

DEWAR-DUNKERTON ROAD
CONSTRUCTION.

1922

39

EUGENE DIETZGEN CO.

DRAWING MATERIALS, MATHEMATICAL and
SURVEYING INSTRUMENTS

Chicago New York San Francisco New Orleans Pittsburg Toronto

Distances from Center of Roadway for Cross-Sectioning
Roadway 16 feet wide. Side Slopes 1 on 1.
For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	0
1	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	1
2	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	2
3	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	3
4	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	4
5	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	5
6	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	6
7	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	7
8	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	8
9	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	9
10	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	10
11	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	11
12	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	12
13	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	13
14	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	14
15	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	15
16	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	16
17	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	17
18	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	18
19	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	19
20	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	20
21	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	21
22	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	22
23	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	23
24	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	24
25	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	25
26	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	26
27	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	27
28	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	28
29	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	29
30	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	30
31	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	31
32	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	32
33	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	33
34	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	34
35	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	35
36	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	36
37	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	37
38	46.0	46.1	46.2	46.3	46.4	46.5	46.6	46.7	46.8	46.9	38
39	47.0	47.1	47.2	47.3	47.4	47.5	47.6	47.7	47.8	47.9	39
40	48.0	48.1	48.2	48.3	48.4	48.5	48.6	48.7	48.8	48.9	40

Example—If point is 22.6 ft. above grade, how far should it be from center line to be a slope stake point? Ans. from Table 30.6. For same slopes but other widths of roadbed, correct above figures by one-half difference in width of roadbed; thus in example above, for 20 ft. roadbed distance will be $30.6 + (20 - 16) \div 2$ or 2 ft. added to 30.6 = 32.6. For slopes of 1 on 1½ see inside of back cover.

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Dewar - Dunkerton Rd.

8920 39

Const.

1922

Property of

County Engineers Office

Court House

Waterloo

Iowa

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Entered 2-1923 CRH

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Construction X-See and Slope

Stakes - Denar-Dunkerton Road 7/16/22

Hoff
Wade
Francis

5

80 $\frac{1.5}{30} - \frac{1.7}{15.7} \frac{3.4}{49} 30 - 49$ 906.20 909.0 9038

T.P. 5.20 912.91 3.70 907.71

79 $\frac{1.3}{30} - \frac{2.0}{15.7} \frac{3.6}{49} 30 - 49$ 905.50 908.87 9035

78 $\frac{1.7}{30} - \frac{2.2}{16.0} \frac{3.5}{49} 30 - 49$ 905.2 908.75 90320

77 $\frac{1.8}{30} \frac{2.4}{16.3} \frac{2.5}{16.5} \frac{3.2}{49} 30 - 49$ 904.50 908.62 90300

+70

76 $-\frac{3.3}{17.5} - -$ *meat about* 47 $-\frac{3.3}{17.5} - -$ 908.50 90250

+84

75 $\frac{2.4}{30} \frac{1.5}{15.1} \frac{2.2}{16.0} \frac{1.7}{30} 30 - 30$ 901.00 907.82 90400

T.P=RP 1.80 911.41 292 909.61

BM #7 0.76 912.53 911.77

907.89 907.7 907.5 907.4 907.3
 $\frac{5.02}{33} \frac{5.2}{22} 5.4 \frac{5.5}{20} \frac{5.6}{50}$
 907.71 907.4 907.3 907.2 907.1
 $\frac{3.70}{33} \frac{4.0}{20} \frac{4.1}{15} \frac{4.2}{20} \frac{4.3}{50}$
 907.21 906.9 906.8 906.7 906.6
 $\frac{4.20}{33} \frac{4.5}{20} \frac{4.6}{12} \frac{4.7}{15} \frac{4.8}{20}$
 906.35 906.3 906.2 906.1 906.0
 $\frac{5.06}{33} \frac{5.1}{21} \frac{5.0}{12} \frac{5.0}{15} \frac{5.0}{36}$
 906.4 906.3 906.2 906.1 906.0
 $\frac{7.4}{40} \frac{9.3}{33} \frac{9.7}{26} \frac{5.5}{21} \frac{5.0}{15} \frac{4.9}{26} \frac{5.3}{50}$
 905.86 905.4 905.3 905.2 905.1 905.0
 $\frac{5.0}{33} \frac{5.8}{24} \frac{5.7}{12} \frac{5.3}{6.2} \frac{5.7}{9.4} \frac{9.0}{5.6} \frac{9.2}{16} \frac{9.4}{18} \frac{9.6}{23} \frac{9.8}{31} \frac{10.0}{37} \frac{10.2}{42}$

905.7 905.6 905.5 905.4 905.3 905.2
 $\frac{5.7}{33} \frac{5.8}{26} \frac{5.7}{12} 6.8 \frac{5.8}{12} \frac{5.9}{20} \frac{5.0}{33} \frac{5.1}{20} \frac{5.2}{16} \frac{5.3}{21} \frac{5.4}{28} \frac{5.5}{33}$
 906.50 906.4 906.3 906.2 906.1 906.0
 $\frac{4.81}{33} \frac{5.0}{22} \frac{5.1}{12} 5.2 \frac{5.4}{18} \frac{5.7}{14} \frac{5.5}{16} \frac{5.6}{21} \frac{5.7}{28} \frac{5.8}{33}$

X Center E Headwall 13x3 RC B Sta 96+50
 Spike in S Gate post L of Sta 84+96 - Old Road

89 $\frac{1.2}{30}$ $\frac{2.2}{16.0}$ $\frac{3.0}{17.2}$ 30 *meat* 910.00 912.95

88 $\frac{3.7}{18.1}$ $\frac{4.6}{19.3}$ no cut 912.85

+50

89 $\frac{5.0}{20}$ $\frac{1.8}{15.7}$ $\frac{5.0}{49}$ 700% - 49 912.14 906.2

+50

T.P. 6.63 (914.95) 8.64 908.32

86 $\frac{2.3}{30}$ - $\frac{0.0}{13}$ $\frac{5.0}{50}$ 30 - 50 909.80 911.73 906.0

+50

85 $\frac{2.5}{30}$ $\frac{0.0}{13}$ $\frac{0.4}{13.6}$ $\frac{4.2}{50}$ 30 - 50 909.30 911.32 900.8

84 $\frac{1.6}{30}$ $\frac{1.8}{15.6}$ $\frac{1.8}{15.6}$ $\frac{2.6}{49}$ 30 - 49 908.00 910.90 900.5

T.P. 8.10 (916.96) 4.05 908.86

83 $\frac{1.0}{30}$ - $\frac{1.9}{15.6}$ $\frac{2.4}{49}$ 30 - 49 907.50 910.50 900.0

82 $\frac{1.0}{30}$ $\frac{2.7}{16.0}$ $\frac{3.3}{49}$ 30 - 49 907.00 910.00 900.0

81 $\frac{1.0}{30}$ - $\frac{1.9}{15.7}$ $\frac{3.4}{49}$ 30 - 49 906.70 909.50 904.20

(912.91)

911.43 910.9 910.6 910. 909.8
 $\frac{3.52}{33}$ $\frac{4.0}{12}$ 43 $\frac{4.9}{22}$ $\frac{5.1}{33}$

909.93 908.8 908.9 908.6 907.8
 $\frac{5.02}{33}$ $\frac{6.1}{12}$ 60 $\frac{6.3}{15}$ $\frac{7.1}{28}$
 907.9 905.8 906.3 905.1 904.9 907.3 906.4 910.5
 $\frac{7.0}{32}$ $\frac{7.1}{19}$ $\frac{8.6}{15}$ $\frac{9.2}{12}$ $\frac{8.0}{80}$ $\frac{7.6}{16}$ $\frac{6.3}{37}$ $\frac{4.4}{50}$
 907.5 907.6 908.3 910.1 911.0 911.1
 $\frac{7.4}{32}$ $\frac{7.3}{12}$ 66 $\frac{4.8}{14}$ $\frac{3.9}{43}$ $\frac{3.8}{50}$

908.8 909.9 911.2 911.3 911.8 911.2
 $\frac{6.1}{33}$ $\frac{5.9}{18}$ 37 $\frac{3.6}{21}$ $\frac{3.6}{48}$ $\frac{3.7}{50}$
 912.2 912.2 911.8 912. 911.2 914.9 910.9
 $\frac{4.76}{33}$ $\frac{4.5}{33}$ $\frac{5.1}{26}$ 49 $\frac{5.7}{26}$ $\frac{6.0}{40}$ $\frac{6.0}{50}$

911.90 911.5 911.3 910.6 909.1 908.7
 $\frac{5.06}{33}$ $\frac{5.1}{18}$ $\frac{5.6}{56}$ $\frac{6.3}{33}$ $\frac{7.0}{50}$ $\frac{6.3}{50}$ 911.6

909.77 908.3 909.1 908.1 909.1
 $\frac{7.17}{33}$ $\frac{7.6}{18}$ 78 $\frac{7.8}{19}$ $\frac{7.9}{49}$
 908.86 908.5 908.7 908.8 908.7
 $\frac{4.05}{33}$ $\frac{4.4}{20}$ 42 $\frac{4.1}{22}$ $\frac{4.2}{50}$

908.28 908.1 908. 907.9 907.9
 $\frac{4.63}{33}$ $\frac{4.8}{20}$ 49 $\frac{5.0}{26}$ $\frac{5.0}{50}$

907.97 907.8 907.7 907.6 907.6
 $\frac{4.94}{33}$ $\frac{5.1}{22}$ 52 $\frac{5.3}{24}$ $\frac{5.3}{50}$

289540409700 = 36.11

$$P.I. 95 + 69.6 = 98194.3$$

+50

+20

$$95 \quad \frac{2.6}{30} \quad \frac{2.4}{163} \quad \frac{1.6}{15.3} \quad \frac{3.6}{32} \quad 30-32 \quad 910.2 \quad 915.29 \quad 910.2$$

$$94 \quad \frac{1.0}{30} \quad \frac{4.0}{186} \quad \frac{2.9}{17.0} \quad \frac{3.7}{32} \quad 30-32 \quad 910.00 \quad 915.00 \quad 908.80$$

$$T.P. \quad 3.57 \quad (917.80) \quad 2.16 \quad 914.23$$

$$93 \quad \frac{2.6}{16.6} \quad \frac{3.4}{17.7} \quad \text{no end} \quad 914.59$$

$$92 \quad - \frac{3.4}{17.7} \quad \frac{3.8}{18.3} \quad - \quad \text{no end} \quad 914.16$$

$$91 \quad - \frac{2.3}{16.1} \quad \frac{2.6}{16.6} \quad - \quad \text{no end} \quad 913.77$$

$$T.P. \quad 4.29 \quad (916.39) \quad 2.85 \quad 912.10$$

$$90 \quad \frac{1.4}{30} \quad \frac{1.4}{15} \quad \frac{1.8}{15.6} \quad 30 \text{ no end} \quad 910.5 \quad 913.36$$

$$(914.95)$$

$$\begin{array}{cccccccccccc} 913.5 & 912.6 & 913.8 & 915.1 & 914.1 & 912.3 & 911.2 & 912.2 & 913.6 & 914.8 \\ \frac{4.3}{33} & \frac{5.2}{34} & \frac{4.0}{25} & 2.7 & \frac{3.4}{10} & \frac{5.5}{15} & \frac{6.6}{17} & \frac{5.6}{20} & \frac{4.2}{25} & \frac{3.0}{33} \end{array}$$

$$\begin{array}{cccccccccccc} 914.0 & 914.3 & 914.7 & 915.2 & 914.4 & 912.4 & 913.6 & 913.1 & 914.5 & 913.3 & 914.8 \\ \frac{3.8}{44} & \frac{3.5}{31} & \frac{3}{14} & 2.6 & \frac{3.4}{3} & \frac{5.4}{5} & \frac{4.2}{8} & \frac{4.7}{12} & \frac{1.9}{15} & \frac{4.5}{23} & \frac{3.0}{32} \end{array}$$

$$\begin{array}{cccccccc} 910.4 & 910.5 & 911.5 & 912.1 & 913.3 & 913.5 & 914.2 \\ \frac{7.4}{33} & \frac{7.3}{23} & \frac{6.3}{12} & 5.7 & \frac{4.0}{11} & \frac{4.3}{19} & \frac{3.6}{30} \end{array}$$

$$\begin{array}{cccccc} 913.00 & 915.0 & 915.7 & 915.8 & 915.9 \\ \frac{4.72}{33} & \frac{4.8}{19} & 4.1 & \frac{4.0}{21} & \frac{3.9}{33} \end{array}$$

$$\begin{array}{cccccc} 911.05 & 911.5 & 911.9 & 912.2 & 912.6 \\ \frac{6.75}{33} & \frac{6.3}{15} & 5.9 & \frac{5.6}{15} & \frac{5.2}{34} \end{array}$$

$$\begin{array}{cccccc} 911.18 & 911.6 & 911.4 & 911.5 & 911.3 \\ \frac{5.21}{33} & \frac{4.8}{12} & 5.6 & \frac{4.9}{21} & \frac{5.1}{31} \end{array}$$

$$\begin{array}{cccccc} 911.67 & 911.2 & 911.1 & 910.9 & 910.7 \\ \frac{4.72}{33} & \frac{5.2}{12} & 5.3 & \frac{5.5}{13} & \frac{5.7}{29} \end{array}$$

$$\begin{array}{cccccc} 912.23 & 911.6 & 911.1 & 911.4 & 911.0 \\ \frac{4.16}{33} & \frac{4.8}{12} & 4.7 & \frac{5.0}{18} & \frac{5.6}{33} \end{array}$$

$$\begin{array}{cccccc} 912.10 & 912.0 & 912.0 & 911.6 & 911.0 \\ \frac{2.85}{33} & \frac{2.9}{12} & 2.9 & \frac{3.3}{19} & \frac{3.9}{37} \end{array}$$

63	$\frac{32}{30}$	$\frac{0.1}{132}$	$\frac{1.2}{147}$	$\frac{1.2}{30}$	30-30	902.25	C+F
T.P.	2.76		<u>906.33</u>	5.40		903.27	C+F
64	$\frac{38}{30}$	—	$\frac{0.1}{13.2}$	$\frac{1.7}{30}$	30-30	901.50	904.13
65	$\frac{20}{30}$	$\frac{0.8}{13.7}$	$\frac{2.0}{15.9}$	$\frac{0.9}{30}$	30-30	902.00	905.00
66	$\frac{2.1}{28}$	$\frac{0.5}{138}$	$\frac{1.5}{15.1}$	$\frac{1.0}{28}$	30-30	902.50	905.18
T.P.	3.92		<u>908.97</u>	5.14		905.05	C-F
67	$\frac{1.7}{21.5}$	$\frac{0.4}{13.6}$	$\frac{1.2}{15.0}$	$\frac{0.4}{14.6}$	Std-19	903.30	905.36
68	$\frac{2.1}{22.4}$	$\frac{0.0}{13}$	$\frac{1.2}{14.7}$	$\frac{0.5}{19.7}$		903.50	905.55
69	$\frac{2.4}{22.6}$		$\frac{0.3}{13.5}$	$\frac{1.0}{21.1}$		903.70	905.73
T.P.	2.95		<u>910.19</u>	3.35		907.24	C-F
70	$\frac{2.1}{22.2}$	$\frac{0.3}{13.5}$	$\frac{1.5}{15.4}$	$\frac{0.3}{19.5}$		904.00	905.91
71	$\frac{2.1}{22.3}$	$\frac{0.1}{13.2}$	$\frac{1.2}{14.7}$	$\frac{0.0}{22}$		904.30	906.09
72	$\frac{2.0}{22}$		$\frac{1.1}{14.6}$	$\frac{0.0}{20}$	Std 19	904.50	906.27
73	$\frac{2.0}{30}$	$\frac{0.7}{14}$	$\frac{1.5}{15.1}$	$\frac{0.6}{20.0}$	Std 19	904.50	906.46
74					30-30	904.00	907.14
T.P.	3.36		<u>910.57</u>	2.54		907.23	
BM	0.16		909.77			909.61	

903.7	903.1	902.6	902.5	902.5	902.0	901.9	
$\frac{2.1}{30}$	$\frac{3.2}{17}$	$\frac{3.7}{9}$	28	$\frac{3.8}{9}$	$\frac{4.3}{16}$	$\frac{4.6}{30}$	V
905.3	905.6	905.7	905.1	904.6	904.7	903.7	903.2
$\frac{3.7}{30}$	$\frac{3.4}{22}$	$\frac{3.3}{16}$	$\frac{2.9}{10}$	$\frac{4.1}{8}$	$\frac{4.3}{17}$	$\frac{5.3}{30}$	V
904.5	904.7	904.5	904.1	903.7	903.8	903.2	902.9
$\frac{4.5}{30}$	$\frac{4.3}{23}$	$\frac{4.5}{17}$	$\frac{4.1}{12}$	23	$\frac{3.2}{9}$	$\frac{5.8}{16}$	$\frac{6.1}{30}$
904.6	904.6	904.8	904.7	904.0	904.2	903.8	903.6
$\frac{4.4}{30}$	$\frac{4.1}{27}$	$\frac{4.2}{18}$	$\frac{4.3}{11}$	20	$\frac{4.0}{9}$	$\frac{4.2}{16}$	$\frac{5.4}{23}$
904.8	905.1	904.9	904.3	904.5	903.7	903.6	
$\frac{5.4}{25}$	$\frac{5.1}{16}$	$\frac{5.3}{7}$	29	$\frac{3.1}{9}$	$\frac{6.3}{16}$	$\frac{6.6}{23}$	V
905.5	905.6	905.6	905.3	905.1	904.4	904.0	
$\frac{4.7}{26}$	$\frac{4.6}{15}$	$\frac{4.6}{9}$	49	$\frac{5.1}{9}$	$\frac{5.8}{16}$	$\frac{6.2}{26}$	V
906.1	906.1	906.1	906.1	905.7	905.5	905.0	
$\frac{4.0}{26}$	$\frac{4.1}{17}$	$\frac{4.1}{10}$	41	$\frac{4.2}{9}$	$\frac{4.7}{14}$	$\frac{5.2}{23}$	V
906.0	906.1	905.9	905.3	904.8	904.3	904.2	
$\frac{4.6}{27}$	$\frac{4.5}{18}$	$\frac{4.9}{11}$	52	$\frac{5.8}{9}$	$\frac{6.3}{15}$	$\frac{6.4}{25}$	V
906.6	906.6	906.2	906.0	905.4	904.5	904.4	
$\frac{4.0}{28}$	$\frac{4.0}{18}$	$\frac{4.1}{12}$	46	$\frac{5.2}{9}$	$\frac{6.1}{19}$	$\frac{6.2}{30}$	V
906.5	906.6	906.1	906.1	905.2	904.4	904.5	
$\frac{4.1}{30}$	$\frac{4.0}{30}$	$\frac{4.5}{12}$	45	$\frac{5.2}{13}$	$\frac{6.2}{23}$	$\frac{6.7}{31}$	V
907.4	906.6	906.6	905.9	905.6	905.4		
$\frac{3.2}{31}$	$\frac{4.0}{14}$	40	$\frac{4.7}{14}$	$\frac{5.0}{24}$	$\frac{5.2}{30}$		V

Use prelink JCC.

x-Center E Headwall cattle prod. 5/9 76450

56+23 X Road

56+50

Free Quibby
900.50

57

30-30 899.00 901.00

58

30-30 898.70 901.67

59

30-30 898.50 902.33

59+50

30-30 898.30 902.67
C+F

BM

904.55

60

30-30 897.30 903.00
C+F

60+50

61	$\frac{2.0}{30}$	$\frac{2.4}{16.6}$	$\frac{2.8}{16.9}$	$\frac{1.8}{30}$	30-30	898.70	903.08 C+F
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62	$\frac{1.2}{30}$	$\frac{2.5}{16.6}$	$\frac{2.5}{16.9}$	$\frac{1.3}{30}$	30-30	899.50	903.17 C+F
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906.33

Vge Prelim X Sec

Center N Handrail I Beam Br on old road

900.5	899.7	900.0	899.5	898.9	898.9	898.8	✓
$\frac{5.9}{30}$	$\frac{6.6}{15}$	$\frac{6.3}{12}$	6.8	$\frac{7.4}{7}$	$\frac{1.6}{18}$	$\frac{7.5}{30}$	

900.4	900.1	900.4	900.5	900.8	900.5	900.5	✓
$\frac{5.6}{30}$	$\frac{5.6}{16}$	$\frac{5.9}{9}$	5.8	$\frac{5.5}{8}$	$\frac{5.8}{15}$	$\frac{5.8}{30}$	

901.7	901.1	901.0	901.0	901.2	900.8	900.8	✓
$\frac{4.6}{30}$	$\frac{5.2}{18}$	$\frac{5.3}{11}$	$\frac{5.5}{5.5}$	$\frac{5.1}{9}$	$\frac{5.8}{17}$	$\frac{5.5}{30}$	

46+50

47

 $\frac{0.7}{28} \frac{0.2}{13.5} \frac{1.0}{14.5} \frac{2.3}{28}$
 $\nearrow 899.50 \quad 901.45$
 $\nwarrow 26.28$

47+50

48

 $\frac{0.8}{28} \frac{1.1}{15.7} \frac{1.5}{16.1} \frac{1.2}{28}$
 $28 - 28 \quad 899.50 \quad 901.00$

T.F.

 $8.73 \quad 908.86 \quad 447 \quad 900.12$

49

 $\frac{1.0}{30} \frac{1.0}{15.0} \frac{1.9}{16.3} \frac{2.3}{30}$
 $30 - 30 \quad 898.30 \quad 901.00$

50

 $\frac{1.0}{30} \frac{2.4}{16.4} \frac{2.5}{16.5} \frac{2.3}{30}$
 $898.00 \quad 901.00$

51

 $\frac{0.8}{30} \frac{2.3}{17.5} \frac{1.5}{16.0} \frac{3.3}{30}$
 $897.80 \quad 901.00$

52

 $\frac{0.8}{30} \frac{3.2}{17.4} \frac{2.5}{16.5} \frac{2.4}{30}$
 $897.60 \quad 901.00$

53

 $\frac{1.0}{30} \frac{3.5}{17.8} \frac{2.7}{17.0} \frac{2.5}{30}$
 $897.40 \quad 901.00$

T.F.

 $4.98 \quad 904.60 \quad 5.28 \quad 899.62$

54

 $\frac{1.6}{30} \frac{3.7}{18.1} \frac{3.0}{17.2} \frac{2.7}{30}$
 $897.20 \quad 901.00$

55

 $\frac{2.1}{30} \frac{3.3}{17.5} \frac{2.7}{16.8} \frac{2.8}{30}$
 $30 - 30 \quad 897.00 \quad 901.00$

56

 $8.00 \text{ only} -$
 901.00

BM

 $0.32 \quad 904.87$

904.55

901.7	901.2	900.6	902.1	902.4	902.2	901.6	903.4	904.0
$\frac{7.2}{29}$	$\frac{7.7}{23}$	$\frac{8.3}{19}$	$\frac{6.5}{14}$	$\frac{6.5}{65}$	$\frac{6.7}{11}$	$\frac{7.3}{14}$	$\frac{5.3}{16}$	$\frac{4.9}{28}$

900.1	900.3	899.9	901.2	901.5	901.2	900.5	901.7	901.8
$\frac{8.8}{28}$	$\frac{8.4}{25}$	$\frac{7.0}{20}$	$\frac{7.7}{18}$	$\frac{7.2}{72}$	$\frac{7.1}{12}$	$\frac{8.4}{14}$	$\frac{7.2}{16}$	$\frac{7.1}{28}$

899.5	899.8	899.5	900.7	901.2	900.5	899.7	900.8	901.1
$\frac{9.4}{29}$	$\frac{7.1}{24}$	$\frac{9.5}{19}$	$\frac{8.2}{15}$	$\frac{7.7}{77}$	$\frac{8.4}{12}$	$\frac{7.2}{14}$	$\frac{8.1}{15}$	$\frac{7.8}{29}$

899.8	898.9	899.2	900.3	900.9	900.0	899.5	900.1	900.1	901.3
$\frac{9.1}{30}$	$\frac{10.0}{21}$	$\frac{9.7}{18}$	$\frac{8.6}{13}$	$\frac{8.0}{80}$	$\frac{8.9}{12}$	$\frac{9.4}{10}$	$\frac{8.8}{18}$	$\frac{8.8}{22}$	$\frac{8.6}{30}$

899.3	899.1	898.5	899.6	900.0	899.3	898.7	900.0	900.6	900.6
$\frac{5.3}{30}$	$\frac{6.3}{23}$	$\frac{6.1}{21}$	$\frac{5.0}{14}$	$\frac{4.6}{46}$	$\frac{5.3}{13}$	$\frac{5.9}{15}$	$\frac{4.6}{17}$	$\frac{4.0}{26}$	$\frac{4.0}{30}$

898.9	898.8	899.0	899.2	899.9	899.5	898.5	899.7	900.3	900.3
$\frac{5.1}{30}$	$\frac{5.8}{23}$	$\frac{6.6}{20}$	$\frac{5.2}{15}$	$\frac{5.7}{47}$	$\frac{5.1}{12}$	$\frac{6.1}{15}$	$\frac{4.8}{17}$	$\frac{4.3}{27}$	$\frac{4.3}{30}$

898.6	898.8	899.8	899.3	899.6	899.0	898.2	898.5	899.6	900.2	900.1
$\frac{6.0}{30}$	$\frac{5.8}{24}$	$\frac{6.8}{19}$	$\frac{5.3}{15}$	$\frac{5.0}{50}$	$\frac{5.6}{12}$	$\frac{6.1}{14}$	$\frac{6.1}{15}$	$\frac{5.0}{17}$	$\frac{4.4}{28}$	$\frac{4.5}{30}$

Use prelim X-sec.

T.P. 1.87 (914.47) 796 912.60

36 $\frac{3.4}{24.6}$ — $\frac{4.5}{26.2}$ 3rd 195 full only 911.42 913.42 914.2

36+50

37 $\frac{1.2}{23.6}$ — $\frac{5.6}{25.1}$ 3rd 195 full only 912.60 914.65

37+50

38 $\frac{1.0}{21}$ $\frac{1.0}{14.5}$ — $\frac{1.6}{21.9}$ 3rd 912.50 914.64

39 $\frac{0.8}{20.7}$ $\frac{1.7}{15.2}$ — $\frac{2.0}{22.5}$ 3rd 911.70 913.77

T.P. 6 76 (920.56) 2.11 913.80

40 — $\frac{2.8}{17.0}$ $\frac{1.3}{14.8}$ — full only 913.00

41 $\frac{3.5}{17.8}$ $\frac{2.4}{16.3}$ — full only 911.40

42 — $\frac{0.2}{13.3}$ $\frac{0.0}{13.0}$ — full only 909.80

43 $\frac{4.49}{14.4}$ (915.71) 1.93 911.43 911.42

43 $\frac{1.0}{14.4}$ $\frac{1.1}{14.5}$ — 3 full only 908.20

44 $\frac{1.8}{26}$ — $\frac{0.4}{13.6}$ $\frac{4.0}{26}$ 26.26 904.40 906.40

T.P. 6.91 (913.36) 2.41 906.45

45 $\frac{2.8}{27}$ — $\frac{5.0}{27}$ 27.27 902.50 904.60

46 $\frac{2.6}{28}$ — $\frac{0.4}{11}$ $\frac{4.5}{28}$ 28.28 900.80 902.80

914.6 914.6 914.1 914.8 914.7 914.6 914.1 915.6 915.9
 $\frac{6.0}{30}$ $\frac{4.0}{21}$ $\frac{6.5}{12}$ $\frac{6.5}{28}$ $\frac{5.9}{8}$ $\frac{6.0}{13}$ $\frac{6.5}{19}$ $\frac{5.0}{21}$ $\frac{4.3}{27}$

915.3 915.7 915.3 916.2 916.0 915.6 917.9
 $\frac{6.2}{28}$ $\frac{4.7}{21}$ $\frac{5.3}{12}$ $\frac{4.4}{24}$ $\frac{4.6}{13}$ $\frac{5.0}{20}$ $\frac{2.7}{28}$

914.2 914.4 914.6 915.8 916.0 916.5 917.1
 $\frac{6.2}{28}$ $\frac{6.2}{22}$ $\frac{6.0}{12}$ $\frac{4.8}{48}$ $\frac{4.6}{17}$ $\frac{4.1}{27}$ $\frac{5.5}{33}$

913.7 914.1 914.2 915.4 915.2 915.1 916.3 917.3
 $\frac{6.9}{28}$ $\frac{6.5}{19}$ $\frac{6.4}{12}$ $\frac{5.2}{52}$ $\frac{5.2}{12}$ $\frac{5.5}{23}$ $\frac{4.3}{29}$ $\frac{3.3}{32}$

913.1 913.5 913.1 914.1 915.1 914.9 914.1 914.8 916.8
 $\frac{7.8}{26}$ $\frac{7.1}{20}$ $\frac{7.5}{16}$ $\frac{6.3}{11}$ $\frac{6.5}{6.5}$ $\frac{5.1}{13}$ $\frac{6.3}{21}$ $\frac{5.8}{25}$ $\frac{3.8}{30}$

912.5 912.5 912.0 913.3 914.9 914.5 914.4 912.8 913.8 917.5
 $\frac{8.1}{28}$ $\frac{8.1}{22}$ $\frac{8.6}{17}$ $\frac{6.8}{12}$ $\frac{6.7}{6.7}$ $\frac{6.2}{12}$ $\frac{6.2}{14}$ $\frac{7.8}{19}$ $\frac{6.8}{24}$ $\frac{3.7}{31}$

910.9 912.4 910.0 911.7 912.8 912.2 912.4 911.6 913.2 914.5
 $\frac{5.8}{29}$ $\frac{5.5}{24}$ $\frac{5.4}{19}$ $\frac{4.2}{12}$ $\frac{3.1}{3.1}$ $\frac{3.1}{12}$ $\frac{5.3}{18}$ $\frac{4.6}{22}$ $\frac{2.1}{25}$ $\frac{1.6}{29}$

908.7 908.6 908.0 909.6 909.5 908.9 908.6 912.1 911.9
 $\frac{1.2}{30}$ $\frac{7.3}{25}$ $\frac{7.9}{19}$ $\frac{6.8}{13}$ $\frac{5.4}{5.4}$ $\frac{5.8}{12}$ $\frac{7.3}{18}$ $\frac{8.8}{21}$ $\frac{4.0}{31}$

907.8 907.7 907.0 908.6 909.3 908.9 907.5 910.6 910.8
 $\frac{8.1}{31}$ $\frac{8.2}{24}$ $\frac{8.9}{20}$ $\frac{7.2}{13}$ $\frac{6.6}{6.6}$ $\frac{7.0}{11}$ $\frac{8.1}{17}$ $\frac{5.3}{25}$ $\frac{5.2}{30}$

902.1 906.9 906.0 907.3 908.1 907.8 907.0 909.0 909.9
 $\frac{6.3}{28}$ $\frac{6.3}{24}$ $\frac{7.4}{20}$ $\frac{6.1}{15}$ $\frac{6.3}{6.3}$ $\frac{5.6}{12}$ $\frac{6.3}{16}$ $\frac{4.4}{20}$ $\frac{3.7}{27}$

906.2 905.3 906.6 907.1 906.4 905.7 903.8 908.4
 $\frac{7.2}{26}$ $\frac{6.0}{20}$ $\frac{6.8}{15}$ $\frac{6.3}{6.3}$ $\frac{7.0}{12}$ $\frac{7.7}{15}$ $\frac{3.6}{17}$ $\frac{5.0}{26}$

905.3 904.5 905.7 906.3 905.7 905.1 906.9 902.5
 $\frac{8.6}{27}$ $\frac{4.4}{21}$ $\frac{3.2}{15}$ $\frac{2.6}{2.6}$ $\frac{3.2}{13}$ $\frac{3.8}{14}$ $\frac{2.0}{17}$ $\frac{1.4}{27}$

903.4 902.8 906.5 903.3 903.7 902.8 902.1 904.9 905.3
 $\frac{5.7}{26}$ $\frac{6.1}{24}$ $\frac{7.4}{21}$ $\frac{5.6}{14}$ $\frac{9.3}{52}$ $\frac{6.1}{11}$ $\frac{6.5}{15}$ $\frac{4.0}{17}$ $\frac{3.6}{28}$

26 $\frac{1.8}{18.7}$ $\frac{3.4}{17.7}$ $\frac{1.9}{1.2}$ — 22 $\frac{41.01}{911.50}$ $\frac{3.4}{15.3}$
 BM 9-20 $\frac{423.54}{1.11}$ $\frac{915.37}{915.31}$
 29 — $\frac{2.4}{16.2}$ $\frac{1.8}{15.4}$ — $\frac{113.77}{113.77}$

30 $\frac{3.0}{22.4}$ — — $\frac{5.5}{27}$ $\frac{21.0}{910.50}$ $\frac{912.50}{912.50}$

31 $\frac{3.3}{22.8}$ $\frac{0.7}{14.0}$ $\frac{2.0}{10.7}$ $\frac{3.6}{24.9}$ $\frac{21.0}{910.50}$ $\frac{912.50}{912.50}$

32 $\frac{1.4}{24}$ $\frac{3.6}{18.0}$ $\frac{2.7}{16.7}$ $\frac{2.4}{24}$ 25 — $\frac{21.0}{905.50}$ $\frac{912.50}{908.79}$

32+50

33 — $\frac{2.3}{16.1}$ $\frac{1.1}{14.5}$ —

33+50

BM 7.55 $\frac{916.48}{1.2}$ $\frac{2.3}{14.7}$ $\frac{2.3}{25}$ 25 — $\frac{909.00}{905.00}$ $\frac{912.50}{907.93}$

34+50

35 $\frac{1.3}{22.1}$ $\frac{2.1}{16.0}$ $\frac{1.0}{14.5}$ $\frac{2.2}{22.1}$ 25 — $\frac{21.0}{908.00}$ $\frac{912.50}{910.85}$

37+50

$\frac{914.47}{914.47}$

$\frac{911.1}{12.1}$ $\frac{910.2}{24}$ $\frac{911.5}{22}$ $\frac{913.6}{13}$ $\frac{913.9}{96}$ $\frac{914.0}{92}$ $\frac{911.8}{11.7}$ $\frac{913.1}{10}$ $\frac{914.0}{27}$

$\frac{910.4}{6.1}$ $\frac{912.1}{22}$ $\frac{912.2}{13}$ $\frac{913.7}{38}$ $\frac{912.7}{11}$ $\frac{912.8}{15}$ $\frac{913.5}{19}$ $\frac{913.9}{26}$

$\frac{912.0}{4.5}$ $\frac{912.4}{21}$ $\frac{911.2}{19}$ $\frac{913.1}{13}$ $\frac{913.9}{26}$ $\frac{913.1}{12}$ $\frac{912.4}{14}$ $\frac{915.1}{19}$ $\frac{915.5}{21}$ $\frac{916.0}{29}$

$\frac{910.6}{5.7}$ $\frac{910.9}{19}$ $\frac{909.1}{17}$ $\frac{910.5}{12}$ $\frac{911.0}{55}$ $\frac{910.1}{12}$ $\frac{908.9}{16}$ $\frac{912.0}{20}$ $\frac{913.2}{23}$ $\frac{913.9}{20}$

$\frac{907.1}{27}$ $\frac{906.9}{19}$ $\frac{905.4}{17}$ $\frac{907.5}{19}$ $\frac{908.1}{84}$ $\frac{907.5}{13}$ $\frac{906.6}{14}$ $\frac{906.4}{20}$ $\frac{907.9}{26}$

$\frac{905.3}{28}$ $\frac{905.8}{14}$ $\frac{904.6}{17}$ $\frac{905.0}{15}$ $\frac{906.1}{29}$ $\frac{907.2}{93}$ $\frac{907.1}{12}$ $\frac{906.2}{14}$ $\frac{905.5}{17}$ $\frac{906.0}{21}$ $\frac{906.8}{23}$

$\frac{904.9}{14}$ $\frac{905.3}{11.2}$ $\frac{904.9}{17}$ $\frac{906.5}{10.2}$ $\frac{906.8}{97}$ $\frac{906.6}{7.9}$ $\frac{906.3}{10.2}$ $\frac{905.3}{10.7}$ $\frac{905.9}{10.6}$

$\frac{904.8}{9.6}$ $\frac{905.4}{21}$ $\frac{905.2}{17}$ $\frac{905.9}{12}$ $\frac{906.4}{10}$ $\frac{906.7}{7.5}$ $\frac{906.7}{13}$ $\frac{906.0}{17}$ $\frac{905.6}{22}$ $\frac{906.3}{23}$ $\frac{906.4}{25}$

$\frac{906.1}{3.8}$ $\frac{905.9}{21}$ $\frac{905.7}{17}$ $\frac{905.7}{12}$ $\frac{906.8}{10}$ $\frac{907.2}{72}$ $\frac{907.0}{7.3}$ $\frac{906.9}{18}$ $\frac{906.6}{21}$ $\frac{907.2}{26}$

$\frac{906.9}{7.5}$ $\frac{907.9}{17.0}$ $\frac{906.6}{7.8}$ $\frac{908.0}{6.4}$ $\frac{908.3}{61}$ $\frac{908.1}{6.3}$ $\frac{906.8}{7.6}$ $\frac{907.4}{7.0}$ $\frac{908.3}{6.1}$

$\frac{909.2}{5.7}$ $\frac{909.6}{48}$ $\frac{909.5}{19}$ $\frac{908.6}{5.8}$ $\frac{909.7}{4.1}$ $\frac{910.0}{44}$ $\frac{909.7}{4.7}$ $\frac{908.6}{5.8}$ $\frac{909.6}{4.8}$ $\frac{910.1}{4.3}$

$\frac{911.7}{2.1}$ $\frac{912.4}{2.0}$ $\frac{911.6}{2.8}$ $\frac{911.4}{3.0}$ $\frac{912.0}{2.4}$ $\frac{912.0}{2.4}$ $\frac{911.4}{3.0}$ $\frac{912.3}{1.1}$ $\frac{912.9}{1.6}$

15 $\frac{0.7}{20.5}$ $\frac{2.9}{17.0}$ $\frac{1.3}{4.8}$ $\frac{2.3}{2.3}$ std cut 1st 929.73 fill bet 931.73

94 $\frac{980.2}{29}$ $\frac{930.3}{21}$ $\frac{928.8}{18}$ $\frac{930.6}{14}$ $\frac{931.5}{11.3}$ $\frac{930.8}{12}$ $\frac{931.6}{11.2}$ $\frac{932.1}{10.7}$

931.6 $\frac{932.4}{11.2}$ $\frac{930.4}{10.4}$ $\frac{932.0}{12.4}$ $\frac{933.0}{10.5}$ $\frac{932.1}{9.8}$ $\frac{931.7}{11.1}$ $\frac{932.9}{9.9}$ $\frac{933.5}{9.3}$ $\frac{933.2}{9.6}$

16 $\frac{3.6}{23.1}$ $\frac{0.3}{13.5}$ $\frac{0.9}{14.2}$ $\frac{3.4}{24.6}$ std cut 1st 932.00 fill bet 931.00

935.5 $\frac{934.3}{22}$ $\frac{932.3}{18}$ $\frac{935.7}{13}$ $\frac{934.6}{8.2}$ $\frac{934.2}{10}$ $\frac{935.3}{14}$ $\frac{935.0}{24}$ $\frac{935.0}{30}$

16+50

935.6 $\frac{936.1}{22}$ $\frac{934.8}{19}$ $\frac{935.6}{12}$ $\frac{934.5}{6.3}$ $\frac{934.0}{11}$ $\frac{935.8}{16}$ $\frac{937.9}{25}$

17 $\frac{3.9}{25.4}$ — — $\frac{4.6}{26.4}$ std cut only 933.65 935.65

936.8 $\frac{937.7}{22}$ $\frac{936.1}{20}$ $\frac{937.4}{11}$ $\frac{938.2}{4.6}$ $\frac{937.6}{5.2}$ $\frac{936.7}{11}$ $\frac{938.2}{19}$ $\frac{938.3}{21}$ $\frac{938.3}{4.5}$ $\frac{938.3}{3.2}$

17+50

936.1 $\frac{937.7}{21}$ $\frac{936.0}{19}$ $\frac{937.5}{12}$ $\frac{938.3}{4.6}$ $\frac{937.6}{5.2}$ $\frac{936.5}{18}$ $\frac{938.1}{24}$ $\frac{938.2}{31}$

18 $\frac{3.3}{24.5}$ — — $\frac{5.4}{24.9}$ std cut only 932.91 931.90

935.2 $\frac{936.0}{30}$ $\frac{934.5}{18}$ $\frac{935.7}{12}$ $\frac{936.2}{6.6}$ $\frac{935.5}{13}$ $\frac{934.6}{15}$ $\frac{936.7}{26}$ $\frac{936.8}{30}$

18+50

932.9 $\frac{933.9}{24}$ $\frac{933.4}{18}$ $\frac{932.2}{17}$ $\frac{933.2}{11}$ $\frac{933.6}{9.2}$ $\frac{933.0}{14}$ $\frac{932.7}{10.6}$ $\frac{934.1}{23}$ $\frac{934.7}{36}$

T.D. 11.17 $\frac{942.82}{23}$ 2.21 931.65

933.0 $\frac{930.7}{32}$ $\frac{931.0}{26}$ $\frac{929.7}{19}$ $\frac{930.8}{17}$ $\frac{931.3}{25}$ $\frac{930.7}{12}$ $\frac{929.8}{18}$ $\frac{931.5}{21}$ $\frac{932.2}{33}$

19 $\frac{1.7}{23}$ $\frac{2.3}{16.1}$ $\frac{1.7}{15.1}$ $\frac{2.9}{23}$ 2.23 929.4

928.2 $\frac{928.5}{56}$ $\frac{928.4}{53}$ $\frac{927.6}{56}$ $\frac{929.1}{47}$ $\frac{929.5}{13}$ $\frac{928.8}{50}$ $\frac{927.8}{12}$ $\frac{929.6}{10}$ $\frac{930.3}{19}$ $\frac{930.3}{35}$

19+50

93386

Ditch d

8 $\frac{11}{30}$ $\frac{17}{15.4}$ $\frac{12}{14.3}$ $\frac{43}{28}$ 28-28 C+R 900.00 903.38
 T.P. 12 11 (913.03) 1.60 (900.92)
 7 $\frac{09}{30}$ $\frac{20}{15.9}$ $\frac{23}{15}$ $\frac{38}{28}$ 28-28 C+R 897.9 900.39

6 $\frac{12}{30}$ $\frac{30}{17.2}$ $\frac{20}{15.3}$ $\frac{38}{28}$ 28-28 C+R 894.3 897.18

5 $\frac{16}{30}$ $\frac{28}{16.9}$ $\frac{22}{16.0}$ $\frac{37}{28}$ 28-28 C+R 892.2 895.17

T.P. 8.70 (902.52) 0.46 893.52

4 $\frac{38}{20}$ $\frac{16}{15.2}$ $\frac{16}{15.2}$ $\frac{40}{28}$ 28-28 C+R 889.5 892.86

+50

3 - $\frac{14}{15.2}$ $\frac{05}{13.7}$ -

+50

2 - $\frac{41}{18.6}$ $\frac{3.9}{18.4}$ $\frac{40}{28}$ - 28 C.R. 884.0

+50

1 $\frac{47}{19.5}$ $\frac{6.6}{22.1}$ $\frac{18}{28}$ - 28 C.R. 882.0

0+50

BM

227 (894.28)

892.01

906.9 901.1 901.3 900.5 901.2 902.4 902.0 901.2 900.1 902.0 902.0 902.3 903.9
 32 28 23 22 17 106 8 11 13 14 19 25.3

898.2 898.2 897.8 894.0 898.3 899.1 897.7 898.2 899.9 901.1 901.1
 43 23 22 21 16 31 7 11 15 16 19 29

895.4 895.4 894.8 894.1 895.1 896.5 895.6 895.2 896.4 898.0 895.1
 30 27 22 20 15 68 8 11 15 16 20 28

893.6 893.4 891.7 893.3 894.0 892.7 894.1 895.8 895.8
 31 21 20 18 19 8 14 17 22 30

892.1 891.6 889.6 891.1 891.6 892.7 890.8 893.3 893.5
 32 21 19 18 22 10 13 16 21 29

890.9 890.9 889.0 890.1 890.9 890.6 890.1 890.6 892.2 892.5
 34 34 33 42 37 27 42 37 21 29

888.2 888.8 889.8 889.9 890.3
 31 31 45 40 40
 885.8 886.9 885.9 885.9 885.9 885.9 885.9 885.9 885.9 885.9
 28 28 28 28 28 28 28 28 28 28

884.7 884.8 883.7 883.7 883.1 883.4 886.9 885.9 883.8 885.9 886.0
 30 29 24 21 13 6.9 10 12 18 25 29

883.4 884.4 887.4 887.5 886.4 884.6 882.5 883.7
 31 19 13 6.5 9 13 19 23 30

883.6 884.9 889.0 889.0 884.8 881.1
 31 24 11 5.0 11 19 28

Center N. Headwall East side Sta 3+70

15

931.73

929.0	929.2	929.3	928.4	929.2	930.0	929.3	928.3	930.2	930.5	930.4
5.0	4.5	6.7	5.6	4.8	4.0	4.7	5.7	3.8	5.5	3.6
28	22	21	15	14	40	9	15	17	21	30

+50

927.6	927.7	927.9	926.0	927.8	928.5	927.9	926.7	928.5	929.2	928.8
6.9	6.3	6.1	8.0	6.2	6.5	6.1	7.3	5.5	4.8	4.8
32	28	23	22	14	50	9	14	17	23	28

14 $\frac{2.0}{225} - \frac{0.1}{132} \frac{1.1}{145} \frac{3.4}{246}$ 800 M 5 and only 925.8 927.85

13 $\frac{3.6}{249} \leftarrow \frac{4.0}{25} \text{ sold } 19.5$ 921.7 923.71

T.D 9.93 (934.02) 1.60 914.09

12 $\frac{3.7}{245} \frac{2.8}{237}$ 800 M 5 917.54 919.57

11 $\frac{3.4}{28} \frac{0.9}{142} \frac{1.0}{157} \frac{2.5}{28}$ 28-28 912.3 915.42

T.D 13.04 (925.69) 0.38 912.65

10 $\frac{2.3}{30} \frac{1.4}{151} \frac{2.6}{167} \frac{1.7}{28}$ 28-28 908.3 911.28

9 $\frac{0.8}{30} \frac{1.5}{151} \frac{0.8}{142} \frac{3.9}{28}$ 28-28 907.5 907.14

(913.03)

925.0	925.6	925.3	923.7	924.0	925.1	924.8	923.1	925.2	925.6	925.7	925.2
9.0	8.0	8.7	11.3	10.0	8.9	7.2	10.9	8.8	8.4	8.3	8.8
32	29	34	22	16	8.9	9	15	18	24	29	31

921.4	921.8	920.7	917.9	919.2	919.7	918.8	918.7	920.6	920.5	920.2
4.3	3.8	5.0	4.8	6.5	6.0	6.9	7.0	5.1	5.2	5.1
32	28	24	22	16	11	13	16	19	24	30

915.8	915.2	913.2	913.5	914.4	915.2	914.8	913.6	913.6	914.5	915.2	914.9
9.9	10.5	12.5	12.2	11.3	10.5	10.9	12.1	12.1	11.2	10.8	10.8
32	28	23	22	18	16	10	12	15	16	20	30

910.9	910.4	910.2	918.5	909.8	909.9	909.3	908.3	908.4	910.2	910.6	910.0	910.4
4.3	2.6	2.8	4.3	3.2	3.1	3.7	4.7	4.6	2.8	2.4	2.02	2.1
32	28	24	21	16	8	11	12	14	19	25	28	31

905.8	905.0	904.1	905.6	916.1	906.1	904.1	903.7	903.3	906.6	908.3	908.3
7.7	8.0	8.9	7.6	11.3	6.9	8.9	7.3	7.7	6.4	4.7	4.7
31	26	24	16	69	11	11	12	13	15	24	30

t50

108

 $\frac{2.2}{16.2} - \frac{26}{166} -$

107

 $\frac{2.9}{17.0} - \frac{3.1}{17.2} -$

106

 $\frac{1.8}{30} \quad \frac{3.1}{17.2} \quad \frac{3.4}{17.5} \quad \frac{1.0}{30} \quad 30-30 \quad 914.00 \quad 917.08$

105

 $\frac{1.5}{30} \quad \frac{3.1}{17.6} \quad \frac{3.4}{17.6} \quad \frac{1.5}{30} \quad 30-30 \quad 913.4 \quad 916.86$

T.P.

 $488 \quad \textcircled{921.60} \quad 367 \quad 916.72$

104

 $\frac{1.4}{30} \quad \frac{3.3}{17.5} \quad \frac{2.7}{17.3} \quad \frac{1.8}{30} \quad 30-30 \quad 913.2 \quad 916.64$

103

 $\frac{1.4}{30} \quad \frac{3.4}{17.6} \quad \frac{2.9}{17.0} \quad \frac{2.0}{30} \quad 30-30 \quad 913.1 \quad 916.41$

102

 $\frac{1.3}{30} \quad \frac{4.0}{18.6} \quad \frac{3.3}{17.5} \quad \frac{2.0}{30} \quad 30-30 \quad 913.0 \quad 916.18$

101

 $\frac{1.3}{30} \quad \frac{2.9}{17.0} \quad \frac{2.8}{16.9} \quad \frac{2.0}{30} \quad 30-30 \quad 912.9 \quad 915.95$

100

 $\frac{1.3}{30} \quad \frac{3.6}{18.0} \quad \frac{2.4}{16.3} \quad 30- \quad 912.7 \quad 915.73$

99

 $\frac{1.3}{30} \quad \frac{1.3}{14.8} \quad \frac{4.7}{18.2} - \quad 30- \quad 912.5 \quad 915.5$

Hub 95

 $731 \quad \textcircled{920.39} \quad 913.08$

16.8 48 31	916.6 50 27	915.5 61 25	915.6 60 17	917.1 43 12	918.5 41 11	916.9 50 10	915.6 60 15	915.4 62 17	915.8 58 18	915.8 51 26	917.2 42 30
916.3 53 30	915.0 62 25	915.2 64 15	916.8 48 12	917.0 46 11	916.6 50 11	915.2 64 17	915.6 60 18	915.5 60 25	916.9 47 29	916.9 47 32	
915.3 63 30	914.2 72 25	914.4 72 18	916.1 53 13	916.7 49 11	916.0 56 10	914.6 70 10	914.4 72 17	914.8 68 18	914.2 74 25	914.4 72 28	915.5 61 30
915.0 66 30	913.9 77 21	914.3 73 17	916.1 53 11	916.5 49 11	915.9 57 10	914.6 70 16	914.2 74 16	914.1 72 17	914.5 71 18	914.4 72 23	915.6 60 29
915.0 66 31	913.2 74 24	913.8 73 17	916.1 53 11	916.5 49 10	916.1 53 10	914.8 68 14	915.8 78 15	913.9 73 18	914.0 72 19	913.7 71 24	915.4 62 31
914.7 51 31	914.4 60 27	913.4 70 24	913.8 66 17	915.5 49 12	915.5 49 12	915.8 46 10	913.6 69 15	913.7 67 17	914.0 61 18	913.7 61 20	915.2 60 21

Use Prelim
X Sec

T.P. 794 942.08 225 934.14
 115 $\frac{33}{30}$ $\frac{08}{13}$ $\frac{14}{15.0}$ $\frac{38}{30}$ 30-30 929.7 931.91

+50

114 $\frac{25}{30}$ $\frac{30}{17.0}$ $\frac{2.8}{17.0}$ $\frac{2.1}{30}$ 30-30 926.10 929.60

+50

T.P. 9.00 926.39 225 927.39
 113 $\frac{2.8}{30}$ $\frac{34}{17.7}$ $\frac{3.4}{17.7}$ $\frac{17}{30}$ 20-30 923.75 926.75

112 $\frac{2.9}{30}$ $\frac{2.4}{16.3}$ $\frac{2.8}{16.7}$ $\frac{2.1}{30}$ 30-30 920.8 923.83

+50

T.P. 10.26 929.64 222 919.38

111 x Road 921.3

+50

110 $\frac{2.2}{16.0}$ $\frac{2.6}{16.6}$ full only 919.57

+50

109 $\frac{2.3}{16.1}$ $\frac{2.6}{16.6}$ full only 918.26

(921.60)

931.1 932.1 931.2 930.2 930.4 932.3 932.7 932.3 930.9 931.4 933.5 933.7 933.6
 $\frac{32}{30}$ $\frac{36}{25}$ $\frac{51}{21}$ $\frac{61}{19}$ $\frac{57}{17}$ $\frac{40}{11}$ $\frac{36}{11}$ $\frac{46}{13}$ $\frac{32}{13}$ $\frac{57}{18}$ $\frac{38}{22}$ $\frac{2.6}{29}$ $\frac{27}{30}$
 930.7 930.1 928.3 928.3 930.4 930.1 930.1 930.1 930.1 930.1 930.1 930.1 930.1 930.1
 $\frac{36}{32}$ $\frac{57}{25}$ $\frac{50}{20}$ $\frac{80}{18}$ $\frac{57}{11}$ $\frac{56}{11}$ $\frac{62}{11}$ $\frac{23}{12}$ $\frac{20}{14}$ $\frac{78}{14}$ $\frac{79}{16}$ $\frac{5.4}{22}$ $\frac{48}{30}$
 929.6 928.5 928.9 926.4 926.8 928.7 928.8 928.8 926.6 926.7 928.6 929.1
 $\frac{22.6}{32}$ $\frac{2.4}{26}$ $\frac{2.4}{19}$ $\frac{9.8}{17}$ $\frac{7.6}{12}$ $\frac{7.4}{10}$ $\frac{5.0}{10}$ $\frac{9.7}{14}$ $\frac{9.6}{14}$ $\frac{7.9}{12}$ $\frac{7.2}{30}$
 928.5 927.3 925.6 925.7 927.9 927.2 926.6 925.7 924.9 925.6 926.9 929.0
 $\frac{5.4}{32}$ $\frac{9.0}{28}$ $\frac{10.7}{19}$ $\frac{10.6}{16}$ $\frac{9.2}{12}$ $\frac{9.1}{12}$ $\frac{7.5}{14}$ $\frac{11}{14}$ $\frac{11.4}{16}$ $\frac{10.7}{17}$ $\frac{9.4}{21}$ $\frac{9.3}{30}$
 925.9 924.9 924.4 924.3 924.3 924.3 924.3 924.3 924.3 924.3 924.3 924.3 924.3
 $\frac{3.7}{24}$ $\frac{5.1}{22}$ $\frac{5.2}{21}$ $\frac{5.4}{19}$ $\frac{5.9}{18}$ $\frac{5.9}{16}$ $\frac{4.0}{10}$ $\frac{4.3}{10}$ $\frac{6.1}{14}$ $\frac{6.1}{16}$ $\frac{5.2}{21}$ $\frac{4.2}{29}$ $\frac{4.2}{30}$
 924.0 923.6 921.7 921.6 923.1 923.3 922.9 921.1 921.4 921.3 922.7 922.9
 $\frac{5.5}{32}$ $\frac{6.1}{25}$ $\frac{7.9}{19}$ $\frac{8.0}{15}$ $\frac{6.1}{11}$ $\frac{6.3}{11}$ $\frac{6.7}{9}$ $\frac{7.8}{12}$ $\frac{8.2}{13}$ $\frac{6.3}{16}$ $\frac{4.9}{21}$ $\frac{6.7}{30}$
 922.6 921.6 921.1 920.9 921.7 921.1 921.6 920.9 921.1 921.4 921.4
 $\frac{7.0}{29}$ $\frac{9.9}{22}$ $\frac{3.5}{20}$ $\frac{8.7}{16}$ $\frac{7.9}{12}$ $\frac{7.6}{11}$ $\frac{8.0}{10}$ $\frac{8.1}{14}$ $\frac{5.5}{21}$ $\frac{5.2}{24}$ $\frac{6.2}{30}$
 919.9 919.9 911.6 918.4 919.2 920.1 919.6 918.4 917.9 919.6 919.6 919.6
 $\frac{1.7}{31}$ $\frac{1.7}{30}$ $\frac{1.7}{26}$ $\frac{2.8}{24}$ $\frac{2.4}{14}$ $\frac{1.5}{15}$ $\frac{8.0}{13}$ $\frac{3.2}{18}$ $\frac{3.7}{25}$ $\frac{2.0}{29}$ $\frac{1.7}{32}$
 919.2 918.2 917.6 917.6 918.6 919.2 918.4 917.9 918.4 917.9 919.6 919.6
 $\frac{2.4}{30}$ $\frac{2.7}{27}$ $\frac{4.0}{24}$ $\frac{4.0}{17}$ $\frac{3.0}{13}$ $\frac{2.4}{13}$ $\frac{3.2}{13}$ $\frac{4.4}{17}$ $\frac{4.4}{20}$ $\frac{2.8}{28}$ $\frac{2.7}{31}$
 918.4 918.2 916.8 916.9 917.6 918.5 917.8 916.5 916.7 917.0 918.0
 $\frac{3.7}{31}$ $\frac{3.4}{28}$ $\frac{4.6}{24}$ $\frac{4.7}{17}$ $\frac{3.8}{14}$ $\frac{3.1}{31}$ $\frac{5.8}{11}$ $\frac{5.1}{16}$ $\frac{4.9}{25}$ $\frac{3.6}{28}$ $\frac{3.6}{30}$
 917.4 917.4 916.7 916.1 917.5 918.0 917.3 916.7 916.2 917.5 917.5
 $\frac{4.2}{30}$ $\frac{4.4}{27}$ $\frac{5.4}{25}$ $\frac{5.6}{17}$ $\frac{4.1}{13}$ $\frac{4.6}{11}$ $\frac{4.3}{15}$ $\frac{5.4}{25}$ $\frac{4.1}{28}$ $\frac{4.1}{31}$

118 $\frac{21}{30}$ $\frac{13}{30}$ 30 - 30 ^{cut only} 932.40 935.41

TSO

117 $\frac{5.3}{30}$ $\frac{48}{30}$ 30 - 30 ^{cut only} 932.00 934.79

TSO

116 $\frac{5.9}{30}$ $\frac{45}{30}$ 30 - 30 ^{cut only} 931.60 933.67

116+50

942.08

0	934.5	934.3	933.3	933.9	934.7	935.4	934.7	933.1	933.0	933.5	933.9	933.9	
8	76	78	88	82	74	67	74	90	91	84	82	84	
10	30	21	17	13	11	67	11	15	18	21	22	30	
26	935.4	935.1	934.5	934.0	934.5	935.0	935.8	935.2	933.1	933.1	935.1	936.1	
64	71	70	76	81	76	69	63	69	90	80	70	6.0	
29	22	21	19	15	13	11	63	11	16	18	22	29	
23	936.7	936.9	935.0	935.4	936.7	936.9	936.3	934.2	934.2	935.8	936.8	936.8	
48	54	62	71	67	52	52	55	79	79	63	53	53	
30	22	21	16	13	12	52	11	15	17	20	22	30	
8.5	937.9	936.1	934.9	935.0	937.2	938.1	936.9	935.1	935.0	935.8	936.7	937.8	938.3
34	62	60	72	71	49	40	52	20	71	63	54	43	32
31	23	22	18	17	12	40	11	15	15	19	22	23	30
23	937.4	936.6	935.8	934.4	934.7	936.6	937.2	936.3	934.7	934.7	937.7	938.1	
54	47	55	63	71	74	53	49	55	74	70	40	40	
11	28	25	23	18	17	12	49	10	14	17	23	30	
935.3	935.6	933.4	932.6	932.6	934.2	935.0	934.6	933.2	932.9	933.1	935.8	936.2	
48	71	87	75	95	71	71	76	59	72	80	63	59	
31	26	22	20	18	14	71	11	13	14	16	21	29	

954.64

158 $\frac{24}{27}$ $\frac{20}{158}$ $\frac{42}{185}$ $\frac{1.6}{27}$ 27 - 27 946.50 950.24

157 $\frac{29}{27}$ $\frac{1.3}{148}$ $\frac{41}{18.7}$ $\frac{1.0}{27}$ 27 - 27 945.50 949.22

T.D. 3 88 952.88 5.64 949.00

156 $\frac{30}{27}$ $\frac{0.0}{15.3}$ $\frac{1.9}{15.7}$ $\frac{3.6}{27}$ 27 - 27 945.00 947.66

155 $\frac{3.6}{29}$ $\frac{0.0}{18.4}$ $\frac{1.6}{15.2}$ $\frac{6.0}{29}$ $\frac{0.0}{29}$ 943.50 946.10

154 $\frac{2.9}{28}$ $\frac{0.5}{138}$ $\frac{2.8}{16.9}$ $\frac{5.8}{28}$ $\frac{0.0}{28}$ 941.50 944.54

T.D. 1.94 945.09 9.73 943.15

153 $\frac{1.3}{25}$ $\frac{1.0}{14.5}$ $\frac{3.1}{17.4}$ $\frac{2.1}{25}$ $\frac{0.0}{25}$ 940.00 942.97

152 $\frac{1.4}{25}$ $\frac{1.4}{15.0}$ $\frac{2.3}{16.1}$ $\frac{1.8}{25}$ $\frac{0.0}{25}$ 938.00 941.41

151 $\frac{2.9}{25}$ $\frac{0.6}{13.9}$ $\frac{2.9}{17.0}$ $\frac{1.5}{25}$ $\frac{0.0}{25}$ 937.0 939.84

150 $\frac{1.7}{25}$ $\frac{0.7}{14.0}$ $\frac{2.8}{16.8}$ $\frac{1.8}{25}$ $\frac{0.0}{25}$ 935.50 938.38

149 $\frac{0.6}{25}$ $\frac{0.8}{14.2}$ $\frac{3.6}{17.8}$ $\frac{1.2}{25}$ $\frac{0.0}{25}$ 934.80 937.60

~~148 $\frac{0.6}{25}$ $\frac{0.8}{14.2}$ $\frac{3.6}{17.8}$ $\frac{1.2}{25}$ $\frac{0.0}{25}$ 934.80 937.60~~

RP

944.16

Center E Headwall Sta #54

Use Prelim X-sec

+50	$\frac{2.1}{15.9}$ $\frac{1.5}{30}$	952.0	955.8
164	$\frac{2.2}{16.0}$ $\frac{2.3}{30}$	951.8	955.5
+50	$\frac{2.2}{16.0}$ $\frac{1.4}{30}$	951.6	955.2
163	$\frac{2.3}{17.7}$ $\frac{1.9}{30}$	951.4	954.9
162+50	$\frac{2.3}{16.1}$ $\frac{2.8}{30}$	951.2	952.6
BM	378 <u>960.00</u>	956.22	

BM	274 <u>958.96</u>	956.22	
Sta 163		955.85	
✓ 162	$\frac{2.5}{27}$ $\frac{2.6}{16.6}$ $\frac{2.3}{16.2}$ $\frac{1.8}{27}$ 27-27	951.00	954.33
161	$\frac{2.9}{27}$ $\frac{1.4}{15.0}$ $\frac{1.1}{14.5}$ $\frac{2.7}{27}$ 27-27	950.50	953.31
T.P	1.28 <u>954.64</u> 6.10	952.86	
✓ 160	$\frac{2.5}{27}$ $\frac{1.7}{15.4}$ $\frac{3.0}{17.0}$ $\frac{2.5}{27}$ 27-27	949.00	952.28
159	$\frac{2.4}{27}$ $\frac{2.3}{16.3}$ $\frac{3.8}{18.2}$ $\frac{1.8}{27}$ 27-27	948.00	951.27

960.0	960.0
4.2	7.8
955.8	952.2

95-2.8
954.3
2.8 / 1.50 / 6
1.26
2.3

95.2
95.1
2.3 / 1.00 / 4

PIKE 15 Cottonwood Lt Sta 164+25

Use Prelim
X Sec

61.

143	$\frac{0.4}{30}$	$\frac{1.2}{14.8}$	$\frac{1.3}{14.8}$	$\frac{1.6}{28}$	C+P 30-28	939.00	941.63
T.P.	2.41		943.15		10.81	940.74	
142	$\frac{1.7}{30}$	$\frac{1.1}{14.6}$	$\frac{1.2}{14.7}$	$\frac{4.3}{28}$	C+P 30-28	943.10	945.50
T.P.	1.87		951.55		6.87	949.68	
141	$\frac{2.3}{28}$	—	—	$\frac{5.8}{28.2}$	old ent only	946.72	948.72
140	$\frac{4.2}{27}$	—	—	$\frac{6.6}{24.2}$	old ent only	948.20	950.24
139+49							
139	$\frac{5.2}{27.3}$	—	—	$\frac{6.3}{25}$	old ent only	948.12	950.14
138	$\frac{1.7}{25}$	$\frac{1.1}{14.5}$	$\frac{1.1}{14.5}$	$\frac{3.2}{25}$	old ent only 25	946.4	948.41
137	$\frac{1.5}{23}$	$\frac{1.7}{15.4}$	$\frac{1.7}{15.4}$	$\frac{2.8}{23}$	— 24	943.5	945.86
T.P.	11.33		956.55		1.51	945.22	
136	$\frac{1.6}{23}$	$\frac{1.7}{15.4}$	$\frac{1.3}{15.0}$	$\frac{3.0}{23}$	— 23	941.0	943.32
135	$\frac{1.8}{23}$	$\frac{1.0}{14.5}$	$\frac{1.4}{15.0}$	$\frac{2.7}{23}$	— 23	939.0	941.19
134	$\frac{1.1}{23}$	$\frac{1.4}{16.0}$	$\frac{1.9}{15.7}$	$\frac{2.0}{23}$	— 23	937.80	939.97
133	—	$\frac{1.2}{14.6}$	$\frac{2.6}{16.6}$	—	Full only	939.80	
BM	619		946.73			940.54	939.20

Use Prelim. X-Sec.

Center E Headwall Culvert Sta 13 2+76.6

~~149~~ 937.60

148 $\frac{1.2}{26}$ $\frac{1.2}{148}$ $\frac{4.8}{168}$ $\frac{1.7}{26}$ 26-26 933.50 937.50

147 $\frac{1.2}{27}$ $\frac{2.4}{163}$ $\frac{3.9}{174}$ $\frac{1.2}{27}$ 26-28 933.00 937.60

146 $\frac{0.9}{29}$ $\frac{2.6}{166}$ $\frac{5.0}{199}$ $\frac{1.0}{28}$ 30-28 932.50 938.20
T.P.-BM 0.15 (941.37) 1.93 941.22

145 $\frac{0.8}{30}$ $\frac{1.6}{157}$ $\frac{4.1}{187}$ $\frac{2.2}{28}$ 30-28^{C+H} 933.50 938.50

144 $\frac{0.8}{30}$ $\frac{2.1}{160}$ $\frac{1.8}{157}$ $\frac{2.3}{28}$ 30-28^{C+H} 936.50 939.06

(943.15)

ET wall New Gull

(94012)

122 $\frac{4.6}{28}$ $\frac{0.6}{13}$ $\frac{1.3}{13}$ $\frac{4.7}{28}$ 28-28 933.00 937.37
 T.D. 6-67 (94012) 2.95 937.17
 123 $\frac{3.9}{28}$ $\frac{1.8}{13}$ $\frac{1.8}{13}$ $\frac{4.5}{28}$ 27-27 933.30 937.68

124 $\frac{2.4}{26}$ $\frac{1.0}{13}$ $\frac{1.2}{13}$ $\frac{3.1}{26}$ 26-26 935.00 938.00

125 $\frac{2.1}{25}$ $\frac{0.0}{13}$ $\frac{0.1}{13}$ $\frac{3.1}{25}$ 25-25 936.00 938.30

126 $\frac{2.6}{25}$ $\frac{0.0}{13}$ $\frac{0.4}{13}$ $\frac{4.1}{25}$ 25-25 936.50 938.60

127 $\frac{2.1}{25}$ $\frac{0.2}{13}$ $\frac{0.5}{13}$ $\frac{3.3}{25}$ 25-25 936.50 938.90

T.D. 5-77 (94012) 3.85 939.99

128 $\frac{1.9}{25}$ $\frac{1.0}{13}$ $\frac{0.8}{13}$ $\frac{3.2}{25}$ 25-25 936.50 939.20

129 $\frac{3.0}{25}$ $\frac{0.3}{13}$ $\frac{0.8}{13}$ $\frac{3.6}{25}$ 25-25 936.40 939.50

130 $\frac{4.2}{26}$ $\frac{0.07}{10}$ $\frac{4.5}{13}$ $\frac{3.8}{26}$ 26-26 936.30 939.50

131 $\frac{4.5}{26}$ $\frac{0.4}{13}$ $\frac{0.8}{13}$ $\frac{4.4}{26}$ 26-26 936.20 939.50

132 $\frac{2.0}{27}$ $\frac{0.8}{13}$ $\frac{1.3}{13}$ $\frac{2.4}{27}$ 27-27 936.10 939.50

B.M. 4.26 940.57 10.50 Center E Headwall Culv Sta 132+76.6

Use Profile X Sec

(940.12)

118

935.41

$$119 \quad \frac{1.8}{28} \quad \frac{1.9}{13} \quad \frac{2.3}{13} \quad \frac{1.6}{28} \quad 28-28 \quad \overset{0.1}{932.40} \quad 935.96$$

$$120 \quad \frac{2.7}{28} \quad \frac{2.7}{13} \quad \frac{2.9}{13} \quad \frac{1.9}{28} \quad 28-28 \quad \overset{0.1}{932.60} \quad 936.51$$

$$121 \quad \frac{1.3}{28} \quad \frac{1.4}{13} \quad \frac{1.6}{13} \quad \frac{3.0}{28} \quad 28-28 \quad \overset{0.1}{932.80} \quad 937.06$$

Final Cross-Section Dewar-Dunkerton Road 27

Constructed 1922 - C.F. Chaney Contract 10/30/22

Hoff
Nathaniel
Noonan

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6
T.D 12 00 906.80 0.53 897.80

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B.M. 3.34 895.35 892.01

898.3	896.4	896.4	900.3	900.4	897.8	897.7	901.1	
8.5	10.4	10.4	6.5	6.4	6.4	9.0	9.1	5.7
30	25	20	12	12	12	18	23	27
895.6	893.3	893.7	897.3	897.8	897.6	894.8	894.8	898
11.3	13.5	13.1	9.3	9.0	9.2	12.0	12.0	9.8
30	25	19	12	12	12	17	21	27
893.8	891.4	891.7	894.9	895	895.12	892.6	892.0	
1.6	4.0	3.7	0.5	0.4	0.2	2.8	2.9	0.5
29	24	17	12	12	13	19	24	28
892.2	889.5	890.1	892.4	892.6	893.6	894.2	893.3	
3.2	5.9	5.3	3.0	2.8	3.8	5.9	5.9	2.1
29	24	16	12	12	19	24	29	
890.9	888.7	889.1	891.2	891.2	891.3	888.9	889.1	892.6
4.5	6.7	6.3	4.2	4.1	4.1	6.5	6.3	2.8
28	24	17	12	12	13	19	24	29
888.3	889.6	890.2	890.3	890.4	890.5	890.5		
7.1	5.8	5.2	5.1	5.0	4.9	5.1		
33	21	12	12	14	22	31		
887.6	888.6	889.6	889.7	889.8	889.2	888.1	887.9	
7.8	9.8	9.6	5.8	5.6	9.2	9.3	6.5	
26	22	19	12	12	18	21	26	
885.9	884.3	884.8	889.1	889.1	889.3	885.3	885.2	886.1
9.5	11.1	11.2	6.3	6.3	6.1	10.1	10.2	9.3
27	23	21	13	13	12	19	21	24
884.9	883.4	888.6	889.0	889.0	889.1	889.0	884.5	884.6
10.5	12.0	11.8	6.4	6.3	9.9	10.9	10.8	9.3
28	24	21	12	12	19	21	22	25
884.5	881.2	889.3	889.3	889.3	889.3	889.3	884.0	
10.8	6.2	6.1	6.1	12.2	12.2	11.4		
22	13	13	13	23	25	28		
885.4	890.3	890.4	890.3	889.6	889.6	889.6	889.6	889.6
10.8	10.0	5.1	5.1	12.8	14.0	13.9	12.1	
22	22	13	12	25	29	21	31	

Center N. Headwall Conc. Cuts End Sta 31.20

+50

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T.P

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11.13

(940.13)

0.25 929.5

12.58

(929.25)

1.50

916.67

11.74

(918.17)

0.37

906.43

(90680)

936.2	933.4	933.7	935.2	935.2	935.3	933.7	933.1	937.8
40	68	65	50	50	49	65	65	24
26	19	16	12	50	12	17	19	26
934.2	932.4	932.6	934	933.9	934.1	932.8	932.8	935.5
60	78	77	62	63	61	74	74	47
26	21	18	12	12	12	16	20	27
932.2	930.6	931	932.7	932.8	932.8	930.8	931	938.6
80	76	72	75	74	74	73	72	66
27	21	18	14	14	13	17	21	26
930.9	928.9	928.4	931.1	931.0	931.3	928.7	931.8	932.1
73	113	108	70	87	89	105	106	81
26	21	17	13	13	12	16	21	27
929.3	927.4	927.8	929.6	930	929.9	928.1	928.1	938.7
109	128	124	106	102	103	121	121	95
27	21	18	14	10	15	16	20	26
928	926.9	926	928.9	928	928.1	926.7	926.5	939.5
13	34	33	13	13	12	26	27	01
26	21	18	14	13	12	16	20	26
925.7	922.4	923.3	924.1	924.1	924.8	923.5	923.5	925.7
56	69	70	52	52	52	63	65	36
29	21	19	12	13	13	16	20	26
921.7	917.9	917.8	918.9	918.8	919.8	918.1	918	928.6
76	114	114	94	95	95	113	113	87
30	22	18	14	14	14	18	21	26
915.6	912.6	912.6	915.6	915.7	915.6	913.1	913	915
26	56	56	26	25	26	51	52	32
28	23	19	13	25	13	19	23	27
910.2	907.7	908.1	911.1	911.3	911.3	908.5	908.5	910.1
80	105	101	71	69	69	77	77	81
28	24	18	12	12	12	18	21	27
905.4	903.2	903.8	907	907.2	907.2	905.1	904.8	909.5
128	150	144	112	110	109	131	134	99
30	26	24	12	12	12	17	21	29
901.8	899.8	900	902.2	903.4	903.4	900.8	900.7	901.4
56	70	68	36	34	34	60	61	24
27	25	19	12	12	12	18	22	21

401-154.5
929.79
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936.64

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Cont'd
W. Max

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No. 17. T.P.

17

5.58

(934.88)

9.81

92430

2 47

(939.11)

3.41

936.72

corr
936.64

(940.13)

932.2	927.6	927.9	929.1	929.3	929.5	928.8	928.8	933.8
2.7	7.3	7.0	5.8	5.6	5.4	6.1	6.1	1.1
27	19	16	13	10	10	16	19	26
931.2	927.9	928.4	929.6	929.8	929.8	928.7	928.9	934.1
3.7	7.0	6.5	5.3	5.1	5.1	6.2	6.0	2.9
27	22	17	10	10	10	14	20	28
929.4	927.3	927.5	930.2	930.3	930.3	928.5	928.5	932.4
5.5	7.2	7.4	4.7	4.6	4.6	6.4	6.4	2.5
27	22	17	12	14	14	12	22	29
925.6	924.9	925.8	929.8	930.1	930.1	926.8	926.8	929.2
9.3	10.0	9.9	5.1	4.8	4.9	8.1	8.0	5.7
27	23	20	13	13	13	19	22	27
924.9	924.5	924.9	929.8	929.9	929.7	926.7	926.7	929.5
10.0	10.0	10.0	5.1	5.2	5.2	8.2	8.2	6.4
25	24	20	12	13	13	18	22	27
920.7	925.1	925.6	929.9	930.0	930.1	927.5	927.5	929.4
13.4	14.0	13.5	9.2	9.1	9.0	11.6	11.8	9.7
25	23	19	12	12	12	17	22	27
920.3	929.5	929.8	930.4	930.7	930.8	928.2	928.2	929.6
10.8	11.6	11.3	8.7	8.4	8.3	10.9	10.9	9.5
26	23	17	11	11	12	17	22	26
930.4	929.3	929.0	931.7	931.9	931.9	930.0	930.0	931.9
6.7	9.8	9.6	7.4	7.2	7.2	9.1	9.1	7.2
26	22	17	12	12	13	18	21	25
933.1	931.2	931.3	933.1	933.4	933.2	931.5	931.5	934.3
6.0	7.9	7.8	6.0	5.7	5.9	7.6	7.8	4.8
27	21	18	13	14	14	18	20	27
935.8	932.8	932.9	934.7	934.7	934.6	933.1	933.1	936.5
3.3	6.3	6.2	4.4	4.4	4.5	6.0	6.0	3.5
26	20	16	13	13	14	18	20	26
937.4	934.2	934.3	935.6	935.7	935.8	934.5	934.5	938.1
1.2	4.9	4.8	3.5	3.4	3.3	4.8	4.8	1.0
26	19	16	14	14	14	18	20	25
935.6	934.4	934.5	936.0	936.0	936.0	934.8	934.8	938.4
4.6	5.8	5.7	4.2	4.3	4.3	5.6	5.6	1.8
30	26	20	16	14	13	17	19	26

54 28+17 - Conter N. Headwall - 9/5-31

+50

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T.P. 217 915.52 9.61 913.36

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T.P. 0.05 922.96 11.97 922.91

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93488

915.5	904.4	903	906.1	908.1	908.1	906.8	923.2	906.9
$\frac{10.2}{25}$	$\frac{11.1}{22}$	$\frac{10.5}{17}$	$\frac{7.4}{11}$	$\frac{7.5}{12}$	$\frac{7.4}{12}$	$\frac{7.7}{19}$	$\frac{10.3}{22}$	$\frac{5.2}{27}$
906.9	905.2	905.8	908.6	908.7	908.7	905.9	906.1	907.9
$\frac{8.7}{25}$	$\frac{10.3}{21}$	$\frac{9.7}{16}$	$\frac{6.9}{11}$	68	$\frac{6.8}{12}$	$\frac{7.4}{17}$	$\frac{9.4}{21}$	$\frac{7.6}{26}$
910.6	909.5	908.7	910.6	910.9	910.6	908.9	908.1	912.1
$\frac{4.9}{25}$	$\frac{7.0}{20}$	$\frac{6.8}{18}$	$\frac{4.9}{12}$	46	$\frac{4.9}{13}$	$\frac{6.6}{16}$	$\frac{6.4}{19}$	$\frac{3.4}{26}$
912.1	910.3	910.7	912.5	912.5	912.7	911.1	911.7	915.1
$\frac{3.4}{26}$	$\frac{5.0}{21}$	$\frac{4.5}{18}$	$\frac{3.0}{16}$	30	$\frac{2.8}{13}$	$\frac{4.4}{16}$	$\frac{3.8}{20}$	$\frac{0.4}{26}$
909.9	919.4	910	913.4	913.7	913.9	911.6	916.2	914.3
$\frac{13.0}{26}$	$\frac{13.5}{26}$	$\frac{12.9}{19}$	$\frac{9.5}{13}$	92	$\frac{9.0}{12}$	$\frac{11.3}{17}$	$\frac{11.7}{21}$	$\frac{8.6}{27}$
911.3	910.6	910.4	914.8	915	915.1	912.1	912	913.6
$\frac{4.6}{27}$	$\frac{12.3}{26}$	$\frac{12.5}{22}$	$\frac{5.1}{12}$	79	$\frac{7.8}{12}$	$\frac{10.8}{16}$	$\frac{10.9}{22}$	$\frac{7.3}{23}$
912.1	911.4	911.9	915.8	916.0	916	912.8	912.8	913.1
$\frac{10.9}{28}$	$\frac{11.5}{26}$	$\frac{11.2}{19}$	$\frac{7.1}{12}$	69	$\frac{6.9}{12}$	$\frac{10.1}{18}$	$\frac{10.1}{22}$	$\frac{9.8}{23}$
914.4	913.9	914.6	917.1	917.2	917.2	914.3	914.6	915
$\frac{8.5}{27}$	$\frac{10.0}{23}$	$\frac{8.3}{20}$	$\frac{5.9}{13}$	57	$\frac{5.6}{13}$	$\frac{8.6}{18}$	$\frac{8.3}{22}$	$\frac{7.9}{23}$
917	916.1	916.1	918.8	919.1	919.2	916.5	916.5	916.0
$\frac{5.9}{26}$	$\frac{6.8}{22}$	$\frac{6.8}{18}$	$\frac{4.9}{13}$	38	$\frac{3.7}{12}$	$\frac{6.1}{18}$	$\frac{6.4}{22}$	$\frac{5.4}{26}$
919.7	918.6	918.6	921.2	921.3	921.6	918.2	919.3	920.8
$\frac{3.2}{28}$	$\frac{4.3}{23}$	$\frac{4.3}{19}$	$\frac{1.7}{12}$	16	$\frac{1.3}{13}$	$\frac{3.4}{17}$	$\frac{3.6}{22}$	$\frac{2.1}{26}$
926.6	923.8	924.4	926	926.1	926.2	924.4	924.8	927.3
$\frac{9.3}{28}$	$\frac{11.0}{21}$	$\frac{10.6}{18}$	$\frac{8.9}{13}$	88	$\frac{8.7}{13}$	$\frac{10.5}{18}$	$\frac{10.7}{22}$	$\frac{7.6}{26}$
930	920.9	926.1	927.8	927.9	927.9	927	926.9	931.5
$\frac{4.9}{29}$	$\frac{9.0}{21}$	$\frac{8.8}{17}$	$\frac{7.1}{13}$	70	$\frac{7.0}{13}$	$\frac{7.9}{16}$	$\frac{8.0}{18}$	$\frac{3.4}{26}$

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908.87

908.93

(915.52)

212.4	911.7	911.6	913.7	913.8	914.2	914.3	912.4	917.3
68 25	75 20	76 17	83 12	52 13	50 13	69 18	68 22	1.9 31
913.1	913.3	912.5	914.1	914.2	914.3	913.8	913.4	918.1
61 25	69 19	67 12	81 13	50 18	49 18	66 18	58 20	1.1 34
913.7	913.7	913.2	914.5	914.4	914.4	913.5	913.8	916.2
63 20	63 20	60 15	47 13	48 15	48 15	37 18	68 23	3.0 28
914.3	913.4	913.8	914.9	914.4	914.9	914.0	914.7	916.4
49 23	58 18	52 16	45 13	48 15	42 15	47 18	43 21	2.8 26
915.4	913.3	913.6	914.5	914.7	914.6	913.8	914.1	(- 1.2 2.6)
1.0 24	31 18	29 15	19 12	17 17	18 16	26 18	2.3 22	
914.7	912.7	912.7	913.8	913.9	914.1	912.8	912.9	915.6
1.7 24	37 19	37 15	25 13	25 20	23 10	36 19	25 22	0.8 26
912.3	910.9	911.2	912.6	912.7	912.9	910.9	910.7	912.9
41 24	53 20	52 17	38 13	37 14	35 14	52 19	57 22	3.5 27
908.6	908.4	908.8	910.9	911.1	911.2	908.9	908.5	911.1
69 24	78 21	76 17	55 13	53 13	52 13	75 17	79 21	6.4 25
907.3	906.5	907.1	909.6	909.9	910	907	907	908.3
21 23	29 21	23 17	65 13	65 15	64 12	24 18	24 22	81 20
906.1	905.4	905.7	908.3	908.6	908.7	906.2	905.8	907.2
103 23	110 22	107 17	81 13	78 18	77 12	102 18	106 21	92 24
905.3	904.2	904.6	907.7	907.8	907.9	906.2	905.2	906.4
111 23	123 20	119 18	87 12	86 12	85 12	112 18	112 21	100 23
904.9	904.1	904.2	907.3	907.7	908.9	906.2	906	906.1
106 23	114 21	110 18	80 11	78 12	76 12	103 18	105 22	94 26

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T.D.

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(906.03) 10.02 902.77

2.63

(912.79) 9.05 910.16

(919.21)

899.1	897.6	897.8	900.7	901.1	900.9	899.7	898.3	900.0
6.9 29	8.1 25	8.2 21	5.3 12	4.9	5.1 13	7.3 18	7.7 23	5.3 25
899.7	898.2	898.3	901	901.6	901.2	898.9	898.6	900.2
6.3 29	7.8 25	7.7 20	5.0 12	4.4	4.5 13	7.1 20	7.4 23	5.8 25
899.6	898.2	899.1	901.4	901.7	901.7	899.3	898.8	901
6.4 28	7.5 21	7.3 20	4.6 12	4.3	4.3 13	6.7 19	7.2 23	5.0 25
900.1	897.8	898.0	901.8	902.	902.7	899.8	899.2	901.7
5.8 29	7.2 25	7.3 21	4.2 12	4.0	3.8 13	6.2 19	6.5 23	4.3 25
901.5	897.8	901.4	902.0	902.8	902.9	900.8	900.6	903.9
4.5 29	6.2 23	5.8 21	3.5 13	3.2	3.1 12	5.2 17	5.2 21	2.1 25
903.5	901	901	903.4	903.7	903.7	902.4	901.9	905.2
7.5 28	11.8 24	11.8 18	9.0 12	7.1	7.1 12	10.4 15	10.9 20	7.6 25
905.2	903.2	903.2	906	905.3	905.6	904.4	904.2	907.7
7.6 29	9.6 24	9.5 19	7.5 12	7.5	7.2 13	8.6 16	8.6 25	5.1 29
906	904	904.1	906.5	906.6	906.6	906.4	906.1	908.6
6.8 28	8.8 24	8.7 20	6.3 12	6.2	6.0 12	7.4 16	7.7 20	4.2 27
907	906.7	906.6	907.9	908.4	908.6	906.6	906.2	909.9
5.8 28	7.1 23	7.2 20	4.9 12	4.4	4.6 12	6.2 15	6.6 19	2.9 27
907.9	906.8	907.1	908.0	908.7	908.6	907.8	907.3	910.9
4.9 28	6.0 25	5.7 18	3.3 13	3.1	3.2 12	5.0 16	5.5 19	1.9 26
908.4	907.2	907.8	910.1	910.9	910.9	909.2	908.0	911
10.8 28	11.7 22	11.4 18	8.5 12	8.3	8.3 12	10.0 16	10.9 20	7.2 27
911.3	909.7	909.8	912.3	912.6	912.4	910.5	910.2	914.4
7.9 29	9.5 20	9.4 18	6.9 12	6.6	6.8 13	8.7 18	9.0 22	4.8 29

Center N. Hand Rail I Beam on old Road 904.55

+50

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58

57

B.M.

2.09

(906.64)

1.14

904.24

904.55 con

+23 V Road

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55

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53

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T.I.R.

4.90

(905.68)

5.25

900.78

51

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(906.03)

900.6	898.4	898.9	902.4	902.4	902.5	899	898.5	901.
$\frac{6.1}{28}$	$\frac{8.2}{21}$	$\frac{7.7}{18}$	$\frac{4.4}{12}$	$\frac{4.2}{12}$	$\frac{4.1}{12}$	$\frac{7.6}{20}$	$\frac{8.1}{25}$	$\frac{6.6}{30}$
900.2	898.9	898.8	901.8	902.1	902.1	898.8	898.6	900.6
$\frac{6.4}{29}$	$\frac{8.2}{25}$	$\frac{7.8}{17}$	$\frac{4.8}{12}$	$\frac{4.5}{12}$	$\frac{4.5}{12}$	$\frac{7.8}{19}$	$\frac{8.1}{24}$	$\frac{6.0}{30}$
900.1	898.3	898.9	901.3	901.5	901.5	898.8	898.6	900.5
$\frac{5.9}{29}$	$\frac{7.8}{25}$	$\frac{7.7}{19}$	$\frac{8.3}{14}$	$\frac{5.1}{14}$	$\frac{6.1}{14}$	$\frac{7.8}{19}$	$\frac{8.0}{24}$	$\frac{6.1}{29}$
900.3	898.3	898.5	900.3	901.	900.8	898.1	898.1	900.
$\frac{6.3}{28}$	$\frac{8.3}{24}$	$\frac{8.1}{18}$	$\frac{5.7}{14}$	$\frac{5.6}{13}$	$\frac{5.8}{13}$	$\frac{8.3}{18}$	$\frac{8.3}{23}$	$\frac{6.6}{28}$
900.4	900.5	900.8	901.	900.7	900.7	900.7	900.7	900.7
$\frac{5.3}{20}$	$\frac{5.2}{23}$	$\frac{4.9}{13}$	$\frac{4.7}{13}$	$\frac{4.8}{13}$	$\frac{4.9}{21}$	$\frac{5.0}{30}$		
897.2	897.4	900.1	900.6	901.	901.	897.9	897.7	899.1
$\frac{7.0}{30}$	$\frac{8.5}{27}$	$\frac{8.3}{24}$	$\frac{5.2}{15}$	$\frac{5.1}{11}$	$\frac{4.6}{12}$	$\frac{7.8}{19}$	$\frac{7.8}{23}$	$\frac{6.0}{29}$
899.1	896.5	897.5	900.8	900.8	900.8	897.2	896.7	899.9
$\frac{6.4}{30}$	$\frac{9.3}{26}$	$\frac{8.5}{19}$	$\frac{4.9}{12}$	$\frac{4.8}{13}$	$\frac{4.9}{13}$	$\frac{8.5}{19}$	$\frac{7.0}{25}$	$\frac{5.8}{30}$
898.8	896.3	896.9	900.7	900.7	900.7	897.3	897.1	900.1
$\frac{6.9}{30}$	$\frac{9.4}{26}$	$\frac{8.8}{20}$	$\frac{5.0}{13}$	$\frac{5.0}{13}$	$\frac{5.0}{13}$	$\frac{8.4}{19}$	$\frac{8.6}{24}$	$\frac{5.6}{30}$
898.4	896.5	896.9	900.5	900.7	900.7	897.6	897.2	899.9
$\frac{7.3}{30}$	$\frac{9.2}{26}$	$\frac{8.8}{20}$	$\frac{5.2}{13}$	$\frac{5.0}{13}$	$\frac{5.0}{13}$	$\frac{8.1}{18}$	$\frac{8.5}{24}$	$\frac{5.8}{30}$
898.3	897.	897.8	900.7	901.	900.8	897.7	897.4	899.1
$\frac{7.4}{30}$	$\frac{8.7}{27}$	$\frac{8.4}{20}$	$\frac{5.0}{13}$	$\frac{4.9}{11}$	$\frac{4.9}{11}$	$\frac{8.0}{18}$	$\frac{8.3}{23}$	$\frac{6.0}{28}$
898.6	897.3	897.9	900.6	900.8	900.9	897.9	897.9	900.1
$\frac{7.4}{30}$	$\frac{8.7}{26}$	$\frac{8.1}{19}$	$\frac{5.4}{13}$	$\frac{5.2}{11}$	$\frac{5.1}{11}$	$\frac{8.1}{18}$	$\frac{8.1}{22}$	$\frac{5.9}{29}$
898.8	897.4	898.	901.1	901.1	901.1	898.5	898.2	900.3
$\frac{7.3}{30}$	$\frac{8.6}{26}$	$\frac{8.2}{19}$	$\frac{4.9}{12}$	$\frac{4.9}{12}$	$\frac{4.9}{12}$	$\frac{7.5}{13}$	$\frac{7.8}{22}$	$\frac{5.9}{29}$

70				
69				
68				
T.P	6.11	(911.19)	4.62	90 2.08
67				
66				
65				
64				
63				
62				
T.P	6.31	(909.70)	3.25	90 3.39
61				
+50				
60				

906.1	904.3	904.2	905.1	905.8	905.7	903	903	904.1	✓
$\frac{5.1}{27}$	$\frac{6.8}{22}$	$\frac{7.0}{17}$	$\frac{5.1}{12}$	$\frac{5.4}{12}$	$\frac{5.1}{12}$	$\frac{5.2}{16}$	$\frac{5.2}{18}$	$\frac{7.1}{22}$	
906.2	904.4	904.3	906	906	906.1	903.7	903.6	904.9	✓
$\frac{5.0}{27}$	$\frac{6.8}{23}$	$\frac{6.9}{17}$	$\frac{5.2}{13}$	$\frac{5.2}{13}$	$\frac{5.1}{13}$	$\frac{7.1}{16}$	$\frac{7.6}{21}$	$\frac{6.3}{26}$	
905.5	903.5	904	905.4	905.4	905.1	903	903.1	904.1	✓
$\frac{5.7}{27}$	$\frac{7.7}{20}$	$\frac{7.2}{15}$	$\frac{6.3}{13}$	$\frac{5.8}{13}$	$\frac{6.1}{13}$	$\frac{5.2}{12}$	$\frac{5.1}{22}$	$\frac{7.2}{21}$	
904.9	903.5	903.8	904.8	905	905	902.2	901.7	902.6	✓
$\frac{4.8}{27}$	$\frac{6.2}{22}$	$\frac{6.3}{16}$	$\frac{4.9}{13}$	47	$\frac{4.7}{12}$	$\frac{7.5}{25}$	$\frac{5.0}{24}$	$\frac{7.1}{27}$	
904.6	902.7	902.8	904.7	905	904.7	901.9	901.8	903.5	✓
$\frac{5.2}{29}$	$\frac{7.0}{24}$	$\frac{6.9}{17}$	$\frac{4.8}{12}$	47	$\frac{5.0}{13}$	$\frac{7.8}{18}$	$\frac{7.8}{21}$	$\frac{6.2}{32}$	
904.5	901.9	902.3	904.6	904.7	904.6	901.8	901.2	902.8	✓
$\frac{5.2}{29}$	$\frac{7.8}{23}$	$\frac{7.4}{17}$	$\frac{5.1}{13}$	50	$\frac{5.1}{13}$	$\frac{7.9}{16}$	$\frac{8.1}{23}$	$\frac{6.9}{28}$	
905.2	901.9	902.3	904.6	904.7	904.5	901.1	901	903.4	✓
$\frac{7.3}{29}$	$\frac{7.8}{22}$	$\frac{7.4}{17}$	$\frac{5.2}{13}$	50	$\frac{5.2}{12}$	$\frac{5.6}{18}$	$\frac{5.7}{24}$	$\frac{6.3}{28}$	
903.6	900.8	901.1	903.8	904	904	900.5	900.1	901.7	✓
$\frac{6.1}{31}$	$\frac{5.9}{24}$	$\frac{5.6}{18}$	$\frac{5.9}{13}$	57	$\frac{5.7}{12}$	$\frac{9.2}{18}$	$\frac{9.6}{25}$	$\frac{8.0}{30}$	
901	899.9	900.5	903.2	903.5	903.3	900.5	899.5	901	✓
$\frac{8.1}{31}$	$\frac{9.8}{26}$	$\frac{7.2}{20}$	$\frac{6.4}{13}$	62	$\frac{6.4}{12}$	$\frac{9.2}{16}$	$\frac{10.2}{27}$	$\frac{8.7}{31}$	
900.7	899.1	899.8	902.8	903	903	899.9	899	901.5	✓
$\frac{5.9}{30}$	$\frac{7.5}{27}$	$\frac{6.8}{20}$	$\frac{3.8}{13}$	36	$\frac{3.6}{12}$	$\frac{7.7}{19}$	$\frac{8.6}{25}$	$\frac{6.1}{30}$	
900.4	898.8	899.2	902.7	902.8	902.8	899.1	897.2	899	✓
$\frac{6.2}{29}$	$\frac{7.8}{25}$	$\frac{7.4}{20}$	$\frac{3.9}{12}$	38	$\frac{3.8}{11}$	$\frac{8.9}{19}$	$\frac{7.4}{25}$	$\frac{7.6}{29}$	
902.9	902.9	902.9	902.9	902.9	902.9	902.9	902.9	902.9	✓
$\frac{3.7}{10}$	$\frac{3.7}{10}$	$\frac{3.7}{10}$	$\frac{3.7}{10}$	$\frac{3.7}{10}$	$\frac{3.7}{10}$	$\frac{3.7}{10}$	$\frac{3.7}{10}$	$\frac{3.7}{10}$	

Bridge

80
T.P. 5.62 (915.06) 385 909.44

79

78

77

+70

76

+82

75

74

T.P. 6.62 (913.29) 452 906.67

73

72

71

(911.19)

913.29 370 909.59

35

907.6	907.6	907.1	908	909.4	909.4	906.3	906.3	903.6	907.1	✓
$\frac{24}{30}$	$\frac{24}{25}$	$\frac{29}{19}$	$\frac{60}{12}$	56	$\frac{56}{12}$	$\frac{87}{18}$	$\frac{77}{28}$	$\frac{11.4}{36}$	$\frac{11.4}{40}$	$\frac{7.9}{48}$
907.4	905.4	906.2	908	906.2	908.9	905.9	905.3	904.1	903.6	907.1
$\frac{59}{30}$	$\frac{29}{25}$	$\frac{71}{18}$	$\frac{43}{13}$	41	$\frac{44}{13}$	$\frac{74}{20}$	50	$\frac{29}{36}$	$\frac{36}{40}$	$\frac{39}{48}$
907.1	905.1	905.9	908.6	908.7	908.1	905.5	905.2	903.4	903.4	906.6
$\frac{62}{30}$	$\frac{52}{26}$	$\frac{74}{18}$	$\frac{47}{14}$	46	$\frac{46}{14}$	$\frac{78}{20}$	$\frac{84}{30}$	$\frac{29}{36}$	$\frac{29}{40}$	$\frac{67}{48}$
906.2	906.2	908.6	908.2	908.5	908.1	904.6	904.4	902.9	903.1	906.3
$\frac{71}{20}$	$\frac{71}{21}$	$\frac{27}{12}$	$\frac{50}{12}$	48	$\frac{52}{12}$	$\frac{57}{21}$	$\frac{89}{20}$	$\frac{104}{37}$	$\frac{102}{43}$	$\frac{70}{48}$
902	902.7	904.2	908.2	908.3	908.1	905.2	904	903.7	903.8	906
$\frac{113}{30}$	$\frac{106}{26}$	$\frac{91}{22}$	$\frac{51}{14}$	60	$\frac{52}{13}$	$\frac{81}{18}$	$\frac{93}{28}$	$\frac{104}{37}$	$\frac{103}{43}$	$\frac{73}{48}$
905.5	900.7	904.2	907.6	908	907.9	904.5	904.3	903.5	903.5	✓
$\frac{77}{28}$	$\frac{76}{21}$	$\frac{91}{19}$	$\frac{37}{12}$	53	$\frac{54}{13}$	$\frac{58}{17}$	$\frac{70}{28}$	$\frac{98}{22}$	✓	
905.6	904.1	903.1	907.6	907.9	907.9	902.7	902.2	902.9	905.6	✓
$\frac{77}{28}$	$\frac{72}{21}$	$\frac{82}{16}$	$\frac{57}{12}$	54	$\frac{54}{13}$	$\frac{106}{21}$	$\frac{111}{38}$	$\frac{101}{40}$	$\frac{77}{48}$	✓
906.2	904.2	904.1	907.1	907.3	907.3	904.1	903.6	905.5	✓	
$\frac{71}{28}$	$\frac{71}{24}$	$\frac{92}{19}$	$\frac{62}{13}$	60	$\frac{60}{13}$	$\frac{92}{20}$	$\frac{97}{25}$	$\frac{28}{31}$	✓	
905.8	904	904.5	904.6	906.8	906.6	904.4	903.2	905.1	✓	
$\frac{74}{30}$	$\frac{73}{25}$	$\frac{80}{18}$	$\frac{67}{14}$	65	$\frac{67}{14}$	$\frac{89}{17}$	$\frac{101}{24}$	$\frac{82}{31}$	✓	
906.3	904.1	904.2	906.2	906.4	906.1	903.7	903.3	904.5	✓	
$\frac{47}{30}$	$\frac{71}{24}$	$\frac{70}{18}$	$\frac{50}{14}$	48	$\frac{57}{13}$	$\frac{79}{18}$	$\frac{79}{24}$	$\frac{67}{29}$	✓	
906.7	904.4	904.7	906.5	906.6	906.3	902.7	903.2	904.5	✓	
$\frac{45}{27}$	$\frac{68}{21}$	$\frac{65}{17}$	$\frac{47}{14}$	46	$\frac{47}{12}$	$\frac{75}{17}$	$\frac{80}{21}$	$\frac{67}{27}$	✓	
906.5	904.3	904.7	906.2	906.2	906.5	903.5	903.1	904.3	✓	
$\frac{47}{26}$	$\frac{69}{22}$	$\frac{65}{16}$	$\frac{50}{14}$	50	$\frac{49}{12}$	$\frac{77}{17}$	$\frac{81}{20}$	$\frac{69}{25}$	✓	

89

88

T.P.

631

91891

4. 24. 9. 12. 60

750

87

FSU

86

752

85

PL WavHub85 4.94

(916.84)

378

911.90
911.28

82/

83

82

81

9/5.06

T.P. 5.76 (921.85) 4.19 916.09

101

100

99

95 = 98 + 94.3
+ 69.6 PL

+50

+20

95

94

Rdway this slope 1/20 (920.28)

913.06

93

92

91

90

that way the left 25 - 913.08

914.5	912.1	912.1	910.9	916.0	916.1	912.8	912.6	912.9	910.1
6.2	8.2	8.2	4.4	4.3	4.2	2.3	2.1	7.4	6.2
31	23	21	13	13	20	23	27	27	31

914.1	912.0	912.2	910.5	915.8	915.7	912.5	911.9	912.3	913.1
6.2	8.3	8.1	4.8	4.5	4.6	2.8	2.0	8.0	2.8
30	24	19	13	43	12	30	24	27	21

913.7	911.7	911.8	915.3	915.5	910.5	911.9	911.0	911.9	915.1
6.6	8.6	8.5	6.1	4.8	4.8	2.0	2.3	8.0	5.2
30	24	21	13	48	12	11	22	27	31

913.2	911.7	911.8	915.1	915.5	915.5	916.7	911.3	911.9	914.8
7.1	8.6	8.5	6.2	4.8	4.8	8.6	9.0	2.0	5.5
30	25	20	13	48	13	20	23	26	31

914.4	911.6	911.9	916.1	915.4	915.3	914.4	911.8	913.8	914.7
5.4	8.7	8.2	6.2	4.9	6.0	8.9	8.3	6.5	5.6
31	24	20	13	49	13	21	21	29	31

911.2	911.3	911.0	911.1	914.9	915.3	915.4	911.7	911.2	911.6	913.1	914.5
7.1	9.0	9.3	9.2	3.4	4.7	8.6	2.1	8.7	2.2	5.8	5.8
29	27	25	21	12	51	13	21	24	27	28	31

912.8	910.7	911.1	915.1	915.1	915.1	911.3	911.0	913.9
7.1	9.0	9.2	5.2	5.2	5.2	9.0	9.3	6.2
30	25	20	12	62	13	22	28	32

909.3	909.3	911.7	913.0	914.7	914.7	914.4	909.9	909.6	912.6
11.0	11.0	8.6	7.3	5.6	5.9	1.6	1.6	1.7	7.7
27	24	19	16	12	56	14	24	28	32

911.1	909.8	910.1	914.4	914.4	914.4	910.1	909.8	911.3
2.8	2.1	8.4	4.9	4.9	4.8	8.8	2.1	7.6
31	27	21	13	49	13	21	25	31
911.4	910.8	910.8	914.4	914.4	914.4	910.6	909.1	909.6
2.5	8.9	8.1	4.9	4.8	4.9	8.3	9.9	9.8
31	23	18	12	48	12	17	21	24
911.9	910.4	910.4	913.8	914.2	913.8	911.4	909.5	911.1
7.0	8.5	8.5	5.1	4.7	5.1	4.5	9.5	2.8
32	24	20	13	47	12	15	23	28
912.0	910.5	910.5	913.8	913.8	913.8	910.8	909.5	911.3
6.9	8.2	8.0	5.1	4.7	5.1	4.5	9.2	11.6
31	25	21	13	50	12	17	25	30

(918.91)

+50

/10

+50

109

+50

108

T.D.

107

106

105

104

103

102

7.17 924 83 4.19 917.66

919.0	918.8	918.1	920.4	920.2	920.0	917.7	917.6	919.5	
$\frac{58}{21}$	$\frac{68}{20}$	$\frac{57}{16}$	$\frac{45}{13}$	$\frac{46}{14}$	$\frac{48}{14}$	$\frac{21}{20}$	$\frac{72}{24}$	$\frac{53}{29}$	✓
7.1	917.0	917.3	917.9	919.4	919.3	919.4	916.6	916.6	917.9
$\frac{1}{28}$	$\frac{78}{23}$	$\frac{75}{18}$	$\frac{69}{15}$	$\frac{54}{13}$	$\frac{55}{13}$	$\frac{54}{14}$	$\frac{82}{20}$	$\frac{82}{21}$	$\frac{61}{28}$
4	916.3	916.7	917.3	918.9	919.0	918.8	916.3	916.2	917.5
$\frac{83}{23}$	$\frac{81}{18}$	$\frac{77}{16}$	$\frac{59}{13}$	$\frac{58}{13}$	$\frac{64}{14}$	$\frac{81}{18}$	$\frac{86}{24}$	$\frac{73}{28}$	✓
917.4	915.5	916.0	918.19	918.5	918.2	915.7	915.7	916.5	✓
$\frac{24}{28}$	$\frac{93}{23}$	$\frac{88}{18}$	$\frac{67}{13}$	$\frac{63}{13}$	$\frac{66}{14}$	$\frac{21}{19}$	$\frac{91}{23}$	$\frac{83}{27}$	✓
916.8	915.0	915.8	917.7	918.2	918.6	915.4	915.5	916.4	✓
$\frac{80}{30}$	$\frac{98}{24}$	$\frac{90}{19}$	$\frac{71}{13}$	$\frac{66}{13}$	$\frac{72}{13}$	$\frac{94}{19}$	$\frac{93}{27}$	$\frac{91}{28}$	✓
916.3	914.8	914.8	915.6	917.4	917.9	917.6	915.2	915.0	916.3
$\frac{83}{29}$	$\frac{100}{21}$	$\frac{100}{19}$	$\frac{92}{17}$	$\frac{74}{13}$	$\frac{69}{13}$	$\frac{72}{13}$	$\frac{96}{17}$	$\frac{98}{27}$	$\frac{85}{28}$
915.3	913.6	913.8	917.2	917.3	916.9	919.0	914.0	914.4	✓
$\frac{63}{29}$	$\frac{82}{24}$	$\frac{84}{21}$	$\frac{46}{13}$	$\frac{45}{13}$	$\frac{44}{13}$	$\frac{76}{18}$	$\frac{78}{23}$	$\frac{74}{24}$	✓
914.7	913.3	913.3	916.5	917.2	917.7	913.8	913.4	913.5	913.9
$\frac{71}{29}$	$\frac{85}{24}$	$\frac{85}{21}$	$\frac{93}{13}$	$\frac{46}{13}$	$\frac{46}{13}$	$\frac{80}{18}$	$\frac{84}{20}$	$\frac{83}{25}$	$\frac{79}{26}$
914.8	913.5	913.3	916.7	917.7	917.7	914.0	914.2	915.1	✓
$\frac{70}{29}$	$\frac{83}{25}$	$\frac{85}{20}$	$\frac{51}{13}$	$\frac{46}{13}$	$\frac{46}{13}$	$\frac{78}{18}$	$\frac{76}{28}$	$\frac{68}{29}$	✓
4.5	913.8	913.3	913.2	916.6	916.8	916.8	913.1	913.7	914.6
$\frac{3}{8}$	$\frac{80}{26}$	$\frac{85}{25}$	$\frac{86}{20}$	$\frac{52}{13}$	$\frac{50}{13}$	$\frac{50}{13}$	$\frac{87}{19}$	$\frac{81}{27}$	$\frac{71}{28}$
11.7	912.3	912.5	913.4	916.5	916.5	916.2	913.1	912.6	913.4
$\frac{71}{30}$	$\frac{85}{25}$	$\frac{93}{20}$	$\frac{94}{18}$	$\frac{53}{13}$	$\frac{53}{13}$	$\frac{56}{13}$	$\frac{87}{18}$	$\frac{92}{23}$	$\frac{84}{29}$
914.2	912.3	912.2	916.0	916.3	916.1	913.1	912.6	913.0	914.8
$\frac{76}{29}$	$\frac{91}{25}$	$\frac{96}{20}$	$\frac{58}{13}$	$\frac{55}{13}$	$\frac{57}{13}$	$\frac{87}{19}$	$\frac{92}{24}$	$\frac{88}{28}$	$\frac{70}{31}$

117

+50

116

+50

115

+50

114

+50

113

112

111+50

RT+WayHub110

111

10.90 930.43

5-36

919.53

919.47

919.38

974.83

45+70	E Hand Rail	[941.16]	39											
936.8	936.7	932.8	932.8	934.7	934.6	932.4	932.5	936.9	936.4	✓				
3.9	4.0	7.9	7.9	6.0	935.0	934.6	932.4	8.4	3.8	4.1				
29	27	22	17	13	5.7	6.1	8.3	8.4	3.8	4.1				
938.4	937.9	932.8	932.6	934.3	934.4	934.1	932.4	932.0	931.2	938.4	✓			
2.3	2.8	7.9	8.1	6.4	934.4	934.1	932.4	6.6	8.3	8.7	3.5	2.5	2.3	✓
33	29	22	18	14	6.3	13	17	20	28	30	33			
931.3	931.2	931.8	931.9	933.5	933.8	933.7	931.6	931.7	938.0	937.9	✓			
3.4	3.5	8.9	8.8	7.2	933.8	933.7	931.6	931.7	938.0	937.9	✓			
33	30	22	19	14	6.9	7.0	9.1	9.0	2.7	2.8	✓			
935.3	935.2	930.6	931.1	932.7	933.0	932.8	930.4	930.4	936.0	936.2	✓			
5.4	5.5	10.1	9.6	8.0	933.0	932.8	930.4	930.4	936.0	936.2	✓			
33	30	23	18	14	7.7	7.9	10.3	10.3	4.7	4.5	✓			
932.7	933.0	929.5	929.8	931.7	932.0	931.8	929.5	929.2	933.3	933.5	✓			
8.0	7.7	11.2	10.9	9.0	932.0	931.8	929.5	929.2	933.3	933.5	✓			
33	30	24	18	14	8.7	8.9	11.2	11.5	7.4	7.2	✓			
930.5	930.1	927.8	928.0	928.8	930.6	930.9	930.7	928.2	927.9	931.2	931.2	✓		
10.2	10.6	12.9	12.7	11.9	10.1	930.9	930.7	928.2	927.9	931.2	931.2	✓		
33	28	23	19	17	13	7.8	13	18	23	30	33			
929.8	929.8	926.3	926.5	929.4	929.7	929.6	926.7	926.7	929.0	928.9	✓			
0.6	0.6	4.1	3.9	1.0	929.7	929.6	926.7	926.7	929.0	928.9	✓			
33	30	23	18	12	0.7	0.8	3.7	3.7	1.4	1.5	✓			
928.1	927.7	925.2	925.2	927.9	928.2	928.0	924.9	924.7	927.2	927.2	✓			
2.3	2.7	5.2	5.2	2.5	928.2	928.0	924.9	924.7	927.2	927.2	✓			
33	30	24	18	13	2.2	2.4	5.5	5.7	3.2	3.2	✓			
926.6	926.4	923.5	923.5	926.6	926.9	926.6	923.3	923.3	925.7	925.6	✓			
3.8	4.0	6.9	6.9	3.8	926.9	926.6	923.3	923.3	925.7	925.6	✓			
33	30	23	15	12	3.5	3.8	7.1	7.1	4.7	4.8	✓			
923.9	923.8	921.0	921.0	923.7	924.1	923.9	920.9	920.8	922.7	922.9	✓			
6.5	6.6	9.4	9.4	6.7	924.1	923.9	920.9	920.8	922.7	922.9	✓			
33	30	24	19	14	6.3	6.5	9.5	9.6	7.7	7.5	✓			
922.5	922.6	920.3	920.2	922.6	922.7	922.4	920.1	919.9	921.6	921.6	✓			
7.9	7.8	10.1	10.2	7.8	922.7	922.4	920.1	919.9	921.6	921.6	✓			
33	30	24	20	13	7.7	8.0	10.3	10.5	8.8	8.8	✓			
920.8	921.3	921.6	921.4	921.4	921.1	921.0	✓							
3.0	3.5	3.2	3.4	3.4	3.7	3.8	✓							
33	17	9	34	10	16	32	✓							

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117+50

5.51 944.51 4.18 939.00

6.21 943.18 3.77 936.97

940.74

938.2	936.2	936.1	936.9	939.1	939.2	939.2	936.7	936.9	938.9		
6.3	8.3	8.4	7.6	5.4	5.2	5.3	7.8	7.6	5.6	✓	
26	22	18	16	13	13	13	18	26	31		
937.3	935.6	935.6	937.1	939.0	939.0	938.8	936.2	936.3	938.5	✓	
7.2	8.9	8.9	7.4	5.5	5.5	5.7	8.3	8.2	6.0		
28	24	19	16	12	13	13	18	26	30		
937.1	935.7	935.9	938.8	939.0	938.9	936.4	936.5	939.0		✓	
5.9	7.5	7.3	7.7	4.2	4.3	6.8	6.7	4.2			
28	24	19	13	13	13	19	25	30			
938.2	935.9	936.0	936.9	938.6	938.8	938.9	937.1	936.8	939.8	✓	
5.0	7.3	7.2	6.3	4.7	4.4	4.4	6.1	6.4	3.4		
28	25	21	18	13	13	13	18	23	29		
937.7	935.9	936.4	938.2	938.4	938.6	936.8	935.8	936.0	938.2	✓	
5.5	7.3	6.6	5.0	4.8	4.7	6.4	7.4	7.2	5.0		
29	24	16	13	13	13	16	21	25	30		
937.0	934.9	934.9	935.8	937.7	937.7	935.8	934.8	935.2	936.9	✓	
6.2	8.3	8.3	7.4	5.5	5.4	7.4	8.4	8.0	6.3		
31	27	20	17	13	13	16	21	27	30		
937.0	934.7	934.8	937.3	937.6	937.8	934.6	934.6	936.5		✓	
6.2	8.5	8.4	5.9	5.9	5.9	8.6	8.6	6.7			
31	27	19	13	13	13	17	26	30			
936.4	934.3	934.4	937.1	937.3	934.1	934.0	936.4			✓	
6.3	8.9	8.8	6.1	5.9	5.9	7.1	7.2	6.9			
31	25	19	13	13	13	18	24	29			
936.3	934.5	933.4	933.4	934.0	936.8	937.0	936.7	933.1	932.8	934.8	✓
6.9	8.7	9.8	9.8	9.2	6.4	6.2	6.5	10.1	10.4	8.4	
33	29	23	20	18	13	13	13	18	26	30	
935.6	933.4	933.4	936.2	936.3	936.1	933.8	932.3	932.2	934.2	✓	
5.1	7.3	7.3	4.5	4.4	4.6	6.9	8.4	8.5	6.5		
32	27	20	15	15	13	15	20	24	29		
934.2	933.1	933.1	936.0	936.1	936.0	933.7	932.3	932.2	934.0	✓	
6.5	7.6	7.6	4.7	4.7	4.7	7.0	8.4	8.5	6.7		
28	23	17	13	13	13	16	21	25	29		
934.1	933.7	933.3	933.2	935.5	935.5	935.4	932.6	932.1	933.8	✓	
6.6	7.0	7.4	7.5	5.2	5.3	8.1	8.3	6.9			
27	26	23	18	13	14	19	25	30			
935.4	933.1	933.2	935.3	935.2	934.9	932.4	932.3	935.3		Intake	
5.3	7.6	7.5	5.4	5.5	5.8	8.3	8.4	5.4			
26	22	17	13	13	14	19	24	30			

Na:1 in Tol. pol/c Kts 19.140450

1.79 947.42 10.07 945.63

141

140

T.P.

+50

1.15 955.70 2.85 954.55

139

138

9.80 957.40 0.65 947.60

137

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B.M.

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7.71 948.25 4.12 940.39

944.56

164+25 spk. in Root 1st C.W. 956.22

948.9 946.2 946.6 948.6 948.8 949.0 949.5 949.8 952.5 411

6.8	9.5	9.1	7.1	6.9	6.7	8.2	7.9	3.2	✓
29	24	18	14	13	17	21	21	30	
952.1	948.3	948.7	950.4	950.4	950.8	950.0	950.3	954.7	

3.5	7.2	7.0	5.3	5.3	4.9	5.7	5.4	1.0	✓
27	22	17	13	13	14	16	18	23	

953.9 949.5 948.8 950.0 950.6 950.5 949.8 955.4

3.5	7.9	8.6	7.4	6.8	6.9	7.6	2.0	✓
29	23	17	14	13	13	16	23	

952.9	948.6	948.3	949.9	950.1	950.2	949.0	949.0	954.2	✓
4.5	8.8	9.1	7.5	7.3	7.2	8.4	8.4	3.2	
29	23	17	14	13	13	15	17	22	

948.5	946.1	946.0	948.2	948.5	948.7	946.9	946.8	949.8	✓
8.9	11.3	11.4	9.2	8.9	8.7	10.5	10.6	7.6	
30	24	18	13	12	15	19	25		

944.9	943.2	943.5	945.9	946.0	946.0	943.7	943.9	946.4	✓
3.4	5.1	4.8	2.4	2.3	2.3	4.6	4.4	1.9	
27	21	18	13	13	13	18	22	27	

942.6	940.8	940.7	942.5	943.5	943.6	941.6	941.4	944.0	✓
5.7	7.5	7.6	4.8	4.7	4.7	6.7	6.9	4.3	
26	22	18	11	13	13	16	22	27	

940.8	939.2	939.3	941.8	942.0	941.8	939.8	939.7	941.7	✓
7.5	9.1	9.0	6.5	6.5	6.5	8.5	8.6	6.6	
28	22	17	13	11	11	15	21	26	

938.9	937.7	937.6	940.2	940.2	940.5	938.1	938.3	939.9	✓
9.4	10.6	10.7	8.1	7.8	7.8	10.2	10.0	8.4	
29	24	18	13	13	13	17	21	24	

936.0	936.2	936.1	939.1	939.7	939.6	936.9	936.9	937.8	✓
11.4	12.1	12.2	9.2	8.7	8.7	11.4	11.4	10.5	
27	26	21	13	12	12	17	22	24	

Corr.

940.54 Head wall

937.2	936.0	936.3	939.1	939.2	939.2	937.0	936.5	936.3	936.1	939.3	✓
7.3	8.5	8.2	5.4	5.3	5.3	7.5	8.0	8.2	8.4	7.2	
27	24	18	13	13	13	16	18	19	21	24	

939.6	936.8	937.2	939.2	939.6	939.1	937.2	937.2	939.5	✓
4.9	7.7	7.3	5.3	4.9	5.4	7.3	7.3	5.0	
27	20	18	14	12	12	16	21	27	

939.5	937.3	937.6	939.6	939.8	939.6	939.1	937.0	940.1	✓
5.0	7.2	7.1	4.9	4.9	4.9	7.4	7.5	4.4	
27	24	16	13	12	12	17	23	30	

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149+50

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146

+50

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B.M.
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143

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10.90 950.38 3.70 939.48

2.02 943.18 6.26 941.16 941.1

947.42

940.5	938.6	938.5	939.4	941.4	941.5	941.3	938.3	938.0	939.8
9.9	11.8	11.9	11.0	9.0	8.9	9.1	12.1	12.4	10.6
31	27	21	17	12	8.9	12	19	24	29
939.7	938.1	937.6	938.0	939.8	939.9	939.6	937.3	936.5	938.3
10.7	12.3	12.9	12.4	10.6	10.5	10.8	13.1	13.9	12.1
32	29	23	18	13	10.5	12	16	24	29
938.5	936.4	936.5	938.5	938.6	938.6	935.7	935.6	937.9	
4.7	7.0	6.7	4.7	4.6	4.6	7.5	7.6	6.0	
33	27	18	14	4.6	12	18	26	30	
937.7	935.2	935.3	936.4	937.9	938.0	937.7	935.5	935.3	936.6
5.5	8.0	7.9	7.0	5.3	5.5	7.7	7.9	6.6	
33	27	22	17	13	5.2	13	16	27	30
937.0	935.2	935.2	937.4	937.6	937.1	934.9	934.9	936.0	
6.2	8.0	8.0	5.8	5.5	5.5	8.5	8.3	7.2	
33	29	20	12	5.6	11	17	28	31	
935.7	934.5	934.4	937.5	937.5	934.3	933.8	935.9		
7.5	8.7	8.8	5.7	5.7	8.9	9.4	7.9		
32	28	20	13	5.8	12	17	27	31	
934.7	933.5	933.8	937.6	938.0	937.6	933.5	933.4	934.8	
8.5	9.7	9.4	5.6	5.6	9.7	9.8	9.0		
32	28	21	13	5.2	11	18	27	30	
934.0	933.7	933.7	936.1	938.3	938.4	938.4	933.4	932.1	932.7
9.2	10.0	9.2	7.1	4.9	4.8	9.8	10.1	10.5	10.3
32	27	22	17	11	4.8	13	21	24	26
932.9	938.2	938.4	938.3	934.8	934.4	933.5	934.6		
10.3	5.0	4.9	4.8	8.4	8.8	9.7	8.6		
20	12	13	19	21	24	24	27		
934.6	934.0	934.1	938.2	938.6	938.4	934.8	934.8	935.6	
8.6	9.2	9.1	5.0	4.8	9.0	8.9	7.6		
30	28	24	14	4.6	11	19	23	27	
935.9	934.9	935.1	939.2	939.5	936.2	936.2	938.2		
11.2	12.5	12.3	8.2	7.9	11.2	11.2	9.2		
29	26	22	13	7.9	12	18	23	28	
940.2	938.7	939.0	941.5	942.0	942.0	939.7	942.2		
7.2	6.7	6.4	5.9	5.2	5.4	7.7	5.2		
29	23	20	13	5.2	13	18	20	28	
944.6	944.5	942.7	945.1	945.6	945.5	944.3	944.6		
2.8	4.9	4.2	4.0	1.9	1.9	3.1	2.8		
29	24	19	13	1.8	1.4	1.7	2.2	29	

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162+50

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5.66 960.29 1.23 954.63

7.85 955.86 2.37 948.01

950.38

955.8 955.0 954.7 951.8 951.8 953.0
 $\frac{4.5}{30}$ 5.3 $\frac{5.6}{18}$ $\frac{8.5}{20}$ $\frac{8.5}{26}$ $\frac{7.3}{29}$

954.1 952.3 952.4 955.0 954.9 951.7 951.7 951.5 953.2
 $\frac{6.2}{33}$ $\frac{8.0}{29}$ $\frac{7.9}{20}$ $\frac{5.3}{13}$ $\frac{5.4}{18}$ $\frac{8.6}{24}$ $\frac{8.8}{30}$ $\frac{7.1}{35}$

953.9 951.9 951.9 954.6 954.7 954.1 951.6 951.1 952.9
 $\frac{6.4}{32}$ $\frac{8.4}{29}$ $\frac{8.4}{19}$ $\frac{5.7}{13}$ $\frac{5.6}{13}$ $\frac{6.2}{19}$ $\frac{8.7}{26}$ $\frac{9.2}{30}$ $\frac{7.4}{35}$

953.8 950.9 951.3 954.3 954.6 954.1 950.7 950.7 953.0
 $\frac{6.5}{30}$ $\frac{9.4}{25}$ $\frac{9.0}{19}$ $\frac{6.0}{12}$ $\frac{5.7}{12}$ $\frac{4.2}{12}$ $\frac{9.6}{21}$ $\frac{9.6}{25}$ $\frac{7.3}{30}$

953.3 950.4 950.6 953.3 953.8 953.5 950.9 950.1 953.3
 $\frac{2.6}{29}$ $\frac{5.3}{24}$ $\frac{5.3}{19}$ $\frac{2.6}{12}$ $\frac{2.1}{12}$ $\frac{2.4}{12}$ $\frac{5.0}{18}$ $\frac{5.8}{22}$ $\frac{2.6}{30}$

951.5 949.3 949.3 952.3 952.4 952.0 949.8 949.1 949.5 951.5
 $\frac{4.4}{30}$ $\frac{6.6}{24}$ $\frac{6.6}{20}$ $\frac{3.6}{13}$ $\frac{3.5}{13}$ $\frac{3.4}{12}$ $\frac{6.1}{17}$ $\frac{6.8}{21}$ $\frac{6.4}{25}$ $\frac{4.4}{29}$

950.3 949.3 949.4 950.8 951.0 950.7 949.7 949.2 949.8
 $\frac{5.6}{30}$ $\frac{7.6}{25}$ $\frac{7.5}{20}$ $\frac{5.1}{14}$ $\frac{4.9}{14}$ $\frac{5.2}{13}$ $\frac{7.2}{17}$ $\frac{7.2}{24}$ $\frac{6.1}{28}$

948.8 947.2 947.2 950.0 950.0 949.7 946.8 946.2 946.8 948.1
 $\frac{7.1}{29}$ $\frac{8.6}{25}$ $\frac{8.4}{20}$ $\frac{5.9}{15}$ $\frac{5.9}{15}$ $\frac{6.2}{13}$ $\frac{9.1}{17}$ $\frac{9.1}{21}$ $\frac{9.1}{26}$ $\frac{7.8}{28}$

948.5 947.0 947.1 947.9 949.1 949.3 948.6 945.9 945.8 946.5
 $\frac{7.4}{27}$ $\frac{8.9}{23}$ $\frac{8.8}{18}$ $\frac{8.0}{15}$ $\frac{6.8}{13}$ $\frac{6.6}{14}$ $\frac{7.3}{14}$ $\frac{10.0}{20}$ $\frac{10.1}{26}$ $\frac{9.4}{29}$

948.8 946.0 946.1 948.1 948.0 947.9 945.5 945.4 946.1 948.7
 $\frac{7.1}{29}$ $\frac{9.9}{25}$ $\frac{9.8}{19}$ $\frac{7.8}{14}$ $\frac{7.9}{14}$ $\frac{8.0}{12}$ $\frac{10.4}{17}$ $\frac{10.5}{22}$ $\frac{9.8}{25}$ $\frac{7.2}{29}$

949.0 949.1 944.4 944.4 946.4 946.6 944.3 944.5 950.2
 $\frac{1.4}{31}$ $\frac{3.3}{28}$ $\frac{6.0}{25}$ $\frac{6.0}{19}$ $\frac{4.0}{14}$ $\frac{3.8}{12}$ $\frac{3.8}{12}$ $\frac{6.1}{17}$ $\frac{5.9}{21}$ $\frac{0.2}{30}$

944.6 942.7 942.1 942.1 944.5 944.8 944.6 942.3 942.5 944.8
 $\frac{5.8}{29}$ $\frac{7.3}{26}$ $\frac{8.3}{23}$ $\frac{8.3}{19}$ $\frac{5.9}{14}$ $\frac{5.8}{12}$ $\frac{5.8}{12}$ $\frac{8.1}{16}$ $\frac{7.9}{23}$ $\frac{2.6}{30}$

941.8 940.0 940.6 942.6 942.6 942.7 940.1 939.8 942.3
 $\frac{8.6}{30}$ $\frac{10.4}{26}$ $\frac{9.8}{20}$ $\frac{7.8}{15}$ $\frac{7.7}{13}$ $\frac{7.7}{13}$ $\frac{10.3}{17}$ $\frac{10.6}{22}$ $\frac{8.1}{28}$

956.22

44

B.M.
+50

4.08 956.21 956.22

164

960.29

955.9	954.6	952.6	952.3	953.2
4.4	5.7	7.7	8.0	7.1
	13	18	23	24
955.8	955.0	952.4	951.8	953.0
4.5	5.3	7.9	8.5	7.3
	13	19	28	31

Title Chk - Sec 3 Lester

45

Gross Land Gr. Given

12" Tile 1.20'

1/20/23

Hoff Church

Hub - 17	7.23	53.97	<u>46.74</u>				
Tile Top 15 + 50		1.20	12.19	40.58	40.36	0.22	High
16		52.77	12.12	40.65	40.42	0.23	High
+50			12.24	40.53	40.48	0.05	High
17			12.23	40.64	40.59	0.05	High
+50			12.04	40.73	40.65	0.08	High
+95			11.96	40.81	40.71	0.10	High

Recheck Figures
Bent #18 p 68-72

Tile Land to 17 + 95 1/20/23

1/26/23

Hoff Church

17 Hub	6.83	53.57	<u>46.74</u>				
18 Tile Top			11.63				
+50			11.58				
19			11.54				
+50			11.51				
20			11.40				
+50			11.33				
21 + 50			11.17				
22			11.11				
+50			11.05				
23			11.01				
+			10.95				
23 Hub			7.90	45.67	45.60		
23 Hub				45.60			

BM	2.43	52.35		49.92	El	Gr	Cut
Hub 26	6.77	52.30	6.77	45.58	45.53	41.67	3.86
27			6.69	45.66	45.61	41.99	2.82
28			7.20	45.75	45.10	41.91	3.19
29			7.75	44.60	44.55	42.03	2.52
30			8.07	44.28	44.23	42.15	2.08
31							
+05			7.72	44.63	44.58	42.28	2.30

Cut to Green

Church

27/23

Tite Chk

2/2/23

26 Hub	8.05	53.58		45.53
24 Tite Top			11.06	
+50			11.05	
25			10.97	
+50			10.80	
26			10.77	
+50			10.67	
27			10.65	
+50			10.56	
28			10.52	
+50			10.45	
29			10.42	
Hub				
31+05			9.01	44.5
BM			3.74	49.9

Hub #15 7.88
Top Tile
15

	12.77
+25	12.68
+50	12.68
+75	12.58
16	12.60
+20	12.66

Hub #13 7.83
Top Tile
12+80

13	12.34
	12.32
+20	12.26
+40	12.25
+60	12.24
+80	12.22
14	12.19

3.24 53.24

50.00

BM on Bridge Coping.

0+60	13.35
1	13.32
+50	13.25
2	13.19
+50	13.21
3	13.01

chk 12" Line sec 3' Lost

Tiled

4.00
1.20
5.20

1/17/23

Hoff
Turner

B.M.	2.75	52.75	50.00			
0			9.00	43.75	5.20	8.65
+50			8.98	43.77	5.20	8.67
1+00						
+50			8.68	44.07	5.20	8.87
2+00			8.54	44.21	5.20	8.91
+50			8.57	44.18	5.20	8.98
3+00			8.67	44.08	5.20	8.88
+50			8.60	44.15	5.20	8.95
4+00			8.62	44.13	5.20	8.93
+50			8.58	44.17	5.20	8.97
5+00			8.40	44.35	5.20	8.95
+50			8.42	44.33	5.20	8.93
6+00			8.32	44.43	5.20	8.93
+50			8.26	44.49	5.20	8.99
7+00			8.30	44.45	5.20	8.95
T.P.	7.56	52.30	8.01	44.74	5.20	8.97
+50		5.20 T.P.	7.65	44.65	5.20	8.95
8+00			7.55	44.75	5.20	8.95
+50			7.62	44.68	5.20	8.95
9+00			7.68	44.62	5.20	8.92
+50			7.59	44.71	5.20	8.91
10+00			7.42	44.88	5.20	8.98
+50			7.41	44.89	5.20	8.99
11+00			7.24	45.06	5.20	9.06

Re check figures in Book #8

Page 68-72

52.30

11+50			7.18	45.12	5.20	9.92
12+00			7.09	45.21	5.20	0.01
+50			7.18	45.12	5.20	9.92
13+00			6.89	45.41	5.20	0.21
+50			6.83	45.47	5.20	0.27
14+00			6.91	45.39	5.20	0.19
T.P.	8.13	54.33	6.10	46.20		
+50			8.83	45.50	6.20	0.30
15+00			8.90	45.43	5.20	40.23
+25			8.69	45.64	5.20	40.44

Chk on Hubs

14			8.13	46.20		
15			7.85	46.98		
16			7.50	46.83		
17			7.59	46.74	40.50	6.15
18			7.94	46.39	40.71	5.68
19			8.48	45.85	40.83	5.02
20			8.76	45.57	40.95	4.62
+50	7.61	53.46	8.48	45.85	41.01	4.84
21+50			7.38	46.08	41.13	4.95
22			7.37	46.14	41.19	4.95
23			7.86	45.60	41.31	4.29
24			7.58	45.88	41.43	5.46
25			7.62	45.84	41.55	4.29
26	6.92	62.45	7.93	45.53	41.67	4.86

New Cuts - Raised Grade
0.05' from Sta 17 to End.

1/17/23

Levels + Stakes - Location of Surface water intakes - Type B

1/17/23

Sta 100+50 Plans - Dewar. Dun Road

Sta
Finish Stake

119 4.74 940.70 935.96

Ditch

E

W

118 ~~8.3~~ 8.3

7.4

119 8.0

7.6

120 8.3

7.4

121 8.2

7.0

122 6.7

6.2

120 + 50 8.1

7.3

120 + 50 Hb 7.4 Cut 0.9

6.6

Cut 0.9

Chk Hubs Lester Twp T. 1 E Sec 3

27 52.45 6.80 45.65 41.79 3.96

28 7.33 45.12 41.91 3.21

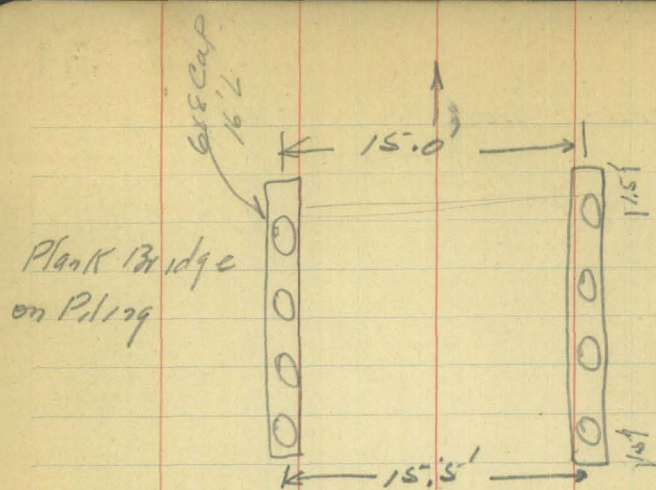
29 7.89 44.56 42.03 7.53

30 8.28 44.17 42.15 7.02

31 12.27 ~~4.90~~

+ 05 7.97 44.48 42.29 2.20

BM 2.53 49.92



I Beam 8 8" I Beams - 16' Long
 Plank Floor 3x16x16'
 Concrete Abutments

Hoff-Matthews-Moore
 11/15/22 52
 dd
 Measurements Wood Bridge Between
 sec 35 Bennington Twp - Sec 2 Barclay Twp

Measurements old I Beam on abandoned Road
 sec 2 Barclay Twp

Note: I Beam to be removed to location
 of Wood Bridge and placed on old piling.
 Old wood Br to be removed to private
 entrance to new road location in SE 1/4
 of NE 1/4 Sec 2 Barclay 2 Mi. N of Lenoir

Construction Figures — 12" Outlet - County Road Sec 3 Lester Twp

53

B.M.	2.92	52.92	50.00		
H ₂ O Level			14.25	38.67	Water 1.5' deep in Waples at point of outlet
0			13.07	39.85	38.50 1.35
+15'			10.28	42.64	38.52 1.12
+30			10.49	42.43	38.56 0.87
1			11.04	41.88	38.62 0.26
2			10.04	42.88	38.74 4.14
3			9.78	43.14	38.86 1.28
4			10.38	42.64	38.98 3.56
5			9.34	43.68	39.10 4.48
6			8.09	44.83	39.22 5.61
7			8.25	44.64	39.34 5.33
T.P	7.81	52.48	8.25	44.67	—
8			7.57	44.91	39.46 5.45
9			7.70	44.78	39.58 5.20
10			7.59	44.89	39.70 5.19
11			7.40	45.08	39.82 5.26
12			7.28	45.20	39.94 5.26
13			6.82	45.66	40.06 5.60
14			6.35	46.13	40.18 5.95
T.T	7.86	53.99	6.35	46.13	—
15			7.60	46.39	40.30 6.09
16			7.48	46.51	40.42 6.09
17			7.30	46.69	40.54 6.15
18			7.10	46.79	40.66 6.63

old
12

10/24/22
Hoff
Mathews
Kearney

53.99

19			8.25	45.74	40.78	4.96
20			8.51	45.48	40.90	4.68
+50	7.37	53.06	8.30	45.69	40.96	4.73
21+50			7.05	46.01	41.08	4.93
22			6.92	46.14	41.14	5.00
23			7.46	45.60	41.26	4.34
24			7.22	45.84	41.38	4.46
25			7.25	45.81	41.50	4.21
26	6.38	51.90	7.54	45.52	41.62	3.90
27			6.29	45.61	41.74	3.84
28			6.86	45.04	41.86	3.18
29			7.49	44.41	41.98	2.43
30			7.85	44.05	42.10	1.95
31			7.92	43.98	42.22	1.76
31+05 End			7.79	44.11	42.2	1.88
Culv Floor			7.69	44.21		
BM			1.95	49.95		

Note Raised Grade 0.05' 1/17/23
from Sta 17 - See Page 50-51

do

N

!

45' enter N. Wall 4' x 8' Concrete Culv Sta 31+05

Force Acct Notes - Constr.

Date sta to sta Kind of Work

7/22/22 75 95 Loose Rock

Dewar Dunkerton Road - 1925

Amount of Work

2 1/2 cu yds. Show on surface

50
12
62

tile check

BR-5 Drain #11				
BM #6	2.37	21.67	19.28	27.18
		6.20		
		<u>15.47</u>		
18+75		2.50	11.97	20.06
18				19.80
BM #11	2.39	29.57	27.18	
		6.20		
18+75		<u>22.37</u>	2.50	19.87
18			2.70	
17+50			3.90	
17			4.12	19.24
16+50			4.24	
16			4.45	
+			4.60	
15			4.78	
+			5.12	
14			5.20	18.07
+			5.50	18.07
13			5.62	
+			5.85	
12			6.15	17.22
+			6.25	17.70
10+4	2.13	19.15	6.35	17.02
+			2.35	17.00

9	10	19.15	2.60	17.55	17.40
4			2.80		
0	9		3.00		
+			3.18		
7	8		3.45	15.55	15.8
+			3.60	15.70	
6	9				
		130' long			
6			3.65	15.50	15.40
+			3.75		
5			4.06	15.07	15.00
+			4.20		
4			4.50	14.65	14.6
+			4.70		
3			4.85	14.30	14.20
+			5.30		
2			5.50	13.65	13.8
+			5.70		
1			5.90	12.25	12.4
+			6.17		
0			6.40		

Hott

Mathews

BM#6 3.55 22.83 19.28
 T R ^{Sta 0} 3.84 20.40 6.27 16.56

Spike in E.N. Cor post SE 1/4 SW 1/4 Sec 16

HE — 6.10 14.30

Bottom of Channel 200' N of 12 Outlet

Sta 0	6.26	22.82		16.56	13.00	3.56
1			5.47	17.35	13.40	3.95
2			4.98	17.84	13.80	4.04
3			4.41	18.41	14.20	4.21
+50			5.08	17.74	14.40	3.84
4			4.78	18.04	14.60	3.44
5	6.58	25.92	3.48	19.34	15.00	4.34
6			5.64	20.28	15.40	4.88
+50			5.41	20.67	15.60	4.91
7			6.17	19.76	15.80	3.95
8			5.71	20.21	16.20	4.01
9			4.80	21.12	16.60	4.62
10	5.87	27.62	4.17	21.75	17.00	4.95
11			5.70	21.92	17.35	4.57
12			5.28	22.34	17.70	4.64
+50			4.88	22.74	17.88	4.86
13			4.66	22.96	18.05	4.91
+50			4.34	23.28	18.23	5.05
14			3.87	23.76	18.40	5.35
15	5.56	29.08	4.10	23.52	18.75	4.77

0.46%

.35%

29.08

91.05

16

4.94 24.14 19.10 5.04

17

4.82 24.26 19.45 4.81

18

5.30 23.78 19.80 3.98

N/A #16

4.80 24.28 19.86 4.42

S. #175 End

5.03 24.05 20.06 3.99

B. #26

1.90 27.18 —

319

25 113.19 14.53

152

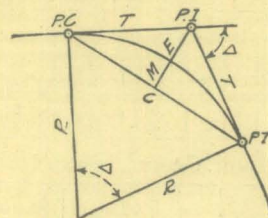
131.8

128.5

69

DIETZGEN'S RAILROAD CURVE AND REDUCTION TABLES

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CURVE FORMULAS

$$\text{Radius} = R = \frac{50}{\sin. D/2} \quad (1) \quad \text{Degree of Curve} = D \text{ and } \sin. \frac{D}{2} = \frac{50}{R} \quad (2)$$
$$\text{Tangent} = T = R \tan \frac{\Delta}{2} \quad (3) \quad \text{Length of Curve} = L = 100 \frac{\Delta}{D} \quad (4)$$
$$\text{Middle ordinate} = M = R(1 - \cos. \frac{\Delta}{2}) \quad (5) = R \text{vers } \frac{\Delta}{2} \quad (6)$$
$$\text{External} = E = T \tan \frac{\Delta}{4} \quad (7) = R \div \cos. \frac{\Delta}{2} - R \quad (8) = R \sec \frac{\Delta}{2} \quad (9)$$

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

EXPLANATION AND USE OF TABLES

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

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

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

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

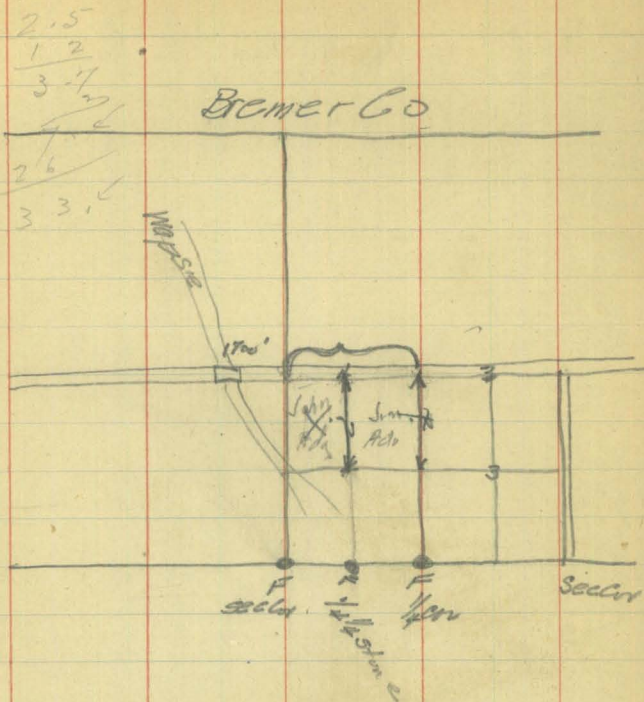


TABLE I.—MINUTES IN DECIMALS OF A DEGREE.

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

TABLE II.—INCHES IN DECIMALS OF A FOOT.

1-16	3-32	$\frac{1}{8}$	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. Offset	Def. for 1 Foot	Deg.	Radius	Mid. Ord.	Tan. Offset	Def. for 1 Foot
0° 10'	34377.5	.036	.145	0.05'	7°	819.02	1.528	6.105	2.10'
20	17188.8	.073	.291	0.10	20'	781.84	1.600	6.395	2.20
30	11459.2	.109	.436	0.15	30	764.49	1.637	6.540	2.25
40	8594.42	.145	.582	0.20	40	747.89	1.673	6.685	2.30
50	6875.55	.182	.727	0.25	8	716.78	1.746	6.976	2.40
1	5729.65	.218	.873	0.30	20	688.16	1.819	7.266	2.50
10	4911.15	.255	1.018	0.35	30	674.69	1.855	7.411	2.55
20	4297.28	.291	1.164	0.40	40	661.74	1.892	7.556	2.60
30	3819.83	.327	1.309	0.45	9	637.28	1.965	7.846	2.70
40	3437.87	.364	1.454	0.50	20	614.56	2.037	8.136	2.80
50	3125.36	.400	1.600	0.55	30	603.80	2.074	8.281	2.85
2	2864.93	.436	1.745	0.60	40	593.42	2.110	8.426	2.90
10	2644.58	.473	1.891	0.65	10	573.69	2.183	8.716	3.00
20	2455.70	.509	2.036	0.70	30	546.44	2.292	9.150	3.15
30	2292.01	.545	2.181	0.75	11	521.67	2.402	9.585	3.30
40	2148.79	.582	2.327	0.80	12	499.06	2.511	10.02	3.45
50	2022.41	.618	2.472	0.85	30	478.34	2.620	10.45	3.60
3	1910.08	.655	2.618	0.90	30	459.28	2.730	10.89	3.75
10	1809.57	.691	2.763	0.95	13	441.68	2.839	11.32	3.90
20	1719.12	.727	2.908	1.00	30	425.40	2.949	11.75	4.05
30	1637.28	.764	3.054	1.05	14	410.28	3.058	12.18	4.20
40	1562.88	.800	3.199	1.10	30	396.20	3.168	12.62	4.35
50	1494.95	.836	3.345	1.15	15	383.07	3.277	13.05	4.50
4	1432.69	.873	3.490	1.20	30	370.78	3.387	13.49	4.65
10	1375.40	.909	3.635	1.25	16	359.27	3.496	13.92	4.80
20	1322.53	.945	3.718	1.30	30	348.45	3.606	14.35	4.95
30	1273.57	.982	3.926	1.35	17	338.27	3.716	14.78	5.10
40	1228.11	1.018	4.071	1.40	18	319.62	3.935	15.64	5.40
50	1185.78	1.055	4.217	1.45	19	302.94	4.155	16.51	5.70
5	1146.28	1.091	4.362	1.50	20	287.94	4.374	17.37	6.00
10	1109.33	1.127	4.507	1.55	21	274.37	4.594	18.22	6.30
20	1074.68	1.164	4.653	1.60	22	262.04	4.814	19.08	6.60
30	1042.14	1.200	4.798	1.65	23	250.79	5.035	19.94	6.90
40	1011.51	1.237	4.943	1.70	24	240.49	5.255	20.79	7.20
50	982.64	1.273	5.088	1.75	25	231.01	5.476	21.64	7.50
6	955.37	1.309	5.234	1.80	26	222.27	5.697	22.50	7.80
10	929.57	1.346	5.379	1.85	27	214.18	5.918	23.35	8.10
20	905.13	1.382	5.524	1.90	28	206.68	6.139	24.19	8.40
30	881.95	1.418	5.669	1.95	29	199.70	6.360	25.04	8.70
40	859.92	1.455	5.814	2.00	30	193.18	6.583	25.88	9.00

Note. Chord Deflection=2 times tangent deflection.

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

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
1°	50.00	.22	11°	551.70	26.50	21°	1061.9	97.57
10'	58.34	.30	10'	560.11	27.31	10'	1070.6	99.16
20	66.67	.39	20	568.53	28.14	20	1079.2	100.75
30	75.01	.49	30	576.95	28.97	30	1087.8	102.35
40	83.34	.61	40	585.36	29.82	40	1096.4	103.97
50	91.68	.73	50	593.79	30.68	50	1105.1	105.60
2	100.01	.87	12	602.21	31.56	22	1113.7	107.24
10	108.35	1.02	10	610.64	32.45	10	1122.4	108.90
20	116.68	1.19	20	619.07	33.35	20	1131.0	110.57
30	125.02	1.36	30	627.50	34.26	30	1139.7	112.25
40	133.36	1.55	40	635.93	35.18	40	1148.4	113.95
50	141.70	1.75	50	644.37	36.12	50	1157.0	115.66
3	150.04	1.96	13	652.81	37.07	23	1165.7	117.38
10	158.38	2.19	10	661.25	38.03	10	1174.4	119.12
20	166.72	2.43	20	669.70	39.01	20	1183.1	120.87
30	175.06	2.67	30	678.15	39.99	30	1191.8	122.63
40	183.40	2.93	40	686.60	40.99	40	1200.5	124.41
50	191.74	3.21	50	695.06	42.00	50	1209.2	126.20
4	200.08	3.49	14	703.51	43.03	24	1217.9	128.00
10	208.43	3.79	10	711.97	44.07	10	1226.6	129.82
20	216.77	4.10	20	720.44	45.12	20	1235.3	131.65
30	225.12	4.42	30	728.90	46.18	30	1244.0	133.50
40	233.47	4.76	40	737.37	47.25	40	1252.8	135.35
50	241.81	5.10	50	745.85	48.34	50	1261.5	137.23
5	250.16	5.46	15	754.32	49.44	25	1270.2	139.11
10	258.51	5.83	10	762.80	50.55	10	1279.0	141.01
20	266.86	6.21	20	771.29	51.68	20	1287.7	142.93
30	275.21	6.61	30	779.77	52.89	30	1296.5	144.85
40	283.57	7.01	40	788.26	53.97	40	1305.3	146.79
50	291.92	7.43	50	796.75	55.13	50	1314.0	148.75
6	300.28	7.86	16	805.25	56.31	26	1322.8	150.71
10	308.64	8.31	10	813.75	57.50	10	1331.6	152.69
20	316.99	8.76	20	822.25	58.70	20	1340.4	154.69
30	325.35	9.23	30	830.76	59.91	30	1349.2	156.70
40	333.71	9.71	40	839.27	61.14	40	1358.0	158.72
50	342.08	10.20	50	847.78	62.38	50	1366.8	160.76
7	350.44	10.71	17	856.30	63.63	27	1375.6	162.81
10	358.81	11.22	10	864.82	64.90	10	1384.4	164.86
20	367.17	11.75	20	873.35	66.18	20	1393.2	166.95
30	375.54	12.29	30	881.88	67.47	30	1402.0	169.04
40	383.91	12.85	40	890.41	68.77	40	1410.9	171.15
50	392.28	13.41	50	898.95	70.09	50	1419.7	173.27
8	400.66	13.99	18	907.49	71.42	28	1428.6	175.41
10	409.03	14.58	10	916.03	72.76	10	1437.4	177.55
20	417.41	15.18	20	924.58	74.12	20	1446.3	179.72
30	425.79	15.80	30	933.13	75.49	30	1455.1	181.89
40	434.17	16.43	40	941.69	76.86	40	1464.0	184.08
50	442.55	17.07	50	950.25	78.26	50	1472.9	186.29
9	450.93	17.72	19	958.81	79.67	29	1481.8	188.51
10	459.32	18.38	10	967.38	81.09	10	1490.7	190.74
20	467.71	19.06	20	975.96	82.53	20	1499.6	192.99
30	476.10	19.75	30	984.53	83.97	30	1508.5	195.25
40	484.49	20.45	40	993.12	85.43	40	1517.4	197.53
50	492.88	21.16	50	1001.7	86.90	50	1526.3	199.82
10	501.28	21.89	20	1010.3	88.39	30	1535.3	202.12
10	509.68	22.62	10	1018.9	89.89	10	1544.2	204.44
20	518.08	23.38	20	1027.5	91.40	20	1553.1	206.77
30	526.48	24.14	30	1036.1	92.92	30	1562.1	209.12
40	534.89	24.91	40	1044.7	94.46	40	1571.0	211.48
50	543.29	25.70	50	1053.3	96.01	50	1580.0	213.86

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

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
31°	1589.0	216.3	41°	2142.2	387.4	51°	2732.9	618.4
10'	1598.0	218.7	10'	2151.7	390.7	10'	2743.1	622.8
20	1606.9	221.1	20	2161.2	394.1	20	2753.4	627.2
30	1615.9	223.5	30	2170.8	397.4	30	2763.7	631.7
40	1624.9	226.0	40	2180.3	400.8	40	2773.9	636.2
50	1633.9	228.4	50	2189.9	404.2	50	2784.2	640.7
32°	1643.0	230.9	42°	2199.4	407.6	52°	2794.5	645.2
10	1652.0	233.4	10	2209.0	411.1	10	2804.9	649.7
20	1661.0	235.9	20	2218.6	414.5	20	2815.2	654.3
30	1670.0	238.4	30	2228.1	418.0	30	2825.6	658.8
40	1679.1	241.0	40	2237.7	421.4	40	2835.9	663.4
50	1688.1	243.5	50	2247.3	425.0	50	2846.3	668.0
33°	1697.2	246.1	43°	2257.0	428.5	53°	2856.7	672.7
10	1706.3	248.7	10	2266.6	432.0	10	2867.1	677.3
20	1715.3	251.3	20	2276.2	435.6	20	2877.5	682.0
30	1724.4	253.9	30	2285.9	439.2	30	2888.0	686.7
40	1733.5	256.5	40	2295.6	442.8	40	2898.4	691.4
50	1742.6	259.1	50	2305.2	446.4	50	2908.9	696.1
34°	1751.7	261.8	44°	2314.9	450.0	54°	2919.4	700.9
10	1760.8	264.5	10	2324.6	453.6	10	2929.9	705.7
20	1770.0	267.2	20	2334.3	457.3	20	2940.4	710.5
30	1779.1	269.9	30	2344.1	461.0	30	2951.0	715.3
40	1788.2	272.6	40	2353.8	464.6	40	2961.5	720.1
50	1797.4	275.3	50	2363.5	468.4	50	2972.1	725.0
35°	1806.6	278.1	45°	2373.3	472.1	55°	2982.7	729.9
10	1815.7	280.8	10	2383.1	475.8	10	2993.3	734.8
20	1824.9	283.6	20	2392.8	479.6	20	3003.9	739.7
30	1834.1	286.4	30	2402.6	483.8	30	3014.5	744.6
40	1843.3	289.2	40	2412.4	487.2	40	3025.2	749.6
50	1852.5	292.0	50	2422.3	491.0	50	3035.8	754.6
36°	1861.7	294.9	46°	2432.1	494.8	56°	3046.5	759.6
10	1870.9	297.7	10	2441.9	498.7	10	3057.2	764.6
20	1880.1	300.6	20	2451.8	502.5	20	3067.9	769.7
30	1889.4	303.5	30	2461.7	506.4	30	3078.7	774.7
40	1898.6	306.4	40	2471.5	510.3	40	3089.4	779.8
50	1907.9	309.3	50	2481.4	514.3	50	3100.2	784.9
37°	1917.1	312.2	47°	2491.3	518.2	57°	3110.9	790.1
10	1926.4	315.2	10	2501.2	522.2	10	3121.7	795.2
20	1935.7	318.1	20	2511.2	526.1	20	3132.6	800.4
30	1945.0	321.1	30	2521.1	530.1	30	3143.4	805.6
40	1954.3	324.1	40	2531.1	534.2	40	3154.2	810.9
50	1963.6	327.1	50	2541.0	538.2	50	3165.1	816.1
38°	1972.9	330.2	48°	2551.0	542.2	58°	3176.0	821.4
10	1982.2	333.2	10	2561.0	546.3	10	3186.9	826.7
20	1991.5	336.3	20	2571.0	550.4	20	3197.8	832.0
30	2000.9	339.3	30	2581.0	554.5	30	3208.8	837.3
40	2010.2	342.4	40	2591.0	558.6	40	3219.7	842.7
50	2019.6	345.5	50	2601.1	562.8	50	3230.7	848.1
39°	2029.0	348.6	49°	2611.2	566.9	59°	3241.7	853.5
10	2038.4	351.8	10	2621.2	571.1	10	3252.7	858.9
20	2047.8	354.9	20	2631.3	575.3	20	3263.7	864.3
30	2057.2	358.1	30	2641.4	579.5	30	3274.8	869.8
40	2066.6	361.3	40	2651.5	583.8	40	3285.8	875.3
50	2076.0	364.5	50	2661.6	588.0	50	3296.9	880.8
40°	2085.4	367.7	50°	2671.8	592.3	60°	3308.0	886.4
10	2094.9	371.0	10	2681.9	596.6	10	3319.1	892.0
20	2104.3	374.2	20	2692.1	600.9	20	3330.3	897.5
30	2113.8	377.5	30	2702.3	605.3	30	3341.4	903.2
40	2123.3	380.8	40	2712.5	609.6	40	3352.6	908.8
50	2132.7	384.1	50	2722.7	614.0	50	3363.8	914.5

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

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
61°	3375.0	920.2	71°	4086.9	1308.2	81°	4893.6	1805.3
10'	3386.3	925.9	10'	4099.5	1315.6	10'	4908.0	1814.7
20	3397.5	931.6	20	4112.1	1322.9	20	4922.5	1824.1
30	3408.8	937.3	30	4124.8	1330.3	30	4937.0	1833.6
40	3420.1	943.1	40	4137.4	1337.7	40	4951.5	1843.1
50	3431.4	948.9	50	4150.1	1345.1	50	4966.1	1852.6
62°	3442.7	954.8	72°	4162.8	1352.6	82°	4980.7	1862.2
10	3454.1	960.6	10	4175.6	1360.1	10	4995.4	1871.8
20	3465.4	966.5	20	4188.5	1367.6	20	5010.0	1881.5
30	3476.8	972.4	30	4201.2	1375.2	30	5024.8	1891.2
40	3488.3	978.3	40	4214.0	1382.8	40	5039.5	1900.9
50	3499.7	984.3	50	4226.8	1390.4	50	5054.3	1910.7
63°	3511.1	990.2	73°	4239.7	1398.0	83°	5069.2	1920.5
10	3522.6	996.2	10	4252.6	1405.7	10	5084.0	1930.4
20	3534.1	1002.3	20	4265.6	1413.5	20	5099.0	1940.3
30	3545.6	1008.3	30	4278.5	1421.2	30	5113.9	1950.3
40	3557.2	1014.4	40	4291.5	1429.0	40	5128.9	1960.2
50	3568.7	1020.5	50	4304.6	1436.8	50	5143.9	1970.3
64°	3580.3	1026.6	74°	4317.6	1444.6	84°	5159.0	1980.4
10	3591.9	1032.8	10	4330.7	1452.5	10	5174.1	1990.5
20	3603.5	1039.0	20	4343.8	1460.4	20	5189.3	2000.6
30	3615.1	1045.2	30	4356.9	1468.4	30	5204.4	2010.8
40	3626.8	1051.4	40	4370.1	1476.4	40	5219.7	2021.1
50	3638.5	1057.7	50	4383.3	1484.4	50	5234.9	2031.4
65°	3650.2	1063.9	75°	4396.5	1492.4	85°	5250.3	2041.7
10	3661.9	1070.2	10	4409.8	1500.5	10	5265.6	2052.1
20	3673.7	1076.6	20	4423.1	1508.6	20	5281.0	2062.5
30	3685.4	1082.9	30	4436.4	1516.7	30	5296.4	2073.0
40	3697.2	1089.3	40	4449.7	1524.9	40	5311.9	2083.5
50	3709.0	1095.7	50	4463.1	1533.1	50	5327.4	2094.1
66°	3720.9	1102.2	76°	4476.5	1541.4	86°	5343.0	2104.7
10	3732.7	1108.6	10	4489.9	1549.7	10	5358.6	2115.3
20	3744.6	1115.1	20	4503.4	1558.0	20	5374.2	2126.0
30	3756.5	1121.7	30	4516.9	1566.3	30	5389.9	2136.7
40	3768.5	1128.2	40	4530.4	1574.7	40	5405.6	2147.5
50	3780.4	1134.8	50	4544.0	1583.1	50	5421.4	2158.4
67°	3792.4	1141.4	77°	4557.6	1591.6	87°	5437.2	2169.2
10	3804.4	1148.0	10	4571.2	1600.1	10	5453.1	2180.2
20	3816.4	1154.7	20	4584.8	1608.6	20	5469.0	2191.1
30	3828.4	1161.3	30	4598.5	1617.1	30	5484.9	2202.2
40	3840.5	1168.1	40	4612.2	1625.7	40	5500.9	2213.2
50	3852.6	1174.8	50	4626.0	1634.4	50	5517.0	2224.3
68°	3864.7	1181.6	78°	4639.8	1643.0	88°	5533.1	2235.5
10	3876.8	1188.4	10	4653.6	1651.7	10	5549.2	2246.7
20	3889.0	1195.2	20	4667.4	1660.5	20	5565.4	2258.0
30	3901.2	1202.0	30	4681.3	1669.2	30	5581.6	2269.3
40	3913.4	1208.9	40	4695.2	1678.1	40	5597.8	2280.6
50	3925.6	1215.8	50	4709.2	1686.9	50	5614.2	2292.0
69°	3937.9	1222.7	79°	4723.2	1695.8	89°	5630.5	2303.5
10	3950.2	1229.7	10	4737.2	1704.7	10	5646.9	2315.0
20	3962.5	1236.7	20	4751.2	1713.7	20	5663.4	2326.6
30	3974.8	1243.7	30	4765.3	1722.7	30	5679.9	2338.2
40	3987.2	1250.8	40	4779.4	1731.7	40	5696.4	2349.8
50	3999.5	1257.9	50	4793.6	1740.8	50	5713.0	2361.5
70°	4011.9	1265.0	80°	4807.7	1749.9	90°	5729.7	2373.3
10	4024.4	1272.1	10	4822.0	1759.0	10	5746.3	2385.1
20	4036.8	1279.3	20	4836.2	1768.2	20	5763.1	2397.0
30	4049.3	1286.5	30	4850.5	1777.4	30	5779.9	2408.9
40	4061.8	1293.6	40	4864.8	1786.7	40	5796.7	2420.9
50	4074.4	1300.9	50	4879.2	1796.0	50	5813.6	2432.9

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

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
91°	5830.5	2444.9	101°	6950.6	3278.1	111°	8336.7	4386.1
10'	5847.5	2457.1	10'	6971.3	3294.1	10'	8362.7	4407.6
20	5864.6	2469.3	20	6992.0	3310.1	20	8388.9	4429.2
30	5881.7	2481.5	30	7012.7	3326.1	30	8415.1	4450.9
40	5898.8	2493.8	40	7033.6	3342.3	40	8441.5	4472.7
50	5916.0	2506.1	50	7054.5	3358.5	50	8468.0	4494.6
92	5933.2	2518.5	102	7075.5	3374.9	112	8494.6	4516.6
10	5950.5	2531.0	10	7096.6	3391.2	10	8521.3	4538.8
20	5967.9	2543.5	20	7117.8	3407.7	20	8548.1	4561.1
30	5985.3	2556.0	30	7139.0	3424.3	30	8575.0	4583.4
40	6002.7	2568.6	40	7160.3	3440.9	40	8602.1	4606.0
50	6020.2	2581.3	50	7181.7	3457.6	50	8629.3	4628.6
93	6037.8	2594.0	103	7203.2	3474.4	113	8656.6	4651.3
10	6055.4	2606.8	10	7224.7	3491.3	10	8684.0	4674.2
20	6073.1	2619.7	20	7246.3	3508.2	20	8711.5	4697.2
30	6090.8	2632.6	30	7268.0	3525.2	30	8739.2	4720.3
40	6108.6	2645.5	40	7289.8	3542.4	40	8767.0	4743.6
50	6126.4	2658.5	50	7311.7	3559.6	50	8794.9	4766.9
94	6144.3	2671.6	104	7333.6	3576.8	114	8822.9	4790.4
10	6162.6	2684.7	10	7355.6	3594.2	10	8851.0	4814.1
20	6180.2	2697.9	20	7377.8	3611.7	20	8879.3	4837.8
30	6198.3	2711.2	30	7399.9	3629.2	30	8907.7	4861.7
40	6216.4	2724.5	40	7422.2	3646.8	40	8936.3	4885.7
50	6234.6	2737.9	50	7444.6	3664.5	50	8965.0	4909.9
95	6252.8	2751.3	105	7467.0	3682.3	115	8993.8	4934.1
10	6271.1	2764.8	10	7489.6	3700.2	10	9022.7	4958.6
20	6289.4	2778.3	20	7512.2	3718.2	20	9051.7	4983.1
30	6307.9	2792.0	30	7534.9	3736.2	30	9080.9	5007.8
40	6326.3	2805.6	40	7557.7	3754.4	40	9110.3	5032.6
50	6344.8	2819.4	50	7580.5	3772.6	50	9139.8	5057.6
96	6363.4	2833.2	106	7603.5	3791.0	116	9169.4	5082.7
10	6382.1	2847.0	10	7626.6	3809.4	10	9199.1	5107.9
20	6400.8	2861.0	20	7649.7	3827.9	20	9229.0	5133.3
30	6419.5	2875.0	30	7672.9	3846.5	30	9259.0	5158.8
40	6438.4	2889.0	40	7696.3	3865.2	40	9289.2	5184.5
50	6457.3	2903.1	50	7719.7	3884.0	50	9319.5	5210.3
97	6476.2	2917.3	107	7743.2	3902.9	117	9349.9	5236.2
10	6495.2	2931.6	10	7766.8	3921.9	10	9380.5	5262.3
20	6514.3	2945.9	20	7790.5	3940.9	20	9411.3	5288.6
30	6533.4	2960.3	30	7814.3	3960.1	30	9442.2	5315.0
40	6552.6	2974.7	40	7838.1	3979.4	40	9473.2	5341.5
50	6571.9	2989.2	50	7862.1	3998.7	50	9504.4	5368.2
98	6591.2	3003.8	108	7886.2	4018.2	118	9535.7	5395.1
10	6610.6	3018.4	10	7910.4	4037.8	10	9567.2	5422.1
20	6630.1	3033.1	20	7934.6	4057.4	20	9598.9	5449.2
30	6649.6	3047.9	30	7959.0	4077.2	30	9630.7	5476.5
40	6669.2	3062.8	40	7983.5	4097.1	40	9662.6	5504.0
50	6688.8	3077.7	50	8008.0	4117.0	50	9694.7	5531.7
99	6708.6	3092.7	109	8032.7	4137.1	119	9727.0	5559.4
10	6728.4	3107.7	10	8057.4	4157.3	10	9759.4	5587.4
20	6748.2	3122.9	20	8082.3	4177.5	20	9792.0	5615.5
30	6768.1	3138.1	30	8107.3	4197.9	30	9824.8	5643.8
40	6788.1	3153.3	40	8132.3	4218.4	40	9857.7	5672.3
50	6808.2	3168.7	50	8157.5	4239.0	50	9890.8	5700.9
100	6828.3	3184.1	110	8182.8	4259.7	120	9924.0	5729.7
10	6848.5	3199.6	10	8208.2	4280.5	10	9957.5	5758.6
20	6868.8	3215.1	20	8233.7	4301.4	20	9991.0	5787.7
30	6889.2	3230.8	30	8259.3	4322.4	30	10025.0	5817.0
40	6909.6	3246.5	40	8285.0	4343.6	40	10059.0	5846.5
50	6930.1	3262.3	50	8310.8	4364.8	50	10093.0	5876.1

TABLE V.—CORRECTIONS FOR TANGENTS AND EXTERNALS.

These corrections are to be added to the approximate values, found by dividing the tangent, or external, for a 1° curve (Table IV) by the degree of curve, in order to obtain the true tangents, or externals. Intermediate values may be obtained by interpolation.

FOR TANGENTS ADD

Central Angle	DEGREE OF CURVE													
	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°	.03	.06	.09	.13	.16	.19	.22	.25	.28	.31	.34	.38	.42	.46
15°	.04	.10	.14	.19	.24	.29	.34	.39	.45	.51	.53	.58	.63	.68
20°	.06	.13	.19	.26	.32	.39	.45	.51	.58	.65	.72	.79	.84	.90
25°	.08	.16	.24	.33	.40	.49	.58	.67	.75	.83	.90	.99	1.06	1.14
30°	.10	.19	.29	.39	.49	.59	.69	.79	.89	.99	1.09	1.20	1.29	1.39
35°	.11	.22	.34	.47	.58	.69	.79	.81	.92	1.04	1.19	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	4.08
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	4.40	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
110°	.51	1.03	1.56	2.08	2.61	3.14	3.67	4.21	4.76	5.31	5.86	6.43	7.01	7.60
120°	.62	1.25	1.93	2.52	3.16	3.81	4.45	5.11	5.77	6.44	7.12	7.80	8.50	9.22

FOR EXTERNALS ADD

Central Angle	DEGREE OF 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	.032	.035	.039	.043	.047	.051	.055
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	.096	.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°	.070	.159	.240	.321	.403	.485	.568	.652	.735	.819	.906	.994	1.08	1.17
75°	.095	.182	.286	.383	.480	.578	.678	.777	.877	.977	1.07	1.18	1.29	1.39
80°	.110	.220	.332	.445	.558	.671	.787	.903	1.02	1.13	1.25	1.38	1.50	1.62
85°	.128	.259	.391	.524	.657	.790	.926	1.06	1.20	1.34	1.47	1.62	1.76	1.91
90°	.149	.299	.450	.603	.756	.910	1.07	1.22	1.38	1.54	1.70	1.87	2.03	2.20
95°	.174	.350	.522	.706	.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
110°	.268	.536	.806	1.08	1.35	1.63	1.91	2.20	2.48	2.76	3.05	3.35	3.66	3.96
120°	.300	.721	1.08	1.45	1.82	2.19	2.57	2.95	3.33	3.72	4.11	4.50	4.91	5.32

TABLE VI.—CORRECTIONS FOR SUB-CHORDS AND LONG CHORDS.

FOR SUB-CHORDS ADD										Excess of arc per 100 ft.	LONG CHORDS				
D	10	20	30	40	50	60	70	80	90		D	200	300	400	500
4°	.00	.00	.01	.01	.01	.01	.01	.01	.06	.02	1	199.99	299.97	399.92	499.85
6	.00	.01	.01	.02	.02	.02	.02	.02	.01	.05	2	199.97	299.88	399.70	499.39
8	.01	.02	.02	.03	.03	.03	.03	.02	.01	.08	3	199.93	299.73	399.32	498.63
10	.01	.02	.03	.04	.05	.05	.05	.04	.02	.13	4	199.88	299.51	398.78	497.57
12	.02	.04	.05	.06	.07	.07	.07	.05	.03	.18	5	199.81	299.24	398.10	496.20
14	.02	.05	.07	.08	.09	.10	.09	.07	.04	.25	6	199.73	298.90	397.26	494.53
16	.03	.06	.09	.11	.12	.12	.12	.09	.05	.33	7	199.63	298.51	396.28	492.57
18	.04	.08	.11	.14	.15	.16	.15	.12	.07	.41	8	199.51	298.05	395.14	490.31
20	.05	.10	.14	.17	.19	.20	.18	.15	.09	.51	9	199.38	297.54	393.86	487.75
22	.06	.12	.17	.21	.23	.24	.22	.18	.10	.62	10	199.24	296.96	392.42	484.90
24	.07	.14	.20	.25	.28	.28	.26	.21	.12	.74	12	198.90	295.63	389.12	478.34
26	.09	.17	.24	.29	.32	.33	.31	.25	.15	.86	14	198.51	294.06	385.22	470.65
28	.10	.19	.27	.34	.37	.38	.36	.29	.17	1.00	16	198.05	292.25	380.76	461.86
30	.11	.22	.31	.39	.43	.44	.41	.33	.19	1.15	18	197.54	290.21	375.74	452.02
32	.13	.25	.36	.44	.49	.50	.47	.38	.22	1.31	20	196.96	287.94	370.17	441.15
34	.15	.28	.40	.50	.55	.57	.53	.43	.25	1.48	22	196.32	285.44	364.06	429.30
36	.17	.32	.45	.56	.62	.64	.59	.48	.28	1.66	24	195.63	282.71	357.43	416.53
38	.18	.36	.51	.62	.70	.71	.66	.53	.31	1.86	26	194.87	279.76	350.30	402.89
40	.21	.40	.56	.69	.77	.79	.73	.59	.35	2.06	28	194.06	276.59	342.69	388.43
42	.23	.44	.62	.76	.85	.87	.81	.65	.38	2.28	30	193.18	273.20	334.61	373.20
44	.25	.48	.68	.84	.94	.96	.89	.72	.42	2.50	32	192.25	269.61	326.08	357.28
46	.27	.52	.75	.92	1.02	1.05	.98	.78	.46	2.74	34	191.26	265.81	317.12	340.73
48	.30	.57	.81	1.00	1.12	1.14	1.06	.86	.50	2.99	36	190.21	261.80	307.77	323.61
50	.32	.62	.89	1.09	1.21	1.24	1.15	.93	.55	3.24	38	189.10	257.60	298.03	305.99
52	.35	.67	.96	1.18	1.31	1.35	1.25	1.01	.59	3.52	40	187.94	253.21	287.94	287.94
54	.38	.73	1.04	1.28	1.42	1.46	1.35	1.09	.64	3.80	42	186.72	248.63	277.51	269.54
56	.41	.78	1.12	1.38	1.53	1.57	1.46	1.17	.69	4.09	44	185.44	243.87	266.78	250.85
58	.44	.84	1.20	1.48	1.65	1.69	1.57	1.26	.74	4.40	46	184.10	239.93	255.78	231.95
60	.47	.91	1.29	1.59	1.76	1.81	1.68	1.35	.80	4.72	48	182.71	233.83	244.51	212.92

NOTE.—When a chord of less than 100 ft. is used the corrections given in the above table should be added to the nominal length of chord to get the length which should be used in order that the 100 ft. points will check with those obtained by using the standard 100 ft. chord. Thus in locating a 14° curve by 25 ft. chords measure 25'.06 for each chord. Long chords are useful in passing obstacles.

TABLE VII.—MIDDLE ORDINATES FOR RAILS IN FEET.

Deg. of Curve	LENGTH OF RAILS							Deg. of Curve	LENGTH OF RAILS.						
	32	30	28	26	24	22	20		32	30	28	26	24	22	20
1°	.022	.020	.016	.013	.011	.009	.008	16°	.356	.313	.273	.236	.200	.170	.139
2	.045	.038	.034	.029	.025	.021	.017	17	.378	.333	.290	.252	.213	.180	.148
3	.037	.058	.051	.044	.037	.031	.026	18	.400	.351	.306	.265	.225	.190	.156
4	.089	.079	.069	.060	.050	.042	.035	19	.423	.371	.324	.280	.238	.201	.165
5	.112	.099	.086	.074	.063	.053	.044	20	.445	.392	.341	.296	.250	.212	.174
6	.134	.117	.102	.088	.076	.064	.052	21	.466	.410	.357	.309	.262	.222	.182
7	.156	.137	.120	.104	.088	.074	.061	22	.487	.430	.375	.325	.275	.233	.191
8	.179	.158	.137	.119	.100	.085	.070	23	.509	.450	.390	.338	.287	.243	.199
9	.201	.175	.153	.133	.112	.095	.078	24	.531	.469	.408	.354	.299	.253	.208
10	.223	.196	.171	.148	.125	.106	.087	25	.552	.486	.424	.367	.311	.263	.216
11	.245	.216	.188	.163	.139	.117	.096	26	.573	.506	.441	.382	.323	.274	.225
12	.268	.236	.206	.179	.151	.128	.105	27	.594	.524	.457	.396	.335	.284	.233
13	.290	.254	.222	.192	.163	.138	.113	28	.618	.545	.475	.411	.348	.294	.242
14	.312	.275	.239	.207	.175	.148	.122	29	.638	.564	.491	.424	.361	.303	.250
15	.334	.295	.257	.223	.188	.159	.131	30	.660	.583	.508	.438	.374	.313	.259

SLOPE REDUCTIONS.

When distances are measured on a slope they may be reduced to the equivalent horizontal distance by the following approximate rule:—subtract from the slope distance the square of the rise divided by twice the slope distance. Thus for a slope distance of 250.3 ft. and a rise of 15 ft. correction= $15^2 \div 2 \times 250.3 = .45$ (by slide rule) or horizontal distance=250.3—.45=249.85. When vertical angle=V. A. is measured horizontal distance=slope distance—slope distance (1—Cos. V. A.). Thus for slope distance of 248.7 ft. and V. A. of 4° 20' from Table VIII Cos=.99714 and correction=1—.99714=.00286 per foot or total of .286×2½ (near enough)=.57 and horizontal distance=248.7—.57=248.13 ft.

See fig. (a).

TRIGONOMETRICAL FORMULAS.

sin. $A = \frac{a}{c}$

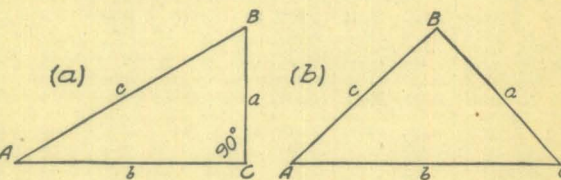
cos. $A = \frac{b}{c}$

tan. $A = \frac{a}{b}$

cot. $A = \frac{b}{a}$

sec. $A = \frac{c}{b}$

cosec. $A = \frac{c}{a}$



FORMULA FOR SOLVING TRIANGLES.

Given	Sought.	Right triangles. See fig. (a).
a, c	A, B, b	sin. $A = \frac{a}{c}$, cos. $B = \frac{b}{c}$, $b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	tan. $A = \frac{a}{b}$, cot. $B = \frac{b}{a}$, $c = \sqrt{a^2 + b^2}$
A, a	B, b, c	$B = 90^\circ - A$, $b = a \cot. A$, $c = \frac{a}{\sin. A}$
A, b	B, a, c	$B = 90^\circ - A$, $a = b \tan. A$, $c = \frac{b}{\cos. A}$
A, c	B, a, b	$B = 90^\circ - A$, $a = c \sin. A$, $b = c \cos. A$

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

TABLE VIII.—NATURAL TRIGONOMETRICAL FUNCTIONS.

Angle	Sine.	Tan.	Cotg.	Cosin.		Angle	Sine.	Tan.	Cotg.	Cosin.	
0°	0	0	00	1	90	0°	1	0	00	0	90
10	.0029	.0029	343.8	.99998	50	10	.1392	.1405	7.115	.99027	82
20	.0058	.0058	171.9	.99996	40	20	.1421	.1435	6.968	.98986	50
30	.0087	.0087	114.6	.99993	30	30	.1449	.1465	6.827	.98944	40
40	.0116	.0116	85.94	.99989	20	40	.1478	.1495	6.691	.98902	30
50	.0145	.0145	68.75	.99989	10	50	.1507	.1524	6.561	.98858	20
											10
1	.0175	.0175	57.29	.99985	89	1	.1536	.1554	6.435	.98814	10
10	.0204	.0204	49.10	.99979	50	9	.1564	.1584	6.314	.98769	81
20	.0233	.0233	42.96	.99973	40	10	.1593	.1614	6.197	.98723	50
30	.0262	.0262	38.19	.99966	30	20	.1622	.1644	6.084	.98676	40
40	.0291	.0291	34.37	.99958	20	30	.1650	.1673	5.976	.98629	30
50	.0320	.0320	31.24	.99949	10	40	.1679	.1703	5.871	.98580	20
						50	.1708	.1733	5.769	.98531	10
2	.0349	.0349	28.64	.99939	88	10	.1736	.1763	5.671	.98481	80
10	.0378	.0378	26.43	.99929	50	10	.1765	.1793	5.576	.98430	50
20	.0407	.0407	24.54	.99917	40	20	.1794	.1823	5.485	.98378	40
30	.0436	.0437	22.90	.99905	30	30	.1822	.1853	5.396	.98325	30
40	.0465	.0466	21.47	.99892	20	40	.1851	.1883	5.309	.98272	20
50	.0494	.0495	20.21	.99878	10	50	.1880	.1914	5.226	.98218	10
3	.0523	.0524	19.08	.99863	87	11	.1908	.1944	5.145	.98163	79
10	.0552	.0553	18.07	.99847	50	10	.1937	.1974	5.066	.98107	50
20	.0581	.0582	17.17	.99831	40	20	.1965	.2004	4.989	.98050	40
30	.0610	.0612	16.35	.99813	30	30	.1994	.2035	4.915	.97992	30
40	.0640	.0641	15.60	.99795	20	40	.2022	.2065	4.843	.97934	20
50	.0669	.0670	14.92	.99776	10	50	.2051	.2095	4.773	.97875	10
4	.0698	.0699	14.30	.99756	86	12	.2079	.2126	4.705	.97815	78
10	.0727	.0729	13.73	.99736	50	10	.2108	.2156	4.638	.97754	50
20	.0756	.0758	13.20	.99714	40	20	.2136	.2186	4.571	.97692	40
30	.0785	.0787	12.71	.99692	30	30	.2164	.2217	4.511	.97630	30
40	.0814	.0816	12.25	.99668	20	40	.2193	.2247	4.449	.97566	20
50	.0843	.0846	11.83	.99644	10	50	.2221	.2278	4.390	.97502	10
5	.0872	.0875	11.43	.99619	85	13	.2250	.2309	4.331	.97437	77
10	.0901	.0904	11.06	.99594	50	10	.2278	.2339	4.275	.97371	50
20	.0929	.0934	10.71	.99567	40	20	.2306	.2370	4.219	.97304	40
30	.0958	.0963	10.39	.99540	30	30	.2334	.2401	4.165	.97237	30
40	.0987	.0992	10.08	.99511	20	40	.2363	.2432	4.113	.97169	20
50	.1016	.1022	9.788	.99482	10	50	.2391	.2462	4.061	.97100	10
6	.1045	.1051	9.514	.99452	84	14	.2419	.2493	4.011	.97030	76
10	.1074	.1080	9.255	.99421	50	10	.2447	.2524	3.962	.96959	50
20	.1103	.1110	9.010	.99390	40	20	.2476	.2555	3.914	.96887	40
30	.1132	.1139	8.777	.99357	30	30	.2504	.2586	3.867	.96815	30
40	.1161	.1169	8.556	.99324	20	40	.2532	.2617	3.821	.96742	20
50	.1190	.1198	8.345	.99290	10	50	.2560	.2648	3.776	.96667	10
7	.1219	.1228	8.144	.99255	83	15	.2588	.2679	3.732	.96593	75
10	.1248	.1257	7.953	.99219	50	10	.2616	.2711	3.689	.96517	50
20	.1276	.1287	7.770	.99182	40	20	.2644	.2742	3.647	.96440	40
30	.1305	.1317	7.596	.99144	30	30	.2672	.2773	3.606	.96363	30
40	.1334	.1346	7.429	.99106	20	40	.2700	.2805	3.566	.96285	20
50	.1363	.1376	7.269	.99067	10	50	.2728	.2836	3.526	.96206	10
											74
Cosin.	Cotg.	Tan.	Sine.	Angle.		Cosin.	Cotg.	Tan.	Sine.	Angle.	

TABLE VIII.—NATURAL TRIGONOMETRICAL FUNCTIONS.

Angle	Sine.	Tan.	Cotg.	Cosin.		Angle	Sine.	Tan.	Cotg.	Cosin.	
16°	.2756	.2867	3.487	.96126	74	16°	.4067	.4452	2.246	.91355	66
10	.2784	.2899	3.450	.96046	50	10	.4094	.4487	2.229	.91236	50
20	.2812	.2931	3.412	.95964	40	20	.4120	.4522	2.211	.91116	40
30	.2840	.2962	3.376	.95882	30	30	.4147	.4557	2.194	.90996	30
40	.2868	.2994	3.340	.95799	20	40	.4173	.4592	2.177	.90875	20
50	.2896	.3026	3.305	.95715	10	50	.4200	.4628	2.161	.90753	10
17	.2924	.3057	3.271	.95615	73	25	.4226	.4663	2.145	.90631	65
10	.2952	.3089	3.237	.95545	50	10	.4253	.4699	2.128	.90507	50
20	.2979	.3121	3.204	.95459	40	20	.4279	.4734	2.112	.90383	40
30	.3007	.3153	3.172	.95372	30	30	.4305	.4770	2.097	.90259	30
40	.3035	.3185	3.140	.95284	20	40	.4331	.4806	2.081	.90133	20
50	.3062	.3217	3.108	.95195	10	50	.4358	.4841	2.066	.90007	10
18	.3090	.3249	3.078	.95106	72	26	.4384	.4877	2.050	.89879	64
10	.3118	.3281	3.048	.95015	50	10	.4410	.4913	2.035	.89752	50
20	.3145	.3314	3.018	.94924	40	20	.4436	.4950	2.020	.89623	40
30	.3173	.3346	2.989	.94832	30	30	.4462	.4986	2.006	.89493	30
40	.3201	.3378	2.960	.94740	20	40	.4488	.5022	1.991	.89363	20
50	.3228	.3411	2.932	.94646	10	50	.4514	.5059	1.977	.89232	10
19	.3256	.3443	2.904	.94552	71	27	.4540	.5095	1.963	.89101	63
10	.3283	.3476	2.877	.94457	50	10	.4566	.5132	1.949	.88968	50
20	.3311	.3508	2.850	.94361	40	20	.4592	.5169	1.935	.88835	40
30	.3338	.3541	2.824	.94264	30	30	.4617	.5206	1.921	.88701	30
40	.3365	.3574	2.798	.94167	20	40	.4643	.5243	1.907	.88566	20
50	.3393	.3607	2.773	.94068	10	50	.4669	.5280	1.894	.88431	10
20	.3420	.3640	2.747	.93969	70	28	.4695	.5317	1.881	.88295	62
10	.3448	.3673	2.723	.93869	50	10	.4720	.5354	1.868	.88158	50
20	.3475	.3706	2.699	.93769	40	20	.4746	.5392	1.855	.88020	40
30	.3502	.3739	2.675	.93667	30	30	.4772	.5430	1.842	.87882	30
40	.3529	.3772	2.651	.93565	20	40	.4797	.5467	1.829	.87743	20
50	.3557	.3805	2.628	.93462	10	50	.4823	.5505	1.816	.87603	10
21	.3584	.3839	2.605	.93358	69	29	.4848	.5543	1.804	.87462	61
10	.3611	.3872	2.583	.93253	50	10	.4874	.5581	1.792	.87321	50
20	.3638	.3906	2.560	.93148	40	20	.4899	.5619	1.780	.87178	40
30	.3665	.3939	2.539	.93042	30	30	.4924	.5658	1.767	.87036	30
40	.3692	.3973	2.517	.92935	20	40	.4950	.5696	1.756	.86892	20
50	.3719	.4006	2.496	.92827	10	50	.4975	.5735	1.744	.86748	10
22	.3746	.4040	2.475	.92718	68	30	.5000	.5774	1.732	.86603	60
10	.3773	.4074	2.455	.92609	50	10	.5025	.5812	1.720	.86457	50
20	.3800	.4108	2.434	.92499	40	20	.5050	.5851	1.709	.86310	40
30	.3827	.4142	2.414	.92388	30	30	.5075	.5890	1.698	.86163	30
40	.3854	.4176	2.394	.92276	20	40	.5100	.5930	1.686	.86015	20
50	.3881	.4210	2.375	.92164	10	50	.5125	.5969	1.675	.85866	10
23	.3907	.4245	2.356	.92050	67	31	.5150	.6009	1.664	.85717	59
10	.3934	.4279	2.337	.91936	50	10	.5175	.6048	1.653	.85567	50
20	.3961	.4314	2.318	.91822	40	20	.5200	.6088	1.643	.85416	40
30	.3987	.4348	2.300	.91706	30	30	.5225	.6128	1.632	.85264	30
40	.4014	.4383	2.282	.91590	20	40	.5250	.6168	1.621	.85112	20
50	.4041	.4417	2.264	.91472	10	50	.5275	.6208	1.611	.84959	10
											58
Cosin.	Cotg.	Tan.	Sine.	Angle.		Cosin.	Cotg.	Tan.	Sine.	Angle.	

TABLE VIII.—NATURAL TRIGONOMETRICAL FUNCTIONS.

Angle	Sine.	Tan.	Cotg.	Cosin.		Angle	Sine.	Tan.	Cotg.	Cosin.	
or						or					
32	.5299	.6249	1.600	.84805	58	30	.6225	.7954	1.257	.78261	30
10	.5324	.6289	1.590	.84650	50	40	.6248	.8002	1.250	.78079	20
20	.5348	.6330	1.580	.84495	40	50	.6271	.8050	1.242	.77897	10
30	.5373	.6371	1.570	.84339	30						
40	.5398	.6412	1.560	.84182	20	39	.6293	.8098	1.235	.77715	51
50	.5422	.6453	1.550	.84025	10	10	.6316	.8146	1.228	.77531	50
						20	.6338	.8195	1.220	.77347	40
33	.5446	.6494	1.540	.83867	57	30	.6361	.8243	1.213	.77162	30
10	.5471	.6536	1.530	.83708	50	40	.6383	.8292	1.206	.76977	20
20	.5495	.6577	1.520	.83549	40	50	.6406	.8342	1.199	.76791	10
30	.5519	.6619	1.511	.83389	30						
40	.5544	.6661	1.501	.83228	20	40	.6428	.8391	1.192	.76604	50
50	.5568	.6703	1.492	.83066	10	10	.6450	.8441	1.185	.76417	50
						20	.6472	.8491	1.178	.76229	40
34	.5592	.6745	1.483	.82904	56	30	.6494	.8541	1.171	.76041	30
10	.5616	.6787	1.473	.82741	50	40	.6517	.8591	1.164	.75851	20
20	.5640	.6830	1.464	.82577	40	50	.6539	.8642	1.157	.75661	10
30	.5664	.6873	1.455	.82413	30						
40	.5688	.6916	1.446	.82248	20	41	.6561	.8693	1.150	.75471	49
50	.5712	.6959	1.437	.82082	10	10	.6583	.8744	1.144	.75280	50
						20	.6604	.8796	1.137	.75088	40
35	.5736	.7002	1.428	.81915	55	30	.6626	.8847	1.130	.74896	30
10	.5760	.7046	1.419	.81748	50	40	.6648	.8899	1.124	.74703	20
20	.5783	.7089	1.411	.81580	40	50	.6670	.8952	1.117	.74509	10
30	.5807	.7133	1.402	.81412	30						
40	.5831	.7177	1.393	.81242	20	42	.6691	.9004	1.111	.74314	48
50	.5854	.7221	1.385	.81072	10	10	.6713	.9057	1.104	.74120	50
						20	.6734	.9110	1.098	.73924	40
36	.5878	.7265	1.376	.80902	54	30	.6756	.9163	1.091	.73728	30
10	.5901	.7310	1.368	.80730	50	40	.6777	.9217	1.085	.73531	20
20	.5925	.7355	1.360	.80558	40	50	.6799	.9271	1.079	.73333	10
30	.5948	.7400	1.351	.80386	30						
40	.5972	.7445	1.343	.80212	20	43	.6820	.9325	1.072	.73135	47
50	.5995	.7490	1.335	.80038	10	10	.6841	.9380	1.066	.72937	50
						20	.6862	.9435	1.060	.72737	40
37	.6018	.7536	1.327	.79864	53	30	.6884	.9490	1.054	.72537	30
10	.6041	.7581	1.319	.79688	50	40	.6905	.9545	1.048	.72337	20
20	.6065	.7627	1.311	.79512	40	50	.6926	.9601	1.042	.72136	10
30	.6088	.7673	1.303	.79335	30						
40	.6111	.7720	1.295	.79158	20	44	.6947	.9657	1.036	.71934	46
50	.6134	.7766	1.288	.78980	10	10	.6967	.9713	1.030	.71732	50
						20	.6988	.9770	1.024	.71529	40
38	.6157	.7813	1.280	.78801	52	30	.7009	.9827	1.018	.71325	30
10	.6180	.7860	1.272	.78622	50	40	.7030	.9884	1.012	.71121	20
20	.6202	.7907	1.265	.78442	40	50	.7050	.9942	1.006	.70916	10
							.7071	1.	1.	.70711	45
											or
	Cosin.	Cotg.	Tan.	Sine.	Angle.		Cosin.	Cotg.	Tan.	Sine.	Angle.

TABLE IX.—CALCULATION OF EARTHWORK.

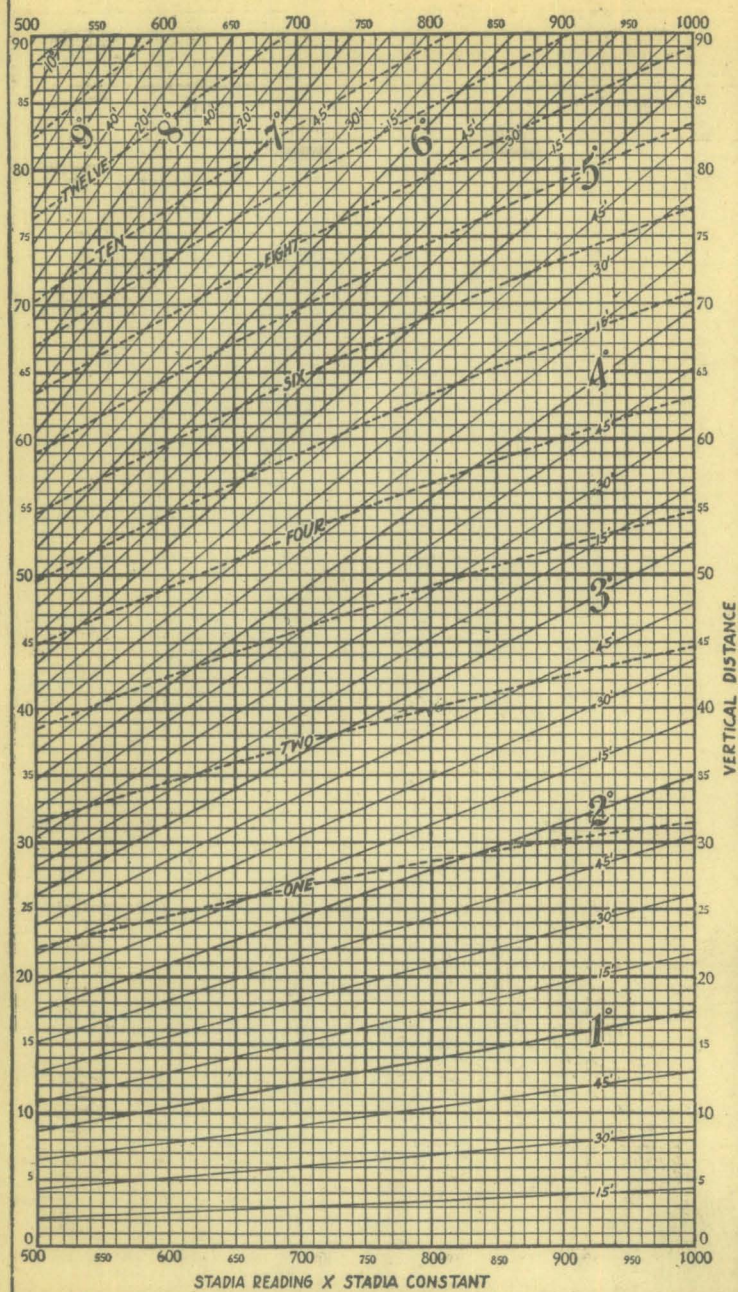
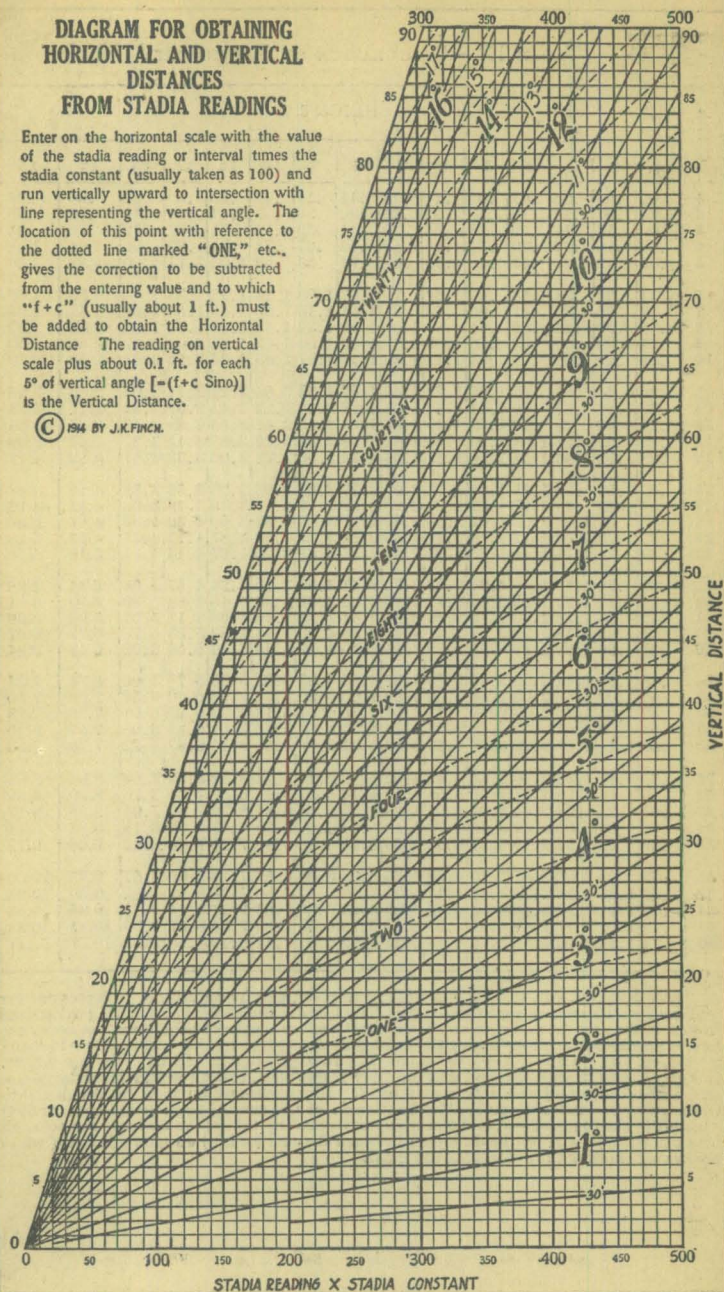
Width	HEIGHT														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	.02	.04	.06	.07	.09	.11	.13	.15	.17	.18	.20	.22	.24	.26	.28
2	.04	.07	.11	.15	.18	.22	.26	.30	.33	.37	.41	.44	.48	.52	.56
3	.06	.11	.17	.22	.28	.33	.39	.44	.50	.56	.61	.67	.72	.78	.83
4	.07	.15	.22	.30	.37	.44	.52	.59	.67	.74	.81	.89	.96	1.04	1.11
5	.09	.19	.28	.37	.46	.56	.65	.74	.83	.93	1.02	1.11	1.20	1.30	1.39
6	.11	.22	.33	.44	.56	.67	.78	.89	1.00	1.11	1.22	1.33	1.44	1.55	1.67
7	.13	.26	.39	.52	.65	.78	.91	1.04	1.16	1.30	1.42	1.55	1.68	1.81	1.94
8	.15	.30	.44	.59	.74	.89	1.04	1.19	1.33	1.48	1.63	1.78	1.92	2.08	2.22
9	.17	.33	.50	.67	.83	1.00	1.17	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50
10	.18	.37	.56	.74	.93	1.11	1.30	1.48	1.67	1.85	2.04	2.22	2.41	2.59	2.78
11	.20	.41	.61	.82	1.02	1.22	1.43	1.63	1.83	2.04	2.24	2.44	2.65	2.85	3.06
12	.22	.44	.67	.89	1.11	1.33	1.56	1.78	2.00	2.22	2.44	2.67	2.89	3.11	3.33
13	.24	.48	.72	.96	1.20	1.44	1.68	1.92	2.16	2.41	2.65	2.89	3.13	3.37	3.61
14	.26	.52	.78	1.04	1.30	1.55	1.81	2.08	2.33	2.59	2.85	3.11	3.37	3.63	3.89
15	.28	.56	.83	1.11	1.39	1.67	1.94	2.22	2.50	2.78	3.06	3.33	3.61	3.89	4.17
16	.30	.59	.89	1.18	1.48	1.78	2.07	2.37	2.67	2.96	3.26	3.56	3.85	4.15	4.44
17	.31	.63	.94	1.26	1.57	1.89	2.20	2.52	2.83	3.15	3.46	3.78	4.09	4.41	4.72
18	.33	.67	1.00	1.33	1.67	2.00	2.32	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00
19	.35	.70	1.06	1.41	1.76	2.11	2.46	2.82	3.17	3.52	3.87	4.22	4.57	4.92	5.28
20	.37	.74	1.11	1.48	1.85	2.22	2.59	2.96	3.33	3.70	4.07	4.44	4.81	5.18	5.56
21	.39	.78	1.17	1.55	1.94	2.33	2.72	3.11	3.50	3.89	4.28	4.67	5.06	5.44	5.83
22	.41	.81	1.22	1.63	2.04	2.44	2.85	3.26	3.67	4.07	4.48	4.89	5.30	5.70	6.11
23	.43	.85	1.28	1.70	2.13	2.56	2.98	3.41	3.83	4.26	4.68	5.11	5.54	5.96	6.39
24	.44	.89	1.33	1.78	2.22	2.67	3.13	3.56	4.00	4.44	4.89	5.33	5.78	6.22	6.67
25	.46	.92	1.39	1.85	2.31	2.78	3.24	3.70	4.17	4.63	5.09	5.56	6.02	6.48	6.94
26	.48	.96	1.44	1.92	2.41	2.89	3.37	3.85	4.33	4.82	5.30	5.78	6.26	6.74	7.24
27	.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50
28	.52	1.04	1.55	2.07	2.59	3.11	3.63	4.15	4.67	5.18	5.70	6.22	6.74	7.26	7.78
29	.54	1.07	1.61	2.15	2.68	3.22	3.76	4.30	4.83	5.37	5.91	6.44	6.98	7.52	8.06
30	.56	1.11	1.67	2.22	2.78	3.33	3.89	4.44	5.00	5.55	6.11	6.67	7.22	7.78	8.33
31	.57	1.15	1.72	2.30	2.87	3.44	4.02	4.59	5.17	5.74	6.32	6.89	7.46	8.04	8.61
32	.59	1.18	1.78	2.37	2.96	3.56	4.15	4.74	5.33	5.92	6.52	7.11	7.70	8.30	8.89
33	.61	1.22	1.83	2.44	3.05	3.67	4.28	4.89	5.50	6.11	6.72	7.33	7.94	8.55	9.17
34	.63	1.26	1.89	2.52	3.15	3.78	4.40	5.04	5.67	6.29	6.93	7.56	8.18	8.81	9.44
35	.65	1.30	1.94	2.59	3.24	3.89	4.53	5.18	5.83	6.48	7.13	7.78	8.42	9.08	9.72
36	.67	1.33	2.00	2.67	3.33	4.00	4.66	5.33	6.00	6.67	7.33	8.00	8.67	9.33	10.00
37	.68	1.37	2.06	2.74	3.42	4.11	4.79	5.48	6.17	6.85	7.54	8.22	8.91	9.59	10.28
38	.70	1.41	2.11	2.82	3.52	4.22	4.92	5.63	6.33	7.03	7.74	8.44	9.15	9.85	10.56
39	.72	1.44	2.17	2.89	3.61	4.33	5.05	5.78	6.50	7.22	7.95	8.67	9.39	10.11	10.83
40	.74	1.48	2.22	2.96	3.70	4.44	5.18	5.92	6.67	7.41	8.15	8.89	9.63	10.37	11.11

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

DIAGRAM FOR OBTAINING HORIZONTAL AND VERTICAL DISTANCES FROM STADIA READINGS

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

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1.72

906.27

904.58-

$$\begin{array}{r}
 \cancel{906.27} \\
 61 - \cancel{903.08} \\
 \hline
 3.19
 \end{array}$$

$$\begin{array}{r}
 \cancel{65} \\
 \cancel{909.63} \\
 \cancel{905.22} \\
 \hline
 4.63
 \end{array}$$

$$\begin{array}{r}
 \cancel{906.27} \quad 903.17 \\
 62 - \cancel{903.17} \quad 6.66 \\
 \hline
 3.10 \quad \textcircled{909.63}
 \end{array}$$

$$\begin{array}{r}
 \cancel{66} \\
 \cancel{909.63} \\
 \cancel{905.18} \\
 \hline
 4.45
 \end{array}$$

$$\begin{array}{r}
 \cancel{63} \\
 \cancel{909.63} \\
 \cancel{903.25} \\
 \hline
 6.38
 \end{array}$$

$$\begin{array}{r}
 \cancel{67} \\
 \cancel{909.63} \\
 \cancel{905.36} \\
 \hline
 4.27
 \end{array}$$

$$\begin{array}{r}
 \cancel{64} \\
 \cancel{909.63} \\
 \cancel{904.13} \\
 \hline
 5.50
 \end{array}$$

909.63

R.A. Hazel

W.E. Sheik
Phone 2882 W

1613 Mrs. Adams Rd
Jesup 66
32.6

9098
9065
3.3

9098
9065
3.3

5260
11.08
41.52
1.2
40.32

5260
12.46
40.14
1.20
38.94

5260
12.59
40.01
1.20
38.80

54.35
12.46
51.99
1.2
40.69

54.35

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

Roadway 16 feet wide. Side Slopes 1 on 1½.
For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.2	8.3	8.5	8.6	8.8	8.9	9.1	9.2	9.4	0
1	9.5	9.7	9.8	10.0	10.1	10.3	10.4	10.6	10.7	10.9	1
2	11.0	11.2	11.3	11.5	11.6	11.8	11.9	12.1	12.2	12.4	2
3	12.5	12.7	12.8	13.0	13.1	13.3	13.4	13.6	13.7	13.9	3
4	14.0	14.2	14.3	14.5	14.6	14.8	14.9	15.1	15.2	15.4	4
5	15.5	15.7	15.8	16.0	16.1	16.3	16.4	16.6	16.7	16.9	5
6	17.0	17.2	17.3	17.5	17.6	17.8	17.9	18.1	18.2	18.4	6
7	18.5	18.7	18.8	19.0	19.1	19.3	19.4	19.6	19.7	19.9	7
8	20.0	20.2	20.3	20.5	20.6	20.8	20.9	21.1	21.2	21.4	8
9	21.5	21.7	21.8	22.0	22.1	22.3	22.4	22.6	22.7	22.9	9
10	23.0	23.2	23.3	23.5	23.6	23.8	23.9	24.1	24.2	24.4	10
11	24.5	24.7	24.8	25.0	25.1	25.3	25.4	25.6	25.7	25.9	11
12	26.0	26.2	26.3	26.5	26.6	26.8	26.9	27.1	27.2	27.4	12
13	27.5	27.7	27.8	28.0	28.1	28.3	28.4	28.6	28.7	28.9	13
14	29.0	29.2	29.3	29.5	29.6	29.8	29.9	30.1	30.2	30.4	14
15	30.5	30.7	30.8	31.0	31.1	31.3	31.4	31.6	31.7	31.9	15
16	32.0	32.2	32.3	32.5	32.6	32.8	32.9	33.1	33.2	33.4	16
17	33.5	33.7	33.8	34.0	34.1	34.3	34.4	34.6	34.7	34.9	17
18	35.0	35.2	35.3	35.5	35.6	35.8	35.9	36.1	36.2	36.4	18
19	36.5	36.7	36.8	37.0	37.1	37.3	37.4	37.6	37.7	37.9	19
20	38.0	38.2	38.3	38.5	38.6	38.8	38.9	39.1	39.2	39.4	20
21	39.5	39.7	39.8	40.0	40.1	40.3	40.4	40.6	40.7	40.9	21
22	41.0	41.2	41.3	41.5	41.6	41.8	41.9	42.1	42.2	42.4	22
23	42.5	42.7	42.8	43.0	43.1	43.3	43.4	43.6	43.7	43.9	23
24	44.0	44.2	44.3	44.5	44.6	44.8	44.9	45.1	45.2	45.4	24
25	45.5	45.7	45.8	46.0	46.1	46.3	46.4	46.6	46.7	46.9	25
26	47.0	47.2	47.3	47.5	47.6	47.8	47.9	48.1	48.2	48.4	26
27	48.5	48.7	48.8	49.0	49.1	49.3	49.4	49.6	49.7	49.9	27
28	50.0	50.2	50.3	50.5	50.6	50.8	50.9	51.1	51.2	51.4	28
29	51.5	51.7	51.8	52.0	52.1	52.3	52.4	52.6	52.7	52.9	29
30	53.0	53.2	53.3	53.5	53.6	53.8	53.9	54.1	54.2	54.4	30
31	54.5	54.7	54.8	55.0	55.1	55.3	55.4	55.6	55.7	55.9	31
32	56.0	56.2	56.3	56.5	56.6	56.8	56.9	57.1	57.2	57.4	32
33	57.5	57.7	57.8	58.0	58.1	58.3	58.4	58.6	58.7	58.9	33
34	59.0	59.2	59.3	59.5	59.6	59.8	59.9	60.1	60.2	60.4	34
35	60.5	60.7	60.8	61.0	61.1	61.3	61.4	61.6	61.7	61.9	35
36	62.0	62.2	62.3	62.5	62.6	62.8	62.9	63.1	63.2	63.4	36
37	63.5	63.7	63.8	64.0	64.1	64.3	64.4	64.6	64.7	64.9	37
38	65.0	65.2	65.3	65.5	65.6	65.8	65.9	66.1	66.2	66.4	38
39	66.5	66.7	66.8	67.0	67.1	67.3	67.4	67.6	67.7	67.9	39
40	68.0	68.2	68.3	68.5	68.6	68.8	68.9	69.1	69.2	69.4	40

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