Burton Station
Johnson's Corners
Road

FIELD BOOK
364

KEUFFEL & ESSER CO.

DRAWING MATERIALS
AND
SURVEYING INSTRUMENTS.
NEW YORK.

CHICAGO. ST. LOUIS. SAN FRANCISCO. MONTREAL.

TABLES FOR EXCAVATIONS AND EMBANKMENTS.

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.
ROADWAY 18 FEET WIDE. SIDE SLOPES 1½ TO 1.
FOR SINGLE TRACK EXCAVATION.

	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 Tabels see end of book.

Book #41

Burton Station
To
Johnsons Corners Road
Middlefield, Twp.

Note:
Iron pipe (1" by 18") were set at all PI, PRT, Sta 36+86.11 and Sta 41+05.07 flush with pavement
11/24/30 MBR

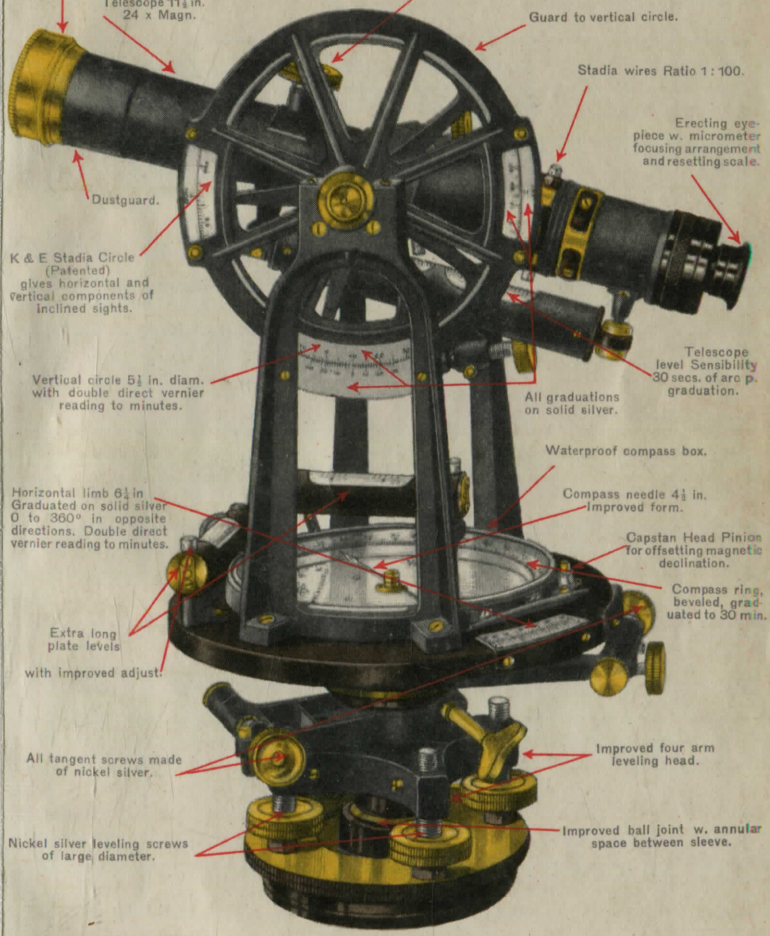
Burton-Windsor Rd-No.14 Sec. C
Alig'n.- pg. 2-11
X-Sect.- pg. 13-17
Slopes- pg. 24-37

Burton-Windsor Rd.-No. 14-Sec. DEFG.
Alig'n.-pg. 40-57
Levels -pg. 58-73

EXTRA FINE ENGINEERS' TRANSIT

No. 5060 S

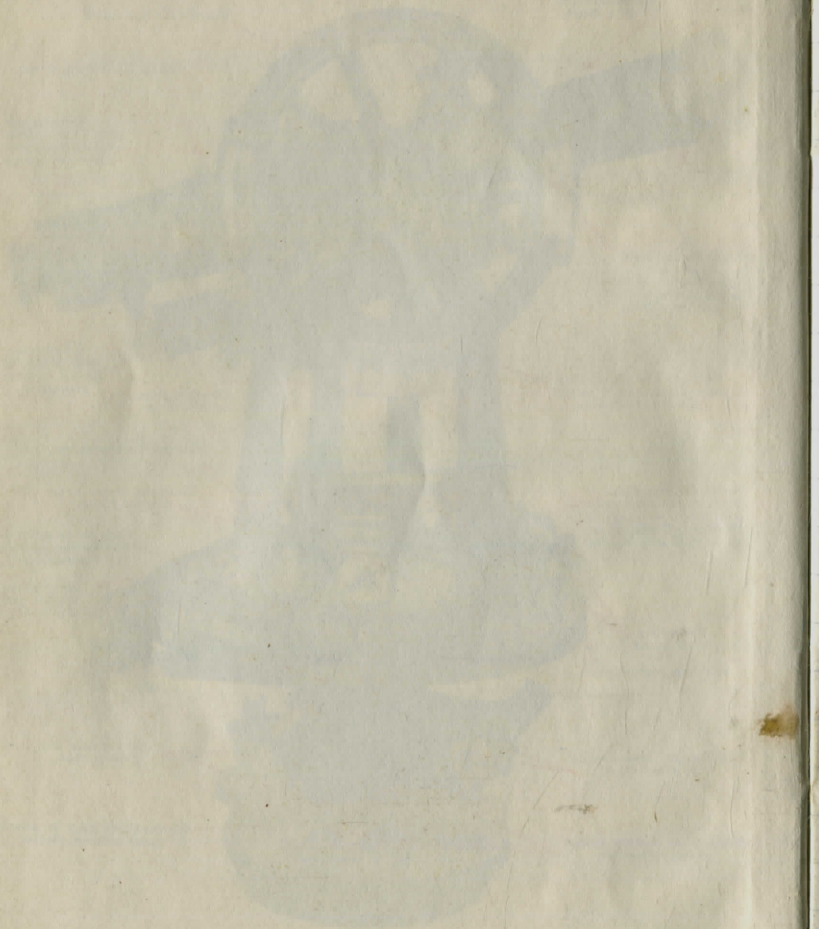
KEUFFEL & ESSER CO., N.Y.



ALSO MADE WITH

INTERNAL FOCUSING TELESCOPE

PRACTICALLY DUST AND MOISTURE PROOF.—



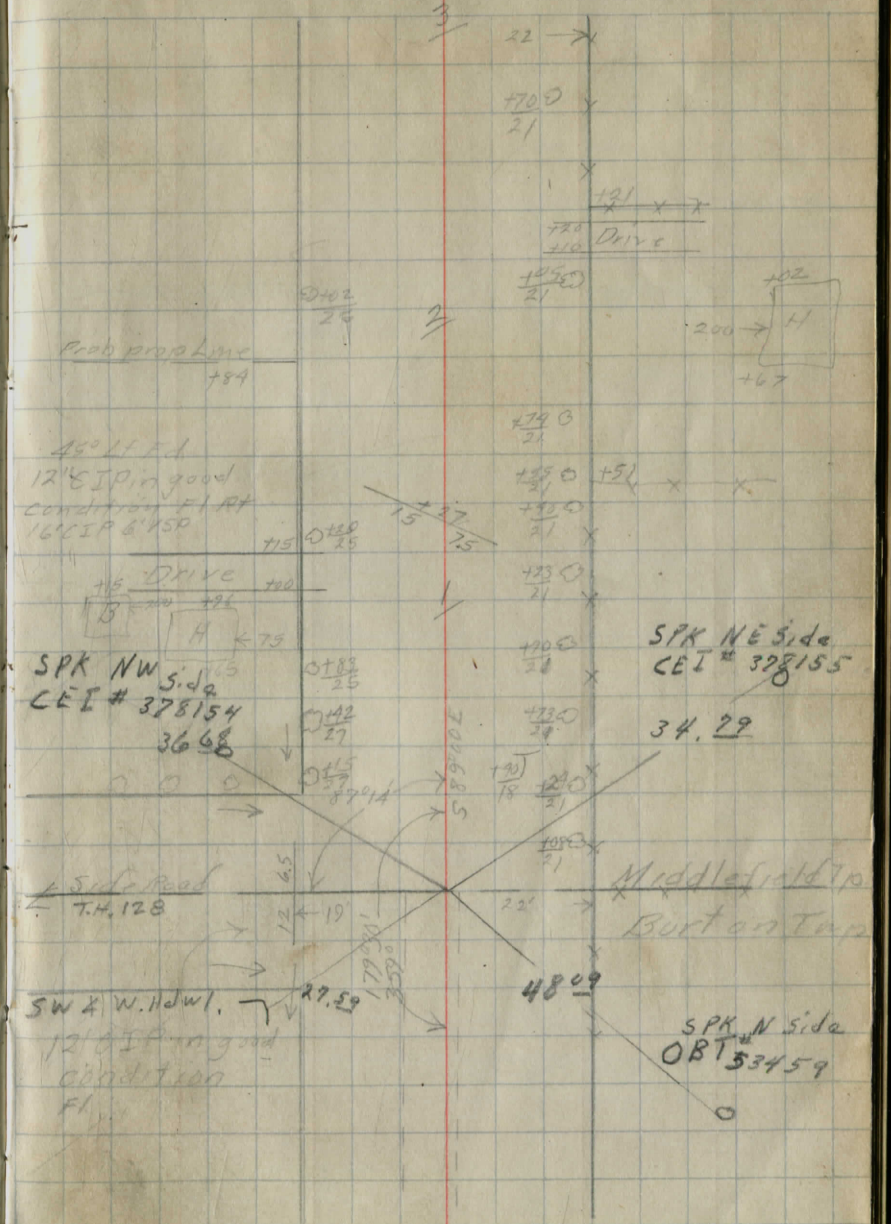
Burton Sta - Johnsons Cor. Road
Location Survey C.H. # 14

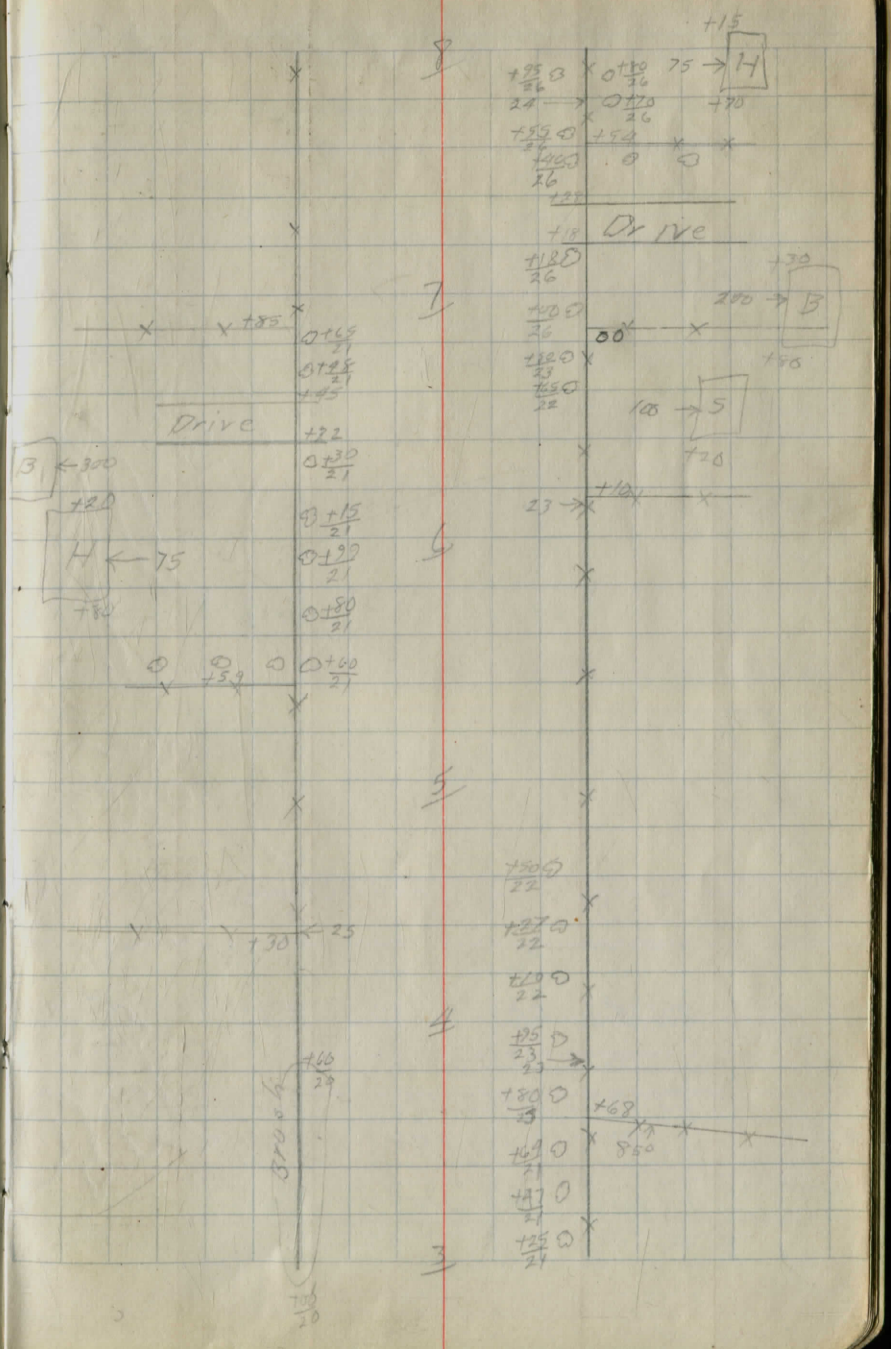
Sta 0+00 Beginning of Imp. Spike Found

= Sta 137+96 Burton-Burton Sta. Road

= End of 16' Conc. 8' 4" Rt

Side Stakes are set 30' Rt or Left



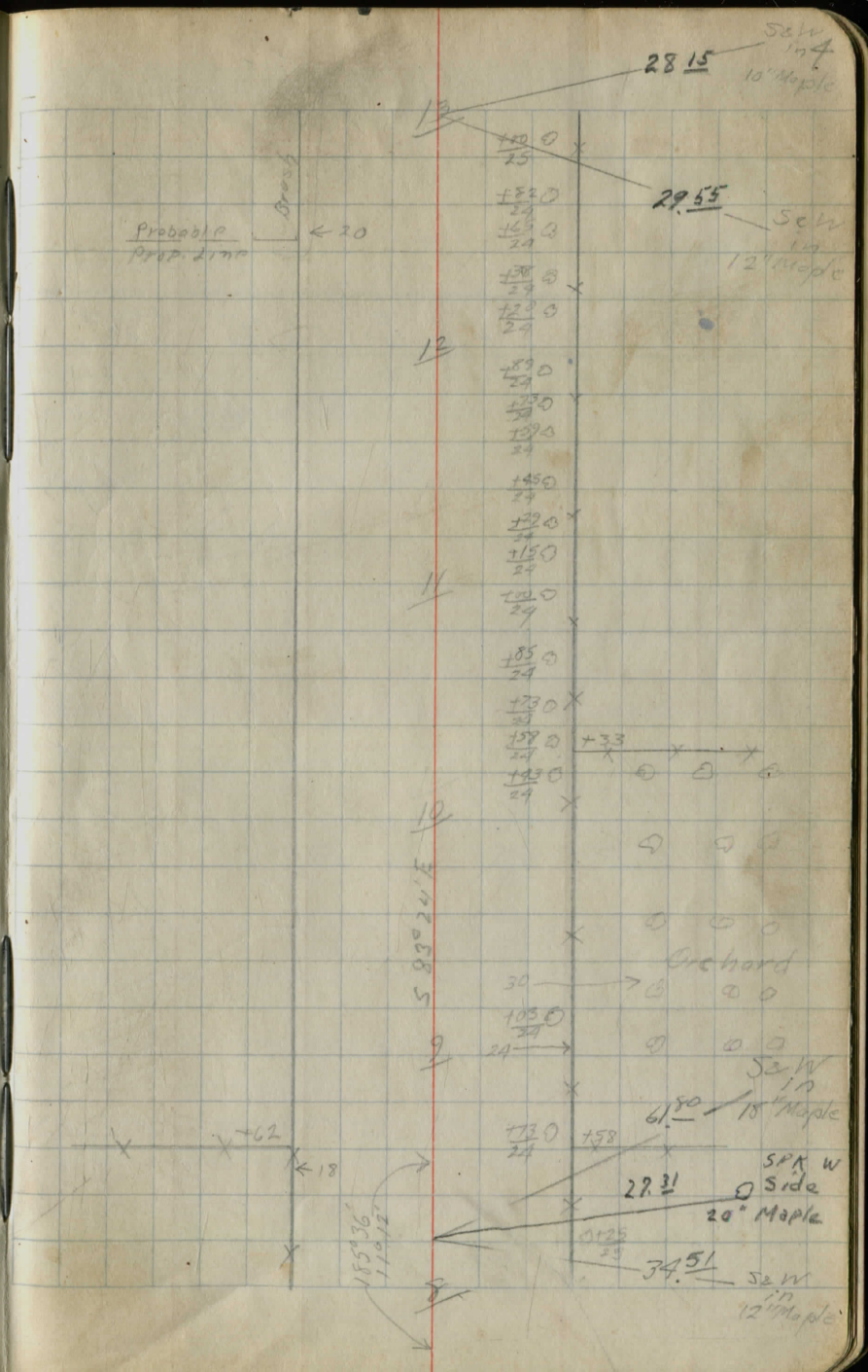

Drive
Drive
H
75
3
300
14
B
5
8
7
6
5
4
3

Sta 13 +00 POT Iron Set

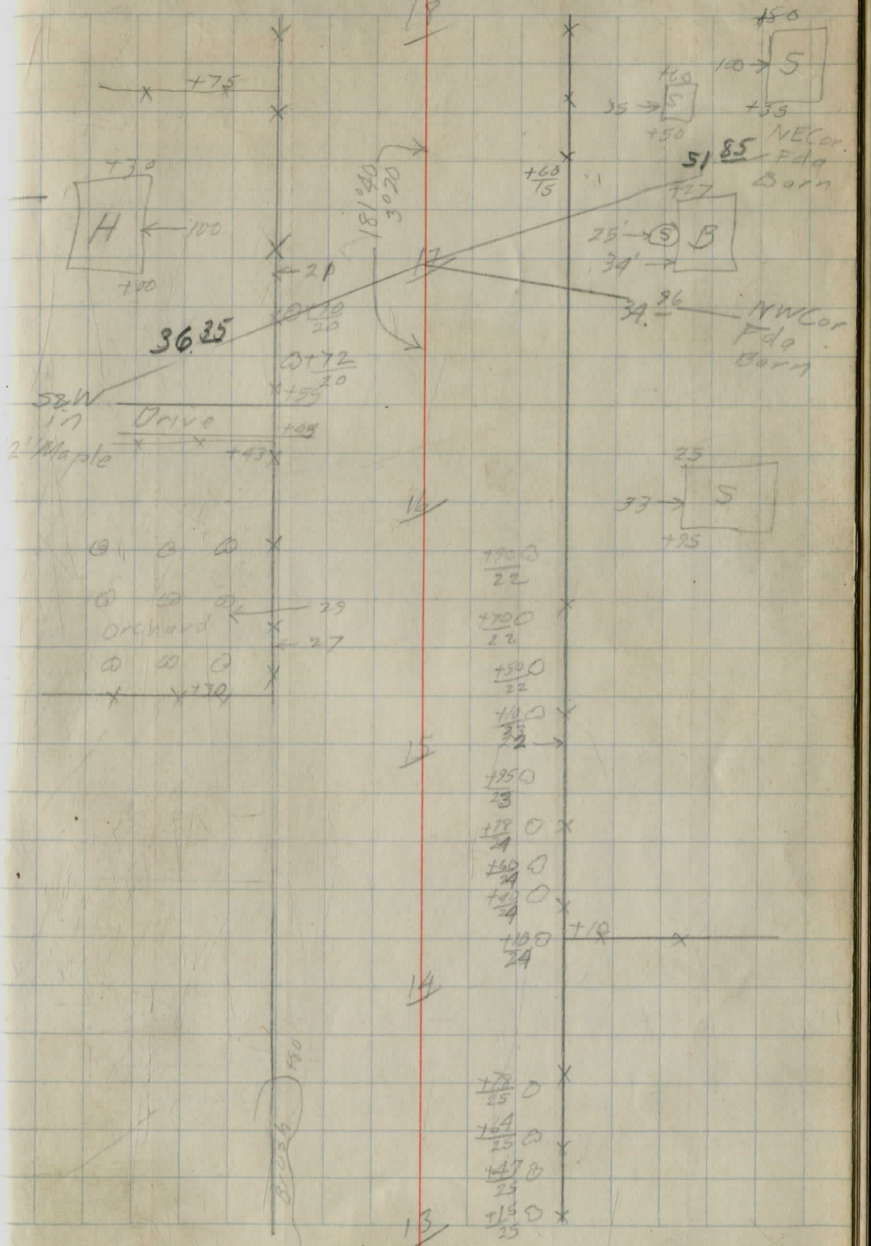
Δ = 5°36' R
D = 6°
T = 46.70
E = 1.2
L = 93.33
PC = 7+68.35
PT = 8+61.68

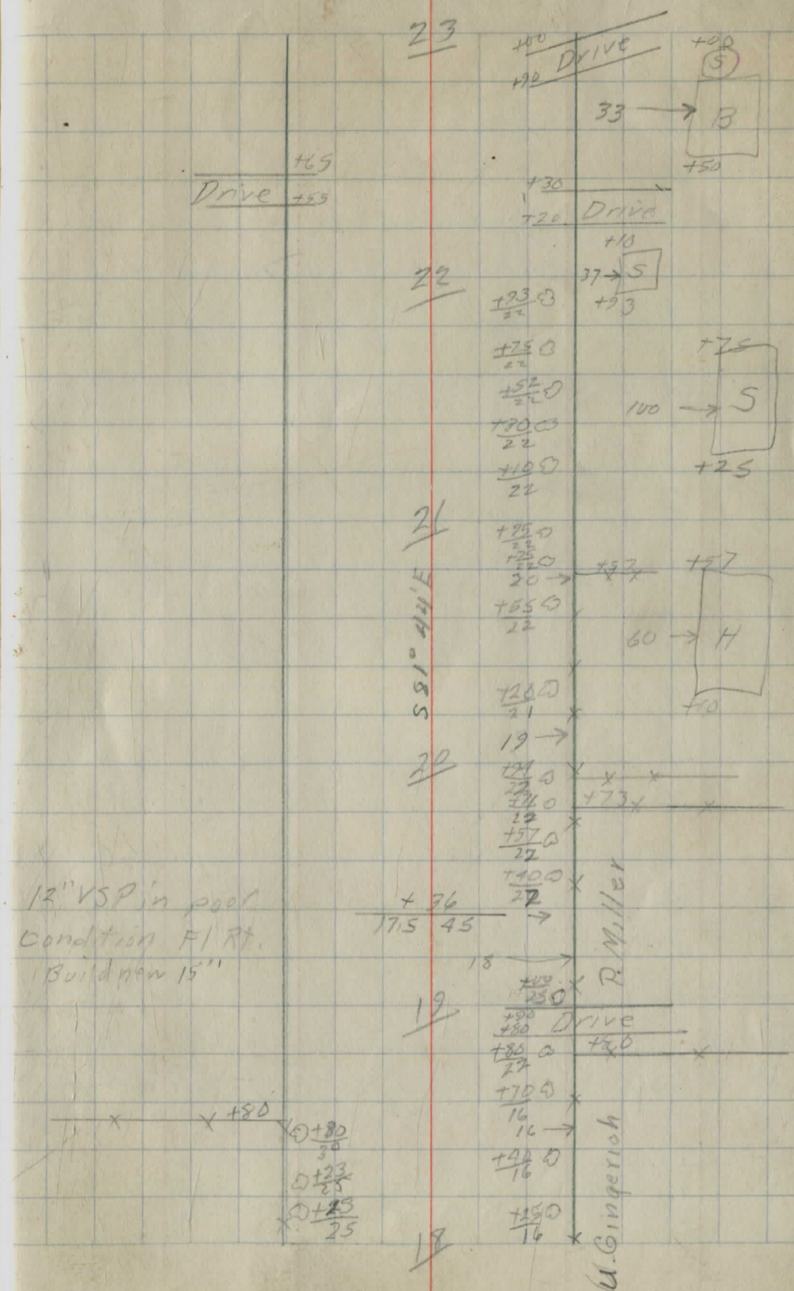
7+68	= 0°00'
8	= 0°57'
8+50	= 2°27'
8+61	= 2°48'

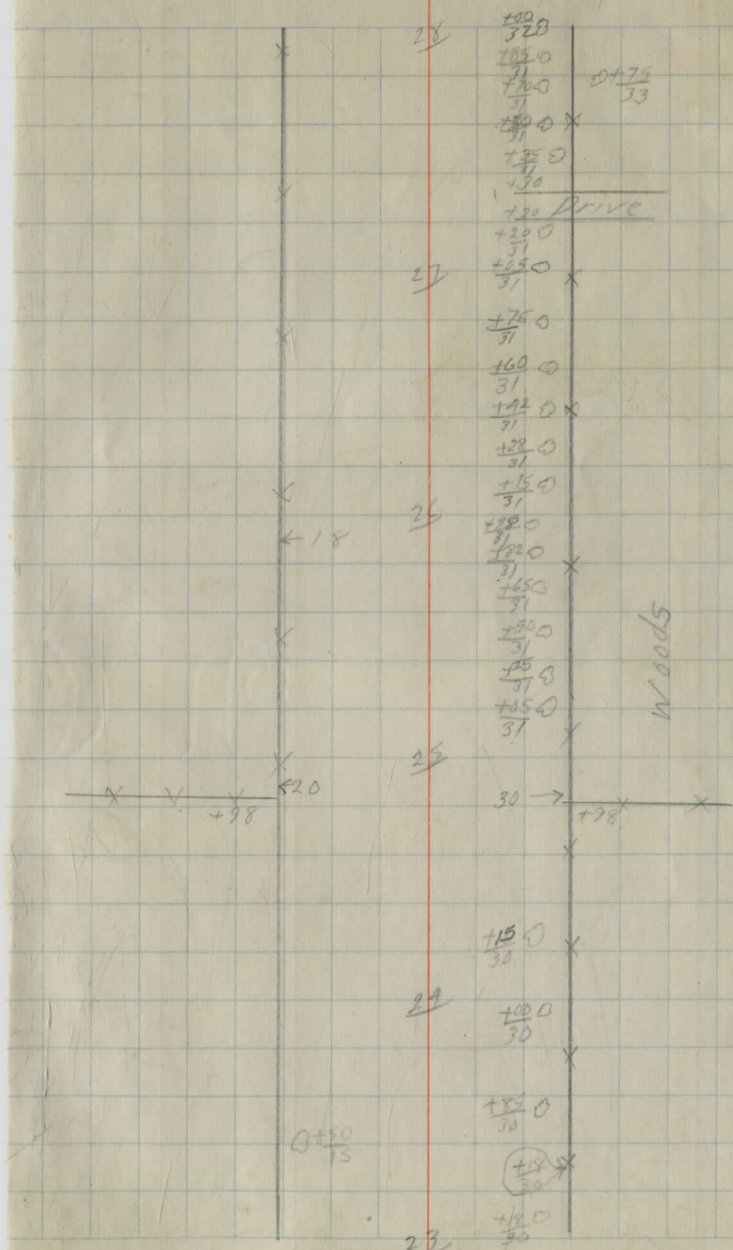
Sta 8+15.05 PI Det Δ = 5°36' Iron Set

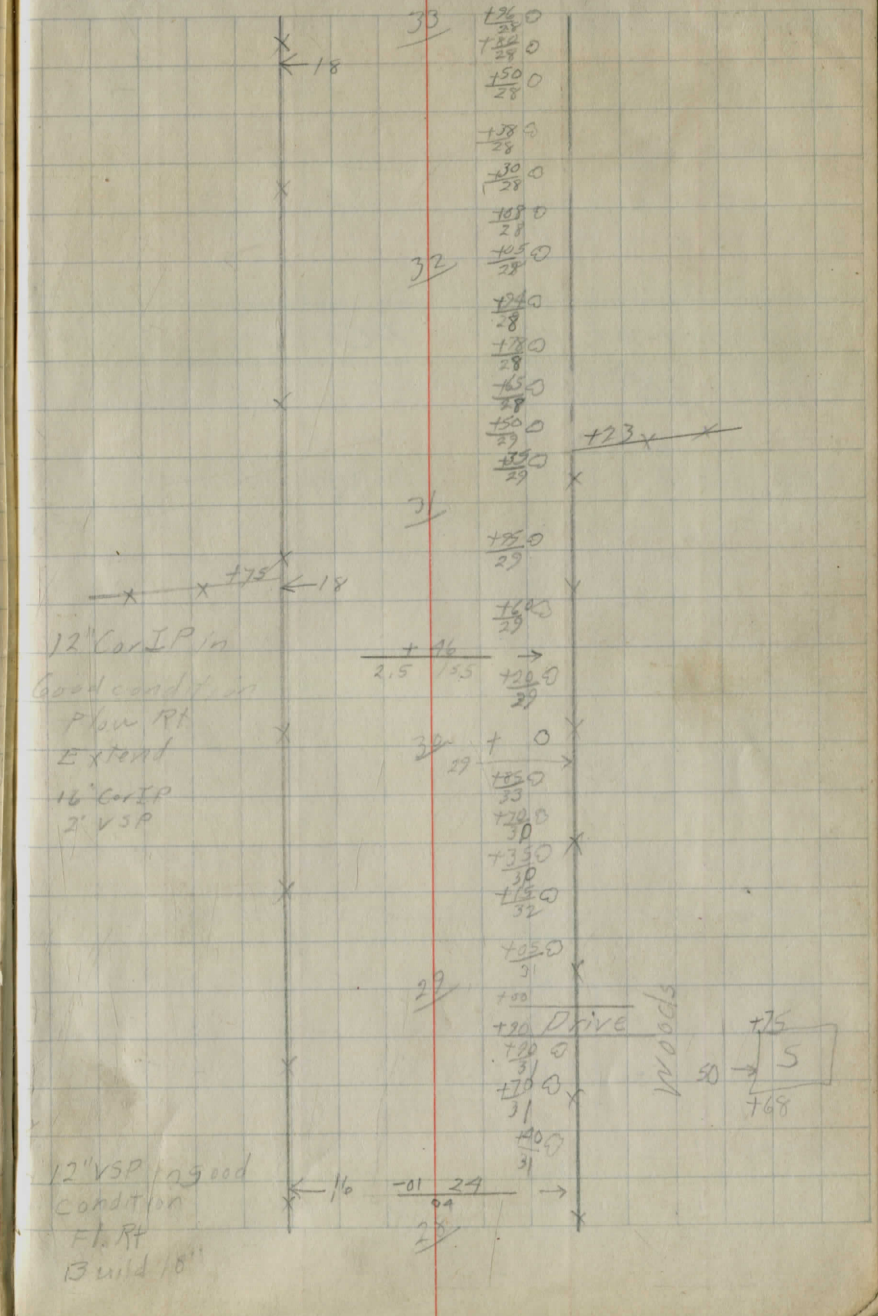


Sta 17+00	PI Def Rt 1°40'	Iron Set

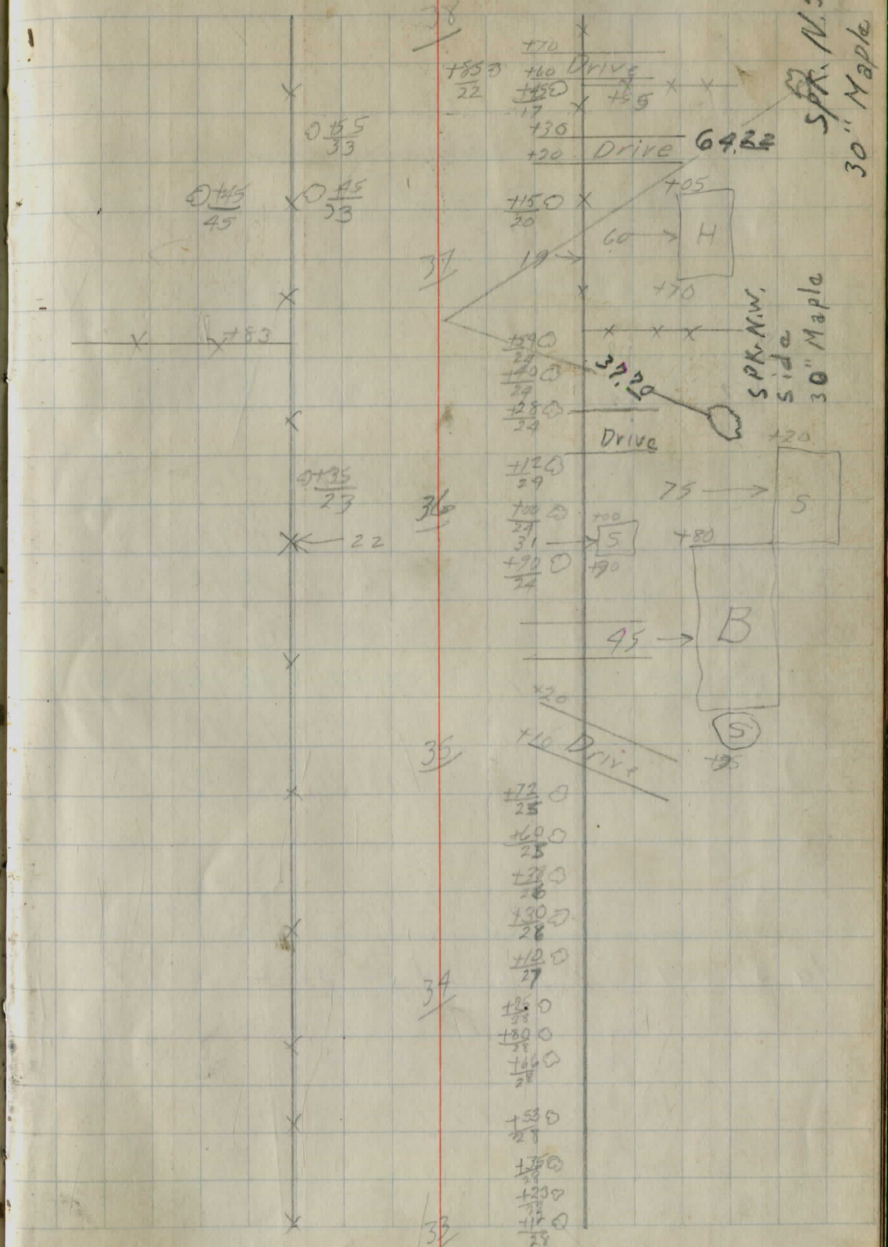



23
Drive
+00
+10
+00
S
33 → B
+50
+65
Drive +55
+30
+20 Drive
+10
37 → S
+93
22
+75
100 → S
+25
21
S 81° 41' E
20 →
+57
60 → H
19 →
20
+73
12" VSP in poor
Condition Fl Rt.
Build new 15"
+ 36
17.5 45
18 →
R Miller
19
Drive
+30
+80
16 →
U. Gingerich
18


28
+100
328
+85
31
+70
31
+50
31
+35
31
+30
+20
Drive
+20
31
27
+25
31
+75
31
+60
31
+42
31
+28
31
+15
31
26
+38
31
+22
31
+45
31
+50
31
+25
31
+65
31
Woods
25
30
+98
+98
+20
18
+15
30
24
+40
30
+85
30
+50
13
23


33
32
31
29
18
+23
+75
18
12" Cor IP in
Good condition
Plow RT
Extend
16" Cor IP
2" VSP
+46
2.5
3.5
+0
Drive
Woods
+75
50
S
+68
12" VSP in good
condition
Fl. RT
Build 18"
110

Sta 36+86.11 PC Iron Set



Sta 41+05.07 PT Iron Set

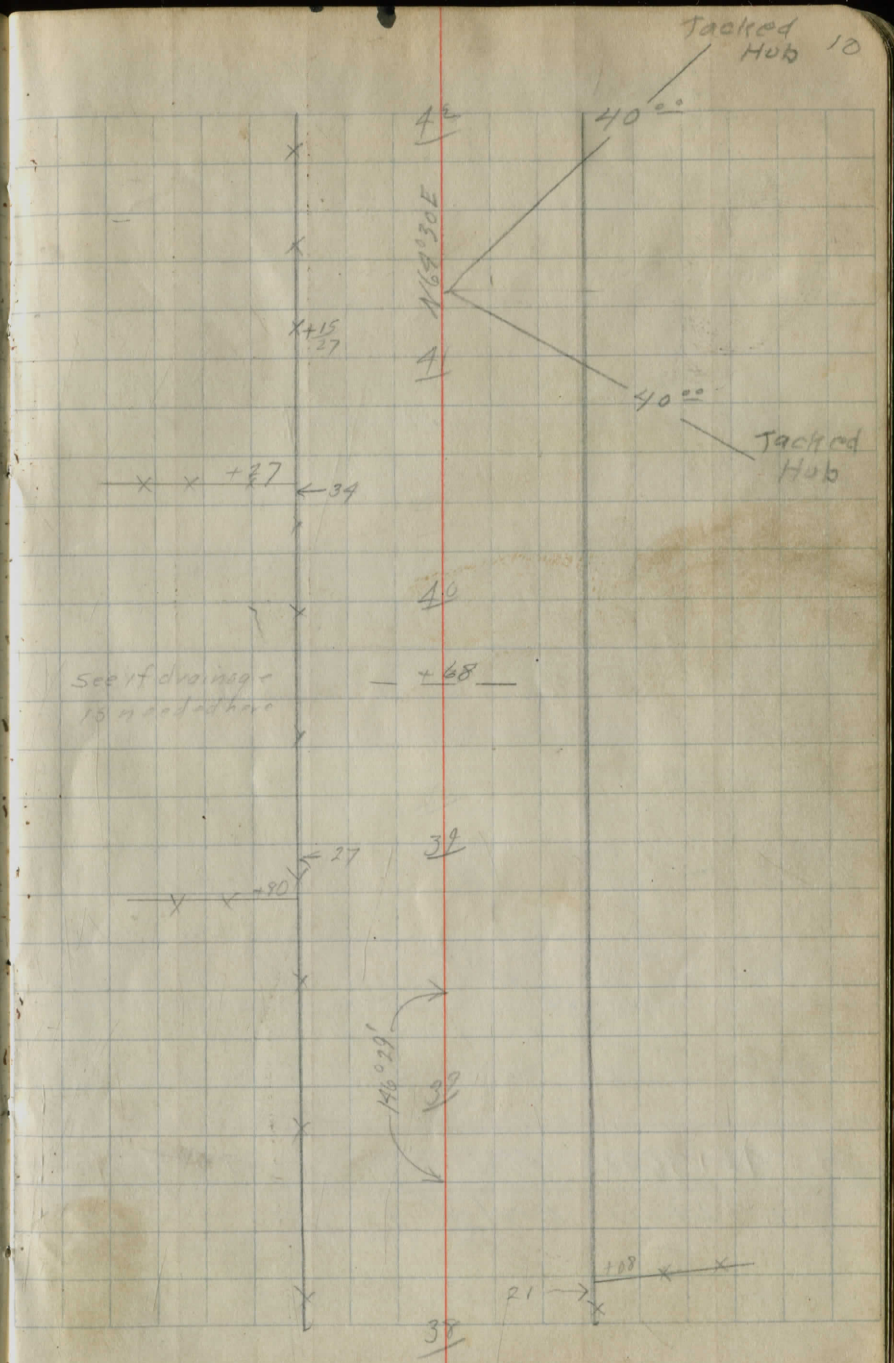
40+55.07 = 2°00'

37+36.11 = 14°45'

41+05.07 = 0°00
41+00 = 0°12
40+00 = 4°12
39+00 = 8°12
38+00 = 12°12
37+00 = 16°12
36+86.11 = 16°45

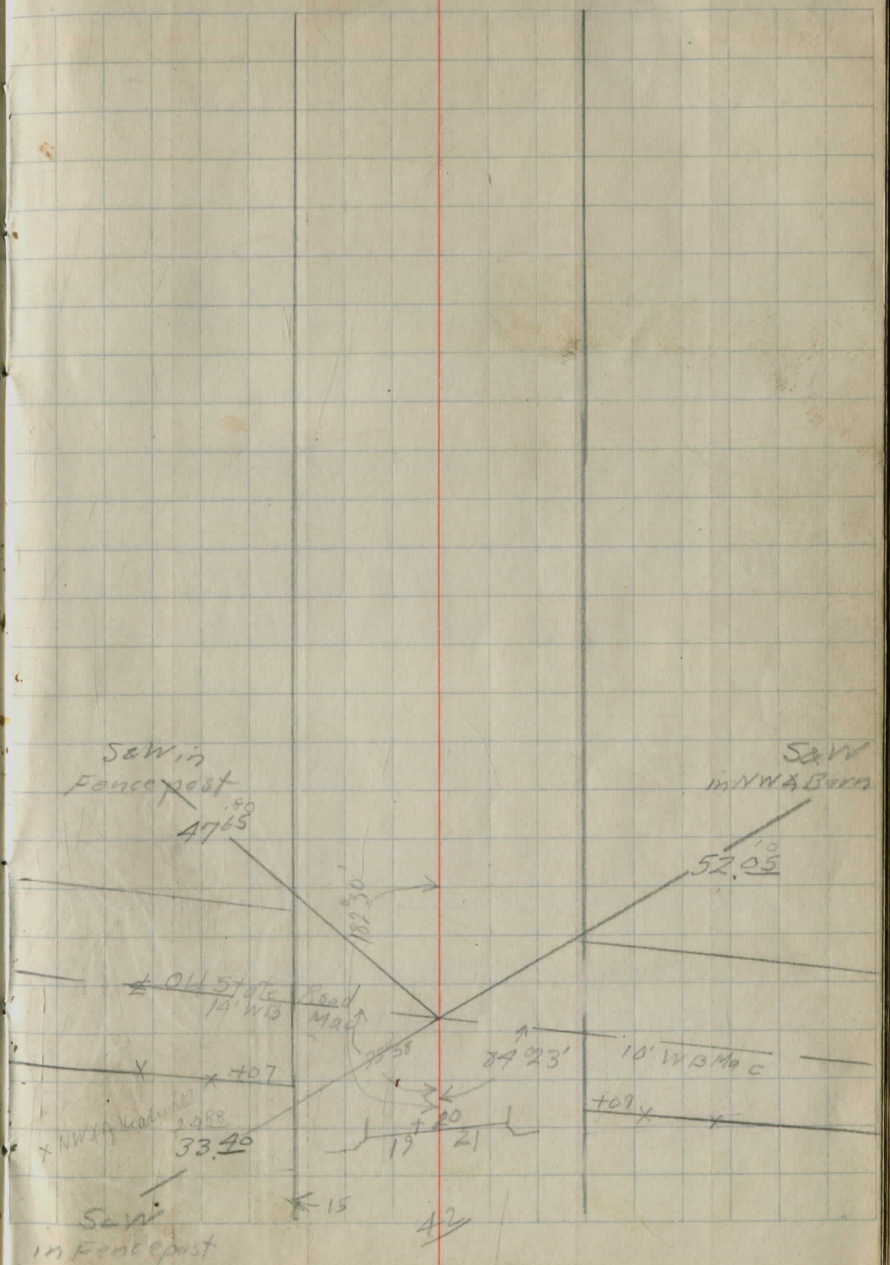
Sta 39+01.80 PI Def Lt 33°31 Iron Set

Δ = 33°31
D = 8°
T = 215.69
E = 31.8
L = 418.96
PC = 36+86.11
PT = 41+05.07



.80 miles

Sta 42+36.78	P I	℄ OH State Rt	Iron Found
Sta 42+30	End of Imp		



June 13-30 Rand Goodrich Canfield

X Sections

B.M #1	12.60	1152.75		1140.15
0-50			4.9	1147.85
0-100			9.1	1143.65
0-200			12.9	1139.85
T.P.	8.54	1160.87	0.42	1152.33
0+00			10.6	1150.27
0+00	Culvert		10.1	1150.77
0+12			9.6	1151.27
1+00			3.3	1157.57
T.P	7.74	1167.44	1.17	1159.70
1+27			7.5	1159.94
B.M #2			9.95	1157.49
1+75			4.8	1162.64
T.P.	12.40	1177.48	2.36	1165.08
2+00			14.3	1163.18
3+00			8.0	1169.48
T.P.	10.56	1183.26	4.78	1172.70
4+00			8.2	1175.1
T.P.	9.35	1190.01	2.60	1180.66
5+00			9.8	1180.2

V on SE cor Conc. step E end of Porch

200 100 50 30 10 12 13 18 30
7.3 7.3 8.1 9.4 11.3 12.0 11.1 8.1 8.0

EJ-W EL-E
12.0 10.7

32 20 17 15 12 14 19 32 30
6.4 8.0 8.9 8.8 10.9 9.8 6.8 6.4 6.6

30 18 12 8 6 10 13 15 22 30
0.0 0.5 2.5 2.9 3.3 4.1 3.4 2.5 3.2 3.4

Cinder down Rd ditch
EL T1 G G T.1 EL 15 25 30 50
8.1 6.8 5.9 7.7 7.8 9.1 9.3 9.7 10.2 11.1
59.3 58.3 → 25' Rt. ℄

Spike in NE root 24" Maple sta. 0+73
30 21 12 11 6 7-8 10 15 30
1.4 2.4 5.0 5.4 5.2 4.9 5.9 5.8 3.6 3.6

30 12 15 13 9 8 20 12 15 30
9.7 11.5 14.2 15.0 14.4 14.2 15.3 13.8 13.3 13.3

30 22 14 12-10 7 7 8-9 12 16 22 30
2.7 3.3 7.2 8.5 8.0 8.1 9.0 6.9 6.0 6.7 7.2

33 21 15 13 10 7 9 13 22 30
5.6 5.6 8.2 9.7 8.5 8.9 9.8 7.6 7.0 9.0

30 20 13 11 10 8 10 11 17 20 24 30
5.9 6.2 9.5 10.2 10.0 9.6 10.4 9.6 7.3 7.5 9.0 9.2

		1190.01		
6+00			5.0	1185.0
T.P.	11.91	1200.58	1.34	1188.67
7+00			11.6	1189.0
8+00			7.9	1192.7
9+00			3.1	1197.5
T.P.	10.98	1211.00	0.56	1200.02
10+00			9.1	1201.9
11+00	~		4.0	1207.0
B.M.#3	6.03	1214.52	2.51	1208.49
12+00			3.9	1210.6
T.P.	5.72	1217.88	2.36	1212.16
13+00			4.6	1213.3
14+00			4.4	1213.5
15+00			4.8	1213.1
16+00			5.9	1212.0
T.P.	2.40	1214.60	5.68	1212.20
17+66			4.0	1210.60
17+27			5.0	1209.60

30 16 13 12-10 5 10 11 17 21 25 26
0.9 3.6 5.3 5.9 7.0 5.4 5.8 4.3 4.8 6.8 6.9

30 16 10 9 8 11 15 21 30
11.6 12.0 13.0 12.5 12.4 12.9 11.9 10.7 9.2

30 13 9 8-7 5 12 17 30
6.1 6.1 8.3 8.9 8.0 8.3 5.1 4.9

30 29 9 8 6 12 14 19 23 30
1.4 1.4 3.0 3.7 2.9 3.3 2.8 1.4 1.2 1.2

30 21 18 13 12 10 6 8 11 15 30
2.0 2.0 2.9 9.5 10.1 7.3 9.6 9.2 8.3 7.4 7.4

30 15 11 8 7 10 14 20 30
2.7 2.7 3.7 4.5 4.2 4.5 4.4 3.8 3.8

Spike in NW root + 18" Maple - 11+29 - 24' Rt. ℄.

30 15 11 9 7 11 14 16 23 30
2.7 2.7 4.1 5.1 4.5 4.5 4.8 4.6 3.5 3.5

30 20 14 11 8 12 18 30
4.0 4.0 5.4 5.9 5.2 5.6 5.4 5.6

30 22 14 12 8 12 18 30
2.1 2.7 4.8 5.2 4.5 4.8 4.6 5.4

30 21 15 11 9 12 17 30
3.9 3.5 5.3 5.8 5.3 5.4 5.3 5.7

30 19 12 11 8 12 20 30
4.2 4.4 6.1 6.5 6.1 6.4 6.3 6.5

30 27 14 12 11 9 30
2.1 2.1 3.4 4.6 4.0 3.6 4.9

30 21 14 11 8 8 30
2.0 2.1 3.1 5.4 4.9 5.4 4.9

		1214.60		
18+00			10.6	1204.0
T.P.	1.06	1206.10	9.56	1205.09
19+00			4.9	1201.2
19+36			5.6	1200.5
BM#4	5.91	1206.41	5.60	1200.50
20+00			5.4	1201.0
21+00			5.6	1200.8
22+00			7.6	1198.8
23+00			10.1	1196.3
T.P	7.22	1201.09	12.54	1193.87
23+45			7.3	1193.8
24+00			9.1	1192.0
25+00			12.2	1188.9
T.P.	1.16	1189.78	12.47	1188.62
26+00			6.7	1183.1
27+00			10.6	1179.2
BM#5	1.53	1182.86	8.45	1181.33
28+00			6.8	1176.1

30 25 17 11 9 7 10 16 30
4.5 4.5 5.8 10.1 10.2 10.3 8.4 6.7 6.7

30 21 18 14 7 2 13 30
3.9 4.4 6.0 4.9 5.9 5.4 6.2 7.5

30 T.I. T.I. 6 6 T.I. 24 30 50
5.3 8.5 7.4 5.4 6.6 9.0 9.4 13.0 13.8
97.6 96.7

Spike in A Root 24" Maple 19+71 - 22' Rt.

30 19 16 13 5 9 12 18 30
3.5 5.0 5.9 5.4 5.1 5.7 4.7 4.4 4.8

30 18 14 12 16 30
2.6 3.9 5.6 5.3 5.9 7.2

30 19 15 12 9 16 30
5.9 6.7 7.0 8.4 7.6 8.0 10.4

30 27 16 13 10 5 20 30
6.0 6.3 9.8 10.8 10.1 10.7 10.0 10.3

30 19 9 7 5 10 18 30
1.1 1.5 7.3 8.3 7.6 8.3 5.3 5.5

30 21 17 12 9 10 15 17 30
7.5 7.7 8.7 9.0 9.6 10.3 9.2 8.8 8.5

30 18 16 6-4 3 11 13 17 30
7.6 9.3 10.9 13.7 12.3 12.6 13.2 12.2 13.6

30 15 7 4 1 1 7 15 17 19 24 29 30
2.7 3.5 5.5 6.7 7.4 6.5 6.3 6.9 7.5 6.5 6.3 5.3 5.6

32 15 7 1 5 17 19 20 30
7.2 8.2 10.4 10.9 10.0 10.5 11.0 10.1 9.7

Spike in N Root 18" Maple 26+75 - 30' Rt.

30 13 2 3 4 8 19 28 31 38
6.4 6.4 6.1 5.4 6.0 5.3 5.8 12.3 14.2 17.2

		1182.86		
			5-2 → Tokunaka of Iron Rod	
28+04			8.2	1174.7
29+00			5.3	1177.6
30+00			7.2	1175.7
30+46			7.4	1175.5
31+00			7.7	1175.2
T.P.	6.75	1181.72	7.89	1174.97
32+00			5.8	1175.9
33+00			4.9	1176.8
34+00			7.4	1174.3
35+00			10.1	1171.6
T.P.	2.04	1172.34	11.42	1170.30
36+00			4.2	1168.1
37+00			7.9	1164.4
BM #6	0.28	1162.00	4.62	1167.72
38+00			5.2	1162.8
39+00			6.7	1161.3

where I cross rd. 10' Rt ℄

50 30 FL. T.1. G — 5.6 6.3 8.2 7.2 5.6 — 74.7

G T.1. FL. — 5.7 9.3 10.8 — 72.0

38 — 20.5 — good fall.

30 16 11 8 — 2.0 2.3 3.6 4.3

10 18 28 30 — 5.0 5.7 6.3 6.6

30 19 17 13-6 8 — 5.3 5.3 6.7 8.4 7.2

7 18-22 28 30 — 6.7 7.9 6.9 7.0

30 30 FL. T.1. G — 7.0 8.5 10.0 8.9 8.0 — 72.9

G T.1 FL. 30 — 7.7 9.3 10.0 11.7 — 72.9

good fall

30 18 15-6 — 7.0 7.5 8.6

6 12 18 30 — 7.1 7.4 9.1 9.1

30 18 14-11 6 16 20 30 — 3.7 4.0 6.9 5.6 6.8 6.2 6.2

30 18 12 8 6 17 17 3 — 2.9 3.2 5.5 6.1 4.7 5.5 5.6 5.4

30 18 18 7 4 17 28 35 — 4.8 5.1 6.2 7.7 7.2 7.6 6.2 7.8

30 19 11 8-6 12 14 22 30 — 7.4 7.7 8.7 10.4 10.4 9.8 9.2 10.4

30 25 21 17 9 6 25 30 — 0.6 1.6 2.5 4.2 4.3 4.6 4.2 4.2

38 25 18 14 6 6 13 30 — 6.5 7.7 8.5 8.0 7.4 8.7 8.2 7.9

Spike in NE root 24" Maple 36+65 - 26' Rt ℄

36 23 21 14 21 10 7 11 17 30 — 0.6 1.6 1.8 5.3 5.7 6.3 5.4 5.0 5.2 5.2

30 25-19 16 9 5 7 14 30 — 5.5 6.7 7.1 6.5 7.6 7.1 7.6 9.6

		1168.00		
40+00			7.9	1160.1
41+00			6.5	1161.5
T.P.	6.05	1166.30	7.75	1160.25
42+00			5.9	1160.4
42+20			6.5	1159.8
42+36.7			6.5	1159.8
BM #7			6.27	1160.03 (1159.62) (1160.45)
New BM #7			4.52	1161.78

Profile Sta 0+00 North.

T.P.	7.39	1157.25		1149.86
0+00 2 ft			7.0	

Profile Sta 0+00 West on B to BS Rd.

	10.21	1150.36		1140.15
0+00			0.1	
0-50			3.7	1146.7
0-100			6.9	1143.5
0-150			9.4	1141.0
0-200			11.7	
0-250			14.1	

37/4.0 30/6.8 22/7.5 12/6.5 6/6.9 7/8.5 30/10.4

30/2.8 23/5.2 18/6.5 16/7.3 12/6.4 5/7.2 7-9/8.0 30/10.2

30/1.4 20/2.4 12/4.4 14/6.4 11/3.8 7/5.2 12/6.3 15/6.0 22/9.0 26/9.3 30/8.7

30/6.8 FL/8.1 TL/6.6 HW/4.5 G/5.2 G/7.9 HW/7.2 TL/9.4 FL/10.9 good fall.

50/1.6 30/3.8 30/9.7 50/12.0 100/17.4

Sta 42+36.7 + ⟶ 30/6.7 50/6.3 100/6.1 ~00/6.7

Middlefield Johnsons As Rd levels

Old State Road Sec E levels.

X cut NW cor W Head wall on N side Rd.

250/4.0 200/1.5 150/3.3 100/3.2 50/4.4 30/5.7

6/18/30 Penfield

Check Levels

BM	4.41	1111.99		1107.58	
T.P.	5.04	111.58	5.45	1106.54	
T.P.	5.24	1112.05	4.78	1106.81	
T.P.	10.41	1118.74	3.72	1108.33	
T.P.	10.92	1129.17	0.49	1118.25	
T.P.	12.49	1141.13	0.53	1128.64	
BM #1	10.60	1150.75	1.09	1140.04	1140.15
T.P.	10.38	1160.24	0.89	1149.86	
BM #2	9.61	1167.10	2.75	1157.49	(1157.49)
T.P.	12.55	1178.83	0.82	1166.28	
T.P.	12.62	1189.70	1.75	1177.08	
T.P.	6.88	1195.03	1.55	1188.15	
T.P.	10.13	1204.72	0.44	1194.59	
T.P.	8.75	1211.38	2.09	1202.63	
BM #3			2.89	1208.49	(1208.49)
T.P.	7.66	1218.35	0.69	1210.69	
T.P.	3.26	1215.47	6.14	1212.21	
T.P.	0.80	1205.85	10.42	1205.05	
BM #4	4.79	1205.29	5.33	1200.52	(1200.50)
T.P.	0.30	1194.17	11.42	1193.87	
T.P.	1.39	1188.44	7.12	1187.05	
BM #5	2.62	1183.95	7.08	1181.36	(1181.33)
T.P.	5.46	1180.96	8.45	1175.50	
T.P.	1.62	1174.11	8.47	1172.49	
BM #6	0.25	1167.97	6.39	1167.73	(1167.72)

X NW cor E Fl bot Iron bridge

✓ SE cor conc. step E end porch to store

Spike NE root 24" Maple 21' Rt ℄ sta 0+73

Spike in NW root 18" Maple 24' Rt ℄ sta 11+29

Spike in N root 24" Maple 22' Rt ℄ sta 19+71

Spike in N root 18" Maple 30' Rt ℄ sta 26+75

Spike in NE root 24" Maple 26' Rt ℄ sta 26+65

		1167.97		
	No Culvert exists. Small ditch on			
40+40			7.4	
T.P.	5.11	1165.36	7.72	1160.25
BM #7			3.60	1161.76 (1161.78)
BM #8			5.32	1160.04 (1160.45
				1159.62
				1160.03)
	Profile to East			
BM #7	3.90	1165.68		1161.78
0+00			5.9	
0+50			5.9	
1+00			5.7	
1+50			6.2	
2+00			6.5	
2+50			6.1	
	Profile to South			
BM #7	0.78	1162.56		1161.78
0+00			2.8	
0+50			7.7	
1+00			13.0	
T.P.	1.64	1149.69	12.95	1148.05
1+50			5.4	
2+00			8.5	
2+50			10.1	
	Profile to North			
BM #7	9.91	1171.69		1161.78
0+00			11.9	

Rt. turns water into Cornfield 75 Same slope
60 33 25 22 17 15 6 5 8 16 50 75
3.8 5.3 6.5 6.8 7.4 7.3 6.7 7.9 8.6 9.4 12.2 14.0 For 600'

X NW cor w Headwall N side Rd. Sta 42+20

BM on N side stone NW cor Barn.

→ Old state Rd. Sec. E Levels.

Middlefield to Johnsons Cor. Rd. Levels.

→ Burton Sta to Johnsons Cor Rd. Levels.

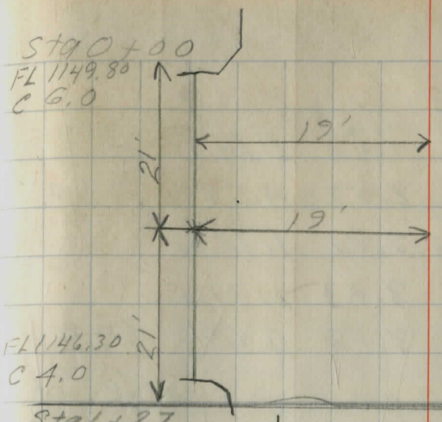
		1171.69		
0+50			8.1	
1+00			4.4	
T.P.	11.07	1181.85	0.9	1170.78
1+50			9.9	
2+00			5.8	
2+50			1.5	
T.P.	11.09	1191.99	0.95	1180.90
T.P.	11.77	1203.11	0.65	1191.34
T.P.	9.78	1212.24	0.66	1202.46
BM			2.81	(1209.43) (1209.78)

Spike in E root Cherry 35' Lt of Sta. 6+70

7/5/30
Rand Canfield
Parks Ashcraft.

BM#2	1.00	1158.49		1157.49	
Flow R			8.69	1149.80	
stake R			8.54	2.54	C 6.0
Flow L			12.19	1146.30	
stake L			12.34	8.34	C 4.0
BM#2	7.22	1164.71		1157.49	
Flow R			7.71	1057.0	
stake R			7.86	5.86	C 2.0
Flow L			6.71	1058.0	
stake L			6.56	0.56	C 6.0
BM#4	4.51	1205.01		1200.50	
Flow R			8.51	1196.5	
stake R			8.66	10.16	F 1.5
Flow L			7.51	1197.5	
stake L			7.36	3.36	C 4.0

No 1



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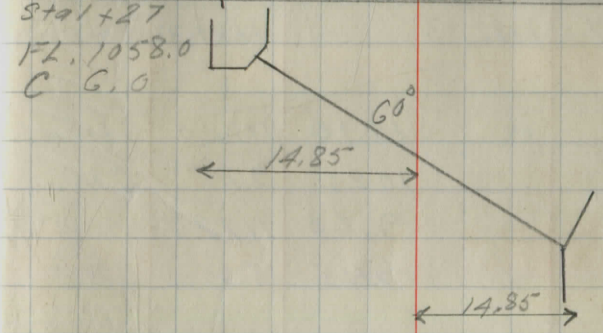

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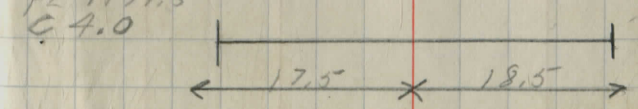


BM #5	1.00	1182.33		1181.33	
Flow L			7.73	1174.5	
stake L			7.58	4.58	C 3.0
T.P.	2.01	1174.53	9.81	1172.52	
Flow R			3.03	1171.5	
stake R			3.18	6.68	F 3.5

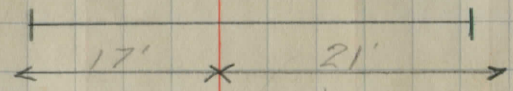
Flow Stake on Right set ~~45° to ℄~~

BM #5	0.77	1182.10		1181.33	
Flow R			10.10	1172.0	
stake R			10.25	9.25	C 1.0
Flow L			9.60	1172.5	
stake L			9.45	5.95	C 3.5

Sta. 28+04 No. 4

FL 1174.5 FL 1171.5

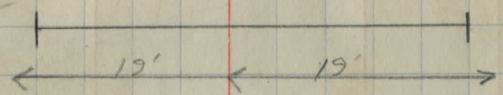
C 3.0 F 3.5



Sta 30+46 No. 5

FL 1172.5 FL 1172.0

C 3.5 C 1.0



Rand
Parks
Canfield
Ashcraft

Slope stakes 8/8/30

	BS	HI	FS	Elev	
BM #7	8.37	1170.15		1161.78	
42			9.76	1160.39	
41			8.56	1161.59	
40			8.75	1161.40	
39			8.86	1161.29	
38			7.39	1162.76	
T.P.	10.62	1174.20	6.57	1163.58	
37			8.36	1165.84	
BM #6			6.47	1167.73	1167.72
36			4.79	1169.41	
T.P.	9.41	1181.79	1.82	1172.38	
35			8.92	1172.87	
34			6.29	1175.50	
33			4.62	1177.17	
32			4.59	1177.20	
31			5.39	1176.40	

C3.6 / 27.7	C3.2 / 24.1	F0.8 / 13.7	F2.9 / 21.7
C2.5 / 25.7	22.7	16.8	F2.2 / 19.8
F0.6 / 24.3	21.3	18.7	F3.1 / 21.7
C0.9 / 25.2	22.2	15.7	F1.6 / 18.7
C4.4 / 32.1	29.1	18.0	F0.1 / 21.0
F1.5 / 21.6	18.0	16.5	F1.5 / 19.3
C0.1 / 21.3	18.3	17.4	F1.2 / 20.4
C1.8 / 24.5	21.5	13.5	F0.5 / 16.3
C2.2 / 25.0	C1.4 / 22.0	F1.3 / 17.0	F0.8 / 20.0
C2.0 / 25.4	C1.7 / 22.4	F1.1 / 18.3	F0.9 / 21.3
C1.0 / 23.9	C0.7 / 20.9	F2.3 / 15.9	F1.9 / 18.7
F0.6 / 21.4	F1.0 / 18.4	F2.0 / 16.9	F2.4 / 19.9

T.P.	5.93	1181.67	6.05	1175.74	
30			5.34	1176.33	
29			4.67	1177.00	
28			3.54	1178.13	
BM #5	8.06	1189.39	0.33	1181.34	1181.33
27			8.53	1180.86	
26			4.19	1185.20	
T.P.	12.57	1200.57	1.37	1188.02	
25			11.46	1189.13	
24			7.17	1193.42	
23			3.73	1196.86	
T.P.	8.74	1206.60 1206.67	2.66	1197.93	
22			6.62	1200.05	
21			5.11	1201.56	
20			5.20	1201.47	
BM #4			6.20	1200.47	1200.50
19			4.01	1202.69	
T.P.	12.89	1216.04	3.55	1203.15	
18			9.97	1206.07	

C2.1 / 25.0	C1.4 / 22.0	F1.2 / 18.1	F1.1 / 21.1
C4.3 / 23.0	C4.1 / 26.0	F0.1 / 19.8	C0.1 / 22.8
F1.3 / 20.7	F1.5 / 17.7	F1.0 / 18.4	F3.2 / 21.4
C2.0 / 24.3	C1.6 / 22.3	F1.7 / 17.4	F1.5 / 20.4
C3.2 / 26.3	C2.1 / 23.9	F2.4 / 19.9	F1.7 / 18.9
C4.0 / 28.3	C3.6 / 25.3	F0.2 / 19.6	F0.6 / 22.6
F0.2 / 21.7	F0.8 / 18.7	F1.3 / 18.0	F0.9 / 21.0
C3.1 / 25.0	C1.4 / 22.0	12.8	F0.5 / 15.8
C0.6 / 22.6	F0.2 / 19.6	16.6	F1.9 / 19.6
C1.5 / 24.5	C1.1 / 21.5	F1.1 / 18.3	F1.3 / 21.3
C0.3 / 22.6	F0.2 / 19.6	C0.3 / 20.3	C0.2 / 23.3
F2.2 / 19.6	F2.2 / 17.6	F3.4 / 17.4	F3.4 / 20.4
C4.4 / 28.6	C3.8 / 25.6	C2.2 / 23.2	C2.1 / 26.2

		1216.04			
17			5.33	1210.71	
16			2.62	1213.42	
15			1.96	1214.08	
T.P.	3.64	1217.50	2.18	1213.86	
14			3.05	1214.45	
13			3.54	1213.96	
12			5.75	1211.75	
T.P.	1.89	1211.49	7.90	1209.60	
11			3.66	1207.83	
BM#3			3.02	1208.47	1209.49
10			8.44	1203.05	
		8/21/30 Rain and Parts	Rain Canfield		
BM#3	1.48	1209.97		1208.49	
9			11.50	1198.27	
T.P.	2.58	1200.00	12.55	1197.42	
8			6.64	1193.36	
7			10.14	1189.86	

C1.5 / 18.8	15.5	F0.9 / 18.6	F0.6 / 21.6
C0.4 / 22.9	C0.0 / 19.9	F1.9 / 17.1	F1.8 / 20.1
C0.5 / 22.8	F0.1 / 19.8	F1.4 / 17.8	F1.5 / 20.8
C1.1 / 23.8	C0.6 / 20.8	F1.2 / 18.1	F1.2 / 21.
C0.6 / 22.5	F0.3 / 19.5	F1.6 / 17.6	F1.5 / 20.5
C0.5 / 22.9	C0.0 / 19.9	F1.0 / 18.4	F0.6 / 21.4
C0.8 / 23.6	C0.5 / 20.6	F0.8 / 18.7	F0.6 / 21.7
C1.5 / 24.4	C1.0 / 21.4	C0.5 / 20.6	C0.7 / 23.6
C1.1 / 24.0	21.0	21.5	C1.0 / 24.5
C1.4 / 23.0	20.0	25.0	C2.7 / 28.0
F0.7 / 21.0	F1.3 / 18.0	F0.7 / 18.9	C0.1 / 21.9

		1200.00			
T.P.	0.57	1188.97	11.60	1188.40	
G			2.83	1186.14	
5			7.26	1181.71	
T.P.	4.80	1181.07	12.70	1176.27	
4			4.48	1176.59	
3			10.29	1170.78	
T.P.	1.50	1169.58	12.99	1168.08	
2			4.70	1164.88	
1			10.93	1158.65	
BM #2	2.22	1159.71	12.11	1157.47	1157.49
0+00			9.41	1150.30	

C2.2 / 24.5	C1.1 / 21.5	F0.6 / 19.0	F1.1 / 22.0
C3.1 / 26.5	C2.4 / 23.5	C0.8 / 21.1	C0.3 / 24.1
C1.0 / 24.4	C1.0 / 21.4	F0.6 / 19.0	F0.6 / 22.0
C3.4 / 27.1	C2.8 / 24.1	C0.0 / 19.7	F0.2 / 22.9
C1.6 / 24.7	C1.2 / 21.7	C.0.9 / 19.9	F0.3 / 22.9
C2.2 / 25.6	F1.8 / 22.6	F0.3 / 19.3	F0.8 / 22.5
C1.1 / 24.2	C.09 / 21.2	C2.6 / 23.8	C2.7 / 26.8

Sta 0+00 profile checked 0.03 Low.

9/30/50

Finished Grade

BM #7	388	1165.66			1161.78
41+50 R			4.75	1160.91	C 0.5
L			4.75	1160.91	C 1.0
41+00 R			3.61	1162.05	
L			4.20	1161.46	C 0.5
40+50 R			3.05	1162.61	
L			4.11	1161.55	
40+00 R			3.06	1162.60	F 1.0
L			4.14	1161.52	
40+00 R			3.31	1162.35	F 1.5
L			4.39	1161.27	C 0.5
39+50 R			3.44	1162.22	F 0.5
L			4.52	1161.14	C 1.0
39+00 R			3.42	1162.24	F 1.0
L			4.50	1161.16	C 0.5
38+50 L			4.18	1161.48	C 0.5
T.P. –	7.20	1169.18	3.68	1161.98	
38+50 R.			6.62	1162.56	
38+00 R			5.47	1163.71	
L			6.55	1162.63	C 1.0
37+50 R			4.17	1165.01	F 1.5
L			5.25	1163.93	
37+36.11 R			3.68	1165.50	F 0.5
L			4.76	1164.42	C 0.5

		1169.18			
37+00 R			2.78	1166.40	C.05
L			3.47	1165.71	
36+50 R			1.53	1167.65	
L			1.68	1167.50	
36+36 R			1.19	1167.99	F0.5
L			1.19	1167.99	
B.M.#6	8.30	1176.02	1.47	1167.71	1167.72
36+00			6.61	1169.41	F 0.5
35+50			4.80	1171.22	F0.5
35+00			3.25	1172.87	F 0.5
34+50			1.77	1174.25	F0.5
34+00			0.52	1175.50	
T.P.	5.54	1181.03	0.53	1175.49	
33+50			4.49	1176.54	C0.5
33+00			3.86	1177.17	C0.5
32+50			3.64	1177.39	F0.5
32+00			3.83	1177.20	F0.5

5
23

4.06

		1181.03			
31+50			4.23	1176.80	F 0.5
31+00			4.63	1176.40	
30+50			5.01	1176.02	C 0.5
30+00			4.70	1176.33	C 0.5
29+50			4.37	1176.66	C 1.0
T.P.	5.40	1183.06	3.37	1177.66	
29+00			6.06	1177.00	C 1.5
28+50			5.68	1177.38	C 1.5
28+00			4.93	1178.13	C 0.5
27+50			3.77	1179.29	
27+00			2.20	1180.86	
BM #5			1.73	1181.33	1181.33

10/8/30

BM #3	2.19	121068			120849
9+11.68 R			11.98	119870	C0.5
L			11.98	119870	C0.5
9+00 R			12.54	119814	C1.0
L			12.44 (11.94)	119824 (119874)	C0.5
8+50 R	1.19	119993	4.17	119576	C0.5
L			3.63	119630	C0.5
8+18 R			5.74	119419	C0.5
L			4.92	119501	
8+00 R			6.80	119323	C0.5
L			5.98	119395	
7+50 R			8.38	119155	
L			8.10	119183	F0.5
7+18 R			9.55	119038	
L			9.55	119038	F0.5

9993
8.86
10.07 .002

10/12/30 Goodrich R
Appleton. J

BM #5	2.20	1183.53		1181.33
27+50			4.24	1179.29
28+00			5.40	1178.13
28+50			6.15	1177.38
29+00			6.53	1177.00
29+50			6.87	1176.66
30+00			7.20	1176.33
30+50			7.51	1176.02

Check Grade

℄ 4.90	F 0.66
℄ 5.65	F 0.25
℄ 5.36	C 0.79
℄ 5.80	C 0.73
℄ 6.52	C 0.35
℄ 7.45	F 0.25
℄ 8.00	F 0.49

13.M.#5	8.72	1190.05		1181.33		
27+00			9.19	1180.86	reset	
26+50			7.20	1182.85		
26+00			4.85	1185.20	F0.5	
25+50			2.45	1187.60	F0.5	
25+00			0.92	1189.13		1.25
	11.12	1200.25	0.92	1189.13		
24+50			8.54	1191.71	F1.0	
24+00			6.83	1193.42	F1.0	8.03
23+50			4.94	1195.31	F0.5	
23+00			3.39	1196.86	F0.5	4.11
22+50			2.68	1197.57	C1.0	
22+00			0.20	1200.05	F1.0	
	7.82	1206.87	1.20	1199.05		
21+50			5.83	1201.04	F1.0	
21+00			5.31	1201.56	F0.5	6.00

		1206.87				
20+50			5.27	1201.60	CO.5	
20+00			5.40	1201.47		5.58
BM#1			6.38	1200.49	1200.50	
19+50			5.06	1201.81	F1.5	
19+00			4.18	1202.69	F1.0	5.42
18+50			2.76	1204.11	F1.0	
	10.96	1214.07	3.76	1203.11		
18+00			8.00	1206.07	F0.5	8.95
17+50			5.57	1208.50		
T.P.	8.77	1217.27	5.57	1208.50		
17+00			6.56	1210.71	CO.5	7.00
16+50			4.93	1212.34	F0.5	
16+00			3.85	1213.42	F0.5	5.19
15+50			3.38	1213.89	F1.0	
15+00			3.19	1214.08	F0.5	4.19

		1217.27				
14+50			3.01	1214.26	FO.5	
14+00			2.82	1214.45		3.45
	3.35	1217.80	2.82	1214.45		
13+50			3.38	1214.42		
13+00			3.84	1213.96	FO.5	4.60
12+50			4.73	1213.07	FO.5	
BM						
12+00			6.05	1211.75	FO.5	7.01
B.M#3	3.65	1212.14	9.32	1208.49	1208.49	
11+50			2.13	1210.01	FO.5	FO.4
11+00			4.31	1207.83		
10+50			6.70	1205.44		.C01
10+00			9.09	1203.05		
9+50			11.48	1200.66		.004
9+11			12.94	1199.20		

BM 2	2.81	106.0.30		1157.49		
0+00			10.03	1150.20		
0+50			5.65	1154.65	5.9	C.2
1	11.35	1170.00	1.65	1158.65		
1+50			8.05	1161.95	85	C.0.0
2			5.12	1164.88		
2+50			2.17	1167.83	30	1.0.3
	11.05	1178.87	2.18	1167.82		
3			8.09	1170.78		
3+50			5.14	1173.73	F05	C.0.0
4			2.28	1176.59	F1.0	
	12.14	1188.73	3.28	1175.59		
4+50			8.47	1179.26	F05	F0.7
5			5.98	1181.75		
5+50			3.69	1184.04		C.0.0

		1187.73			
6	6.95	1193.09	1.59	1186.14	
6+50			5.04	1188.05	
7			3.23	1189.86	FD5
7+18R			2.71	1190.38	

FD2

Driveway Pipe

23+10 Rt. 12" CSP

22+80 Lt. 12" "

17+20 Lt. 12"

16+60 Lt. 12"

7+20 Rt. 15"

6+40 Lt. 18"

2+30 Rt. 18"

1+20 Lt. 15"

12/4/33 Richey Dietz Barton

20

℄ Location County Highway No 14

Johnsons Cor. WE to Ashtabula County

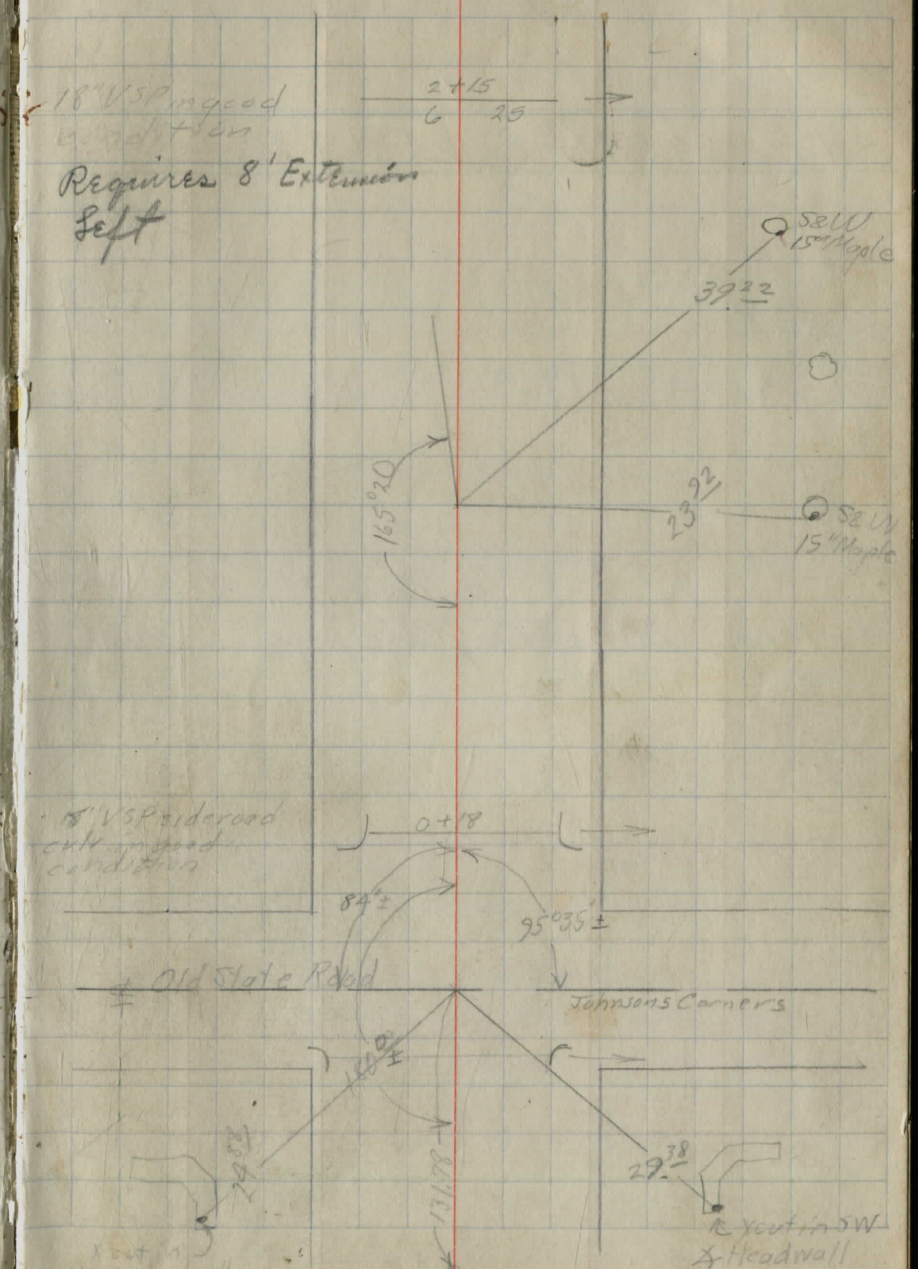
Note: sideslakes are set 25' Lt.

Sta 0+94.20 PI Det Lt. 14°40' Pipe Set

Curve Data
- Δ - 14°40' Lt
- D - 12°
- T - 61.45
- E - 3.1
- L - 122.22
- PC - 0+32.75
- PT - 1+54.97

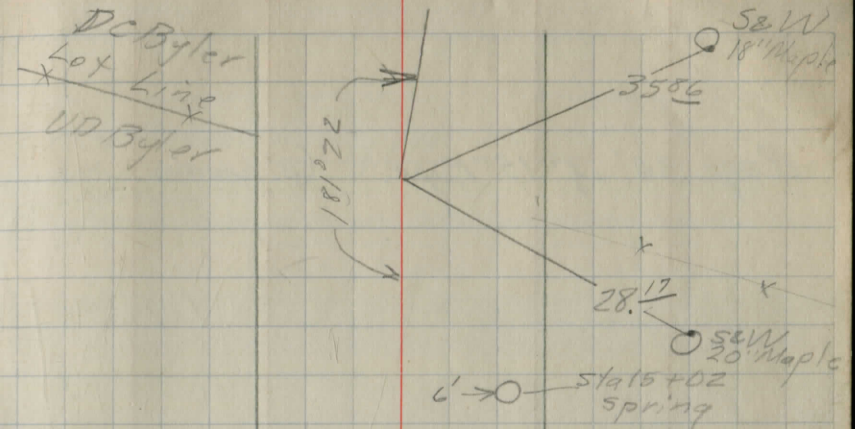
Sta 0+08 = Edge of Rd

Sta 0+00 Beginning of Project P.C. Road



Sta 16+04 72° PI Def Rt 1°22' Pipe Set

Reg. 36 of 12" Corr. or Conc. Pipe



1X1 Stone box culvert in fair condition — 11+06 / 6 / 12 →

10" Cor. IP in good condition — 8+87 / 3 / 15 →
Reg. 10' Ext. Left.

14' CIP in good condition — 9+75 / 1 / 18 →
Reg. 12' Ext. Left. and collar or connecting band.

Req. 36' of 15" Pipe. (3' cover

Sta 20 + 92 $\frac{98}{}$ POT — Pipe Set

Note: Sta 20+92 $\frac{98}{}$ is 300' East of DC Byler house

Req. 2' Ext. L.

15"x18" stone box culvert in fair condition

22+79 / 7 11 →

52 W 15" Maple

29.30

Stump

28.35 54W 12" Maple

12" V/S Pipe in good condition Skew 10° Rt

17+01 / 13 27 →

N 51° 10' E

JC Byler
32+47
Prop Line
M Yoder

3 x 3 Stone Box
culvert Cone.
Top slab in
good condition

34+52
72 85

JC Byler
32+47
Prop Line
M Yoder

32+23
Prop Line
S&W
Anchor Post
49.2'
Notched
Hub in
fence row
100.38'
N 34°E
163°50'

Sta 31+68.12 PI Dcf Lt 16°10' Set 8°

Δ - 16°10 Lt.
D - 8°
T - 101.71
E - 7.2
L - 202.08
PC - 30+66.39
PT - 32+68.47

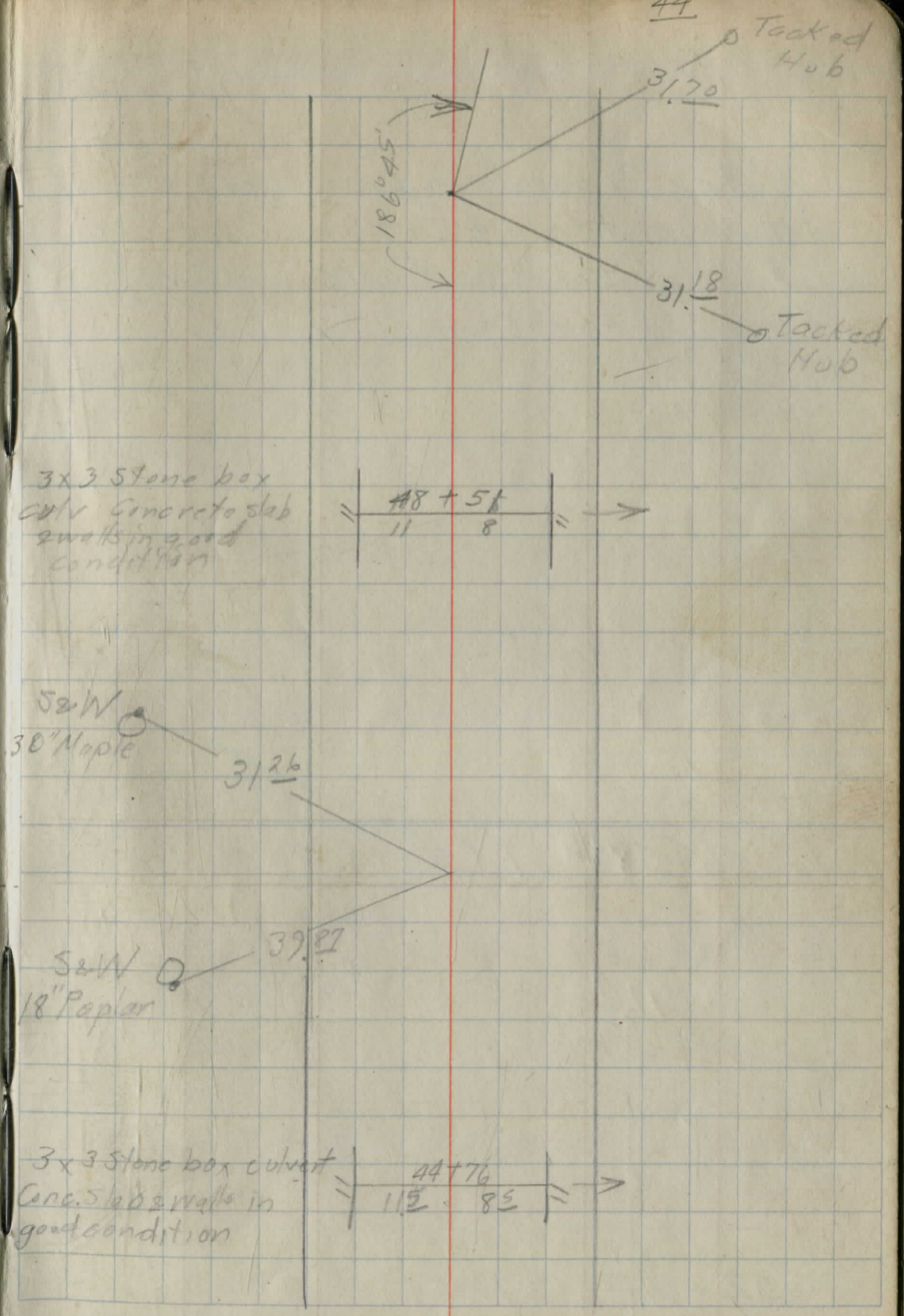
31 - .7
32 - 3.2

Sta 50+58.40 PI Def Rt 6°45' Pipe Set

Curve Data
- Δ - 6°45' Rt
- D - 4°
- T - 84.48
- E - 2.5
- L - 168.75
- PC - 49+73.92
- PT - 51+42.67

50 - .93
51 - .65

Sta 46+75.00 POT Pipe Set



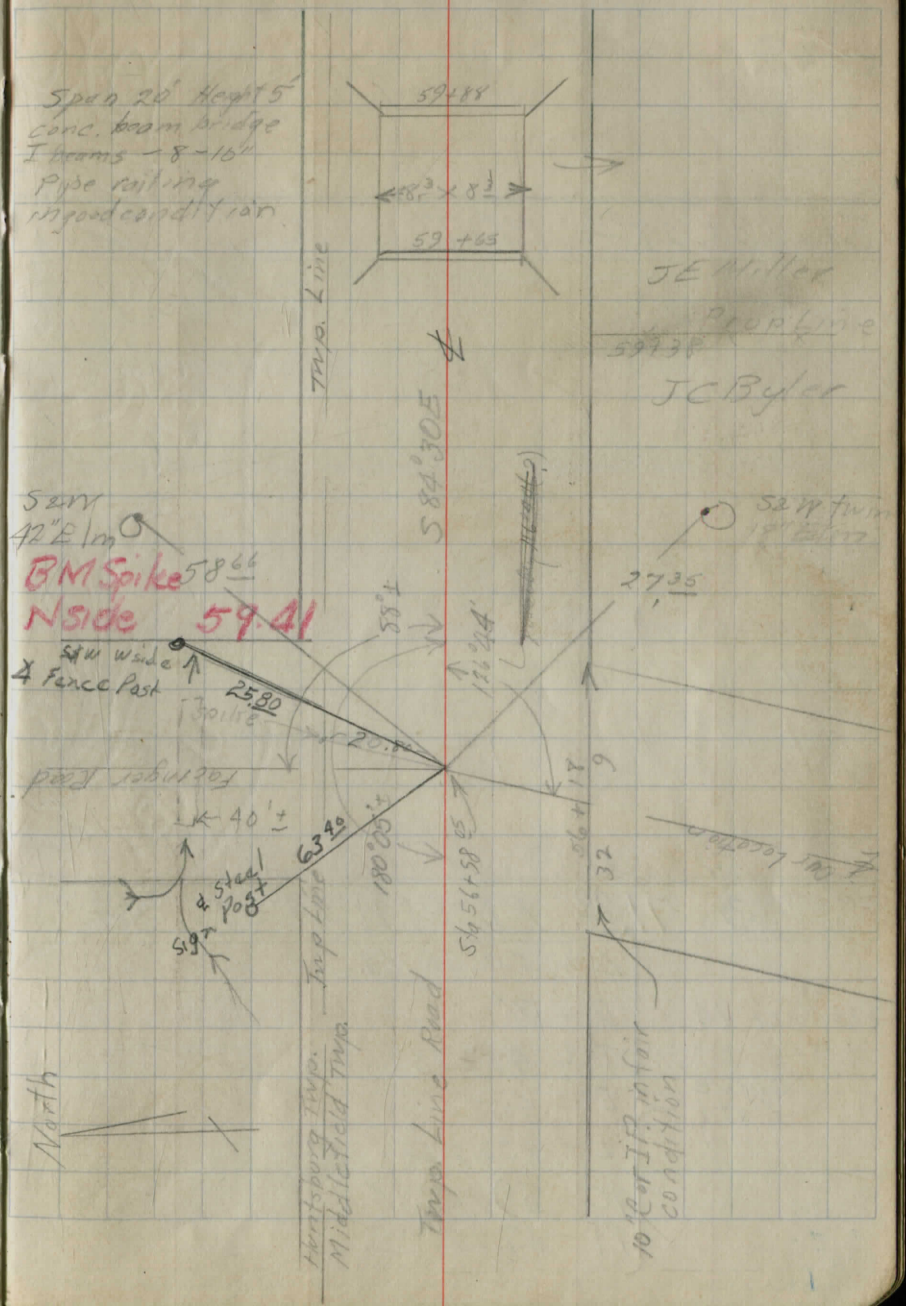
Note: Township Line was determined from ℄ Twp Line Road 1 mile westerly to ℄ post 1500' Easterly from Sta 56+58

fd -7-5-58

Sta 56+58.95 PI Dt Rt 53°16' Pipe Set

Present, 18'± of 10"? corr. pipe

Sta 52+01.05 POT Spike Set



Sta 68+28.50 POT — Pipe Set

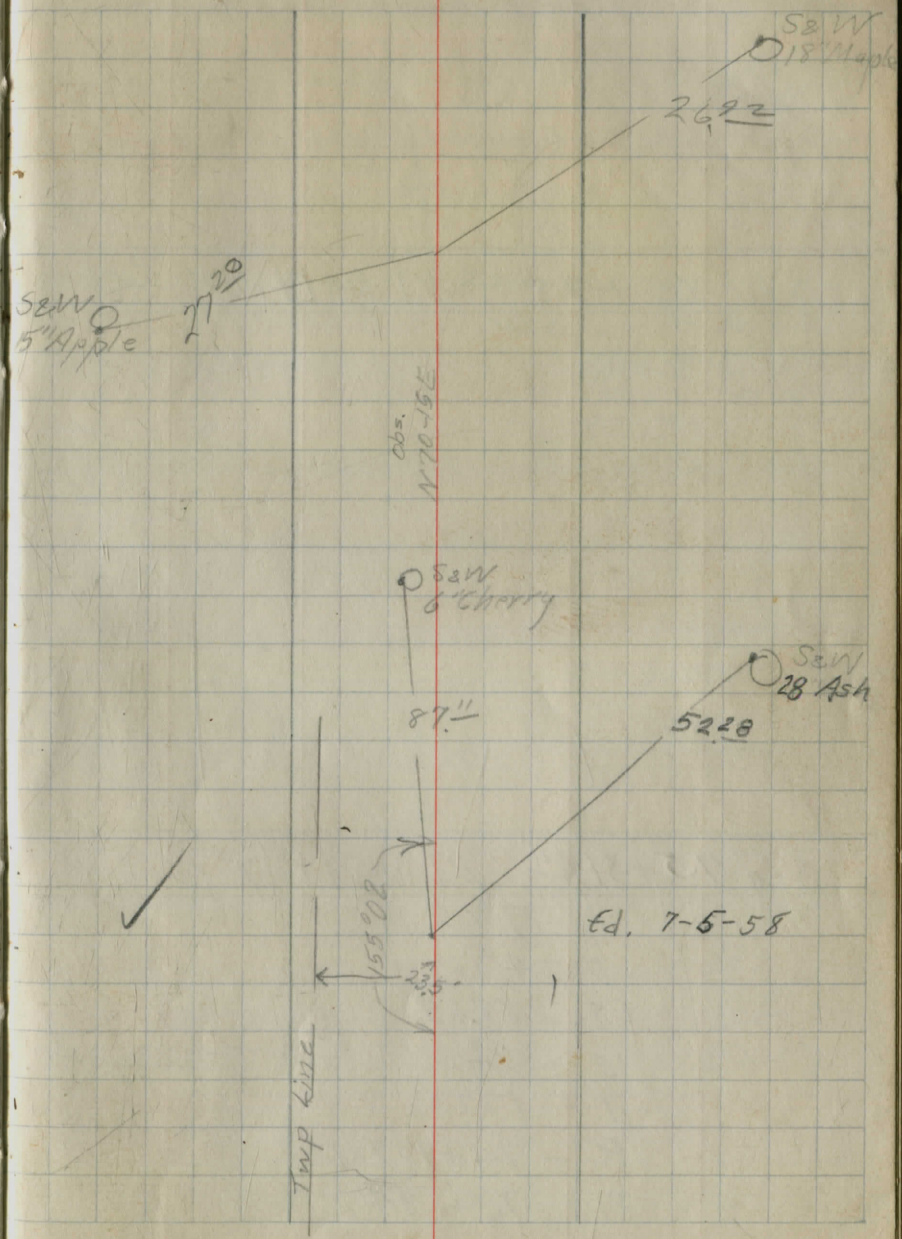
Note Sta 63+71.22 is set in fence row

Sta 63+71.99 PI Def Lt 24°58' — Pipe Set

SEE PAGE 74

Curve Data

- Δ - 24°58' Lt.
- D - 3°
- T - 422.83
- E - 46.2
- L - 832.22
- PC - 59+49.07
- PT - 67+81.29



Sta 85+98.20 PI Def Lt 1°38' Pipe Set

Sta 75+81.00 PI Def Lt 7°05' Pipe Set

Δ - 7°05' Lt.

D - 4°

T - 88.65

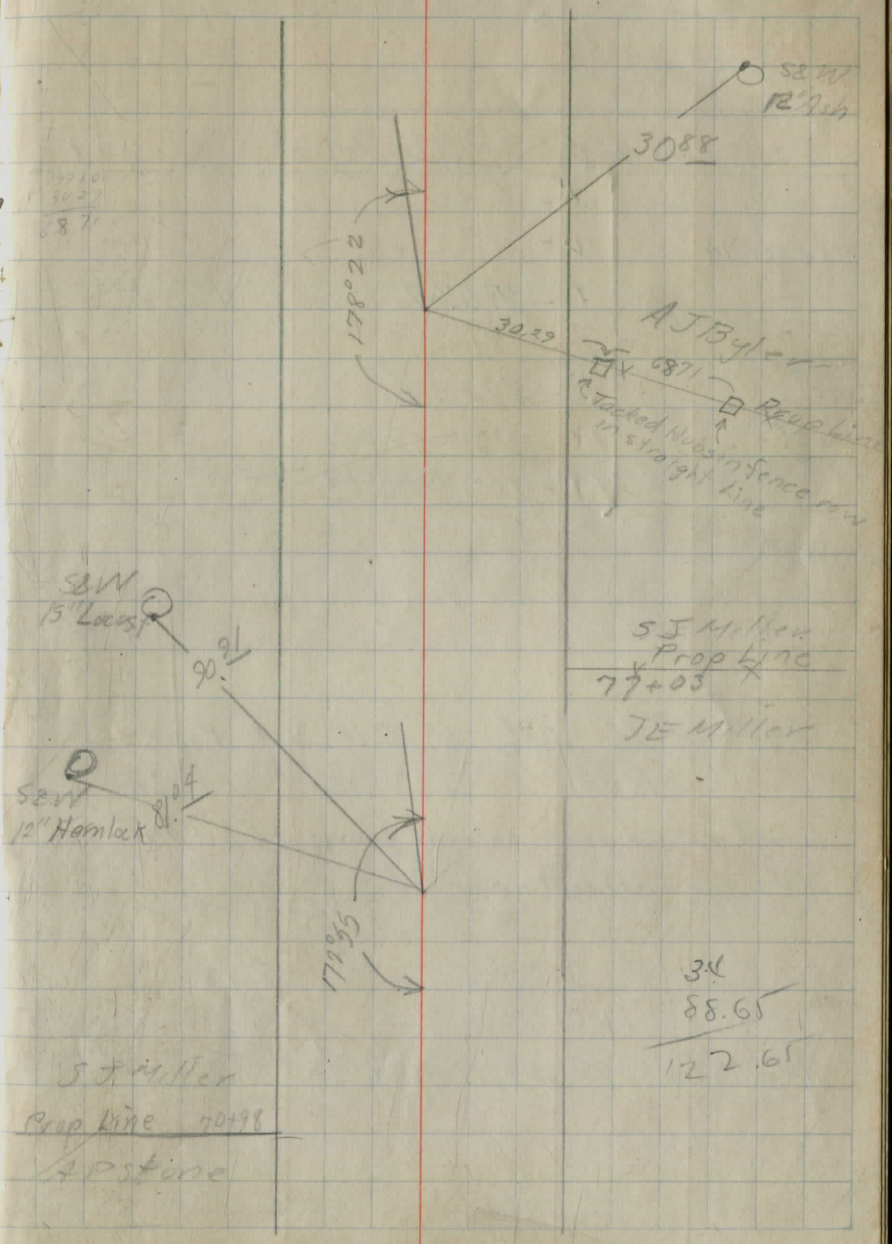
E - 2.5

L - 177.06

PC - 74+92.35

PT - 76+69.41

75=17



Sta 101+06.39 PI Def Lt 8°39' 100

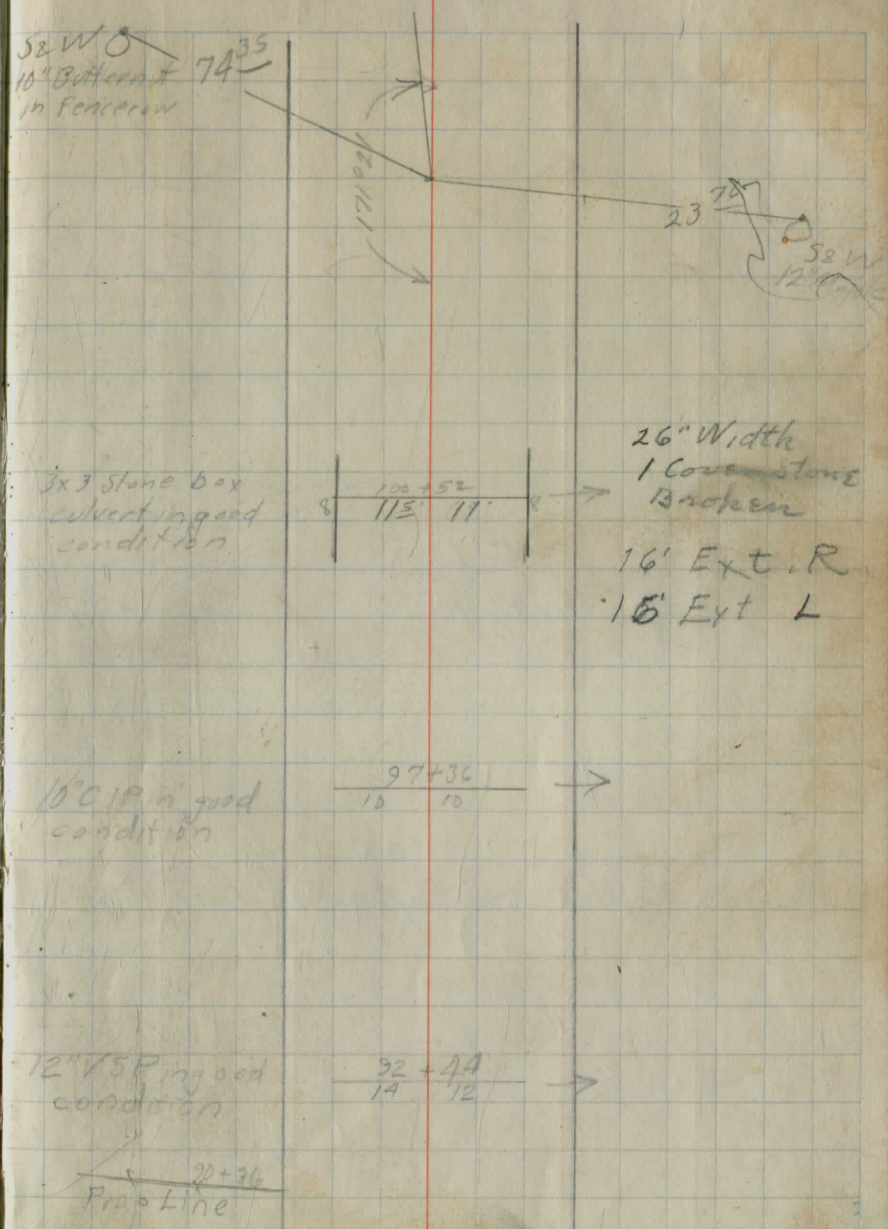
SEE PAGE 74

curve Data
- Δ - 8°39'
- D - 2°
- T - 216.67
- E - 8.1
- L - 432.50
- PC - 98+89.63
- PT - 103+22.13

100 + 3.07
101 - 7.58
102 - 2.56
103 - .09

Extend L with 6' of 10" Vit. Pipe
R " 6' " 10" " " "
with 12" C.I. pipe, salvage from 103+99
No new material required

Requires 8' of Vit. Pipe (1 pipe broken)



Reg. 8 6' Ext. L
6 8' Ext. R

Remove, Replace with 32 New 12" Corr. or Conc. Pipe

3 x 1½ Stone box culvert Concrete walls & slab in good condition

117+86
11 11

12" VSP in good condition

108+64
8 11

Barnes Prop Line
107+12 Isaac

Prop Line
107+12

18" VSP in fair condition
Part 12" C.I. pipe

12 103+24 123

J.M. Host
Prop Line (?)
101+65
Isaac

N 52° 15' E

Sta 120+20.70 POT — Spike Set

Note Sta 120+20.70 = Sta 31+07.74 N25 Center Rd

Sta 120+06.02 PI Def RT 41° 40' Set

Steel Truss bridge
Clear span - 39'
Overall length - 42'
width - 14'
Height - 8'
Plank flooring good condition

142+75
8 @ 7'
8 @ 7'
142+32

Flow

S & W
15" Maple

No. 74

Pipe Sta 31+29.2 N25 Center Rd

S 85° 40' E

90° 07'

N 25 Center 1964

Spike

Road S.R. 528
Barnes' Corners

26.20

45° 25'

Nail RE
root 15" Maple

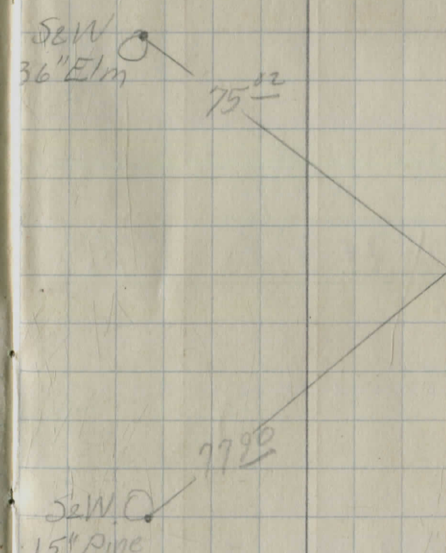
22.40

Req. 30' 15" Pipe. (12"± cover)

Sta 145+88.92 POT Pipe Set

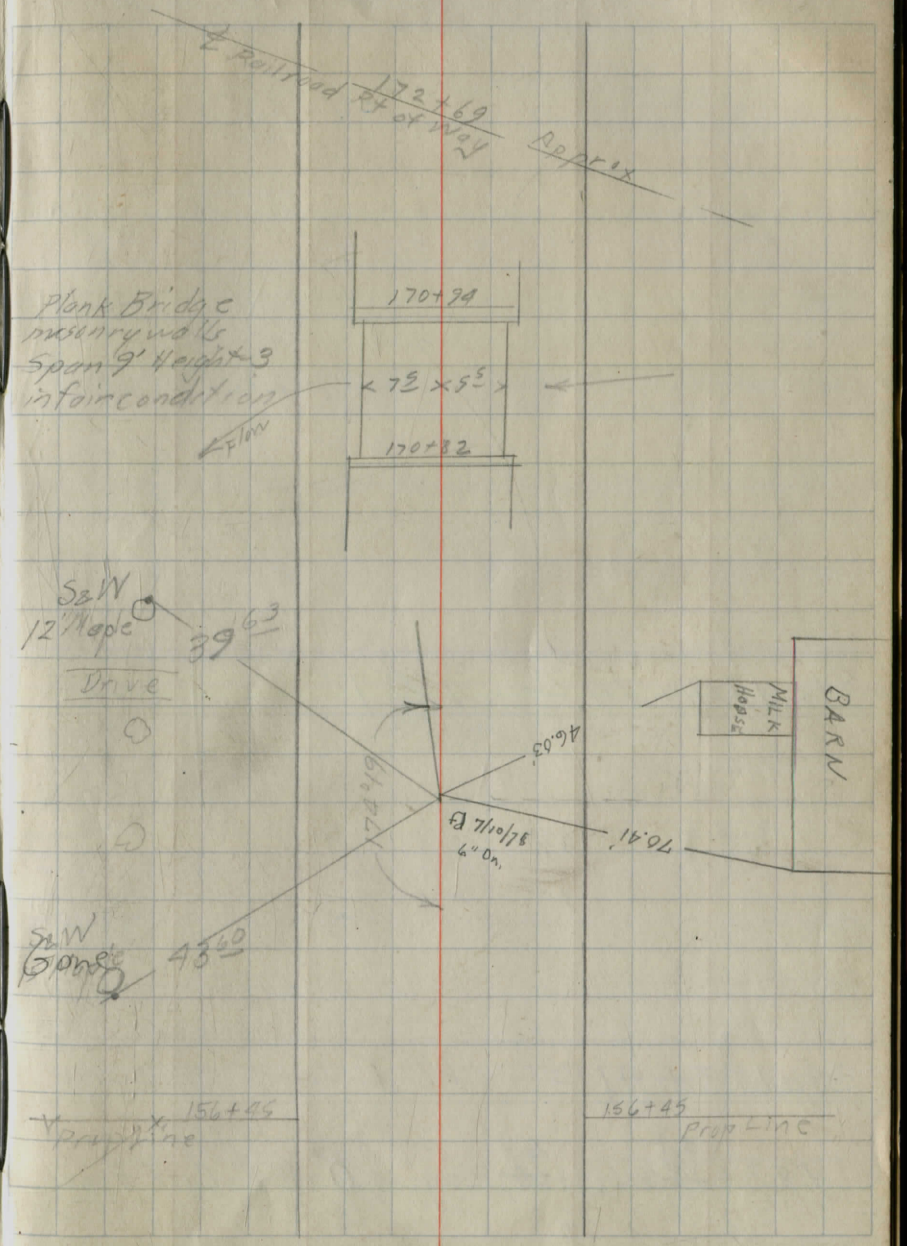
10" Cor IP in fair condition ← 154+37 / 4.5 11.5

8" Cor IP in poor condition ← 149+25 / 7 9



Sta 163+69.35 PI Def Lt. 5°41' Pipe Set

1 Δ - 5°41'
D - 3°
T - 94.80
E - 2.3
L - 189.44
PC - 162+74.55
PT - 164+63.99

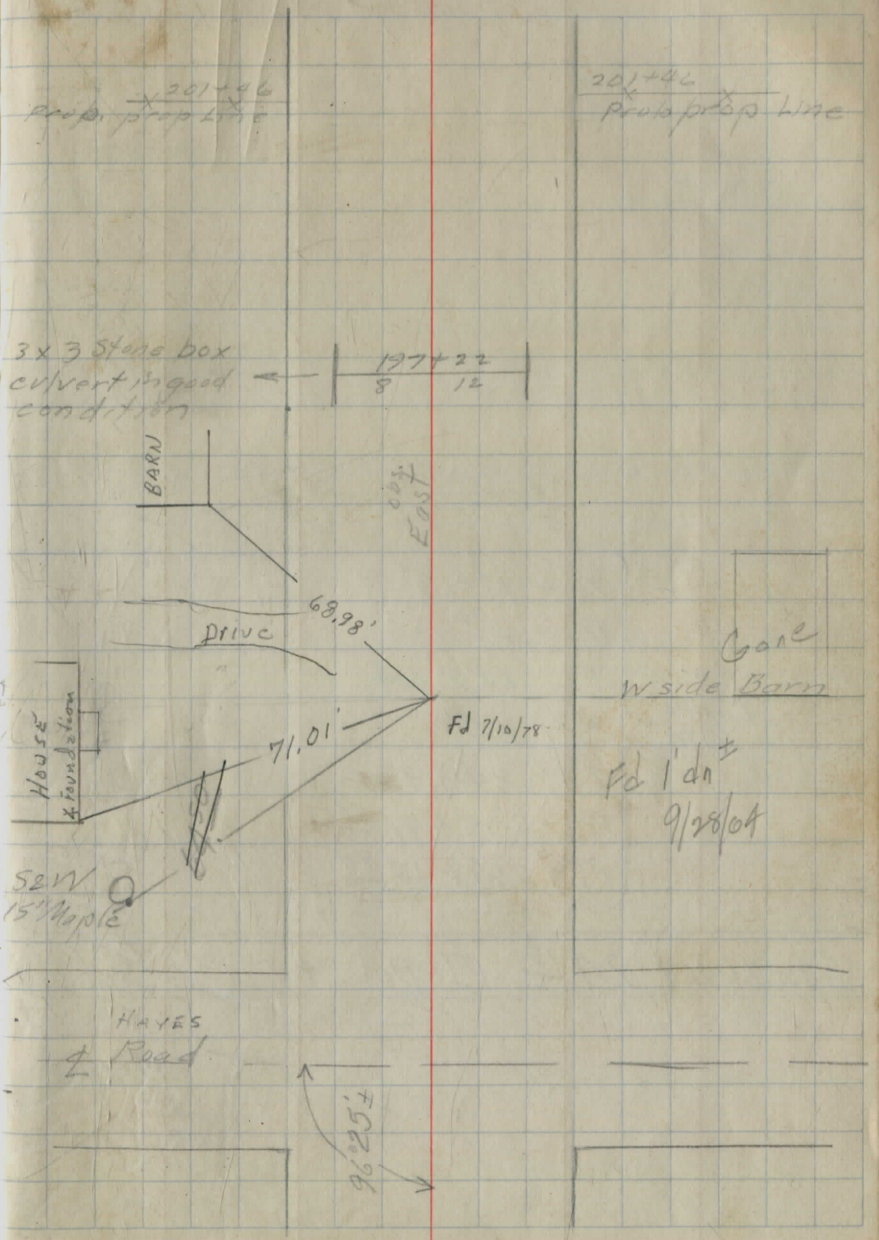


Sta 184+74.20 POT Pipe Set

133.70

Sta 183+41.20 POT Spike Set

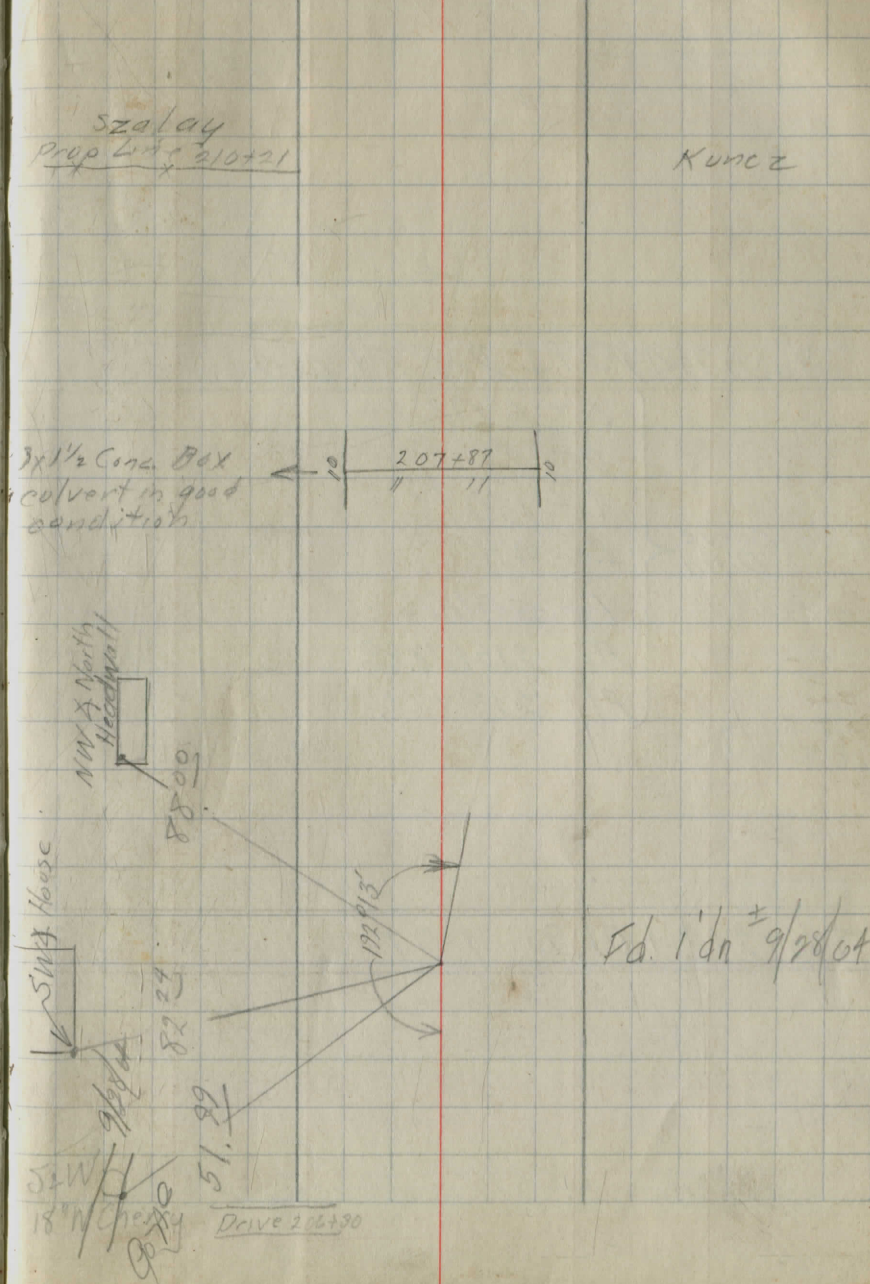
183+~~21~~ 183+~~67~~ 61 Reg. 40 of 8" Corr. Pipe



Curve Data
- Δ - 12°13' Rt
- D - 5°
- T - 122.64
- E - 6.5
- L - 244.33
- PC - 205+71.51
- PT - 208+15.84

Sta 206+94.15 PI Def Rt 12°13' P.I.P. Set

206 - .34
207 - 5.77
208 - .09

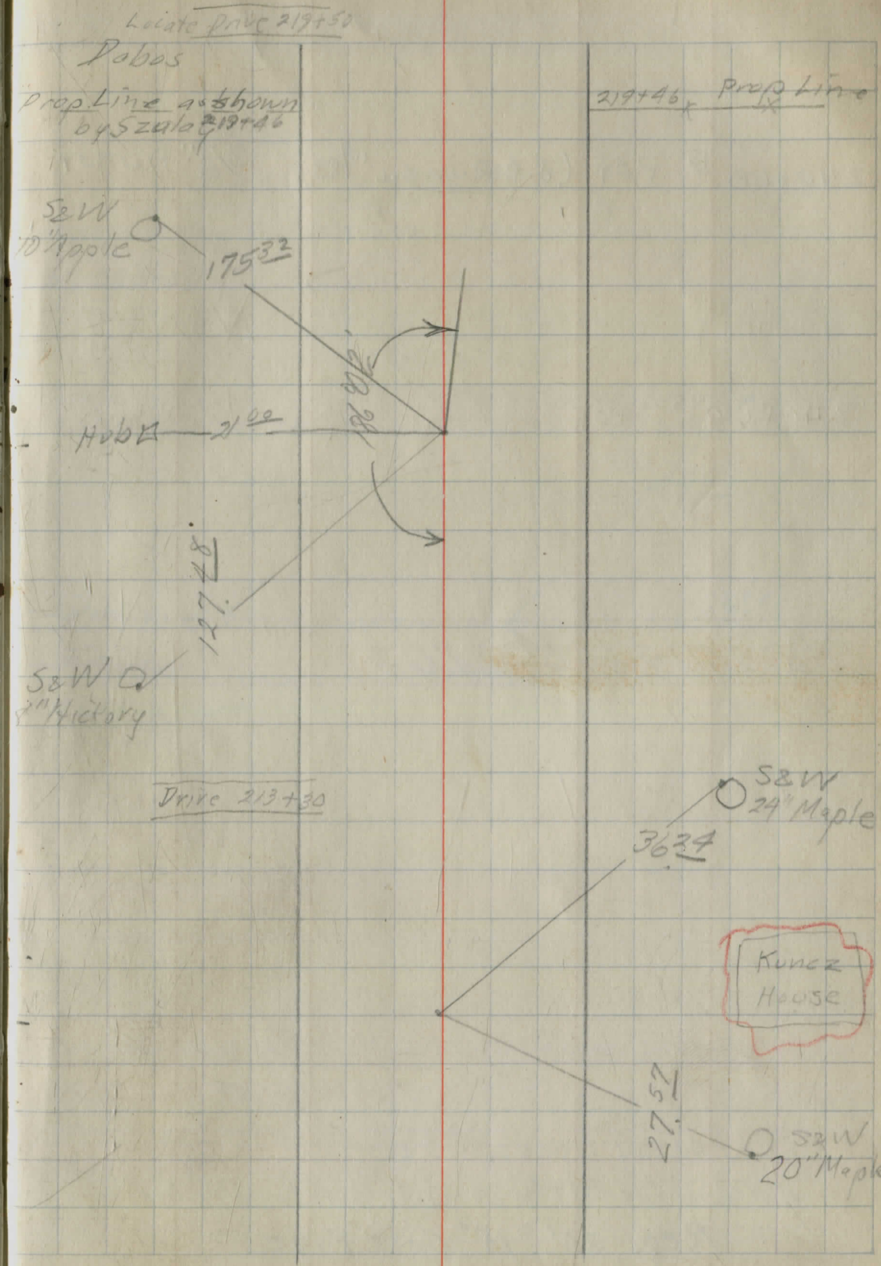


Sta 217+49.55 PI Def Rt 6°02' Pipe Set

Curve Data:
- Δ - 6°02' Rt
- D - 2°
- T - 150.95
- E - 4.0
- L - 301.66
- PC - 215+98.60
- PT - 219+00.26

217 - 1.79
218 - 1.75

Sta 212+01.95 POT Pipe Set

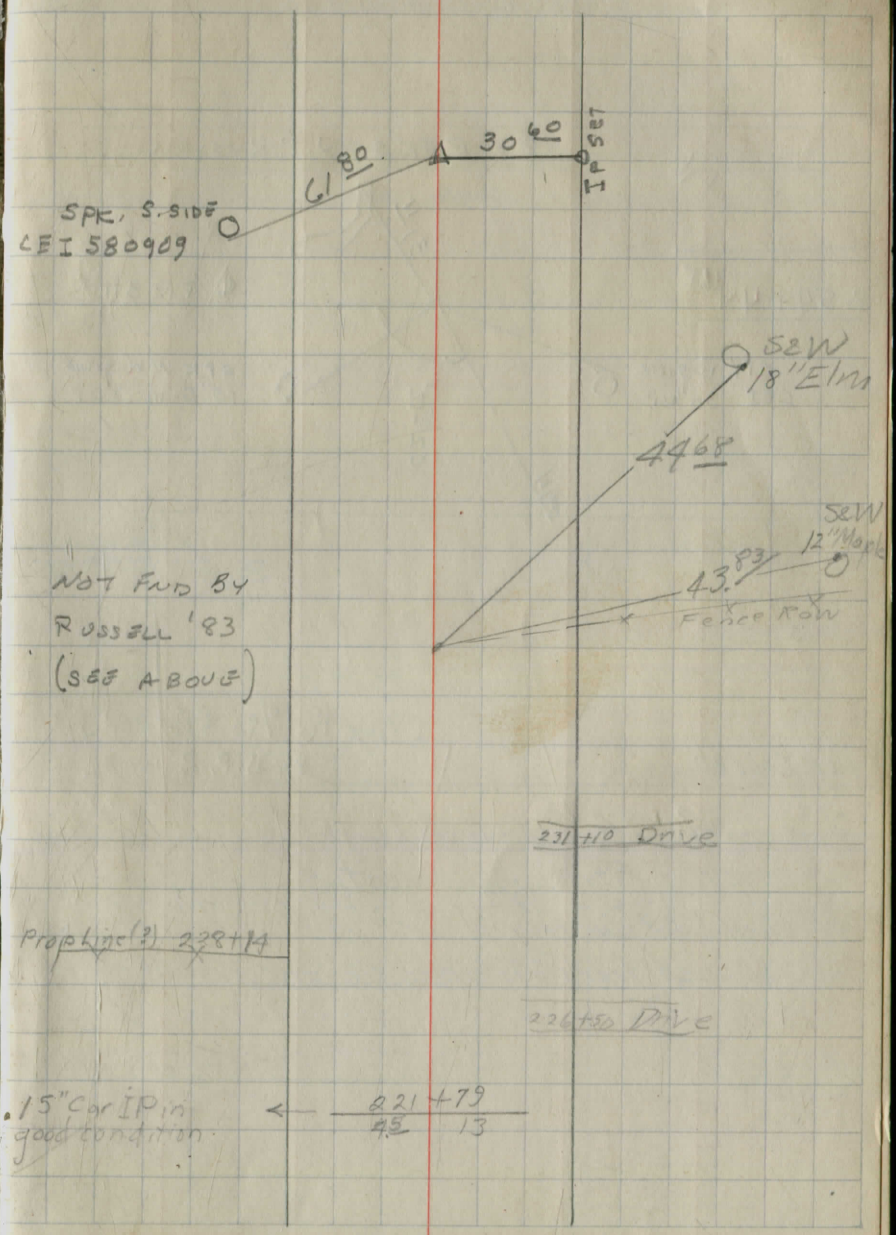


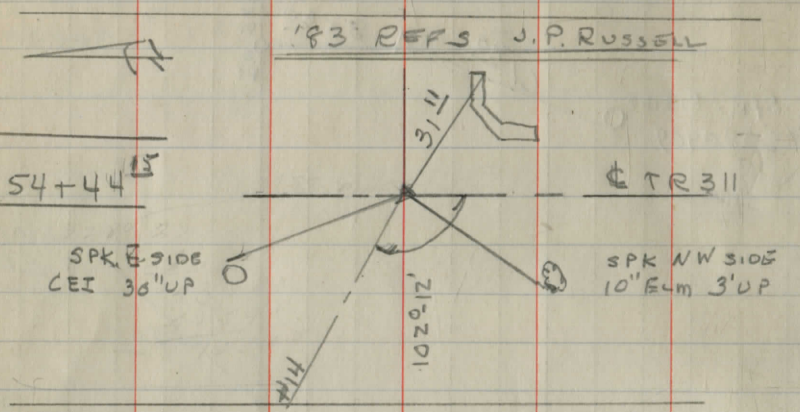
240+68 15" POT (J.P. RUSSELL 10/83) 3/8" PIN SET

Sta 240+66 64 POT Pipe Set

Note: Szahay requests that culvert at 221+79 be moved to Sta 217+46 & outlet at rt Δs 250' North

Req., 30', 15" Corr. Pipe



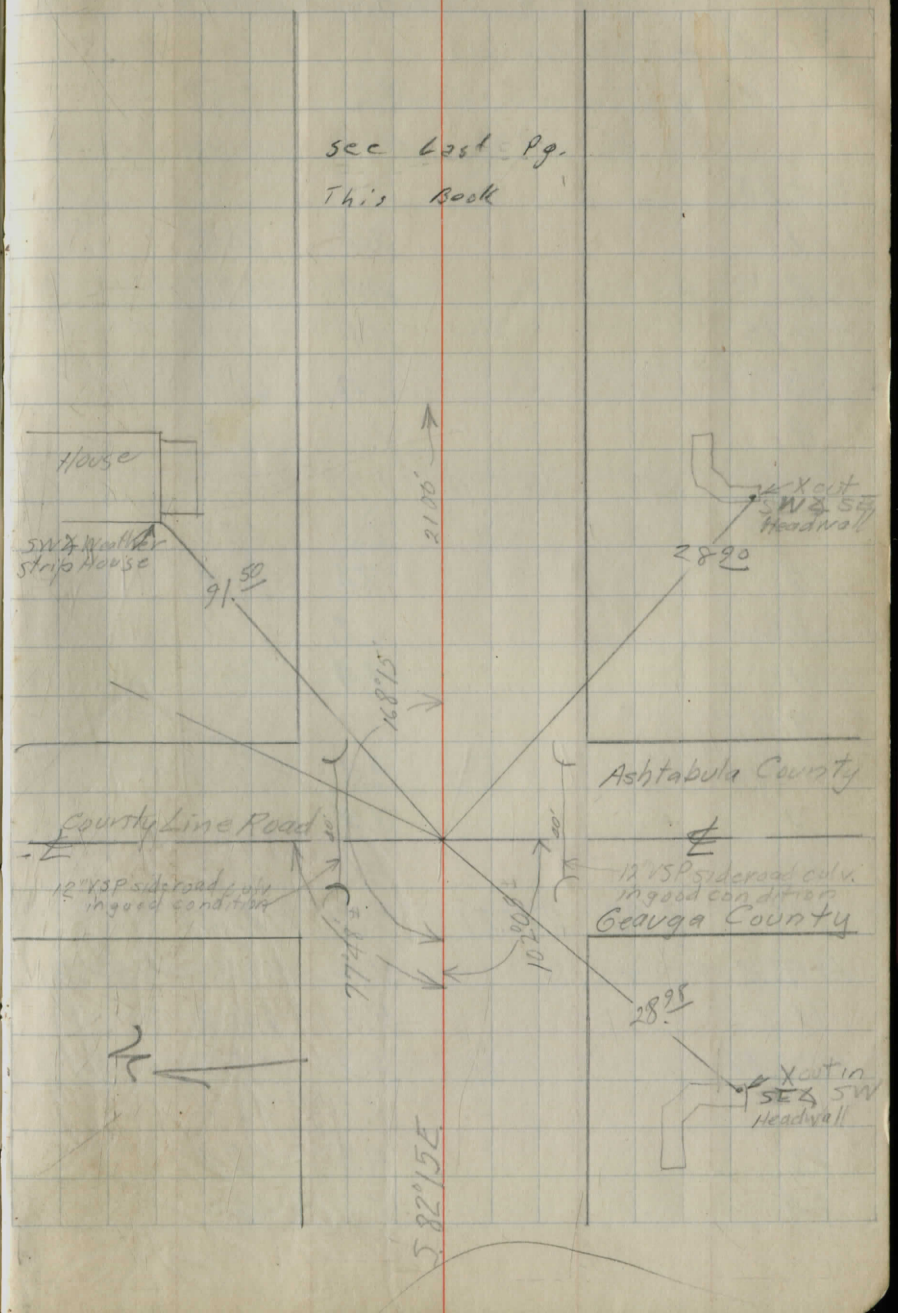


IP, PF FD 10/83 & REREF'D
BY J.P. RUSSEL

SEE PAGE 80

Sta 254+44.15 End of Project Set

Note: Stone monument at County Line could not be found Set pipe using references obtained from Ashtabula Co. Surveyors Office



3/2/34 Richey Goodrich Pomeroy

Profile Levels County Highway No 14 Burton Station Road

BM#1	2.30	1164.08			1161.78
0+00			4.2	59.9	
			4.02	160.06	155.62
0+18					
1			3.4	60.7	
2			4.4	59.7	
2+15			4.4	59.7	
3			2.4	61.7	
4			1.6	62.5	
	6.81	1168.90	1.99	1162.09	
4+75			6.9	62.0	
5			7.1	61.8	
6			6.2	62.7	
7			7.4	64.5	
8			3.7	65.2	
8+87			3.3	65.6	
9			3.9	65.0	
10			4.0	64.9	
	6.93	1172.21	3.62	1165.28	
BM#2			7.00		1165.21
11			5.9	66.3	
11+86			5.9	66.3	
12			5.5	66.7	
13			4.8	67.4	
14			5.7	66.5	

X cut NW cor N Headwall Sta 0 – 20

= BM#7 Burton Sta-Johnson Cor Road

Top boulder NW Cor Barn 30' Rt & Sta 0+30

Fl 6.1 Fl 8.0

Fl 7.8 Fl 10.0

Fl 11.5 Fl 10.5

Fl 4.6 Fl 6.2

Spike W root 15" Maple 25' Rt & Sta 10+75

Fl 8.4 Fl 9.0

		1172.21				
15			7.3	64.9		
16			9.0	63.2		
	5.18	1168.45	8.94	1163.27		
17			5.8	62.6		
17+01			5.8	62.6		
18			4.2	64.2		
19			5.0	63.4		
20			5.3	63.1		
21			6.2	62.2		
B4#3	2.60	1162.98 (6.3.0)	8.07		1160.38	Spike NW root 15" Maple 25' Rt & Sta 21+90
22			5.5	57.5		
22+79			7.0	56.0		
23			7.2	55.8		
24			9.0	54.0		
25			11.1	51.9		
26			13.4	49.6		
	0.64	1152.07 (52.1)	11.55	1151.43		
27			3.8	48.3		
28			6.5	45.6		
29			8.3	43.8		
30			10.1	42.0		
	1.18	1141.88 (41.9)	11.37	1140.70		
31			2.6	39.3		
32			7.0	34.9		
33			12.3	29.6		

Fl 9.6 Fl 12.4

Fl. 11.4 Fl 12.1

		1141.88			
	5.28	1135.04	12.12	1129.76	
34			6.7	28.3	
BM #4			7.97		1127.07
34+52	culvert		7.0	28.0	
35			6.5	28.5	
36			3.6	31.4	
37			1.8	33.2	
38			1.9	33.1	
39			2.1	32.9	
	3.62	36.6 1136.58	2.08	1132.96	
40			3.8	32.8	
41			4.6	32.0	
42			5.0	31.6	
43			6.1	30.5	
44			11.5	25.1	
	7.22	31.1 1131.08	12.72	1123.86	
BM #5			9.15		1121.93
44+76	culvert		7.4	23.7	
45			7.4	23.7	
46			4.6	26.5	
46+75			2.5	28.6	
47			4.5	26.6	
48			7.3	21.8	
	9.14	1130.11	10.11	1120.97	
48+51	culvert		9.3	20.8	

Spike 5 root 10 Maple 75' Lt & Sta 34+60

Fl	TO	TO	Fl	150
12.7	9.1	9.3	12.7	13.6

Spike E root 24" Elm 25' Lt & Sta 44+70

Fl	TO	TO	Fl
13.8	11.3	11.7	14.0

Fl	TO	TO	Fl
15.5	12.0	12.4	15.9

47		1130.11	9.4	20.7	
50			8.1	22.0	
51			3.4	26.7	
52	5.39	35.4 1135.39	0.11	1130.00	
52			4.7	30.7	
53			4.5	30.9	
54			5.0	30.4	
55			4.8	30.6	
56			8.9	26.5	
	7.15	1131.02	11.52	1123.87	
56+18					
56+58	north 100'		2.5	28.5	
56+58	West 85'		1.5	29.5	
BM #6			9.21		1121.81
57			8.0	23.0	
58			9.5	21.5	
59			10.1	20.9	
	5.42	1128.04	8.40	1122.62	
59+76	culvert		6.0	22.0	
60			6.5	21.5	
61			5.7	22.3	
62			4.4	23.6	
63			3.2	24.8	
64			0.8	27.2	
	12.57	1140.00	0.61	1127.43	

Fl 56 TO 68 TO 68 Fl

Spike N root 42" Elm 40' Lt & Sta 57+00

7/17/50
See Book 42 pg 73
levels on bridge
& outlet stream.

Fl TO 74 TO 74 Fl

		1140.00				
65			9.3	30.7		
66			3.4	36.6		
BM #7			0.32		1139.68	Spike N root 18" Maple 40' Rt & Sta 66+00
	9.13	1148.81				
67			4.6	44.2		
	13.09	1160.47 (10.5)	1.43	1147.38		
68			7.6	52.9		
69			1.7	58.8		
	12.08	1171.69 (11.7)	0.86	1159.61		
70			7.7	64.0		
71			3.0	68.7		
	12.63	1182.39 (12.4)	1.93	1168.76		
BM #8			8.74		1173.65	24 Horiz Spike SE Side 12" Apple 20' Lt & Sta 71+00
72			5.9	76.5		
	11.77	1182.83	3.33	1179.06		
73			7.6	83.2		
74			3.5	87.3		
	10.25	1201.08 (01.1)	0.00	1190.83		
75			9.7	91.4		
76			6.4	94.7		
77			4.3	96.8		
BM #9			0.24		1200.84	Spike SE root 20" Pine 30' Lt & Sta 77+30
78			2.4	98.7		
	11.78	1212.89 (12.9)	-0.03	1201.11		
79			11.0	01.9		

		1212.89				
80			7.8	05.1		
81			5.2	07.7		
82			2.6	10.3		
	12.58	1223.83	1.64	1211.25		
83			10.2	13.6		
84			7.0	16.8		
85			4.2	19.6		
86			4.7	19.1		
BM #10	3.40	1223.04	4.19		1219.64	2 Horiz spikes N side 12" Ash 25' Rt & Sta 86+20
87			4.7	18.3		
88			6.9	16.1		
89			9.5	13.5		
90			13.2	09.8		
	1.30	1211.81	12.53	1210.51		
91			6.4	05.4		
92			8.5	03.3		
92+44	culvert		9.2	02.6		
93			9.5	02.3		
94			9.0	02.8		
	2.74	1206.25	8.30	1203.51		
95			4.3	01.9		
96			6.0	00.2		
97			8.1	98.1		
BM #11			5.84		1200.41	Spike SE root 18" Maple 50' Lt & Sta 97+05
98			9.2	97.0		

Fl 11.8 Fl 13.2

		1206.25			
99			13.3	92.9	
	6.50	1199.67	13.08	1193.17	
97+36	culvert		1.9	97.8	
100			12.3	87.4	
	2.57	1189.74	12.50	1187.17	
100+52			3.4	86.3	
101			3.8	85.9	
102			5.3	84.4	
103			9.6	80.1	
103+94	culvert		11.4	78.3	
104			11.4	78.3	
105			12.1	77.6	
	0.22	1178.05	11.91	1177.83	
106			5.5	72.5	
107			11.1	66.9	
	1.34	1168.74	10.65	1167.40	
Sta = 12			0.50		1168.24 Spike N root 12" Pine 25 Rt ℄ Sta 107+60
108			5.1	63.6	
108+64	culvert		6.7	62.0	
109			6.8	61.9	
110			6.2	62.5	
111			5.6	63.1	
	0.35	1163.05	6.04	1162.70	
112			3.1	59.9	
113			5.7	57.3	

$\frac{Fl}{4.7}$ $\frac{Fl}{4.9}$

$-\frac{Fl}{12.2}$ $\frac{Fl}{12.4}-$

$\frac{Fl}{13.3}$ $\frac{Fl}{14.3}$

$\frac{Fl}{9.3}$ $\frac{Fl}{10.3}$

		1163.05			
114			7.5	55.5	
115			10.9	52.1	
	1.18	1152.33	11.90	1151.15	
116			6.4	45.9	
117			3.5	42.8	
117+86			10.2	42.1	
BM#13			8.92		1143.41
118			10.2	42.1	
119			6.7	46.7	
	8.38	1158.80	1.91	1150.42	
BM#14	0.12		0.12	1158.68	1158.56
	0.11	58.7 1158.67			
120			7.0	51.7	
120+21			7.0	51.7	
	1.89	49.3 1149.28	11.28	1147.39	
121			5.0	44.3	
122			11.3	38.0	
	1.20	37.9 1137.86	12.62	1136.66	
123			4.3	33.6	
124			7.0	30.9	
125			2.1	28.8	
126			11.0	26.9	
BM#15			12.54		1125.32
	0.02	1125.34			
127			0.9	24.4	

Fl 14.0 TO 12.5 — TO 12.5 Fl. 14.1

Top N E Cor N Headwall Sta 117+86

Elev of some BM on N/S Huntsburg Center Road Imp.

Spike N nail 18" Maple 40 Lt ± Sta 120+00

100/43 — 100/10.8

Spike N nail 18" Maple 25 Rt ± Sta 127+10

		1125.34				
128			2.9	22.4		
129			4.2	21.1		
130			5.1	20.2		
131			5.5	19.8		
132			9.6	15.7		
	1.39	1117.20	2.53	1115.81		
133			7.2	10.0		
BM #16	4.15	1117.20	4.15		1113.05	Spike E root 12" Maple 56' Rt & Sta 132+90
134			9.2	08.0		
135			10.8	06.4		
	1.48	1108.1 1108.06	10.62	1106.58		
136			4.1	04.0		
137			6.6	01.5		
138			8.9	99.2		
139			10.3	97.8		
	0.41	1100.80	7.67	1100.39		
140			4.3	96.5		
141			5.3	95.5		
142			5.7	95.1		
BM #17			3.29		1097.51	USGS Triangulation Sta Top wing SW & Bridge Sta 142+30 marked "Sta. 122"
	2.36	1099.7 1099.87				
Floor			2.6	97.3		
Flow W			9.6	90.3		
Flow &			10.1	89.8		
Flow E			9.4	90.5		

Note: 2" H_2O on Mar 6, 934

		10 99.87				
143			4.0	95.9		
144			4.7	95.2		
145			1.6	98.3		
	8.23	1106.86	1.24	109863		
146			4.7	102.2		
147			4.5	102.4		
148			3.7	103.2		
149			4.3	102.6		
150			4.3	102.6		
	2.69	1105.95	3.60	1103.26		
151			3.3	102.7		
BM # 18	3.33	1105.95	3.33		1102.62	Spike NW root 12" Maple 25' Lt & Sta 151+60
152			4.7	101.3		
153			5.9	100.1		
154			5.5	100.5		
154+27	culvert		5.8	100.2		
	7.95	1107.79	6.11	1099.84		
155			7.8	100.0		
156			6.5	101.3		
157			4.5	103.3		
158			3.8	104.0		
159			4.0	103.8		
160			3.3	104.5		
	7.50	1111.86	3.43	1104.36		
161			6.7	105.2		

Fl 8.3 Fl 8.4

		11.9				
		1111.86				
BM #19	4.26	111186	4.26		1107.60	Spike S root 12" Maple 50' Lt & Sta 161+75
162			4.7	07.2		
163			3.6	08.3		
164			1.9	10.0		
	0.95	12.5	0.34	111.52		
		1112.47				
165			3.8	08.7		
166			4.7	07.8		
167			4.2	08.3		
168			4.7	07.8		
169			8.1	04.4		
	2.85	1106.52	8.80	1103.67		
170			4.8	01.7		
170+70	culvert		4.9	01.6		
171			4.9	01.6		
BM #20	5.02	1106.52	5.02		1101.50	Spike E. root 18" Elm 50' Rt & Sta 171+60
172			4.3	02.2		
173			1.0	05.5		
	7.69	1114.13	0.08	1106.44		
174			6.4	07.7		
175			4.8	09.3		
176			3.2	10.9		
177			1.7	12.4		
178			1.0	13.1		
	2.48	1116.09	0.52	1113.61		
179			4.0	12.1		

$\frac{Pl}{2.2}$ $\frac{El}{9.1}$

		1116.09 (16.1)				
180			4.3	11.8		
181			4.1	12.0		
BM #21	4.47	1116.09	4.47		1111.62	Spike S root 18" Maple 25' Lt ℄ Sta 181+00
182			3.6	12.5		
183			2.1	14.0		
	8.84	1122.60	2.33	1113.76		
183+41			8.1	14.5		Level 1.50/4.8 1.00/8.3
184			6.5	16.1		
185			4.3	18.3		
186			5.4	17.2		
187			5.7	16.9		
	4.12	1120.38 (20.4)	6.34	1116.26		
188			4.0	16.4		
189			3.4	17.0		
190			4.9	15.5		
191			6.1	14.3		
192			6.6	13.8		
BM #22	2.78	1116.75	6.41		1113.97	Spike S root (SE) 15" Maple 25' Lt ℄ Sta 192+25
193			3.6	13.1		
194			4.1	12.6		
195			4.5	12.2		
196			4.9	11.8		
197			4.3	12.4		
197+22	culvert		3.9	12.8		Fl 7.6 Fl 7.7
198			4.9	11.8		

		1116.75			
	4.24	1117.05	3.94	1112.81	
199			4.7	12.3	
200			4.4	12.6	
201			4.6	12.4	
202			4.4	12.6	
	3.43	1116.45	4.03	1113.02	
203			3.6	12.8	
204			4.4	12.0	
205			4.5	11.9	
206			5.0	11.4	
BM #23			3.29		1113.16
	3.26	1116.42			
207			5.3	11.1	
207+87			4.6	11.8	
208			4.6	11.8	
209			4.5	11.9	
210			3.2	13.2	
211			0.8	15.6	
	5.85	1122.07	0.20	1116.22	
212			3.2	18.9	
213			3.6	18.5	
214			4.8	17.3	
215			5.6	16.5	
216			5.9	16.2	
BM #24	6.09	1119.94	8.22		1113.85

Spike N Wrost 18" W Cherry 25 Lt & Sta 206+50

100/8.2 Fl./7.7 T.O./5.5 T.O./5.8 Fl./7.8

Spike S root 8" Hickory 100 Lt & Sta 216+85

		1112.94				
217			4.3	15.6		
218			4.5	15.4		
219			4.8	15.1		Szaley requests culvert near here instead of 221+79
220			4.7	15.2		
221			4.9	15.0		
221+79	culvert		4.8	15.1		$\frac{3\%0}{7.5}$ $\frac{200}{7.2}$ $\frac{100}{7.0}$ $\frac{El}{6.8}$ $\frac{El}{6.8}$
	4.48	1120.45	3.97	1115.97		
222			5.3	15.1		
223			5.5	14.9		
224			5.2	15.2		
225			4.8	15.6		
226			4.2	16.2		
227			3.6	16.8		
228			2.4	18.0		
BM #25	4.82	1123.02	2.25		1118.20	Spike N root 6" Elm 25' Lt ℄ Sta 228+05
229			4.7	18.7		
230			5.0	18.0		
231			4.3	18.7		
232			4.0	19.0		
233			3.8	19.2		
	3.82	1123.35	3.49	1119.53		
234			4.3	19.0		
235			4.5	18.8		
236			4.8	18.5		
BM #26	3.98	1123.35	3.98		1119.37	Spike S root 30" Elm 25' Lt ℄ Sta 236+50

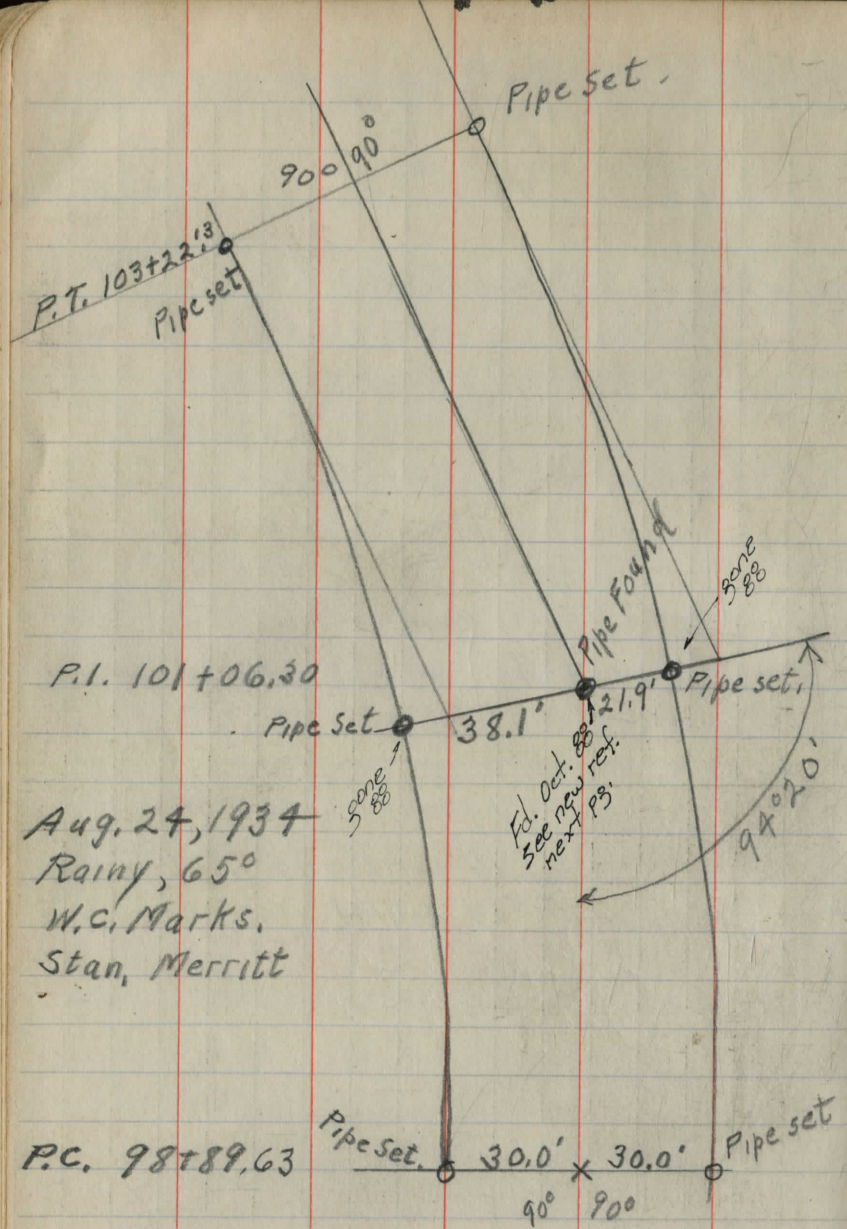
		1123.35				
237			4.8	18.5		
238			5.2	18.1		
239			6.2	17.1		
	2.12	1119.72	5.75	1117.60		
240			2.9	16.8		
241			3.4	16.3		
242			5.3	~~14.4~~		
243			6.3	13.4		
244			7.9	11.8		
245			8.7	11.0		
BM #27	0.64	1113.42	6.94		1112.78	Spike N root 15" Maple 25' Rt ℄ Sta 244+95
246			3.6	09.8		
247			4.1	09.3		
248			4.8	08.6		
249			5.0	08.4		
250			5.3	08.1		
	3.99	1111.75	5.66	1107.76		
251			4.4	07.3		
252			4.6	07.1		
253			5.0	06.7		
254			5.7	06.0		
254+44			5.8	05.9		
BM # 28			5.62		1106.13	X cut SE Cor. SW Headwall 20' Rt ℄ Sta 254+25
Road East						
C						

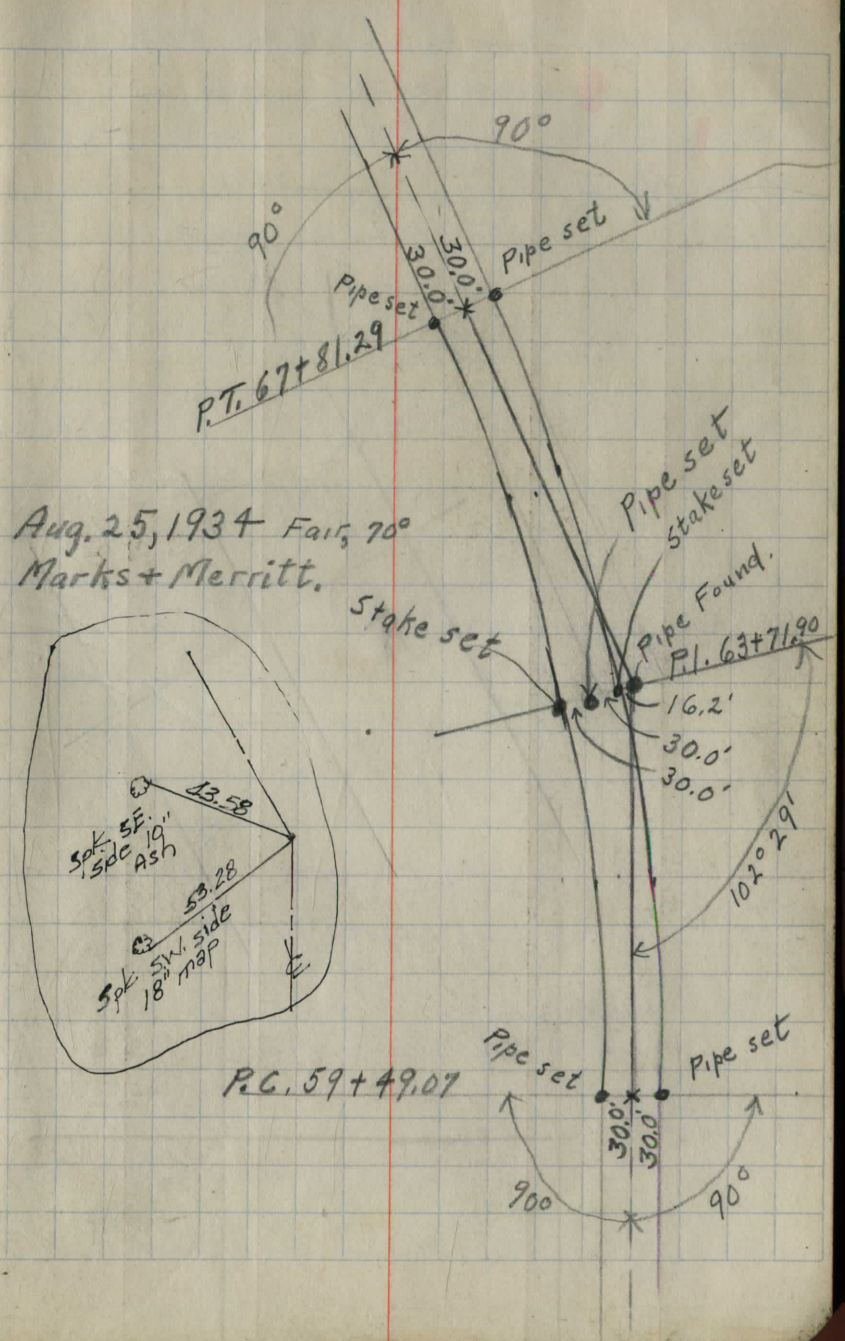
100/6.2 100/6.2

100/7.1 200/8.4

		1111.75				
S Culvert						
N Culvert						
	Check	level from	BM #27	North to	Hell	Road along County Line Road
BM #27	1.39	1107.52		1106.13		
	3.65	1108.04	3.13	1104.39		
	5.80	1110.47	3.37	1104.67		
	4.11	1107.46	7.12	1033.5		
	2.95	1108.09	2.32	1105.14		
	3.53	1105.59	6.03	1102.06		
BM	3.69	1105.59	3.69	1101.90		← Spike in E root 24" Elm W side Rd. 150' S of Fence run. E 3st and approx 1500' N of CM No 14
	4.52	1105.14	4.47	1100.62		
	3.67	1104.53	4.28	1100.86		
	2.05	1098.84	7.74	1096.79		
	-0.08	1092.53	6.39	1092.45		
BM			5.83	1086.70	1086.73	← X cut NE & E Headwall Hell Road and Co Line Road = New BM #19 Hell Rd.

W Pl 8.3	E Pl 8.8
W Pl 7.8	E Pl 9.0

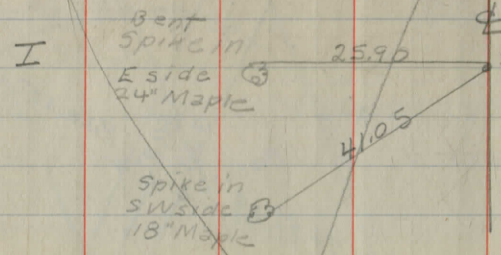

Pipe set.
90° 90°
P.T. 103+22.18
Pipe set
P.I. 101+06.30
Pipe Found
Stone 88
Pipe Set
38.1'
21.9'
Pipe set.
Stone 88
Fd. Oct. 88 See new ref. next P.S.
94°20'
Aug. 24, 1934
Rainy, 65°
W.C. Marks.
Stan. Merritt
P.C. 98+89.63
Pipe Set.
30.0'
30.0'
Pipe set
90° 90°


90°
90°
30.0'
30.0'
Pipe set
Pipe set
P.T. 67+81.29
Aug. 25, 1934 Fair, 70°
Marks + Merritt.
Pipe set
stake set
Stake set
Pipe Found.
P.I. 63+71.90
16.2'
30.0'
30.0'
13.58
Spk. SE. side 10" Ash
53.28
Spk. SW. side 18" map
102°29'
P.C. 59+49.07
Pipe set
Pipe set
30.0'
30.0'
90°
90°

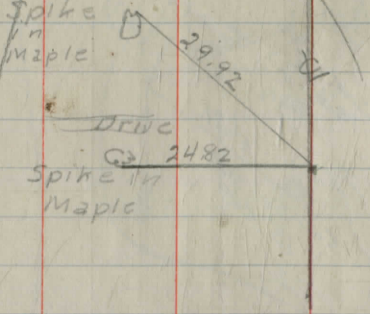
Transit Points Co. Hi # 14

Spike set 100 ft W of NE8 Center. 2 stakes 15' ft E

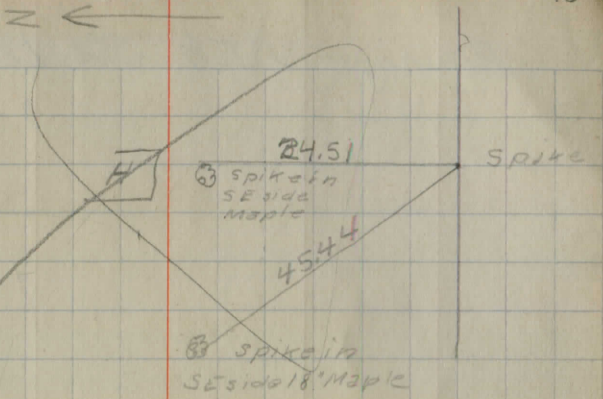
POT No I



P.I. (Not determined)



POT No III

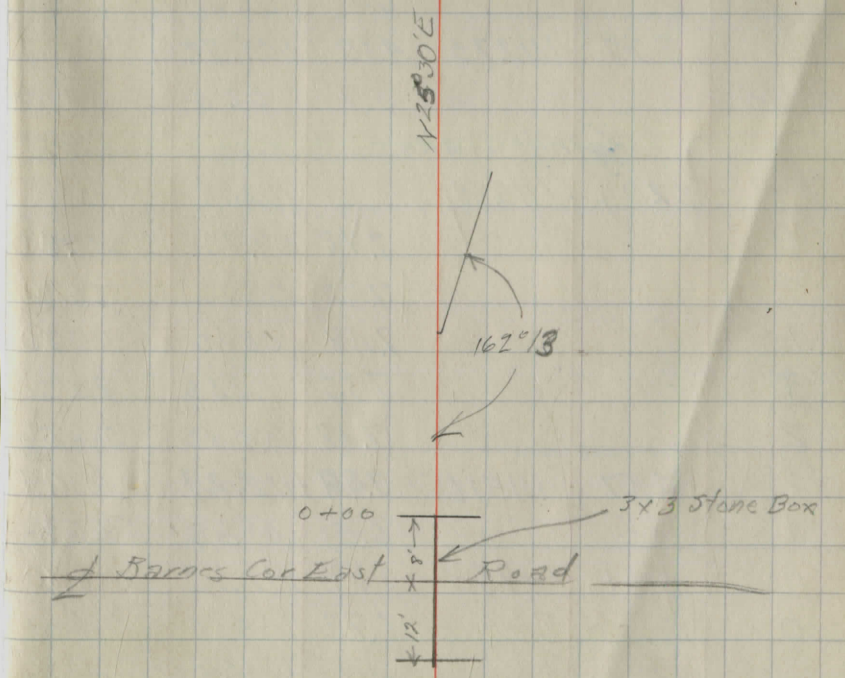


Drainage Ditch Sta 197+22

Sta 6+00

Sta 1+00 Def Rt 17°47'

Sta 0+00



Levels on Ditch Sta 1977+22

BM22	3.00	1116.97			1113.97
0-200			25		
0-100			7.9	09.1	
Flow 5 end Culv			7.6	09.4	
Flow 0+00			7.7	09.3	grade 08.5
	3.62	1115.89	4.70	1112.27	
Flow 5			7.6	08.3	07.8
" 6			7.8	08.1	
" 8			7.4	08.5	
TP	1.10	1113.58	3.41	1112.48	
" 10			5.8	07.8	
" 11			6.0	07.6	
	3.97	1112.75	4.80	1108.78	
" 14			5.7	07.0	

Grade Stakes

				grade	stake	Cut
TP	3.20 C	1115.68		1112.48		
6			7.78	07.90	4.78	C 3.0
5			7.63	0805	5.63	C 2.0
4			7.48	0820	598	C 1.5
3			733	0.835	533	C 2.0
2			7.18	08.50	5.68	C 1.5
	2.87	1115.16	3.39	1112.29		
1			6.51	08.65	5.51	C 1.0
	5.21	1117.53	284	1112.32		
0			8.73	0880	7.23	C 1.5
			47	12.8		

0
1
2
3
4

NE Top Stomp Sta 7+00

N – of Lot 10

	20+88	– Road Midd.
Fence Line	14+01	Fence Line
	12+74	Fence Line Rt
Fence –	10+62	~~Fence~~
	6+25	W–Edge of woods
	±85	Brush Row
1/0	12+82	Prob. P.L. × × × × ×
	⊖	

Width of A. Gingerich

6+00	Fence
9+50	Fence
15+80	East Line Prob
14+55	Fence Line
0 = Gingerich W line	
37+05	S E cor. of A. Ging.
34+75	℄ R. Ditch
21+94	B+O. R of Way
16+15	S – of A Gingerich + N – of B+O Windsor
9+20	Fence Line
0	
~~6+90~~	~~B+O. R.R. of Way~~
0	

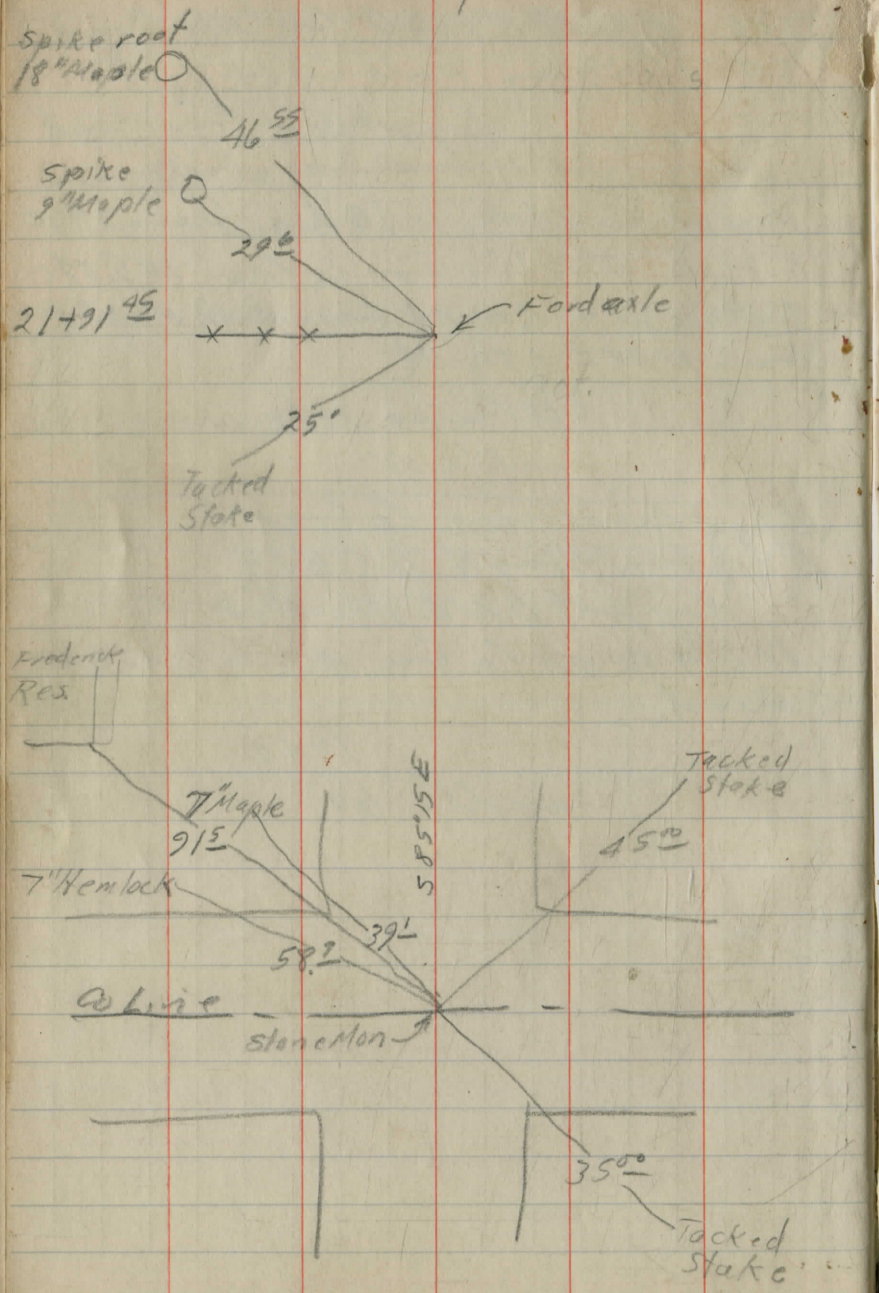
A. Gingerich East Line

Copy of Road Record. Co line Road.
S & E to Hunterberg North CH 14 North
..... Beg. where Co. line road
ends in list 11 Hunterberg at stone.
from which W bolt tree 18 dia. bears S 45 E
8.24 ch. & N 1 3/4 E on Co line. 145.89 ch
to stone in E & W Rd. from which maple
bears N 75 E 6 1/2 ch.

E L F Phelps. 1878
width 50'

Copy of Road Record Co line Rd
S & E to Hunterberg N to CH 14
Beg part SW 1/4 Hunterberg. &
N 1 3/4 W on Co line 40 ch to E & W
Road.

1840
width 60'



KEITH'S RAILROAD CURVE TABLES.

Published by KEUFFEL & ESSER CO., New York.

HOW TO USE KEITH'S TABLES.

EXAMPLE.

Wanted a Curve with an Ext. of about 12 ft. Angle of Intersection or I. P.=23° 20′ to the R. at Station 542+72.

Ext. in Tab. IV opposite 23° 20′=120.87
120.87÷12=10.07. Say a 10° Curve.

Tan. in Tab. IV opp. 23° 20′=1183.1
1183.1÷10=118.31.

Tab. V. correction for A. 23° 20′ for a 10° Cur.=0.16
118.31+0.16=118.47=corrected Tangent.

(If corrected Ext. is required find in same way)
Ang. 23° 20′=23.33°÷10=2.3333=L. C.

2° 19½′	=def. for	sta.	542	I. P.=sta.	542+72
4° 49½′	= "	" "	+50	Tan.=	1.18.47
7° 19½′	= "	" "	543	B. C.=sta.	541+53.53
9° 49½′	= "	" "	+50	L. C.=	2 33.33
11° 40′	= "	" "	543+ 86.86	E. C.=sta.	543+86.86

100—53.53=46.47×3′(def. for 1 ft. of 10° Cur.)=139.41′=2° 19½″=def. for sta. 542.

Def. for 50 ft.=2° 30′ for a 10° Curve.

Def. for 36.86 ft.=1° 50½′ for a 10° Curve

(These tables are published in Field Books of KEUFFEL & ESSER Co., New York, N. Y.)

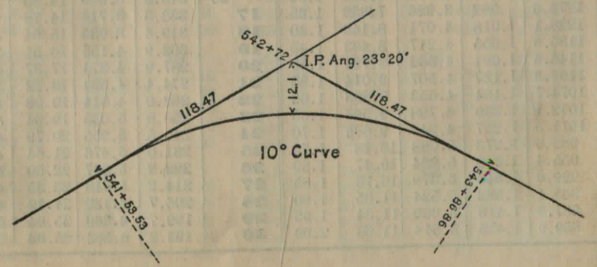


Table I. — Minutes in Decimals of a Degree.

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	8	716.8	1.746	6.976	13.95	2.40
1	5729.6	.218	.873	1.745	0.30	20	688.2	1.819	7.266	14.53	2.50
10	4911.2	.255	1.018	2.036	0.35	30	674.7	1.855	7.411	14.82	2.55
20	4297.3	.291	1.164	2.327	0.40	40	661.7	1.892	7.556	15.11	2.60
30	3819.8	.327	1.309	2.618	0.45	9	637.3	1.965	7.846	15.69	2.70
40	3437.9	.364	1.454	2.909	0.50	20	614.6	2.037	8.136	16.27	2.80
50	3125.4	.400	1.600	3.200	0.55	30	603.8	2.074	8.281	16.56	2.85
2	2864.9	.436	1.745	3.490	0.60	40	593.4	2.110	8.426	16.85	2.90
10	2644.6	.473	1.891	3.781	0.65	10	573.7	2.183	8.716	17.43	3.00
20	2455.7	.509	2.036	4.072	0.70	30	546.4	2.292	9.150	18.30	3.15
30	2292.0	.545	2.181	4.363	0.75	11	521.7	2.402	9.585	19.16	3.30
40	2148.8	.582	2.327	4.654	0.80	30	499.1	2.511	10.02	20.04	3.45
50	2022.4	.618	2.472	4.945	0.85	12	478.3	2.620	10.45	20.91	3.60
3	1910.1	.655	2.618	5.235	0.90	30	459.3	2.730	10.89	21.77	3.75
10	1809.6	.691	2.763	5.526	0.95	13	441.7	2.839	11.32	22.64	3.90
20	1719.1	.727	2.908	5.817	1.00	30	425.4	2.949	11.75	23.51	4.05
30	1637.3	.764	3.054	6.108	1.05	14	410.3	3.058	12.18	24.37	4.20
40	1562.9	.800	3.199	6.398	1.10	30	396.2	3.168	12.62	25.24	4.35
50	1495.0	.836	3.345	6.689	1.15	15	383.1	3.277	13.05	26.11	4.50
4	1432.7	.873	3.490	6.980	1.20	30	370.8	3.387	13.49	26.97	4.65
10	1375.4	.909	3.635	7.271	1.25	16	359.3	3.496	13.92	27.84	4.80
20	1322.5	.945	3.781	7.561	1.30	30	348.5	3.606	14.35	28.70	4.95
30	1273.6	.982	3.926	7.852	1.35	17	338.3	3.716	14.78	29.56	5.10
40	1228.1	1.018	4.071	8.143	1.40	18	319.6	3.935	15.64	31.29	5.40
50	1185.8	1.055	4.217	8.433	1.45	19	302.9	4.155	16.51	33.01	5.70
5	1146.3	1.091	4.362	8.724	1.50	20	287.9	4.374	17.37	34.73	6.00
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
6	955.4	1.309	5.234	10.47	1.80	26	222.3	5.697	22.50	44.99	7.80
10	929.6	1.346	5.379	10.76	1.85	27	214.2	5.918	23.35	46.69	8.10
20	905.1	1.382	5.524	11.05	1.90	28	206.7	6.139	24.19	48.38	8.40
30	881.9	1.418	5.669	11.34	1.95	29	199.7	6.360	25.04	50.07	8.70
40	859.9	1.455	5.814	11.63	2.00	30	193.2	6.583	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	2o31.1	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	2191.1
30	3828.4	1161.3	30	4598.5	1617.1	30	5484.9	2202.2
40	3840.5	1168.1	40	4612.2	1625.7	40	5500.9	2213.2
50	3852.6	1174.8	50	4626.0	1634.4	50	5517.0	2224.3
68	3864.7	1181.6	**78**	4639.8	1643.0	**88**	5533.1	2235.5
10	3876.8	1188.4	10	4653.6	1651.7	10	5549.2	2246.7
20	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	2373.3
10	4024.4	1272.1	10	4822.0	1759.0	10	5746.3	2385.1
20	4036.8	1279.3	20	4836.2	1768.2	20	5763.1	2397.0
30	4049.3	1286.5	30	4850.5	1777.4	30	5779.9	2408.9
40	4061.8	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′	8362.7	4407.6
20	5864.6	2469.3	20	6992.0	3310.1	20	8388.9	4429.2
30	5881.7	2481.5	30	7012.7	3326.1	30	8415.1	4450.9
40	5898.8	2493.8	40	7033.6	3342.3	40	8441.5	4472.7
50	5916.0	2506.1	50	7054.5	3358.5	50	8468.0	4494.6
92	5933.2	2518.5	**102**	7075.5	3374.9	**112**	8494.6	4516.6
10	5950.5	2531.0	10	7096.6	3391.2	10	8521.3	4538.8
20	5967.9	2543.5	20	7117.8	3407.7	20	8548.1	4561.1
30	5985.3	2556.0	30	7139.0	3424.3	30	8575.0	4583.4
40	6002.7	2568.6	40	7160.3	3440.9	40	8602.1	4606.0
50	6020.2	2581.3	50	7181.7	3457.6	50	8629.3	4628.6
93	6037.8	2594.0	**103**	7203.2	3474.4	**113**	8656.6	4651.3
10	6055.4	2606.8	10	7224.7	3491.3	10	8684.0	4674.2
20	6073.1	2619.7	20	7246.3	3508.2	20	8711.5	4697.2
30	6090.8	2632.6	30	7268.0	3525.2	30	8739.2	4720.3
40	6108.6	2645.5	40	7289.8	3542.4	40	8767.0	4743.6
50	6126.4	2658.5	50	7311.7	3559.6	50	8794.9	4766.9
94	6144.3	2671.6	**104**	7333.6	3576.8	**114**	8822.9	4790.4
10	6162.6	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	5288.6
30	6533.4	2960.3	30	7814.3	3960.1	30	9442.2	5315.0
40	6552.6	2974.7	40	7838.1	3979.4	40	9473.2	5341.5
50	6571.9	2989.2	50	7862.1	3998.7	50	9504.4	5368.2
98	6591.2	3003.8	**108**	7886.2	4018.2	**118**	9535.7	5395.1
10	6610.6	3018.4	10	7910.4	4037.8	10	9567.2	5422.1
20	6630.1	3033.1	20	7934.6	4057.4	20	9598.9	5449.2
30	6649.6	3047.9	30	7959.0	4077.2	30	9630.7	5476.5
40	6669.2	3062.8	40	7983.5	4097.1	40	9662.6	5504.0
50	6688.8	3077.7	50	8008.0	4117.0	50	9694.7	5531.7
99	6708.6	3092.7	**109**	8032.7	4137.1	**119**	9727.0	5559.4
10	6728.4	3107.7	10	8057.4	4157.3	10	9759.4	5587.4
20	6748.2	3122.9	20	8082.3	4177.5	20	9792.0	5615.5
30	6768.1	3138.1	30	8107.3	4197.9	30	9824.8	5643.8
40	6788.1	3153.3	40	8132.3	4218.4	40	9857.7	5672.3
50	6808.2	3168.7	50	8157.5	4239.0	50	9890.8	5700.9
100	6828.3	3184.1	**110**	8182.8	4259.7	**120**	9924.0	5729.7
10	6848.5	3199.6	10	8208.2	4280.5	10	9957.5	5758.6
20	6868.8	3215.1	20	8233.7	4301.4	20	9991.0	5787.7
30	6889.2	3230.8	30	8259.3	4322.4	30	10025.0	5817.0
40	6909.6	3246.5	40	8285.0	4343.6	40	10059.0	5846.5
50	6930.1	3262.3	50	8310.8	4364.8	50	10093.0	5876.1

Table V. Corrections for use with Table IV,

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	.70	.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	.120	.127	.135
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	.213	.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	.332	.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	.711	.845	922	1.01
70°	.080	.159	.240	.321	.403	.485	.568	.652	.735	.819	.906	.994	1.08	1.17
75°	.095	.182	.286	.383	.480	.578	.678	.777	.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	.985	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 / R = sin of def. angle 12.5 Ft.	15 Ft.	20 Ft.	25 Ft.	Length of arc for 100 ft.
30°	193.18	1° 51′	2° 17′	2° 58′	3° 43′	101.15
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.

$T = R \tan \frac{1}{2} I$

$T = \frac{50 \tan. \frac{1}{2} I}{\text{Sin. D}}$

$\text{Sin. D} = \frac{50}{R}$

$\text{Sin. D} = \frac{50 \tan. \frac{1}{2} I}{T}$

$R = T \cot. \frac{1}{2} I$

$R = \frac{50}{\text{Sin. D}}$

$E = R \text{ ex. sec. } \frac{1}{2} I$

$E = T \tan \frac{1}{4} I$

$\text{Chord def.} = \frac{\text{chord}^2}{R}$

$\text{No. chords} = \frac{\frac{1}{2} I}{D}$

$\text{Tan. def.} = \frac{1}{2} \text{ chord def.}$

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 Externals 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. $25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875$ = 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.	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	2476	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.	60′	50′	40′	30′	20′	10′	DEG.	DEG.	60′	50′	40′	30′	20′	10′	DEG.

DEG.	0′	10′	20′	30′	40′	50′	DEG.
80	9848	9853	9858	9863	9868	9872	9
81	9877	9881	9886	9890	9894	9899	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
DEG.	60′	50′	40′	30′	20′	10′	DEG.

Natural Cosines

Natural Tangents

DEG.	0′	10′	20′	30′	40′	50′	DEG.	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	1.0661	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	1.2349	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	2.2460	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.	60′	50′	40′	30	20′	10′	DEG.	DEG.	60′	50′	40′	30′	20′	10′	DEG.

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	10.711	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	343.77	0
DEG.	60′	50′	40′	30′	20′	10′	DEG.

Natural Cotangents

Barnes Co 865.92 Not SE¼ Lot 15
P Ion Imp 149.14 Not Lot 4
721.78

Rod is 33' S of Twp line

165 - 20
330 - 40
135 - 59

175 - 59
3 Lo
3 495 - 59
165° 19' 40"

62.10
16
3726
3726
4098.
120.20
12.198.
163.16

PLEASE RETURN TO
GEAUGA COUNTY ENGINEER
COURT HOUSE
CHARDON, O.
PHONE 256 - X

STATIONS FROM CENTER OF ROADWAY FOR CROSS SECTIONING.
ROADWAY 16 FEET WIDE. SIDE SLOPES 1½ TO 1.
FOR SINGLE TRACK EMBANKMENT.

	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.

68+28.50
67+81.29
47.21

K-E

P.C.	59+49.05		50.95'	✓	17-29-00
60+0	50.95'	✓ 0°-45-51		✓	11-43-09
61+0		✓ 2-15-51		✓	10-13-09
62+0		✓ 3-45-51		✓	8-43-09
63+0		✓ 5-15-51	63+0	✓	7-13-09
64+0		✓ 6-45-51	64+0	✓	5-43-09
65+0		✓ 8-15-51	65+0	✓	4-13-09
66		✓ 9-45-51	66+0	✓	2-43-09
67		✓ 11-15-51	81.29'		1-13-09
PT	+81.29	81.29' 1-13-09 12-29-00			

17-29

24-58 QED

Δ = 24-58 Lt.

T. = 422.83'

E = 46.2

P.C. = 59+49.07

PT = 67+81.29

31.90

65+50 out 40 feet

75+00 out 40 feet

IMPORTANT MESSAGE

To Daddy

Date 8/10/59 Time

Mr. Mr. Yurik

of State Highway Dept.

Address

Phone No.

Telephoned		Please call	✓
Called to see you		Will call again	
Wants to see you		Rush	

Message Call Today

Michigan 11926

Stake #1 at Dare Creek Wed or Thurs Parkman survey start this week

184 74 90	
183 41	
133.90	