

Book-4-A Dr. 12-A

FIELD BOOK

360 A

30-N2

# 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 1 TO 1.  
FOR SINGLE TRACK EXCAVATION.

*"Copyright, 1895, by Keuffel & Esser Co."*

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

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

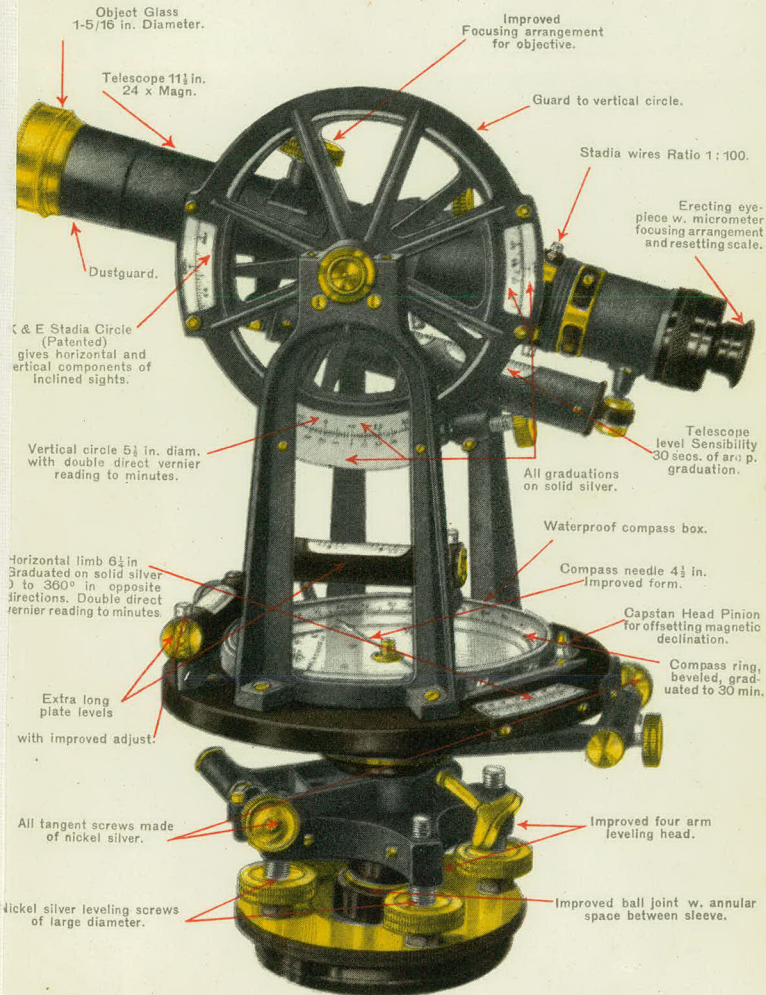
For Keith's Railroad Curve Tables see end of book.



# EXTRA FINE ENGINEERS' TRANSIT

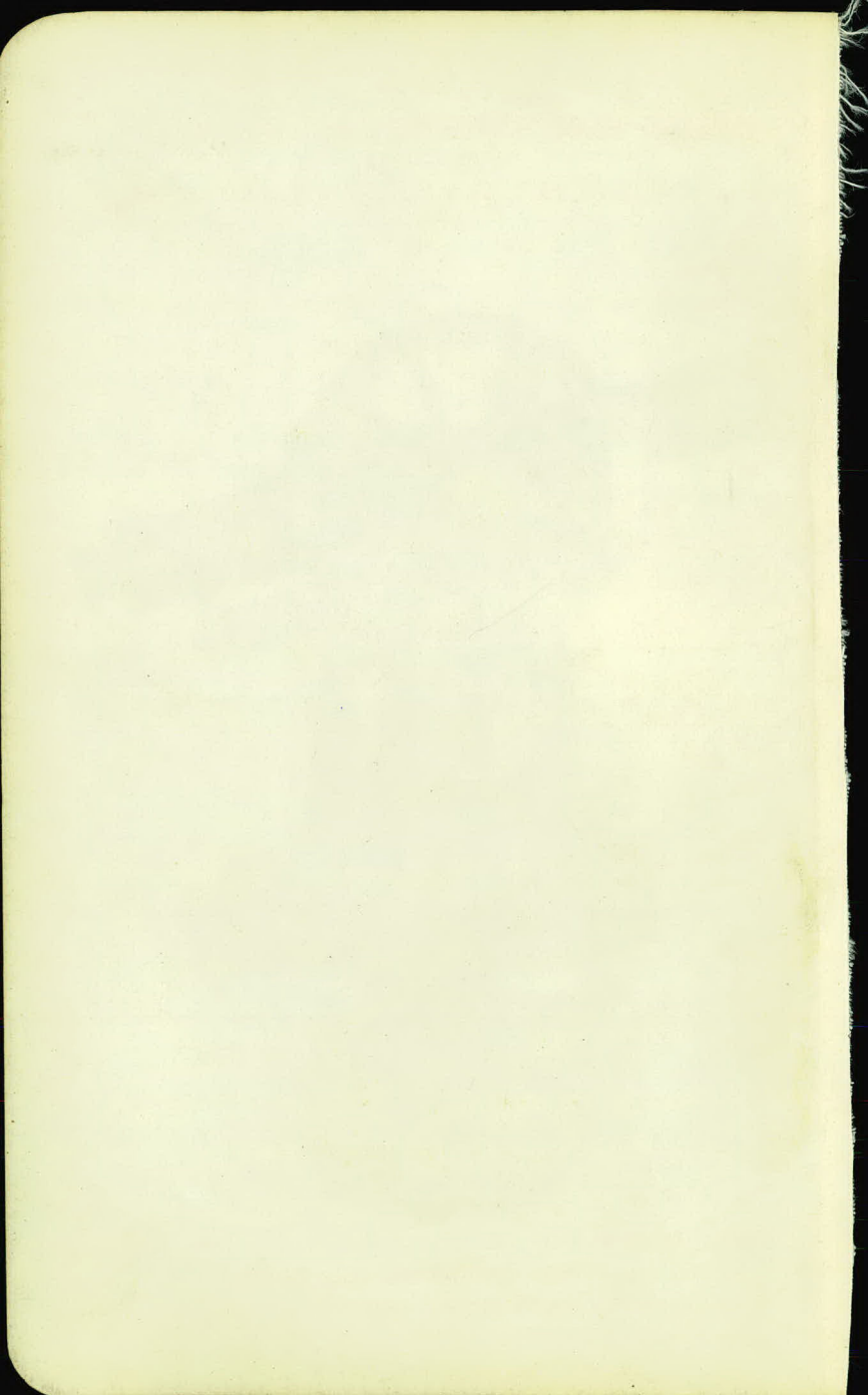
## No. 5060 S

### KEUFFEL & ESSER CO., N.Y.



ALSO MADE WITH

INTERNAL FOCUSING TELESCOPE  
PRACTICALLY DUST AND MOISTURE PROOF. —





PROJ # 30-N<sup>2</sup> BOCK ST.

| STA  | TO STA | DESCRIPTION         | PAGE | TO PAGE |
|------|--------|---------------------|------|---------|
| 0+00 | 78+84  | ALIGNMENT           | 1    | 3       |
| 0+00 | 78+84  | ORIGINAL X SECTIONS | 4    | 19      |

| STA                | POINT | A LT. | $\Delta$ RT |
|--------------------|-------|-------|-------------|
| 26+36 <sup>±</sup> | P.I.  |       | 0°-06       |

|                    |        |
|--------------------|--------|
| 13+59 <sup>2</sup> | P.O.T. |
|--------------------|--------|

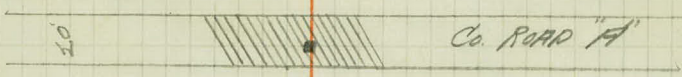
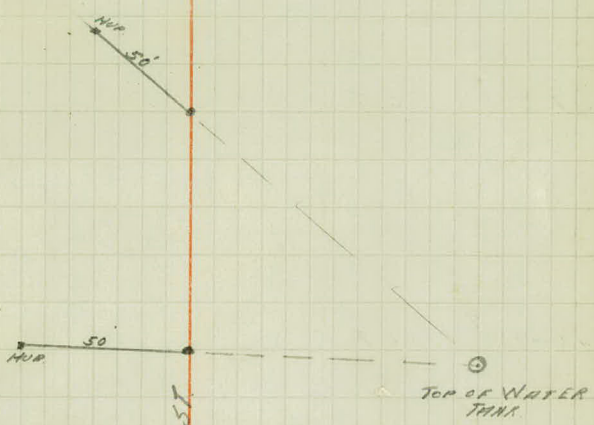
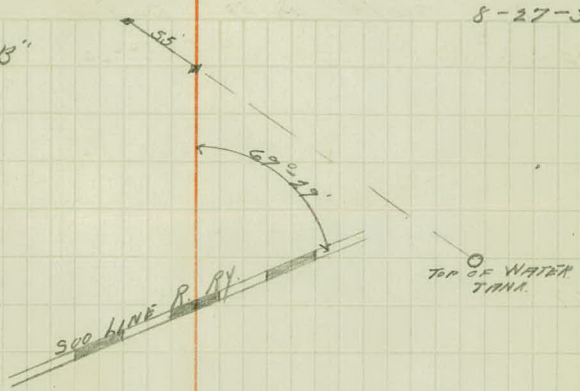
|                   |        |
|-------------------|--------|
| 9+23 <sup>2</sup> | P.O.T. |
|-------------------|--------|

|                   |        |
|-------------------|--------|
| 5+24 <sup>2</sup> | P.O.T. |
|-------------------|--------|

|      |  |
|------|--|
| 0+00 |  |
|------|--|

8-27-30

Co. ROAD "B"





| STA | POINT | $\Delta$ LT. | $\Delta$ RT. |
|-----|-------|--------------|--------------|
|-----|-------|--------------|--------------|

|       |        |  |  |
|-------|--------|--|--|
| 58+00 | P.O.T. |  |  |
|-------|--------|--|--|

|                    |        |  |  |
|--------------------|--------|--|--|
| 52+67 <sup>5</sup> | P.O.T. |  |  |
|--------------------|--------|--|--|

|                    |        |  |  |
|--------------------|--------|--|--|
| 43+27 <sup>7</sup> | P.O.T. |  |  |
|--------------------|--------|--|--|

|                    |        |  |  |
|--------------------|--------|--|--|
| 29+97 <sup>2</sup> | P.O.T. |  |  |
|--------------------|--------|--|--|

7-4-30

POINT ON  
SILO.

①

HUB

50'

CHURCH STEEPLE.

△

HUB

50'

50'

HUB.

FLAT PINE  
KILN COUNSE

CHURCH STEEPLE.

△

HUB.

40'

40'

HUB.

50'

HUB.

10" TREE.

STA. POINT A LT A RT

78+83<sup>2</sup>

70+00 P.O.T.



9-4-30

Co. ROAD "C"

POINT ON HOUSE  
WITH RED ROOFH.W.B.  
50

| STA  | +     | M.I    | -    | ELEV   | GR. ROD |
|------|-------|--------|------|--------|---------|
| B.M. | 10.20 | 905.71 |      | 895.51 |         |
| 0+00 |       |        |      | 99.3   | 6.4     |
| +10  |       |        |      | 99.4   | 6.3     |
| +15  |       |        |      | 99.5   | 6.2     |
| +23  |       |        |      | 99.7   | 6.0     |
| +33  |       |        |      | 99.9   | 5.8     |
| +50  |       |        | 8/6  | 900.6  | 5.1     |
| 1+00 |       |        | 576  | 03.0   | 27      |
| +50  |       |        | 271  | 04.0   | 0.3     |
| T.P  | 12.77 | 918.35 | 0.13 | 905.58 |         |
| 2+00 |       |        |      | 08.7   | 97      |
| +50  |       |        |      | 10.7   | 77      |
| 3+00 |       |        |      | 12.1   | 63      |
| +25  |       |        |      | 12.5   | 59      |

Culvert Survey Dr 6 BK 88 Page 260 1930 & 1931

Rd #N-2 Bock St. (Now Hazelwood Ave.)

Sta. 26 + 37 = & Co. Rd "B"

16 + 80 = 24" X 48' Conc. X Drain F.S. 7 New.

9 57' South of Co. Rd. B

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Const. Notes Proj. 30-N2 Page 25 10/25/30 (X-Drain)

26 + 36.2 - Mont. Co. Rd. B

Page 27

Sta. Co. Rd B

16 + 81. = 24" X 48' P3 (Conc.) X Drain

9 55.2' South of Co. Rd B

Elevations: H.I. 900.37

Lt. (West)

Rt. (East)

$$\begin{array}{r} 900.37 \\ 15.65 \\ \hline 884.72 \end{array}$$

$$\begin{array}{r} 884.72 \\ 15.65 \\ \hline 24 \\ \hline \text{F.L.} \end{array}$$

$$\begin{array}{r} 893.67 \\ 6.7 \\ \hline 900.37 \\ \hline 893.67 \end{array}$$

$$\begin{array}{r} 886.42 \\ 13.95 \\ \hline 24 \\ \hline \text{F.L.} \end{array}$$

$$\begin{array}{r} 900.37 \\ 13.95 \\ \hline 886.42 \end{array}$$

$$\begin{array}{r} 886.42 \\ 884.72 \\ \hline 1.70' \text{ fall in } 48' \end{array}$$

---

Check Info.

~~Distance~~ Location  
Culv. Survey 957' So of B  
Const. Notes 955.2  
1.8 ✓

Elevations

F.L. at & 886.07  
+ Culvert 2.0

888.07

+ Fill Culv. Survey 5.7

893.77

& Elev. Const Notes 893.67

0.10 ✓



LEFT

RIGHT

8-28-30

ON SPA IN P.P. 100' S.E. OF STP 0400.

|      |      |       |      |      |
|------|------|-------|------|------|
| 6.11 | 6.17 | (6.4) | 6.20 | 6.20 |
| 33   | 13   | 6.20  | 13   | 33   |

|      |      |       |      |      |
|------|------|-------|------|------|
| 6.26 | 6.27 | (6.3) | 6.35 | 6.32 |
| 33   | 13   | 6.32  | 13   | 33   |

|       |     |     |     |     |     |     |
|-------|-----|-----|-----|-----|-----|-----|
| (6.2) |     |     |     |     |     |     |
| 6.2   | 6.5 | 6.6 | 6.1 | 6.2 | 6.5 | 6.2 |
| 33    | 23  | 12  | 9   |     | 14  | 33  |

|       |     |     |     |     |     |     |
|-------|-----|-----|-----|-----|-----|-----|
| (6.0) |     |     |     |     |     |     |
| 7.9   | 7.9 | 6.6 | 5.9 | 6.2 | 6.4 | 6.2 |
| 33    | 25  | 23  | 7   |     | 9   | 11  |

|       |     |     |     |     |     |     |
|-------|-----|-----|-----|-----|-----|-----|
| (5.8) |     |     |     |     |     |     |
| 4.5   | 5.5 | 6.6 | 6.2 | 5.8 | 6.0 | 7.2 |
| 23    | 23  | 20  | 15  |     | 8   | 23  |

|       |     |     |     |      |     |     |
|-------|-----|-----|-----|------|-----|-----|
| (5.1) |     |     |     |      |     |     |
| 3.9   | 3.9 | 5.5 | 5.2 | 4.9  | 5.0 | 6.0 |
| 33    | 20  | 15  | 12  | 10.2 | 6   | 12  |

|       |     |     |     |      |     |     |
|-------|-----|-----|-----|------|-----|-----|
| (2.7) |     |     |     |      |     |     |
| 3.6   | 3.9 | 4.4 | 2.8 | 2.5  | 2.6 | 4.2 |
| 33    | 16  | 15  | 11  | 10.2 | 6   | 13  |

|        |     |     |     |     |     |     |
|--------|-----|-----|-----|-----|-----|-----|
| (-0.2) |     |     |     |     |     |     |
| 2.7    | 2.5 | 2.5 | 0.5 | 0.3 | 0.4 | 3.1 |
| 33     | 24  | 14  | 8   | 0.4 | 7   | 17  |

|      |     |     |     |     |     |     |
|------|-----|-----|-----|-----|-----|-----|
| (.1) |     |     |     |     |     |     |
| 1.1  | 1.2 | 1.2 | 1.2 | 1.0 | 1.0 | 1.1 |
| 33   | 15  | 10  | 0.4 | 10  | 18  | 24  |

|      |     |     |     |     |      |     |
|------|-----|-----|-----|-----|------|-----|
| (.7) |     |     |     |     |      |     |
| 7.4  | 6.6 | 7.3 | 7.2 | 6.5 | 6.1  | 7.5 |
| 33   | 15  | 13  | 10  | 8   | 11.4 | 10  |

|       |     |     |     |     |     |      |
|-------|-----|-----|-----|-----|-----|------|
| (6.3) |     |     |     |     |     |      |
| 3.7   | 4.1 | 3.7 | 3.5 | 4.8 | 4.8 | 4.4  |
| 33    | 25  | 14  | 13  | 10  | 8   | 12.6 |

|       |     |     |     |     |     |     |
|-------|-----|-----|-----|-----|-----|-----|
| (5.0) |     |     |     |     |     |     |
| 3.5   | 3.0 | 2.8 | 4.5 | 3.8 | 3.3 | 3.4 |
| 33    | 24  | 14  | 11  | 8   |     | 10  |



| STA  | +    | H.I.   | -    | ELEV   | GR ROR |
|------|------|--------|------|--------|--------|
|      |      | 918.55 |      |        |        |
| +65  |      |        |      | 13.0   | 5.4    |
| 4+00 |      |        |      | 13.2   | 5.2    |
|      | 5.10 | 916.61 | 6.84 | 911.51 |        |
| +50  |      |        |      | 13.6   | 5.0    |
| 5+00 |      |        |      | 14.0   | 2.6    |
| +50  |      |        |      | 14.1   | 1.5    |
| 6+00 |      |        |      | 14.6   | 2.0    |
| T.P  | 7.29 | 922.51 | 1.59 | 915.22 |        |
| +25  |      |        |      | 14.6   | 7.9    |
| +50  |      |        |      | 14.6   | 7.9    |
| 7+00 |      |        |      | 14.6   | 7.9    |
| +50  |      |        |      | 14.5   | 8.0    |
| 8+00 |      |        |      | 14.2   | 8.3    |
| +50  |      |        |      | 13.8   | 8.7    |

LEFT

RIGHT

8-28-30

61  
 $\frac{6}{1} \frac{2.8}{2.6} \quad 28 \quad 24 \quad 35 \quad 48 \quad 44 \quad 40 \quad 42 \quad 57 \quad 57 \quad 45 \quad 50 \quad \frac{6}{1} \frac{5.8}{5.4}$   
 $\frac{4}{1} \frac{2.8}{2.6} \quad 35 \quad 19 \quad 16 \quad 12 \quad 9 \quad 11.4 \quad 8 \quad 17 \quad 23 \quad 27 \quad 33 \quad \frac{6}{1} \frac{5.8}{5.4}$

63  
 $\frac{9}{1} \frac{5.8}{5.4} \quad 5.3 \quad 5.4 \quad 5.5 \quad 6.4 \quad 4.4 \quad 5.5 \quad 5.4 \quad 5.5 \quad 7.8 \quad 7.4 \quad 7.0 \quad 7.5 \quad \frac{3}{1} \frac{7.4}{7.0}$   
 $\frac{2}{1} \frac{5.8}{5.4} \quad 33 \quad 27 \quad 17 \quad 15 \quad 12 \quad 9 \quad 10.2 \quad 9 \quad 17 \quad 24 \quad 27 \quad 33 \quad \frac{1}{1} \frac{7.4}{7.0}$

62  
 $\frac{1}{1} \frac{6.4}{6.0} \quad 6.5 \quad 6.2 \quad 6.4 \quad 6.7 \quad 6.6 \quad 5.3 \quad 5.2 \quad 5.3 \quad 8.3 \quad 8.2 \quad 8.8 \quad \frac{7}{1} \frac{8.3}{7.9}$   
 $\frac{1}{1} \frac{6.4}{6.0} \quad 33 \quad 24 \quad 17 \quad 16 \quad 13 \quad 10 \quad -2.2 \quad 7 \quad 12 \quad 21 \quad 33 \quad \frac{6}{1} \frac{8.3}{7.9}$

716  
 $\frac{2}{1} \frac{8.7}{8.1} \quad 8.7 \quad 8.8 \quad 8.2 \quad 5.8 \quad 5.8 \quad 5.9 \quad 10.6 \quad 11.4 \quad 10.7 \quad \frac{6}{1} \frac{1.3}{1.1}$   
 $\frac{2}{1} \frac{8.7}{8.1} \quad 33 \quad 23 \quad 16 \quad 11 \quad -3.2 \quad 5 \quad 12 \quad 27 \quad 33 \quad \frac{2}{1} \frac{8.7}{8.1}$

65  
 $\frac{7}{1} \frac{9.0}{8.6} \quad 9.0 \quad 9.1 \quad 8.9 \quad 5.4 \quad 5.2 \quad 5.4 \quad 11.1 \quad 11.2 \quad 10.8 \quad \frac{6}{1} \frac{1.2}{1.1}$   
 $\frac{6}{1} \frac{9.0}{8.6} \quad 33 \quad 24 \quad 18 \quad 11 \quad -2.7 \quad 5 \quad 13 \quad 24 \quad 33 \quad \frac{6}{1} \frac{9.0}{8.6}$

68  
 $\frac{9}{1} \frac{7.5}{7.3} \quad 7.2 \quad 7.2 \quad 7.2 \quad 4.3 \quad 4.4 \quad 4.3 \quad 7.2 \quad 7.3 \quad 6.9 \quad 7.5 \quad \frac{6}{1} \frac{7.1}{6.9}$   
 $\frac{2}{1} \frac{7.5}{7.3} \quad 33 \quad 25 \quad 18 \quad 12 \quad -2.4 \quad 7 \quad 13 \quad 25 \quad 25 \quad 33 \quad \frac{1}{1} \frac{7.5}{7.3}$

71  
 $\frac{6}{1} \frac{10.3}{9.4} \quad 10.6 \quad 10.6 \quad 10.5 \quad 10.4 \quad 9.8 \quad 9.5 \quad 9.5 \quad 9.4 \quad 10.7 \quad 10.7 \quad 10.4 \quad 9.8 \quad 8.9 \quad 9.5 \quad 9.6 \quad \frac{9}{1} \frac{10.4}{9.4}$   
 $\frac{6}{1} \frac{10.3}{9.4} \quad 36 \quad 33 \quad 23 \quad 17 \quad 15 \quad 12 \quad -1.4 \quad 8 \quad 11 \quad 18 \quad 24 \quad 27 \quad 27 \quad 33 \quad 36 \quad \frac{3}{1} \frac{10.4}{9.4}$

71  
 $\frac{3}{1} \frac{8.1}{7.9} \quad 8.2 \quad 8.1 \quad 8.1 \quad 7.3 \quad 9.3 \quad 7.2 \quad 7.9 \quad 7.7 \quad 8.8 \quad 8.7 \quad 7.5 \quad 6.4 \quad 4.6 \quad 5.3 \quad 5.3 \quad \frac{3}{1} \frac{5.3}{5.3}$   
 $\frac{3}{1} \frac{8.1}{7.9} \quad 34 \quad 33 \quad 24 \quad 21 \quad 18 \quad 15 \quad 0.0 \quad 8 \quad 13 \quad 18 \quad 23 \quad 26 \quad 29 \quad 33 \quad 36 \quad \frac{3}{1} \frac{8.1}{7.9}$

71  
 $\frac{3}{1} \frac{7.2}{7.0} \quad \frac{7.3}{7.1} \quad 7.2 \quad 6.6 \quad 7.4 \quad 7.4 \quad 6.2 \quad 5.7 \quad 5.3 \quad 5.4 \quad 6.3 \quad 6.1 \quad 2.6 \quad 1.2 \quad 1.7 \quad 1.7 \quad \frac{6}{1} \frac{1.7}{1.7}$   
 $\frac{3}{1} \frac{7.2}{7.0} \quad 36 \quad 33 \quad 24 \quad 21 \quad 18 \quad 14 \quad 12 \quad 12.4 \quad 6 \quad 12 \quad 19 \quad 27 \quad 29 \quad 33 \quad 36 \quad 3 \quad \frac{6}{1} \frac{7.2}{7.0}$

810  
 $\frac{9}{1} \frac{7.9}{7.7} \quad 8.0 \quad 7.9 \quad 7.3 \quad 7.0 \quad 6.5 \quad 5.6 \quad 5.1 \quad 5.0 \quad 5.9 \quad 5.3 \quad 3.2 \quad 1.5 \quad 1.9 \quad 1.9 \quad \frac{3}{1} \frac{2.0}{2.0}$   
 $\frac{3}{1} \frac{7.9}{7.7} \quad 34 \quad 33 \quad 21 \quad 19 \quad 14 \quad 11 \quad 12.9 \quad 7 \quad 10 \quad 19 \quad 25 \quad 27 \quad 33 \quad 36 \quad 3 \quad \frac{3}{1} \frac{7.9}{7.7}$

813  
 $\frac{3}{1} \frac{8.1}{8.0} \quad 8.6 \quad 8.3 \quad 7.9 \quad 7.1 \quad 5.8 \quad 5.4 \quad 5.7 \quad 6.5 \quad 6.5 \quad 4.6 \quad 3.2 \quad 3.0 \quad 3.1 \quad \frac{3}{1} \frac{3.0}{3.0}$   
 $\frac{3}{1} \frac{8.1}{8.0} \quad 36 \quad 33 \quad 24 \quad 14 \quad 11 \quad 12.9 \quad 8 \quad 11 \quad 18 \quad 25 \quad 27 \quad 33 \quad 36 \quad 3 \quad \frac{3}{1} \frac{8.1}{8.0}$

81  
 $\frac{3}{1} \frac{8.4}{8.2} \quad 8.6 \quad 8.4 \quad 8.1 \quad 7.7 \quad 6.2 \quad 5.6 \quad 5.6 \quad 7.3 \quad 7.5 \quad 7.1 \quad 6.8 \quad 6.0 \quad 6.0 \quad \frac{3}{1} \frac{6.0}{6.0}$   
 $\frac{3}{1} \frac{8.4}{8.2} \quad 36 \quad 33 \quad 23 \quad 15 \quad 11 \quad 12.1 \quad 5 \quad 9 \quad 14 \quad 19 \quad 24 \quad 31 \quad 36 \quad 3 \quad \frac{3}{1} \frac{8.4}{8.2}$

| STA.  | +    | H.I.                | -     | ELEV                | CR. ROD |
|-------|------|---------------------|-------|---------------------|---------|
|       |      | 922.51 <sup>✓</sup> |       |                     |         |
| 9+00  |      |                     |       | 13.3                | 912     |
| T.P.  | 8.49 | 925.52 <sup>✓</sup> | 5.48  | 917.03 <sup>✓</sup> |         |
| +50   |      |                     |       | 12.7                | 12.8    |
| 10+00 |      |                     |       | 11.9                | 134     |
| 10+50 |      |                     |       | 11.0                | 145     |
| T.P.  | 1.40 | 913.64 <sup>✓</sup> | 13.28 | 912.24 <sup>✓</sup> |         |
| 10+50 |      |                     |       | 11.0                | 26      |
| 11+00 |      |                     |       | 10.0                | 36      |
| +50   |      |                     |       | 09.3                | 4.3     |
| +50   |      |                     |       | 09.1                | 45      |
| 12+00 |      |                     |       | 07.6                | 60      |
| +50   |      |                     |       | 06.2                | 74      |
| T.P.  | 3.29 | 907.59 <sup>✓</sup> | 9.54  | 904.10 <sup>✓</sup> |         |
| 13+00 |      |                     |       | 04.8                | 26      |
| B.M.  |      |                     | 3.48  | 903.91              |         |
| +10   |      |                     |       | 4.5                 | 29      |



LEFT

RIGHT

8-28-30

(0.7)

0/2.2 64 63 61 74 71 59 54 53 66 63 41 36 34 37 0/5.4  
3/130 36 33 26 24 16 12 13 8 7 12 18 23 28 33 36 3/5.8

(12.8)

0/7.0 72 70 68 103 102 94 87 90 99 87 33 27 30 0/2.8  
3/158 36 33 28 23 17 14 10 5 11 18 29 33 36 3/10.0

(13.6)

0/10.6 111 106 102 116 123 133 110 102 110 112 121 120 80 54 35 31 35 3/1  
3/130 36 33 29 27 23 22 15 4 12 6 6 10 13 23 29 30 33 36 3/10.5

(10.5)

13.4 13.4 13.9 14.1 11.3 96 78 83 26 3/8.3  
7.1 7 9 12 22 26 27 33 36 3/76.2

(2.0)

0/2.0 23 20 14 26 30 24 18  
3/106 36 33 30 28 25 21 14

(3.6)

0/4.3 0/4.7 5.2 4.9 4.6 5.2 5.9 4.3 4.0 3.9 4.2 5.3 5.3 4.3 3.1 3.0 5.3 3/5.0  
1/-0.7 3/7.3 36 33 31 29 23 13 10.4 6 9 14 16 20 27 33 36 3/10.0

(1.3)

80 74 72 69 57 53 54 53 72 71 66 67  
33 29 24 17 12 5 7 12 21 23 33

(1.5)

4/8.1 94 88 88 81 69 65 61 62 63 78 82 85 87 4/8.1  
8/36 33 28 22 18 14 11 4 7.9 6 11 19 26 33 8/3.6

(6.0)

4/10.4 111 108 113 105 100 88 84 78 79 81 87 11.3 120 128 0/2.0  
1/-4.4 33 29 25 22 16 14 12 5 7.7 4 7 12 21 33 3/10.0

(1.0)

7/11.9 112 112 118 119 116 94 90 92 94 100 128 134 134 132 2/13.5  
1/-4.5 33 27 27 23 16 12 5 7.8 4 7 11 19 26 33 2/-6.1

(2.6)

4/6.2 4.5 5.3 6.2 6.2 4.1 3.6 3.8 4.1 7.9 8.4 8.1 1/8.4  
8/36 33 23 20 17 11 6 7.2 4 11 23 33 4/-5.8

S.P.K. IN 12" CAR 100 RT. 37.7 13 72.0

7.0 6.7 6.1 4.2 3.8 3.9 4.1 4.5 8.0 8.6 8.5  
33 27 17 11 3 6 12 21 33

(2.8)

| STA    | +    | H.I.                | -     | ELEV                | CH. ROD |
|--------|------|---------------------|-------|---------------------|---------|
|        |      | 907.39 <sup>✓</sup> |       |                     |         |
| +35    |      |                     |       | 03.7                | 3.7     |
| +50    |      |                     |       | 03.2                | 4.0     |
| +70    |      |                     |       | 02.6                | 4.8     |
| +90    |      |                     |       | 01.9                | 5.5     |
| 14 +00 |      |                     |       | 01.7                | 5.7     |
| T.P.   | 5.28 | 899.32 <sup>✓</sup> | 15.35 | 894.04              |         |
| +50    |      |                     | 4.1   | 00.2                | -0.9    |
| T.P.   | 1.23 | 895.27 <sup>✓</sup> | 5.28  | 894.04 <sup>✓</sup> |         |
| 15 +00 |      |                     |       | 98.5                | -3.3    |
| +50    |      |                     |       | ✓ 97.1              | -1.8    |
| 16 +00 |      |                     |       | ✓ 95.7              | -0.4    |
| +50    |      |                     |       | ✓ 94.4              | 0.9     |
| 17 +00 |      |                     |       | ✓ 93.7              | 1.6     |
| +50    |      |                     |       | ✓ 93.2              | 2.1     |

LEFT

RIGHT

8-28-30

31  
 $\frac{3}{4} \frac{40}{-0.9}$  62 64 60 40 38 39 42 72 94 21  
 33 27 18 12 4 6 10 23 33

41  
 45 76 42 39 38 76 92 76 97.5  
 33 13 10 103 6 12 17 33 2/-5.3

42  
 66 71 79 52 51 49 46 49 46 46  
 33 31 24 19 10 5 7 19 33

43  
 90 102 97 76 70 70 68 75 68 61  
 33 23 14 14 11 6 15 25 33

44  
 $\frac{5}{2} \frac{107}{-5.0}$  106 108 83 80 77 87 109 112 106 97/110  
 33 18 11 23 5 13 16 23 33 2/-5.3

45  
 $\frac{3}{2} \frac{60}{-6.9}$  53 58 66 63 63 39 34 33 77 78 97/77  
 33 27 17 17 14 11 43 8 17 33 2/-8.6

RAIL IN F.COR.

46  
 $\frac{4}{2} \frac{40}{-7.3}$  33 46 46 28 22 18 18 21 57 55 52 67/54  
 33 21 14 11 8 51 6 9 15 25 33 2/-2.7

47  
 $\frac{5}{2} \frac{66}{-84}$  66 74 70 68 45 39 37 38 40 72 77 69 97/71  
 33 18 17 14 10 7 55 7 9 14 20 33 2/-2.9

48  
 $\frac{6}{2} \frac{89}{-7.5}$  90 94 91 86 52 47 48 51 24 24 83 57/81  
 33 23 16 12 8 51 7 9 14 20 33 2/-8.5

49  
 $\frac{9}{2} \frac{102}{-9.5}$  103 100 101 97 97 57 53 50 50 80 80 81 80 97/80  
 33 24 16 14 7 43 8 12 16 25 33 2/-7.3

50  
 $\frac{5}{2} \frac{7}{-9.5}$  101 103 100 101 97 97 57 53 49 51 78 81 76 37/78  
 33 24 15 14 12 7 5 33 9 14 20 33 2/-6.2

51  
 $\frac{4}{2} \frac{97}{-76}$  99 96 95 53 50 52 58 78 71 73 97/76  
 33 15 12 7 2.9 9 11 14 15 33 2/-5.2

| STATION | +     | H.I.   | -    | ELEV.  | GR. MON. |
|---------|-------|--------|------|--------|----------|
|         |       | 895.27 |      |        |          |
| 18+00   |       |        |      | 92.9   | 2.4      |
| +50     |       |        |      | 93.0   | 2.3      |
| T.P.    | 10.14 | 903.77 | 1.64 | 893.63 |          |
| 19+00   |       |        |      | 93.2   | 10.6     |
| B.M.    |       |        | 9.00 | 894.77 | 894.78   |
| +50     |       |        |      | 93.4   | 10.4     |
| 20+00   |       |        |      | 93.6   | 10.2     |
| +20     |       |        |      | 93.7   | 10.1     |
| +30     |       |        |      | 93.8   | 10.0     |
| 21+00   |       |        |      | 94.0   | 9.8      |
| T.P.    | 4.62  | 899.03 | 9.35 | 894.71 | 894.41   |
| +50     |       |        |      | 94.1   | 4.9      |
| 22+00   |       |        |      | 94.3   | 4.7      |
| +50     |       |        |      | 94.4   | 4.6      |
| 23+00   |       |        |      | 94.4   | 4.4      |



LEFT

RIGHT

8-27-30

$$\begin{array}{r} 21 \\ 1.7 \overline{) 21} \quad 24 \quad 23 \quad 20 \quad 40 \quad 37 \quad 41 \quad 65 \quad 62 \quad 65 \quad 44 \quad 16.5 \\ 2 \overline{) -5.7} \quad 33 \quad 19 \quad 13 \quad 8 \quad -14 \quad 10 \quad 15 \quad 18 \quad 26 \quad 30 \quad 19 \quad -4.1 \end{array}$$

$$\begin{array}{r} 10.13 \\ 1.7 \overline{) 21} \quad 24 \quad 23 \quad 20 \quad 40 \quad 37 \quad 41 \quad 65 \quad 62 \quad 65 \quad 44 \quad 16.5 \\ 2 \overline{) -5.7} \quad 33 \quad 19 \quad 13 \quad 8 \quad -14 \quad 10 \quad 15 \quad 18 \quad 26 \quad 30 \quad 19 \quad -4.1 \end{array}$$

$$\begin{array}{r} 10.13 \\ 3 \overline{) 76} \quad 80 \quad 76 \quad 74 \quad 84 \quad 87 \quad 83 \quad 80 \quad 78 \quad 92 \quad 86 \quad 58 \quad 53 \quad 55 \quad 3 \overline{) 153} \\ 3 \overline{) 130} \quad 36 \quad 33 \quad 25 \quad 17 \quad 13 \quad 11 \quad 12 \quad 6 \quad 12 \quad 17 \quad 20 \quad 26 \quad 23 \quad 36 \quad 3 \overline{) 753} \end{array}$$

$$\begin{array}{r} 10.12 \\ 3 \overline{) 65} \quad 68 \quad 65 \quad 66 \quad 71 \quad 75 \quad 75 \quad 72 \quad 67 \quad 62 \quad 62 \quad 72 \quad 71 \quad 55 \quad 58 \quad 59 \quad 3 \overline{) 158} \\ 3 \overline{) 159} \quad 36 \quad 33 \quad 20 \quad 15 \quad 13 \quad 13 \quad 12 \quad 8 \quad 14 \quad 12 \quad 14 \quad 19 \quad 26 \quad 33 \quad 36 \quad 3 \overline{) 762} \end{array}$$

$$\begin{array}{r} 10.12 \\ 3 \overline{) 46} \quad 49 \quad 46 \quad 41 \quad 44 \quad 58 \quad 59 \quad 54 \quad 49 \quad 50 \quad 60 \quad 54 \quad 20 \quad 20 \quad 22 \quad 3 \overline{) 150} \\ 3 \overline{) 154} \quad 36 \quad 33 \quad 28 \quad 18 \quad 15 \quad 13 \quad 10 \quad 15 \quad 3 \quad 11 \quad 14 \quad 19 \quad 27 \quad 33 \quad 36 \quad 3 \overline{) 782} \end{array}$$

$$\begin{array}{r} 10.1 \\ 41 \quad 38 \quad 29 \quad 36 \quad 49 \quad 58 \quad 58 \quad 48 \quad 51 \quad 59 \quad 60 \quad 14 \quad 21 \quad 22 \\ 36 \quad 33 \quad 24 \quad 19 \quad 17 \quad 14 \quad 8 \quad 11 \quad 15 \quad 20 \quad 27 \quad 33 \quad 36 \end{array}$$

$$\begin{array}{r} 10.0 \\ 3 \overline{) 58} \quad 58 \quad 55 \quad 52 \quad 58 \quad 65 \quad 68 \quad 60 \quad 62 \quad 60 \quad 55 \quad 56 \quad 66 \quad 66 \quad 34 \quad 41 \quad 58 \quad 37 \quad 3 \overline{) 158} \\ 3 \overline{) 145} \quad 36 \quad 33 \quad 23 \quad 14 \quad 14 \quad 13 \quad 10 \quad 9 \quad 7 \quad 14 \quad 5 \quad 11 \quad 16 \quad 20 \quad 26 \quad 28 \quad 33 \quad 36 \quad 3 \overline{) 762} \end{array}$$

$$\begin{array}{r} 10.0 \\ 3 \overline{) 108} \quad 111 \quad 108 \quad 100 \quad 92 \quad 85 \quad 77 \quad 78 \quad 77 \quad 80 \quad 83 \quad 90 \quad 86 \quad 80 \quad 77 \quad 75 \quad 3 \overline{) 177} \\ 3 \overline{) 110} \quad 36 \quad 33 \quad 22 \quad 12 \quad 12 \quad 10 \quad 8 \quad 12 \quad 11 \quad 10 \quad 13 \quad 19 \quad 22 \quad 27 \quad 33 \quad 36 \quad 3 \overline{) 721} \end{array}$$

$$\begin{array}{r} 10.1 \\ 1 \overline{) 76} \quad 70 \quad 78 \quad 75 \quad 57 \quad 52 \quad 49 \quad 50 \quad 50 \quad 56 \quad 50 \quad 41 \quad 39 \quad 3 \overline{) 141} \\ 1 \overline{) 27} \quad 33 \quad 30 \quad 13 \quad 10 \quad 7 \quad 0 \quad 8 \quad 11 \quad 15 \quad 22 \quad 33 \quad 36 \quad 3 \overline{) 708} \end{array}$$

$$\begin{array}{r} 10.1 \\ 2 \overline{) 98} \quad 107 \quad 100 \quad 91 \quad 64 \quad 57 \quad 58 \quad 64 \quad 65 \quad 60 \quad 59 \quad 58 \quad 3 \overline{) 159} \\ 2 \overline{) -5.1} \quad 33 \quad 23 \quad 14 \quad 9 \quad 7 \quad 10 \quad 12 \quad 14 \quad 17 \quad 24 \quad 33 \quad 36 \quad 3 \overline{) 112} \end{array}$$

$$\begin{array}{r} 10.1 \\ 8 \overline{) 81} \quad 83 \quad 80 \quad 59 \quad 63 \quad 60 \quad 56 \quad 61 \quad 69 \quad 65 \quad 59 \quad 3 \overline{) 167} \\ 1 \overline{) -5.5} \quad 33 \quad 14 \quad 10 \quad 9 \quad 7 \quad 10 \quad 11 \quad 13 \quad 18 \quad 33 \quad 36 \quad 1 \overline{) -2.1} \end{array}$$

$$\begin{array}{r} 10.1 \\ 1 \overline{) 76} \quad 74 \quad 81 \quad 68 \quad 54 \quad 58 \quad 55 \quad 52 \quad 54 \quad 63 \quad 63 \quad 49 \quad 40 \quad 3 \overline{) 152} \quad 3 \overline{) 163} \\ 1 \overline{) -3.1} \quad 33 \quad 23 \quad 13 \quad 10 \quad 8 \quad 7 \quad 10 \quad 10 \quad 13 \quad 16 \quad 24 \quad 33 \quad 3 \overline{) 108} \quad 3 \overline{) 119} \end{array}$$

| STA   | +      | H. I.    | -    | ELEV     | Gr. Rod |
|-------|--------|----------|------|----------|---------|
|       |        | 899.03   |      |          |         |
| +50   |        |          | ✓    | 94.7     | 43      |
| 24+00 |        |          | ✓    | 94.8     | 42      |
| +50   |        |          | ✓    | 94.9     | 41      |
| 25    |        |          | ✓    | 95.0     | 40      |
| +50   |        |          | ✓    | 95.0     | 40      |
| T.P.  | 5.41   | 900.62 ✓ | 5.82 | 895.21 ✓ |         |
| 26    |        |          |      | 95.1     | 5.5     |
| T.P.  | 13/100 | 2.00 =   |      | 896.21   |         |
| +10   |        |          |      | 95.1     | 5.5     |
| +15   |        |          |      | 95.2     | 5.4     |
| +25   |        |          |      | 95.2     | 5.4     |
| +36   |        |          |      | 95.3     | 5.3     |
| T.P.  | 5.65   | 901.85 ✓ | 4.42 | 896.20 ✓ |         |
| +51   |        |          |      | 95.4     | 6.5     |
| +60   |        |          |      | 95.6     | 6.3     |

LEFT

RIGHT

8-29-30

$$\begin{array}{r} 9 \overline{) 76} \quad 87 \quad 80 \quad 71 \quad 50 \quad 53 \quad 50 \quad 51 \quad 56 \quad 41 \quad 29 \quad 2 \overline{) 42} \\ 1 \overline{) 33} \quad 33 \quad 23 \quad 13 \quad 10 \quad 8 \quad -07 \quad 11 \quad 15 \quad 23 \quad 33 \quad 2 \overline{) 101} \end{array}$$

$$\begin{array}{r} 9 \overline{) 23} \quad 21 \quad 85 \quad 76 \quad 55 \quad 57 \quad 54 \quad 51 \quad 55 \quad 58 \quad 61 \quad 55 \quad 48 \quad 8 \overline{) 61} \quad 5 \overline{) 57} \\ 1 \overline{) 41} \quad 33 \quad 23 \quad 13 \quad 10 \quad 8 \quad 7 \quad -09 \quad 9 \quad 12 \quad 15 \quad 23 \quad 33 \quad 1 \overline{) 29} \quad 2 \overline{) 15} \end{array}$$

$$\begin{array}{r} 8 \overline{) 75} \quad 86 \quad 79 \quad 72 \quad 54 \quad 55 \quad 49 \quad 51 \quad 56 \quad 47 \quad 8 \overline{) 53} \quad 2 \overline{) 56} \\ 1 \overline{) 34} \quad 33 \quad 23 \quad 13 \quad 10 \quad 8 \quad -08 \quad 12 \quad 16 \quad 33 \quad 2 \overline{) 72} \quad 1 \overline{) 75} \end{array}$$

$$\begin{array}{r} 6 \overline{) 61} \quad 67 \quad 60 \quad 59 \quad 54 \quad 44 \quad 41 \quad 39 \quad 43 \quad 52 \quad 48 \quad 43 \quad 4 \overline{) 46} \quad 4 \overline{) 51} \\ 1 \overline{) 21} \quad 33 \quad 24 \quad 13 \quad 13 \quad 11 \quad 8 \quad 10 \quad 1 \quad 9 \quad 14 \quad 15 \quad 33 \quad 2 \overline{) 26} \quad 1 \overline{) 21} \end{array}$$

$$\begin{array}{r} 15 \overline{) 59} \quad 1 \overline{) 59} \quad 61 \quad 57 \quad 59 \quad 52 \quad 42 \quad 38 \quad 41 \quad 51 \quad 48 \quad 44 \quad 2 \overline{) 48} \\ 79 \quad 2 \overline{) 19} \quad 33 \quad 25 \quad 13 \quad 13 \quad 10 \quad 10 \quad 2 \quad 11 \quad 15 \quad 18 \quad 33 \quad 2 \overline{) 68} \end{array}$$

$$\begin{array}{r} 6 \overline{) 79} \quad 85 \quad 83 \quad 77 \quad 63 \quad 59 \quad 59 \quad 61 \quad 55 \quad 58 \quad 57 \quad 7 \overline{) 58} \quad 7 \overline{) 60} \\ 1 \overline{) 24} \quad 33 \quad 20 \quad 14 \quad 10 \quad -04 \quad 9 \quad 14 \quad 17 \quad 19 \quad 33 \quad 2 \overline{) 03} \quad 1 \overline{) 05} \end{array}$$

Nail on T-P 55 56 57 58

$$\begin{array}{r} 87 \quad 83 \quad 77 \quad 63 \quad 57 \quad 56 \quad 61 \quad 57 \quad 55 \\ 33 \quad 23 \quad 18 \quad 10 \quad 12 \quad 13 \quad 27 \quad 33 \end{array}$$

$$\begin{array}{r} 86 \quad 84 \quad 82 \quad 64 \quad 56 \quad 56 \quad 70 \quad 69 \quad 67 \\ 33 \quad 26 \quad 16 \quad 11 \quad 12 \quad 16 \quad 26 \quad 33 \end{array}$$

$$\begin{array}{r} 58 \quad 55 \quad 52 \quad 50 \quad 43 \\ 33 \quad 14 \quad 13 \quad 33 \end{array}$$

$$\begin{array}{r} 54 \quad 52 \quad 49 \quad 46 \quad 41 \\ 33 \quad 15 \quad 14 \quad 33 \end{array}$$

$$\begin{array}{r} 66 \quad 64 \quad 62 \quad 59 \quad 54 \\ 33 \quad 18 \quad 17 \quad 33 \end{array}$$

$$\begin{array}{r} 91 \quad 71 \quad 89 \quad 70 \quad 65 \quad 80 \quad 76 \quad 75 \\ 33 \quad 26 \quad 18 \quad 14 \quad 12 \quad 13 \quad 23 \quad 33 \end{array}$$

| STA. | T     | H. I                | -    | ELEV                | Gr. Rod |
|------|-------|---------------------|------|---------------------|---------|
|      |       | 901.85 <sup>v</sup> |      |                     |         |
| +65  |       |                     |      | 95.7                | 6.1     |
| 27   |       |                     |      | 96.4                | 5.5     |
| +50  |       |                     |      | 97.7                | 4.0     |
| T.P. | 10.72 | 911.56 <sup>v</sup> | 1.01 | 900.84 <sup>v</sup> |         |
| 28   |       |                     |      | 00.2                | 11.4    |
| +50  |       |                     |      | 02.6                | 9.0     |
| 29   |       |                     |      | 04.6                | 7.0     |
| +50  |       |                     |      | 06.5                | 5.1     |
| B.M. |       |                     | 4.13 | 907.43 <sup>v</sup> |         |
| 30   |       |                     |      | 08.2                | 3.4     |
| +50  |       |                     |      | 09.5                | 2.1     |
| 31   |       |                     |      | 10.4                | 1.0     |
| T.P. | 8.30  | 917.80 <sup>v</sup> | 2.04 | 909.50 <sup>v</sup> |         |
| +50  |       |                     |      | 11.5                | 6.3     |
| 32   |       |                     |      | 12.0                | 5.8     |



LEFT

RIGHT 9-2-30

$$\begin{array}{r} 4 \overline{) 78} \quad 81 \quad 78 \quad 72 \quad 68 \quad 65 \quad 65 \quad 65 \quad 65 \\ 2 \overline{) -16} \quad 33 \quad 20 \quad 18 \quad 14 \quad -0.3 \quad 12 \quad 15 \quad 33 \quad 2 \overline{) 65} \end{array}$$

$$\begin{array}{r} 8 \overline{) 67} \quad 4 \overline{) 71} \quad 73 \quad 72 \quad 71 \quad 61 \quad 61 \quad 67 \quad 64 \quad 61 \quad 59 \quad 3 \overline{) 62} \quad 2 \overline{) 63} \\ 1 \overline{) -12} \quad 0 \overline{) -16} \quad 33 \quad 24 \quad 17 \quad 10 \quad -0.6 \quad 5 \quad 9 \quad 9 \quad 20 \quad 53 \quad 1 \overline{) -07} \quad 4 \overline{) -08} \end{array}$$

$$\begin{array}{r} 8 \overline{) 42} \quad 34 \quad 45 \quad 43 \quad 45 \quad 40 \quad 38 \quad 39 \quad 43 \quad 52 \quad 46 \quad 47 \quad 3 \overline{) 47} \\ 1 \overline{) -02} \quad 33 \quad 18 \quad 15 \quad 14 \quad 12 \quad 102 \quad 5 \quad 9 \quad 13 \quad 20 \quad 33 \quad 1 \overline{) -07} \end{array}$$

$$\begin{array}{r} 3 \overline{) 103} \quad 92 \quad 110 \quad 106 \quad 101 \quad 102 \quad 103 \quad 110 \quad 109 \quad 119 \quad 120 \quad 115 \quad 120 \quad 8 \overline{) 116} \quad 9 \overline{) 120} \\ 2 \overline{) -11} \quad 33 \quad 17 \quad 13 \quad 4 \quad 112 \quad 5 \quad 8 \quad 9 \quad 11 \quad 15 \quad 17 \quad 33 \quad 1 \overline{) -02} \quad 1 \overline{) 106} \end{array}$$

$$\begin{array}{r} 1 \overline{) 89} \quad 80 \quad 86 \quad 95 \quad 81 \quad 98 \quad 81 \quad 82 \quad 90 \quad 110 \quad 110 \quad 105 \quad 105 \quad 103 \quad 2 \overline{) 104} \\ 2 \overline{) -10.1} \quad 33 \quad 25 \quad 17 \quad 12 \quad 4 \quad 109 \quad 4 \quad 7 \quad 13 \quad 14 \quad 17 \quad 22 \quad 33 \quad 2 \overline{) -06} \end{array}$$

$$\begin{array}{r} 0 \overline{) 70} \quad 1 \overline{) 29} \quad 22 \quad 77 \quad 81 \quad 63 \quad 59 \quad 61 \quad 62 \quad 83 \quad 82 \quad 88 \quad 89 \quad 86 \quad 83 \quad 83 \quad 9 \overline{) 84} \\ 1 \overline{) -00} \quad 2 \overline{) -09} \quad 33 \quad 25 \quad 17 \quad 11 \quad 4 \quad 109 \quad 5 \quad 11 \quad 14 \quad 14 \quad 14 \quad 17 \quad 21 \quad 33 \quad 2 \overline{) -14} \end{array}$$

$$\begin{array}{r} 4 \overline{) 47} \quad 40 \quad 47 \quad 49 \quad 41 \quad 38 \quad 42 \quad 39 \quad 42 \quad 4 \overline{) 59} \\ 2 \overline{) -10.4} \quad 33 \quad 24 \quad 16 \quad 10 \quad 113 \quad 22 \quad 25 \quad 33 \quad 2 \overline{) -12} \end{array}$$

SPK IN 12 FOR RT STA 29760

$$\begin{array}{r} 8 \overline{) 36} \quad 41 \quad 36 \quad 34 \quad 26 \quad 24 \quad 30 \quad 36 \quad 41 \quad 41 \quad 40 \quad 51 \quad 2 \overline{) 42} \\ 1 \overline{) -02} \quad 33 \quad 21 \quad 12 \quad 9 \quad 110 \quad 9 \quad 13 \quad 15 \quad 20 \quad 23 \quad 33 \quad 1 \overline{) -08} \end{array}$$

$$\begin{array}{r} 9 \overline{) 47} \quad 45 \quad 43 \quad 45 \quad 26 \quad 23 \quad 25 \quad 31 \quad 34 \quad 35 \quad 28 \quad 23 \quad 1 \overline{) 29} \\ 1 \overline{) -26} \quad 33 \quad 25 \quad 14 \quad 11 \quad -0.2 \quad 7 \quad 10 \quad 13 \quad 16 \quad 21 \quad 33 \quad 1 \overline{) -08} \end{array}$$

$$\begin{array}{r} 1 \overline{) 45} \quad 42 \quad 43 \quad 44 \quad 45 \quad 26 \quad 21 \quad 23 \quad 36 \quad 38 \quad 33 \quad 32 \quad 1 \overline{) 37} \\ 8 \overline{) -34} \quad 33 \quad 22 \quad 20 \quad 15 \quad 10 \quad -1.1 \quad 7 \quad 12 \quad 14 \quad 20 \quad 33 \quad 1 \overline{) -27} \end{array}$$

$$\begin{array}{r} 3 \overline{) 80} \quad 82 \quad 78 \quad 82 \quad 83 \quad 76 \quad 75 \quad 77 \quad 79 \quad 95 \quad 95 \quad 91 \quad 91 \quad 3 \overline{) 92} \\ 2 \overline{) -17} \quad 33 \quad 22 \quad 19 \quad 12 \quad 9 \quad -1.2 \quad 8 \quad 10 \quad 14 \quad 17 \quad 19 \quad 33 \quad 1 \overline{) -29} \end{array}$$

$$\begin{array}{r} 1 \overline{) 47} \quad 47 \quad 45 \quad 60 \quad 66 \quad 67 \quad 64 \quad 60 \quad 63 \quad 69 \quad 69 \quad 66 \quad 61 \quad 65 \quad 1 \overline{) 61} \quad 4 \overline{) 66} \\ 3 \overline{) -11} \quad 33 \quad 21 \quad 13 \quad 13 \quad 11 \quad 10 \quad -0.2 \quad 6 \quad 9 \quad 11 \quad 14 \quad 20 \quad 33 \quad 1 \overline{) -03} \quad 1 \overline{) -08} \end{array}$$

| STA. | T    | H.I.   | -      | ELEV   | CR. MOD. |
|------|------|--------|--------|--------|----------|
|      |      | 917.80 |        |        |          |
|      | +20  |        |        | 12.2   | 5.6      |
|      | +50  |        |        | 12.4   | 5.4      |
| 33   |      |        |        | 12.4   | 5.4      |
|      | +50  |        |        | 12.4   | 5.4      |
| 34   |      |        |        | 12.4   | 5.4      |
|      | +50  |        |        | 12.3   | 5.5      |
| T.P  | 4.98 | 917.36 | 5.42   | 912.58 |          |
| 35   |      |        |        | 12.3   | 5.1      |
|      | +50  |        |        | 12.2   | 5.2      |
| 36   |      |        |        | 12.2   | 5.2      |
|      | +50  |        |        | 12.1   | 5.3      |
| 37   |      |        | 908.0  | 12.1   | 9.4 5.3  |
|      | +50  |        | 908.15 | 12.0   | 9.1 5.4  |

LEFT

RIGHT 9-2-30

(56)

42 5.5 61 62 58 56 58 61 61 52 50 54  
33 21 14 12 10 6 9 12 13 20 33

(56)

440 45 5.7 5.1 5.8 5.3 5.2 5.3 5.7 5.7 5.0 45 42 444  
2/11.4 33 21 15 14 11 10 2 4 8 10 12 21 33 2/110

(58)

7/5.9 2/5.2 5.3 5.2 5.4 6.2 5.4 5.1 5.3 5.5 5.6 5.2 4.9 4/5.0  
1/0.5 2/10.2 33 27 22 18 15 12 4 10 1 4 5 20 33 2/10.4

(51)

2/6.2 5.5 6.2 6.1 5.4 5.2 5.3 5.5 5.7 6.9 6.8 6.6 6.4 8/6.6  
2/0.8 33 22 17 11 4 10 1 3 6 10 12 14 33 2/1.2

(51)

7/5.9 4/7.0 6.8 7.1 7.1 5.5 5.4 5.5 5.6 6.3 7.9 8.1 7.9 7.5 0/8.1  
1/0.5 2/1.6 33 23 17 12 5 0.1 2 6 10 17 19 33 1/2.7

(51)

4/5.1 5.4 5.1 5.5 5.2 5.2 5.0 5.1 5.2 5.5 5.9 6.1 5.7 4/6.1  
2/10.4 33 24 16 16 13 5 10 4 2 6 8 17 33 2/0.6

(51)

6/4.5 4.8 4.3 5.2 5.4 4.9 4.5 4.6 4.7 5.0 4.3 3.0 2.4 2.0 1.7 4/1.7  
2/10.6 33 19 17 15 13 5 10 5 3 7 8 11 16 20 33 2/1.34

(52)

3/4.1 5.8 4.3 5.7 5.1 4.0 4.8 5.0 5.5 4.5 4.0 2.8 7/3.3  
2/1.1 33 20 15 13 5 10 4 3 6 9 17 33 2/1.9

(51)

8/6.4 2/4.9 5.0 4.9 5.6 6.4 6.4 5.7 5.4 5.5 5.7 6.4 6.1 6.3 5.9 0/6.2 4/6.3  
1/1.4 2/10.3 33 23 17 17 14 11 5 0.3 3 4 9 19 33 2/1.0 1/1.1

(51)

9/9.1 8.8 8.8 9.2 7.1 6.6 6.7 6.9 10.0 9.6 10.9 2/10.1  
1/3.8 33 20 17 11 4 7.4 4 10 12 33 2/4.8

(51)

0/9.5 9.1 9.3 9.4 7.1 6.9 6.7 7.1 7.7 9.9 10.0 11.5 6/10.4  
1/4.0 33 23 17 11 4 7.6 3 5 10 14 33 2/5.1

(51)

6/7.9 4/6.7 6.6 6.7 7.2 8.0 8.0 7.0 6.9 7.0 7.1 7.9 8.8 8.8 8.0 8.5 1/1.1 1/6.5  
1/2.5 2/12.4 33 16 18 17 16 11 5 7.6 2 6 6 9 10 17 33 1/3.1

| STA  | T     | H.I.   | -      | ELEV   | CR. RD  |
|------|-------|--------|--------|--------|---------|
|      |       | 917.35 |        |        |         |
| 38   |       |        | 908.50 | 12.0   | 8.9 5.4 |
| +35  |       |        | 908.70 | 12.0   | 8.7 5.4 |
| T.P. | 6.37  | 917.62 | 6.11   | 911.25 |         |
| 39   |       |        | 909.0  | 12.5   | 8.6 5.1 |
| +31  |       |        |        | 12.9   | 4.7     |
| +50  |       |        |        | 13.0   | 4.6     |
| 40   |       |        |        | 14.0   | 3.6     |
| +10  |       |        |        | 14.3   | 2.3     |
| +50  |       |        |        | 15.1   | 2.5     |
| T.P. | 10.45 | 923.07 | 5.00   | 912.62 |         |
| 41   |       |        |        | 16.6   | 6.5     |
| B.M. |       |        | 2.74   | 920.33 |         |
| +35  |       |        |        | 17.6   | 3.5     |
| T.P. | 7.67  | 928.04 | 2.68   | 920.39 |         |
| +35  |       |        |        | 18.2   | 9.9     |
| 42   |       |        |        | 19.1   | 7.0     |



LEFT

RIGHT

9-2-30

51  
 $\frac{5}{1} \frac{7}{1} \frac{1}{1.7}$   $\frac{8}{2} \frac{3}{1.58}$  29 38 60 72 63 61 64 66 75 74 64 72 88  $\frac{5}{1} \frac{7}{1} \frac{1}{1.7}$

51  
 $\frac{5}{1} \frac{7}{1} \frac{1}{1.7}$   $\frac{8}{2} \frac{3}{1.58}$  06 23 55 72 72 64 60 63 64 72 72 62 66 78 78  $\frac{5}{1} \frac{7}{1} \frac{1}{1.7}$

51  
 $\frac{0}{1} \frac{7}{1} \frac{1}{1.7}$   $\frac{6}{2} \frac{8}{1.4}$  75 79 68 66 68 73 96 108 120 131  $\frac{5}{1} \frac{7}{1} \frac{1}{1.7}$

56 60 63 65 67 70 118 124 137  
 33 20 16 7 2 9 13 33

46  
 $\frac{8}{1} \frac{6}{1} \frac{8}{1}$  63 66 72 81 80 66 63 66 71 118 124 132 138  $\frac{8}{1} \frac{6}{1} \frac{8}{1}$

30  
 $\frac{4}{1} \frac{5}{1} \frac{2}{1}$   $\frac{5}{1} \frac{5}{1} \frac{5}{1}$   $\frac{5}{1} \frac{9}{1} \frac{10}{1}$   $\frac{10}{1} \frac{10}{1} \frac{11}{1}$   $\frac{7}{1} \frac{11}{1} \frac{14}{1}$   
 33 17 8 74 2 8 13 18 33  $\frac{7}{1} \frac{11}{1} \frac{14}{1}$

47 48 63 65 67 53 48 48 49 55 79 101 106 112  
 33 29 25 23 19 17 13 7 3 10 14 24 33

51  
 $\frac{9}{1} \frac{3}{1} \frac{1}{1.7}$  25 34 49 49 31 28 50 68 76 81 79  $\frac{5}{1} \frac{8}{1} \frac{2}{1}$   
 $\frac{1}{1} \frac{1}{1.7}$  33 26 22 17 14 7 65 7 12 16 33  $\frac{1}{1} \frac{1}{1.7}$

NAIL INT. P. LT. STR 40+15 63  
 $\frac{2}{1} \frac{5}{1} \frac{2}{1}$  34 59 55 52 55 60 79 83 76 102  $\frac{9}{1} \frac{9}{1} \frac{1}{1.7}$   
 $\frac{1}{1} \frac{1}{1.7}$  33 25 16 4 110 5 9 14 22 33  $\frac{1}{1} \frac{1}{1.7}$

N.E. COR. OF BRCH LT. STR 40+85 53  
 14 23 37 44 36 3.7 4.3 4.4 4.1 4.0 2.2 3.4 2.8  
 33 25 18 17 4 4 8 8 12 16 27 33

69  
 $\frac{3}{1} \frac{6}{1} \frac{2}{1}$  62 70 79 86 83 79 80 83 88 87 83 60 50 36 39  $\frac{1}{1} \frac{1}{1.7}$   
 $\frac{2}{1} \frac{5}{1} \frac{5}{1}$  33 21 17 15 13 4 71.9 5 4 8 10 15 20 25 33  $\frac{1}{1} \frac{1}{1.7}$

69  
 $\frac{8}{1} \frac{6}{1} \frac{2}{1}$  57 65 70 77 74 69 69 68 73 73 67 59 48 40 33 4 36  
 $\frac{1}{1} \frac{1}{1.7}$  33 22 17 16 13 4 12.1 4 7 9 10 13 15 21 33  $\frac{1}{1} \frac{1}{1.7}$

| STA. | +    | H.I.     | -    | ELEV     | Ch. Rod |
|------|------|----------|------|----------|---------|
|      |      | 928.06   |      |          |         |
|      | +50  |          |      | ✓ 19.8   | 83      |
| 43   |      |          |      | ✓ 20.1   | 80      |
|      | +50  |          |      | ✓ 20.2   | 79      |
| 44   |      |          |      | ✓ 20.4   | 77      |
|      | +50  |          |      | ✓ 20.5   | 76      |
| 45   |      |          |      | ✓ 20.7   | 74      |
| T.P. | 5.03 | 925.94 ✓ | 7.15 | 920.91 ✓ |         |
|      | +50  |          |      | ✓ 20.8   | 51      |
| 46   |      |          |      | ✓ 21.0   | 49      |
|      | +50  |          |      | ✓ 21.1   | 48      |
| 47   |      |          |      | ✓ 21.4   | 45      |
|      | +50  |          |      | ✓ 21.6   | 43      |
| 48   |      |          |      | ✓ 22.0   | 39      |

LEFT

RIGHT 9-3-30

8/5.5 62 54 55 65 62 57 58 59 53 46 43 3.6 3.1 29 4/2.9  
 2/12.8 33 24 17 16 13 6 12.5 4 9 9 11 12 18 33 2/15.4

8/5.2 59 51 48 52 54 49 49 51 55 55 49 49 59 3.6 33 6/3.4  
 2/12.8 33 24 17 16 13 4 13 1 3 6 8 9 10 12 23 33 2/14.6

5/5.4 56 54 56 47 44 45 47 57 54 54 46 45 41 6/4.3  
 2/12.5 33 25 16 11 5 13.4 3 7 7 10 13 23 33 2/13.6

4/5.6 59 56 59 52 47 46 47 49 53 45 47 0/4.7  
 2/12.1 33 25 17 13 10 5 13.0 3 7 10 13 2/13.0

2/6.4 69 65 65 70 60 59 60 61 65 59 54 56 5/5.1  
 2/11.2 33 26 18 15 10 4 11.6 3 7 10 19 33 2/12.5

1/7.7 76 76 79 23 82 73 72 73 73 82 82 72 64 65 0/6.4  
 2/12.3 33 24 17 16 14 9 5 12.1 3 7 8 10 22 33 2/11.0

4/7.4 71 70 74 63 58 59 59 62 74 77 79 6/7.6  
 1/12.3 33 19 16 11 9 4 10.8 4 8 16 33 1/12.5

7/6.7 4/6.5 63 65 65 70 59 58 59 60 64 66 76 73 77 85 0/1.6  
 1/17.8 2/1.6 33 25 17 15 10 4 7.0 3 4 7 8 11 24 33 1/12.7

7/6.1 55 62 66 61 57 56 58 60 65 86 87 94 101 0/9.5  
 2/17.3 33 18 16 14 11 4 7.0 3 5 9 12 23 33 2/14.7

5/6.0 1/5.4 47 57 62 56 56 57 57 64 73 81 83 4/8.1  
 1/17.5 2/10.9 33 18 14 9 4 7.2 3 6 10 26 33 1/13.6

8/5.5 49 53 59 61 69 53 52 53 53 55 61 58 56 5/5.8  
 2/17.2 33 26 16 14 12 9 4 7.0 3 7 10 22 33 2/11.5

4/5.4 1/4.8 36 46 54 57 53 50 49 50 51 54 64 65 65 7/6.4  
 1/17.5 2/10.9 33 24 15 14 12 9 4 7.1 3 6 9 19 33 1/12.5

| STA  | +    | H.I.   | -    | ELEV   | GR. ROD. |
|------|------|--------|------|--------|----------|
|      |      | 925.94 |      |        |          |
| 48   |      |        |      | 22.5   | 56       |
| 49   |      |        |      | 22.7   | 52       |
| 50   |      |        |      | 23.0   | 49       |
| 50   |      |        |      | 23.4   | 45       |
| T.P. | 8.68 | 930.48 | 4.14 | 921.80 |          |
| B.M. |      |        | 1.62 | 928.86 |          |
| B.M. | 5.28 | 930.36 | 5.39 | 925.09 | 925.08   |
| 51   |      |        |      | 23.8   | 66       |
| 52   |      |        |      | 24.1   | 63       |
| 53   |      |        |      | 24.4   | 60       |
| 54   |      |        |      | 24.7   | 57       |
| 55   |      |        |      | 24.9   | 55       |
| 56   |      |        |      | 25.0   | 54       |
| 57   |      |        |      | 25.3   | 51       |
| T.P. | 7.27 | 932.35 | 5.28 | 925.08 |          |



LEFT

RIGHT

9-3-30

(3.5)

|                                |     |     |     |     |     |     |     |      |     |     |     |     |     |     |     |                                |
|--------------------------------|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|--------------------------------|
| $\frac{5}{0} \frac{5.1}{-1.5}$ | 4.3 | 4.7 | 5.4 | 5.6 | 5.0 | 4.6 | 4.6 | 7.7  | 4.6 | 5.2 | 5.5 | 5.8 | 6.1 | 5.8 | 6.2 | $\frac{3}{0} \frac{5.8}{-2.2}$ |
|                                | 3.3 | 2.7 | 1.7 | 1.4 | 1.1 | 8   | 3   | -1.1 | 4   | 8   | 9   | 12  | 13  | 2.4 | 3.3 |                                |

(3.7)

|                                |                                |     |     |     |     |     |     |     |     |     |     |     |     |     |                                |
|--------------------------------|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------------|
| $\frac{7}{0} \frac{5.0}{-1.8}$ | $\frac{4}{0} \frac{4.8}{-1.6}$ | 4.2 | 5.1 | 5.5 | 5.0 | 4.4 | 4.3 | 4.6 | 4.7 | 5.3 | 5.8 | 6.3 | 6.2 | 6.5 | $\frac{5}{0} \frac{6.2}{-3.5}$ |
|                                |                                | 3.3 | 1.6 | 1.3 | 1.1 | 8   | 3   | 7.4 | 5   | 9   | 11  | 11  | 2.8 | 3.3 | $\frac{1}{0} \frac{7}{-3.5}$   |

(2.9)

|                                |     |     |     |     |     |     |     |     |     |     |     |     |     |                                |
|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------------|
| $\frac{1}{0} \frac{5.0}{-2.1}$ | 4.5 | 4.8 | 5.1 | 5.4 | 4.8 | 4.2 | 4.0 | 4.1 | 4.1 | 4.5 | 5.1 | 5.6 | 5.4 | $\frac{9}{0} \frac{5.5}{-2.6}$ |
|                                | 3.3 | 2.6 | 1.6 | 1.3 | 1.1 | 8   | 3   | 7.2 | 4   | 7   | 10  | 2.2 | 3.3 | $\frac{1}{0} \frac{6}{-2.6}$   |

(2.5)

|                                |     |     |     |     |     |     |      |     |     |     |     |                                |
|--------------------------------|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|--------------------------------|
| $\frac{2}{0} \frac{5.3}{-2.8}$ | 5.1 | 5.2 | 5.3 | 5.7 | 4.4 | 4.1 | 4.1  | 4.2 | 4.9 | 5.3 | 5.0 | $\frac{0}{0} \frac{5.2}{-2.7}$ |
|                                | 3.3 | 2.6 | 1.7 | 1.5 | 9   | 3   | -1.6 | 4   | 8   | 2.0 | 3.3 | $\frac{1}{0} \frac{7}{-2.7}$   |

SNA IN TR. 150 RT STA 52 + 50

(6.6)

TOP OF NEW CON. MONT.

|                                |     |     |     |     |     |      |     |     |     |     |                                |
|--------------------------------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|--------------------------------|
| $\frac{5}{0} \frac{7.6}{-3.0}$ | 9.3 | 9.5 | 9.7 | 8.5 | 8.2 | 8.3  | 8.3 | 8.9 | 8.9 | 8.4 | $\frac{1}{0} \frac{8.7}{-2.1}$ |
|                                | 3.8 | 2.8 | 1.3 | 9   | 3   | -1.7 | 3   | 7   | 2.1 | 3.3 | $\frac{1}{0} \frac{6}{-2.1}$   |

(6.2)

|                                |     |     |     |     |     |     |     |     |     |     |     |                                |
|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------------------|
| $\frac{1}{0} \frac{8.4}{-2.1}$ | 8.4 | 8.5 | 8.8 | 8.8 | 7.7 | 7.5 | 7.5 | 7.7 | 8.1 | 8.3 | 8.0 | $\frac{5}{0} \frac{8.1}{-7.8}$ |
|                                | 3.7 | 1.6 | 1.4 | 1.2 | 9   | 4   | 7.2 | 5   | 11  | 2.5 | 3.3 | $\frac{1}{0} \frac{5}{-7.8}$   |

(6.0)

|                                |     |     |     |     |     |      |     |     |     |     |                                |
|--------------------------------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|--------------------------------|
| $\frac{1}{0} \frac{8.1}{-2.1}$ | 8.2 | 8.1 | 8.4 | 7.0 | 6.7 | 6.6  | 6.7 | 7.2 | 7.3 | 6.3 | $\frac{9}{0} \frac{7.1}{-7.1}$ |
|                                | 3.3 | 1.5 | 1.3 | 9   | 3   | -0.6 | 4   | 7   | 1.2 | 3.3 | $\frac{2}{0} \frac{6}{-7.1}$   |

(5.7)

|                                |     |     |     |     |     |      |     |     |     |     |                                |
|--------------------------------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|--------------------------------|
| $\frac{0}{0} \frac{7.7}{-2.0}$ | 7.7 | 7.6 | 7.6 | 6.9 | 6.6 | 6.5  | 6.6 | 7.2 | 7.7 | 2.2 | $\frac{0}{0} \frac{7.7}{-2.0}$ |
|                                | 3.3 | 1.4 | 1.2 | 9   | 4   | -0.8 | 4   | 7   | 1.7 | 3.3 | $\frac{1}{0} \frac{6}{-2.0}$   |

(5.5)

|                                 |     |     |     |     |     |     |      |     |     |     |     |     |                                |
|---------------------------------|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|--------------------------------|
| $\frac{2}{0} \frac{5.3}{-1.02}$ | 4.9 | 5.2 | 5.9 | 6.1 | 5.2 | 5.3 | 5.2  | 5.5 | 6.2 | 6.5 | 6.0 | 5.4 | $\frac{4}{0} \frac{6.1}{-2.6}$ |
|                                 | 3.3 | 2.4 | 1.4 | 1.3 | 1.1 | 4   | 12.3 | 7   | 10  | 1.2 | 2.3 | 3.3 | $\frac{1}{0} \frac{6}{-2.6}$   |

(5.4)

|     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4.7 | 4.7 | 5.0 | 5.2 | 5.6 | 5.3 | 5.0 | 4.8 | 5.0 | 5.1 | 5.0 |
| 3.3 | 2.7 | 1.6 | 1.5 | 1.3 | 1.2 | 4   |     | 1.1 | 2.7 | 3.3 |

(5.1)

|                                 |     |     |     |     |     |     |      |     |     |     |     |     |                                 |
|---------------------------------|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|---------------------------------|
| $\frac{0}{0} \frac{4.5}{-1.06}$ | 4.4 | 4.5 | 4.6 | 5.2 | 4.8 | 4.5 | 4.6  | 4.8 | 5.4 | 4.6 | 4.4 | 4.2 | $\frac{1}{0} \frac{4.4}{-1.07}$ |
|                                 | 3.3 | 2.5 | 1.8 | 1.4 | 1.3 | 4   | 10.5 | 4   | 11  | 1.4 | 2.4 | 3.3 | $\frac{1}{0} \frac{4}{-1.07}$   |

| STA | +   | H.I.   | -     | ELEV   | C.R. ROD. |
|-----|-----|--------|-------|--------|-----------|
|     |     | 732.35 |       |        |           |
|     | 750 |        |       | ✓ 25.5 | 69        |
| 54  |     |        |       | ✓ 25.8 | 66        |
|     | 750 |        |       | ✓ 26.1 | 63        |
| 55  |     |        |       | ✓ 26.3 | 61        |
|     | 750 |        |       | ✓ 26.4 | 60        |
| 56  |     |        |       | ✓ 26.5 | 59        |
|     | 750 |        |       | ✓ 26.5 | 59        |
| 57  |     |        | 926.2 | ✓ 26.2 | 62        |
|     | 750 |        |       | ✓ 25.7 | 67        |
| 58  |     |        |       | ✓ 25.2 | 72        |
|     | 750 |        |       | ✓ 24.6 | 78        |
| 59  |     |        |       | ✓ 23.8 | 86        |

LEFT

RIGHT 9-5-30

(60)  
 $\frac{5}{2} \frac{64}{105} \quad \frac{64}{33} \quad \frac{66}{21} \quad \frac{66}{19} \quad \frac{64}{14} \quad \frac{61}{13} \quad \frac{63}{5} \quad \frac{64}{106} \quad \frac{74}{4} \quad \frac{66}{11} \quad \frac{65}{14} \quad \frac{65}{23} \quad \frac{65}{33} \quad \frac{4}{2} \frac{65}{104}$

(60)  
 $\frac{9}{1} \frac{69}{63} \quad \frac{7}{2} \frac{77}{71} \quad \frac{78}{33} \quad \frac{78}{24} \quad \frac{76}{16} \quad \frac{66}{12} \quad \frac{63}{5} \quad \frac{65}{00} \quad \frac{69}{5} \quad \frac{82}{12} \quad \frac{80}{13} \quad \frac{77}{22} \quad \frac{74}{33} \quad \frac{7}{2} \frac{77}{73} \quad \frac{9}{1} \frac{79}{73}$

(60)  
 $\frac{4}{1} \frac{70}{47} \quad \frac{75}{33} \quad \frac{91}{19} \quad \frac{72}{15} \quad \frac{65}{12} \quad \frac{63}{5} \quad \frac{64}{01} \quad \frac{64}{1} \quad \frac{71}{8} \quad \frac{86}{11} \quad \frac{84}{20} \quad \frac{72}{33} \quad \frac{3}{1} \frac{85}{82}$

(60)  
 $\frac{4}{1} \frac{64}{43} \quad \frac{88}{33} \quad \frac{86}{21} \quad \frac{65}{14} \quad \frac{63}{13} \quad \frac{59}{5} \quad \frac{60}{101} \quad \frac{62}{1} \quad \frac{67}{6} \quad \frac{78}{11} \quad \frac{78}{21} \quad \frac{74}{33} \quad \frac{3}{2} \frac{78}{17} \quad \frac{0}{1} \frac{81}{20}$

(60)  
 $\frac{0}{2} \frac{60}{00} \quad \frac{60}{33} \quad \frac{60}{21} \quad \frac{63}{20} \quad \frac{63}{17} \quad \frac{56}{13} \quad \frac{54}{5} \quad \frac{52}{104} \quad \frac{57}{2} \quad \frac{46}{8} \quad \frac{55}{10} \quad \frac{45}{19} \quad \frac{43}{33} \quad \frac{5}{2} \frac{45}{115}$

(59)  
 $\frac{1}{2} \frac{52}{107} \quad \frac{52}{33} \quad \frac{54}{25} \quad \frac{52}{22} \quad \frac{55}{17} \quad \frac{51}{14} \quad \frac{49}{5} \quad \frac{51}{108} \quad \frac{52}{3} \quad \frac{59}{6} \quad \frac{59}{9} \quad \frac{40}{10} \quad \frac{27}{21} \quad \frac{19}{33} \quad \frac{7}{2} \frac{25}{734}$

(59)  
 $\frac{2}{2} \frac{57}{102} \quad \frac{60}{33} \quad \frac{52}{20} \quad \frac{60}{19} \quad \frac{56}{16} \quad \frac{53}{14} \quad \frac{54}{5} \quad \frac{54}{105} \quad \frac{58}{4} \quad \frac{64}{6} \quad \frac{64}{7} \quad \frac{44}{8} \quad \frac{43}{11} \quad \frac{45}{14} \quad \frac{25}{33} \quad \frac{3}{2} \frac{26}{153}$

(60)  
 $\frac{9}{1} \frac{62}{00} \quad \frac{8}{1} \frac{64}{02} \quad \frac{69}{33} \quad \frac{65}{34} \quad \frac{66}{20} \quad \frac{68}{19} \quad \frac{67}{15} \quad \frac{63}{13} \quad \frac{59}{5} \quad \frac{60}{102} \quad \frac{62}{8} \quad \frac{68}{6} \quad \frac{71}{9} \quad \frac{55}{11} \quad \frac{56}{20} \quad \frac{47}{33} \quad \frac{0}{2} \frac{52}{110}$   
 70 p 51 a 60

(60)  
 $\frac{0}{2} \frac{780}{73} \quad \frac{84}{33} \quad \frac{81}{20} \quad \frac{64}{14} \quad \frac{59}{5} \quad \frac{59}{102} \quad \frac{61}{3} \quad \frac{74}{9} \quad \frac{71}{12} \quad \frac{68}{21} \quad \frac{65}{33} \quad \frac{0}{2} \frac{67}{00}$

(77)  
 $\frac{1}{2} \frac{81}{09} \quad \frac{88}{33} \quad \frac{85}{27} \quad \frac{80}{19} \quad \frac{67}{14} \quad \frac{63}{5} \quad \frac{62}{110} \quad \frac{62}{3} \quad \frac{76}{9} \quad \frac{71}{12} \quad \frac{66}{23} \quad \frac{62}{33} \quad \frac{1}{2} \frac{65}{107}$

(79)  
 $\frac{5}{2} \frac{78}{105} \quad \frac{74}{33} \quad \frac{76}{23} \quad \frac{73}{14} \quad \frac{67}{14} \quad \frac{67}{4} \quad \frac{68}{110} \quad \frac{67}{3} \quad \frac{71}{5} \quad \frac{72}{10} \quad \frac{60}{11} \quad \frac{58}{18} \quad \frac{50}{33} \quad \frac{5}{2} \frac{55}{105}$

(80)  
 $\frac{6}{1} \frac{90}{04} \quad \frac{93}{33} \quad \frac{91}{25} \quad \frac{90}{14} \quad \frac{86}{13} \quad \frac{81}{5} \quad \frac{81}{105} \quad \frac{82}{4} \quad \frac{88}{6} \quad \frac{90}{9} \quad \frac{82}{11} \quad \frac{78}{17} \quad \frac{71}{19} \quad \frac{65}{33} \quad \frac{6}{2} \frac{70}{106}$

| STA  | T    | H.I.   | -     | ELEV   | CR. ROD |
|------|------|--------|-------|--------|---------|
|      |      | 932.35 |       |        |         |
| +50  |      |        |       | 22.8   | 96      |
| T.P. | 4.53 | 927.91 | 8.97  | 923.38 |         |
| 60   |      |        |       | 21.7   | 62      |
| +108 |      |        |       | 21.5   | 6.4     |
| +50  |      |        |       | 20.4   | 75      |
| 61   |      |        |       | 19.1   | 88      |
| T.P. | 5.78 | 924.23 | 9.46  | 918.45 |         |
| +50  |      |        |       | 17.6   | 66      |
| B.M. |      |        | 1.26  | 922.97 | 922.99  |
| 62   |      |        | 1.2   | 16.4   | 7.8     |
| +50  |      |        | 1.2   | 15.5   | 8.7     |
| 63   |      |        | 1.2   | 14.8   | 94      |
| +50  |      |        | 1.2   | 14.5   | 97      |
| T.P. | 5.33 | 919.52 | 10.04 | 914.19 |         |
| 64   |      |        | 1.2   | 14.6   | 49      |
| B.M. |      |        | 5.48  | 914.04 |         |
| +50  |      |        |       | 15.0   | 4.5     |



LEFT

RIGHT 9-5-30

$\begin{array}{r} x \\ 4/102 \\ 1/06 \end{array}$ 
 $\begin{array}{r} 108 \\ 33 \end{array}$ 
 $\begin{array}{r} 103 \\ 18 \end{array}$ 
 $\begin{array}{r} 99 \\ 17 \end{array}$ 
 $\begin{array}{r} 100 \\ 15 \end{array}$ 
 $\begin{array}{r} 92 \\ 12 \end{array}$ 
 $\begin{array}{r} 90 \\ 4 \end{array}$ 
 $\begin{array}{r} 91 \\ 10 \end{array}$ 
 $\begin{array}{r} 92 \\ 5 \end{array}$ 
 $\begin{array}{r} 101 \\ 8 \end{array}$ 
 $\begin{array}{r} 101 \\ 10 \end{array}$ 
 $\begin{array}{r} 93 \\ 11 \end{array}$ 
 $\begin{array}{r} 89 \\ 24 \end{array}$ 
 $\begin{array}{r} 88 \\ 33 \end{array}$ 
 $\begin{array}{r} 6/90 \\ 2/106 \end{array}$

$\begin{array}{r} x \\ 8/64 \\ 1/02 \end{array}$ 
 $\begin{array}{r} 70 \\ 33 \end{array}$ 
 $\begin{array}{r} 66 \\ 24 \end{array}$ 
 $\begin{array}{r} 59 \\ 15 \end{array}$ 
 $\begin{array}{r} 57 \\ 4 \end{array}$ 
 $\begin{array}{r} 59 \\ 10 \end{array}$ 
 $\begin{array}{r} 61 \\ 6 \end{array}$ 
 $\begin{array}{r} 66 \\ 7 \end{array}$ 
 $\begin{array}{r} 66 \\ 8 \end{array}$ 
 $\begin{array}{r} 44 \\ 9 \end{array}$ 
 $\begin{array}{r} 37 \\ 19 \end{array}$ 
 $\begin{array}{r} 29 \\ 33 \end{array}$ 
 $\begin{array}{r} 9/33 \\ 4/129 \end{array}$

$\begin{array}{r} 83 \\ 23 \end{array}$ 
 $\begin{array}{r} 81 \\ 25 \end{array}$ 
 $\begin{array}{r} 60 \\ 18 \end{array}$ 
 $\begin{array}{r} 61 \\ 5 \end{array}$ 
 $\begin{array}{r} 62 \\ 4 \end{array}$ 
 $\begin{array}{r} 63 \\ 6 \end{array}$ 
 $\begin{array}{r} 68 \\ 8 \end{array}$ 
 $\begin{array}{r} 68 \\ 10 \end{array}$ 
 $\begin{array}{r} 44 \\ 11 \end{array}$ 
 $\begin{array}{r} 39 \\ 23 \end{array}$ 
 $\begin{array}{r} 37 \\ 33 \end{array}$ 
 $\begin{array}{r} 30 \\ 33 \end{array}$

$\begin{array}{r} x \\ 8/27 \\ 8/72 \end{array}$ 
 $\begin{array}{r} 92 \\ 33 \end{array}$ 
 $\begin{array}{r} 87 \\ 20 \end{array}$ 
 $\begin{array}{r} 82 \\ 19 \end{array}$ 
 $\begin{array}{r} 78 \\ 5 \end{array}$ 
 $\begin{array}{r} 79 \\ 04 \end{array}$ 
 $\begin{array}{r} 81 \\ 6 \end{array}$ 
 $\begin{array}{r} 88 \\ 7 \end{array}$ 
 $\begin{array}{r} 58 \\ 10 \end{array}$ 
 $\begin{array}{r} 52 \\ 21 \end{array}$ 
 $\begin{array}{r} 49 \\ 33 \end{array}$ 
 $\begin{array}{r} 4/51 \\ 4/124 \end{array}$

$\begin{array}{r} x \\ 15/108 \\ 1/10 \end{array}$ 
 $\begin{array}{r} 3/105 \\ 8/70 \end{array}$ 
 $\begin{array}{r} 113 \\ 33 \end{array}$ 
 $\begin{array}{r} 109 \\ 25 \end{array}$ 
 $\begin{array}{r} 75 \\ 17 \end{array}$ 
 $\begin{array}{r} 99 \\ 14 \end{array}$ 
 $\begin{array}{r} 97 \\ 5 \end{array}$ 
 $\begin{array}{r} 97 \\ 10 \end{array}$ 
 $\begin{array}{r} 101 \\ 3 \end{array}$ 
 $\begin{array}{r} 110 \\ 7 \end{array}$ 
 $\begin{array}{r} 90 \\ 9 \end{array}$ 
 $\begin{array}{r} 86 \\ 19 \end{array}$ 
 $\begin{array}{r} 69 \\ 33 \end{array}$ 
 $\begin{array}{r} 4/84 \\ 2/104 \end{array}$

$\begin{array}{r} x \\ 1/82 \\ 1/76 \end{array}$ 
 $\begin{array}{r} 2/86 \\ 2/20 \end{array}$ 
 $\begin{array}{r} 93 \\ 33 \end{array}$ 
 $\begin{array}{r} 87 \\ 21 \end{array}$ 
 $\begin{array}{r} 78 \\ 14 \end{array}$ 
 $\begin{array}{r} 75 \\ 7 \end{array}$ 
 $\begin{array}{r} 76 \\ 10 \end{array}$ 
 $\begin{array}{r} 77 \\ 5 \end{array}$ 
 $\begin{array}{r} 73 \\ 9 \end{array}$ 
 $\begin{array}{r} 67 \\ 19 \end{array}$ 
 $\begin{array}{r} 58 \\ 33 \end{array}$ 
 $\begin{array}{r} 2/64 \\ 2/102 \end{array}$

$\begin{array}{r} x \\ 4/94 \\ 1/76 \end{array}$ 
 $\begin{array}{r} 105 \\ 33 \end{array}$ 
 $\begin{array}{r} 103 \\ 26 \end{array}$ 
 $\begin{array}{r} 94 \\ 17 \end{array}$ 
 $\begin{array}{r} 25 \\ 16 \end{array}$ 
 $\begin{array}{r} 89 \\ 5 \end{array}$ 
 $\begin{array}{r} 87 \\ 13 \end{array}$ 
 $\begin{array}{r} 91 \\ 8 \end{array}$ 
 $\begin{array}{r} 94 \\ 10 \end{array}$ 
 $\begin{array}{r} 89 \\ 21 \end{array}$ 
 $\begin{array}{r} 85 \\ 30 \end{array}$ 
 $\begin{array}{r} 78 \\ 2/67 \end{array}$ 
 $\begin{array}{r} 3/85 \\ 4/70 \end{array}$

$\begin{array}{r} x \\ 5/104 \\ 1/77 \end{array}$ 
 $\begin{array}{r} 111 \\ 33 \end{array}$ 
 $\begin{array}{r} 111 \\ 25 \end{array}$ 
 $\begin{array}{r} 107 \\ 15 \end{array}$ 
 $\begin{array}{r} 101 \\ 12 \end{array}$ 
 $\begin{array}{r} 96 \\ 5 \end{array}$ 
 $\begin{array}{r} 97 \\ 10 \end{array}$ 
 $\begin{array}{r} 100 \\ 10 \end{array}$ 
 $\begin{array}{r} 96 \\ 22 \end{array}$ 
 $\begin{array}{r} 94 \\ 33 \end{array}$ 
 $\begin{array}{r} 0/77 \\ 2/70 \end{array}$

$\begin{array}{r} x \\ 3/103 \\ 1/09 \end{array}$ 
 $\begin{array}{r} 9/105 \\ 2/71 \end{array}$ 
 $\begin{array}{r} 104 \\ 33 \end{array}$ 
 $\begin{array}{r} 105 \\ 19 \end{array}$ 
 $\begin{array}{r} 101 \\ 4 \end{array}$ 
 $\begin{array}{r} 101 \\ 07 \end{array}$ 
 $\begin{array}{r} 104 \\ 4 \end{array}$ 
 $\begin{array}{r} 110 \\ 8 \end{array}$ 
 $\begin{array}{r} 111 \\ 11 \end{array}$ 
 $\begin{array}{r} 109 \\ 13 \end{array}$ 
 $\begin{array}{r} 108 \\ 21 \end{array}$ 
 $\begin{array}{r} 103 \\ 23 \end{array}$ 
 $\begin{array}{r} 7/107 \\ 2/13 \end{array}$ 
 $\begin{array}{r} 3/109 \\ 1/75 \end{array}$

$\begin{array}{r} x \\ 3/104 \\ 2/07 \end{array}$ 
 $\begin{array}{r} 96 \\ 33 \end{array}$ 
 $\begin{array}{r} 103 \\ 36 \end{array}$ 
 $\begin{array}{r} 102 \\ 15 \end{array}$ 
 $\begin{array}{r} 111 \\ 14 \end{array}$ 
 $\begin{array}{r} 102 \\ 11 \end{array}$ 
 $\begin{array}{r} 102 \\ 3 \end{array}$ 
 $\begin{array}{r} 102 \\ 05 \end{array}$ 
 $\begin{array}{r} 104 \\ 7 \end{array}$ 
 $\begin{array}{r} 114 \\ 10 \end{array}$ 
 $\begin{array}{r} 116 \\ 12 \end{array}$ 
 $\begin{array}{r} 113 \\ 13 \end{array}$ 
 $\begin{array}{r} 114 \\ 23 \end{array}$ 
 $\begin{array}{r} 113 \\ 33 \end{array}$ 
 $\begin{array}{r} 0/143 \\ 6/70 \end{array}$

$\begin{array}{r} x \\ 8/51 \\ 1/02 \end{array}$ 
 $\begin{array}{r} 44 \\ 33 \end{array}$ 
 $\begin{array}{r} 50 \\ 25 \end{array}$ 
 $\begin{array}{r} 52 \\ 15 \end{array}$ 
 $\begin{array}{r} 61 \\ 14 \end{array}$ 
 $\begin{array}{r} 61 \\ 12 \end{array}$ 
 $\begin{array}{r} 56 \\ 11 \end{array}$ 
 $\begin{array}{r} 53 \\ 04 \end{array}$ 
 $\begin{array}{r} 57 \\ 7 \end{array}$ 
 $\begin{array}{r} 66 \\ 13 \end{array}$ 
 $\begin{array}{r} 67 \\ 24 \end{array}$ 
 $\begin{array}{r} 69 \\ 33 \end{array}$ 
 $\begin{array}{r} 5/66 \\ 5/77 \end{array}$ 
 $\begin{array}{r} 3/66 \\ 2/77 \end{array}$

SPK IN 12" TREE 45 FT STR 65+60

$\begin{array}{r} x \\ 9/36 \\ 2/09 \end{array}$ 
 $\begin{array}{r} 27 \\ 33 \end{array}$ 
 $\begin{array}{r} 36 \\ 23 \end{array}$ 
 $\begin{array}{r} 40 \\ 14 \end{array}$ 
 $\begin{array}{r} 51 \\ 13 \end{array}$ 
 $\begin{array}{r} 49 \\ 10 \end{array}$ 
 $\begin{array}{r} 45 \\ 2 \end{array}$ 
 $\begin{array}{r} 45 \\ 00 \end{array}$ 
 $\begin{array}{r} 48 \\ 4 \end{array}$ 
 $\begin{array}{r} 53 \\ 8 \end{array}$ 
 $\begin{array}{r} 68 \\ 13 \end{array}$ 
 $\begin{array}{r} 65 \\ 14 \end{array}$ 
 $\begin{array}{r} 70 \\ 18 \end{array}$ 
 $\begin{array}{r} 72 \\ 33 \end{array}$ 
 $\begin{array}{r} 0/67 \\ 1/22 \end{array}$

| STA. | T    | H. I.  | -    | ELEV   |     |
|------|------|--------|------|--------|-----|
|      |      | 919.52 |      |        |     |
| 65   |      |        |      | 15.5   | 40  |
|      | +50  |        |      | 160    | 35  |
| 66   |      |        |      | 16.6   | 2.9 |
| T.P. | 3.19 | 922.43 | 0.28 | 919.34 |     |
|      | +50  |        |      | 19.1   | 53  |
| 67   |      |        |      | 17.7   | 4.7 |
|      | +50  |        |      | 18.1   | 4.3 |
| 68   |      |        |      | 18.6   | 38  |
|      | +50  |        |      | 18.9   | 3.5 |
| 69   |      |        |      | 19.2   | 30  |
| T.P. | 6.69 | 927.73 | 1.39 | 921.04 |     |
|      | +50  |        |      | 19.3   | 8.4 |
| 70   |      |        |      | 19.4   | 8.3 |
|      | +50  |        |      | 19.4   | 8.3 |

LEFT.

RIGHT.

7-5-30

10  
 $\frac{1}{2} \frac{1}{23} \frac{14}{33} \frac{24}{24} \frac{30}{14} \frac{43}{12} \frac{40}{10} \frac{55}{3} \frac{34}{104} \frac{37}{4} \frac{42}{8} \frac{55}{12} \frac{58}{16} \frac{63}{19} \frac{68}{33} \frac{5}{17} \frac{1}{17}$

35  
 $\frac{5}{125} \frac{00}{33} \frac{10}{25} \frac{15}{14} \frac{35}{12} \frac{31}{9} \frac{26}{1} \frac{37}{108} \frac{31}{7} \frac{34}{9} \frac{50}{13} \frac{50}{17} \frac{46}{20} \frac{52}{27} \frac{60}{33} \frac{1}{73} \frac{1}{73}$

21  
 $\frac{6}{716} \frac{15}{33} \frac{05}{23} \frac{14}{11} \frac{24}{2} \frac{20}{148} \frac{21}{2} \frac{27}{22} \frac{42}{33} \frac{51}{2} \frac{8}{112} \frac{1}{103} \frac{1}{103}$

NAI4 IN T.P. 41. 5719 66710  
 $\frac{1}{2} \frac{1}{42} \frac{38}{33} \frac{43}{21} \frac{50}{13} \frac{54}{11} \frac{51}{7} \frac{47}{2} \frac{48}{105} \frac{52}{6} \frac{57}{9} \frac{65}{11} \frac{71}{20} \frac{77}{22} \frac{85}{33} \frac{1}{13} \frac{1}{13}$

47  
 $\frac{14}{71} \frac{6}{58} \frac{5}{52} \frac{48}{33} \frac{52}{23} \frac{59}{15} \frac{56}{10} \frac{52}{2} \frac{52}{25} \frac{61}{48} \frac{71}{8} \frac{75}{11} \frac{82}{20} \frac{97}{32} \frac{2}{28} \frac{2}{28}$

43  
 $\frac{2}{61} \frac{61}{33} \frac{61}{24} \frac{62}{13} \frac{64}{12} \frac{58}{9} \frac{52}{7} \frac{53}{70} \frac{54}{5} \frac{61}{11} \frac{69}{12} \frac{63}{15} \frac{66}{21} \frac{72}{23} \frac{87}{33} \frac{1}{20} \frac{1}{20}$

86  
 $\frac{9}{64} \frac{60}{33} \frac{62}{23} \frac{62}{12} \frac{66}{11} \frac{58}{8} \frac{54}{7} \frac{56}{13} \frac{61}{14} \frac{69}{24} \frac{78}{26} \frac{80}{33} \frac{86}{33} \frac{5}{30} \frac{5}{30}$

30  
 $\frac{5}{50} \frac{40}{33} \frac{49}{21} \frac{55}{10} \frac{53}{8} \frac{50}{15} \frac{54}{9} \frac{74}{15} \frac{79}{22} \frac{91}{33} \frac{1}{44} \frac{1}{44}$

37  
 $\frac{1}{34} \frac{2}{22} \frac{2}{23} \frac{12}{33} \frac{24}{22} \frac{28}{9} \frac{37}{5} \frac{35}{23} \frac{39}{10} \frac{58}{14} \frac{61}{25} \frac{74}{33} \frac{1}{27} \frac{1}{27}$

84  
 $\frac{60}{140} \frac{74}{33} \frac{37}{24} \frac{44}{17} \frac{56}{14} \frac{64}{6} \frac{70}{71} \frac{67}{7} \frac{73}{10} \frac{77}{13} \frac{76}{14} \frac{87}{27} \frac{99}{30} \frac{114}{33} \frac{1}{104} \frac{1}{104}$

86  
 $\frac{70}{153} \frac{30}{33} \frac{31}{24} \frac{36}{15} \frac{59}{12} \frac{59}{9} \frac{54}{6} \frac{51}{13} \frac{50}{2} \frac{54}{10} \frac{56}{13} \frac{57}{16} \frac{68}{25} \frac{78}{33} \frac{81}{110} \frac{1}{110}$

60  
 $\frac{14}{146} \frac{37}{33} \frac{34}{24} \frac{39}{15} \frac{47}{15} \frac{64}{10} \frac{66}{7} \frac{60}{72} \frac{54}{7} \frac{55}{11} \frac{54}{14} \frac{57}{17} \frac{56}{23} \frac{71}{33} \frac{1}{121} \frac{1}{121}$

| STA. | T    | H. I.  | -     | ELEV.  | CH. RD. |
|------|------|--------|-------|--------|---------|
|      |      | 927.73 |       |        |         |
| 71   |      |        |       | 19.3   | 8.4     |
| B.M. |      |        | 1.32  | 926.42 |         |
| +50  |      |        |       | 19.0   | 8.7     |
| 72   |      |        |       | 18.8   | 8.9     |
| +50  |      |        |       | 18.4   | 9.3     |
| 73   |      |        |       | 18.0   | 9.7     |
| T.P. | 3.57 | 921.08 | 10.22 | 917.51 |         |
| +50  |      |        |       | 17.5   | 3.4     |
| 74   |      |        |       | 17.0   | 4.1     |
| +50  |      |        |       | 16.5   | 4.4     |
| 75   |      |        |       | 16.0   | 5.1     |
| +50  |      |        |       | 15.5   | 5.4     |
| 76   |      |        |       | 15.3   | 5.8     |
| +50  |      |        |       | 15.9   | 5.2     |



LEFT

RIGHT

9-6-30

81  
 $\frac{1}{2} \frac{1}{63}$  60 62 67 77 68 66 65 68 78 78 90  $\frac{5}{2} \frac{1}{79}$   
 $\frac{2}{1} \frac{1}{121}$  53 25 14 12 5 71.8 1 8 14 18 33  $\frac{2}{1} \frac{1}{105}$

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87  
 $\frac{1}{2} \frac{1}{86}$  82 24 25 91 28 24 81 82 93 88 96  $\frac{5}{2} \frac{1}{72}$   
 $\frac{2}{1} \frac{1}{101}$  33 25 14 13 10 8 784 8 15 18 33  $\frac{2}{1} \frac{1}{25}$

89  
 $\frac{4}{1} \frac{1}{96}$   $\frac{1}{2} \frac{1}{97}$  95 98 96 101 94 91 92 100 95 96 97  $\frac{5}{2} \frac{1}{74}$   $\frac{4}{1} \frac{1}{100}$   
 $\frac{2}{1} \frac{1}{27}$   $\frac{1}{2} \frac{1}{28}$  33 23 14 13 9 02 7 14 17 25 33  $\frac{2}{1} \frac{1}{25}$   $\frac{1}{2} \frac{1}{71}$

93  
 $\frac{2}{1} \frac{1}{101}$  99 104 104 101 92 98 105 101 104 104  $\frac{1}{2} \frac{1}{103}$   
 $\frac{2}{1} \frac{1}{28}$  33 18 13 9 03 8 14 16 26 33  $\frac{2}{1} \frac{1}{70}$

97  
 $\frac{5}{1} \frac{1}{114}$   $\frac{1}{2} \frac{1}{116}$  114 116 113 107 102 101 105 103 103  $\frac{4}{1} \frac{1}{103}$   $\frac{9}{1} \frac{1}{103}$   
 $\frac{1}{2} \frac{1}{77}$   $\frac{2}{1} \frac{1}{79}$  33 26 13 7 05 9 12 16 33  $\frac{2}{1} \frac{1}{22}$   $\frac{1}{2} \frac{1}{26}$

36  
 $\frac{1}{2} \frac{1}{62}$  72 64 61 53 47 43 46 51 48 46 45  $\frac{9}{1} \frac{1}{47}$   
 $\frac{1}{2} \frac{1}{26}$  33 18 15 12 9 07 8 12 15 26 33  $\frac{2}{1} \frac{1}{71}$

111  
 $\frac{1}{2} \frac{1}{65}$  78 67 63 49 46 51 57 52 54 51  $\frac{1}{2} \frac{1}{54}$   $\frac{4}{1} \frac{1}{52}$   
 $\frac{1}{2} \frac{1}{24}$  33 19 14 8 05 7 11 14 24 33  $\frac{2}{1} \frac{1}{15}$   $\frac{1}{2} \frac{1}{71}$

116  
 $\frac{5}{1} \frac{1}{63}$  75 73 64 60 51 47 49 52 49 53 53  $\frac{4}{1} \frac{1}{50}$   
 $\frac{1}{2} \frac{1}{77}$  33 28 16 14 9 01 5 8 14 27 33  $\frac{2}{1} \frac{1}{24}$

51  
 $\frac{1}{2} \frac{1}{28}$  91 84 75 53 59 63 67 75 80  $\frac{8}{1} \frac{1}{20}$   
 $\frac{1}{2} \frac{1}{27}$  33 24 15 10 08 8 11 23 33  $\frac{5}{1} \frac{1}{19}$

56  
 $\frac{1}{2} \frac{1}{74}$  103 98 91 74 67 66 70 74 89 93 93  $\frac{8}{1} \frac{1}{88}$   
 $\frac{1}{2} \frac{1}{38}$  33 26 16 12 8 10 4 12 14 26 33  $\frac{1}{2} \frac{1}{32}$

58  
 $\frac{1}{2} \frac{1}{96}$  99 96 95 70 67 69 76 71 67 62  $\frac{1}{2} \frac{1}{68}$   $\frac{8}{1} \frac{1}{20}$   
 $\frac{1}{2} \frac{1}{38}$  33 20 14 8 09 7 10 14 24 33  $\frac{2}{1} \frac{1}{10}$   $\frac{4}{1} \frac{1}{72}$

52  
 $\frac{1}{2} \frac{1}{73}$  81 78 72 62 58 58 59 63 62 50 43 40  $\frac{8}{1} \frac{1}{44}$   
 $\frac{1}{2} \frac{1}{21}$  33 26 13 9 1 04 4 8 10 14 24 33  $\frac{2}{1} \frac{1}{28}$

| STA. | +    | H. I.  | -    | ELEV.  | GR. ROD |
|------|------|--------|------|--------|---------|
|      |      | 921.08 |      |        |         |
| 77   |      |        |      | 17.0   | 4.1     |
| +30  |      |        |      | 18.7   | 2.2     |
| T.P. | 8.95 | 927.14 | 2.89 | 918.19 |         |
| 78   |      |        |      | 20.6   | 6.5     |
| +50  |      |        |      | 21.3   | 5.8     |
| +63  |      |        |      | 21.4   | 5.7     |
| +68  |      |        |      | 21.4   | 5.7     |
| +84  |      |        |      | 21.5   | 5.6     |
| B.M. |      |        | 4.05 | 923.09 | 923.07  |

LEFT

RIGHT. 9-6-30

$\begin{array}{r} 5 \overline{) 5.5} \\ 1 \overline{) 7.4} \end{array}$ 
 $\begin{array}{r} 4 \overline{) 5.7} \\ 2 \overline{) 7.6} \end{array}$ 
 $\begin{array}{r} 5.9 \\ 3.3 \end{array}$ 
 $\begin{array}{r} 5.8 \\ 2.4 \end{array}$ 
 $\begin{array}{r} 5.4 \\ 1.4 \end{array}$ 
 $\begin{array}{r} 5.2 \\ 1.0 \end{array}$ 
 $\begin{array}{r} 4.6 \\ 2 \end{array}$ 
 $\begin{array}{r} 4.6 \\ 0.5 \end{array}$ 
 $\begin{array}{r} 4.9 \\ 5 \end{array}$ 
 $\begin{array}{r} 5.6 \\ 10 \end{array}$ 
 $\begin{array}{r} 5.3 \\ 13 \end{array}$ 
 $\begin{array}{r} 5.2 \\ 24 \end{array}$ 
 $\begin{array}{r} 5.9 \\ 33 \end{array}$ 
 $\begin{array}{r} 6 \overline{) 5.5} \\ 2 \overline{) 7.4} \end{array}$ 
 $\begin{array}{r} 8 \overline{) 5.3} \\ 1 \overline{) 7.2} \end{array}$

$\begin{array}{r} 3 \overline{) 2.9} \\ 2 \overline{) 0.7} \end{array}$ 
 $\begin{array}{r} 2.7 \\ 3.3 \end{array}$ 
 $\begin{array}{r} 3.3 \\ 1.8 \end{array}$ 
 $\begin{array}{r} 3.6 \\ 1.3 \end{array}$ 
 $\begin{array}{r} 3.1 \\ 1.0 \end{array}$ 
 $\begin{array}{r} 2.2 \\ 0.4 \end{array}$ 
 $\begin{array}{r} 3.0 \\ 8 \end{array}$ 
 $\begin{array}{r} 5.1 \\ 14 \end{array}$ 
 $\begin{array}{r} 5.7 \\ 18 \end{array}$ 
 $\begin{array}{r} 6.8 \\ 33 \end{array}$ 
 $\begin{array}{r} 4 \overline{) 5.7} \\ 1 \overline{) 3.5} \end{array}$

$\begin{array}{r} 1 \overline{) 4.4} \\ 4 \overline{) 12.1} \end{array}$ 
 $\begin{array}{r} 4.1 \\ 5.3 \end{array}$ 
 $\begin{array}{r} 4.6 \\ 2.1 \end{array}$ 
 $\begin{array}{r} 7.1 \\ 1.3 \end{array}$ 
 $\begin{array}{r} 6.2 \\ 8 \end{array}$ 
 $\begin{array}{r} 6.6 \\ 2 \end{array}$ 
 $\begin{array}{r} 6.7 \\ 0.2 \end{array}$ 
 $\begin{array}{r} 6.9 \\ 5 \end{array}$ 
 $\begin{array}{r} 7.3 \\ 9 \end{array}$ 
 $\begin{array}{r} 7.0 \\ 12 \end{array}$ 
 $\begin{array}{r} 7.6 \\ 21 \end{array}$ 
 $\begin{array}{r} 8.5 \\ 33 \end{array}$ 
 $\begin{array}{r} 10 \overline{) 7.5} \\ 1 \overline{) 7.0} \end{array}$

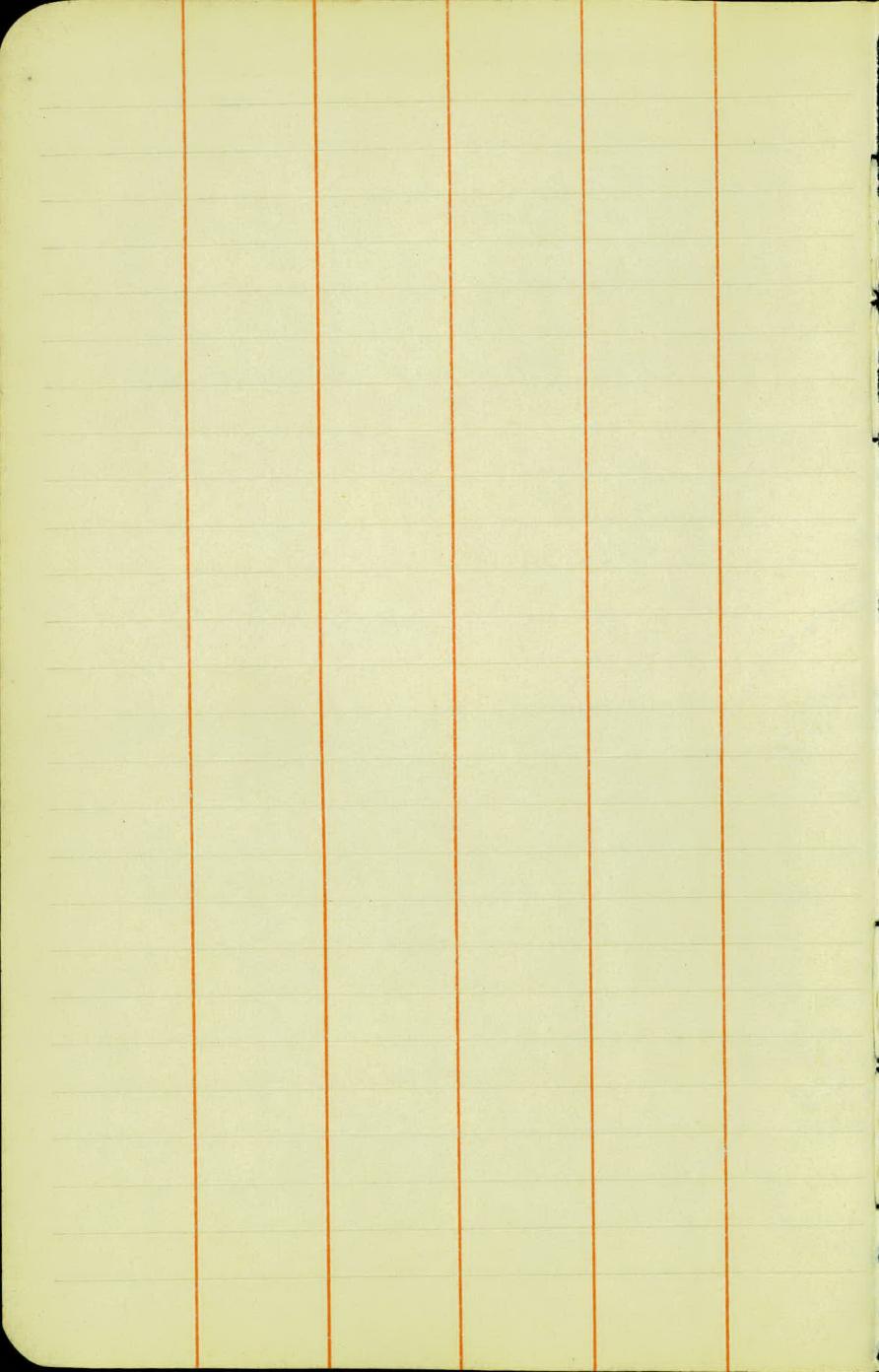
$\begin{array}{r} 0 \overline{) 2.8} \\ 2 \overline{) 7.0} \end{array}$ 
 $\begin{array}{r} 2.0 \\ 3.3 \end{array}$ 
 $\begin{array}{r} 2.5 \\ 2.6 \end{array}$ 
 $\begin{array}{r} 4.4 \\ 1.4 \end{array}$ 
 $\begin{array}{r} 5.5 \\ 1.5 \end{array}$ 
 $\begin{array}{r} 5.0 \\ 1.0 \end{array}$ 
 $\begin{array}{r} 5.1 \\ 10 \end{array}$ 
 $\begin{array}{r} 5.4 \\ 7 \end{array}$ 
 $\begin{array}{r} 5.5 \\ 10 \end{array}$ 
 $\begin{array}{r} 5.4 \\ 12 \end{array}$ 
 $\begin{array}{r} 5.4 \\ 18 \end{array}$ 
 $\begin{array}{r} 5.6 \\ 33 \end{array}$ 
 $\begin{array}{r} 4 \overline{) 5.4} \\ 2 \overline{) 10.4} \end{array}$

$\begin{array}{r} 2.3 \\ 3.3 \end{array}$ 
 $\begin{array}{r} 3.4 \\ 2.4 \end{array}$ 
 $\begin{array}{r} 5.4 \\ 1.7 \end{array}$ 
 $\begin{array}{r} 5.1 \\ 5 \end{array}$ 
 $\begin{array}{r} 5.3 \\ 5 \end{array}$ 
 $\begin{array}{r} 5.6 \\ 1.3 \end{array}$ 
 $\begin{array}{r} 5.8 \\ 2.3 \end{array}$ 
 $\begin{array}{r} 6.0 \\ 3.3 \end{array}$

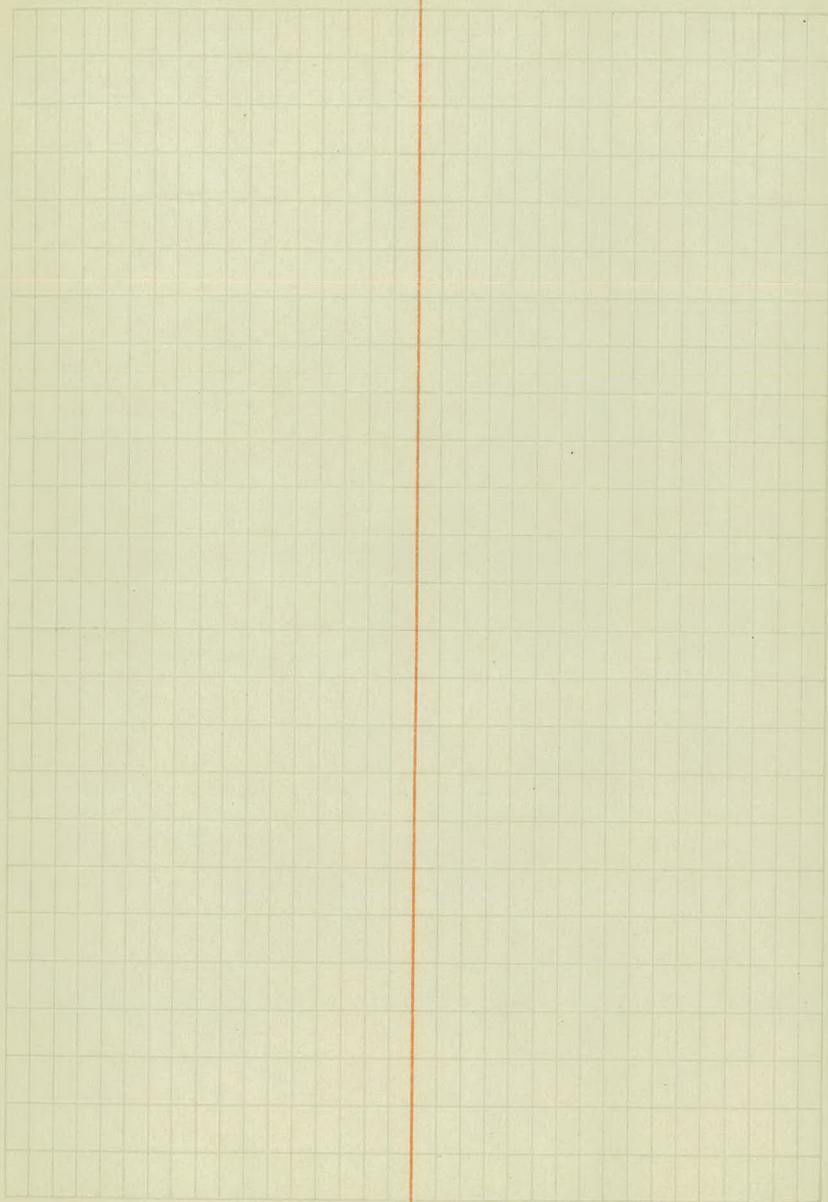
$\begin{array}{r} 5.2 \\ 3.3 \end{array}$ 
 $\begin{array}{r} 5.4 \\ 2.9 \end{array}$ 
 $\begin{array}{r} 5.5 \\ 1.9 \end{array}$ 
 $\begin{array}{r} 5.2 \\ 5 \end{array}$ 
 $\begin{array}{r} 6.0 \\ 12 \end{array}$ 
 $\begin{array}{r} 6.0 \\ 14 \end{array}$ 
 $\begin{array}{r} 6.8 \\ 17 \end{array}$ 
 $\begin{array}{r} 7.1 \\ 33 \end{array}$

$\begin{array}{r} 5.0 \\ 3.3 \end{array}$ 
 $\begin{array}{r} 5.3 \\ 1.3 \end{array}$ 
 $\begin{array}{r} 5.6 \\ 5 \end{array}$ 
 $\begin{array}{r} 5.8 \\ 1.3 \end{array}$ 
 $\begin{array}{r} 6.2 \\ 3.3 \end{array}$

SPK IN 18" OAK N.W. COR. INT.







|     |       |        |  |        |
|-----|-------|--------|--|--------|
| BM. | 11.71 | 907.22 |  | 895.51 |
|-----|-------|--------|--|--------|

0+00

+10

+15

+23

0+23

X Drain

15" - 44' C.M.C. (2100)

+33

+50

1+00

+50

T.P

11.23

917.00

145

905.77

2+00

+50

3+00

+25

Left.

RIGHT

(77)

$$\begin{array}{r} 76 \\ 50 \end{array} \quad \begin{array}{r} 765 \\ 20 \end{array} \quad \begin{array}{r} 775 \\ 25 \end{array} \quad \begin{array}{r} 77 \\ 50 \end{array}$$

(78)

$$\begin{array}{r} 77 \\ 50 \end{array} \quad \begin{array}{r} 77 \\ 20 \end{array} \quad \begin{array}{r} 77 \\ 25 \end{array} \quad \begin{array}{r} 77 \\ 50 \end{array}$$

(76)

$$\begin{array}{r} 77 \\ 33 \end{array} \quad \begin{array}{r} 76 \\ 18 \end{array} \quad \begin{array}{r} 74 \\ 22 \end{array} \quad \begin{array}{r} 77 \\ 33 \end{array}$$

(74)

$$\begin{array}{r} 92 \\ 33 \end{array} \quad \begin{array}{r} 80 \\ 23 \end{array} \quad \begin{array}{r} 72 \\ 17 \end{array} \quad \begin{array}{r} 74 \\ 17 \end{array} \quad \begin{array}{r} 97 \\ 33 \end{array}$$

12.15

34

FLOWLINE

10.65

20

$$\begin{array}{r} 61 \\ 33 \end{array} \quad \begin{array}{r} 69 \\ 27 \end{array} \quad \begin{array}{r} 89 \\ 26 \end{array} \quad \begin{array}{r} 80 \\ 21 \end{array} \quad \begin{array}{r} 73 \\ 17 \end{array} \quad \begin{array}{r} 69 \\ 14 \end{array} \quad \begin{array}{r} 70 \\ 18 \end{array} \quad \begin{array}{r} 56 \\ 33 \end{array} \quad \begin{array}{r} 90 \\ 33 \end{array}$$

(6.5)

$$\begin{array}{r} 54 \\ 33 \end{array} \quad \begin{array}{r} 53 \\ 25 \end{array} \quad \begin{array}{r} 81 \\ 21 \end{array} \quad \begin{array}{r} 88 \\ 16 \end{array} \quad \begin{array}{r} 64 \\ 13 \end{array} \quad \begin{array}{r} 61 \\ 13 \end{array} \quad \begin{array}{r} 65 \\ 17 \end{array} \quad \begin{array}{r} 85 \\ 27 \end{array} \quad \begin{array}{r} 91 \\ 27 \end{array} \quad \begin{array}{r} 84 \\ 33 \end{array}$$

(4.1)

$$\begin{array}{r} 51 \\ 33 \end{array} \quad \begin{array}{r} 80 \\ 23 \end{array} \quad \begin{array}{r} 57 \\ 22 \end{array} \quad \begin{array}{r} 55 \\ 16 \end{array} \quad \begin{array}{r} 41 \\ 13 \end{array} \quad \begin{array}{r} 39 \\ 13 \end{array} \quad \begin{array}{r} 40 \\ 17 \end{array} \quad \begin{array}{r} 68 \\ 25 \end{array} \quad \begin{array}{r} 71 \\ 27 \end{array} \quad \begin{array}{r} 62 \\ 27 \end{array} \quad \begin{array}{r} 63 \\ 33 \end{array}$$

(1.1)

$$\begin{array}{r} 42 \\ 33 \end{array} \quad \begin{array}{r} 56 \\ 16 \end{array} \quad \begin{array}{r} 65 \\ 13 \end{array} \quad \begin{array}{r} 17 \\ 13 \end{array} \quad \begin{array}{r} 45 \\ 19 \end{array} \quad \begin{array}{r} 50 \\ 23 \end{array} \quad \begin{array}{r} 30 \\ 26 \end{array} \quad \begin{array}{r} 18 \\ 27 \end{array} \quad \begin{array}{r} 12 \\ 33 \end{array}$$

Art. Berthoom started to work

$$\begin{array}{r} 113 \\ 33 \end{array} \quad \begin{array}{r} 107 \\ 16 \end{array} \quad \begin{array}{r} 85 \\ 13 \end{array} \quad \begin{array}{r} 85 \\ 13 \end{array} \quad \begin{array}{r} 95 \\ 16 \end{array} \quad \begin{array}{r} 104 \\ 23 \end{array} \quad \begin{array}{r} 81 \\ 26 \end{array} \quad \begin{array}{r} 59 \\ 33 \end{array}$$

(6.3)

$$\begin{array}{r} 60 \\ 33 \end{array} \quad \begin{array}{r} 58 \\ 23 \end{array} \quad \begin{array}{r} 80 \\ 20 \end{array} \quad \begin{array}{r} 80 \\ 16 \end{array} \quad \begin{array}{r} 65 \\ 13 \end{array} \quad \begin{array}{r} 64 \\ 13 \end{array} \quad \begin{array}{r} 63 \\ 16 \end{array} \quad \begin{array}{r} 80 \\ 20 \end{array} \quad \begin{array}{r} 83 \\ 23 \end{array} \quad \begin{array}{r} 50 \\ 28 \end{array} \quad \begin{array}{r} 31 \\ 28 \end{array} \quad \begin{array}{r} 08 \\ 33 \end{array}$$

(1.9)

$$\begin{array}{r} 28 \\ 33 \end{array} \quad \begin{array}{r} 23 \\ 25 \end{array} \quad \begin{array}{r} 67 \\ 21 \end{array} \quad \begin{array}{r} 67 \\ 16 \end{array} \quad \begin{array}{r} 50 \\ 13 \end{array} \quad \begin{array}{r} 50 \\ 13 \end{array} \quad \begin{array}{r} 51 \\ 16 \end{array} \quad \begin{array}{r} 67 \\ 20 \end{array} \quad \begin{array}{r} 67 \\ 26 \end{array} \quad \begin{array}{r} 13 \\ 26 \end{array} \quad \begin{array}{r} +10 \\ 33 \end{array}$$

(1.1)

$$\begin{array}{r} 22 \\ 33 \end{array} \quad \begin{array}{r} 17 \\ 25 \end{array} \quad \begin{array}{r} 66 \\ 20 \end{array} \quad \begin{array}{r} 63 \\ 16 \end{array} \quad \begin{array}{r} 46 \\ 13 \end{array} \quad \begin{array}{r} 44 \\ 13 \end{array} \quad \begin{array}{r} 44 \\ 16 \end{array} \quad \begin{array}{r} 63 \\ 21 \end{array} \quad \begin{array}{r} 64 \\ 24 \end{array} \quad \begin{array}{r} 18 \\ 24 \end{array} \quad \begin{array}{r} 03 \\ 28 \end{array} \quad \begin{array}{r} 05 \\ 33 \end{array}$$

+

H1

-

L7cv

917.00

+65

4

+50

T.P.

438

917.90

3.48

913.52

5

+50

6

+25

+50

T.P.

8.50

922.98

3.42

914.48

7

+50

8

+50





|        | +    | H.I.   | -     | Elev   |
|--------|------|--------|-------|--------|
| 9      |      | 922.98 |       |        |
| +50    |      |        |       |        |
| 10     |      |        |       |        |
| +50    |      |        |       |        |
| T.P.   | 1.70 | 912.67 | 12.01 | 910.97 |
| 11     |      |        |       |        |
| +30    |      |        |       |        |
| 11 +50 |      |        |       |        |
| 12     |      |        |       |        |
| B.M.   | 3.83 | 907.74 | 8.75  | 903.92 |
| +50    |      |        |       | 903.91 |
| 13     |      |        |       |        |
| +10    |      |        |       |        |
| +36    |      |        |       |        |

Left

L

Right

|                  |                  |                   |                   |                  |                   |                  |                   |                   |                  |                  |
|------------------|------------------|-------------------|-------------------|------------------|-------------------|------------------|-------------------|-------------------|------------------|------------------|
| $\frac{6.9}{40}$ | $\frac{6.8}{33}$ | $\frac{11.7}{28}$ | $\frac{11.2}{16}$ | $\frac{9.5}{13}$ | $\frac{6.7}{9.2}$ | $\frac{9.3}{13}$ | $\frac{11.1}{16}$ | $\frac{11.3}{24}$ | $\frac{4.0}{33}$ | $\frac{4.5}{40}$ |
|------------------|------------------|-------------------|-------------------|------------------|-------------------|------------------|-------------------|-------------------|------------------|------------------|

|                  |                  |                   |                   |                   |                     |                   |                   |                   |                  |                  |
|------------------|------------------|-------------------|-------------------|-------------------|---------------------|-------------------|-------------------|-------------------|------------------|------------------|
| $\frac{4.8}{40}$ | $\frac{4.4}{32}$ | $\frac{12.2}{24}$ | $\frac{12.1}{16}$ | $\frac{10.3}{13}$ | $\frac{10.3}{10.1}$ | $\frac{10.4}{13}$ | $\frac{12.3}{16}$ | $\frac{12.3}{20}$ | $\frac{0.0}{34}$ | $\frac{1.0}{40}$ |
|------------------|------------------|-------------------|-------------------|-------------------|---------------------|-------------------|-------------------|-------------------|------------------|------------------|

|                  |                  |                   |                   |                   |                     |                   |                   |                   |                  |                  |
|------------------|------------------|-------------------|-------------------|-------------------|---------------------|-------------------|-------------------|-------------------|------------------|------------------|
| $\frac{9.0}{40}$ | $\frac{8.2}{33}$ | $\frac{13.0}{26}$ | $\frac{12.6}{16}$ | $\frac{11.0}{13}$ | $\frac{11.4}{10.8}$ | $\frac{11.3}{13}$ | $\frac{13.3}{16}$ | $\frac{13.3}{20}$ | $\frac{0.8}{33}$ | $\frac{1.8}{40}$ |
|------------------|------------------|-------------------|-------------------|-------------------|---------------------|-------------------|-------------------|-------------------|------------------|------------------|

|                   |                   |                   |                   |                   |                     |                   |                   |                   |                  |                  |
|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------|-------------------|-------------------|-------------------|------------------|------------------|
| $\frac{12.4}{40}$ | $\frac{11.4}{33}$ | $\frac{14.0}{30}$ | $\frac{12.8}{16}$ | $\frac{12.2}{13}$ | $\frac{12.0}{11.9}$ | $\frac{12.2}{13}$ | $\frac{14.5}{17}$ | $\frac{14.5}{21}$ | $\frac{5.4}{31}$ | $\frac{6.4}{40}$ |
|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------|-------------------|-------------------|-------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                   |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{4.2}{35}$ | $\frac{3.9}{33}$ | $\frac{4.9}{30}$ | $\frac{4.2}{16}$ | $\frac{2.7}{13}$ | $\frac{2.7}{2.7}$ | $\frac{2.7}{13}$ | $\frac{4.9}{17}$ | $\frac{5.1}{26}$ | $\frac{1.4}{30}$ | $\frac{2.0}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                   |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{6.7}{33}$ | $\frac{6.1}{27}$ | $\frac{6.3}{22}$ | $\frac{5.7}{17}$ | $\frac{3.7}{13}$ | $\frac{3.4}{2.7}$ | $\frac{3.8}{13}$ | $\frac{5.4}{17}$ | $\frac{6.1}{27}$ | $\frac{5.6}{29}$ | $\frac{6.0}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                   |                  |                  |                  |
|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|
| $\frac{8.4}{33}$ | $\frac{6.8}{18}$ | $\frac{4.0}{13}$ | $\frac{3.6}{4.0}$ | $\frac{4.2}{13}$ | $\frac{6.4}{17}$ | $\frac{7.6}{33}$ |
|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|

|                   |                   |                  |                  |                   |                   |                   |
|-------------------|-------------------|------------------|------------------|-------------------|-------------------|-------------------|
| $\frac{10.1}{33}$ | $\frac{10.3}{24}$ | $\frac{9.4}{19}$ | $\frac{5.2}{13}$ | $\frac{5.4}{5.3}$ | $\frac{11.0}{22}$ | $\frac{10.8}{33}$ |
|-------------------|-------------------|------------------|------------------|-------------------|-------------------|-------------------|

spike in 12' Oak 100'  $\frac{13+20}{16}$

|                  |                  |                  |                  |                  |                  |                 |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|------------------|-----------------|------------------|------------------|------------------|
| $\frac{5.2}{33}$ | $\frac{5.3}{28}$ | $\frac{6.0}{25}$ | $\frac{6.0}{20}$ | $\frac{1.8}{13}$ | $\frac{1.5}{16}$ | $\frac{16}{13}$ | $\frac{7.6}{23}$ | $\frac{7.7}{29}$ | $\frac{7.2}{33}$ |
|------------------|------------------|------------------|------------------|------------------|------------------|-----------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                   |                  |                  |                  |
|------------------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|
| $\frac{4.8}{33}$ | $\frac{5.9}{21}$ | $\frac{6.5}{19}$ | $\frac{3.2}{13}$ | $\frac{3.1}{3.1}$ | $\frac{3.1}{13}$ | $\frac{8.7}{23}$ | $\frac{8.4}{33}$ |
|------------------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|

|                  |                  |                  |                   |                  |                  |                  |
|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|
| $\frac{7.4}{33}$ | $\frac{6.6}{18}$ | $\frac{3.4}{13}$ | $\frac{3.4}{3.3}$ | $\frac{3.4}{19}$ | $\frac{8.9}{23}$ | $\frac{8.9}{33}$ |
|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                   |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|
| $\frac{6.9}{33}$ | $\frac{6.6}{20}$ | $\frac{5.0}{16}$ | $\frac{5.1}{13}$ | $\frac{4.0}{13}$ | $\frac{3.9}{3.9}$ | $\frac{3.9}{13}$ | $\frac{9.7}{22}$ | $\frac{9.4}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|

Sta. + HI - Elev.

907.74

+50

+70

+90

14

+50

T.P. 194 90037 9.31 898.43

15

+50

16

+50

+81 X Drain 24" X 18" R3

17

+50

18

T.P. 10.91 90223 9.05 891.32



Cold W. m. d. y.

25

LH

L

R.

10/25/30

$$\begin{array}{r} 49 \quad 4.9 \quad 46 \quad 45 \quad 100 \quad 100 \\ 33 \quad 74 \quad 73 \quad 41 \quad 73 \quad 21 \quad 33 \end{array}$$

$$\begin{array}{r} 64 \quad 72 \quad 56 \quad 54 \quad 48 \quad 46 \quad 48 \quad 49 \\ 33 \quad 27 \quad 22 \quad 74 \quad 73 \quad 73 \quad 74 \quad 33 \end{array}$$

$$\begin{array}{r} 90 \quad 104 \quad 104 \quad 5.8 \quad 57 \quad 71 \quad 6.6 \quad 6.2 \\ 33 \quad 23 \quad 21 \quad 73 \quad 73 \quad 76 \quad 20 \quad 33 \end{array}$$

$$\begin{array}{r} 108 \quad 112 \quad 60 \quad 60 \quad 109 \quad 109 \\ 33 \quad 21 \quad 73 \quad 73 \quad 21 \quad 33 \end{array}$$

$$\begin{array}{r} 108 \quad 144 \quad 76 \quad 76 \quad 160 \quad 160 \\ 33 \quad 23 \quad 73 \quad 77 \quad 73 \quad 27 \quad 33 \end{array}$$

$$\begin{array}{r} 24 \quad 91 \quad 20 \quad 1.9 \quad 10.4 \quad 10.2 \\ 33 \quad 24 \quad 73 \quad 73 \quad 26 \quad 33 \end{array}$$

$$\begin{array}{r} 117 \quad 118 \quad 36 \quad 36 \quad 121 \quad 121 \\ 33 \quad 26 \quad 73 \quad 33 \quad 73 \quad 26 \quad 33 \end{array}$$

$$\begin{array}{r} 142 \quad 142 \quad 48 \quad 50 \quad 132 \quad 13.4 \\ 33 \quad 27 \quad 73 \quad 73 \quad 26 \quad 33 \end{array}$$

$$\begin{array}{r} 151 \quad 151 \quad 57 \quad 57 \quad 130 \quad 13.2 \\ 33 \quad 27 \quad 73 \quad 73 \quad 26 \quad 33 \end{array}$$

$$\begin{array}{r} 1565 \quad 15.1 \quad 6.7 \quad 6.7 \quad 66 \quad 12.7 \quad 12.8 \\ 24 \quad 27 \quad 73 \quad 6.7 \quad 73 \quad 25 \quad 33 \end{array}$$

$$\begin{array}{r} 146 \quad 146 \quad 70 \quad 71 \quad 125 \quad 12.5 \\ 33 \quad 24 \quad 73 \quad 73 \quad 22 \quad 33 \end{array}$$

$$\begin{array}{r} 133 \quad 133 \quad 76 \quad 7.4 \quad 11.6 \quad 11.7 \\ 33 \quad 22 \quad 73 \quad 73 \quad 22 \quad 33 \end{array}$$

540. + 41. - 270

902.23

+50

19

+50

B.M.

20

7.48

894.75 894.78

+20

+50

21

+50

22

T.P

540

899.76

7.87

894.36

+50

23

+50

10/25/30

Lit

L

(92)

$$\frac{116}{33} \quad \frac{108}{29} \quad \frac{116}{27} \quad \frac{114}{18} \quad \frac{94}{13}$$

92

$$\frac{94}{13} \quad \frac{106}{17} \quad \frac{108}{26} \quad \frac{93}{29} \quad \frac{93}{33}$$

(90)

$$\frac{65}{40} \quad \frac{63}{33} \quad \frac{115}{26} \quad \frac{108}{17} \quad \frac{91}{13}$$

90

$$\frac{88}{13} \quad \frac{107}{18} \quad \frac{110}{26} \quad \frac{40}{33} \quad \frac{44}{40}$$

(88)

$$\frac{54}{37} \quad \frac{50}{33} \quad \frac{110}{26} \quad \frac{107}{17} \quad \frac{88}{13}$$

88

$$\frac{87}{13} \quad \frac{104}{17} \quad \frac{107}{24} \quad \frac{24}{33} \quad \frac{28}{40}$$

(86)

$$\frac{36}{37} \quad \frac{21}{33} \quad \frac{107}{24} \quad \frac{105}{15} \quad \frac{84}{13}$$

86

$$\frac{86}{13} \quad \frac{104}{17} \quad \frac{103}{24} \quad \frac{06}{33} \quad \frac{11}{40}$$

(84)

$$\frac{26}{37} \quad \frac{21}{33} \quad \frac{108}{26} \quad \frac{107}{17} \quad \frac{88}{13}$$

84

$$\frac{88}{13} \quad \frac{104}{17} \quad \frac{104}{24} \quad \frac{403}{33} \quad \frac{06}{40}$$

(82)

$$\frac{44}{38} \quad \frac{40}{33} \quad \frac{110}{25} \quad \frac{109}{17} \quad \frac{85}{13}$$

82

$$\frac{86}{13} \quad \frac{106}{17} \quad \frac{107}{25} \quad \frac{22}{33} \quad \frac{21}{40}$$

(80)

$$\frac{94}{33} \quad \frac{93}{30} \quad \frac{105}{27} \quad \frac{104}{16} \quad \frac{84}{13}$$

80

$$\frac{84}{13} \quad \frac{105}{18} \quad \frac{106}{24} \quad \frac{62}{31} \quad \frac{62}{33}$$

(81)

$$\frac{122}{33} \quad \frac{106}{17} \quad \frac{83}{13}$$

81

$$\frac{80}{13} \quad \frac{103}{18} \quad \frac{102}{24} \quad \frac{78}{27} \quad \frac{73}{33}$$

(79)

$$\frac{138}{33} \quad \frac{131}{21} \quad \frac{81}{13}$$

79

$$\frac{81}{13} \quad \frac{103}{17} \quad \frac{104}{23} \quad \frac{93}{24} \quad \frac{71}{33}$$

(77)

$$\frac{91}{33} \quad \frac{89}{19} \quad \frac{54}{13}$$

77

$$\frac{56}{13} \quad \frac{79}{16} \quad \frac{80}{22} \quad \frac{67}{23} \quad \frac{67}{33}$$

(75)

$$\frac{96}{33} \quad \frac{83}{18} \quad \frac{52}{13}$$

75

$$\frac{54}{13} \quad \frac{76}{16} \quad \frac{76}{19} \quad \frac{58}{22} \quad \frac{47}{33}$$

(73)

$$\frac{96}{33} \quad \frac{83}{18} \quad \frac{52}{13}$$

73

$$\frac{54}{13} \quad \frac{77}{17} \quad \frac{77}{19} \quad \frac{50}{23} \quad \frac{36}{33}$$

| Sta. | + | HI.    | - | Elev |
|------|---|--------|---|------|
|      |   | 899.76 |   |      |

24

+50

25

+50

26 +500 10.00

|     |      |        |      |        |        |
|-----|------|--------|------|--------|--------|
| T.P | 7.93 | 904.13 | 3.57 | 896.19 | 896.20 |
|-----|------|--------|------|--------|--------|

+10

+12 X Drain 15" x 30' C.M.

+15

+25

+36

+51

+60

X Drain 15" x 30' C.M.

+65



10/25/30 Lt

27

|     |     |     |      |     |     |     |     |     |
|-----|-----|-----|------|-----|-----|-----|-----|-----|
| 4.9 | 9.1 | 5.0 | (10) | 5.3 | 7.4 | 7.5 | 6.6 | 5.2 |
| 33  | 20  | 13  | 5.0  | 13  | 16  | 20  | 21  | 33  |

|     |     |     |      |     |     |     |     |     |
|-----|-----|-----|------|-----|-----|-----|-----|-----|
| 9.4 | 8.4 | 5.0 | (11) | 4.9 | 7.0 | 7.1 | 6.1 | 5.6 |
| 33  | 19  | 13  | 4.9  | 13  | 16  | 19  | 21  | 33  |

|     |     |     |      |     |     |     |     |     |
|-----|-----|-----|------|-----|-----|-----|-----|-----|
| 7.4 | 6.7 | 4.6 | (12) | 4.9 | 6.5 | 6.7 | 5.4 | 5.0 |
| 33  | 17  | 13  | 4.6  | 13  | 16  | 20  | 21  | 33  |

|     |     |     |     |     |      |     |     |     |     |     |
|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|
| 6.8 | 6.8 | 6.4 | 6.7 | 4.8 | (13) | 4.8 | 6.6 | 6.6 | 5.5 | 5.0 |
| 33  | 28  | 24  | 16  | 13  | 4.5  | 13  | 17  | 20  | 21  | 33  |

|     |     |     |      |     |     |     |     |     |
|-----|-----|-----|------|-----|-----|-----|-----|-----|
| 4.7 | 7.2 | 4.7 | (14) | 4.6 | 6.0 | 6.0 | 5.0 | 4.9 |
| 33  | 17  | 13  | 4.7  | 13  | 16  | 19  | 21  | 33  |

sp. Ke in TP S.E. Co. Rd 18" & Back 4.

|          |      |      |      |     |      |     |      |      |     |     |
|----------|------|------|------|-----|------|-----|------|------|-----|-----|
| 10/27/30 | 12.3 | 11.7 | 10.6 | 9.9 | (15) | 9.0 | 10.4 | 10.4 | 9.3 | 9.0 |
|          | 33   | 23   | 16   | 13  | 8.7  | 13  | 16   | 19   | 21  | 33  |

|       |      |     |      |     |      |      |
|-------|------|-----|------|-----|------|------|
| 12.20 | 11.8 | 9.1 | (16) | 9.0 | 10.9 | 10.2 |
| 15    | 17   | 14  | 8.8  | 13  | 16   | 33   |

|     |     |     |
|-----|-----|-----|
| 9.2 | 8.7 | 7.8 |
| 33  |     | 33  |

|     |     |     |
|-----|-----|-----|
| 8.8 | 8.3 | 7.6 |
| 33  |     | 33  |

|     |     |     |
|-----|-----|-----|
| 8.8 | 8.3 | 7.7 |
| 33  |     | 33  |

|      |      |      |     |      |     |      |     |
|------|------|------|-----|------|-----|------|-----|
| 11.4 | 11.4 | 10.1 | 8.6 | (17) | 8.3 | 10.3 | 9.7 |
| 33   | 17   | 16   | 13  | 8.2  | 13  | 15   | 33  |

|      |      |      |      |     |      |     |     |     |     |     |
|------|------|------|------|-----|------|-----|-----|-----|-----|-----|
| 10.3 | 10.0 | 11.1 | 10.8 | 8.6 | (18) | 8.3 | 9.3 | 9.9 | 8.7 | 8.7 |
| 33   | 21   | 19   | 16   | 13  | 8.2  | 13  | 16  | 18  | 20  | 33  |

Sta.

+

141.

-

Elev

904.13

27

+50

28

+50

T.P.

11.55

915.23

0.45

903.68

29

+50

30

B.M.

7.79

907.44

907.43

+50

31

+50

32

+20

L.F.

L.F.

L.F.

$$\begin{array}{cccccc} \frac{7.6}{33} & \frac{9.4}{20} & \frac{10.0}{19} & \frac{9.6}{16} & \frac{7.7}{13} & \frac{7.6}{13} \end{array}$$

(1)

$$\frac{7.7}{13} \quad \frac{9.4}{15} \quad \frac{9.4}{18} \quad \frac{8.4}{20} \quad \frac{8.2}{33}$$

$$\frac{5.5}{33} \quad \frac{6.4}{22} \quad \frac{8.0}{20} \quad \frac{7.8}{16} \quad \frac{6.1}{13} \quad \frac{5.9}{13}$$

(6)

$$\frac{6.0}{13} \quad \frac{7.8}{15} \quad \frac{7.9}{18} \quad \frac{6.9}{20} \quad \frac{7.0}{33}$$

$$\frac{1.7}{33} \quad \frac{2.8}{24} \quad \frac{5.7}{19} \quad \frac{5.4}{16} \quad \frac{3.6}{13} \quad \frac{3.9}{13}$$

(3)

$$\frac{3.9}{13} \quad \frac{5.4}{16} \quad \frac{5.5}{18} \quad \frac{3.9}{20} \quad \frac{4.5}{33}$$

$$\frac{0.6}{33} \quad \frac{1.6}{23} \quad \frac{3.4}{20} \quad \frac{3.8}{16} \quad \frac{1.6}{13} \quad \frac{1.6}{13}$$

(1)

$$\frac{1.8}{13} \quad \frac{3.8}{15} \quad \frac{3.9}{18} \quad \frac{2.8}{19} \quad \frac{2.9}{33}$$

$$\frac{10.9}{33} \quad \frac{11.6}{21} \quad \frac{12.7}{19} \quad \frac{12.5}{15} \quad \frac{10.8}{13} \quad \frac{10.6}{13}$$

(10)

$$\frac{10.8}{13} \quad \frac{12.6}{16} \quad \frac{12.7}{18} \quad \frac{12.0}{19} \quad \frac{11.9}{33}$$

$$\frac{8.3}{33} \quad \frac{8.7}{22} \quad \frac{10.8}{19} \quad \frac{10.9}{16} \quad \frac{8.9}{13} \quad \frac{8.5}{13}$$

(8)

$$\frac{8.5}{13} \quad \frac{10.6}{16} \quad \frac{10.6}{19} \quad \frac{7.5}{23} \quad \frac{7.8}{33}$$

$$\frac{7.7}{33} \quad \frac{7.3}{21} \quad \frac{8.7}{19} \quad \frac{8.7}{16} \quad \frac{7.1}{13} \quad \frac{7.1}{13}$$

(7)

$$\frac{7.1}{13} \quad \frac{8.7}{16} \quad \frac{8.8}{20} \quad \frac{8.0}{22} \quad \frac{8.8}{33}$$

$$\frac{8.3}{33} \quad \frac{7.9}{16} \quad \frac{6.0}{13} \quad \frac{5.7}{13} \quad \frac{7.1}{16} \quad \frac{7.1}{19}$$

(5)

$$\frac{6.6}{20} \quad \frac{6.0}{33}$$

$$\frac{7.7}{33} \quad \frac{7.7}{21} \quad \frac{8.1}{18} \quad \frac{5.2}{13} \quad \frac{4.9}{13} \quad \frac{4.9}{13}$$

(1)

$$\frac{7.1}{17} \quad \frac{6.8}{33}$$

$$\frac{5.4}{33} \quad \frac{5.5}{22} \quad \frac{6.4}{21} \quad \frac{6.5}{18} \quad \frac{4.1}{13} \quad \frac{3.9}{13}$$

(3)

$$\frac{6.4}{17} \quad \frac{6.4}{33}$$

$$\frac{2.2}{33} \quad \frac{2.1}{23} \quad \frac{5.4}{21} \quad \frac{5.4}{17} \quad \frac{3.5}{13} \quad \frac{3.2}{13}$$

(2)

$$\frac{5.5}{16} \quad \frac{5.5}{19} \quad \frac{3.8}{22} \quad \frac{3.9}{33}$$

$$\frac{1.6}{33} \quad \frac{1.0}{23} \quad \frac{5.0}{21} \quad \frac{4.9}{17} \quad \frac{3.1}{13} \quad \frac{3.2}{13}$$

(2)

$$\frac{5.1}{16} \quad \frac{5.4}{19} \quad \frac{2.6}{23} \quad \frac{2.8}{33}$$

915.23

+50

33

+50

34

+50

T.P.

4.91

917.11

3.03

912.20

35

976

907.35

+50

36

+50

+98

X Drain 24" X 42' P<sup>3</sup>

37

+50

38



Left

Head

Right

|                  |                  |                  |                  |                  |                         |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-------------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{2.0}{33}$ | $\frac{1.4}{24}$ | $\frac{4.4}{21}$ | $\frac{4.4}{17}$ | $\frac{2.9}{13}$ | (A)<br>$\frac{2.6}{13}$ | $\frac{3.1}{13}$ | $\frac{4.8}{16}$ | $\frac{5.1}{20}$ | $\frac{2.0}{23}$ | $\frac{2.0}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-------------------------|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                         |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-------------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{2.8}{33}$ | $\frac{2.7}{22}$ | $\frac{4.5}{20}$ | $\frac{4.1}{16}$ | $\frac{2.6}{13}$ | (B)<br>$\frac{2.6}{13}$ | $\frac{2.9}{13}$ | $\frac{4.6}{16}$ | $\frac{4.6}{20}$ | $\frac{2.6}{23}$ | $\frac{2.4}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-------------------------|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                         |                  |                                        |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-------------------------|------------------|----------------------------------------|------------------|------------------|------------------|------------------|
| $\frac{3.0}{33}$ | $\frac{3.6}{21}$ | $\frac{4.8}{19}$ | $\frac{4.5}{16}$ | $\frac{2.7}{13}$ | (A)<br>$\frac{2.3}{13}$ | $\frac{2.8}{13}$ | <del><math>\frac{4.4}{13}</math></del> | $\frac{4.4}{16}$ | $\frac{4.5}{21}$ | $\frac{4.0}{22}$ | $\frac{3.8}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-------------------------|------------------|----------------------------------------|------------------|------------------|------------------|------------------|

(Excuse Please)

|                  |                  |                  |                  |                  |                         |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-------------------------|------------------|------------------|------------------|
| $\frac{4.2}{33}$ | $\frac{4.4}{22}$ | $\frac{5.1}{21}$ | $\frac{4.9}{17}$ | $\frac{2.8}{13}$ | (A)<br>$\frac{2.6}{13}$ | $\frac{2.6}{13}$ | $\frac{5.3}{18}$ | $\frac{5.0}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-------------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                          |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|--------------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{2.9}{33}$ | $\frac{2.5}{23}$ | $\frac{4.5}{21}$ | $\frac{4.7}{17}$ | $\frac{2.5}{13}$ | (30)<br>$\frac{2.4}{13}$ | $\frac{2.8}{13}$ | $\frac{4.5}{16}$ | $\frac{4.8}{21}$ | $\frac{3.4}{23}$ | $\frac{2.8}{33}$ |
|------------------|------------------|------------------|------------------|------------------|--------------------------|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                         |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-------------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{4.6}{33}$ | $\frac{4.3}{23}$ | $\frac{6.5}{21}$ | $\frac{6.5}{16}$ | $\frac{4.6}{13}$ | (W)<br>$\frac{4.3}{13}$ | $\frac{5.2}{13}$ | $\frac{3.4}{16}$ | $\frac{1.5}{20}$ | $\frac{1.4}{26}$ | $\frac{1.4}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-------------------------|------------------|------------------|------------------|------------------|------------------|

spike in TP 28'

|                  |                  |                  |                  |                  |                         |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-------------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{3.7}{33}$ | $\frac{4.2}{23}$ | $\frac{7.0}{20}$ | $\frac{6.4}{16}$ | $\frac{4.8}{13}$ | (W)<br>$\frac{4.4}{13}$ | $\frac{4.5}{13}$ | $\frac{6.6}{16}$ | $\frac{6.7}{22}$ | $\frac{2.8}{25}$ | $\frac{2.2}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-------------------------|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                         |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-------------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{4.4}{33}$ | $\frac{4.1}{23}$ | $\frac{7.4}{21}$ | $\frac{6.8}{16}$ | $\frac{5.3}{13}$ | (W)<br>$\frac{4.9}{13}$ | $\frac{5.0}{13}$ | $\frac{7.2}{16}$ | $\frac{7.4}{20}$ | $\frac{5.3}{22}$ | $\frac{4.5}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-------------------------|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                          |                  |                  |                   |
|------------------|------------------|------------------|--------------------------|------------------|------------------|-------------------|
| $\frac{8.7}{33}$ | $\frac{9.1}{18}$ | $\frac{5.4}{13}$ | (50)<br>$\frac{5.2}{13}$ | $\frac{5.3}{13}$ | $\frac{9.9}{12}$ | $\frac{10.7}{33}$ |
|------------------|------------------|------------------|--------------------------|------------------|------------------|-------------------|

|                  |                  |                  |                          |                  |                   |                   |
|------------------|------------------|------------------|--------------------------|------------------|-------------------|-------------------|
| $\frac{8.6}{33}$ | $\frac{9.3}{19}$ | $\frac{5.1}{13}$ | (51)<br>$\frac{5.1}{13}$ | $\frac{5.2}{13}$ | $\frac{10.0}{22}$ | $\frac{11.3}{33}$ |
|------------------|------------------|------------------|--------------------------|------------------|-------------------|-------------------|

Flawline

|                  |                  |                  |                  |                  |                          |                  |                  |                   |
|------------------|------------------|------------------|------------------|------------------|--------------------------|------------------|------------------|-------------------|
| $\frac{6.3}{33}$ | $\frac{6.5}{26}$ | $\frac{8.6}{24}$ | $\frac{8.2}{18}$ | $\frac{5.2}{13}$ | (61)<br>$\frac{5.2}{13}$ | $\frac{5.3}{13}$ | $\frac{8.3}{19}$ | $\frac{10.0}{33}$ |
|------------------|------------------|------------------|------------------|------------------|--------------------------|------------------|------------------|-------------------|

|                  |                  |                  |                  |                  |                          |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|--------------------------|------------------|------------------|------------------|
| $\frac{2.6}{33}$ | $\frac{2.7}{28}$ | $\frac{8.2}{24}$ | $\frac{8.1}{19}$ | $\frac{5.3}{13}$ | (61)<br>$\frac{5.0}{13}$ | $\frac{5.0}{13}$ | $\frac{6.9}{16}$ | $\frac{8.6}{33}$ |
|------------------|------------------|------------------|------------------|------------------|--------------------------|------------------|------------------|------------------|

Sta.      +      H.I.      -      Elev.

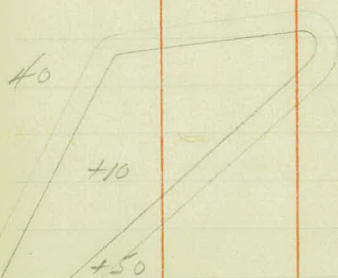
917.11

+35

39

+31 Lt side = ~~L~~ Twp. Rd.

+50



T.P.

11.22

927.26

1.07

916.04

41

B.M.

6.91

920.35

920.33

+35

+55

42

+50

Left

L

Right

$$\frac{0.3}{33}$$

$$\frac{0.6}{30}$$

$$\frac{8.8}{23}$$

$$\frac{8.0}{18}$$

$$\frac{5.0}{13}$$

$$\frac{9.1}{4.9}$$

$$\frac{5.0}{13}$$

$$\frac{7.0}{17}$$

$$\frac{9.5}{33}$$

$$\frac{6.1}{33}$$

$$\frac{7.6}{23}$$

$$\frac{7.9}{22}$$

$$\frac{7.5}{17}$$

$$\frac{4.7}{13}$$

$$\frac{4.0}{4.6}$$

$$\frac{4.6}{13}$$

$$\frac{11.6}{24}$$

$$\frac{12.8}{33}$$

$$\frac{4.4}{33}$$

$$\frac{4.2}{13}$$

$$\frac{4.0}{4.2}$$

$$\frac{4.2}{13}$$

$$\frac{12.7}{25}$$

$$\frac{13.1}{33}$$

$$\frac{5.8}{33}$$

$$\frac{6.3}{25}$$

$$\frac{7.5}{23}$$

$$\frac{7.4}{16}$$

$$\frac{4.3}{13}$$

$$\frac{4.1}{3.9}$$

$$\frac{4.0}{13}$$

$$\frac{12.3}{26}$$

$$\frac{13.4}{33}$$

$$\frac{4.5}{33}$$

$$\frac{5.5}{23}$$

$$\frac{6.5}{20}$$

$$\frac{6.0}{16}$$

$$\frac{3.4}{13}$$

$$\frac{3.1}{3.3}$$

$$\frac{3.3}{13}$$

$$\frac{10.6}{24}$$

$$\frac{11.1}{33}$$

$$\frac{3.7}{33}$$

$$\frac{4.2}{28}$$

$$\frac{5.7}{24}$$

$$\frac{5.9}{18}$$

$$\frac{3.2}{13}$$

$$\frac{3.1}{3.1}$$

$$\frac{3.1}{13}$$

$$\frac{9.8}{24}$$

$$\frac{10.0}{33}$$

$$\frac{1.9}{33}$$

$$\frac{2.8}{25}$$

$$\frac{4.2}{22}$$

$$\frac{4.3}{17}$$

$$\frac{2.3}{13}$$

$$\frac{2.0}{2.1}$$

$$\frac{2.0}{13}$$

$$\frac{7.2}{22}$$

$$\frac{7.2}{33}$$

$$\frac{9.5}{33}$$

$$\frac{10.3}{23}$$

$$\frac{12.3}{21}$$

$$\frac{12.5}{17}$$

$$\frac{10.7}{13}$$

$$\frac{10.7}{10.6}$$

$$\frac{10.8}{13}$$

$$\frac{13.1}{17}$$

$$\frac{13.7}{20}$$

$$\frac{14.2}{33}$$

$$\frac{5.6}{33}$$

$$\frac{6.6}{25}$$

$$\frac{11.4}{21}$$

$$\frac{11.4}{16}$$

$$\frac{9.9}{13}$$

$$\frac{9.7}{9.7}$$

$$\frac{9.8}{13}$$

$$\frac{11.9}{16}$$

$$\frac{12.0}{20}$$

$$\frac{7.4}{26}$$

$$\frac{7.6}{33}$$

$$\frac{5.4}{33}$$

$$\frac{5.8}{25}$$

$$\frac{11.7}{22}$$

$$\frac{11.1}{17}$$

$$\frac{7.4}{13}$$

$$\frac{9.1}{9.2}$$

$$\frac{9.3}{13}$$

$$\frac{11.0}{16}$$

$$\frac{11.0}{20}$$

$$\frac{3.2}{28}$$

$$\frac{3.6}{33}$$

$$\frac{5.0}{33}$$

$$\frac{5.2}{27}$$

$$\frac{10.6}{22}$$

$$\frac{10.4}{17}$$

$$\frac{8.2}{13}$$

$$\frac{8.7}{8.1}$$

$$\frac{8.2}{13}$$

$$\frac{10.4}{16}$$

$$\frac{10.5}{20}$$

$$\frac{2.8}{28}$$

$$\frac{2.5}{33}$$

$$\frac{5.6}{33}$$

$$\frac{4.8}{26}$$

$$\frac{10.0}{21}$$

$$\frac{9.4}{16}$$

$$\frac{7.6}{13}$$

$$\frac{7.3}{7.5}$$

$$\frac{7.3}{13}$$

$$\frac{9.1}{16}$$

$$\frac{9.1}{21}$$

$$\frac{2.1}{28}$$

$$\frac{2.1}{33}$$

Sta.

+

H.L.

-

Elev.

927.26

43

+50

44

+50

45

+50

B.M.

8.93

929.39

6.81

920.45 920.46

46

+50

47

+50

48

+50



Lt.

2

27

|            |            |            |            |            |            |            |            |            |            |            |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <u>7.0</u> | <u>6.9</u> | <u>6.5</u> | <u>8.6</u> | <u>6.5</u> | <u>6.4</u> | <u>6.5</u> | <u>8.2</u> | <u>8.3</u> | <u>5.6</u> | <u>5.7</u> |
| 33         | 23         | 20         | 16         | 13         | 64         | 13         | 16         | 20         | 24         | 33         |

| Sta. | + | H.I. | - | Elev |
|------|---|------|---|------|
|------|---|------|---|------|

|  |  |        |  |  |
|--|--|--------|--|--|
|  |  | 929.39 |  |  |
|--|--|--------|--|--|

|    |  |  |  |  |
|----|--|--|--|--|
| 49 |  |  |  |  |
|----|--|--|--|--|

|     |  |  |  |  |
|-----|--|--|--|--|
| +50 |  |  |  |  |
|-----|--|--|--|--|

|    |  |  |  |  |
|----|--|--|--|--|
| 50 |  |  |  |  |
|----|--|--|--|--|

|     |  |  |  |  |
|-----|--|--|--|--|
| +50 |  |  |  |  |
|-----|--|--|--|--|

|    |  |  |  |  |
|----|--|--|--|--|
| 51 |  |  |  |  |
|----|--|--|--|--|

|     |  |  |  |  |
|-----|--|--|--|--|
| +50 |  |  |  |  |
|-----|--|--|--|--|

|    |  |  |  |  |
|----|--|--|--|--|
| 52 |  |  |  |  |
|----|--|--|--|--|

|      |  |  |  |  |
|------|--|--|--|--|
| B.M. |  |  |  |  |
|------|--|--|--|--|

|      |        |        |  |  |
|------|--------|--------|--|--|
| 0.52 | 928.87 | 928.86 |  |  |
|------|--------|--------|--|--|

|     |  |  |  |  |
|-----|--|--|--|--|
| +50 |  |  |  |  |
|-----|--|--|--|--|

|     |  |  |  |  |
|-----|--|--|--|--|
| +67 |  |  |  |  |
|-----|--|--|--|--|

|    |  |  |  |  |
|----|--|--|--|--|
| 53 |  |  |  |  |
|----|--|--|--|--|

|     |  |  |  |  |
|-----|--|--|--|--|
| +50 |  |  |  |  |
|-----|--|--|--|--|

|    |  |  |  |  |
|----|--|--|--|--|
| 54 |  |  |  |  |
|----|--|--|--|--|

Left

L

Right

|                  |                  |                  |                  |                  |                  |                  |                   |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-------------------|
| $\frac{7.6}{33}$ | $\frac{8.2}{22}$ | $\frac{9.3}{21}$ | $\frac{9.1}{16}$ | $\frac{6.8}{13}$ | $\frac{6.6}{13}$ | $\frac{9.8}{19}$ | $\frac{10.1}{33}$ |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-------------------|

|                  |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{8.1}{33}$ | $\frac{8.5}{16}$ | $\frac{6.4}{13}$ | $\frac{6.2}{13}$ | $\frac{8.8}{18}$ | $\frac{8.9}{33}$ |
|------------------|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{8.6}{33}$ | $\frac{8.7}{17}$ | $\frac{6.0}{13}$ | $\frac{5.7}{13}$ | $\frac{8.6}{18}$ | $\frac{8.5}{33}$ |
|------------------|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{8.4}{33}$ | $\frac{8.7}{18}$ | $\frac{5.8}{13}$ | $\frac{5.6}{13}$ | $\frac{7.9}{16}$ | $\frac{7.5}{33}$ |
|------------------|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{7.4}{33}$ | $\frac{7.4}{18}$ | $\frac{5.5}{14}$ | $\frac{5.2}{13}$ | $\frac{7.1}{16}$ | $\frac{6.9}{33}$ |
|------------------|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{7.2}{33}$ | $\frac{7.1}{17}$ | $\frac{5.0}{13}$ | $\frac{5.1}{13}$ | $\frac{6.9}{16}$ | $\frac{7.5}{19}$ | $\frac{6.1}{21}$ | $\frac{5.3}{33}$ |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{6.7}{33}$ | $\frac{6.7}{21}$ | $\frac{7.2}{20}$ | $\frac{6.9}{16}$ | $\frac{4.7}{13}$ | $\frac{4.8}{13}$ | $\frac{6.7}{15}$ | $\frac{7.1}{19}$ | $\frac{6.6}{20}$ | $\frac{6.1}{33}$ |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|

slope in T.P. 150 ft. Az = 52 + 50

|                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{3.9}{33}$ | $\frac{4.3}{23}$ | $\frac{6.7}{20}$ | $\frac{6.5}{16}$ | $\frac{4.6}{13}$ | $\frac{4.4}{13}$ | $\frac{5.8}{16}$ | $\frac{6.2}{20}$ | $\frac{5.2}{22}$ | $\frac{4.6}{33}$ |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                  |                        |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------------|
| $\frac{3.7}{33}$ | $\frac{4.2}{22}$ | $\frac{6.5}{20}$ | $\frac{5.9}{16}$ | $\frac{4.3}{13}$ | $\frac{4.0}{33}$ | This side = L Trip Rt. |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------------|

|                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{3.4}{33}$ | $\frac{3.5}{22}$ | $\frac{6.2}{19}$ | $\frac{6.0}{16}$ | $\frac{4.4}{13}$ | $\frac{4.2}{13}$ | $\frac{5.7}{16}$ | $\frac{6.0}{20}$ | $\frac{3.4}{23}$ | $\frac{3.2}{33}$ |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{3.4}{33}$ | $\frac{3.3}{23}$ | $\frac{5.5}{21}$ | $\frac{5.7}{16}$ | $\frac{3.7}{13}$ | $\frac{3.7}{13}$ | $\frac{5.7}{16}$ | $\frac{5.8}{20}$ | $\frac{3.5}{22}$ | $\frac{3.5}{33}$ |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| $\frac{7.7}{33}$ | $\frac{4.6}{21}$ | $\frac{5.5}{20}$ | $\frac{5.6}{16}$ | $\frac{3.8}{13}$ | $\frac{3.9}{13}$ | $\frac{5.9}{16}$ | $\frac{6.1}{19}$ | $\frac{4.8}{20}$ | $\frac{4.5}{33}$ |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|

Sta

+

H.I.

-

Elev.

929.39

54+50

55

+50

56

T.P.

3.63

930.65

2.37

927.02

✓

+50

57

+50

58

+50

59

+50

60





| Sta.  | +    | H.I.   | -       | Elev.  |
|-------|------|--------|---------|--------|
|       |      | 930.65 |         |        |
| 60+08 |      |        |         |        |
| +50   |      |        |         |        |
| T.P.  | 0.50 | 920.73 | 10.42   | 920.23 |
| 61    |      |        |         |        |
| +50   |      |        |         |        |
| 62    |      |        |         |        |
| +50   |      |        |         |        |
| 63    |      |        |         |        |
| +50   | C.M. | XDrain | 18"X32' | C.M.   |
| +50   |      |        |         |        |
| 64    |      |        |         |        |
| +50   |      |        |         |        |
| 65    |      |        |         |        |
| +50   |      |        |         |        |

Left

C

Right

|                   |                   |                   |                   |                   |                     |                    |                   |                   |                   |                  |                   |
|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------|--------------------|-------------------|-------------------|-------------------|------------------|-------------------|
| $\frac{11.1}{33}$ | $\frac{10.7}{24}$ | $\frac{10.1}{22}$ | $\frac{10.9}{20}$ | $\frac{10.6}{17}$ | $\frac{9.0}{13}$    | $\frac{7.7}{8.8}$  | $\frac{9.1}{13}$  | $\frac{10.9}{16}$ | $\frac{10.9}{21}$ | $\frac{6.2}{25}$ | $\frac{5.7}{33}$  |
| $\frac{11.5}{33}$ | $\frac{11.4}{21}$ | $\frac{12.4}{19}$ | $\frac{12.3}{16}$ | $\frac{10.2}{13}$ | $\frac{10.2}{10.0}$ | $\frac{10.1}{13}$  | $\frac{11.6}{16}$ | $\frac{12.0}{22}$ | $\frac{7.8}{24}$  | $\frac{7.5}{33}$ |                   |
| $\frac{4.1}{33}$  | $\frac{3.3}{20}$  | $\frac{3.8}{18}$  | $\frac{3.8}{17}$  | $\frac{1.7}{13}$  | $\frac{1.1}{1.6}$   | $\frac{1.5}{13}$   | $\frac{3.1}{16}$  | $\frac{3.4}{22}$  | $\frac{1.2}{23}$  | $\frac{0.6}{32}$ | $\frac{40.4}{35}$ |
| $\frac{5.9}{33}$  | $\frac{4.9}{20}$  | $\frac{5.6}{19}$  | $\frac{5.6}{18}$  | $\frac{2.7}{13}$  | $\frac{3.1}{2.8}$   | $\frac{2.9}{13}$   | $\frac{4.7}{17}$  | $\frac{4.9}{22}$  | $\frac{3.0}{24}$  | $\frac{2.5}{33}$ |                   |
|                   |                   | $\frac{7.0}{33}$  | $\frac{6.1}{18}$  | $\frac{3.7}{13}$  | $\frac{4.3}{3.8}$   | $\frac{3.8}{13}$   | $\frac{6.0}{16}$  | $\frac{6.1}{20}$  | $\frac{4.9}{22}$  | $\frac{4.3}{33}$ |                   |
|                   |                   | $\frac{7.5}{33}$  | $\frac{7.2}{17}$  | $\frac{5.0}{13}$  | $\frac{5.2}{4.8}$   | $\frac{4.9}{13}$   | $\frac{7.1}{16}$  | $\frac{7.4}{19}$  | $\frac{6.2}{21}$  | $\frac{5.4}{33}$ |                   |
| $\frac{7.0}{33}$  | $\frac{7.3}{21}$  | $\frac{7.8}{21}$  | $\frac{7.0}{16}$  | $\frac{5.3}{13}$  | $\frac{5.9}{5.2}$   | $\frac{5.4}{13}$   | $\frac{7.8}{16}$  | $\frac{8.5}{20}$  | $\frac{7.1}{21}$  | $\frac{6.7}{33}$ |                   |
| $\frac{6.1}{33}$  | $\frac{6.7}{22}$  | $\frac{8.0}{21}$  | $\frac{8.0}{16}$  | $\frac{5.4}{13}$  | $\frac{6.2}{5.3}$   | $\frac{8.30}{7.6}$ | $\frac{5.4}{13}$  | $\frac{8.3}{16}$  | $\frac{8.5}{19}$  | $\frac{7.7}{20}$ | $\frac{7.7}{33}$  |
| $\frac{5.5}{33}$  | $\frac{6.2}{22}$  | $\frac{7.5}{21}$  | $\frac{7.2}{16}$  | $\frac{5.7}{13}$  | $\frac{6.1}{5.5}$   | $\frac{5.9}{13}$   | $\frac{7.8}{17}$  | $\frac{8.4}{20}$  | $\frac{8.0}{21}$  | $\frac{7.8}{33}$ |                   |
| $\frac{8.9}{33}$  | $\frac{4.9}{23}$  | $\frac{7.4}{21}$  | $\frac{7.4}{16}$  | $\frac{5.6}{13}$  | $\frac{8.1}{5.3}$   | $\frac{5.6}{13}$   | $\frac{8.2}{17}$  | $\frac{8.4}{33}$  |                   |                  |                   |
| $\frac{2.5}{33}$  | $\frac{3.4}{24}$  | $\frac{7.0}{22}$  | $\frac{7.0}{16}$  | $\frac{5.1}{13}$  | $\frac{5.1}{4.6}$   | $\frac{4.9}{13}$   | $\frac{7.0}{16}$  | $\frac{8.0}{33}$  |                   |                  |                   |
| $\frac{1.2}{33}$  | $\frac{2.1}{25}$  | $\frac{6.6}{22}$  | $\frac{6.6}{16}$  | $\frac{4.7}{13}$  | $\frac{2.7}{4.2}$   | $\frac{4.4}{13}$   | $\frac{6.1}{17}$  | $\frac{7.1}{33}$  |                   |                  |                   |

| Sta. | +    | H.I.   | -    | Elev.  |
|------|------|--------|------|--------|
|      |      | 920.73 |      |        |
| 66   |      |        |      |        |
| B.M. | 7.67 | 921.71 | 4.65 | 914.08 |
|      | +50  |        |      |        |

67

+50

68

+50

69

|      |      |        |      |        |
|------|------|--------|------|--------|
| T.P. | 6.64 | 925.65 | 2.70 | 919.01 |
|------|------|--------|------|--------|

+50

70

+50

71

+50



Left.

♀

Right

|                  |                  |                  |                  |                  |     |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|
| $\frac{1.9}{33}$ | $\frac{2.4}{24}$ | $\frac{4.2}{21}$ | $\frac{5.9}{16}$ | $\frac{4.0}{13}$ | 3.7 | $\frac{4.1}{13}$ | $\frac{4.6}{15}$ | $\frac{5.3}{20}$ | $\frac{6.3}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|

Sp. in 12" Tree 45' Rt. 54. 63+60

10/29/30

|                  |                  |                  |                  |                  |     |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|
| $\frac{3.2}{33}$ | $\frac{3.5}{23}$ | $\frac{4.5}{21}$ | $\frac{6.4}{16}$ | $\frac{4.7}{13}$ | 4.3 | $\frac{4.7}{13}$ | $\frac{6.0}{16}$ | $\frac{7.9}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |     |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|
| $\frac{4.1}{33}$ | $\frac{4.5}{22}$ | $\frac{6.1}{21}$ | $\frac{6.0}{16}$ | $\frac{4.1}{13}$ | 3.9 | $\frac{4.1}{13}$ | $\frac{6.5}{17}$ | $\frac{9.2}{28}$ | $\frac{8.8}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |     |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|
| $\frac{5.8}{33}$ | $\frac{6.4}{20}$ | $\frac{5.8}{19}$ | $\frac{5.7}{15}$ | $\frac{3.8}{13}$ | 3.4 | $\frac{3.7}{13}$ | $\frac{5.7}{17}$ | $\frac{7.4}{28}$ | $\frac{8.0}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|

|                  |                  |                  |     |                  |                  |                  |                  |
|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|
| $\frac{5.3}{33}$ | $\frac{5.7}{17}$ | $\frac{5.2}{13}$ | 3.0 | $\frac{3.0}{13}$ | $\frac{6.2}{18}$ | $\frac{6.5}{23}$ | $\frac{5.2}{28}$ |
|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |     |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|
| $\frac{3.3}{33}$ | $\frac{4.4}{21}$ | $\frac{4.8}{20}$ | $\frac{4.8}{17}$ | $\frac{3.1}{13}$ | 2.6 | $\frac{2.8}{13}$ | $\frac{7.1}{20}$ | $\frac{7.1}{25}$ | $\frac{8.5}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |     |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|
| $\frac{0.4}{33}$ | $\frac{1.6}{23}$ | $\frac{4.6}{20}$ | $\frac{4.5}{16}$ | $\frac{2.7}{13}$ | 2.2 | $\frac{2.5}{13}$ | $\frac{5.0}{18}$ | $\frac{5.5}{25}$ | $\frac{6.8}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|
| $\frac{1.8}{33}$ | $\frac{2.4}{26}$ | $\frac{7.4}{23}$ | $\frac{7.2}{15}$ | $\frac{6.0}{13}$ | 5.9 | $\frac{6.3}{13}$ | $\frac{8.2}{16}$ | $\frac{8.3}{19}$ | $\frac{6.9}{22}$ | $\frac{8.2}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|
| $\frac{0.8}{33}$ | $\frac{1.0}{26}$ | $\frac{7.9}{21}$ | $\frac{7.9}{16}$ | $\frac{6.3}{13}$ | 5.6 | $\frac{6.3}{13}$ | $\frac{8.2}{17}$ | $\frac{8.5}{21}$ | $\frac{4.5}{24}$ | $\frac{5.6}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|
| $\frac{1.4}{33}$ | $\frac{1.6}{26}$ | $\frac{8.2}{22}$ | $\frac{7.8}{16}$ | $\frac{6.2}{13}$ | 5.8 | $\frac{6.3}{13}$ | $\frac{8.2}{16}$ | $\frac{8.3}{20}$ | $\frac{4.1}{24}$ | $\frac{5.3}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|
| $\frac{3.4}{33}$ | $\frac{4.1}{24}$ | $\frac{8.3}{22}$ | $\frac{8.1}{16}$ | $\frac{6.1}{13}$ | 5.8 | $\frac{6.4}{13}$ | $\frac{8.2}{16}$ | $\frac{8.3}{21}$ | $\frac{5.8}{23}$ | $\frac{6.6}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|

|                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|
| $\frac{6.3}{33}$ | $\frac{6.5}{23}$ | $\frac{5.6}{21}$ | $\frac{8.4}{16}$ | $\frac{6.4}{13}$ | 6.1 | $\frac{6.3}{13}$ | $\frac{8.6}{16}$ | $\frac{8.7}{20}$ | $\frac{7.1}{21}$ | $\frac{7.5}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|

| Sta  | +    | $\pi$  | -    | Elev.  |
|------|------|--------|------|--------|
| 72   |      | 925.65 |      |        |
|      | +50  |        |      |        |
| 73   |      |        |      |        |
|      | +50  |        |      |        |
| T.P. | 2.95 | 920.47 | 8.13 | 917.52 |
| 74   |      |        |      |        |
|      | +50  |        |      |        |
| 75   |      |        |      |        |
|      | +50  |        |      |        |
| 76   |      |        |      |        |
|      | +50  |        |      |        |
| 77   |      |        |      |        |
|      | +50  |        |      |        |
| T.P. |      |        |      |        |

Left

Right

$$\frac{74}{33} \quad \frac{22}{22} \quad \frac{91}{21} \quad \frac{86}{17} \quad \frac{67}{13}$$

6.9

$$\frac{45}{13}$$

$$\frac{70}{13} \quad \frac{87}{15} \quad \frac{89}{20} \quad \frac{74}{22} \quad \frac{70}{33}$$

$$\frac{75}{33} \quad \frac{79}{22} \quad \frac{91}{20} \quad \frac{89}{16} \quad \frac{70}{13}$$

7.3

$$\frac{68}{13}$$

$$\frac{73}{13} \quad \frac{91}{16} \quad \frac{95}{20} \quad \frac{80}{21} \quad \frac{80}{33}$$

$$\frac{92}{33} \quad \frac{95}{20} \quad \frac{97}{19} \quad \frac{97}{16} \quad \frac{70}{13}$$

7.7

$$\frac{72}{13}$$

$$\frac{76}{13} \quad \frac{94}{16} \quad \frac{99}{21} \quad \frac{82}{22} \quad \frac{82}{33}$$

$$\frac{117}{33}$$

$$\frac{110}{17} \quad \frac{81}{13}$$

8.2

$$\frac{78}{13}$$

$$\frac{81}{13} \quad \frac{100}{16} \quad \frac{102}{20} \quad \frac{92}{21} \quad \frac{92}{33}$$

$$\frac{71}{33}$$

$$\frac{60}{18} \quad \frac{34}{13}$$

3.5

$$\frac{30}{13}$$

$$\frac{32}{13} \quad \frac{52}{16} \quad \frac{56}{20} \quad \frac{48}{21} \quad \frac{46}{33}$$

$$\frac{70}{33}$$

$$\frac{59}{18} \quad \frac{35}{13}$$

4.0

$$\frac{34}{13}$$

$$\frac{34}{13} \quad \frac{53}{16} \quad \frac{55}{20} \quad \frac{48}{22} \quad \frac{46}{33}$$

$$\frac{85}{33}$$

$$\frac{72}{18} \quad \frac{43}{13}$$

4.2

$$\frac{41}{13}$$

$$\frac{41}{13} \quad \frac{64}{17} \quad \frac{74}{33}$$

$$\frac{94}{33}$$

$$\frac{88}{20} \quad \frac{52}{13}$$

5.0

$$\frac{49}{13}$$

$$\frac{51}{13} \quad \frac{81}{18} \quad \frac{85}{33}$$

$$\frac{92}{33}$$

$$\frac{88}{19} \quad \frac{51}{13}$$

5.7

$$\frac{48}{13}$$

$$\frac{51}{13} \quad \frac{69}{17} \quad \frac{74}{20} \quad \frac{63}{22} \quad \frac{56}{33}$$

$$\frac{75}{33}$$

$$\frac{67}{17} \quad \frac{45}{13}$$

4.6

$$\frac{44}{13}$$

$$\frac{44}{13} \quad \frac{65}{17} \quad \frac{45}{20} \quad \frac{37}{23} \quad \frac{38}{33}$$

$$\frac{52}{33}$$

$$\frac{50}{21}$$

$$\frac{55}{20}$$

$$\frac{51}{16}$$

$$\frac{34}{18}$$

3.5

$$\frac{33}{13}$$

$$\frac{34}{13} \quad \frac{53}{16} \quad \frac{56}{19} \quad \frac{49}{21} \quad \frac{54}{33}$$

$$\frac{21}{33}$$

$$\frac{35}{22}$$

$$\frac{38}{20}$$

$$\frac{35}{16}$$

$$\frac{19}{13}$$

1.6

$$\frac{16}{13}$$

$$\frac{16}{13} \quad \frac{47}{18} \quad \frac{43}{33}$$

920.47

| STA  | +    | $\Sigma$ | -    | Elev.  |
|------|------|----------|------|--------|
| T.P. | 7.92 | 926.85   | 1.54 | 918.93 |
| 78   |      |          |      |        |

+50

+63

+68

+84

L.C. R.R. "C"

|      |  |  |      |        |        |
|------|--|--|------|--------|--------|
| B.M. |  |  | 3.73 | 923.12 | 923.07 |
|------|--|--|------|--------|--------|



6.3

|                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|
| $\frac{3.8}{33}$ | $\frac{4.0}{24}$ | $\frac{8.5}{20}$ | $\frac{8.6}{16}$ | $\frac{6.6}{13}$ | 6.4 | $\frac{6.4}{13}$ | $\frac{8.1}{16}$ | $\frac{8.3}{20}$ | $\frac{7.2}{21}$ | $\frac{8.2}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|

5.6

|                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|
| $\frac{1.8}{33}$ | $\frac{4.4}{24}$ | $\frac{7.0}{20}$ | $\frac{6.7}{15}$ | $\frac{5.6}{13}$ | 5.4 | $\frac{5.6}{13}$ | $\frac{7.2}{16}$ | $\frac{7.5}{22}$ | $\frac{5.1}{23}$ | $\frac{5.4}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|

5.5

|                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|
| $\frac{1.9}{33}$ | $\frac{2.6}{25}$ | $\frac{6.2}{21}$ | $\frac{6.2}{17}$ | $\frac{5.3}{15}$ | 5.1 | $\frac{5.9}{16}$ | $\frac{6.8}{19}$ | $\frac{7.0}{23}$ | $\frac{5.6}{25}$ | $\frac{5.8}{33}$ |
|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|

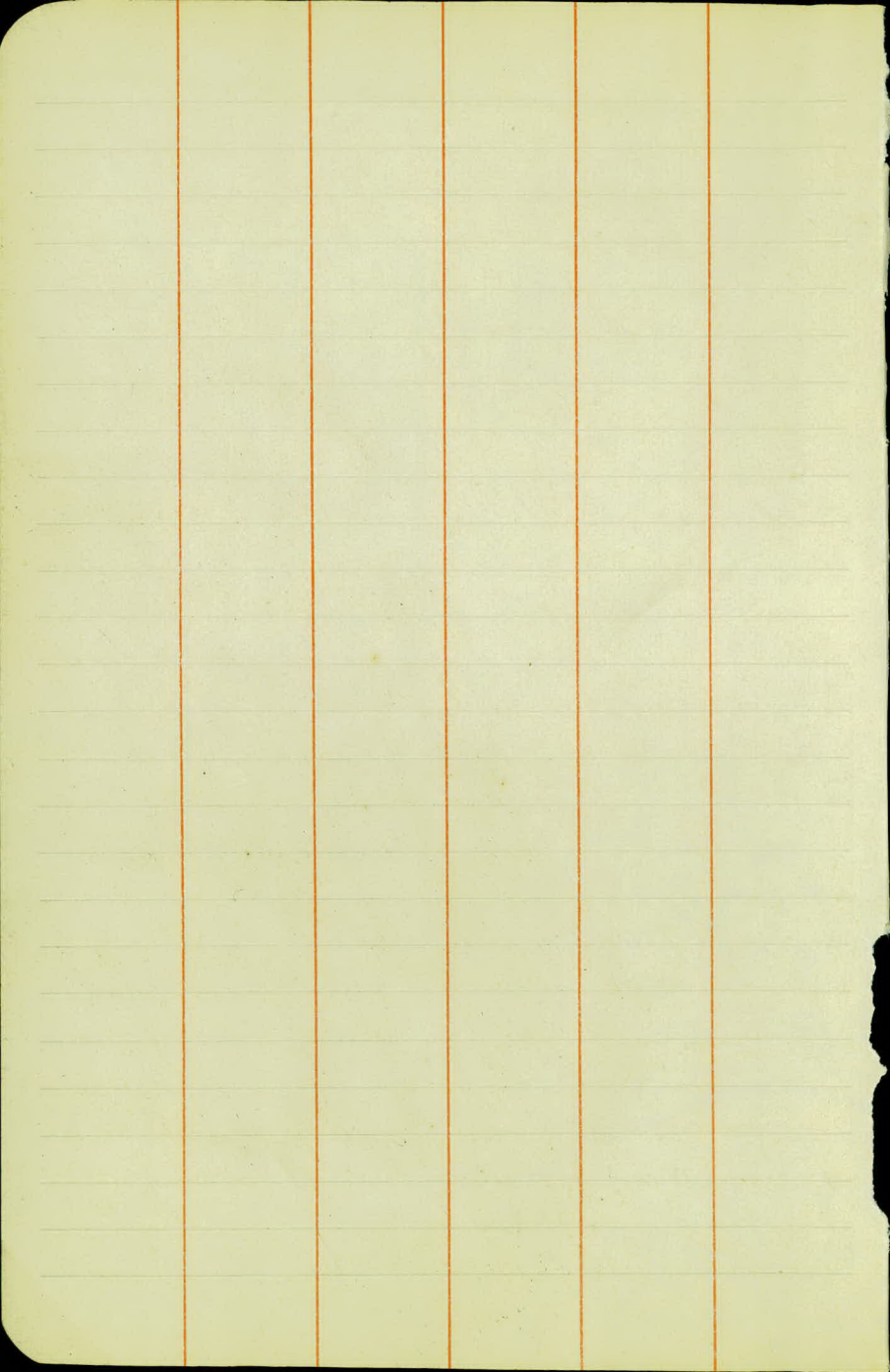
5.5

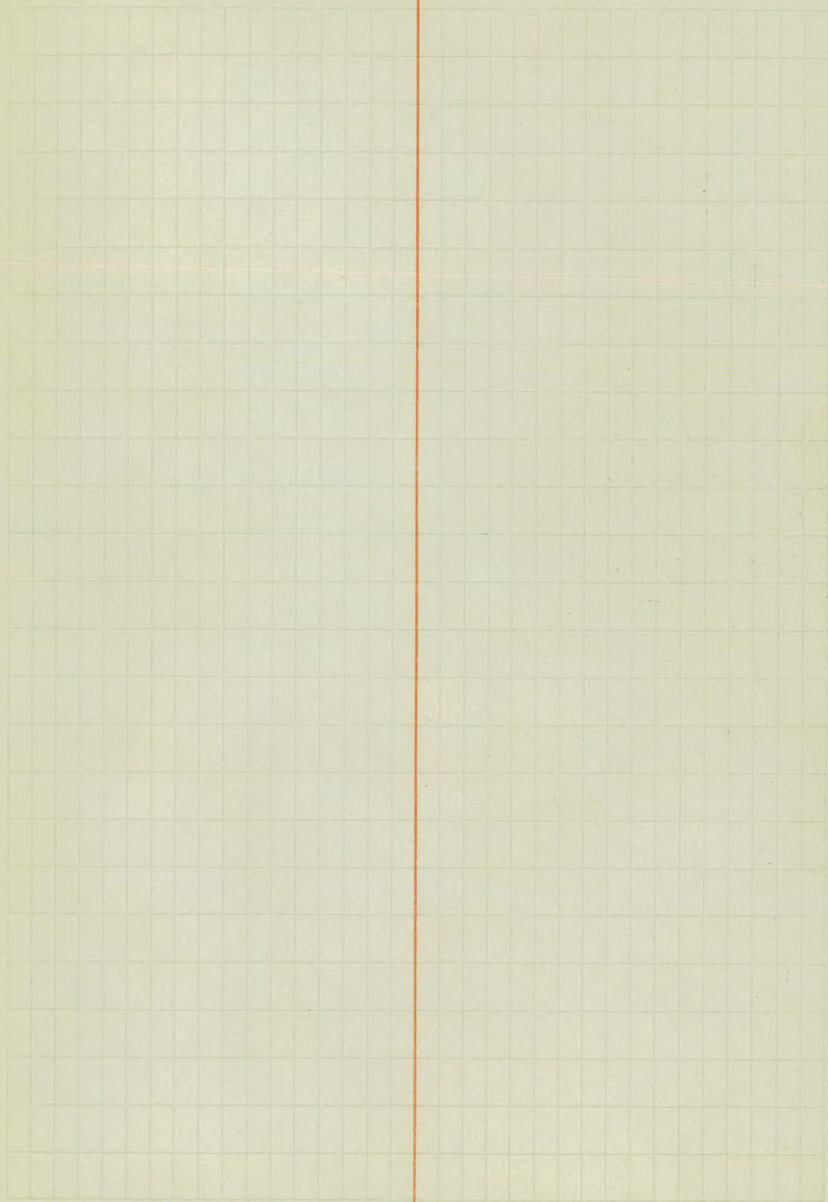
|                  |  |                  |                  |  |     |                  |                  |  |                  |
|------------------|--|------------------|------------------|--|-----|------------------|------------------|--|------------------|
| $\frac{5.6}{33}$ |  | $\frac{5.7}{21}$ | $\frac{4.9}{19}$ |  | 5.0 | $\frac{5.9}{19}$ | $\frac{6.6}{22}$ |  | $\frac{4.6}{33}$ |
|------------------|--|------------------|------------------|--|-----|------------------|------------------|--|------------------|

5.4

|                  |  |                  |  |     |                  |  |                  |
|------------------|--|------------------|--|-----|------------------|--|------------------|
| $\frac{4.8}{33}$ |  | $\frac{4.8}{25}$ |  | 5.2 | $\frac{5.7}{25}$ |  | $\frac{6.2}{50}$ |
|------------------|--|------------------|--|-----|------------------|--|------------------|

spike in 18" Oak N.W. cor. of Int.





| Sta.    |                   |                |           | Cubic | Yards |
|---------|-------------------|----------------|-----------|-------|-------|
|         |                   |                |           | Cut   | Fill  |
| 0+23    | X Drain           | 15" x 44' C.M. | (None)    |       |       |
| 3+93    | Field Entrance    | Right          |           |       | 4.0   |
| 4+00    | "                 | "              | Left      |       | 6.5   |
| 16+81   | X Drain           | 24" x 48' P.3  |           |       |       |
| 18+53   | Field Entrance    | 22' Left       |           |       | 10.0  |
| 18+48   | "                 | "              | 22' Rt.   |       | 9.0   |
| 21+22   | "                 | "              | Left      |       | 10.0  |
| 21+37   | "                 | "              | 20' Left. | 3.0   | 11.0  |
| 26+12   | X Drain           | 15" x 30' C.M. |           |       |       |
| 26+60   | "                 | "              | "         |       |       |
| 29+57   | Private Entrance  | 16' Right      |           |       | 4.0   |
| 29+79   | "                 | "              | 11' Left  |       | 8.0   |
| 32+93   | Field Entrance    | Left.          | 2.0       |       | 4.0   |
| 32+97   | Farm Entrance     | Right          | 5.0       |       | 7.0   |
| 36+01   | "                 | "              | 19' Rt.   |       | 10.0  |
| 36+24   | "                 | "              | 20' Lt    |       | 8.0   |
| 36+98   | X Drain           | 24" x 42' P.3  |           |       |       |
| 38+13   | Field Entrance.   |                |           |       | 17.0  |
| 39+31   | Int. Trp. Road    | 20' Lt.        |           |       | 33.0  |
| 40+03   | Private Entrance. | 20' Lt.        |           |       | 9.0   |
| 41+13   | "                 | "              | 19' Lt.   |       | 7.0   |
| 42+22   | "                 | "              | 20' Rt    | 17.0  | 10.5  |
| 46+96   | Field Entrance    | 20' Lt.        |           |       | 5.0   |
| 52+67.5 | Int. Trp. Rd.     | 19' Right      |           |       | 9.0   |



(10-29-30 P.M.)

(Left in Place)

No. Culvert

" "

15" x 20' C.M. (New) ✓

12" x 20' C.M. (Old) ✓

No. Culvert.

12" x 16' C.M. (Old) ✓

(Left in Place)

" " "

15" x 20' C.M. (New) ✓

15" x 20' C.M. (New) ✓

No. Culvert.

" "

12" x 24' C.M. (24' Old & ~~4' New~~) ✓

15" x 20' C.M. (New) ✓

No. Culvert.

15" x 36' C.M. (New) ✓

15" x 20' C.M. " ✓

15" x 20' C.M. " ✓

15" x 20' C.M. " ✓

12" x 16' C.M. (Old) ✓

12" x 30' C.M. (Old) ✓

| Sta.               |                  |                |      | Cubic | Yards. |
|--------------------|------------------|----------------|------|-------|--------|
|                    |                  |                |      | Cut   | Fill   |
| 52+81              | Field Entrance   | 19' Lt         | 1.0  | 9.0   |        |
| 56+76              | " "              | 19'            | 6.0  | 7.0   |        |
| 58+30              | Private Entrance | 20' Rt.        | 8.0  | 5.5   |        |
| 60+00              | " "              | 19' Lt.        |      | 6.0   |        |
| 61+41              | " "              | 20' Rt.        |      | 5.5   |        |
| 62+46              | Side Road.       | 19' Rt         |      | 11.0  |        |
| 62+93              | " "              | 20' Lt.        |      | 10.0  |        |
| 63+50              | X Drain          | 18" x 32' C.M. |      |       |        |
| 63+94              | Private Ent.     | 19' Rt.        |      | 15.0  |        |
| 69+61 <sup>2</sup> | " "              |                | 25.0 | 7.0   |        |

12" x 26' C.M. (Old) ✓

No Culvert

12" x 16' C.M. (Old) ✓

12" x 18' C.M. "Old" ✓

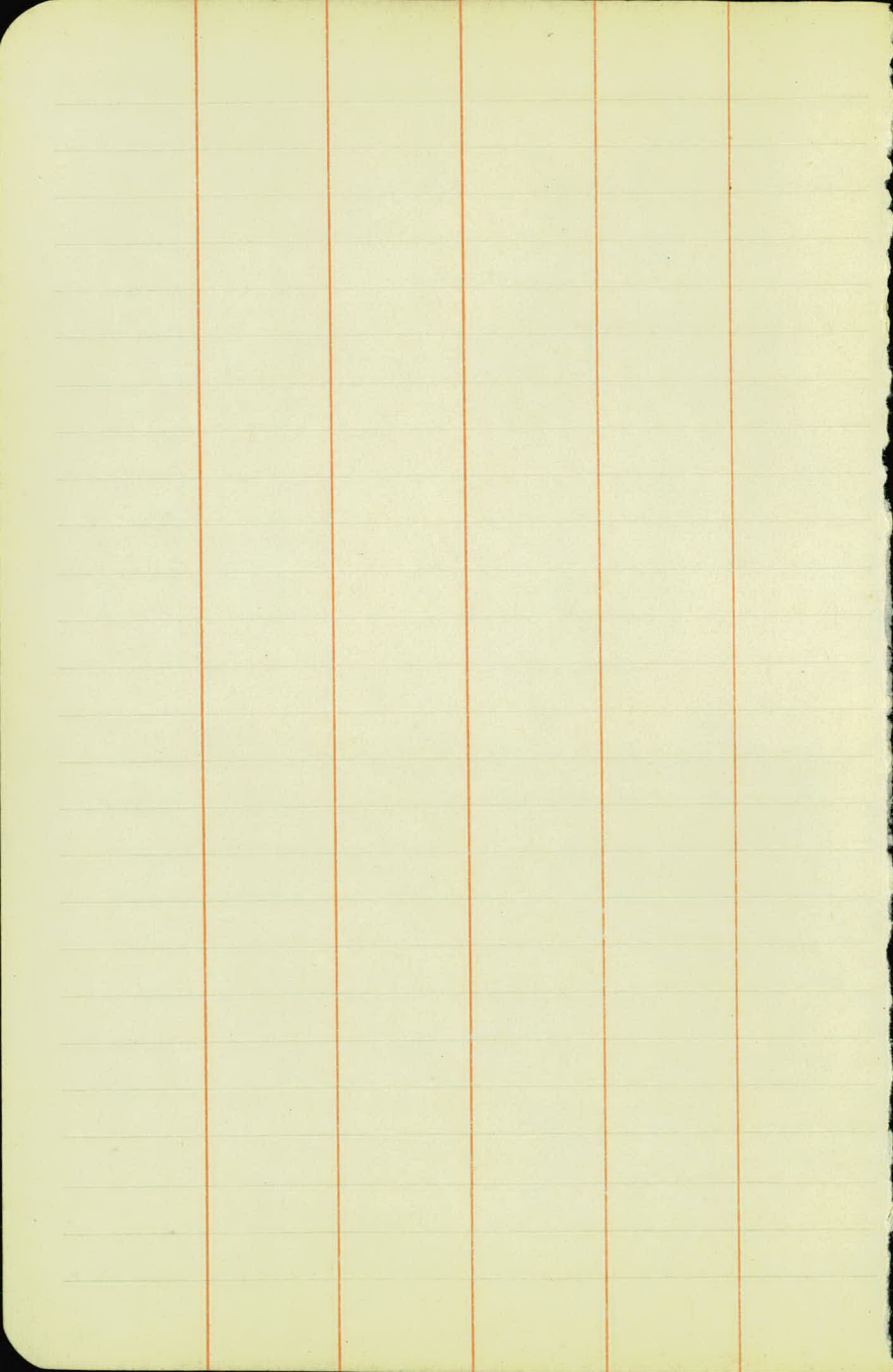
12" x 16' C.M. " ✓

12" x 22' C.M. " ✓

12" x 20' C.M. " ✓

12" x 20' C.M. (Old) ✓

No Culvert





# KEITH'S RAILROAD CURVE TABLES.

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## HOW TO USE KEITH'S TABLES.

### EXAMPLE.

Wanted a Curve with an Ext. of about 12 ft. Angle  
of Intersection or I. P.= $23^{\circ} 20'$  to the R. at Station  
542+72.

Ext. in Tab. IV opposite  $23^{\circ} 20' = 120.87$

$120.87 \div 12 = 10.07$ . Say a  $10^{\circ}$  Curve.

Tan. in Tab. IV opp.  $23^{\circ} 20' = 1183.1$

$1183.1 \div 10 = 118.31$ .

Tab. V, correction for A.  $23^{\circ} 20'$  for a  $10^{\circ}$  Cur.=0.16

$118.31 + 0.16 = 118.47 = \text{corrected Tangent.}$

(If corrected Ext. is required find in same way)

Ang.  $23^{\circ} 20' = 23.33^{\circ} \div 10 = 2.3333 = \text{L. C.}$

|                                                   |       |            |           |
|---------------------------------------------------|-------|------------|-----------|
| $2^{\circ} 19\frac{1}{2}' = \text{def. for sta.}$ | 542   | I. P.=sta. | 542+72    |
| $4^{\circ} 49\frac{1}{2}' = \text{ " " "}$        | +50   | Tan.=      | 1.18.47   |
| $7^{\circ} 19\frac{1}{2}' = \text{ " " "}$        | 543   | B. C.=sta. | 541+53.53 |
| $9^{\circ} 49\frac{1}{2}' = \text{ " " "}$        | +50   | L. C.=     | 2.33.33   |
| $11^{\circ} 40' = \text{ " " "}$                  | 543+  | E. C.=sta. | 543+86.86 |
|                                                   | 86.86 |            |           |

$100 - 53.53 = 46.47 \times 3' (\text{def. for 1 ft. of } 10^{\circ} \text{ Cur.}) = 139.41' =$   
 $2^{\circ} 19\frac{1}{2}'' = \text{def. for sta. 542.}$

Def. for 50 ft.= $2^{\circ} 30'$  for a  $10^{\circ}$  Curve.

Def. for 36.86 ft.= $1^{\circ} 50\frac{1}{2}'$  for a  $10^{\circ}$  Curve

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

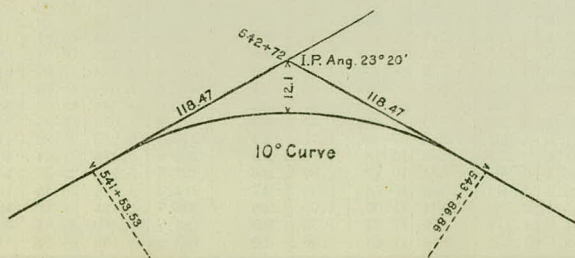


TABLE I. — Minutes in Decimals of a Degree.

|    |       |     |       |     |       |     |       |     |       |     |        |
|----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|--------|
| 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  | $\frac{1}{8}$ | 3-16  | $\frac{1}{4}$ | 5-16  | $\frac{3}{8}$ | $\frac{1}{2}$ | $\frac{5}{8}$ | $\frac{3}{4}$ | $\frac{7}{8}$ |
| .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  | 6.136     | 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 |
|-----------|---------|----------|------------|---------|----------|------------|---------|----------|
| <b>1°</b> | 50.00   | .22      | <b>11°</b> | 551.70  | 26.50    | <b>21°</b> | 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   |
| <b>2</b>  | 100.01  | .87      | <b>12</b>  | 602.21  | 31.56    | <b>22</b>  | 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   |
| <b>3</b>  | 150.04  | 1.96     | <b>13</b>  | 652.81  | 37.07    | <b>23</b>  | 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   |
| <b>4</b>  | 200.08  | 3.49     | <b>14</b>  | 703.51  | 43.03    | <b>24</b>  | 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   |
| <b>5</b>  | 250.16  | 5.46     | <b>15</b>  | 754.32  | 49.44    | <b>25</b>  | 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   |
| <b>6</b>  | 300.28  | 7.86     | <b>16</b>  | 805.25  | 56.31    | <b>26</b>  | 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   |
| <b>7</b>  | 350.44  | 10.71    | <b>17</b>  | 856.30  | 63.63    | <b>27</b>  | 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   |
| <b>8</b>  | 400.66  | 13.99    | <b>18</b>  | 907.49  | 71.42    | <b>28</b>  | 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   |
| <b>9</b>  | 450.93  | 17.72    | <b>19</b>  | 958.81  | 79.67    | <b>29</b>  | 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   |
| <b>10</b> | 501.28  | 21.89    | <b>20</b>  | 1010.3  | 88.39    | <b>30</b>  | 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 |
|------------|---------|----------|------------|---------|----------|------------|---------|----------|
| <b>31°</b> | 1589.0  | 216.3    | <b>41°</b> | 2142.2  | 387.4    | <b>51°</b> | 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    |
| <b>32</b>  | 1643.0  | 230.9    | <b>42</b>  | 2199.4  | 407.6    | <b>52</b>  | 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    |
| <b>33</b>  | 1697.2  | 246.1    | <b>43</b>  | 2257.0  | 428.5    | <b>53</b>  | 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    |
| <b>34</b>  | 1751.7  | 261.8    | <b>44</b>  | 2314.9  | 450.0    | <b>54</b>  | 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    |
| <b>35</b>  | 1806.6  | 278.1    | <b>45</b>  | 2373.3  | 472.1    | <b>55</b>  | 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    |
| <b>36</b>  | 1861.7  | 294.9    | <b>46</b>  | 2432.1  | 494.8    | <b>56</b>  | 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    |
| <b>37</b>  | 1917.1  | 312.2    | <b>47</b>  | 2491.3  | 518.2    | <b>57</b>  | 3110.9  | 790.1    |
| 10         | 1926.4  | 315.2    | 10         | 2501.2  | 522.2    | 10         | 3121.7  | 795.2    |
| 20         | 1935.7  | 318.1    | 20         | 2511.2  | 526.1    | 20         | 3132.6  | 800.4    |
| 30         | 1945.0  | 321.1    | 30         | 2521.1  | 530.1    | 30         | 3143.4  | 805.6    |
| 40         | 1954.3  | 324.1    | 40         | 2531.1  | 534.2    | 40         | 3154.2  | 810.9    |
| 50         | 1963.6  | 327.1    | 50         | 2541.0  | 538.2    | 50         | 3165.1  | 816.1    |
| <b>38</b>  | 1972.9  | 330.2    | <b>48</b>  | 2551.0  | 542.2    | <b>58</b>  | 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    |
| <b>39</b>  | 2029.0  | 348.6    | <b>49</b>  | 2611.2  | 566.9    | <b>59</b>  | 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    |
| <b>40</b>  | 2085.4  | 367.7    | <b>50</b>  | 2671.8  | 592.3    | <b>60</b>  | 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 |
|------------|---------|----------|------------|---------|----------|------------|---------|----------|
| <b>61°</b> | 3375.0  | 920.2    | <b>71°</b> | 4086.9  | 1308.2   | <b>81°</b> | 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   |
| <b>62</b>  | 3442.7  | 954.8    | <b>72</b>  | 4162.8  | 1352.6   | <b>82</b>  | 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   |
| <b>63</b>  | 3511.1  | 990.2    | <b>73</b>  | 4239.7  | 1398.0   | <b>83</b>  | 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   |
| <b>64</b>  | 3580.3  | 1026.6   | <b>74</b>  | 4317.6  | 1444.6   | <b>84</b>  | 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   |
| <b>65</b>  | 3650.2  | 1063.9   | <b>75</b>  | 4396.5  | 1492.4   | <b>85</b>  | 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   |
| <b>66</b>  | 3720.9  | 1102.2   | <b>76</b>  | 4476.5  | 1541.4   | <b>86</b>  | 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   |
| <b>67</b>  | 3792.4  | 1141.4   | <b>77</b>  | 4557.6  | 1591.6   | <b>87</b>  | 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   |
| <b>68</b>  | 3864.7  | 1181.6   | <b>78</b>  | 4639.8  | 1643.0   | <b>88</b>  | 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   |
| <b>69</b>  | 3937.9  | 1222.7   | <b>79</b>  | 4723.2  | 1695.8   | <b>89</b>  | 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   |
| <b>70</b>  | 4011.9  | 1265.0   | <b>80</b>  | 4807.7  | 1749.9   | <b>90</b>  | 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 |
|------------|---------|----------|-------------|---------|----------|-------------|---------|----------|
| <b>91°</b> | 5830.5  | 2444.9   | <b>101°</b> | 6950.6  | 3278.1   | <b>111°</b> | 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   |
| <b>92</b>  | 5933.2  | 2518.5   | <b>102</b>  | 7075.5  | 3374.9   | <b>112</b>  | 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   |
| <b>93</b>  | 6037.8  | 2594.0   | <b>103</b>  | 7203.2  | 3474.4   | <b>113</b>  | 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   |
| <b>94</b>  | 6144.3  | 2671.6   | <b>104</b>  | 7333.6  | 3576.8   | <b>114</b>  | 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   |
| <b>95</b>  | 6252.8  | 2751.3   | <b>105</b>  | 7467.0  | 3682.3   | <b>115</b>  | 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   |
| <b>96</b>  | 6363.4  | 2833.2   | <b>106</b>  | 7603.5  | 3791.0   | <b>116</b>  | 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   |
| <b>97</b>  | 6476.2  | 2917.3   | <b>107</b>  | 7743.2  | 3902.9   | <b>117</b>  | 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   |
| <b>98</b>  | 6591.2  | 3003.8   | <b>108</b>  | 7886.2  | 4018.2   | <b>118</b>  | 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   |
| <b>99</b>  | 6708.6  | 3092.7   | <b>109</b>  | 8032.7  | 4137.1   | <b>119</b>  | 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   |
| <b>100</b> | 6828.3  | 3184.1   | <b>110</b>  | 8182.8  | 4259.7   | <b>120</b>  | 9924.0  | 5729.7   |
| 10         | 6848.5  | 3199.6   | 10          | 8208.2  | 4280.5   | 10          | 9957.5  | 5758.6   |
| 20         | 6868.8  | 3215.1   | 20          | 8233.7  | 4301.4   | 20          | 9991.0  | 5787.7   |
| 30         | 6889.2  | 3230.8   | 30          | 8259.3  | 4322.4   | 30          | 10025.0 | 5817.0   |
| 40         | 6909.6  | 3246.5   | 40          | 8285.0  | 4343.6   | 40          | 10059.0 | 5846.5   |
| 50         | 6930.1  | 3262.3   | 50          | 8310.8  | 4364.8   | 50          | 10093.0 | 5876.1   |



Table V. Corrections for use with table IV,

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|       |       | For Tangents Add |     |      |      |      |      |      |      |      |      |      |      |      |      |
|-------|-------|------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|
| ANGLE | CURVE | 5°               | 10° | 15°  | 20°  | 25°  | 30°  | 35°  | 40°  | 45°  | 50°  | 55°  | 60°  | 65°  | 70°  |
| 10°   |       | .03              | .06 | .09  | .13  | .16  | .19  | .22  | .25  | .28  | .31  | .34  | .38  | .42  | .46  |
| 15°   |       | .04              | .10 | .14  | .19  | .24  | .29  | .34  | .39  | .45  | .51  | .53  | .58  | .63  | .68  |
| 20°   |       | .06              | .13 | .19  | .26  | .32  | .39  | .45  | .51  | .58  | .65  | .72  | .79  | .84  | .90  |
| 25°   |       | .08              | .16 | .24  | .33  | .40  | .49  | .58  | .67  | .75  | .83  | .90  | .99  | 1.06 | 1.14 |
| 30°   |       | .10              | .19 | .29  | .39  | .49  | .59  | .69  | .79  | .89  | .99  | 1.09 | 1.20 | 1.29 | 1.39 |
| 35°   |       | .11              | .22 | .34  | .47  | .58  | .69  | .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 | .771 | .845 | .922 | 1.01 |
| 70°   |       | .080 | .159 | .240 | .321 | .403 | .485 | .568 | .652 | .735 | .819 | .906 | .994 | 1.08 | 1.17 |
| 75°   |       | .095 | .182 | .266 | .353 | .440 | .528 | .618 | .707 | .797 | .887 | .977 | 1.07 | 1.18 | 1.29 |
| 80°   |       | .110 | .220 | .332 | .445 | .558 | .671 | .787 | .903 | 1.02 | 1.13 | 1.25 | 1.38 | 1.50 | 1.62 |
| 85°   |       | .128 | .259 | .391 | .524 | .657 | .790 | .926 | 1.06 | 1.20 | 1.34 | 1.47 | 1.62 | 1.76 | 1.91 |
| 90°   |       | .149 | .299 | .450 | .603 | .756 | .910 | 1.07 | 1.22 | 1.38 | 1.54 | 1.70 | 1.87 | 2.03 | 2.20 |
| 95°   |       | .174 | .350 | .522 | .706 | .885 | 1.06 | 1.25 | 1.43 | 1.62 | 1.80 | 1.99 | 2.18 | 2.38 | 2.58 |
| 100°  |       | .200 | .401 | .604 | .809 | 1.01 | 1.22 | 1.43 | 1.64 | 1.85 | 2.06 | 2.28 | 2.50 | 2.73 | 2.96 |

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

| Degree of Curve | Radius 50<br>sin. def. ang. | $\frac{1}{2}$ sub chord = sin of def. angle<br>R |        |        |        | Length of arc<br>for 100 ft. |
|-----------------|-----------------------------|--------------------------------------------------|--------|--------|--------|------------------------------|
|                 |                             | 12.5 Ft.                                         | 15 Ft. | 20 Ft. | 25 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

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

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

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

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

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

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

To find angle for a given distance and deflection.

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

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

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

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

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

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

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

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



## Natural Sines

| DEG. | 0'   | 10'  | 20'  | 30'  | 40'  | 50'  | DEG. | 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   | 6609 | 6713 | 6734 | 6756 | 6777 | 6799 | 47   |
| 3    | 0523 | 0552 | 0581 | 0610 | 0640 | 0669 | 86   | 43   | 6620 | 6641 | 6662 | 6684 | 6695 | 6696 | 46   |
| 4    | 0698 | 0727 | 0756 | 0785 | 0814 | 0843 | 85   | 44   | 6647 | 6667 | 6688 | 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 | I.0000 | I.0000 | 0    |

| DEG. | 60' | 50' | 40' | 30' | 20' | 10' | DEG. |
|------|-----|-----|-----|-----|-----|-----|------|
|------|-----|-----|-----|-----|-----|-----|------|

## Natural Cosines

## Natural Tangents

| deg. | 0'   | 10'  | 20'  | 30'  | 40'  | 50'  | deg. | 0'   | 10'    | 20'    | 30'    | 40'    | 50'    | deg.   |      |
|------|------|------|------|------|------|------|------|------|--------|--------|--------|--------|--------|--------|------|
| 0    | 0000 | 0029 | 0058 | 0087 | 0116 | 0145 | 89   | 40   | 8391   | 8441   | 8491   | 8541   | 8591   | 8642   | 49   |
| 1    | 0175 | 0204 | 0233 | 0262 | 0291 | 0320 | 88   | 41   | 8693   | 8744   | 8796   | 8847   | 8899   | 8952   | 48   |
| 2    | 0349 | 0378 | 0407 | 0437 | 0466 | 0495 | 87   | 42   | 9004   | 9057   | 9110   | 9163   | 9217   | 9271   | 47   |
| 3    | 0524 | 0553 | 0582 | 0612 | 0641 | 0670 | 86   | 43   | 9325   | 9380   | 9435   | 9490   | 9545   | 9601   | 46   |
| 4    | 0699 | 0729 | 0758 | 0787 | 0816 | 0846 | 85   | 44   | 9657   | 9713   | 9770   | 9827   | 9884   | 9942   | 45   |
| 5    | 0875 | 0904 | 0934 | 0963 | 0992 | 1022 | 84   | 45   | 1.0000 | 1.0058 | 1.0117 | 1.0176 | 1.0235 | 1.0295 | 44   |
| 6    | 1051 | 1080 | 1110 | 1139 | 1169 | 1198 | 83   | 46   | 1.0355 | 1.0416 | 1.0477 | 1.0533 | 1.0599 | 1.0661 | 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   | 2.2450 | 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 | 343.770 | 0    |

## Natural Cotangents



# DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 14 FEET WIDE. SIDE SLOPES 1 1/2 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.

22901