck and 8  
men worked on cleanup

18<sup>th</sup> fair  
Grading outfit worked Sta  
105+00 To 91+00 8 men  
worked on cleanup

19<sup>th</sup> Fair in A.M. Rain in P.M.  
Grading outfit worked Sta 94+00  
To Sta 90+00 7 men worked on  
Backslopes 2 men Blowing  
stumps

20<sup>th</sup> fair in A.M. Rain in P.M.  
Grading outfit worked Sta 80+00  
To 70+00 Put in 10" corr  
pipe culvert Sta 88+90  
12" corr EXT Sta 52+40  
10 men working on Backslopes

21<sup>st</sup> Rain  
No work

22<sup>nd</sup> fair  
Put in 15" corr pipe culvert  
Sta 0+50 2 men shunting  
Gravel

25<sup>th</sup> fair  
Started Laying Gravel Sta 135+75  
To Sta 131+00 = 474'  
Grading outfit worked subgrade  
Sta 135+74 To Sta 90+00  
3 men worked on grade 11 men on  
Gravel 2 Trucks Hauling

26<sup>th</sup> Fair in A.M. Rain in P.M.  
Grading outfit worked Sta  
90+00 To Sta 82+00 Laid  
Gravel Sta 131+00 To  
Sta 124+25 = 675'  
2 Trucks Hauling 12  
men working

Sep 27<sup>th</sup>

Rain

Grading outfit worked sta 90+00  
To sta 82+00 Laid Gravel  
Sta 124+25 To sta 121+90 = 235'  
2 Trucks Hauling 12 men  
working

28<sup>th</sup>

cloudy

Grading outfit worked sta 80+00  
to sta 90+00 Laid Gravel sta  
121+90 To sta 115+90  
Sta 108+50 To sta 109+75 = 75'  
2 Trucks Hauling 11 men working

29<sup>th</sup>

Fair

Grading outfit worked  
Sta 78+00 To sta 90+00  
2 men worked on Backslopes  
Laid gravel sta 109+75 To  
Sta 115+90 = 615'  
2 Trucks Hauling 11 men  
working

Oct 2<sup>nd</sup>

Fair

Grading outfit worked sta 94+00  
To sta 82+00 2 men worked  
on Backslopes Laid Gravel  
Sta 99+25 To sta 106+75 = 750'  
2 Trucks Hauling 19 men  
working

3<sup>rd</sup>

Fair

Grading outfit worked sta 91+00  
To sta . 3 men worked on  
Backslopes Laid Gravel sta 106+75  
To 108+50 = sta 91+25 To sta 96+75  
= 675' 2 Trucks Hauling 11 men  
working

4<sup>th</sup>

Fair

Grading outfit worked sta 69+00  
To sta 79+00 2 men worked on  
Backslopes Laid Gravel sta 96+75 To  
99+00 - sta 80+00 To 96+75 = 915'  
13 men working

Oct 5<sup>th</sup> Cloudy Light Rain  
Grading outfit worked sta  
69+00 To sta 78+00 4 men  
worked on Backslopes  
Laid Gravel Sta 76+75 To  
Sta 91+75

Fair

6<sup>th</sup> Grading outfit worked sta  
69+00 To sta 62+00 Put in  
culvert EXT- sta 68+35 R- and L-  
16' 10" V.P. Put in Driveway-  
Pipe sta 71+75 R. 10"  
Bladed Gravel in P.M.  
7 men working

9<sup>th</sup> Cloudy  
Grading outfit worked sta  
61+00 To sta 68+00 9 men  
worked on Backslopes

10<sup>th</sup> Cloudy  
Grading outfit worked sta  
58+00 To 68+00 Put in Driveway  
Pipe sta 64+75-L 9 men  
worked on Backslopes

Oct 11<sup>th</sup> Cloudy  
Grading outfit worked sta 50+00  
To sta 58+00 9 men worked on  
Backslopes

12<sup>th</sup>

Grading outfit worked sta 50+00  
To sta 58+00 Relaid corr pipe  
culvert sta 52+40. Extended  
V.P. Culvert sta 49+00 16' 12" - R-  
Extended V.P. Culvert sta 39+50  
12' - 12" - R- 7 Men  
Working on Banks

13<sup>th</sup> Cloudy

Grading outfit worked sta 50+00  
To sta 58+00 9 men worked  
on Backslopes

Oct-16<sup>th</sup> Fair in A.M. Cloudy in P.M.  
Grading outfit worked  
Sta 45+00 To Sta 52+00  
8 Men worked on Backslopes

17<sup>th</sup> Fair  
Grading outfit worked  
Sta 45+00 To Sta 52+00  
Put in Driveway Pipe  
Sta 51+60-L- 8 Men  
worked on backslopes

18<sup>th</sup> Rain No work

19<sup>th</sup> Cloudy  
Grading outfit worked  
Sta 45+00 To Sta 52+00  
6 Men worked on Backslopes

20<sup>th</sup> Cloudy  
Grading outfit worked Sta  
40+00 To Sta 52+00 7 men  
working on Backslopes

Oct 21<sup>st</sup> Fair  
Grading outfit worked Sta 40+00  
To Sta 55+00 4 Men working  
on Backslopes 3 men on Cleanup  
Pulled Hedge Sta 40+00 To  
Sta 48+00 in A.M.

Oct 23<sup>rd</sup> Fair  
Laid Gravel Sta 67+00 To Sta  
74+00 = 700' 3 Trucks  
Hauling 14 men working on Gravel  
Grading outfit worked Sta 35+00  
To Sta 45+00

24<sup>th</sup> Cloudy in A.M. Rain in P.M.  
Laid Gravel Sta 74+00 To Sta 77+50  
Sta 55+00 To Sta 79+25 = 775'  
3 Trucks Hauling 15 men on Gravel  
Grading outfit worked Sta 35+00  
To Sta 45+00

Oct 25 Cloudy Light Snow  
Grading outfit worked  
Sta 35+00 To Sta 45+00  
6 men working

26<sup>th</sup> cloudy cold  
Grading outfit worked Sta  
35+00 To Sta 55+00 8 men  
worked on Backslopes

27<sup>th</sup> Cloudy  
Grading outfit worked Sta  
35+00 To 55+00 Laid Gravel  
Sta 48+25 To Sta 55+00  
Sta 59+25 To 63+00 = 1050'  
12 men working 4 Trucks  
Hauling.

28<sup>th</sup> Fair  
Grading outfit worked Sta  
25+00 To Sta 35+00  
Laid Gravel Sta 63+00  
To Sta 67+00 - Sta 39+00  
To Sta 44+75 = 975'  
4 Trucks Hauling 15 men  
working

Oct 30<sup>th</sup> Fair  
Grading outfit worked Sta 25+00  
To Sta 35+00 Put in Downspout  
Pipe Sta 30+00 - L - 12"  
Sta 33+00 - L - 10"  
7 men working on Backslopes

Oct 31<sup>st</sup> Fair  
Grading outfit worked Sta 35+00  
To Sta 18+00 Put in corr pipe  
culvert Sta 28+70 - 12"  
7 men worked on Backslopes

Nov 1<sup>st</sup> Fair in AM, Cloudy in PM.  
Grading outfit worked Sta  
18+00 To Sta 35+00 7 men  
working

Nov 2<sup>nd</sup> Fair  
Grading outfit worked Sta 18+00  
To Sta 23+00 Put in Downspout  
Pipe Sta 119+50 - L - 10"  
Laid Gravel Sta 44+75 To  
Sta 48+25 Sta 24+00  
To Sta 28+00 = 750'  
4 Trucks 15 men working

Nov 3<sup>rd</sup>

Cloudy Light Rain  
Grading outfit worked sta  
18+00 to sta 23+00  
Laid gravel sta 28+00  
to sta 34+75 = 675'  
4 Trucks Hauling 15 men  
working

Nov 4<sup>th</sup>

Fair  
Grading outfit worked  
sta 15+00 to sta 23+00  
Laid Gravel sta 34+75  
to sta 39+10 = 425'  
Extra Coat sta 90+00  
to sta 75+00 4 Trucks  
Hauling 15 men working

Nov 5<sup>th</sup>

cloudy Light Rain in A.M.  
Grading outfit worked sta 0+00  
to sta 10+00 2 men working

Nov 7<sup>th</sup>

Cloudy Light Rain  
Grading outfit worked sta 0+00  
to sta 18+00 6 men worked in  
Backslopes

Nov 25<sup>th</sup>

Fair

Put in Driveway pipe sta  
5+00 L-10" ~ sta 4+00-R-10"  
4 men worked on Backslopes  
and Ditches

Nov 29<sup>th</sup>

Light Rain cloudy

8 men worked on Backslopes  
and Berms

Dec-I

cloudy

9 men working on  
Backslopes and Ditches

Dec 2<sup>nd</sup> Cloudy

Laid Gravel STA 0+00  
To STA 5+00 = 500'  
4 Trucks Hauling  
10 men working on Gravel  
2 men worked on Backslopes  
Grading outfit worked  
STA 0+00 To STA 45+00

Dec 4<sup>th</sup> Cloudy Light Rain

Laid Gravel STA 19+00  
To STA 20+00 = 200'  
2 Trucks Hauling 9  
men working on Gravel  
2 men worked on Backslope

Dec 5<sup>th</sup> Fair

10 men worked on Ditches

Dec 6<sup>th</sup> Cloudy

12 men working on  
Ditches Put in Driveway  
Pipe STA 27+90 - R - 15"

Dec 7<sup>th</sup> Fair

Laid Gravel STA 24+00 To  
STA 19+00 = 500'  
4 Trucks Hauling 11 men  
working

Dec 8<sup>th</sup> Fair in A.M. Snow in P.M.

Laid Gravel STA 19+00 To  
STA 14+00 = 500'  
10 men working 4 Trucks  
Hauling

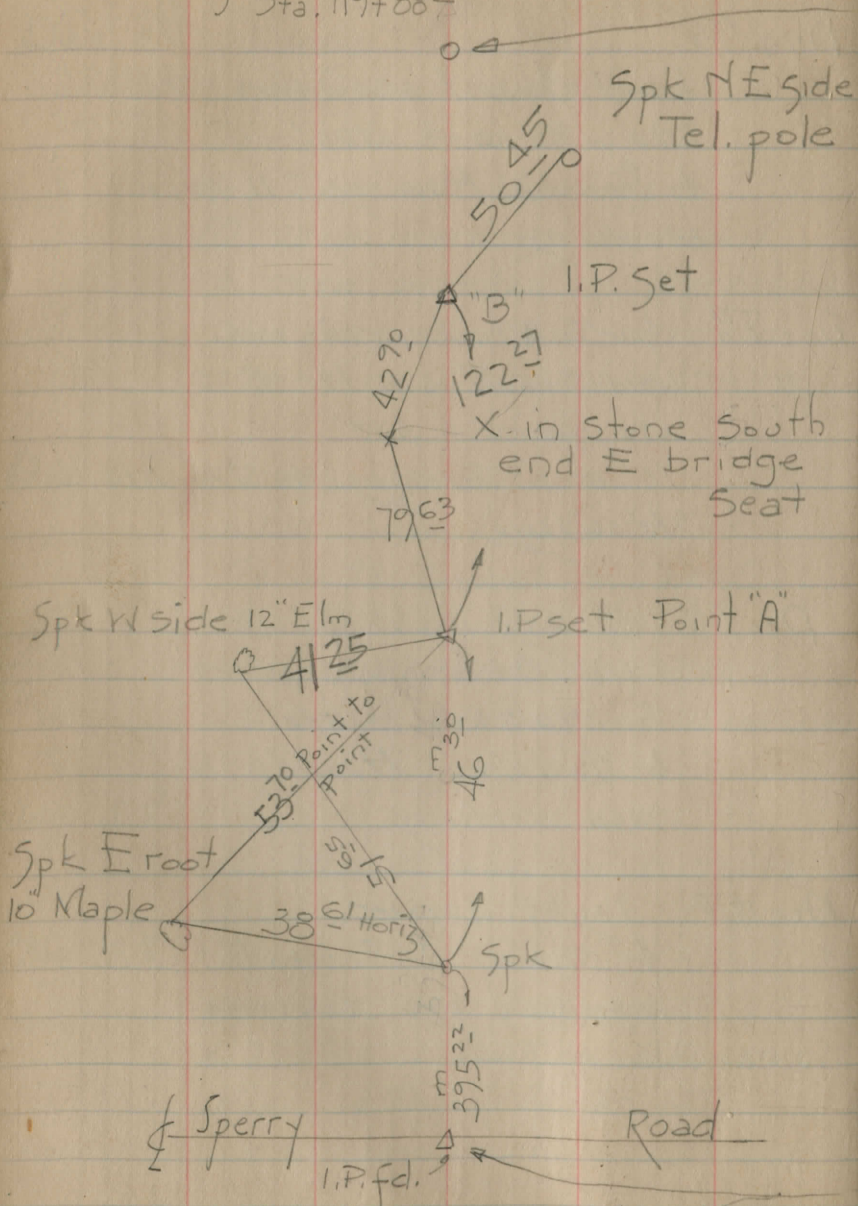
Dec 9<sup>th</sup> Cloudy Light Snow

Laid Gravel STA 14+00  
To STA 5+00 = 900'  
4 Trucks Hauling 12  
men working

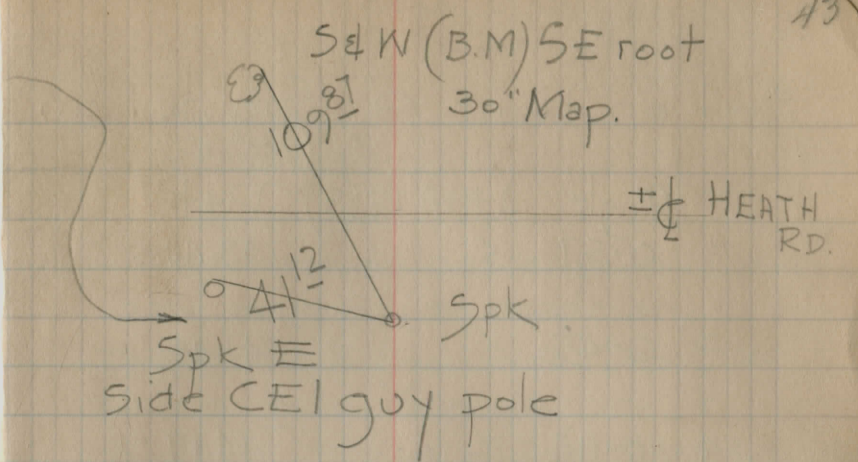
Dec 12<sup>th</sup> Light Snow

4 men 1 Truck  
worked on Berms

I.P. set from  $\Delta$   
 ref. See pg. 49  
 Sta. 119+88<sup>37</sup>



See Fd. Bk # 29 pg. 35 Sta 60+83<sup>90</sup>  
 SPERRY RD

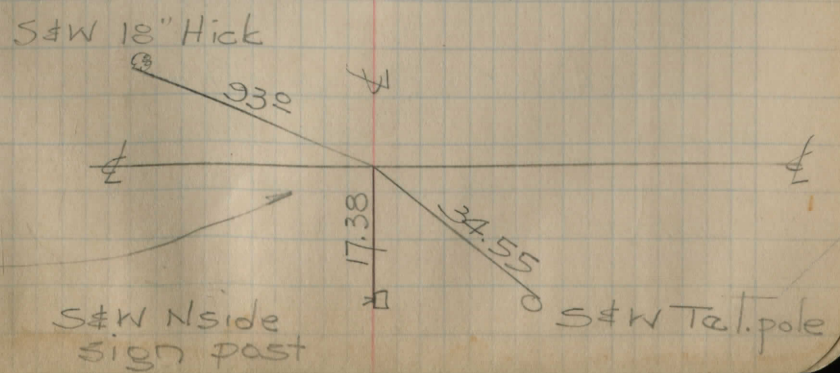


See pg 49 & 50 for  
 relocation 1948

CHAGRIN RIVER  
 BRIDGE  
 Mulberry Rd Sec. G

4-24-45

Tom - Hall



Set on Point "A" Sighted on "B"

	Angle	L(N) ✓	R(S)	Dist	
1	0-57	✓		38.44	
✓	6-45	✓		41.49	—
4	10-11 <sup>2</sup>	✓		44.17	
3	8-48	✓		44.61	
✓	27-36	✓		50 <sup>50</sup>	N edge of head
6	27-35	✓		51.76	—
7	30-27	✓		50.85	—
8	41-45	✓		48.54	
9	2-43	✓		79.63	

Edge top of easterly bolt in SW wing (to deadman) Back face (fill side) top SW wing  $\pm 10"$  SW of break  $\equiv$  Bolt truss plate SW  $\times$  bridge

$\perp$  angle in W abut. south end taken  $\pm 3'$  below bridge floor

NE bolt truss plate N.W  $\times$  bridge

Out side angle (creek face) W abut. N side

Out side (creek face) edge NW wing  $\pm 6"$  N.W of break  $\pm$  NW  $\times$  NW wing

X in stone  $\equiv$  bridge seat. South end X is  $\pm 7"$  S of south truss

B.M.	10.53	947.60		937.07
T.P.	0.86	936.62	11.84	935.76
T.P.	5.30	932.53	9.39	927.23
B.M.			10.06	931.52
T.P.	9.65	941.58	0.60	931.93
B.M.			0.26	741.32

941.58

8.73 932.65

9.35 932.23

9.25 932.33

9.10 932.48

8.88 932.70

9.66 931.92

9.68 931.90

12.90

22.58 919.00

Spk SE root 30" Maple NE  
quad. Mulberry & Heath  
Rds

X Send E bridge seat

Ref. spk W side 12" Elm  $\pm$  60'  
NW of bridge

E bolt SW truss plate (seat)  
N end truss seat plate W abut

N end  
Top NW wing  $\pm$  6" NW of break

W end NW wing (top)

SW wing  $\pm$  10" SW of break

NW  $\frac{1}{4}$  of SW wing at W end

So. tie rod over E footer

E. conc footer  $\pm$  4" from abut  
below South tie rod

W abut 3'+ thick at H<sub>2</sub>O line  
Hit blue clay 6" below  
Blue clay ± 2' above H<sub>2</sub>O  
NO footers W abut or  
Bottom of W abut. in ctr  
" " NW wing ± ctr  
Shoved 3/8" rod down ± 3'6" ctr

46  
(at N end)  
H<sub>2</sub>O line S & W abut  
line NW wing (Hard as flint)  
Wings (Existing)  
= 17" below H<sub>2</sub>O  
= 2" below H<sub>2</sub>O rod under ± 1°  
bridge at W abut

SET on "B" backsight on "A"

Lt 13-56 34.48

" 7-26 36.06

Rt 5-02 42.70

Rt 25-28 47.12

H wing  $\pm$   $\pi$  with  $\epsilon$

H.E. truss (seat) can move west  
19" (plate)

SE wing stones and (probably) abut  
stones = 2'-6"

SE truss plate 8" from abut. face

35.15 Abut. to abut at top

15.75 outside truss to outside truss

truss = .82

Footer for E abut  $\pm$  2.5' wide from

ctr abut to end S wing

Fill washing out. back of SE wing

W part HW wing out  $\pm$  2'-4"

S.W. & SE wing at bott step

" " " " on level

X S side E bridge seat

NE  $\times$  abut.

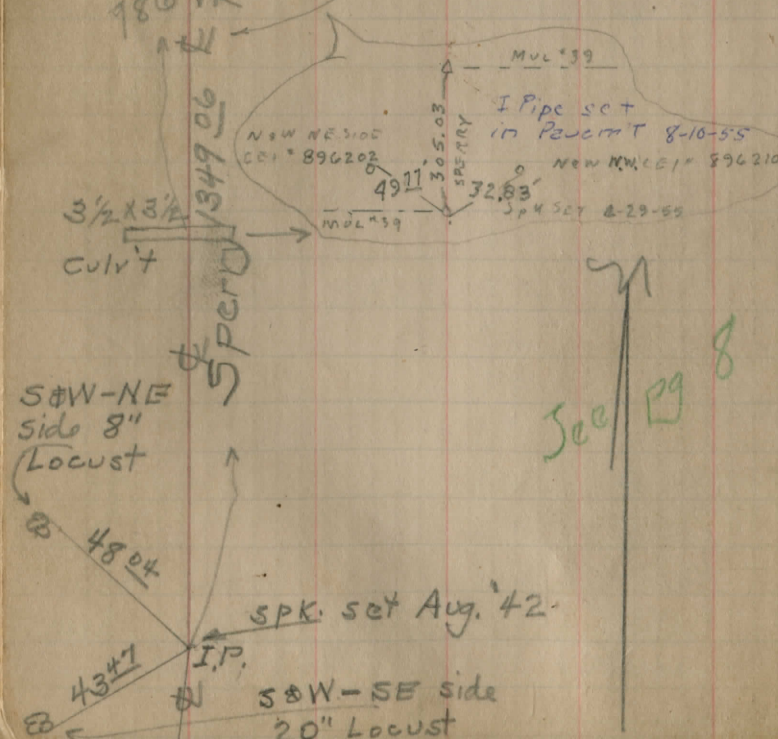
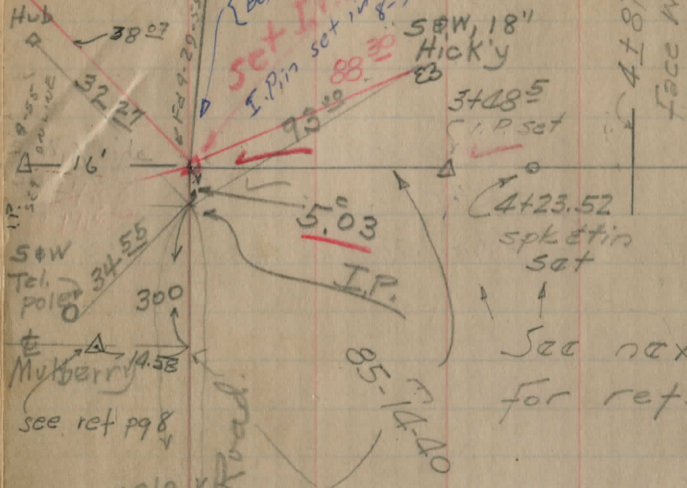
			3.8	21.4
			4.2	21.0
			5.7	19.5
			8.4	16.8
			8.6	16.6
BM	6.15	925.15		919.00
<hr/>				
620			8.4	27.1
520			7.8	27.7
420			6.2	29.3
SE wing bot. step			6.35	29.14
SE wing on level			3.12	32.37
Head E abut seat			3.99	31.50
BM x in stone			3.98	931.51
320 = face E abut			3.18	32.3
W side bridge			2.30	33.2
P	0.30	935.49	11.96	935.19
220			8.6	38.5
150			3.5	43.6
100			1.7	45.4
50			1.0	46.15
0			0.95	46.2
Inters Sperry			0.10	47.2
BM	5.83	947.15		941.32

48

30' S send W abut  $\pm$  5' to ck  
 20' " " " " "  $\pm$  3' " "  
 10' " " " " " ck edge  
 H.W wing  $\pm$  3' from abut. ang  
 Bot. W abut  $\pm$  ctr  
 E footer 4" from abut. under S truss

SPK SW  
side CEI  
899512

Monument  
box set Aug 64  
set I.P.  
I.P. set in Pavmit  
8-9-55

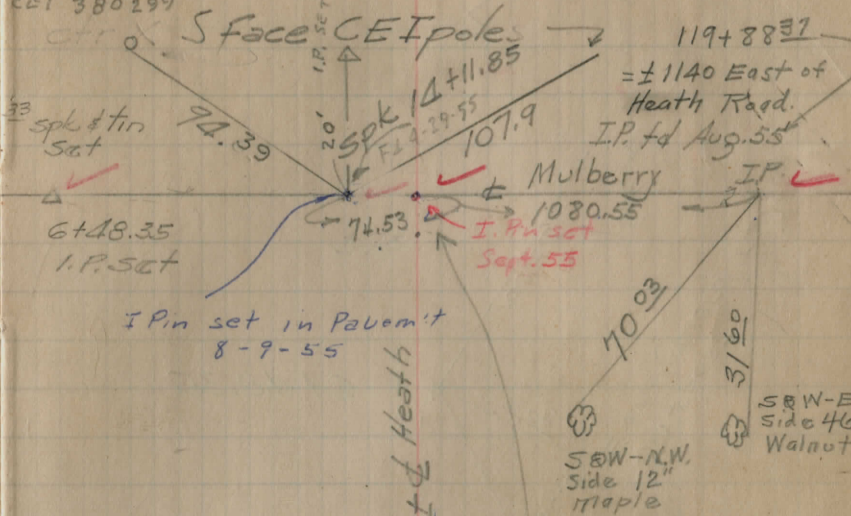


See next sheet  
for ref.

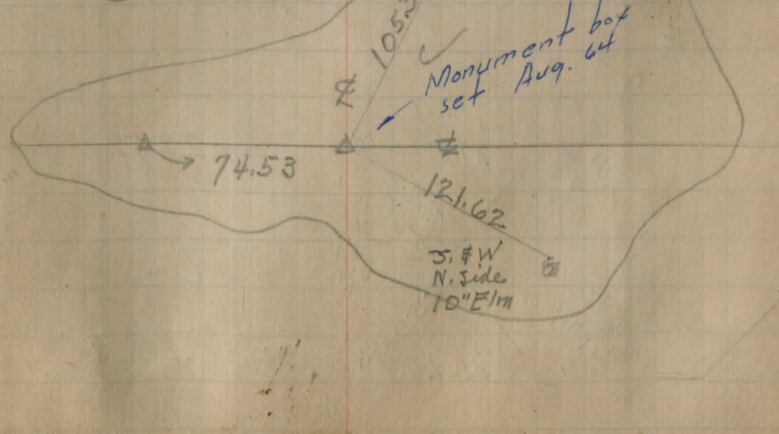
See pg 8

380299

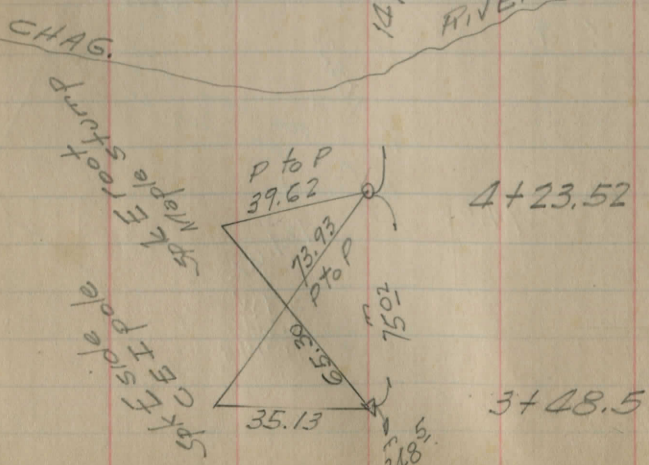
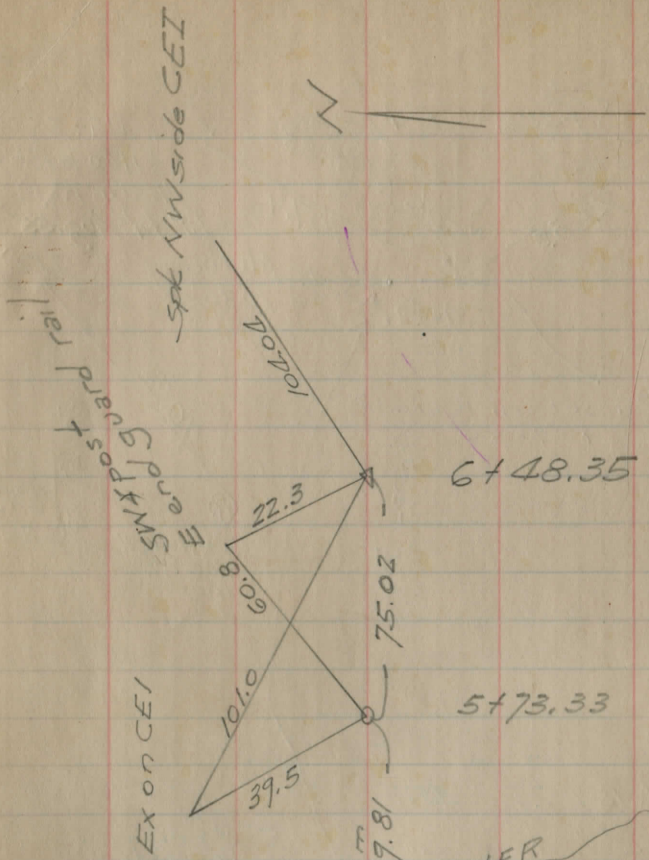
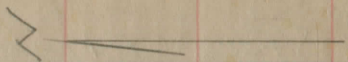
S.W. SW side  
CEI 380299



May 26 48  
J. Maynard  
J. Randles



49



inter. Sperry & Mulla

420

B.M. 6.55 941.32

4+0 T.P. 1.52 947.87 946.35

4+00 down steep 47.6

3+00 44.1

2+00 7.42 953.77 5.40 946.35

2+50 46.0

CHAG. RIVER BRIDGE  
Mulberry Rd. Levels  
5-27-48  
Maynard Farm

2+0 46.1

1+0 46.5

0+0 4.90 46.8

B.M. 5.83 951.75 945.92

36.7

11.2 11. 10.2  
4 7

38.5

10.7 9.7 9.6 9.3 9.4 9.5 10.0  
19.5 17 14 7 Edge 2 4  
2.0 Edge 4+20 4.5

54.4 53.1  
D.W. T. C. 1.7  
1.6 1.5 4.0

HI = 53.77

10.10 1.4  
16.25 4.0  
43.8 53.7 52.4

7.9 8.3 11.1 11.1 9.7 9.3 10.0 11.2 5.6 5.6  
30 25 20.19. 13.5 6.0 9.7 Edge 3 8.5 15 30

6.6 7.2 6.5 5.9 5.5 6.1 6.4 7.6 5.2 5.1  
30 22 18. 13. 5.0 5.8 Edge 4.5 7.5 10.11 15. 30

7.6 7.5 6.3 6.0 6.0 6.2 7.6 7.1 7.2  
30 20. 16. 11.5 5.6 Edge 7.0 9.0 14. 15. 30

5.2 6.2 6.2 5.6 5.6 5.5 5.8 6.9 6.8 7.6  
30 16. 14. 11. 8.5 5.2 Edge 9.5 14. 18. 22 30

(New) X & S Sperry & Mulb

Ref spk NW side West Shao Hick  
88' N E of X Sperry & Mulberry

8+00 27.0

11.3 12.4 9.9 11 9.4 9.3 9.5 11.3 9.7 9.3  
30 21 13 11 10.5 8 7 10 15 14.5 30

7+00 ± 4 washout 27.6

11.3 14.2 12.6 8.6 8.7 9 8.8 10.5 9.3 9.4  
30 16 6 3.5 4 6 13 14 17.5 30  
Edge

TP 9.46

(NOT A CHISEL)  
6" Speckled Rock West side E pasture Fence @ 200' S

6+00 29.8

11.5 12.7 7.4 6.9 5.5 6.7 7 8.5 9.1  
30 27 26 17 12 5 3 9 13 14 30  
Edge 2' strip Edge

B.M. 10.04 926.29

CEI POLE # 380303 Spk NW side 2' up

5+50 31.6

12.4 6. 4.4 4.5 4.7 5.2 7.1 13.4 16  
33 22 13 7 6.5 11 15 30 40  
NE Edge Along 1' Edge

5+40 Edge of washout NW 1/4 - SE 1/4

4+87 Stream face West Abutment

15.7 29.3 30.5  
12' down in water 7.0 5.8  
100' to top of cut 22 1

4+70 33.9

VERT Drip Rate 3.3 2.9 2.7 3.0 2.4 3.5 5.7 13.7 11.2 13.5  
30 23 10 3 2 7 11 11.5 17 35  
Edge Tapped wire G.W. of Basin

4+50 34.8

END CUT - begin fill both sides

2.4 1.8 1.5 1.3 1.5 2.2 2.9 3. 4.8  
30 20 15 10 Edge 7 8 22 30  
Edge

TP 0.17 936.33 11.71 936.16  
947.87

+

-

BM 9.70 937.12 (937.07)

14+85± 42.2

14+30 44.0

14+0 43.6

13+0 38.3

TP, 11.94 946.82 1.40 934.88

12+0 34.4

11+0 31.6

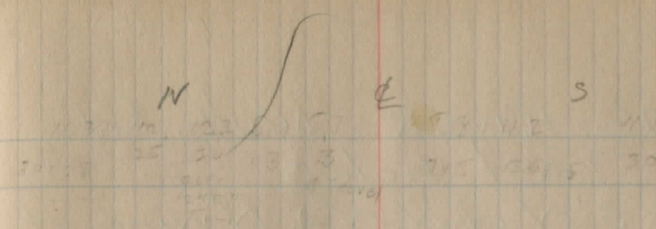
10+90

10+0 29.1

± 9+50 End Wash over Road

9+0 27.6

TP1 9.35 936.28 9.40 926.93  
936.33



S&W; SE root 30" Map. NE quad  
X Heath & Mulberry

HEATH 4.6

2.8

3.2

8.5

4.7  
± Travel 2.

6" VSP Field Drain 002607

6.8	8.5	7.5	7.2	7.4	8.9	5.9	5.5
30E26	20+18	13	2	7.5	13E14	20+5	30
			± Travel	8.5			

11.3	12	12.2	8.9	8.7	8.9	11.2	11.1	12.5 I/cr
30E29	25	20	13	3	7E8	13.5#15	30	12" CR
		012#FL		± Travel				
		12" CR						

7-3-48

## CHAG. RIVER Mulb. Rd

## Test holes

#1 = ± 3' N of NW & N wing of  
existing W abut

BM 5.97 932.26 926.29

H<sub>2</sub>O level = 14.75 917.51

" " down 24" = blue clay

24" to 48" = fine blue gravel  
(mostly sand & very fine)  
unable to go lower than  
48" because of cave ins (913.5)H<sub>2</sub>O T.H. #2 <sup>LEVEL</sup> 14.1 918.16

0-23" = blue clay

23"-51' sand &amp; gravel (913.9)

BM 4.11 930.40 926.29

T.P. 2.35 922.65 10.10 920.30

5.23 917.42 H<sub>2</sub>O

Spk Tele pole

3' SE of SE end E abut

Spk Tel pole

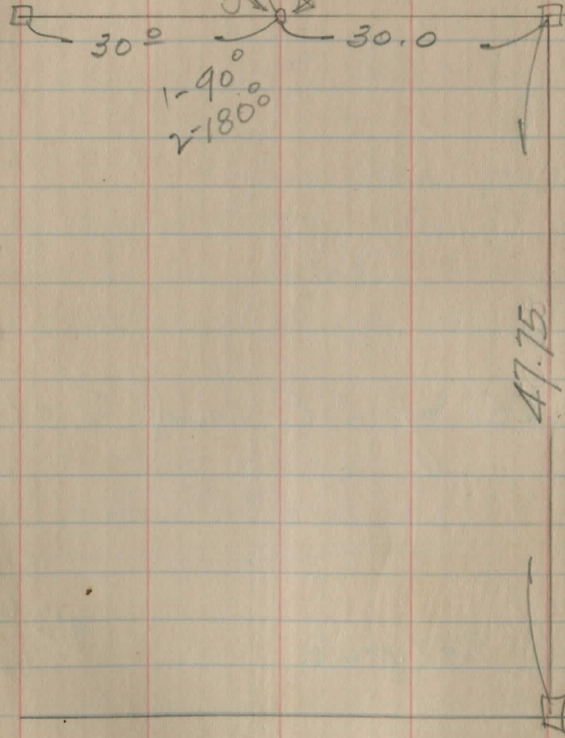
level

912.0 prop.  
bottom footers22.65  
12  
10.65

54

7-3-48

T. Hub



1-90°  
2-180°

spk set

5+73.33

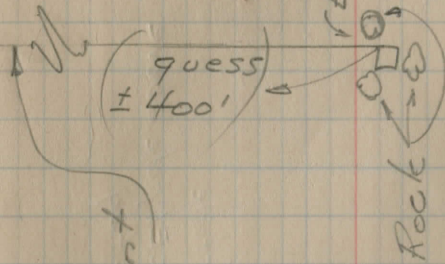
5+51.5

5+51.5

T. Hub

47.75

55



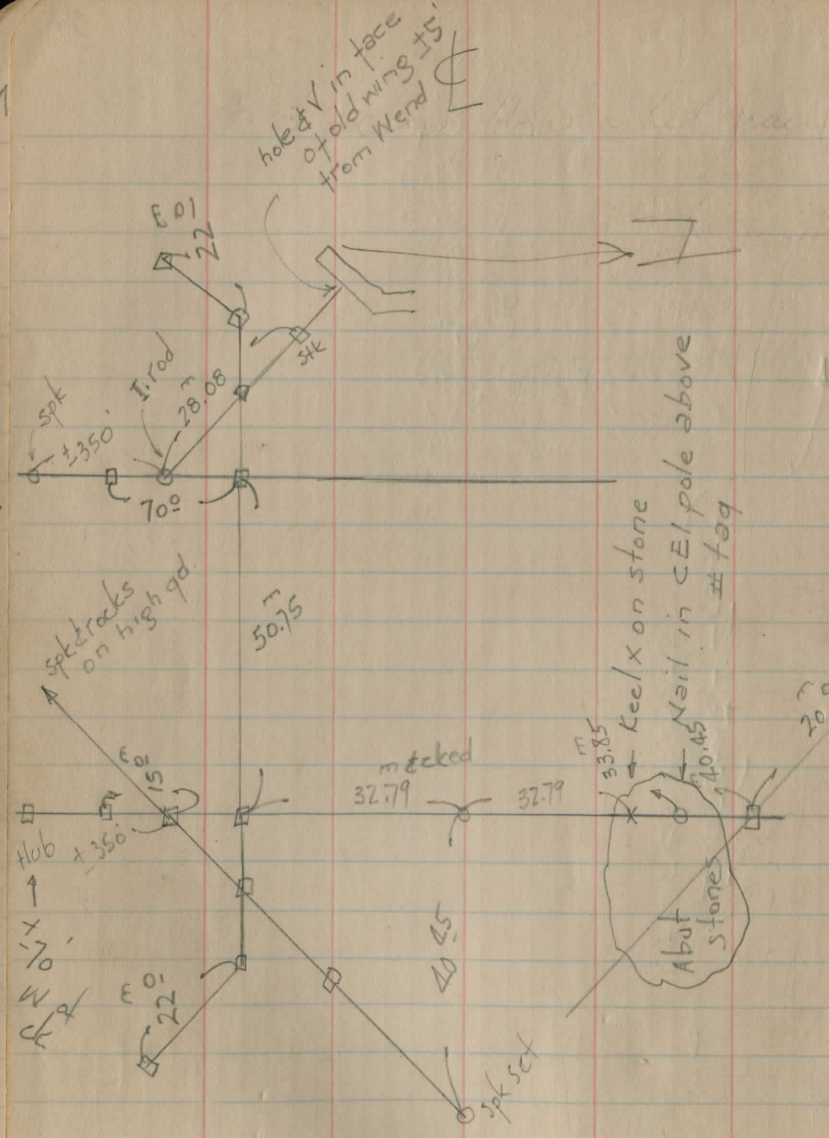
guess  
± 400'

RE. edge hub

high qd. Mt  
River

Rock

1.5 in front of front  
faces abuts



See grades pg 59

Hub on W bank 13' NW of 30" Elm

Molberry Bridge  
Stakes  
April 49

Hub on bank

Beam lengths  
54.03  
Flange 11 5/8"

888958

H.I.S

LEVELS FROM  $\pm$  200 EAST OF PURSIFUL DRIVE TO FIRST CULVERT WESTERLY  
ON MULBERRY, WEST OF SPERRY ROAD, JULY 22 1948 MAYNARD TEMPLE

BM. 6.21

0+00

1+00

2+00

2+35

PURSIFUL DRIVE

3+00

PURSIFUL WEST P.L.

4+00

5+00

6+00

S

N

59

SPACE 1<sup>st</sup> 898958 ( $\pm$  PROLONGATION SWLY OF PURSIFUL W line)

1st W. PURSIFUL DRIVE

7.05.361.4

DITCH

6.3

6.175.56

4.90

5.00

5.74.42.14.94.723.953.253.636.75.681.6

DITCH

6.0

E. END D. PIPE

5.784.674.25

4.45

4.24

E. END

5.0

D. PIPE

5.65

40'

5.5

100

5.3

150

E

7400

7+61

CONC SOUTH

32' x 12" CONCRETE

C.I.P. 40570

S E N

DITCH DITCH DITCH

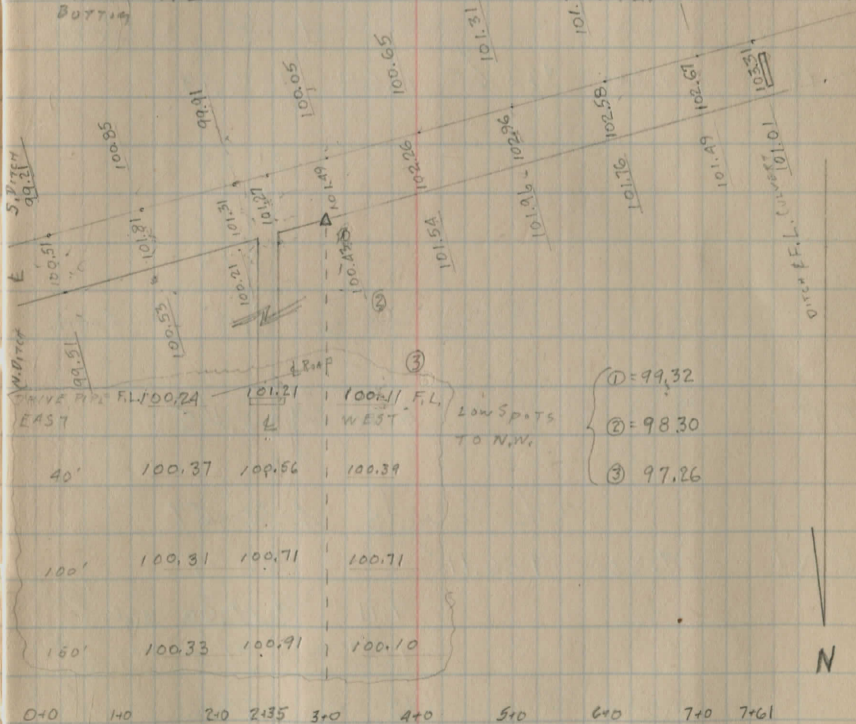
6.35 3.54 4.72

4.65 7.70  
DITCH FL  
BOTTOM

2.9

5.20  
F.L. & DITCH BOTTOM

99.86  
96.56  
98.51  
CULVERT



DRIVE PILE FL 100.72 EAST WEST

- ① = 99.32
- ② = 98.30
- ③ = 97.26

BM = Spk N side CEI Pile #998958 ± sly on PARSIPPAN P.L. PROLONGED TO SOUTH SIDE OF ROAD. AN ASSIGNED VALUE OF 100 GIVEN TO B.M. FOR ABOVE READINGS.

Top East Footer

914.5

B.M. 9.75 936.04

926.29

36.04  
14.50  
21.54 ✓  
9.04 mod ✓

12.50 C 12'-6"

T.P. 1.26 925.65 ✓

11.65

924.39 ✓

25.65  
14.50  
11.15  
3.15

C 8.0 from

T.P. 3.20 922.45 ✓

ck levels 4-30-49

B.M. 9.82 936.11 ✓

926.29

9.11 927.00 914.5 C 12.5  
4.7 31.4 933.0 F 1.6  
12.05 24.06 2567 F 1.6

T.P. 1.43 925.83 ✓

11.71

924.40 ✓

T.P. 3.37 922.46 ✓

9.9

15.9

Bot. footer 12.0

7.17

918.66

ck T.P. 3.31 922.52

3.31

922.52

GRADES MULBERRY  
BRIDGE Apr. 49

59

932.8 ± 4 gr E  
933.3 " " " W  
925.67 end wing E

Spk C E I

8.89

top stk, ± line of back of E about ± 32.8 Not E

top of stk in line of about 32.8 S of E

Hub 25' E of creek ± 75' S of E ←

grade stk N

ground E & E about

ground end S wing E about

Hub 25' E of creek ± 75' S of E ←

Hole ± E just W about 0

H<sub>2</sub>O level + 35' S of E apr 30

27.75 SW of S end west wing

same

T.P. 1.44 925.84 924.40

3.32

Slope stks 5-12-49

10+0 30.55

9+0 29.75

8+0 30.50

7+0 931.50

6+0 932.50

B.M. 11.87 934.32 922.45

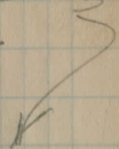
N E S

60

grade slk S end E abut

Flange 11 5/8

Slopes & G.O.s E side bridge  
stks set at toe slope



18 3 27 G 3 27 G 16.5

23.5 4 57 G 4 57 G 22

24.5 3 82 G 3 82 G 20

25 2 82 G 2 82 G Rod 3 82 F19 20

1 82 G No slope set

6.44

6.63

4.07

4.15

6.65

7.36

4.8

8.0

6.34

8.5

F.L. tile

25' W ditch

" " bank

50' " "

" " ditch dirt dumped in

75 " " " "

" " bank

69' W = Sta 10+0

100' W - ditch

100 " = bank

125 " " ditch filled

6-3-49

T.P.	4.52	926.97	922.45
B.M.	3.19		923.78

Mon			
B.M.	1.82	25.60	23.78

Tues			
B.M.	2.24	26.02	23.78

26.02		
12.0		
14.02		
10.02 read	7.02 read front	7.27 read back

spk 1<sup>st</sup> map N of bridge  
W bank  
river

26.97
12
14.97

23.78
2.24
26.02
12
14.02

25.60
12.00
13.60
4
9.60

10.02

WEST WALL

EL.

934.04  
 929.96  
 932.67 ✓  
 32.46

926.17

6/16/49

BM 12.77 936.55

923.78  
 3.02 33.53  
 3.05 33.50

Highest level  
 Seat at ends  
 Top curtain wall at ends  
 " " " at ctr  
 $2\frac{1}{8}'' = 0.18$   $2\frac{1}{2}'' = .21$   
 top wings at ends

top (Highest) N end E about  
 " " " S " " "

936.55  
 34.04  
 2.51

36.55  
 26.17  
 10.38

36.55  
 32.67  
 3.88  
 3-10 $\frac{1}{2}$

36.55  
 29.96  
 6.59 seat at ends  
 .08  
 6.51 2<sup>d</sup> level in

6.41 seat middle

6/17

BM 12.68 936.46

923.78

929.96 1" = .08

930.04 1 1/8" = .18

929.78 2 1/8" = .18

add 1/2" minus (.03+) for top

make front .01 higher	{	932.67	2 1/2" =
" " .01 lower		32.46	.21

63

Seat at ends (conc.)

2 intermed seats (conc)

Ctr seat (conc)

1 set plates

top curtain wall ends

" " " ctr

36.46	seat at ends
29.96	
<hr/>	
6.50	

36.46	mid seats
29.88	
<hr/>	
6.42	

6.32 ctr seat

36.46	
32.67	
<hr/>	
3.79	
21	
<hr/>	
3.58	

B17 1187 934.32 722.45

Shigh	083	33.49	
S plate	480	29.52	29.54
Sinter pl	478	29.53	29.62
ctr pl	463	29.69	29.72
n inter pl	472	29.60	29.62
n plate	484	29.48	29.54
N. HIGH	079	33.53	

eg

Grade

64

29.54 end plates

29.62 intermed. pl

29.72

- OK

.09 low

- OK

- OK

- 06 low

ij level

" "

" "

⊕



top of cut

± 11'

1226

1. Pin

WILLIAMS P/L  
WHITING P/L

± 20'

Nail in  
hub

Ref to I.P. n w x  
whiting

Reset 7/29/49

± 1/4 way down  
cut

E plates

B 77

922.45

3-11  $\frac{15}{16}$  down  
 from high to top  
 plates at ends  
 3-10  $\frac{15}{16}$  interm  
 3-9  $\frac{13}{16}$  ctr

934.04  
 934.04  
 929.79  
 .08 up  
 .018

ends  
 inter  
 ctr

w wall  
 high South  
 " north

4'  $\frac{10}{16}$ " = 4.05 down  
 from high to top of  
 bottom plate

10.32

FL, WEER HOLE E ABUT

10.25

E BRIDGE

12.83

N SAND BAR

3/0'

1

12.50

2

12.20

3

11.90

10.95

10.90

+75

11.70

12.83

.90

11.90

12.83

10.33

2.5

7/2/49

BM 11.27 935.05

923.78

68

Map N of W end bridge

±

2.32

2.17

2.27

12'

12'

NE

SE

2.06

1.94

2.04

12'

12'

ctr

ctr

1.81

1.62

1.75

NW

SW

12'

12'

±

7/8/09 SLOPES & GRADES WEST SIDE MULB. BDGE

Slopes set both sides of  $\pm 3'$  beyond (out) end of cut (or fill) Stks N of  $\pm$  graded (only)

	+	H1	-	Elev.	Grade
+20				935.8	5.1
T.P.	2.80	940.92	11.36	938.12	49.5
4to				936.9	12.6
				49.5	
+50				939.7	9.8
				49.5	
3to				942.6	6.9
				49.5	
+50				944.9	4.6
T.P.	2.55	949.48	4.69	946.93	
				51.6	
2to				945.9	5.7
1to					
B.M.	5.70	951.62		945.92	

See pg 60 for grades & slopes E side

22'	5.1	1.1 Rod		44.5
			C 4'-0"	
21.5'	12.6	9.1 - Rod	read 11.07	42.5
			3'-6"	
21'	9.8	4.30 Rod		
			5'-6"	Grade only
21'	6.9	3.4 Rod		28'
			3'-6"	
21'	4.6	2.1 - Rod		22.5'
			2'-6"	
19.5'	5.7	4.7 Rod	No set	Section OK as is 15'
			C 1'-0"	

No change

Ref spk NW side shag bark Hick 88" NE of X Sperry & Mulb.

BM 10.30 923.80 (923.78)

T.P. 0.52 934.10 7.34 933.58

4450 40.9  
934.6  
6.3

940.92

turn ditches N E S + 4450

21' 6.3  
3.8 Rod  
21.6"

not set  
18.5

9-59  
H. Patterson  
G. Dieckrich Mulberry Rd. Bridge

Check Levels

B.M. #1	2.65	936.69	934.04	SW A	Bridge Top Abut.
	2.65	934.04	934.04	NW A	" " "
	3.13	933.56	933.56	NE A	" " "
	3.48	933.29	933.29	SE A	" " "
	21.49	915.20	915.20	NE	Footar
	21.35	915.34	915.34	SE	"
	21.46	915.23	915.23	SE	" at S. end wing
B.M. #1	2.65	934.04	934.04		

11-59

B.M. #1	2.97	937.01	934.04	SW A	Bridge Top Abut
B.M. #2	7.67	929.33	929.33		Hort Spk S. side CEI #3FD303X
NW A	2.97	934.04	934.04		
NE A	3.44	933.57	933.57		
SE A	3.76	933.31	933.31		

T.P.	0.27	929.69	7.59	929.42	
			10.41	919.28	
			11.51	918.18	

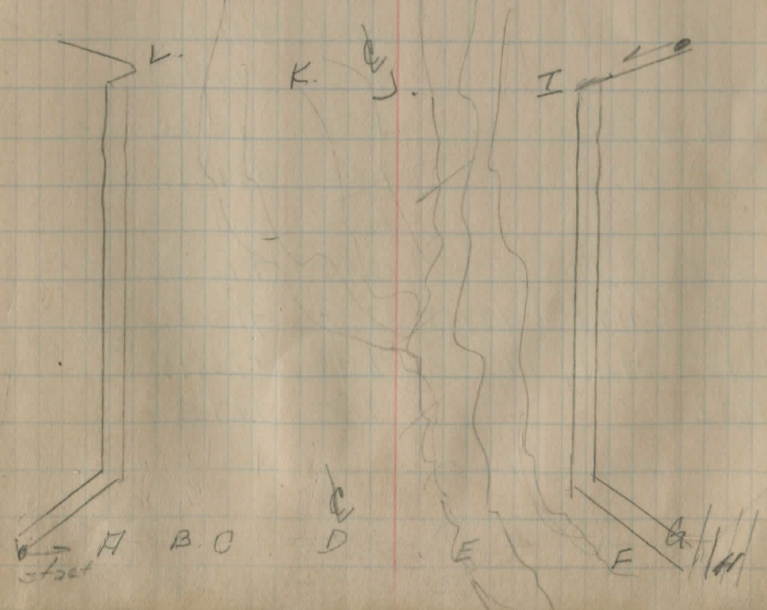
15' E. of SW. wing wall  
18" " " " "

T.P.	0.53	923.30	6.92	922.77	
			8.53	914.77	
			8.53	914.77	
			9.30	914.00	
			10.91	912.39	
			11.81	911.49	

25' " " " "  
37' " " " " also & creek  
50' " " " "  
55' " " " "  
65' " " " "

	+	HI	-	elev
		923.30		
			11.2	912.10
			11.2	912.10
T.P.	10.71	933.46	0.55	922.75
BM #2			4.08	929.38
young col'd Ridge of 3/18/61				
BM #1	2.02	936.06		934.04
SW ±			2.46	
NW ±			2.48	
NE ±			3.60	
SE ±			3.14	
T.P.	5.17	930.09	11.14	924.92
T.P.	6.99	924.30	12.78	917.31
A 15'			5.21	919.09
B 18'			7.96	916.30
C 25'			10.04	914.26
D 37'			10.68	913.62 <i>← creek</i>
E 50'			11.90	912.40
F 56 ±			15.46	908.84
G 60 ±			9.23	915.07 <i>on footer</i>
H 65 ±			11.77	912.53
I 18'			11.53	912.77 <i>N. side Brk.</i>
J 35'			11.06	912.44 <i>← creek</i>
K 42'			13.3	911.00
L 48'			12.57	911.76

73' E of SW wing wall at E. wing footer  
 79' " " " " " "



		HI		elev.
	+		-	
T.P.	12.05	934.65	1.70	922.60
BM#1			0.60	934.05

check elev April 1962

BM#2	7.32	936.65		929.33
NEX Abot			3.11	933.54
NW "			2.62	934.03
SW "			2.61	934.04
SE "			3.36	933.29
T.P.	0.58	926.04	11.19	925.46
A 15'			7.06	918.98
B 18'			7.59	916.45
T.P.	3.33	918.72	10.65	915.39
C 25'			4.91	913.81
✓ D 37' E Bridge			5.93	912.79
E 50'			7.32	911.40
F 56' #1/2 channel			7.87	910.85
G 60'			7.62	911.10
H 66'			6.92	911.80
I 73'			2.27	916.45
T.P.	11.75	927.13	3.34	915.38
T.P.	9.71	936.66	0.18	926.95
BM#2			7.33	929.33

SPK S. side CEI #380303 X

check elev 7/20/65

	BS.	HI	F.S.	Elev
BM#2	0.21	929.54		929.33
TP#1	2.16	920.10	11.60	917.94
			5.54	
			9.13	
			9.95	
			10.23	
			10.78	
			10.13	
			9.92	
			7.68	
			5.23	
		0.83	7/9.27	send bridge
		1.21		
		5.00		
		6.74		
		8.33		
		9.94		
		10.99		
		11.30		
		10.95		
		5.03		
TP#2	5.01	920.48	4.63	915.47

SPK S side CEI # 380303

N end bridge

- 16' W of NE Wing Wall at E footer
- 16' W of NE wing wall at base of E footer
- 22' " " " " "
- 24' " " " " "
- 38' " " " " "
- 43' " " " " "
- 51' " " " " "
- 58' " " " " " at base of W footer
- 59' " " " " " at W footer
- 12' E of SW wing wall at wall
- 14' " " " " "
- 18' " " " " "
- 26' " " " " "
- 27' " " " " "
- 36' " " " " "
- 40' " " " " "
- 55' " " " " "
- 58' " " " " " at base of footer
- 58' " " " " " at footer

BS	HI	FS,	Elev
	920.48	.65	
		1.09	
		5.15	
		7.11	
		9.31	
		10.24	
		11.01	
		12.25	
		11.19	
		10.40	
		5.51	

opposite S  
Wing walls  
± 15' S of  
bridge

12'	E of SW	wing wall	at wall
14'	" "	" "	" "
19'	" "	" "	" "
27'	" "	" "	" "
35'	" "	" "	" "
44'	" "	" "	" "
50'	" "	" "	" "
64'	" "	" "	" "
65'	" "	" "	" "
67'	" "	" "	" "
67'	" "	" "	" "

at base of footer  
on footer

TP#3	11.79	929.63	2.64	917.84
BM#2			.35	929.28

1966 Levels in Field Book  
127 A

Paid To Chester Twp. Trustees

For Gas and Oil

From Aug 14<sup>th</sup> To Sep 6<sup>th</sup>

475 Gal Gas 14¢ \$66.50

21 Gal Oil 66¢ \$13.86

From Sep 8<sup>th</sup> To Oct 6<sup>th</sup>

415 Galls Gas 14¢ \$58.10

25 Galls Oil 66¢ \$16.50

61 Hrs - Truck \$1.50 per hr \$91.50 on Gravel

49 Hrs - Truck \$1.10 per hr \$53.90

Less (Back pay for Driver) \$24.40 \$29.50 on Gravel

From Oct 7<sup>th</sup> To Nov 9<sup>th</sup>

520 Galls Gas 14¢ \$72.80

26 Galls Oil 66¢ \$17.16

From Dec 2<sup>nd</sup> To Dec 15<sup>th</sup>

20 Galls Gas 14¢ \$4.20

4 " Oil 66¢ \$2.64

25 Hrs Truck service \$1.10 \$27.50

Material from Chester Twp. Trustees

32' of 10" Corro Culvert Pipe

18' of 10" " Driveway "

14' of 12" Corro Culvert Pipe

# Gravel from Frank

Sep 25 75 yds  
 26 115 "  
 27 36 1/2  
 29 136  
 29 128  
 Oct 2<sup>7/8</sup> 128  
 3 126  
 4 165  
 5 148

1057 1/2 yds To Tot at 10 @  
 = \$105.75 (P.D.)

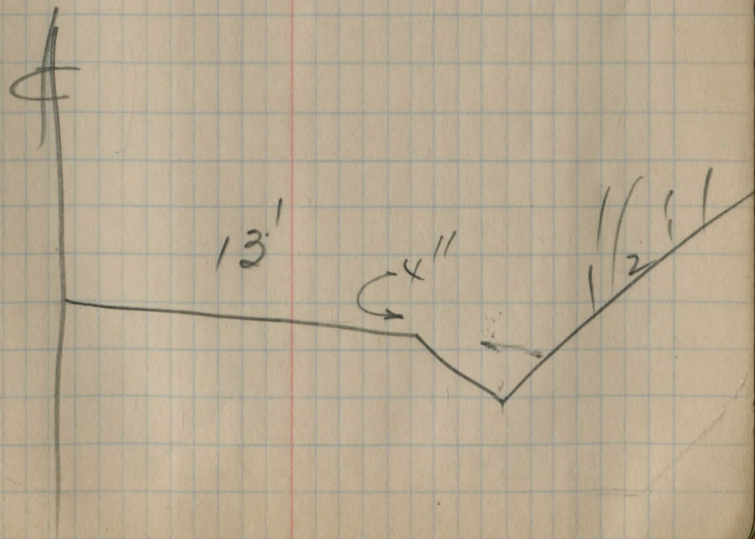
Oct 23<sup>7/8</sup> 140 yds  
 24<sup>7/8</sup> 142 "  
 25<sup>7/8</sup> 6 "  
 27<sup>7/8</sup> 178  
 28<sup>7/8</sup> 189 1/2  
 Nov 2<sup>7/8</sup> 162  
 3<sup>7/8</sup> 153  
 4<sup>7/8</sup> 199

To Tot 1149 1/2 yds = \$114.95 (P.D.)

# Barnes - Bank

Dec-2<sup>7/8</sup> - 101 yds  
 4<sup>7/8</sup> - 60 yds  
 7<sup>7/8</sup> 95 yds  
 8<sup>7/8</sup> 114 yds  
 9<sup>7/8</sup> 130 yds

To Tot 500 yds PD  
 = \$50.00



Tool List From County Maint. Dept.

Axes - 3  
 B. Hooks 1  
 Saw - 1  
 Mattocks 4+1+2  
 Picks 6+2  
 Shovels 5+2+2

3<sup>00</sup>  
 1.27

Material From County Garage  
 Directed on Jobs

32' 10" corr culvert pipe  
 42' 12" V.P.

160 Board ft of Oak Lumber

22.45

11.81

34.26

29.52

4.74 to set

34.26

33.54

.72

1.37

2.09 top wheel

33

4

922.45  
9.85

932.30 = HI

933.54 = top wings

$4\frac{13}{16}$  down

$2\frac{1}{8}$  up

32.30

925.67 = end wings  
6.63

32.30  
929.52 = seat at ends  
2.78

33.54  
32.30  
1.24  
1.3

33.54

2

31.54

32.30

31.54

0.76

+ 2'-0" = top wing

## IMPROVED TABLES

AND

## INFORMATION

3 + 48.5 to I.P. spk W of river  
4 + 23.53 spk W of river  
5 + 73.33 spk E of river  
6 + 48.35 I.P. E of river  
14 + 11.85 spk W of Heath

## DIRECTIONS FOR USE OF TABLES

TABLE No. 1.

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

TABLE No. 9.

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

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

The distance from a point on the tangent to the curve is very nearly the square of the tangent length divided by twice the radius.

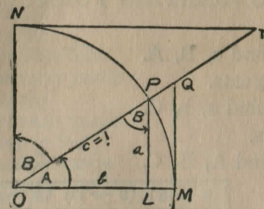


TABLE II  
TRIGONOMETRIC FORMULÆ.

$$\angle A = \angle MOP \quad \angle B = \angle PON = \angle OPL$$

$$R = OB = c = 1$$

$$\sin A = \frac{a}{c} = \frac{a}{1} = a = \cos B = LP$$

$$\cos A = \frac{b}{c} = \frac{b}{1} = b = \sin B = OL$$

$$\tan A = \frac{a}{b} = \frac{MQ}{OM} = \frac{MQ}{1} = MQ = \cot B = MQ$$

$$\cot A = \frac{NT}{ON} = \frac{NT}{1} = NT = \tan B = NT$$

$$\sec A = \frac{OQ}{OM} = \frac{OQ}{1} = OQ = \csc B = OQ$$

$$\csc A = \frac{OT}{ON} = \frac{OT}{1} = OT = \sec B = OT$$

$$\text{vers } A = \frac{LM}{OP} = LM = \text{covers } B \#$$

$$\text{covers } A = \frac{OP - LP}{OP} = OP - LP = \text{vers } B$$

$$\text{exsec } A = PQ = \text{coexsec } B$$

$$\text{coexsec } A = PT = \text{exsec } B$$

$$\sin \frac{1}{2} A = \sqrt{\frac{1 - \cos A}{2}} \quad \cos \frac{1}{2} A = \sqrt{\frac{1 + \cos A}{2}}$$

$$\sin 2A = 2 \sin A \cos A \quad \cos 2A = \cos^2 A - \sin^2 A$$

$$\text{Law of Sines} \quad \frac{\sin A}{a} = \frac{\sin B}{B} = \frac{\sin C}{C}$$

$$\text{Law of Cosines} \quad c^2 = a^2 + b^2 - 2ab \cos C$$

$$\text{Law of Tangents} \quad \frac{a+b}{a-b} = \frac{\tan \frac{1}{2}(A+B)}{\tan \frac{1}{2}(A-B)}$$

TABLE II—Continued  
TRIGONOMETRIC FORMULAE (continued)

In any triangle:

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

Use Law of Tangents.

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

Use Law of Sines.

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

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

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

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

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

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

Area of a triangle:

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

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

PRISMOIDAL FORMULA.

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

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

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

	0	1	2	3	4	5	6	7	8	9	10	11	
$\frac{1}{16}$	.0052	.0885	.1719	.2552	.3385	.4219	.5052	.5885	.6719	.7552	.8385	.9219	$\frac{1}{8}$
$\frac{3}{16}$	.0104	.0938	.1771	.2604	.3438	.4271	.5104	.5938	.6771	.7604	.8438	.9271	$\frac{1}{4}$
$\frac{1}{4}$	.0156	.0990	.1823	.2656	.3490	.4323	.5156	.5990	.6823	.7656	.8490	.9323	$\frac{3}{8}$
$\frac{5}{16}$	.0208	.1042	.1875	.2708	.3542	.4375	.5208	.6042	.6875	.7708	.8542	.9375	$\frac{1}{2}$
$\frac{3}{8}$	.0260	.1094	.1927	.2760	.3594	.4427	.5260	.6094	.6927	.7760	.8594	.9427	$\frac{5}{8}$
$\frac{7}{16}$	.0313	.1146	.1979	.2813	.3646	.4479	.5313	.6146	.6979	.7813	.8646	.9479	$\frac{3}{4}$
$\frac{1}{2}$	.0365	.1198	.2031	.2865	.3698	.4531	.5365	.6198	.7031	.7865	.8698	.9531	$\frac{7}{8}$
$\frac{9}{16}$	.0417	.1250	.2083	.2917	.3750	.4583	.5417	.6250	.7083	.7917	.8750	.9583	1
$\frac{5}{8}$	.0469	.1302	.2135	.2969	.3803	.4635	.5469	.6302	.7135	.7969	.8802	.9635	
$\frac{3}{4}$	.0521	.1354	.2188	.3021	.3854	.4688	.5521	.6354	.7188	.8021	.8854	.9688	
$\frac{7}{8}$	.0573	.1406	.2240	.3073	.3906	.4740	.5573	.6406	.7240	.8073	.8906	.9740	
$\frac{15}{16}$	.0625	.1458	.2292	.3125	.3958	.4792	.5625	.6458	.7292	.8125	.8958	.9792	
$\frac{1}{8}$	.0677	.1510	.2344	.3177	.4010	.4844	.5677	.6510	.7344	.8177	.9010	.9844	
$\frac{3}{16}$	.0729	.1563	.2396	.3229	.4063	.4896	.5729	.6563	.7396	.8229	.9063	.9896	
$\frac{1}{4}$	.0781	.1615	.2448	.3281	.4115	.4948	.5781	.6615	.7448	.8281	.9115	.9948	
$\frac{5}{16}$	.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167	1.000	
1	0	1	2	3	4	5	6	7	8	9	10	11	

TABLE IV  
USEFUL RELATIONS.

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

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

$$\text{Radius} = \text{arc of } 57.2957790^\circ$$

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

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

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

$$\pi = 3.141592654 \quad \sqrt{\frac{1}{\pi}} = 0.564190$$

$$\frac{\pi}{4} = 0.785398163 \quad \sqrt[3]{\frac{6}{\pi}} = 1.240700982$$

$$\frac{\pi}{6} = 0.523598776 \quad \pi^2 = 9.869604401$$

$$\sqrt{\frac{4}{\pi}} = 1.128379167 \quad \frac{1}{\pi^2} = 0.101321184$$

$$\frac{\pi}{6} = 0.523598776 \quad \sqrt{\pi} = 1.772453851$$

$$\frac{4\pi}{3} = 4.188790205 \quad \frac{1}{\pi} = 0.3183099$$

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

Curvature in feet = 0.667 (Dist. in miles)<sup>2</sup>

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

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

Error in chaining of 0.01 feet in 100 feet:

Due to—

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

STADIA REDUCTION FORMULAE.

Horizontal Distance = R - R sin<sup>2</sup> a + C cos a

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

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

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

a = angle of elevation for mid Reading



TABLE VI (continued)  
SINES, COSINES, TANGENTS, COTANGENTS (continued)

deg	sin 0'	tan 0'	sin 10'	tan 10'	sin 20'	tan 20'	sin 30'	tan 30'	sin 40'	tan 40'	sin 50'	tan 50'	deg
46	7193	1.0355	7214	1.0416	7234	1.0477	7254	1.0533	7274	1.0599	7294	1.0661	43
47	314	.0724	333	.0786	353	.0850	373	.0913	392	.0977	412	.1041	42
48	434	.1106	451	.1171	470	.1237	490	.1303	509	.1369	528	.1436	41
49	547	.1504	566	.1571	585	.1640	604	.1708	623	.1778	642	.1847	40
50	660	1.1918	7679	1.1988	7698	1.2059	7716	1.2131	7735	1.2203	7753	1.2276	39
51	771	.2349	790	.2423	808	.2497	826	.2572	844	.2647	862	.2723	38
52	880	.2799	898	.2876	916	.2954	934	.3032	951	.3111	969	.3190	37
53	986	.3270	8004	.3351	8021	.3452	8039	.3514	8056	.3597	8073	.3680	36
54	8090	.3764	107	.3848	124	.3934	141	.4019	158	.4106	175	.4193	35
55	192	.4281	208	.4370	225	.4460	241	.4550	258	.4641	274	.4733	34
56	290	.4826	307	.4919	323	.5013	339	.5108	355	.5204	371	.5301	33
57	387	.5399	403	.5497	418	.5597	434	.5697	450	.5798	465	.5900	32
58	480	.6003	496	.6107	511	.6212	526	.6319	542	.6426	557	.6534	31
59	572	.6643	587	.6753	601	.6864	616	.6977	631	.7090	646	.7205	30
60	660	1.7321	8675	1.7437	8689	1.7556	8704	1.7675	8718	1.7797	8732	1.7917	29
61	746	.8040	760	.8165	774	.8291	788	.8418	802	.8546	816	.8676	28
62	829	.8807	843	.8940	857	.9074	870	.9210	884	.9347	897	.9486	27
63	910	.9626	923	.9768	936	.9912	949	2.0057	962	2.0204	975	2.0353	26
64	988	2.0503	9001	2.0655	9013	2.0809	9026	.0965	9038	.1123	9051	.1283	25
65	9063	.1445	075	.1609	088	.1775	100	.1943	112	.2113	124	.2286	24
66	135	.2460	147	.2637	159	.2817	171	.2998	182	.3183	194	.3369	23
67	205	.3559	216	.3750	228	.3945	239	.4142	250	.4342	261	.4545	22
68	272	.4751	283	.4960	293	.5172	304	.5386	315	.5605	325	.5826	21
69	336	.6051	346	.6279	356	.6511	367	.6746	377	.6985	387	.7228	20
70	397	2.7475	9407	2.7725	9417	2.7980	9426	2.8239	9436	2.8502	9446	2.8770	19
71	455	.9042	465	.9319	474	.9600	483	.9887	492	3.0178	502	3.0475	18
72	511	3.0777	520	3.1084	528	3.1397	537	3.1716	546	.2041	555	.2371	17
73	563	.2709	572	.3052	580	.3402	588	.3759	596	.4124	605	.4495	16
74	613	.4874	621	.5261	628	.5656	636	.6059	644	.6470	652	.6891	15
75	659	.7321	667	.7760	674	.8208	681	.8657	689	.9136	696	.9617	14
76	703	4.0108	710	4.0611	717	4.1126	724	4.1653	730	4.2193	737	4.2747	13
77	744	.3315	750	.3897	757	.4494	763	.5107	769	.5736	775	.6382	12
78	781	.7046	787	.7729	793	.8430	799	.9152	805	.9894	811	5.0658	11
79	816	1.4446	822	5.2257	827	5.3093	833	5.3955	838	5.4845	843	.5764	10
80	9848	5.6713	9853	5.7694	9858	5.8708	9863	5.9758	9868	6.0844	9872	6.1970	9
81	877	6.3138	881	6.4348	886	6.5606	890	6.6912	894	.8269	899	.9682	8
82	903	7.1154	907	7.2687	911	7.4287	914	7.5958	918	7.7704	922	7.9530	7
83	925	8.1443	929	8.3450	932	8.5555	936	8.7769	939	9.0098	942	9.2553	6
84	945	9.5144	948	9.7882	951	10.078	954	10.385	957	10.711	959	11.059	5
85	962	11.430	964	11.826	967	12.250	969	12.706	971	13.187	974	13.727	4
86	976	14.300	978	14.924	980	15.605	981	16.350	983	17.169	985	18.075	3
87	986	19.081	988	20.206	989	21.470	990	22.903	992	24.542	993	26.432	2
88	994	28.636	995	31.242	996	34.368	997	38.189	997	42.964	998	49.104	1
89	9998	57.290	9999	68.750	9999	85.940	9999	114.58	1.000	171.88	1.000	343.77	0
deg	60'	60'	50'	50'	40'	40'	30'	30'	20'	30'	10'	10'	deg
	cos	cot	cos	cot	cos	cot	cos	cot	cos	cot	cos	cot	

TABLE VII  
RODS IN FEET AND INCHES

Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches
1	16-6	21	346-6	41	676-6	61	1006-6	81	1336-6
2	33-0	22	363-0	42	693-0	62	1023-0	82	1353-0
3	49-6	23	379-6	43	709-6	63	1039-6	83	1369-6
4	66-0	24	396-0	44	726-0	64	1056-0	84	1386-0
5	82-6	25	412-6	45	742-6	65	1072-6	85	1402-6
6	99-0	26	429-0	46	759-0	66	1089-0	86	1419-0
7	115-6	27	445-6	47	775-6	67	1105-6	87	1435-6
8	132-0	28	462-0	48	792-0	68	1122-0	88	1452-0
9	148-6	29	478-6	49	808-6	69	1138-6	89	1468-6
10	165-0	30	495-0	50	825-0	70	1155-0	90	1485-0
11	181-6	31	511-6	51	841-6	71	1171-6	91	1501-6
12	198-0	32	528-0	52	858-0	72	1188-0	92	1518-0
13	214-6	33	544-6	53	874-6	73	1204-6	93	1534-6
14	231-0	34	561-0	54	891-0	74	1221-0	94	1551-0
15	247-6	35	577-6	55	907-6	75	1237-6	95	1567-6
16	264-0	36	594-0	56	924-0	76	1254-0	96	1584-0
17	280-6	37	610-6	57	940-6	77	1270-6	97	1600-6
18	297-0	38	627-0	58	957-0	78	1287-0	98	1617-0
19	313-6	39	643-6	59	973-6	79	1303-6	99	1633-6
20	330-0	40	660-0	60	990-0	80	1320-0	100	1650-0

TABLE VIII  
LINKS IN FEET AND INCHES

Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches
1	0-7.92	18	11-10.53	35	23-1.20	52	34-3.84	69	45-6.48	86	56-9.12
2	1-3.84	19	12-6.48	36	23-9.12	53	34-11.76	70	46-2.40	87	57-5.04
3	1-11.76	20	13-2.40	37	24-5.04	54	35-7.68	71	46-10.32	88	58-0.96
4	2-7.68	21	13-10.32	38	25-0.96	55	36-3.60	72	47-6.24	89	58-8.88
5	3-3.60	22	14-6.24	39	25-8.88	56	36-11.52	73	48-2.16	90	59-4.80
6	3-11.52	23	15-2.16	40	26-4.80	57	37-7.44	74	48-10.08	91	60-0.72
7	4-7.44	24	15-10.08	41	27-0.72	58	38-3.36	75	49-6.00	92	60-8.64
8	5-3.36	25	16-6.00	42	27-8.64	59	38-11.28	76	50-1.92	93	61-4.56
9	5-11.28	26	17-1.92	43	28-4.56	60	39-7.20	77	50-9.84	94	62-0.48
10	6-7.20	27	17-9.84	44	29-0.48	61	40-3.12	78	51-5.76	95	62-8.40
11	7-3.12	28	18-5.76	45	29-8.40	62	40-11.04	79	52-1.68	96	63-4.32
12	7-11.04	29	19-1.68	46	30-4.32	63	41-6.96	80	52-9.60	97	64-0.24
13	8-6.96	30	19-9.60	47	31-0.24	64	42-2.88	81	53-5.52	98	64-8.16
14	9-2.88	31	20-5.52	48	31-8.16	65	42-10.80	82	54-1.44	99	65-4.08
15	9-10.80	32	21-1.44	49	32-4.08	66	43-6.72	83	54-9.36	100	66-.000
16	10-6.72	33	21-9.36	50	33-0.00	67	44-2.64	84	55-5.28	101	66-7.92
17	11-2.64	34	22-5.28	51	33-7.92	68	44-10.56	85	56-1.20	102	67-3.84

# CONCRETE PIPE COMPANY of OHIO, INC.

P. O. BOX 706, WARRENSVILLE STA.

Cleveland: LO. 5367

CLEVELAND 22, OHIO

Erie, Pa. 22511

Youngstown: 35923

Sandusky: 2553

IMMEDIATE DELIVERY 6" TO 72" INCLUSIVE

SEWER PIPE

★

CULVERT PIPE

★

DRAIN TILE

BMs Mulberry  
Bridge (as of July 49)

Hub  $\pm$  75' S of E abut  
(in hole in ground.)

ELEV. = 922.45

Nail 1<sup>st</sup> maple N of  
bridge, W bank of river

ELEV. = 923.78

See pg 51

Ref spk W side 12" Elm  
(stump?)  $\pm$  70' NW of bridge

ELEV. = 941.32

719.23

410.87

133.21

544.08

150

394.08

144 + 28.25

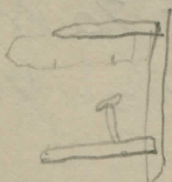
10 + 50.51

133 47.70

14 09.15

149 56.85

58 91 50  
42 + 82 33  
16 09 15



1068.76

920

148.76

I.P.C

168-20  
16-40  
150-20

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=10°	I	T	E	I=20°	I	T	E	I=30°
1°	50.00	.218	+	11°	551.70	26.500	+	21°	1061.9	97.577	+
10'	58.34	.297		10'	560.11	27.313	5° C	10'	1070.6	99.155	5° C
20'	66.67	.388	5° C.	20'	568.53	28.137		20'	1079.2	100.75	5° C.
30'	75.01	.491	T	30'	576.95	28.974	T	30'	1087.8	102.35	T
40'	83.34	.606	.03	40'	585.36	29.824	.06	40'	1096.4	103.97	.10
50'	91.68	.733	E	50'	593.79	30.686	E	50'	1105.1	105.60	E
2°	100.01	.873	.001	12°	602.21	31.561	.006	22°	1113.7	107.24	.013
10'	108.35	1.024		10'	610.64	32.447		10'	1122.4	108.90	
20'	116.68	1.188		20'	619.07	33.347		20'	1131.0	110.57	
30'	125.02	1.364		30'	627.50	34.259		30'	1139.7	112.25	
40'	133.36	1.552		40'	635.93	35.183		40'	1148.4	113.95	
50'	141.70	1.752		50'	644.37	36.120		50'	1157.0	115.66	
3°	150.04	1.964	10° C.	13°	652.81	37.070	10° C.	23°	1165.7	117.38	10° C.
10'	158.38	2.188	T	10'	661.25	38.031	T	10'	1174.4	119.12	T
20'	166.72	2.425	.06	20'	669.70	39.006	.13	20'	1183.1	120.87	.19
30'	175.06	2.674	E	30'	678.15	39.993	E	30'	1191.8	122.63	E
40'	183.40	2.934	.003	40'	686.60	40.992	.011	40'	1200.5	124.41	.025
50'	191.74	3.207		50'	695.06	42.004		50'	1209.2	126.20	
4°	200.08	3.492		14°	703.51	43.029		24°	1217.9	128.00	
10'	208.43	3.790		10'	711.97	44.066		10'	1226.6	129.82	
20'	216.77	4.099		20'	720.44	45.116		20'	1235.3	131.65	
30'	225.12	4.421		30'	728.90	46.178		30'	1244.0	133.50	
40'	233.47	4.755		40'	737.37	47.253		40'	1252.8	135.35	
50'	241.81	5.100	15° C.	50'	745.85	48.341	15° C.	50'	1261.5	137.23	15° C.
5°	250.16	5.459	T	15°	754.32	49.441	T	25°	1270.2	139.11	T
10'	258.51	5.829	.09	10'	762.80	50.554	.19	10'	1279.0	141.01	.29
20'	266.86	6.211	E	20'	771.29	51.679	E	20'	1287.7	142.93	E
30'	275.21	6.606	.004	30'	779.77	52.818	.017	30'	1296.5	144.85	.038
40'	283.57	7.013		40'	788.26	53.969		40'	1305.3	146.79	
50'	291.92	7.432		50'	796.75	55.132		50'	1314.0	148.75	
6°	300.28	7.863		16°	805.25	56.309		26°	1322.8	150.71	
10'	308.64	8.307		10'	813.75	57.498		10'	1331.6	152.69	
20'	316.99	8.762		20'	822.25	58.699		20'	1340.4	154.69	
30'	325.35	9.230		30'	830.76	59.914		30'	1349.2	156.70	
40'	333.71	9.710	20° C.	40'	839.27	61.141	20° C.	40'	1358.0	158.72	20° C.
50'	342.08	10.202	T	50'	847.78	62.381	T	50'	1366.8	160.76	T
7°	350.44	10.707	.13	17°	856.30	63.634	.26	27°	1375.6	162.81	.39
10'	358.81	11.224	E	10'	864.82	64.900	E	10'	1384.4	164.86	E
20'	367.17	11.753	.006	20'	873.35	66.178	.022	20'	1393.2	166.95	.051
30'	375.54	12.294		30'	881.88	67.470		30'	1402.0	169.04	
40'	383.91	12.847		40'	890.41	68.774		40'	1410.9	171.15	
50'	392.28	13.413		50'	898.95	70.091		50'	1419.7	173.27	
8°	400.66	13.991		18°	907.49	71.421		28°	1428.6	175.41	
10'	409.03	14.582	25° C.	10'	916.03	72.764	25° C.	10'	1437.4	177.55	25° C.
20'	417.41	15.184	T	20'	924.58	74.119	T	20'	1446.3	179.72	T
30'	425.79	15.799	E	30'	933.13	75.488	E	30'	1455.1	181.89	E
40'	434.17	16.426	.16	40'	941.69	76.869	.32	40'	1464.0	184.08	.49
50'	442.55	17.065		50'	950.25	78.264	E	50'	1472.9	186.29	E
9°	450.93	17.717	.007	19°	958.81	79.671	.028	29°	1481.8	188.51	.065
10'	459.32	18.381		10'	967.38	81.092		10'	1490.7	190.74	
20'	467.71	19.058		20'	975.96	82.525		20'	1499.6	192.99	
30'	476.10	19.746		30'	984.53	83.972		30'	1508.5	195.25	
40'	484.49	20.447		40'	993.12	85.431		40'	1517.4	197.53	
50'	492.88	21.161		50'	1001.7	86.904		50'	1526.3	199.82	
10°	501.28	21.887	30° C.	20°	1010.3	88.389	30° C.	30°	1535.3	202.12	30° C.
10'	509.68	22.624	T	10'	1018.9	89.888	T	10'	1544.2	204.44	T
20'	518.08	23.375	.19	20'	1027.5	91.399	.39	20'	1553.1	206.77	.59
30'	526.48	24.138	E	30'	1036.1	92.924	E	30'	1562.1	209.12	E
40'	534.89	24.913	.008	40'	1044.7	94.462	.034	40'	1571.0	211.48	.078
50'	543.29	25.700		50'	1053.3	96.013		50'	1580.0	213.86	

T = R tan ½ I

E = R exsec ½ I

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=40°	I	T	E	I=50°	I	T	E	I=60°
31°	1589.0	216.3	+	41°	2142.2	387.4	+	51°	2732.9	618.4	+
10'	1598.0	218.1		10'	2151.7	390.7		10'	2743.1	622.8	
20'	1606.9	221.1	5° C.	20'	2161.2	394.1	5° C.	20'	2753.4	627.2	5° C.
30'	1615.9	223.5	T	30'	2170.8	397.4	T	30'	2763.7	631.7	T
40'	1624.9	226.0	.13	40'	2180.3	400.8	.17	40'	2773.9	636.2	.21
50'	1633.9	228.4	E	50'	2189.9	404.2	E	50'	2784.2	640.7	E
32°	1643.0	230.9	.023	42°	2199.4	407.6	.037	52°	2794.0	645.2	.056
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	10° C.	43°	2257.0	428.5	10° C.	53°	2856.7	672.7	10° C.
10'	1706.3	248.7	T	10'	2266.6	432.0	T	10'	2867.1	677.3	T
20'	1715.3	251.3	.26	20'	2276.2	435.6	.34	20'	2877.5	682.0	.42
30'	1724.4	253.9	E	30'	2285.9	439.2	E	30'	2888.0	686.7	E
40'	1733.5	256.5	.046	40'	2295.6	442.8	.075	40'	2898.4	691.4	.112
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	15° C.	50'	2363.5	468.4	15° C.	50'	2972.1	725.0	15° C.
35°	1806.6	278.1	T	45°	2373.3	472.1	T	55°	2982.7	729.9	T
10'	1815.7	280.8	.40	10'	2383.1	475.8	.51	10'	2993.3	734.8	.63
20'	1824.9	283.6	E	20'	2392.8	479.6	E	20'	3003.9	739.7	E
30'	1834.1	286.4	.070	30'	2402.6	483.4	.116	30'	3014.5	744.6	.168
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	300.5		20'	2451.8	502.5		20'	3067.9	769.7	
30'	1889.4	303.5	20° C.	30'	2461.7	506.4	20° C.	30'	3078.7	774.7	20° C.
40'	1898.6	306.4	T	40'	2471.5	510.3	T	40'	3089.4	779.8	T
50'	1907.9	309.3	.39	50'	2481.4	514.3	.68	50'	3100.2	784.9	.84
37°	1917.1	312.2	.53	47°	2491.3	518.2	.68	57°	3110.9	790.1	.84
10'	1926.4	315.2	.093	10'	2501.2	522.2	.151	10'	3121.7	795.2	.225
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	25° C.	10'	2561.0	546.3	25° C.	10'	3186.9	826.7	25° C.
20'	1991.5	336.3	T	20'	2571.0	550.4	T	20'	3197.8	832.0	T
30'	2000.9	339.3	E	30'	2581.0	554.5	E	30'	3208.8	837.3	E
40'	2010.2	342.4	.67	40'	2591.0	558.6	.85	40'	3219.7	842.7	1.05
50'	2019.6	345.5	E	50'	2601.1	562.8	E	50'	3230.7	848.1	E
39°	2029.0	348.6	.117	49°	2611.2	566.9	.189	59°	3241.7	853.5	.283
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			

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=70°	I	T	E	I=80°	I	T	E	I=90°
61°	3375.0	920.2	+	71°	4086.9	1308.2	+	81°	4893.6	1805.3	+
10'	3386.3	925.9	5° C.	10'	4099.5	1315.6	5° C.	10'	4908.0	1814.7	5° C.
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	.080	72°	4162.8	1352.6	.110	82°	4980.7	1862.2	.149
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	10° C.	73°	4239.7	1398.0	10° C.	83°	5069.2	1920.5	10° C.
10'	3522.6	996.2	T	10'	4252.6	1405.7	T	10'	5084.0	1930.4	T
20'	3534.1	1002.3	.51	20'	4265.6	1413.5	.61	20'	5099.0	1940.3	.72
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	
				.159				.220			
64°	3580.3	1026.6	15° C.	74°	4317.6	1444.6	15° C.	84°	5159.0	1980.4	15° C.
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	T	75°	4396.5	1492.4	T	85°	5250.3	2041.7	T
10'	3661.9	1070.2	.76	10'	4409.8	1500.5	.91	10'	5265.6	2052.1	1.09
20'	3673.7	1076.6	E	20'	4423.1	1508.6	E	20'	5281.0	2062.5	E
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	
				.240				.332			
66°	3720.9	1102.2	20° C.	76°	4476.5	1541.4	20° C.	86°	5343.0	2104.7	20° C.
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	1.02	77°	4557.6	1591.6	1.22	87°	5437.2	2169.2	1.45
10'	3804.4	1148.0	E	10'	4571.2	1600.1	E	10'	5453.1	2180.2	E
20'	3816.4	1154.7	.321	20'	4584.8	1608.6	.445	20'	5469.0	2191.1	.603
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	25° C.	78°	4639.8	1643.0	25° C.	88°	5533.1	2235.5	25° C.
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	.403	79°	4723.2	1695.8	.558	89°	5630.5	2303.5	.756
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	30° C.	80°	4807.7	1749.9	30° C.	90°	5729.7	2373.3	30° C.
10'	4024.4	1272.1	T	10'	4822.0	1759.0	T	10'	5746.3	2385.1	T
20'	4036.8	1279.3	1.54	20'	4836.2	1768.2	1.84	20'	5763.1	2397.0	2.20
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	
				.485				.671			

T = R tan ½ I

E = R exsec ½ I

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=100°	I	T	E	I=110°	I	T	E	I=120°
91°	5830.5	2444.9	+	101°	6950.6	3278.1	+	111°	8336.7	4386.1	+
10'	5847.5	2457.1	5° C.	10'	6971.3	3294.1	5° C.	10'	8362.7	4407.6	5° C.
20'	5864.6	2469.3		20'	6992.0	3310.1		20'	8388.9	4429.2	
30'	5881.7	2481.5		30'	7012.7	3326.1		30'	8415.1	4450.9	
40'	5898.8	2493.8		40'	7033.6	3342.3		40'	8441.5	4472.7	
50'	5916.0	2506.1		50'	7054.5	3358.5		50'	8468.0	4494.6	
92°	5933.2	2518.5	.200	102°	7075.5	3374.9	.268	112°	8494.6	4516.6	.360
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	10° C.	103°	7203.2	3474.4	10° C.	113°	8656.6	4651.3	10° C.
10'	6055.4	2606.8	T	10'	7224.7	3491.3	T	10'	8684.0	4674.2	T
20'	6073.1	2619.7	.86	20'	7246.3	3508.2	.103	20'	8711.5	4697.2	1.25
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	
				.401				.536			
94°	6144.3	2671.6	15° C.	104°	7333.6	3576.8	15° C.	114°	8822.9	4790.4	15° C.
10'	6162.2	2684.7		10'	7355.6	3594.2		10'	8851.0	4814.1	
20'	6180.2	2697.9		20'	7377.8	3611.7		20'	8879.3	4837.8	
30'	6198.3	2711.2		30'	7399.9	3629.5		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	T	105°	7467.0	3682.3	T	115°	8993.8	4934.1	T
10'	6271.1	2764.8	1.30	10'	7489.3	3700.2	1.56	10'	9022.7	4958.6	1.93
20'	6289.4	2778.3	E	20'	7512.2	3718.2	E	20'	9051.7	4983.1	E
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	
				.604				.806			
96°	6363.4	2833.2	20° C.	106°	7603.5	3791.0	20° C.	116°	9169.4	5082.7	20° C.
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	1.74	107°	7743.2	3902.9	2.08	117°	9349.9	5236.2	2.52
10'	6495.2	2931.6	E	10'	7766.8	3921.9	E	10'	9380.5	5262.3	E
20'	6514.3	2945.9	.809	20'	7790.5	3940.9	1.08	20'	9411.3	5288.6	1.46
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	25° C.	108°	7886.2	4018.2	25° C.	118°	9535.7	5395.1	25° C.
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	1.02	109°	8032.7	4137.1	1.36	119°	9727.0	5559.4	1.83
10'	6728.4	3107.7		10'	8057.4	4157.3		10'	9759.4</		

TABLE X.  
MIDDLE ORDINATES OF RAILS  
Length of Rail (feet)

C o /	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch	C o	R Feet	30 Inch	28 Inch	26 Inch	24 Inch	22 Inch	20 Inch
0-20	17189	.08	.07	.06	.05	.04	.03	8	716.8	1.88	1.64	1.42	1.20	1.01	.84
0-40	8594	.16	.14	.12	.10	.08	.07	9	637.3	2.12	1.84	1.60	1.35	1.14	.94
1-0	5730	.24	.20	.18	.15	.13	.10	10	573.7	2.36	2.05	1.78	1.50	1.27	1.04
1-20	4297	.31	.27	.23	.20	.17	.13	11	521.7	2.59	2.26	1.95	1.65	1.39	1.15
1-40	3438	.39	.34	.29	.25	.21	.17	12	478.3	3.83	2.47	2.15	1.81	1.54	1.26
2-0	2865	.47	.41	.35	.30	.25	.20	13	441.7	3.05	2.66	2.30	1.96	1.66	1.36
2-20	2456	.55	.48	.41	.35	.29	.23	14	410.3	3.30	2.87	2.48	2.10	1.78	1.46
2-40	2149	.63	.55	.47	.40	.33	.27	15	383.1	3.54	3.08	2.68	2.26	1.91	1.57
3-0	1910	.71	.62	.53	.45	.38	.31	16	359.3	3.76	3.28	2.83	2.40	2.04	1.67
3-20	1719	.78	.68	.59	.50	.42	.35	17	338.3	4.00	3.48	3.02	2.57	2.16	1.78
3-40	1563	.86	.75	.65	.55	.46	.38	18	319.6	4.21	3.67	3.18	2.70	2.28	1.87
4-0	1433	.94	.82	.71	.60	.50	.42	19	302.9	4.45	3.89	3.36	2.86	2.41	1.98
4-20	1323	1.02	.89	.77	.65	.55	.45	20	287.9	4.70	4.09	3.55	3.00	2.54	2.09
4-40	1228	1.10	.96	.83	.70	.59	.48	22	262.0	5.16	4.44	3.84	3.30	2.80	2.29
5	1146	1.18	1.03	.89	.75	.63	.52	24	240.5	5.64	4.92	4.20	3.59	3.04	2.50
6	955.3	1.41	1.23	1.06	.90	.76	.62	26	222.3	6.07	5.29	4.58	3.88	3.29	2.70
7	819.0	1.65	1.44	1.24	1.05	.89	.73								

TABLE XI.  
SHORT RADIUS CURVES

Radius Feet	Chord Feet	Central Angle	Deflection Angle	Deflection for 1 Foot
35	10	16-26	8-13	49.3
45	10	12-46	6-23	38.3
50	15	17-16	8-38	34.5
60	15	14-22	7-11	28.8
75	15	11-30	5-45	23.0
100	20	11-30	5-45	17.3
120	20	9-34	4-47	14.3
150	20	7-39	3-49	11.5
190	25	7-32	3-46	9.15
200	25	7-10	3-35	8.6
225	25	6-25	3-12	7.7
240	25	5-58	2-59	7.2
250	25	5-44	2-52	6.9
275	25	5-12	2-36	6.2
288	50	9-58	4-59	6.0
300	50	9-32	4-46	5.7
350	50	8-12	4-06	4.9
376	50	7-40	3-50	4.6
400	50	7-10	3-35	4.3
410	50	7-00	3-30	4.2

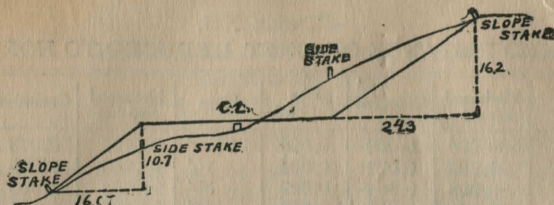
To find length of curve divide angle from P. C. to P. T. by central angle of chord, and multiply by length of chord.

TABLE XII.  
INCLINED DISTANCE OF 100 FT. REDUCED TO HORIZONTAL

Slope	Horizontal Distance	Correction	Rise Per Foot	Slope	Horizontal Distance	Correction	Rise Per Foot
0°00'	100.000	0.000	0.000	8°00'	99.027	0.973	0.139
15'	99.999	0.001	0.004	15'	98.965	1.035	0.143
30'	99.996	0.004	0.009	30'	98.902	1.098	0.148
45'	99.991	0.009	0.013	45'	98.836	1.164	0.152
1 00	99.985	0.015	0.017	9 00	98.769	1.231	0.156
15	99.976	0.024	0.022	15	98.700	1.300	0.161
30	99.966	0.034	0.026	30	98.629	1.371	0.165
45	99.953	0.047	0.031	45	98.556	1.444	0.169
2 00	99.939	0.061	0.035	10 00	98.481	1.519	0.174
15	99.923	0.077	0.039	15	98.404	1.596	0.178
30	99.905	0.095	0.044	30	98.325	1.675	0.182
45	99.885	0.115	0.048	45	98.245	1.755	0.187
3 00	99.863	0.137	0.052	11 00	98.163	1.837	0.191
15	99.839	0.161	0.057	15	98.079	1.921	0.195
30	99.813	0.187	0.061	30	97.992	2.008	0.199
45	99.786	0.214	0.065	45	97.905	2.095	0.204
4 00	99.756	0.244	0.070	12 00	97.815	2.185	0.208
15	99.725	0.275	0.074	15	97.723	2.277	0.212
30	99.692	0.308	0.078	30	97.630	2.370	0.216
45	99.657	0.343	0.083	45	97.534	2.466	0.221
5 00	99.619	0.381	0.087	13 00	97.437	2.563	0.225
15	99.580	0.420	0.092	15	97.338	2.662	0.229
30	99.540	0.460	0.096	30	97.237	2.763	0.233
45	99.497	0.503	0.100	45	97.134	2.866	0.238
6 00	99.452	0.548	0.105	14 00	97.030	2.970	0.242
15	99.406	0.594	0.109	15	96.923	3.077	0.246
30	99.357	0.643	0.113	30	96.815	3.185	0.250
45	99.307	0.693	0.118	45	96.705	3.295	0.255
7 00	99.255	0.745	0.122	15 00	96.593	3.407	0.259
15	99.200	0.800	0.126	15	96.479	3.521	0.263
30	99.144	0.856	0.131	30	96.363	3.637	0.267
45	99.087	0.913	0.135	45	96.246	3.754	0.271

TABLE XIII.  
MINUTES IN DECIMALS OF A DEGREE.

0 30"	.00833	10' 30"	.17500	20' 30"	.34167	30' 10"	.50833	40' 30"	.67500	50' 10"	.84167
1 00	.01667	11 00	.18333	21 00	.35000	31 00	.51667	41 00	.68333	51 00	.85000
30	.02500	30	.19167	30	.35833	30	.52500	30	.69167	30	.85833
2 00	.03333	12 00	.20000	22 00	.36667	32 00	.53333	42 00	.70000	52 00	.86667
30	.04167	30	.20833	30	.37500	30	.54167	30	.70833	30	.87500
3 00	.05000	13 00	.21667	23 00	.38333	33 00	.55000	43 00	.71667	53 00	.88333
30	.05833	30	.22500	30	.39167	30	.55833	30	.72500	30	.89167
4 00	.06667	14 00	.23333	24 00	.40000	34 00	.56667	44 00	.73333	54 00	.90000
30	.07500	30	.24167	30	.40833	30	.57500	30	.74167	30	.90833
5 00	.08333	15 00	.25000	25 00	.41667	35 00	.58333	45 00	.75000	55 00	.91667
30	.09167	30	.25833	30	.42500	30	.59167	30	.75833	30	.92500
6 00	.10000	16 00	.26667	26 00	.43333	36 00	.60000	46 00	.76667	56 00	.93333
30	.10833	30	.27500	30	.44167	30	.60833	30	.77500	30	.94167
7 00	.11667	17 00	.28333	27 00	.45000	37 00	.61667	47 00	.78333	57 00	.95000
30	.12500	30	.29167	30	.45833	30	.62500	30	.79167	30	.95833
8 00	.13333	18 00	.30000	28 00	.46667	38 00	.63333	48 00	.80000	58 00	.96667
30	.14167	30	.30833	30	.47500	30	.64167	30	.80833	30	.97500
9 00	.15000	19 00	.31667	29 00	.48333	39 00	.65000	49 00	.81667	59 00	.98333
30	.15833	30	.32500	30	.49167	30	.65833	30	.82500	30	.99167
10 00	.16667	20 00	.33333	30 00	.50000	40 00	.66667	50 00	.83333	60 00	1.00000



DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING.

SLOPE 1 1/2 TO 1. ROADWAY OF ANY WIDTH.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0 00	0 15	0 30	0 45	0 60	0 75	0 90	1 05	1 20	1 35	0
1	1 50	1 65	1 80	1 95	2 10	2 25	2 40	2 55	2 70	2 85	1
2	3 00	3 15	3 30	3 45	3 60	3 75	3 90	4 05	4 20	4 35	2
3	4 50	4 65	4 80	4 95	5 10	5 25	5 40	5 55	5 70	5 85	3
4	6 00	6 15	6 30	6 45	6 60	6 75	6 90	7 05	7 20	7 35	4
5	7 50	7 65	7 80	7 95	8 10	8 25	8 40	8 55	8 70	8 85	5
6	9 00	9 15	9 30	9 45	9 60	9 75	9 90	10 05	10 20	10 35	6
7	10 50	10 65	10 80	10 95	11 10	11 25	11 40	11 55	11 70	11 85	7
8	12 00	12 15	12 30	12 45	12 60	12 75	12 90	13 05	13 20	13 35	8
9	13 50	13 65	13 80	13 95	14 10	14 25	14 40	14 55	14 70	14 85	9
10	15 00	15 15	15 30	15 45	15 60	15 75	15 90	16 05	16 20	16 35	10
11	16 50	16 65	16 80	16 95	17 10	17 25	17 40	17 55	17 70	17 85	11
12	18 00	18 15	18 30	18 45	18 60	18 75	18 90	19 05	19 20	19 35	12
13	19 50	19 65	19 80	19 95	20 10	20 25	20 40	20 55	20 70	20 85	13
14	21 00	21 15	21 30	21 45	21 60	21 75	21 90	22 05	22 20	22 35	14
15	22 50	22 65	22 80	22 95	23 10	23 25	23 40	23 55	23 70	23 85	15
16	24 00	24 15	24 30	24 45	24 60	24 75	24 90	25 05	25 20	25 35	16
17	25 50	25 65	25 80	25 95	26 10	26 25	26 40	26 55	26 70	26 85	17
18	27 00	27 15	27 30	27 45	27 60	27 75	27 90	28 05	28 20	28 35	18
19	28 50	28 65	28 80	28 95	29 10	29 25	29 40	29 55	29 70	29 85	19
20	30 00	30 15	30 30	30 45	30 60	30 75	30 90	31 05	31 20	31 35	20
21	31 50	31 65	31 80	31 95	32 10	32 25	32 40	32 55	32 70	32 85	21
22	33 00	33 15	33 30	33 45	33 60	33 75	33 90	34 05	34 20	34 35	22
23	34 50	34 65	34 80	34 95	35 10	35 25	35 40	35 55	35 70	35 85	23
24	36 00	36 15	36 30	36 45	36 60	36 75	36 90	37 05	37 20	37 35	24
25	37 50	37 65	37 80	37 95	38 10	38 25	38 40	38 55	38 70	38 85	25
26	39 00	39 15	39 30	39 45	39 60	39 75	39 90	40 05	40 20	40 35	26
27	40 50	40 65	40 80	40 95	41 10	41 25	41 40	41 55	41 70	41 85	27
28	42 00	42 15	42 30	42 45	42 60	42 75	42 90	43 05	43 20	43 35	28
29	43 50	43 65	43 80	43 95	44 10	44 25	44 40	44 55	44 70	44 85	29
30	45 00	45 15	45 30	45 45	45 60	45 75	45 90	46 05	46 20	46 35	30
31	46 50	46 65	46 80	46 95	47 10	47 25	47 40	47 55	47 70	47 85	31
32	48 00	48 15	48 30	48 45	48 60	48 75	48 90	49 05	49 20	49 35	32
33	49 50	49 65	49 80	49 95	50 10	50 25	50 40	50 55	50 70	50 85	33
34	51 00	51 15	51 30	51 45	51 60	51 75	51 90	52 05	52 20	52 35	34
35	52 50	52 65	52 80	52 95	53 10	53 25	53 40	53 55	53 70	53 85	35
36	54 00	54 15	54 30	54 45	54 60	54 75	54 90	55 05	55 20	55 35	36
37	55 50	55 65	55 80	55 95	56 10	56 25	56 40	56 55	56 70	56 85	37
38	57 00	57 15	57 30	57 45	57 60	57 75	57 90	58 05	58 20	58 35	38
39	58 50	58 65	58 80	58 95	59 10	59 25	59 40	59 55	59 70	59 85	39
40	60 00	60 15	60 30	60 45	60 60	60 75	60 90	61 05	61 20	61 35	40
41	61 50	61 65	61 80	61 95	62 10	62 25	62 40	62 55	62 70	62 85	41
42	63 00	63 15	63 30	63 45	63 60	63 75	63 90	64 05	64 20	64 35	42
43	64 50	64 65	64 80	64 95	65 10	65 25	65 40	65 55	65 70	65 85	43
44	66 00	66 15	66 30	66 45	66 60	66 75	66 90	67 05	67 20	67 35	44
45	67 50	67 65	67 80	67 95	68 10	68 25	68 40	68 55	68 70	68 85	45
46	69 00	69 15	69 30	69 45	69 60	69 75	69 90	70 05	70 20	70 35	46
47	70 50	70 65	70 80	70 95	71 10	71 25	71 40	71 55	71 70	71 85	47
48	72 00	72 15	72 30	72 45	72 60	72 75	72 90	73 05	73 20	73 35	48
49	73 50	73 65	73 80	73 95	74 10	74 25	74 40	74 55	74 70	74 85	49
50	75 00	75 15	75 30	75 45	75 60	75 75	75 90	76 05	76 20	76 35	50

Computed by L. Leland Locke.

5-9 Hozers 2 trucks  
8:00 - 9:30 a.m.  
broke shovel  
C. Diederich 8:30 - 9:30

499-41  
333-08

Steve Loza  
Midd fld

66-33

22513 Phone

9.80

4.05

166-33

166-35

5280	2071	5.250
<u>13574.58</u>		<u>129</u>
10860		26400
<u>30145</u>		10500
26400		5280
<u>37458</u>		<u>48008</u>
36968		
<u>4980</u>		

11.1
<u>7.9</u>
3.2
<u>7.2</u>
5.9
<u>1.3</u>

13574.58	528
<u>19</u>	<u>.13</u>
122171.22	158.4
<u>13574.58</u>	528
257917.02	<u>68.44</u>

El. 1015.46

1153.31
<u>1138.95</u>
14.36

33
<u>80</u>
57
<u>270</u>
305

1149.23
<u>1134.95</u>
14.28

25.83
<u>12.00</u>
13.83
<u>9.9</u>
3.93

5446 PL

1079.28 total Monarda

15,030 ft. to intersection

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

539
<u>65</u>
5034
<u>5532</u>
279
<u>53768</u>
7847138

1.74

36.11
<u>25.67</u>
10.44

9124.24
<u>81.25</u>
9042.99
<u>127.98</u>
9170.97

36.50
<u>2.64</u>
4.20
<u>42.34</u>

34.04
<u>4.08</u>
29.96
<u>75</u>
300

5701.5  
50

573.33
<u>51.5</u>
21.83

33.54
<u>32.8</u>

648.35
<u>51.65</u>

