

FIELD BOOK

350 A

105

KEUFFEL & ESSER CO.

DRAWING MATERIALS

AND

SURVEYING INSTRUMENTS.

NEW YORK.

CHICAGO. ST. LOUIS. SAN FRANCISCO. MONTREAL.

TABLES FOR EXCAVATIONS AND EMBANKMENTS.

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 18 FEET WIDE. SIDE SLOPES 1 TO 1.

FOR SINGLE TRACK EXCAVATION.

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

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

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

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

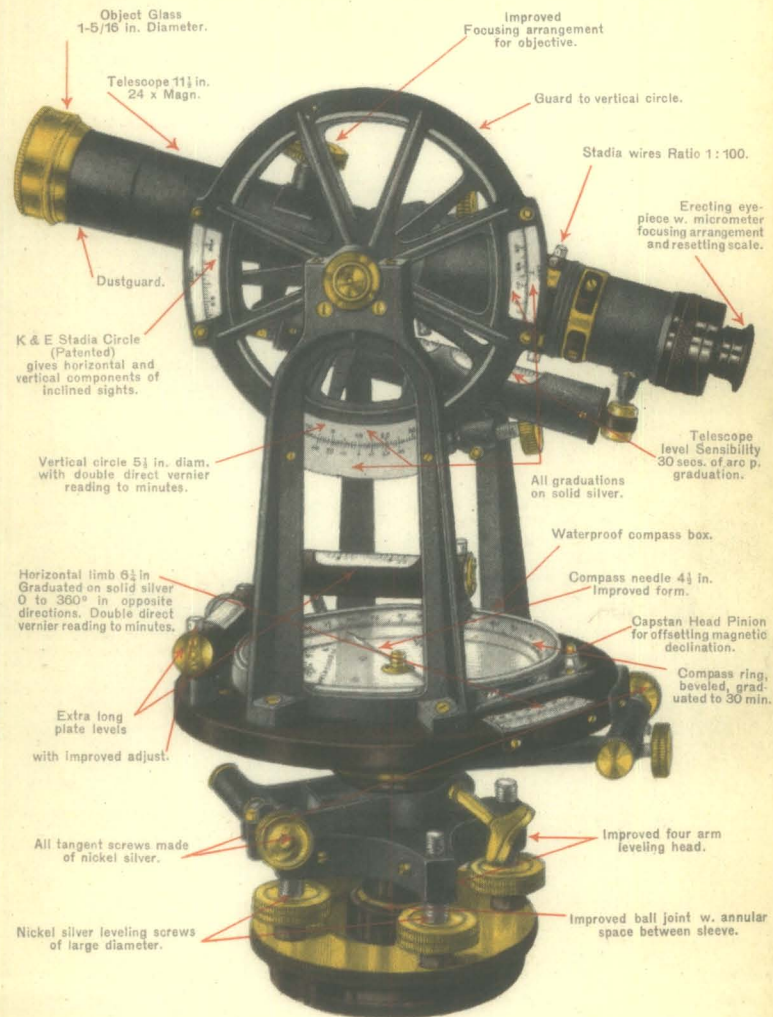
105

BLACK HAWK COUNTY
ENGINEER'S OFFICE
COURT HOUSE
WATERLOO, IOWA 50703

EXTRA FINE ENGINEERS' TRANSIT

No. 5060 S

KEUFFEL & ESSER CO., N.Y.



ALSO MADE WITH

INTERNAL FOCUSING TELESCOPE

PRACTICALLY DUST AND MOISTURE PROOF. —

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PREL. X-SECT.

LOCAL COUNTY RD. SOUTH OF

SEC. 19-20-21 BIG CREEK

87-12

3-9-1931
C-E-5
B. J.
K. K.

BM. 6.66 106.66 100.00

Sp in Root Tree at Sch. House. Sta 1+20

0+00

$\frac{13.8}{50}$ $\frac{12.6}{88}$ $\frac{10.3}{10.3}$ $\frac{9.9}{38}$ $\frac{9.2}{50}$ ✓

1+0

$\frac{101}{33}$ $\frac{99}{23}$ $\frac{94}{19}$ $\frac{99}{15}$ $\frac{103}{10}$ $\frac{111}{8-6}$ $\frac{97}{3}$ $\frac{97.5}{97.5}$ $\frac{95}{10}$ $\frac{105}{21-24}$ $\frac{91}{29}$ $\frac{93}{32}$ ✓

2+0

$\frac{81}{33}$ $\frac{76}{20}$ $\frac{81}{18}$ $\frac{87}{10}$ $\frac{96}{6-8}$ $\frac{93}{4}$ $\frac{91}{91}$ $\frac{93}{20}$ $\frac{95}{21-23}$ $\frac{73}{25}$ $\frac{65}{31}$ $\frac{70}{33}$ ✓

3+0

$\frac{63}{33}$ $\frac{62}{20}$ $\frac{71}{10}$ $\frac{82}{6-8}$ $\frac{70}{4}$ $\frac{69}{69}$ $\frac{68}{19}$ $\frac{82}{21-24}$ $\frac{57}{27}$ $\frac{52}{31}$ $\frac{56}{33}$ ✓

4+0

$\frac{52}{33}$ $\frac{52}{21}$ $\frac{55}{9}$ $\frac{65}{8-7}$ $\frac{50}{5}$ $\frac{56}{56}$ $\frac{55}{19}$ $\frac{24}{21-24}$ $\frac{54}{27}$ $\frac{45}{30}$ $\frac{50}{33}$ ✓

5+0

$\frac{33}{33}$ $\frac{33}{22}$ $\frac{46}{7}$ $\frac{44}{44}$ $\frac{40}{7}$ $\frac{45}{20}$ $\frac{57}{21-24}$ $\frac{37}{30}$ $\frac{40}{33}$ ✓

+35

$\frac{3.5}{33}$ $\frac{42}{42}$ $\frac{40}{10}$ $\frac{47}{20}$ $\frac{59}{23-25}$ $\frac{3.9}{29}$ $\frac{3.9}{33}$ ✓

106.66

6+0

7+0

①

0.66

98.10

9.22

97.44

8+0

9+0

10+0

11+0

12+0

13+0

①

1.51

90.13

9.48

88.62

$$\frac{40}{32} \frac{40}{23} \frac{46}{13} \frac{58}{11} \frac{65}{7.5} \frac{57}{4} 57 \frac{54}{11} \frac{60}{21} \frac{71}{23.25} \frac{47}{30} \frac{50}{33} \checkmark$$

$$\frac{66}{34} \frac{66}{16} \frac{70}{17} \frac{82}{9} \frac{101}{4.6} \frac{90}{4} 86 \frac{88}{21} \frac{97}{21.24} \frac{78}{27} \frac{73}{30} \frac{77}{33} \checkmark$$

$$\frac{82}{31} \frac{82}{16} \frac{100}{10} \frac{39}{4.6} \frac{28}{2} 25 \frac{29}{20} \frac{38}{21.24} \frac{25}{20} \frac{17}{30} \frac{21}{33} \checkmark$$

$$\frac{57}{33} \frac{27}{16} \frac{34}{10} \frac{54}{4.6} \frac{43}{2} 41 \frac{45}{20} \frac{54}{21.24} \frac{48}{25} \frac{45}{30} \frac{48}{33} \checkmark$$

$$\frac{44}{33} \frac{44}{15} \frac{50}{11} \frac{69}{4.6} \frac{58}{4} 55 \frac{58}{19} \frac{68}{21.24} \frac{62}{25} \frac{59}{29} \frac{64}{33} \checkmark$$

$$\frac{59}{33} \frac{59}{15} \frac{62}{11} \frac{72}{8} \frac{82}{6.4} \frac{69}{2} 67 \frac{68}{19} \frac{81}{21.24} \frac{74}{25} \frac{72}{29} \frac{76}{33} \checkmark$$

$$\frac{74}{33} \frac{74}{14} \frac{74}{9} \frac{89}{6.4} \frac{78}{4} 76 \frac{77}{19} \frac{88}{21.24} \frac{80}{25.29} \frac{84}{33} \checkmark$$

$$\frac{86}{33} \frac{83}{14} \frac{81}{8} \frac{96}{6.4} \frac{98}{4} 83 \frac{84}{18} \frac{97}{20.23} \frac{85}{25} \frac{82}{29} \frac{84}{33} \checkmark$$

20.13

3

14+0

15+0

16+0

17+0

18+0

19+0

20+0

21+0

0.03

26.33

13.83

76.30

$\frac{15}{33} \frac{10}{15} \frac{13}{8} \frac{30}{4.5} \frac{19}{7} \frac{15}{18} \frac{30}{21-22} \frac{11}{45} \frac{0.6}{30} \frac{05}{33}$ ✓

$\frac{33}{23} \frac{27}{14} \frac{31}{9} \frac{52}{4.6} \frac{37}{2} \frac{36}{18} \frac{52}{20-22} \frac{3.0}{25} \frac{15}{30} \frac{14}{23}$ ✓

$\frac{56}{33} \frac{48}{18} \frac{56}{8} \frac{76}{6.4} \frac{62}{1} \frac{62}{10} \frac{63}{18} \frac{76}{20-22} \frac{56}{25} \frac{46}{24} \frac{42}{33}$ ✓

$\frac{84}{33} \frac{75}{14} \frac{80}{8} \frac{102}{5.4} \frac{87}{1} \frac{86}{19} \frac{101}{20-22} \frac{81}{26} \frac{72}{28} \frac{68}{23}$ ✓

$\frac{116}{33} \frac{109}{16} \frac{108}{9} \frac{130}{6.7} \frac{114}{1} \frac{112}{17} \frac{125}{19-22} \frac{105}{24} \frac{100}{29} \frac{97}{33}$ ✓

$\frac{152}{35} \frac{141}{20} \frac{134}{15} \frac{135}{9} \frac{154}{5.6} \frac{135}{1} \frac{134}{17} \frac{136}{19} \frac{150}{20-22} \frac{131}{24} \frac{125}{33}$ ✓

$\frac{19}{33} \frac{18}{16} \frac{19}{9} \frac{36}{6.5} \frac{19}{2} \frac{18}{17} \frac{20}{19-21} \frac{34}{23} \frac{16}{27} \frac{08}{27} \frac{08}{33}$ ✓

$\frac{44}{33} \frac{39}{14} \frac{33}{16} \frac{39}{8} \frac{56}{5.6} \frac{39}{2} \frac{27}{17} \frac{39}{20-22} \frac{54}{23} \frac{39}{28} \frac{31}{33}$ ✓

76.33

22+0

$\frac{67}{33}$ $\frac{64}{19}$ $\frac{57}{16}$ $\frac{61}{9}$ $\frac{75}{7.6}$ $\frac{58}{3}$ $\frac{56}{16}$ $\frac{57}{16}$ $\frac{74}{19-21}$ $\frac{57}{22}$ $\frac{50}{28}$ $\frac{45}{33}$ ✓

23+0

$\frac{71}{33}$ $\frac{71}{17}$ $\frac{73}{10}$ $\frac{91}{7.6}$ $\frac{74}{3}$ $\frac{73}{16}$ $\frac{76}{16}$ $\frac{93}{19-20}$ $\frac{72}{23}$ $\frac{67}{28}$ $\frac{65}{33}$ ✓

24+0

$\frac{94}{33}$ $\frac{91}{20}$ $\frac{86}{16}$ $\frac{88}{9}$ $\frac{114}{4.5}$ $\frac{100}{2}$ $\frac{101}{11}$ $\frac{99}{7}$ $\frac{101}{16}$ $\frac{118}{19-21}$ $\frac{97}{28}$ $\frac{86}{27}$ $\frac{86}{33}$ ✓

①

2.02

65.61

12.74

63.59

25+0

$\frac{14}{33}$ $\frac{1.0}{29}$ $\frac{02}{16}$ $\frac{1.2}{10}$ $\frac{43}{7}$ $\frac{43}{5}$ $\frac{28}{2}$ $\frac{2.7}{17}$ $\frac{26}{20}$ $\frac{43}{22}$ $\frac{16}{24}$ $\frac{09}{26}$ $\frac{04}{33}$ ✓

26+0

$\frac{46}{33}$ $\frac{47}{16}$ $\frac{60}{11}$ $\frac{84}{8.5}$ $\frac{67}{2}$ $\frac{65}{16}$ $\frac{65}{16}$ $\frac{80}{14}$ $\frac{80}{11}$ $\frac{44}{24}$ $\frac{33}{20}$ $\frac{30}{33}$ ✓

BM.

2.90

61.71

Spike in Root Maple 90° N. of Sta 27+0

27+0

$\frac{93}{33}$ $\frac{88}{15}$ $\frac{100}{11}$ $\frac{114}{8.7}$ $\frac{100}{4}$ $\frac{97}{16}$ $\frac{98}{16}$ $\frac{108}{18-19}$ $\frac{73}{27}$ $\frac{71}{33}$ ✓

28+0

$\frac{131}{23}$ $\frac{128}{18}$ $\frac{129}{11}$ $\frac{136}{9.6}$ $\frac{127}{4}$ $\frac{125}{16}$ $\frac{128}{16}$ $\frac{13.7}{18-20}$ $\frac{130}{21}$ $\frac{114}{28}$ $\frac{111}{33}$ ✓

29+0

$\frac{101}{33}$ $\frac{156}{17}$ $\frac{150}{10}$ $\frac{153}{8.5}$ $\frac{143}{3}$ $\frac{141}{16}$ $\frac{142}{16}$ $\frac{151}{18}$ $\frac{152}{21}$ $\frac{145}{22}$ $\frac{149}{29}$ $\frac{148}{33}$ ✓

①

2.60

54.22

13.99

51.62

54.22

30+0

+ 66 ± Cor. Cul. 4x3 - Poor - D.A. 320 Ac. Flat

BM.

492 49.30

31+0

32+0

33+0

①

13.85

64.88

3.19

51.03

34+0

35+0

36+0

501
62 58 52 54 +4 41 41 47 46 49 57
33 15 7 4 1 16 18 23 29 33

486
27 85 86 49 40 49 83 88 92 102
50 13 1.5 1.5 17 17 29 50 90

x on ± N.H.W. Conc. Cul.

483
53 58 54 61 49 51 72 60 69 79
33 13 6 3.5 19 19-22 24 31 33

485
38 41 39 51 49 51 47 50 58 53 63 69
33 25 17 13 6 8 20 21-22 28 30 33

487
22 24 28 39 53 45 45 57 54 52 58
33-27 21 14 6 4.2 19 21-22 25 30 33

511
104 108 113 121 138 145 146 138 132 135 151 153 142 132 133
33 23 14 8 4 2 1 2 20 23 26 28 31 33

53.5
22 28 85 104 121 123 114 106 105 108 125 126 108 108
33 18 11 5 3 1 2 2 11 21 24 25 31 33

56.2
35 41 53 64 85 47 21 23 91 80 25 28
33 18 8 4 1 4 21 24-26 27 31 33

64.88

37+0

①

4.31

67.52

1.67

63.21

+ 40

$$+ \frac{07}{33} \frac{00}{19} \frac{07}{6} \frac{44}{1} \frac{46}{11} \frac{43}{1} \frac{30}{3} \frac{26}{12} \frac{30}{21} \frac{43}{24} \frac{42}{26} \frac{20}{29} \frac{15}{32} \frac{12}{33}$$

60.0

63.0

$$\frac{09}{33} \frac{11}{11} \frac{15}{5} \frac{43}{1} \frac{45}{1} \frac{44}{1} \frac{29}{5} \frac{26}{13} \frac{25}{22} \frac{41}{24} \frac{42}{26} \frac{20}{29} \frac{20}{33}$$

61.2

38+0

$$\frac{15}{33} \frac{19}{8} \frac{42}{5} \frac{63}{1} \frac{63}{0} \frac{45}{5} \frac{40}{12} \frac{43}{12} \frac{58}{25} \frac{57}{27} \frac{33}{29} \frac{24}{32} \frac{25}{33}$$

56.2

39+0

①

1.01

55.37

13.16

54.36

$$\frac{64}{33} \frac{65}{25} \frac{69}{14} \frac{73}{8} \frac{115}{1} \frac{113}{2} \frac{98}{13} \frac{97}{13} \frac{102}{22} \frac{114}{24} \frac{113}{26} \frac{87}{30} \frac{28}{33}$$

51.4

40+0

$$+ \frac{45}{33} + \frac{15}{25} \frac{00}{9} \frac{44}{2} \frac{40}{2} \frac{24}{5} \frac{22}{12} \frac{30}{22} \frac{42}{24} \frac{44}{26} \frac{20}{29} \frac{10}{33}$$

48.1

41+0

$$\frac{38}{33} \frac{34}{21} \frac{38}{15} \frac{48}{9} \frac{70}{7} \frac{68}{4} \frac{80}{3} \frac{78}{1} \frac{73}{13} \frac{63}{3} \frac{65}{13} \frac{68}{22} \frac{86}{25} \frac{54}{33}$$

45.1

42+0

$$\frac{78}{33} \frac{80}{23} \frac{71}{17} \frac{80}{11} \frac{102}{9.5} \frac{113}{3} \frac{111}{1} \frac{103}{2} \frac{94}{12} \frac{96}{12} \frac{101}{22} \frac{112}{24} \frac{113}{26} \frac{96}{33}$$

42.0

43+0

$$\frac{115}{33} \frac{115}{44} \frac{110}{17} \frac{121}{13} \frac{122}{11} \frac{131}{5} \frac{127}{4.2} \frac{126}{2} \frac{121}{12} \frac{120}{12} \frac{124}{21} \frac{134}{23} \frac{136}{26} \frac{128}{33}$$

①

2.42

45.10

12.69

42.68

45.10

44+0

B.M.

3.39 41.71

+ 81 ± 6x3 Con. Pools DA 240 Ac Flat

45+0

46+0

47+0

48+0

49+0

50+0

① 5.97 48.07 3.00 42.10

40 37 50 49 45 34 32 32 44 43 48
33 18 10 4 1 10 20 22 24 26 33

X on H.W. Conc. Cul. Sta. 44+81

61 63 63 67 34 40 40 3.4 3.4 21 6.8 6.5
50 19 3 6 0.7 0.7 9 17.3 18.3 18.3 33 50

55 52 54 58 58 42 42 43 58 5.5
33 22 8 4 2 10 17 22 33

51 54 57 61 51 51 50 52 65 68 62 56
33 19 10 3 2 11 19 22 24 25 33

51 53 47 56 63 50 50 53 68 58 50
33 23 20 8 7-5 3 18 21-24 26 33

3.8 3.5 3.0 3.9 4.3 5.2 5.0 5.7 4.3 4.2 9.5 6.2 6.3 9.9 3.6
83 25 24 20 14 12 8 6 3 0 18 21 23 26 33

29 26 41 50 34 32 31 40 55 50 41 39
33 22 14 9-6 4 5 16 21 23 25 33

33 30 37 43 45 37 31 36 48 49 38 35 40
33 20 17 9 7 5 17 20 22 24 32 33

48.07

51+0

52+0

BM.

3.31 44.76

53+0

54+0

55+0

56+0

57+0

③

12.05 56.82 3.30 44.77

58+0

$\frac{60}{33} \frac{58}{24} \frac{63}{12} \frac{72}{10} \frac{23}{8} \frac{60}{5} \frac{59}{5} \frac{63}{16} \frac{80}{20} \frac{80}{22} \frac{65}{23} \frac{60}{31} \frac{63}{33}$ ✓

$\frac{40}{50} \frac{41}{30} \frac{39}{20} \frac{44}{10} \frac{49}{7} \frac{51}{7} \frac{5.5}{20} \frac{5.9}{33} \frac{61}{40} \frac{62}{50}$ ✓

Spike in Cotton 50' S Sta: 52+33

$\frac{40}{33} \frac{43}{22} \frac{42}{13} \frac{61}{11} \frac{61}{9} \frac{52}{6} \frac{50}{17} \frac{63}{18} \frac{66}{20} \frac{63}{23} \frac{51}{28} \frac{55}{33}$ ✓

$\frac{39}{33} \frac{39}{22} \frac{48}{13} \frac{59}{11} \frac{59}{9} \frac{45}{6} \frac{45}{15} \frac{63}{18} \frac{66}{21} \frac{50}{23} \frac{56}{27} \frac{56}{33}$ ✓

$\frac{33}{33} \frac{30}{30} \frac{34}{21} \frac{41}{13} \frac{55}{7} \frac{56}{9} \frac{39}{6} \frac{41}{14} \frac{61}{18} \frac{60}{20} \frac{45}{22} \frac{39}{26} \frac{41}{33}$ ✓

$\frac{31}{33} \frac{34}{23} \frac{41}{12} \frac{51}{11} \frac{50}{9} \frac{37}{6} \frac{36}{12} \frac{41}{17} \frac{50}{19} \frac{44}{21} \frac{39}{25} \frac{42}{33}$ ✓

$\frac{36}{33} \frac{36}{22} \frac{46}{11} \frac{45}{9} \frac{35}{5} \frac{35}{13} \frac{3.6}{17} \frac{52}{19} \frac{54}{21} \frac{43}{27} \frac{48}{33}$ ✓

$\frac{12.2}{33} \frac{133}{22} \frac{125}{12} \frac{12.9}{10} \frac{135}{7} \frac{118}{6} \frac{116}{13} \frac{134}{12} \frac{134}{18} \frac{137}{20} \frac{11.0}{33}$ ✓

56.82

59+0

60+0

61+0

62+0

B.M.

0.93 55.89

63+0

+50

64+0

65+0

Q

4.51

50.28

11.05

45.77

$\frac{10.9}{33} \frac{11.3}{22} \frac{11.7}{12} \frac{12.0}{10-8} \frac{11.1}{6} \frac{10.9}{109} \frac{11.0}{12} \frac{12.7}{14} \frac{12.5}{15} \frac{11.8}{20} \frac{11.0}{33}$

$\frac{2.9}{33} \frac{8.6}{21} \frac{10.4}{11} \frac{10.5}{8} \frac{9.7}{5} \frac{7.6}{76} \frac{10.0}{12} \frac{11.1}{14} \frac{11.3}{18} \frac{10.2}{19} \frac{10.0}{25} \frac{10.4}{33}$

$\frac{5.3}{33} \frac{6.0}{22} \frac{9.0}{11} \frac{9.1}{9} \frac{7.9}{5} \frac{7.7}{77} \frac{8.0}{12} \frac{8.1}{15} \frac{9.2}{18} \frac{7.7}{20} \frac{7.2}{24} \frac{8.3}{33}$

$\frac{3.0}{33} \frac{4.0}{22} \frac{6.2}{11} \frac{6.5}{8} \frac{5.6}{5} \frac{5.8}{58} \frac{6.3}{18} \frac{7.3}{15} \frac{7.0}{18} \frac{5.8}{19} \frac{5.4}{24} \frac{5.9}{33}$

Spike in Root of Maple 35' So. of Sta. 62+95

$\frac{1.6}{33} \frac{2.0}{23} \frac{2.7}{13} \frac{4.5}{11} \frac{4.9}{9} \frac{4.1}{7} \frac{3.8}{38} \frac{4.3}{11} \frac{5.6}{14} \frac{5.8}{17} \frac{4.3}{21} \frac{4.6}{24} \frac{5.1}{33}$

$\frac{1.5}{33} \frac{1.8}{25} \frac{3.2}{14} \frac{5.0}{11} \frac{4.8}{9} \frac{4.0}{9} \frac{3.6}{36} \frac{4.0}{11} \frac{5.4}{14} \frac{5.4}{17} \frac{4.4}{19} \frac{4.2}{22} \frac{4.7}{33}$

$\frac{1.7}{33} \frac{2.7}{19} \frac{4.0}{14} \frac{6.3}{11} \frac{6.1}{9} \frac{5.1}{7} \frac{4.7}{47} \frac{5.1}{10} \frac{6.2}{13} \frac{6.4}{16} \frac{4.9}{18} \frac{4.5}{21} \frac{5.8}{33}$

$\frac{5.1}{33} \frac{5.9}{21} \frac{8.2}{15} \frac{10.8}{12} \frac{11.0}{10} \frac{9.4}{7} \frac{9.1}{91} \frac{9.6}{10} \frac{11.0}{12} \frac{11.0}{15} \frac{10.0}{17} \frac{9.6}{19} \frac{10.8}{24} \frac{11.7}{33}$

57.06

76+0

65	64	61	76	74	66	61	61	71	70	60	56	52	✓
33	26	21	16	12	10	9	9	13	17	20	25	33	

77+0

59	56	69	68	55	53	55	58	54	52	✓
31	21	17	13	9	9	12	20	33		

+57 ± 4x2 Conc. Cul. - Fair OA. 20 Ac. Rollins

Flow ←

64	33	38	37	34	62	52	✓
11	10	10	8.5	8.5	9.5	33	

BM.

3.38 53.68

x at ± N.H.W. Conc. Cul.

78+0

41	38	40	42	44	45	34	34	36	53	54	34	32	✓
33	27	25	16	14	12	10	9	6	10	13	22	33	

79+0

22	20	29	34	33	24	20	25	36	36	16	18	15	✓
33	24	19	15	12	10	9	10	13	15	18	30	33	

○

12.54 66.22

53.68

80+0

93	88	91	116	113	102	101	102	118	119	103	85	80	86	82	✓
33	27	20	14	12	10	9	9	12	14	16	19	24	29	33	

81+0

85	78	81	97	96	82	82	86	106	68	62	67	62	✓
33	25	18	16	13	11	10	10	12-14	16	25	26	33	

82+0

68	63	66	78	77	62	60	62	76	87	38	43	38	✓
33	25	18	16	14	11	9	8	11-13	16	24	25	33	

83+0

45	39	47	58	58	44	43	45	62	22	14	17	12	✓
33	25	18	17	14	12	9	8	10-12	16	24	25	33	

84+0

30	20	26	38	38	24	23	23	41	41	05	03	06	✓
33	15	19	17	15	12	9	9	10	12	16	24	33	

○

12.99

79.80 0.41 65.81

70.80

85+0

130	126	128	144	142	130	12.8	12.8	15.0	112	105	102
33	25	19	16	14	12	7	7	10	15	23	33

86+0

107	104	108	120	118	109	104	108	12.2	8.9	80	86	80
33	25	19	17	14	12	7	7	10-13	16	21	27	33

87+0

80	72	77	94	95	82	81	82	9.9	54	50	53	46
33	25	19	17	15	12	6	6	9-11	14	22	26	33

88+0

55	55	72	69	56	56	57	72	73	34	27	25
25	20	17	15	13	6	6	8	10	14	22	23

89+0

58	52	52	64	60	45	42	42	56	56	36	31	26
33	25	19	17	15	12	5	5	8	10	13	23	33

90+0

78	75	63	54	62	57	43	42	51	41	32	30
33	25	21	19	17	15	12	7	8-11	13	23	33

91+0

50	45	52	49	36	33	32	44	45	27	21	21
33	26	18	15	12	8	8	8	10	13	22	33

①

10.60

85.99

3.41

75.39

92+0

80	77	76	97	96	85	83	85	95	94	59	47	48
33	25	21	19	15	13	5	5	8	10	15	25	33

BM.

0.70

85.29

Spike in Apple Tree 40' N. of Sta 93+0

93+0

55	51	49	64	65	50	46	47	68	62	37	16	15
33	26	21	18	16	14	5	5	8	11	16	24	33

94+0

73	69	69	78	74	62	56	57	70	71	54	38	34
33	26	19	18	15	13	6	6	8	12	14	19	33

85.99

95+0

82	26	21	26	24	61	58	58	6.8	67	60	49	46
33	25	19	18	14	12	7	9	12	13	20	33	

96+0

63	59	54	67	67	53	50	50	52	31	29
33	26	19	18	16	13	7	11	37	33	

97+0

60	57	51	45	58	54	47	42	42	37	34	33
33	26	25	20	18	14	12	12	14	24	33	

98+0

①

2.49

83.74

4.73

81.26

64	55	52	46	46	3.0	28
33	22	10	16	20	33	

99+0

42	40	30	27	25	29	39	37	11	0.4	02
33	30	11	10	8	10	13	17	21	33	

100+0

39	39	39	44	39	42	54	54	21	1.9
33	27	21	14	8	8	10	12	21	33

101+0

64	64	28	27	61	60	66	37	24	41	3.8
33	24	16	14	11	9	11	13	21	33	

102+0

116	116	94	91	95	78	72	77	86	85	60	55
33	29	21	17	14	11	10	11	14	22	33	

103+0

111	111	107	97	103	81	74	74	86	86	24	66
33	29	25	17	12	9	11	13	18	20	33	

+24. ± 18" Cor. Cvt. DA. 15A Rolling

Flow	117	107	107	93	77	70	74	95	96	88	80	71
33	27	11	11	8	4	13	18	22	30	33		

104+0

117	107	84	79	98	84	68	67	68	80	81	67	66
33	24	23	15	14	12	9	12	15	17	22	33	

+ 94. Stone at Inter.

$$\begin{array}{r} 63 \\ 56 \end{array} \quad \begin{array}{r} 64 \\ 33 \end{array} \quad \begin{array}{r} 64 \\ 15 \end{array} \quad \begin{array}{r} 63 \\ 774 \end{array} \quad \begin{array}{r} 59 \\ 16 \end{array} \quad \begin{array}{r} 56 \\ 33 \end{array} \quad \begin{array}{r} 54 \\ 50 \end{array}$$

BM.

3.88

79.86

Sp. in N.H.W. Conc. Cul. 105 + 30

260 56.49

55.89

6.87 52.06

11.30

45.19

55.89

60

52.49

11.30

45.19

6.87

52.06

11.30

47.76

43.31

4.45

5206

875

43.31

5200

848

43.58

4776

43.58

4.18

47.76

Top New Br

876.3

87-12

4-29-31
CES.
EW
KK.

15

PRELIM X-SEC 30. OF JEC. 19 - BIG CREEK

9.04

88.80

79.86

SP. N. H.W.

105

+52 ± 3' x 3'

150	150	94	105	106	106	90	143	146	109	98
23	90	90	80		126	126	131	20	22	33
		90				136				

78.3

106

103	103	110	112	99	100	99	100	123
33	25	20	7	7	16	16	22	33

78.9

107

58	63	60	94	94	81	80	90	89	88	81
33	26	20	13	6	5	15	18	24	26	33

80.7

108

84	37	63	70	83	77	61	59	76	71	76	57	52	56
27	25	19	11	10	6	5	15	18	21	24	27	29	33

82.7

109

23	24	44	63	60	38	35	56	51	41	41
33	27	12	10	6	5	15	19	24	27	33

85.2

110

 O 1415 102.46 0.59 88.31

21	19	28	18	13	09	30	23	12	12
37	12	8	6		15	14	22	31	33
		16				20			

87.6

102.46

111

$$\frac{134}{33} \frac{131}{25} \frac{131}{13} \frac{139}{19} \frac{138}{6} \frac{125}{3} \frac{123}{15} \frac{122}{15} \frac{139}{18} \frac{131}{22} \frac{114}{33} \checkmark$$

112

$$\frac{101}{33} \frac{101}{30} \frac{91}{23} \frac{102}{10} \frac{113}{6} \frac{96}{3} \frac{95}{15} \frac{96}{15} \frac{109}{17} \frac{103}{23} \frac{72}{33} \checkmark$$

113

$$\frac{62}{33} \frac{63}{24} \frac{54}{23} \frac{64}{12} \frac{82}{6} \frac{64}{9} \frac{65}{15} \frac{64}{14} \frac{82}{17} \frac{72}{21} \frac{36}{33} \checkmark$$

114

①

14.10

115.74

0.82

101.64

$$\frac{13}{33} \frac{16}{24} \frac{11}{23} \frac{23}{11} \frac{41}{7} \frac{23}{4} \frac{23}{15} \frac{37}{17} \frac{15}{24} \frac{+01}{33} \checkmark$$

115

$$\frac{18}{3} \frac{100}{25} \frac{93}{24} \frac{108}{16} \frac{112}{12} \frac{130}{7} \frac{114}{5} \frac{114}{13} \frac{137}{15} \frac{113}{24} \frac{25}{30} \frac{93}{33} \checkmark$$

116

$$\frac{86}{33} \frac{86}{25} \frac{78}{24} \frac{84}{11} \frac{96}{7} \frac{74}{8} \frac{73}{14} \frac{95}{18} \frac{70}{22} \frac{54}{33} \checkmark$$

117

$$\frac{12}{13} \frac{50}{25} \frac{73}{24} \frac{66}{11} \frac{81}{8} \frac{77}{7} \frac{58}{4} \frac{54}{15} \frac{68}{18} \frac{54}{21} \frac{36}{33} \checkmark$$

118

$$\frac{63}{33} \frac{64}{28} \frac{57}{27} \frac{57}{11} \frac{65}{7} \frac{42}{4} \frac{40}{15} \frac{54}{18} \frac{41}{21} \frac{19}{33} \checkmark$$

115.74

119

⊙ 10.59 124.50 1.43 114.31

120

121

122

123

124

⊙ 2.36 119.60 7.66 117.24

B7.

3.45 116.15

125

126

$$\frac{24}{33} \frac{25}{78} \frac{16}{26} \frac{20}{12} \frac{43}{8} \frac{22}{5} \frac{21}{15} \frac{38}{78} \frac{23}{22} \frac{0.3}{33} \checkmark$$

$$\frac{50}{33} \frac{83}{27} \frac{25}{26} \frac{81}{13} \frac{104}{9} \frac{86}{6} \frac{87}{13} \frac{105}{18} \frac{88}{21} \frac{70}{30} \frac{70}{33} \checkmark$$

$$\frac{55}{33} \frac{58}{26} \frac{50}{25} \frac{53}{17} \frac{72}{9} \frac{57}{7} \frac{55}{12} \frac{75}{16} \frac{55}{20} \frac{45}{33} \checkmark$$

$$\frac{45}{33} \frac{41}{30} \frac{50}{14} \frac{64}{13} \frac{47}{7} \frac{45}{12} \frac{63}{14} \frac{53}{19} \frac{44}{33} \checkmark$$

$$\frac{54}{33} \frac{59}{28} \frac{52}{17} \frac{60}{14} \frac{75}{13} \frac{61}{7} \frac{58}{12} \frac{59}{14} \frac{77}{18} \frac{64}{23} \checkmark$$

$$\frac{21}{33} \frac{75}{19} \frac{69}{28} \frac{77}{14} \frac{95}{12} \frac{77}{10} \frac{77}{11} \frac{77}{14} \frac{94}{17} \frac{86}{18} \frac{25}{27} \frac{80}{33} \checkmark$$

5p in FCP. N of Sta. 124+80

$$\frac{29}{33} \frac{28}{28} \frac{35}{16} \frac{54}{10} \frac{37}{7} \frac{40}{11} \frac{57}{14} \frac{51}{18} \frac{45}{28} \frac{52}{33} \checkmark$$

$$\frac{36}{33} \frac{37}{25} \frac{51}{15} \frac{64}{16} \frac{46}{7} \frac{50}{11} \frac{28}{15} \frac{65}{18} \frac{52}{28} \frac{68}{33} \checkmark$$

119.60

127

$$\frac{40}{33} \frac{52}{14} \frac{68}{10} \frac{50}{9} 50 \frac{53}{11} \frac{73}{17} \frac{69}{18} \frac{69}{28} \frac{71}{33} \checkmark$$

128

$$\frac{45}{33} \frac{51}{26} \frac{43}{24} \frac{54}{15} \frac{24}{9} \frac{58}{13} 57 \frac{59}{11} \frac{27}{17} \frac{66}{19} \frac{62}{27} \frac{21}{33} \checkmark$$

129

$$\frac{52}{33} \frac{56}{27} \frac{87}{15} \frac{121}{10} \frac{101}{6} 98 \frac{101}{11} \frac{120}{15} \frac{83}{21} \frac{81}{27} \frac{90}{33} \checkmark$$

130

$$\frac{125}{33} \frac{127}{28} \frac{118}{27} \frac{123}{15} \frac{171}{11} \frac{198}{11} \frac{146}{11} \frac{196}{11} \frac{177}{15} \frac{144}{27} \frac{135}{27} \frac{120}{33} \checkmark$$

①

0.22

105.22

14.60

105.00

131

$$\frac{17}{33} \frac{20}{23} \frac{44}{16} \frac{57}{12} \frac{39}{6} 37 \frac{40}{11} \frac{58}{14} \frac{50}{17} \frac{38}{27} \frac{38}{33} \checkmark$$

B.M.

2.98

102.24

sp. in C.F.P. 5.0 of 51

131 + 31

132

$$\frac{21}{33} \frac{62}{27} \frac{29}{14} \frac{70}{10} \frac{21}{7} 70 \frac{72}{10} \frac{90}{13} \frac{82}{17} \frac{28}{27} \frac{85}{33} \checkmark$$

133

$$\frac{100}{33} \frac{93}{27} \frac{105}{16} \frac{114}{14} \frac{101}{8} 97 \frac{101}{10} \frac{117}{13} \frac{105}{18} \frac{105}{26} \frac{105}{33} \checkmark$$

134

$$\frac{121}{33} \frac{114}{26} \frac{122}{17} \frac{130}{14} \frac{117}{8} 117 \frac{121}{10} \frac{135}{13} \frac{119}{26} \frac{121}{33} \checkmark$$

①

1.43

94.92

11.73

93.49

94.92

135

40	34	42	42	32	31	35	48	38	27	31
33	26	15	$\frac{10}{11}$	8		9	$\frac{11}{14}$	16	26	33

136

58	51	53	57	44	44	45	60	51	39	42
33	27	16	$\frac{12}{13}$	9		9	$\frac{12}{14}$	16	25	33

137

69	65	31	54	82	54	66	62	50	57
33	21	13	10		8	$\frac{10}{13}$	15	23	33

138

86	82	83	59	57	61	74	76	66	25
33	26	16	10		7	10	17	27	33

+21 $\frac{1}{2}$ 4x3. Conc Box

BM.

7.23 87.69

98	117	72	59	58	59	64	109	96	75	74
33	12	$\frac{11}{12}$	10		8	9	9	18	25	33

BM. x on S Hd W. Conc BX.

139

80	27	84	51	60	59	62	75	62	60	61
33	24	10	13	9		9	$\frac{11}{14}$	20	23	33

140

66	62	51	28	60	56	56	75	67	40	40
33	25	10	13	10		8	$\frac{11}{13}$	18	21	33

141

①

6.66

97.01

4.57

90.35

53	49	62	58	64	43	42	44	66	57	18	17
33	27	21	17	14	10		9	$\frac{11}{14}$	17	24	33

97.01

142

$$\frac{24}{33} \frac{20}{22} \frac{25}{17} \frac{81}{15} \frac{60}{11} 57 \frac{58}{9} \frac{25}{12} \frac{44}{22} \frac{41}{33} \checkmark$$

143

$$\frac{90}{33} \frac{24}{18} \frac{29}{14} \frac{58}{11} 55 \frac{55}{7} \frac{68}{11} \frac{50}{15} \frac{43}{21} \frac{42}{33} \checkmark$$

144

$$\frac{54}{33} \frac{44}{23} \frac{65}{14} \frac{45}{10} 44 \frac{46}{7} \frac{62}{13} \frac{51}{14} \frac{38}{20} \frac{37}{33} \checkmark$$

145

○ 7.35 102.61 1.75 95.26

$$\frac{24}{33} \frac{22}{20} \frac{40}{14} \frac{24}{11} 23 \frac{24}{7} \frac{37}{12} \frac{11}{15} \frac{02}{20} \frac{03}{33} \checkmark$$

146

$$\frac{72}{33} \frac{66}{21} \frac{90}{19} \frac{58}{12} 55 \frac{54}{7} \frac{70}{10} \frac{45}{15} \frac{39}{21} \frac{29}{33} \checkmark$$

147

$$\frac{64}{33} \frac{60}{28} \frac{62}{20} \frac{70}{16} \frac{51}{12} 46 \frac{45}{6} \frac{65}{10} \frac{25}{20} \frac{25}{33} \checkmark$$

148

BTL

7.30 95.31

$$\frac{77}{33} \frac{72}{28} \frac{78}{16} \frac{63}{12} 57 \frac{59}{6} \frac{73}{10} \frac{57}{14} \frac{25}{24} \frac{37}{33} \checkmark$$

Sp Root Ser. of 540, 148, 10

149

$$\frac{90}{33} \frac{78}{25} \frac{82}{16} \frac{66}{12} 62 \frac{63}{6} \frac{78}{11} \frac{69}{12} \frac{42}{22} \frac{44}{33} \checkmark$$

102.61

150

$$\frac{75}{33} \frac{76}{20} \frac{87}{13} \frac{20}{14} 68 \frac{70}{6} \frac{88}{10} \frac{73}{12} \frac{49}{24} \frac{53}{33} \checkmark$$

151

⊙

1.11

95.18

8.54

94.07

$$\frac{91}{33} \frac{104}{22} \frac{118}{17} \frac{99}{15} \frac{98}{14} \frac{101}{6} \frac{115}{9} \frac{87}{15} \frac{73}{21} \frac{82}{33} \checkmark$$

152

$$\frac{54}{33} \frac{53}{24} \frac{79}{17} \frac{62}{13} 61 \frac{63}{6} \frac{77}{10} \frac{54}{14} \frac{38}{20} \frac{44}{33} \checkmark$$

153

$$\frac{89}{33} \frac{90}{43} \frac{97}{21} \frac{116}{17} \frac{100}{13} 98 \frac{100}{6} \frac{115}{9} \frac{97}{14} \frac{77}{20} \frac{77}{33} \checkmark$$

154

⊙

0.97

63.35

1200

82.38

$$\frac{132}{33} \frac{133}{22} \frac{144}{17} \frac{133}{13} 128 \frac{132}{6} \frac{148}{9} \frac{124}{14} \frac{110}{20} \frac{117}{24} \frac{114}{33} \checkmark$$

155

$$\frac{37}{33} \frac{37}{24} \frac{53}{18} \frac{38}{14} 36 \frac{39}{7} \frac{50}{12} \frac{28}{16} \frac{20}{21} \frac{18}{33} \checkmark$$

156

$$\frac{64}{33} \frac{66}{21} \frac{77}{18} \frac{57}{14} 58 \frac{58}{7} \frac{73}{12} \frac{50}{15} \frac{40}{25} \frac{40}{33} \checkmark$$

157

$$\frac{81}{33} \frac{78}{27} \frac{84}{22} \frac{94}{20} \frac{80}{15} 76 \frac{78}{9} \frac{92}{15} \frac{80}{16} \frac{63}{33} \checkmark$$

+95.5

B.M.

8.62

74.73

$$\frac{111}{50} \frac{107}{33} 99 \frac{82}{33} \frac{88}{50} \checkmark$$

spin Maple S. Sta. 157

Laporte-Brandon Co. Rd. N.E. of 5/14/31 22
Laporte City over River & Cut-off Bridge

P.S.B.
K.L.K.
E.M.W.
G.E.S.
Sta. B.S. H.I. F.S. Elev.
B.M. 2.88 810.39 807.51
0-200

0 on S. Hdwl. Conc. Culv. Approx. 200' N.E. Sta. 0+00

80%
2.6
0

0-100

0.0
4.9
0

0+00 = N. end Wood Br.

$\frac{7.6}{33}$ $\frac{9.9}{29}$ $\frac{8.9}{23}$ $\frac{7.6}{13}$ $\frac{5.3}{8}$ $\frac{5.6}{8}$ $\frac{5.6}{8}$ $\frac{8.0}{12}$ $\frac{10.6}{21}$ $\frac{14.6}{23}$ $\frac{10.8}{33}$ ✓

0+20 = S. end Wood Br.

0.51
5.3
0

1+00

$\frac{8.8}{33}$ $\frac{8.8}{30}$ $\frac{7.5}{24}$ $\frac{8.4}{18}$ $\frac{5.6}{15}$ $\frac{7.4}{8}$ $\frac{5.3}{11}$ $\frac{8.8}{19}$ $\frac{8.9}{26}$ $\frac{8.9}{33}$ ✓

2+00

$\frac{8.5}{33}$ $\frac{8.5}{30}$ $\frac{10.3}{25}$ $\frac{9.4}{17}$ $\frac{5.4}{11}$ $\frac{7.4}{8}$ $\frac{5.1}{17}$ $\frac{8.1}{23}$ $\frac{8.8}{33}$ $\frac{8.7}{39}$ ✓

3+00

$\frac{10.2}{34}$ $\frac{10.2}{26}$ $\frac{7.2}{19}$ $\frac{7.6}{17}$ $\frac{7.6}{8}$ $\frac{5.1}{11}$ $\frac{7.2}{15}$ $\frac{8.2}{20}$ $\frac{8.6}{33}$ ✓

0 5.63 811.68 7.34 806.05

0.5.9
0.6.6
5.1
0

3+85.4 = N. end Br.

Sta. B.S. H.I. F.S. Elev.

811.68

4+00

5+00

5+11.4 = S. end Br.

6+00

9.8	9.6	8.3	6.0	6.3	6.3	10.5	10.4	9.7	9.7
32	22	17	13	8	10	20	22	27	33
				f					f

7+00

9.2	9.2	10.4	10.3	7.7	6.3	5.8	6.0	9.1	9.0	8.4	9.0
33	32	29	24	16	15	8	12	18	23	30	34
				f							f

8+00

11.1	12.1	11.7	8.5	5.6	5.1	5.4	7.6	8.8	8.5	7.4	7.4
31	29	24	16	14	8	13	14	19	23	26	33
				f							f

9+00

10.4	9.4	7.8	7.3	3.2	3.5	10.0	10.9	10.6
31	22	17	15	8	12	23	30	33
				f				

^{N.}
 9+65.1 = N. end Approach to 130' Hy Truss

0 5.20 816.73 0.15 811.53

Sta. B.S. H.I. F.S. Elev.

816.73

9+94.5 = N. end 130' Hy. Truss Br.

10+00

11+00

11+29.6 = S. end 130' Hy. Truss Br.

11+88.8 = S. end of S. Approach 130' Hy. Truss

12+00

0 3.17 809.26 10.64 806.09

12+55

X 13+00

12.78
3.95
0

12.77
3.96
0

12.75
3.95
0

12.75
3.95
0

09.6
7.6
0

00.0
00.0
0

05.1
7.2
0

04.0
7.2
0

13.2 12.1 11.2 7.9 7.9 8.2 11.7 13.3 13.3
33 28 18 12 0 9 15 22 33 ✓

X 7.6 7.6 9.3 8.9 5.6 5.3 5.8 6.7 9.2 9.9 6.9 6.9
33 28 25 19 14 0 11 14 17 26 32 33
f f f f f f f f f f f

Sta. B.S. H.I. F.S. Elev.

809.26

Sta.	B.S.	H.I.	F.S.	Elev.
X 14+00			$\frac{6.9}{33}$ $\frac{7.1}{30}$ $\frac{8.1}{28}$ $\frac{8.8}{25}$ $\frac{8.0}{18}$ $\frac{6.8}{12}$ $\frac{5.6}{12}$ $\frac{5.2}{0}$ $\frac{5.6}{8}$ $\frac{8.2}{15}$ $\frac{8.8}{22}$ $\frac{8.3}{28}$ $\frac{6.3}{33}$	✓

X 15+00			$\frac{6.5}{33}$ $\frac{7.5}{31}$ $\frac{7.5}{27}$ $\frac{8.5}{25}$ $\frac{7.8}{18}$ $\frac{5.1}{12}$ $\frac{7.9}{0}$ $\frac{5.1}{9}$ $\frac{6.5}{12}$ $\frac{7.0}{16}$ $\frac{8.5}{22}$ $\frac{8.2}{29}$ $\frac{6.3}{33}$	✓
---------	--	--	--	---

X 16+00			$\frac{7.3}{31}$ $\frac{7.3}{29}$ $\frac{7.4}{26}$ $\frac{8.7}{24}$ $\frac{7.8}{19}$ $\frac{5.2}{13}$ $\frac{7.8}{0}$ $\frac{5.0}{8}$ $\frac{6.5}{12}$ $\frac{7.0}{19}$ $\frac{7.9}{23}$ $\frac{7.9}{29}$ $\frac{6.0}{33}$	✓
---------	--	--	--	---

X 17+00			$\frac{5.3}{31}$ $\frac{6.1}{29}$ $\frac{6.5}{28}$ $\frac{7.5}{24}$ $\frac{6.9}{23}$ $\frac{7.0}{18}$ $\frac{7.0}{14}$ $\frac{7.3}{0}$ $\frac{5.4}{9}$ $\frac{5.9}{11}$ $\frac{8.4}{17}$ $\frac{8.3}{22}$ $\frac{5.2}{29}$ $\frac{5.2}{33}$	✓
---------	--	--	---	---

X 18+00			$\frac{7.0}{13}$ $\frac{7.8}{30}$ $\frac{6.0}{28}$ $\frac{6.8}{24}$ $\frac{6.2}{21}$ $\frac{7.3}{17}$ $\frac{3.7}{12}$ $\frac{7.1}{0}$ $\frac{5.3}{9}$ $\frac{5.6}{13}$ $\frac{6.3}{20}$ $\frac{6.2}{25}$ $\frac{7.8}{31}$ $\frac{7.8}{37}$	✓
---------	--	--	---	---

X 19+00			$\frac{5.3}{33}$ $\frac{5.0}{31}$ $\frac{5.4}{26}$ $\frac{5.6}{20}$ $\frac{5.1}{17}$ $\frac{7.0}{13}$ $\frac{3.8}{0}$ $\frac{3.9}{10}$ $\frac{5.1}{13}$ $\frac{5.2}{21}$ $\frac{6.0}{23}$ $\frac{6.3}{31}$ $\frac{7.6}{33}$	✓
---------	--	--	---	---

0 6.60 810.80 5.06 804.20

X 20+00			$\frac{6.3}{33}$ $\frac{6.3}{23}$ $\frac{7.3}{20}$ $\frac{7.1}{16}$ $\frac{5.3}{9}$ $\frac{7.8}{0}$ $\frac{5.3}{11}$ $\frac{6.5}{16}$ $\frac{9.7}{22}$ $\frac{10.0}{27}$ $\frac{6.3}{33}$ $\frac{7.8}{35}$	✓
---------	--	--	--	---

X 21+00			$\frac{6.0}{33}$ $\frac{6.5}{26}$ $\frac{7.1}{20}$ $\frac{7.8}{19}$ $\frac{7.4}{17}$ $\frac{7.6}{10}$ $\frac{7.3}{0}$ $\frac{7.6}{10}$ $\frac{6.8}{13}$ $\frac{7.0}{18}$ $\frac{10.1}{28}$ $\frac{10.8}{33}$	✓
---------	--	--	--	---

Sta. B.S. H.I. F.S. Elev.

810.80

21+35.2 = N. end Conc. I-Beam

21+65.3 = S. end Conc. I-Beam

+ 22+00

B.M. 5.94 811.92 4.82 805.98

6.7	7.0	8.0	7.7	5.5	5.8	7.2	8.3	8.3	6.7	6.7
32	26	22	19	13	8	23	26	30	32	36

on end of S.E. Wing of Conc. I-Beam

+ 23+00

9.1	7.4	7.4	9.0	9.4	8.7	6.5	6.0	6.4	8.2	11.2	11.4	10.9
28	26	24	21	17	12	9	5	12	18	28	32	36

+ 24+00

7.0	7.0	6.8	7.0	8.5	8.0	6.3	6.0	6.4	8.5	10.0	10.2	9.1	8.7
33	30	26	24	20	16	10	5	11	18	22	29	31	34

+ 25+00

12.3	12.1	11.9	8.4	7.7	5.3	4.7	5.3	6.6	7.7	8.2	10.6	11.4	11.2	11.0
33	30	27	20	14	9	5	10	13	13	15	19	23	31	33

+ 26+00

11.5	8.7	8.8	8.7	10.1	9.4	5.4	5.2	5.5	9.8	10.6	10.9	10.2	10.3	4.2
32	26	23	21	18	14	7	5	11	14	21	27	29	33	42

+ 27+00

9.8	9.4	8.9	9.0	8.5	5.5	5.2	5.7	8.9	10.3	10.8	10.3	10.3	10.3
33	28	25	18	12	8	5	12	14	21	25	30	33	42

Sta. B.S. H.I. F.S. Elev.

811.92

x 28+00

8.9	8.9	8.7	7.4	8.2	7.3	4.1	4.3	5.5	10.0	10.4	9.8	12.7	13.0	14.2
33	27	26	23	21	14	7	5	9	13	17	18	24	31	35
f														

28+49 = N. end Pony Truss

B.M. 2.47 810.44 3.95 807.97

Inside Corner N.E. Wing Pony Truss Sta. 28+43

28+91 = S. end Pony Truss

x 29+00

Top Water

16.1	11.6	8.8	2.8	2.6	2.6	3.6	8.2	8.5	9.7	9.6	8.1	8.1
23	19	17	10	5	10	11	11	23	27	33	37	41
f												

x 30+00

7.2	7.6	8.6	8.7	7.6	3.9	3.8	4.0	7.2	8.0	8.0	7.5	7.9	7.8
33	29	27	23	19	12	5	11	12	19	25	29	32	34
f													

x 31+00

8.6	8.3	8.1	7.3	7.5	4.3	4.4	7.5	8.5	8.3	7.9	7.9
35	29	18	14	10	5	11	12	20	25	29	37
f											

x 32+00

7.3	7.0	7.3	6.9	6.0	4.8	4.6	4.7	6.6	7.6	7.6	7.6
35	30	24	19	13	11	5	11	12	17	24	31
f											

+50.

805.34

2.10 = Hy. Water March 1923

x 33+00

7.1	7.0	6.8	5.8	5.6	5.1	4.9	4.9	6.5	7.0	6.7	7.3
34	27	19	16	12	10	5	11	18	23	25	32
f											

Sta. B.S. H.L. F.S. Elev.

010.44

+ 34+00

5.8 5.8 7.2 6.5 5.3 5.0 5.2 6.8 7.1 6.5 5.3 4.8 5.3
33 32 26 12 11 0 11 16 20 25 27 30 31 33
f

+ 35+00

4.7 4.7 5.8 6.4 6.3 5.1 4.4 5.1 4.7 4.8 6.4 7.3 6.8 5.1 5.8 5.3
33 30 22 20 16 12 0 9 10 16 17 20 23 25 27 33
f

+ 36+00

6.0 6.2 6.4 7.7 8.0 7.6 6.4 5.9 6.3 7.3 7.5 6.7 6.7
33 29 24 23 19 16 12 0 10 12 17 21 23 33
f

0 7.85 012.14 6.15 004.29

+ 37+00

10.0 9.5 9.0 9.5 9.3 8.0 7.7 7.8 8.8 10.3 10.4 8.9 8.4
33 29 21 19 15 12 0 10 19 22 26 28 33
f

+ 38+00

8.4 8.3 8.1 8.6 7.2 6.8 6.8 8.5 9.4 9.2
33 23 17 12 10 0 13 26 31 33
f

+ 39+00

8.4 9.2 7.6 6.2 6.1 6.6 9.7 10.6 10.3
33 23 15 12 0 13 19 30 33
f

Toward-rail begins R.R. Sta. 39+15 - 9.5' from E

" " " Lt Sta. 39+85 - 6.0' from E

40+00

8.0 8.0 8.2 10.2 7.8 6.4 4.7 4.5 5.2 7.2 9.2
29 26 22 19 14 9 6 0 20 23 34
f G.R. G.R. f

0 8.95 017.96 3.13 009.01

40+98 = E. end E. Approach Hy. Truss over Cedar Riv.

05.4
4.6
0

Sta. B.S. H.I. F.S. Elev.

817.96

41+21 = E. end Hy. Truss Br. over Cedar River

45+91.5 = W. end Hy. Truss Br. over Cedar River

13.17

5.85 812.11

3p Anchor-bolt on E. abut. at S.E. Cor. Hy. Truss Br.

41+21
4+22.9
45+91.5

815.0

3.0

815.8

2.2

SLOPE STAKES & PRELIM X-SECT. COUNTY ROAD "L"
BETWEEN HIGH BRIDGE + CUTOFF BRIDGE.

KLK 30
ES.
Thompson.

May 18-1931

3.00 810.97

807.97

2.9

29

F0.2

F6.3

808.1

3.1

9.2

30

F0.3

F3.0

4.0

807.0

4.3

7.8

31

F0.5

F4.1

4.0

807.0

4.8

8.1

32

F1.1

F3.6

4.0

807.0

5.1

7.6

33

F1.4

F3.2

4.0

807.0

5.4

7.2

34

F1.5

F1.2

4.0

807.0

41- 808.8

35/41 36/53 45/58 45/65 37/71 38/88 41/100

5.5

5.2

⊙

2.97

808.83

5.11

805.86

35

F1.5

F1.8

1.8

807.0

37/41 29/51 42/75 42/100

3.3

3.4

36

F2.5

F2.9

1.8

807.0

4/13 40/45 41/57 50/64 53/80 49/91 47/100

4.3

4.7

808.83

37

F2.6

F3.3

1.8

807.0 $\frac{65}{33}$ $\frac{65}{67}$ $\frac{64}{65}$ $\frac{60}{74}$ $\frac{67}{90}$ $\frac{70}{100}$ ✓

4.4

5.1

38

F1.6

F3.7

1.8

807.0 $\frac{50}{33}$ $\frac{49}{41}$ $\frac{57}{53}$ $\frac{59}{63}$ $\frac{65}{75}$ $\frac{65}{90}$ $\frac{63}{100}$ ✓

3.4

5.5

39

F0.9

F4.9

1.8

807.0

2.7

6.6

3.29

811.26

807.97

38

F0.9

F4.7

3.2

808.1 $\frac{30}{50}$ $\frac{89}{78}$ $\frac{82}{100}$ $\frac{30}{100}$ ↑

3.4

11.9

27

F1.1

F5.9

3.5

807.0 $\frac{97}{35}$ $\frac{102}{66}$ $\frac{93}{100}$ $\frac{97}{100}$ $\frac{97}{100}$

4.6

9.3

26

F0.9

F6.2

3.7

807.6 $\frac{95}{40}$ $\frac{94}{58}$ $\frac{85}{86}$ $\frac{90}{100}$

4.6

9.9

25

F0.9

F9.9

3.9

807.4 $\frac{122}{57}$ $\frac{100}{71}$ $\frac{54}{62}$ $\frac{54}{100}$

4.1

9.8

8/11.26

24		$f_{1.3}$	$f_{3.6}$	4.1 807.2	$\frac{84}{54}$	$\frac{116}{69}$	$\frac{115}{77}$	$\frac{85}{89}$	$\frac{52}{100}$	✓	8.4	7.6
23		$f_{1.1}$	$f_{6.0}$	4.7 806.9	$\frac{95}{38}$	$\frac{95}{54}$	$\frac{67}{68}$	$\frac{67}{100}$	✓		6.5	10.0
22		$f_{0.7}$	$f_{2.0}$	4.6 806.7	$\frac{77}{50}$	$\frac{59}{76}$	$\frac{93}{90}$	$\frac{99}{100}$	✓		5.3	6.6
21	3 21	00	$f_{6.0}$	4.8 806.5	$\frac{59}{42}$	$\frac{66}{85}$	$\frac{74}{100}$	✓			4.8	10.8
	①	<u>809.58</u>	5.59	805.67								
20		$f_{0.7}$	$f_{2.3}$	3.0 806.6	$\frac{56}{55}$	$\frac{53}{65}$	$\frac{52}{100}$	✓			3.7	5.3
19		$f_{1.2}$	$f_{2.0}$	3.0 806.6	$\frac{59}{60}$	$\frac{60}{100}$	✓				4.2	5.0
18		$f_{1.2}$	$f_{2.1}$	2.9 806.7	$\frac{61}{77}$	$\frac{53}{100}$	✓				4.1	5.0
17		$f_{1.5}$	$f_{2.6}$	2.8 806.8	$\frac{62}{63}$	$\frac{61}{100}$	✓				4.3	5.4

809.58

16

P2.4

P3.2

2.8

806.8⁸₃₃ $\frac{69}{63}$ $\frac{66}{100}$

✓

5.2

6.0

15

P2.5

P3.3

2.7

806.9⁹₃₃ $\frac{72}{63}$ $\frac{72}{100}$

✓

5.2

6.0

14

P2.9

P3.3

2.7

806.9

5.4

6.0

13

P3.1

P4.0

2.6

807.0

5.7

6.6

FINAL X-SEC. ON COUNTY ROAD L

34

BET. HIGH BRIDGE + CUT OFF BRIDGE IN SEC. 19 - SPRING CREEK 87-11

13

$\frac{110}{23}$

$\frac{46}{14}$

40

$\frac{17}{9}$

$\frac{114}{19}$

14

$\frac{108}{25}$

$\frac{50}{15}$

43

$\frac{25}{9}$

$\frac{107}{20}$

15

$\frac{103}{22}$

$\frac{49}{14}$

43

$\frac{50}{9}$

$\frac{100}{19}$

16

$\frac{81}{104}$

$\frac{95}{100}$

$\frac{104}{87}$

$\frac{106}{77}$

$\frac{98}{65}$

$\frac{101}{46}$

$\frac{111}{30}$

$\frac{95}{27}$

$\frac{99}{20}$

$\frac{52}{13}$

$\frac{46}{0}$

$\frac{50}{9}$

$\frac{96}{16}$

17

$\frac{76}{103}$

$\frac{98}{77}$

$\frac{98}{85}$

$\frac{98}{79}$

$\frac{92}{65}$

$\frac{96}{47}$

$\frac{101}{27}$

$\frac{81}{27}$

$\frac{94}{19}$

$\frac{52}{13}$

$\frac{46}{0}$

$\frac{50}{10}$

$\frac{103}{32}$

Ent. 20' x 17 x 2.1

18

$\frac{78}{96}$

$\frac{94}{81}$

$\frac{95}{65}$

$\frac{91}{47}$

$\frac{98}{78}$

$\frac{72}{28}$

$\frac{92}{18}$

$\frac{50}{12}$

$\frac{46}{0}$

$\frac{51}{12}$

$\frac{77}{17}$

$\frac{87}{28}$

$\frac{78}{32}$

Ent 28 x 10 x 1.9

19

⑥

6.90

811.17

7.73

804.27

50

$\frac{75}{100}$

$\frac{83}{96}$

$\frac{86}{95}$

$\frac{92}{81}$

$\frac{92}{64}$

$\frac{92}{45}$

$\frac{43}{34}$

$\frac{38}{24}$

$\frac{86}{18}$

$\frac{51}{12}$

$\frac{46}{0}$

$\frac{46}{11}$

$\frac{73}{15}$

$\frac{85}{30}$

$\frac{79}{32}$

20

812.00

$\frac{78}{124}$

$\frac{100}{117}$

$\frac{103}{100}$

$\frac{97}{93}$

$\frac{105}{81}$

$\frac{99}{75}$

$\frac{98}{94}$

$\frac{103}{83}$

$\frac{106}{43}$

$\frac{100}{42}$

$\frac{103}{29}$

$\frac{78}{26}$

$\frac{90}{17}$

$\frac{54}{11}$

$\frac{54}{0}$

$\frac{54}{11}$

$\frac{45}{16}$

$\frac{114}{30}$

$\frac{98}{32}$

Follow original

21

+45

End B. Left

6.10

805.90

$$\frac{82}{125} \frac{106}{112} \frac{103}{104} \frac{91}{82} \frac{91}{8}$$

$$\frac{93}{69} \frac{103}{42} \frac{93}{41} \frac{95}{49}$$

$$\frac{28}{24} \frac{82}{22}$$

$$\frac{90}{21} \frac{88}{17} \frac{53}{10}$$

$$\frac{50}{11}$$

$$\frac{80}{15}$$

807.0

22

$$\frac{94}{17} \frac{55}{10}$$

$$\frac{50}{12}$$

$$\frac{78}{16}$$

807.0

23

$$\frac{96}{17} \frac{53}{10}$$

$$\frac{52}{12}$$

$$\frac{96}{18}$$

$$\frac{87}{20}$$

807.1

Entr

21' x 15' x 3.3'

24

$$\frac{82}{16} \frac{51}{11}$$

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

$$\frac{98}{19}$$

$$\frac{107}{14}$$

$$\frac{107}{29}$$

$$\frac{91}{33}$$

807.1

End Cut

25

$$\frac{85}{17} \frac{49}{11}$$

$$\frac{46}{11}$$

$$\frac{53}{13}$$

$$\frac{74}{13}$$

$$\frac{106}{19}$$

$$\frac{114}{22}$$

$$\frac{112}{31}$$

807.4

End Cut

26

$$\frac{50}{10}$$

$$\frac{45}{12}$$

$$\frac{53}{12}$$

$$\frac{95}{14}$$

807.5

27

$$\frac{100}{19} \frac{92}{18}$$

$$\frac{50}{11}$$

$$\frac{47}{11}$$

$$\frac{50}{11}$$

$$\frac{94}{15}$$

807.3

28

$$\frac{91}{16} \frac{43}{11}$$

$$\frac{40}{10}$$

$$\frac{42}{10}$$

$$\frac{55}{12}$$

$$\frac{104}{14}$$

808.0

4.03

812.00

807.7

807.97

3.28

811.25

808.2

29

$$\frac{93}{14} \frac{32}{11}$$

$$\frac{31}{10}$$

$$\frac{35}{10}$$

$$\frac{98}{14}$$

811.25

↓

30

 $\frac{93}{18} \frac{44}{12} 41 \frac{42}{10} \frac{80}{12}$ ✓

807.2

31

 $\frac{94}{19} \frac{46}{12} 41 \frac{46}{10} \frac{82}{12}$ ✓

807.2

32

 $\frac{81}{19} \frac{48}{13} 45 \frac{49}{10} \frac{26}{12}$ ✓

806.8

Ent. 15 x 14 x 16

33

 $\frac{81}{18} \frac{49}{13} 47 \frac{49}{12} \frac{22}{16} \frac{26}{24}$ ✓

806.6

Beg. Di. Cut

34

 $\frac{61}{140} \frac{72}{130} \frac{75}{100} \frac{26}{87} \frac{73}{57} \frac{71}{39} \frac{64}{38} \frac{82}{25} \frac{85}{25} \frac{84}{19} \frac{50}{13} 47 \frac{48}{12} \frac{80}{17} \frac{77}{26} \frac{62}{27}$ ✓

117

806.6

35

 $\frac{53}{175} \frac{64}{172} \frac{66}{160} \frac{62}{143} \frac{71}{136} \frac{66}{128} \frac{66}{115} \frac{78}{98} \frac{67}{65} \frac{72}{46} \frac{73}{33} \frac{55}{32} \frac{68}{23} \frac{76}{23} \frac{79}{19} \frac{49}{12} 44 \frac{43}{12} \frac{77}{17} \frac{83}{24} \frac{69}{24}$ ✓

806.9

18' x 14' x 2'

36

 $\frac{76}{193} \frac{88}{188} \frac{90}{169} \frac{80}{149} \frac{85}{129} \frac{87}{110} \frac{88}{75} \frac{84}{73} \frac{80}{54} \frac{84}{30} \frac{72}{29} \frac{73}{23} \frac{81}{26} \frac{89}{15} \frac{49}{12} 46 \frac{50}{13} \frac{82}{18} \frac{89}{23} \frac{77}{24}$ ✓

806.7

37

 $\frac{86}{180} \frac{94}{165} \frac{86}{148} \frac{95}{132} \frac{94}{86} \frac{97}{51} \frac{95}{27} \frac{68}{26} \frac{45}{16} \frac{52}{11} 49 \frac{51}{14} \frac{81}{20} \frac{87}{23} \frac{102}{30} \frac{96}{28}$ ✓

806.8

40

011.25

30

$\frac{24}{21} \frac{87}{18} \frac{45}{72}$
 $\frac{44}{19} \frac{24}{23} \frac{89}{27} \frac{81}{28}$ ✓
 $\frac{20}{20}$
 $\frac{20}{20}$

806.4

39

$\frac{24}{18} \frac{42}{13} \frac{43}{12}$
 $\frac{49}{12} \frac{29}{17}$ ✓

807.0

012.11

Top Anchor Bolt E. Abut

59/ FINAL X-SECS. 50. OF 9ECS. 19-20-21 BIG CREEK July 13 1938

Wise.
Johnston
Kraft.

[108.1]

8.05 108.05 100.00

0

$\frac{133}{50}$ $\frac{116}{15}$ $\frac{110}{10}$ $\frac{109}{33}$ $\frac{108}{50}$

97.1

98.7

1

$\frac{116}{32}$ $\frac{135}{27}$ $\frac{132}{19}$ $\frac{100}{11}$ 94 $\frac{95}{11}$ $\frac{122}{16}$ $\frac{127}{26}$ $\frac{97}{32}$

2

60.4

$\frac{95}{32}$ $\frac{116}{27}$ $\frac{111}{18}$ $\frac{81}{12}$ 77 $\frac{77}{11}$ $\frac{111}{17}$ $\frac{115}{26}$ $\frac{78}{31}$

3

01.6

$\frac{80}{32}$ $\frac{101}{27}$ $\frac{98}{18}$ $\frac{67}{12}$ 65 $\frac{66}{11}$ $\frac{98}{17}$ $\frac{101}{26}$ $\frac{66}{32}$

4

02.6

$\frac{67}{32}$ $\frac{91}{26}$ $\frac{86}{19}$ $\frac{52}{11}$ 55 $\frac{58}{11}$ $\frac{87}{17}$ $\frac{94}{26}$ $\frac{60}{32}$

5

03.6

$\frac{52}{30}$ $\frac{70}{24}$ $\frac{73}{17}$ $\frac{45}{9}$ 45 $\frac{57}{14}$ $\frac{25}{18}$ $\frac{82}{27}$ $\frac{52}{32}$

+35

03.6

$\frac{49}{32}$ $\frac{51}{18}$ ~~45~~ 45 $\frac{49}{12}$ $\frac{25}{18}$ $\frac{81}{27}$ $\frac{53}{30}$

6

02.6

$\frac{80}{33}$ $\frac{55}{14}$ 55 $\frac{58}{13}$ $\frac{83}{19}$ $\frac{92}{26}$ $\frac{57}{31}$

7.78 107.78 100.00

7

00.3

$\frac{73}{32}$ $\frac{101}{24}$ $\frac{93}{13}$ $\frac{76}{10}$ 75 $\frac{80}{13}$ $\frac{110}{19}$ $\frac{116}{27}$ $\frac{87}{32}$

8

97.7

$\frac{96}{30}$ $\frac{125}{25}$ $\frac{128}{14}$ $\frac{99}{10}$ 101 $\frac{103}{12}$ $\frac{135}{20}$ $\frac{140}{27}$ $\frac{115}{32}$

9

96.20

$\frac{121}{24}$ $\frac{147}{24}$ $\frac{150}{17}$ $\frac{116}{10}$ 116 $\frac{122}{12}$ $\frac{149}{18}$ $\frac{163}{27}$ $\frac{141}{32}$

1.27 96.11 12.94 94.44

10

$\frac{121}{24}$ $\frac{147}{24}$ $\frac{150}{17}$ $\frac{116}{10}$ 116 $\frac{122}{12}$ $\frac{149}{18}$ $\frac{163}{27}$ $\frac{141}{32}$

96.11

11

93.4
 $\frac{41}{30}$ $\frac{70}{25}$ $\frac{62}{16}$ $\frac{28}{9}$ 27 $\frac{30}{13}$ $\frac{60}{18}$ $\frac{75}{27}$ $\frac{53}{32}$

12

92.3
 $\frac{57}{30}$ $\frac{84}{25}$ $\frac{22}{16}$ $\frac{41}{11}$ 38 $\frac{39}{12}$ $\frac{72}{18}$ $\frac{84}{26}$ $\frac{61}{32}$

13

91.3
 $\frac{72}{30}$ $\frac{94}{25}$ $\frac{83}{16}$ $\frac{51}{10}$ 48 $\frac{48}{12}$ $\frac{81}{19}$ $\frac{91}{26}$ $\frac{65}{32}$

14

90.2
 $\frac{82}{30}$ $\frac{103}{26}$ $\frac{94}{17}$ $\frac{61}{11}$ 59 $\frac{58}{12}$ $\frac{92}{18}$ $\frac{96}{26}$ $\frac{66}{32}$

15

88.4
 $\frac{94}{30}$ $\frac{115}{25}$ $\frac{111}{17}$ $\frac{80}{11}$ 77 $\frac{78}{13}$ $\frac{110}{19}$ $\frac{118}{26}$ $\frac{74}{32}$

16

⊖ 0.08 83.64 12.55 83.56

86.1
 $\frac{115}{30}$ $\frac{136}{26}$ $\frac{133}{17}$ $\frac{102}{10}$ 100 $\frac{101}{12}$ $\frac{136}{18}$ $\frac{140}{25}$ $\frac{101}{32}$

17

83.6
 $\frac{40}{32}$ $\frac{43}{26}$ $\frac{34}{17}$ $\frac{62}{12}$ 00 $\frac{02}{11}$ $\frac{37}{17}$ $\frac{40}{25}$ $\frac{113}{31}$

18

81.0
 $\frac{49}{32}$ $\frac{21}{26}$ $\frac{65}{18}$ $\frac{28}{11}$ 20 $\frac{29}{12}$ $\frac{61}{17}$ $\frac{65}{25}$ $\frac{32}{31}$

19

78.4
 $\frac{76}{32}$ $\frac{100}{27}$ $\frac{87}{17}$ $\frac{55}{12}$ 52 $\frac{54}{11}$ $\frac{89}{17}$ $\frac{92}{24}$ $\frac{59}{31}$

20

76.2
 $\frac{94}{32}$ $\frac{118}{26}$ $\frac{106}{16}$ $\frac{25}{11}$ 74 $\frac{74}{12}$ $\frac{109}{18}$ $\frac{114}{25}$ $\frac{83}{31}$

21

74.4
 $\frac{114}{31}$ $\frac{135}{27}$ $\frac{125}{17}$ $\frac{95}{12}$ 92 $\frac{93}{11}$ $\frac{126}{19}$ $\frac{134}{25}$ $\frac{105}{31}$

22

72.3
 $\frac{134}{31}$ $\frac{158}{26}$ $\frac{132}{18}$ $\frac{115}{12}$ 113 $\frac{114}{12}$ $\frac{146}{19}$ $\frac{150}{26}$ $\frac{123}{31}$

23

⊖ 0.19 71.16 12.67 70.97

70.8
 $\frac{76}{31}$ $\frac{88}{26}$ $\frac{44}{17}$ $\frac{05}{11}$ 04 $\frac{05}{12}$ $\frac{44}{19}$ $\frac{45}{25}$ $\frac{12}{31}$

71.16

24

25

26

27

9.41

71.12

61.71

⊖

0.14

56.69

14.57

66.55

56.55

28

29

30

7.

+66 ±

31

32

33

⊖

10.29

63.88

3.10

53.59

34

35

68.8

$$\frac{39}{31} \quad \frac{63}{26} \quad \frac{57}{17} \quad \frac{26}{12} \quad 24 \quad \frac{27}{12} \quad \frac{59}{17} \quad \frac{67}{25} \quad \frac{32}{32}$$

65.6

$$\frac{64}{31} \quad \frac{95}{25} \quad \frac{87}{17} \quad \frac{58}{12} \quad 56 \quad \frac{60}{12} \quad \frac{93}{18} \quad \frac{99}{25} \quad \frac{62}{31}$$

64.0

$$\frac{102}{31} \quad \frac{137}{25} \quad \frac{126}{16} \quad \frac{101}{12} \quad 97 \quad \frac{98}{11} \quad \frac{132}{17} \quad \frac{137}{23} \quad \frac{90}{28}$$

57.9

$$\frac{145}{30} \quad \frac{172}{25} \quad \frac{163}{16} \quad \frac{136}{12} \quad 133 \quad \frac{132}{10} \quad \frac{167}{17} \quad \frac{168}{22} \quad \frac{124}{29}$$

54.8

$$\frac{38}{30} \quad \frac{59}{25} \quad \frac{56}{18} \quad \frac{22}{12} \quad 19 \quad \frac{22}{11} \quad \frac{55}{17} \quad \frac{52}{22} \quad \frac{26}{27}$$

52.8

$$\frac{72}{31} \quad \frac{88}{27} \quad \frac{76}{18} \quad \frac{45}{12} \quad 39 \quad \frac{42}{11} \quad \frac{76}{17} \quad \frac{75}{24} \quad \frac{57}{29}$$

51.2

$$\frac{86}{32} \quad \frac{106}{29} \quad \frac{91}{18} \quad \frac{57}{13} \quad 55 \quad \frac{57}{12} \quad \frac{90}{17} \quad \frac{92}{24} \quad \frac{76}{28}$$

50.8

$$\frac{78}{31} \quad \frac{103}{27} \quad \frac{101}{22} \quad \frac{90}{15} \quad \frac{62}{12} \quad 59 \quad \frac{41}{14} \quad \frac{96}{19} \quad \frac{103}{22} \quad \frac{108}{29} \quad \frac{95}{32}$$

57.4

$$\frac{64}{32} \quad \frac{94}{27} \quad \frac{88}{19} \quad \frac{55}{12} \quad 53 \quad \frac{54}{12} \quad \frac{95}{19} \quad \frac{102}{26} \quad \frac{91}{29}$$

51.9

$$\frac{48}{31} \quad \frac{77}{27} \quad \frac{69}{17} \quad \frac{46}{12} \quad 48 \quad \frac{48}{12} \quad \frac{90}{18} \quad \frac{96}{26} \quad \frac{79}{30}$$

53.8

$$\frac{98}{31} \quad \frac{130}{26} \quad \frac{124}{17} \quad \frac{98}{12} \quad 100 \quad \frac{103}{12} \quad \frac{145}{20} \quad \frac{153}{26} \quad \frac{126}{30}$$

56.7

$$\frac{65}{32} \quad \frac{96}{26} \quad \frac{91}{16} \quad \frac{22}{12} \quad 70 \quad \frac{75}{11} \quad \frac{112}{16} \quad \frac{126}{26} \quad \frac{120}{32}$$

63.88

~~63.88~~

36

⊙

4.98

57.46

1.40

62.48

37

+40

38

39

40

⊙

0.45

53.23

14.68

52.78

41

42

43

44

N.B.M.

S.H.W.

9.61

~~11.41~~

+81

⊙

4.16

47.78

37.80

9.61

43.62

45

46

60.2
 $\frac{33}{31} \frac{66}{26} \frac{62}{17} \frac{39}{12} \frac{37}{10} \frac{43}{10} \frac{74}{16} \frac{90}{26} \frac{90}{31}$

63.6
 $\frac{26}{31} \frac{62}{25} \frac{58}{17} \frac{36}{13} \frac{40}{11} \frac{43}{11} \frac{74}{16} \frac{82}{25} \frac{46}{31}$

65.0
 $\frac{10}{31} \frac{38}{26} \frac{33}{16} \frac{22}{13} \frac{25}{12} \frac{28}{12} \frac{50}{17} \frac{57}{26} \frac{21}{32}$

64.8
 $\frac{12}{30} \frac{48}{24} \frac{46}{16} \frac{26}{12} \frac{27}{12} \frac{30}{12} \frac{55}{16} \frac{60}{27} \frac{22}{32}$

61.3
 $\frac{60}{31} \frac{92}{25} \frac{86}{17} \frac{60}{12} \frac{62}{12} \frac{68}{11} \frac{108}{18} \frac{117}{26} \frac{28}{31}$

56.1
 $\frac{111}{31} \frac{138}{25} \frac{126}{16} \frac{118}{13} \frac{114}{11} \frac{118}{11} \frac{157}{18} \frac{165}{27} \frac{131}{32}$

51.4
 $\frac{12}{32} \frac{58}{26} \frac{38}{17} \frac{17}{13} \frac{18}{13} \frac{23}{11} \frac{44}{17} \frac{61}{27} \frac{28}{32}$

48.2
 $\frac{55}{32} \frac{86}{16} \frac{79}{17} \frac{51}{12} \frac{50}{12} \frac{54}{12} \frac{92}{18} \frac{100}{26} \frac{25}{32}$

46.3
 $\frac{91}{32} \frac{117}{27} \frac{111}{18} \frac{82}{20} \frac{79}{20} \frac{80}{12} \frac{116}{18} \frac{126}{27} \frac{103}{32}$

43.6
 $\frac{119}{32} \frac{147}{27} \frac{142}{21} \frac{130}{16} \frac{103}{12} \frac{96}{12} \frac{99}{30} \frac{129}{17} \frac{143}{26} \frac{124}{32}$

42.4
 $\frac{152}{14} \frac{97}{13} \frac{101}{13} \frac{108}{13} \frac{108}{13} \frac{98}{13} \frac{153}{14}$

42.4
 $\frac{79}{31} \frac{107}{26} \frac{93}{18} \frac{58}{12} \frac{54}{12} \frac{59}{12} \frac{98}{18} \frac{98}{27} \frac{21}{32}$

42.0
 $\frac{76}{33} \frac{104}{28} \frac{95}{14} \frac{59}{13} \frac{58}{13} \frac{61}{11} \frac{108}{19} \frac{106}{26} \frac{86}{32}$

47.78

47

48

49

50

51

52

53

54

55

56

57

58

59

44.76
2.83
47.59

47.59

6.26

51.04

2.81

44.78

50.04

42.0

78 107 96 62 58 62 102 106 78
33 27 18 13 12 18 27 32

42.17

65 95 88 56 51 56 92 99 67
32 27 17 12 12 18 28 32

43.4

55 86 83 46 44 47 86 93 59
32 27 18 12 12 18 26 32

43.4

59 81 79 47 44 44 83 89 68
32 27 17 12 12 19 28 32

43.9

55 79 74 43 39 44 79 85 60
32 28 18 13 11 17 27 32

44.1

50 66 63 35 37 40 69 71 55
32 34 20 13 12 21 27 31

45.8

115 64 60 31 26 31 63 73 52
32 27 17 12 12 12 28 28 32

45.2

67 95 91 63 58 62 95 102 78
32 27 16 11 12 19 29 32

45.7

62 88 82 54 53 58 96 98 73
32 27 16 11 12 17 30 32

46.0

62 89 82 53 50 55 89 97 73
32 27 17 12 13 18 29 32

45.8

66 87 83 55 52 55 89 101 80
32 28 17 12 12 18 28 32

46.0

68 91 83 51 50 53 88 95 81
32 27 18 11 13 18 29 32

46.8

56 92 91 48 41 46 92 90 76
32 28 17 11 12 19 28 31

51.04

60

61

642 ~~50.25~~ 0.53 50.51

62

54.73

63

1.20

57.09

55.89
1.20
57.09

+50

64

65

66

5.85 53.41 9.53 47.56

67

68

26' x 20' R/c BT.

20
+ 1845

69

70

48.3
 $\frac{26}{32} \frac{53}{26} \frac{50}{17} \frac{23}{13} 27 \frac{32}{11} \frac{67}{17} \frac{71}{29} \frac{53}{32}$

50.4
 $\frac{45}{31} \frac{22}{28} \frac{30}{17} \frac{06}{12} \frac{06}{12} \frac{14}{12} \frac{43}{18} \frac{44}{27} \frac{27}{32}$

51.8
 $\frac{38}{32} \frac{71}{28} \frac{71}{15} \frac{53}{12} 53 \frac{58}{14} \frac{82}{18} \frac{88}{28} \frac{71}{32}$

53.0
 $\frac{20}{32} \frac{60}{25} \frac{58}{16} \frac{40}{12} 41 \frac{47}{14} \frac{71}{19} \frac{75}{28} \frac{54}{32}$

53.3
 $\frac{14}{32} \frac{59}{25} \frac{59}{17} \frac{39}{13} 38 \frac{42}{13} \frac{65}{18} \frac{71}{28} \frac{50}{32}$

52.6
 $\frac{76}{32} \frac{86}{26} \frac{66}{16} \frac{46}{12} 45 \frac{50}{14} \frac{72}{18} \frac{78}{27} \frac{53}{32}$

49.8
 $\frac{52}{32} \frac{98}{28} \frac{90}{16} \frac{73}{12} 73 \frac{27}{12} \frac{109}{18} \frac{126}{29} \frac{111}{32}$

48.1
 $\frac{100}{32} \frac{133}{26} \frac{126}{17} \frac{90}{18} 90 \frac{94}{12} \frac{143}{20} \frac{148}{30} \frac{138}{32}$

47.7
 $\frac{80}{32} \frac{104}{27} \frac{100}{18} \frac{60}{12} 57 \frac{62}{12} \frac{107}{19} \frac{113}{28} \frac{95}{32}$

48.0
 $\frac{95}{32} \frac{110}{29} \frac{106}{20} \frac{54}{10} 54 \frac{55}{10} \frac{116}{20} \frac{117}{26} \frac{92}{31}$

48.0
 $\frac{116}{33} \frac{119}{11} \frac{55}{11} 54 \frac{55}{11} \frac{117}{11} \frac{121}{32}$

48.3
 $\frac{84}{59} \frac{94}{56} \frac{90}{40} \frac{97}{32} \frac{95}{19} \frac{58}{13} 51 \frac{90}{12} \frac{105}{20} \frac{113}{27} \frac{86}{31}$

48.3
 $\frac{73}{62} \frac{95}{60} \frac{95}{34} \frac{96}{32} \frac{93}{21} \frac{53}{14} 51 \frac{83}{11} \frac{98}{18} \frac{107}{27} \frac{83}{32}$

53.41

71

72

73

74

①

7.74

58.88

2.27

51.14

75

76

20' x 30" c c

77

+57

78

79

80

①

13.56

72.03

0.41

58.47

81

82

48.9
 $\frac{70}{62} \frac{81}{58} \frac{80}{50} \frac{84}{40} \frac{86}{28} \frac{88}{20} \frac{44}{13} \frac{45}{11} \frac{49}{11} \frac{91}{18} \frac{102}{27} \frac{75}{32}$

50.2
 $\frac{63}{62} \frac{69}{60} \frac{75}{58} \frac{74}{40} \frac{84}{28} \frac{76}{19} \frac{38}{12} \frac{37}{11} \frac{38}{11} \frac{81}{18} \frac{84}{27} \frac{50}{32}$

50.7
 $\frac{53}{62} \frac{66}{58} \frac{64}{50} \frac{66}{38} \frac{75}{29} \frac{71}{20} \frac{29}{12} \frac{27}{12} \frac{31}{12} \frac{69}{18} \frac{76}{27} \frac{38}{32}$

50.0
 $\frac{78}{62} \frac{52}{60} \frac{59}{56} \frac{57}{41} \frac{68}{30} \frac{57}{21} \frac{27}{14} \frac{24}{11} \frac{28}{11} \frac{58}{18} \frac{67}{27} \frac{30}{32}$

53.0
 $\frac{75}{62} \frac{104}{58} \frac{108}{50} \frac{105}{39} \frac{116}{20} \frac{105}{21} \frac{62}{14} \frac{59}{11} \frac{61}{11} \frac{106}{17} \frac{115}{23} \frac{116}{28} \frac{86}{32}$

53.4
 $\frac{89}{62} \frac{76}{60} \frac{96}{41} \frac{105}{29} \frac{100}{21} \frac{56}{14} \frac{55}{11} \frac{58}{11} \frac{98}{18} \frac{106}{28} \frac{71}{32}$

52.9
 $\frac{82}{62} \frac{89}{61} \frac{93}{42} \frac{100}{29} \frac{92}{20} \frac{52}{14} \frac{50}{9} \frac{53}{9} \frac{91}{18} \frac{92}{27} \frac{69}{32}$

52.4
 $\frac{73}{62} \frac{90}{62} \frac{86}{43} \frac{91}{31} \frac{86}{28} \frac{46}{14} \frac{45}{11} \frac{46}{11} \frac{80}{17} \frac{83}{24} \frac{70}{29} \frac{63}{32}$

55.0
 $\frac{67}{62} \frac{71}{62} \frac{23}{50} \frac{71}{42} \frac{77}{32} \frac{82}{21} \frac{44}{14} \frac{39}{14} \frac{40}{13} \frac{73}{18} \frac{22}{28} \frac{50}{32}$

56.3
 $\frac{41}{32} \frac{63}{27} \frac{62}{19} \frac{29}{14} \frac{46}{14} \frac{30}{12} \frac{54}{18} \frac{61}{27} \frac{35}{32}$

58.1
 $\frac{18}{32} \frac{44}{26} \frac{42}{18} \frac{12}{12} \frac{08}{12} \frac{08}{12} \frac{36}{16} \frac{41}{28} \frac{09}{32}$

59.8
 $\frac{142}{32} \frac{158}{30} \frac{155}{18} \frac{123}{13} \frac{12}{12} \frac{124}{12} \frac{149}{14} \frac{153}{27} \frac{121}{32}$

62.0
 $\frac{124}{32} \frac{148}{27} \frac{136}{18} \frac{105}{13} \frac{100}{10} \frac{104}{19} \frac{125}{18} \frac{131}{24} \frac{97}{32}$

72.03

83

84

85

86

① 10.80 82.11 0.92 71.31

87

88

89

90

18" x 30' CC £

91

92

① 6.03 87.09 1.05 81.06

93

94

63.9

$$\begin{array}{r} 103 \\ 32 \end{array} \quad \begin{array}{r} 134 \\ 27 \end{array} \quad \begin{array}{r} 114 \\ 18 \end{array} \quad \begin{array}{r} 83 \\ 12 \end{array} \quad \begin{array}{r} 81 \\ 12 \end{array} \quad \begin{array}{r} 81 \\ 12 \end{array} \quad \begin{array}{r} 106 \\ 18 \end{array} \quad \begin{array}{r} 105 \\ 27 \end{array} \quad \begin{array}{r} 71 \\ 32 \end{array}$$

66.0

$$\begin{array}{r} 82 \\ 32 \end{array} \quad \begin{array}{r} 103 \\ 27 \end{array} \quad \begin{array}{r} 97 \\ 18 \end{array} \quad \begin{array}{r} 61 \\ 11 \end{array} \quad \begin{array}{r} 60 \\ 12 \end{array} \quad \begin{array}{r} 61 \\ 12 \end{array} \quad \begin{array}{r} 94 \\ 17 \end{array} \quad \begin{array}{r} 85 \\ 27 \end{array} \quad \begin{array}{r} 54 \\ 32 \end{array}$$

68.2

$$\begin{array}{r} 62 \\ 32 \end{array} \quad \begin{array}{r} 83 \\ 18 \end{array} \quad \begin{array}{r} 79 \\ 19 \end{array} \quad \begin{array}{r} 43 \\ 13 \end{array} \quad \begin{array}{r} 38 \\ 11 \end{array} \quad \begin{array}{r} 42 \\ 11 \end{array} \quad \begin{array}{r} 65 \\ 16 \end{array} \quad \begin{array}{r} 65 \\ 26 \end{array} \quad \begin{array}{r} 36 \\ 32 \end{array}$$

70.7

$$\begin{array}{r} 40 \\ 32 \end{array} \quad \begin{array}{r} 60 \\ 27 \end{array} \quad \begin{array}{r} 52 \\ 18 \end{array} \quad \begin{array}{r} 16 \\ 12 \end{array} \quad \begin{array}{r} 13 \\ 11 \end{array} \quad \begin{array}{r} 14 \\ 11 \end{array} \quad \begin{array}{r} 24 \\ 17 \end{array} \quad \begin{array}{r} 46 \\ 27 \end{array} \quad \begin{array}{r} 13 \\ 32 \end{array}$$

72.7

$$\begin{array}{r} 113 \\ 32 \end{array} \quad \begin{array}{r} 142 \\ 28 \end{array} \quad \begin{array}{r} 133 \\ 17 \end{array} \quad \begin{array}{r} 95 \\ 12 \end{array} \quad \begin{array}{r} 94 \\ 13 \end{array} \quad \begin{array}{r} 94 \\ 13 \end{array} \quad \begin{array}{r} 118 \\ 17 \end{array} \quad \begin{array}{r} 122 \\ 27 \end{array} \quad \begin{array}{r} 81 \\ 32 \end{array}$$

74.9

$$\begin{array}{r} 92 \\ 32 \end{array} \quad \begin{array}{r} 117 \\ 27 \end{array} \quad \begin{array}{r} 111 \\ 19 \end{array} \quad \begin{array}{r} 77 \\ 12 \end{array} \quad \begin{array}{r} 72 \\ 14 \end{array} \quad \begin{array}{r} 75 \\ 15 \end{array} \quad \begin{array}{r} 97 \\ 15 \end{array} \quad \begin{array}{r} 93 \\ 26 \end{array} \quad \begin{array}{r} 57 \\ 32 \end{array}$$

75.9

$$\begin{array}{r} 87 \\ 32 \end{array} \quad \begin{array}{r} 110 \\ 27 \end{array} \quad \begin{array}{r} 102 \\ 20 \end{array} \quad \begin{array}{r} 68 \\ 13 \end{array} \quad \begin{array}{r} 62 \\ 12 \end{array} \quad \begin{array}{r} 63 \\ 12 \end{array} \quad \begin{array}{r} 89 \\ 17 \end{array} \quad \begin{array}{r} 88 \\ 27 \end{array} \quad \begin{array}{r} 59 \\ 32 \end{array}$$

77.0

$$\begin{array}{r} 112 \\ 30 \\ \text{ns} \end{array} \quad \begin{array}{r} 104 \\ 21 \end{array} \quad \begin{array}{r} 56 \\ 11 \end{array} \quad \begin{array}{r} 51 \\ 12 \end{array} \quad \begin{array}{r} 50 \\ 12 \end{array} \quad \begin{array}{r} 91 \\ 17 \end{array} \quad \begin{array}{r} 92 \\ 27 \end{array} \quad \begin{array}{r} 65 \\ 32 \end{array}$$

77.8

$$\begin{array}{r} 85 \\ 32 \end{array} \quad \begin{array}{r} 104 \\ 28 \end{array} \quad \begin{array}{r} 93 \\ 19 \end{array} \quad \begin{array}{r} 46 \\ 12 \end{array} \quad \begin{array}{r} 43 \\ 12 \end{array} \quad \begin{array}{r} 44 \\ 12 \end{array} \quad \begin{array}{r} 78 \\ 17 \end{array} \quad \begin{array}{r} 84 \\ 27 \end{array} \quad \begin{array}{r} 58 \\ 32 \end{array}$$

80.1

$$\begin{array}{r} 40 \\ 31 \end{array} \quad \begin{array}{r} 70 \\ 27 \end{array} \quad \begin{array}{r} 65 \\ 20 \end{array} \quad \begin{array}{r} 27 \\ 14 \end{array} \quad \begin{array}{r} 20 \\ 10 \end{array} \quad \begin{array}{r} 24 \\ 10 \end{array} \quad \begin{array}{r} 47 \\ 16 \end{array} \quad \begin{array}{r} 50 \\ 25 \end{array} \quad \begin{array}{r} 09 \\ 32 \end{array}$$

82.2

$$\begin{array}{r} 64 \\ 32 \end{array} \quad \begin{array}{r} 98 \\ 27 \end{array} \quad \begin{array}{r} 87 \\ 20 \end{array} \quad \begin{array}{r} 58 \\ 13 \end{array} \quad \begin{array}{r} 49 \\ 10 \end{array} \quad \begin{array}{r} 51 \\ 10 \end{array} \quad \begin{array}{r} 69 \\ 15 \end{array} \quad \begin{array}{r} 74 \\ 25 \end{array} \quad \begin{array}{r} 24 \\ 32 \end{array}$$

82.9

$$\begin{array}{r} 80 \\ 32 \end{array} \quad \begin{array}{r} 102 \\ 27 \end{array} \quad \begin{array}{r} 91 \\ 18 \end{array} \quad \begin{array}{r} 57 \\ 13 \end{array} \quad \begin{array}{r} 47 \\ 11 \end{array} \quad \begin{array}{r} 47 \\ 11 \end{array} \quad \begin{array}{r} 72 \\ 15 \end{array} \quad \begin{array}{r} 78 \\ 20 \end{array} \quad \begin{array}{r} 41 \\ 32 \end{array}$$

87.09

15" x 20' C.C.

95

96

97

98

99

100

① 7.09 82.47 6.71 80.38

101

102

103

+24

± 24" x 30' C.C.

104

12.65 92.51

#94

79.86

21.28

$$\begin{array}{ccccccc} & & & & 82.1 & & \\ 94 & 107 & 91 & 53 & 50 & 44 & 81 & 36 & 57 \\ 31 & 28 & 19 & 12 & & 10 & 16 & 27 & 32 \end{array}$$

$$\begin{array}{ccccccc} & & & & 82.2 & & \\ 75 & 95 & 86 & 52 & 49 & 50 & 69 & 68 & 48 \\ 31 & 27 & 18 & 13 & & 11 & 15 & 27 & 32 \end{array}$$

$$\begin{array}{ccccccc} & & & & 82.9 & & \\ 69 & 85 & 77 & 51 & 42 & 40 & & & 43 \\ 32 & 29 & 20 & 14 & & 13 & & & 32 \end{array}$$

$$\begin{array}{ccccccc} & & & & 82.6 & & \\ 21 & & & 53 & 45 & 45 & 63 & 68 & 42 \\ 32 & & & 12 & & 14 & 20 & 25 & 32 \end{array}$$

$$\begin{array}{ccccccc} & & & & 81.9 & & \\ 72 & 59 & & 52 & 55 & 77 & 81 & 24 & \\ 31 & 13 & & 11 & 14 & 27 & 31 & & \end{array}$$

$$\begin{array}{ccccccc} & & & & 80.7 & & \\ 73 & & & 67 & 64 & 68 & 89 & 92 & 51 \\ 32 & & & 12 & & 13 & 18 & 25 & 32 \end{array}$$

$$\begin{array}{ccccccc} & & & & 79.6 & & \\ 49 & 77 & 64 & 33 & 24 & 31 & 55 & 62 & 24 \\ 32 & 27 & 19 & 13 & & 11 & 16 & 25 & 31 \end{array}$$

$$\begin{array}{ccccccc} & & & & 78.3 & & \\ 101 & & 86 & 46 & 42 & 42 & 69 & 78 & 43 \\ 32 & & 19 & 12 & & 13 & 17 & 26 & 32 \end{array}$$

$$\begin{array}{ccccccc} & & & & 77.6 & & \\ 92 & 52 & & 49 & 50 & 77 & 88 & 51 & \\ 20 & 12 & & 12 & 12 & 17 & 17 & 32 & \end{array}$$

$$\begin{array}{ccccccc} & & & & 77.8 & & \\ 102 & 98 & 51 & 47 & 50 & 86 & 86 & 59 & \\ 24 & 15 & 11 & & 12 & 15 & 27 & 32 & \end{array}$$

$$\begin{array}{ccccccc} & & & & 75.2 & & \\ 88 & 46 & 43 & 44 & 73 & 75 & 84 & 53 & \\ 16 & 10 & & 14 & 19 & 22 & 26 & 32 & \end{array}$$

$$\begin{array}{ccccccc} & & & & 78.6 & & \\ 153 & 151 & & 129 & 137 & 140 & & & \\ 60 & 35 & & & 25 & 50 & & & \end{array}$$

92.51

105

$$\frac{153}{50} \quad \frac{151}{33} \quad 78.6 \quad \frac{137}{25} \quad \frac{140}{50}$$

+52

$$79.3 \quad \frac{172}{33} \quad \frac{181}{26} \quad \frac{186}{14} \quad \frac{141}{13} \quad \frac{134}{10} \quad 132 \quad \frac{135}{22} \quad \frac{127}{13} \quad \frac{179}{15} \quad \frac{179}{26} \quad \frac{138}{32}$$

106

$$79.8 \quad \frac{142}{31} \quad \frac{160}{25} \quad \frac{156}{14} \quad \frac{128}{10} \quad 127 \quad \frac{129}{13} \quad \frac{158}{18} \quad \frac{165}{30} \quad \frac{156}{32}$$

107

$$81.6 \quad \frac{94}{32} \quad \frac{138}{25} \quad \frac{135}{16} \quad \frac{111}{11} \quad 109 \quad \frac{110}{12} \quad \frac{141}{18} \quad \frac{136}{27} \quad \frac{118}{32}$$

108

$$83.7 \quad \frac{72}{32} \quad \frac{118}{26} \quad \frac{117}{17} \quad \frac{90}{11} \quad 88 \quad \frac{90}{12} \quad \frac{115}{16} \quad \frac{118}{27} \quad \frac{90}{32}$$

109

$$86.0 \quad \frac{61}{32} \quad \frac{78}{28} \quad \frac{96}{26} \quad \frac{72}{17} \quad \frac{67}{12} \quad 65 \quad \frac{69}{13} \quad \frac{91}{19} \quad \frac{95}{29} \quad \frac{78}{32}$$

110

$$88.9 \quad \frac{62}{31} \quad \frac{77}{30} \quad \frac{73}{21} \quad \frac{63}{17} \quad \frac{40}{11} \quad 36 \quad \frac{41}{12} \quad \frac{72}{18} \quad \frac{73}{29} \quad \frac{54}{32}$$

111

$$91.7 \quad \frac{37}{31} \quad \frac{52}{26} \quad \frac{39}{16} \quad \frac{12}{12} \quad 08 \quad \frac{09}{12} \quad \frac{38}{18} \quad \frac{42}{28} \quad \frac{16}{32}$$

⊖

12.11

104.21

0.41

92.10

112

$$94.6 \quad \frac{120}{30} \quad \frac{132}{28} \quad \frac{124}{19} \quad \frac{98}{12} \quad 96 \quad \frac{99}{12} \quad \frac{129}{18} \quad \frac{138}{26} \quad \frac{71}{32}$$

113

$$97.5 \quad \frac{84}{31} \quad \frac{101}{27} \quad \frac{99}{18} \quad \frac{70}{15} \quad 67 \quad \frac{71}{15} \quad \frac{98}{18} \quad \frac{105}{25} \quad \frac{54}{32}$$

114

$$101.5 \quad \frac{33}{32} \quad \frac{62}{26} \quad \frac{56}{14} \quad \frac{32}{13} \quad 27 \quad \frac{29}{13} \quad \frac{59}{18} \quad \frac{66}{26} \quad \frac{19}{32}$$

115

$$105.2 \quad \frac{110}{32} \quad \frac{148}{26} \quad \frac{137}{18} \quad \frac{117}{14} \quad 116 \quad \frac{118}{15} \quad \frac{144}{19} \quad \frac{153}{26} \quad \frac{106}{32}$$

⊖

13.13

116.80

0.54

103.67

116.80

116

117

118

119

⑤

7.96

124.30

0.46

116.34

120

121

122

123

124

8.43

124.58

116.15

125

126

127

08.7

79 32	119 28	116 20	83 14	81	80 13	107 17	113 25	66 32
----------	-----------	-----------	----------	----	----------	-----------	-----------	----------

11.1

95 32	111 27	101 18	63 12	57	60 14	83 16	90 27	48 33
----------	-----------	-----------	----------	----	----------	----------	----------	----------

12.5

25 31	92 28	82 19	46 12	43	42 13	20 18	28 25	33 32
----------	----------	----------	----------	----	----------	----------	----------	----------

14.9

83 32	58 27	55 18	21 12	19	23 14	48 18	55 26	16 32
----------	----------	----------	----------	----	----------	----------	----------	----------

117.8

26 32	99 27	96 19	67 13	65	67 12	101 18	108 26	65 32
----------	----------	----------	----------	----	----------	-----------	-----------	----------

120.6

49 32	77 26	21 17	41 11	38	41 14	21 18	28 27	42 32
----------	----------	----------	----------	----	----------	----------	----------	----------

21.2

44 32	60 29	56 18	32 12	31	33 12	63 14	67 27	41 32
----------	----------	----------	----------	----	----------	----------	----------	----------

20.0

51 32	78 26	78 19	64 14	44 11	43	46 12	26 19	54 32
----------	----------	----------	----------	----------	----	----------	----------	----------

18.3

21 32	88 28	91 19	85 16	61 11	63	65 12	95 18	29 32
----------	----------	----------	----------	----------	----	----------	----------	----------

16.9

29 32	101 27	101 18	77 12	77	29 12	110 19	119 28	102 32
----------	-----------	-----------	----------	----	----------	-----------	-----------	-----------

16.1

86 32	114 27	115 19	86 13	95	92 12	120 18	129 27	119 32
----------	-----------	-----------	----------	----	----------	-----------	-----------	-----------

15.6

87 32	116 27	114 18	90 12	90	94 11	124 19	136 27	128 32
----------	-----------	-----------	----------	----	----------	-----------	-----------	-----------

124.58

128

②

1.15

111.56

14.17

110.41

129

130

131

s

9.15

111.39102.24
9.15

132

②

0.28

97.47

14.20

97.19

133

134

135

136

137

138

121

s

87.69
9.76
97.45

NBM

N.

8.68

15.1
 $\frac{95}{32}$ $\frac{127}{27}$ $\frac{120}{19}$ $\frac{95}{13}$ $\frac{95}{12}$ $\frac{98}{12}$ $\frac{124}{78}$ $\frac{139}{27}$ $\frac{118}{32}$

111.6
 $\frac{101}{31}$ $\frac{24}{25}$ $\frac{21}{16}$ $\frac{03}{12}$ $\frac{00}{14}$ $\frac{06}{14}$ $\frac{32}{19}$ $\frac{43}{26}$ $\frac{06}{31}$

107.0
 $\frac{41}{32}$ $\frac{21}{26}$ $\frac{66}{16}$ $\frac{45}{12}$ $\frac{46}{13}$ $\frac{52}{13}$ $\frac{81}{19}$ $\frac{94}{26}$ $\frac{57}{31}$

103.2
 $\frac{77}{31}$ $\frac{113}{26}$ $\frac{105}{16}$ $\frac{89}{12}$ $\frac{84}{13}$ $\frac{90}{13}$ $\frac{118}{19}$ $\frac{128}{27}$ $\frac{100}{32}$

99.2
 $\frac{132}{32}$ $\frac{153}{28}$ $\frac{141}{18}$ $\frac{125}{13}$ $\frac{122}{13}$ $\frac{129}{23}$ $\frac{154}{19}$ $\frac{167}{26}$ $\frac{144}{32}$

96.4
 $\frac{21}{31}$ $\frac{46}{26}$ $\frac{36}{17}$ $\frac{10}{12}$ $\frac{11}{13}$ $\frac{13}{13}$ $\frac{40}{19}$ $\frac{48}{28}$ $\frac{29}{32}$

94.5
 $\frac{43}{31}$ $\frac{61}{27}$ $\frac{54}{17}$ $\frac{29}{12}$ $\frac{30}{12}$ $\frac{33}{12}$ $\frac{61}{19}$ $\frac{73}{27}$ $\frac{45}{31}$

92.8
 $\frac{68}{32}$ $\frac{86}{26}$ $\frac{26}{18}$ $\frac{88}{12}$ $\frac{47}{13}$ $\frac{44}{13}$ $\frac{28}{20}$ $\frac{82}{27}$ $\frac{58}{32}$

91.4
 $\frac{84}{32}$ $\frac{103}{28}$ $\frac{91}{19}$ $\frac{61}{12}$ $\frac{61}{14}$ $\frac{43}{14}$ $\frac{86}{18}$ $\frac{90}{27}$ $\frac{71}{32}$

90.1
 $\frac{86}{31}$ $\frac{113}{29}$ $\frac{109}{22}$ $\frac{77}{12}$ $\frac{74}{13}$ $\frac{25}{13}$ $\frac{92}{18}$ $\frac{100}{27}$ $\frac{82}{32}$

89.9
 $\frac{114}{30}$ $\frac{122}{25}$ $\frac{104}{19}$ $\frac{80}{13}$ $\frac{76}{10}$ $\frac{76}{13}$ $\frac{95}{13}$ $\frac{104}{19}$ $\frac{105}{28}$ $\frac{101}{31}$

89.8
 $\frac{125}{32}$ $\frac{131}{23}$ $\frac{122}{12}$ $\frac{83}{12}$ $\frac{87}{13}$ $\frac{77}{13}$ $\frac{843}{14}$ $\frac{813}{27}$ $\frac{875}{32}$

97.47

139

140

O

8.81

98.55

2.73

89.74

141

142

143

144

145

O

6.40

101.62

3.33

95.22

146

147

148

6.43

101.74

95.31

149

150

$$\begin{array}{r} 89.8 \\ 105 \quad 120 \quad 112 \quad 78 \quad 77 \quad 89 \quad 105 \quad 88 \\ 31 \quad 27 \quad 18 \quad 12 \quad 12 \quad 12 \quad 19 \quad 31 \\ \hline 27 \end{array}$$

90.3

$$\begin{array}{r} 91 \quad 113 \quad 108 \quad 74 \quad 72 \quad 73 \quad 98 \quad 100 \quad 65 \\ 32 \quad 27 \quad 17 \quad 12 \quad 12 \quad 12 \quad 17 \quad 26 \quad 32 \\ \hline \end{array}$$

91.7

$$\begin{array}{r} 87 \quad 111 \quad 103 \quad 73 \quad 69 \quad 69 \quad 93 \quad 95 \quad 54 \\ 31 \quad 27 \quad 19 \quad 12 \quad 12 \quad 13 \quad 18 \quad 26 \quad 31 \\ \hline \end{array}$$

92.6

$$\begin{array}{r} 92 \quad 108 \quad 99 \quad 63 \quad 60 \quad 60 \quad 87 \quad 90 \quad 57 \\ 31 \quad 28 \quad 19 \quad 12 \quad 13 \quad 13 \quad 18 \quad 27 \quad 32 \\ \hline \end{array}$$

92.9

$$\begin{array}{r} 107 \quad 114 \quad 101 \quad 62 \quad 57 \quad 58 \quad 85 \quad 87 \quad 58 \\ 31 \quad 28 \quad 21 \quad 12 \quad 12 \quad 13 \quad 18 \quad 28 \quad 32 \\ \hline \end{array}$$

93.0

$$\begin{array}{r} 68 \quad 92 \quad 79 \quad 44 \quad 46 \quad 49 \quad 77 \quad 80 \quad 52 \\ 31 \quad 26 \quad 19 \quad 13 \quad 12 \quad 12 \quad 17 \quad 26 \quad 32 \\ \hline \end{array}$$

96.0

$$\begin{array}{r} 41 \quad 67 \quad 50 \quad 26 \quad 26 \quad 29 \quad 29 \quad 51 \quad 118 \\ 31 \quad 26 \quad 17 \quad 13 \quad 13 \quad 13 \quad 18 \quad 26 \quad 31 \\ \hline \end{array}$$

98.0

$$\begin{array}{r} 64 \quad 84 \quad 69 \quad 38 \quad 36 \quad 35 \quad 54 \quad 57 \quad 20 \\ 32 \quad 27 \quad 17 \quad 13 \quad 13 \quad 13 \quad 19 \quad 26 \quad 32 \\ \hline \end{array}$$

98.4

$$\begin{array}{r} 54 \quad 75 \quad 61 \quad 29 \quad 27 \quad 28 \quad 51 \quad 53 \quad 17 \\ 32 \quad 27 \quad 18 \quad 12 \quad 12 \quad 12 \quad 18 \quad 26 \quad 32 \\ \hline \end{array}$$

98.5

$$\begin{array}{r} 67 \quad 84 \quad 82 \quad 34 \quad 31 \quad 35 \quad 60 \quad 61 \quad 28 \\ 32 \quad 27 \quad 24 \quad 13 \quad 12 \quad 12 \quad 18 \quad 27 \quad 32 \\ \hline \end{array}$$

97.6

$$\begin{array}{r} 73 \quad 90 \quad 78 \quad 41 \quad 41 \quad 44 \quad 67 \quad 68 \quad 36 \\ 32 \quad 27 \quad 19 \quad 13 \quad 13 \quad 13 \quad 18 \quad 27 \quad 32 \\ \hline \end{array}$$

96.8

$$\begin{array}{r} 67 \quad 93 \quad 82 \quad 58 \quad 49 \quad 50 \quad 75 \quad 78 \quad 15 \\ 32 \quad 27 \quad 19 \quad 13 \quad 12 \quad 12 \quad 18 \quad 27 \quad 32 \\ \hline \end{array}$$

101.74

151

152

0 0.12 87.16 14.70 87.04

153

154

Ent. 12" x 18" C.C.

155

156

157

+95.5

74.73
1220

99.4

$\frac{85}{32}$	$\frac{113}{28}$	$\frac{105}{19}$	$\frac{76}{13}$	$\frac{73}{12}$	$\frac{76}{12}$	$\frac{78}{17}$	$\frac{99}{26}$	$\frac{72}{31}$
-----------------	------------------	------------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------

90.9

$\frac{120}{32}$	$\frac{147}{27}$	$\frac{138}{18}$	$\frac{112}{13}$	$\frac{108}{11}$	$\frac{107}{11}$	$\frac{138}{17}$	$\frac{139}{26}$	$\frac{110}{31}$
------------------	------------------	------------------	------------------	------------------	------------------	------------------	------------------	------------------

87.2

$\frac{07}{32}$	$\frac{36}{27}$	$\frac{27}{18}$	$\frac{102}{12}$	$\frac{104}{12}$	$\frac{99}{12}$	$\frac{27}{17}$	$\frac{26}{25}$	$\frac{118}{31}$
-----------------	-----------------	-----------------	------------------	------------------	-----------------	-----------------	-----------------	------------------

89.3

$\frac{38}{32}$	$\frac{64}{28}$	$\frac{57}{20}$	$\frac{28}{14}$	$\frac{29}{14}$	$\frac{32}{12}$	$\frac{62}{17}$	$\frac{62}{26}$	$\frac{32}{31}$
-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------

81.4

$\frac{24}{32}$	$\frac{47}{29}$	$\frac{87}{18}$	$\frac{56}{12}$	$\frac{56}{12}$	$\frac{56}{12}$	$\frac{88}{17}$	$\frac{90}{27}$	$\frac{56}{31}$
-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------	-----------------

79.4

$\frac{100}{32}$	$\frac{122}{29}$	$\frac{109}{20}$	$\frac{80}{14}$	$\frac{78}{14}$	$\frac{80}{11}$	$\frac{111}{17}$	$\frac{111}{26}$	$\frac{78}{31}$
------------------	------------------	------------------	-----------------	-----------------	-----------------	------------------	------------------	-----------------

77.5

$\frac{115}{32}$	$\frac{143}{27}$	$\frac{128}{18}$	$\frac{99}{14}$	$\frac{97}{14}$	$\frac{102}{12}$	$\frac{131}{18}$	$\frac{134}{27}$	$\frac{101}{31}$
------------------	------------------	------------------	-----------------	-----------------	------------------	------------------	------------------	------------------

74.7

$\frac{145}{40}$	$\frac{132}{15}$	$\frac{125}{15}$	$\frac{126}{20}$	$\frac{125}{50}$
------------------	------------------	------------------	------------------	------------------

PRELIM X-SEC. THEN SEC. II BLACKAWK TWP

13.33 940.06

926.73

spike in 2nd Cotton. SE Cor. Inter

0+0 N end of Mile

$\frac{142}{33}$

$\frac{23.7}{164}$

$\frac{16.2}{33}$

1

$\frac{121}{33}$ $\frac{122}{27}$ $\frac{143}{21}$ $\frac{148}{15}$ $\frac{132}{12}$ $\frac{27.2}{129}$ $\frac{132}{10}$ $\frac{150}{16}$ $\frac{134}{18}$ $\frac{121}{27}$ $\frac{118}{33}$

2

$\frac{65}{33}$ $\frac{69}{27}$ $\frac{103}{21}$ $\frac{109}{15}$ $\frac{96}{12}$ $\frac{31.3}{89}$ $\frac{91}{11}$ $\frac{107}{16}$ $\frac{84}{17}$ $\frac{75}{21}$ $\frac{62}{30}$ $\frac{62}{33}$

3

⊖ 6.30 943.61 2.75 937.31 ✓

$\frac{15}{33}$ $\frac{17}{27}$ $\frac{51}{20}$ $\frac{56}{15}$ $\frac{41}{12}$ $\frac{36.7}{34}$ $\frac{38}{10}$ $\frac{47}{15}$ $\frac{18}{20}$ $\frac{27}{29}$ $\frac{29}{33}$

+75

$\frac{27}{33}$ $\frac{34}{21}$ $\frac{60}{17}$ $\frac{43}{12}$ $\frac{38}{15}$ $\frac{42}{12}$ $\frac{51}{18}$ $\frac{27}{21}$ $\frac{22}{26}$ $\frac{23}{33}$

4

$\frac{28}{33}$ $\frac{39}{23}$ $\frac{57}{21}$ $\frac{70}{17}$ $\frac{58}{11}$ $\frac{38.8}{48}$ $\frac{52}{12}$ $\frac{63}{16}$ $\frac{30}{25}$ $\frac{28}{33}$

5

⊖ 0.19 929.66 14.14 929.47 ✓

$\frac{23}{33}$ $\frac{82}{25}$ $\frac{121}{21}$ $\frac{136}{15}$ $\frac{118}{10}$ $\frac{32.2}{114}$ $\frac{123}{13}$ $\frac{133}{15}$ $\frac{121}{19}$ $\frac{125}{20}$ $\frac{94}{27}$ $\frac{91}{33}$

6

$\frac{26}{33}$ $\frac{14}{26}$ $\frac{14}{17}$ $\frac{45}{14}$ $\frac{33}{9}$ $\frac{26.8}{29}$ $\frac{35}{14}$ $\frac{42}{15}$ $\frac{49}{24}$ $\frac{25}{27}$ $\frac{19}{33}$

7

$\frac{61}{33}$ $\frac{70}{25}$ $\frac{73}{16}$ $\frac{95}{14}$ $\frac{8}{9}$ $\frac{21.8}{79}$ $\frac{95}{15}$ $\frac{95}{18}$ $\frac{86}{21}$ $\frac{83}{29}$ $\frac{25}{33}$

8

⊖ 0.75 916.29 14.12 915.54 ✓

$\frac{104}{21}$ $\frac{112}{28}$ $\frac{117}{16}$ $\frac{125}{14}$ $\frac{127}{10}$ $\frac{17.4}{123}$ $\frac{127}{15}$ $\frac{142}{18}$ $\frac{134}{20}$ $\frac{124}{24}$ $\frac{124}{33}$

916.29

9

$$\frac{16}{33} \frac{14}{27} \frac{22}{22} \frac{23}{16} \frac{45}{11} \frac{29}{8} 25 \frac{31}{15} \frac{48}{18} \frac{47}{21} \frac{33}{26} \frac{30}{33} \quad \checkmark$$

10

$$\frac{61}{33} \frac{65}{16} \frac{80}{11} \frac{61}{8} 59 \frac{63}{15} \frac{76}{17} \frac{80}{22} \frac{62}{24} \frac{57}{33} \quad \checkmark$$

11

$$\frac{87}{33} \frac{94}{17} \frac{110}{15} \frac{109}{11} \frac{91}{8} 88 \frac{92}{15} \frac{107}{17} \frac{112}{22} \frac{88}{25} \frac{83}{33} \quad \checkmark$$

12

817.

12.05 904.24

$$\frac{118}{31} \frac{112}{30} \frac{116}{19} \frac{129}{14} \frac{136}{11} \frac{119}{8} 116 \frac{119}{15} \frac{134}{18} \frac{136}{22} \frac{116}{24} \frac{110}{29} \frac{109}{30-33} \quad \checkmark$$

⊙

2.85 906.25 12.89 903.40

spike in tree Left Sta.

13

$$\frac{27}{33} \frac{30}{24} \frac{44}{16} \frac{61}{14} \frac{59}{11} \frac{43}{9} 41 \frac{45}{14} \frac{65}{18} \frac{44}{21} \frac{45}{33} \quad \checkmark$$

14

$$\frac{58}{33} \frac{58}{26} \frac{67}{17} \frac{90}{15} \frac{88}{12} \frac{72}{9} 67 \frac{69}{14} \frac{92}{16} \frac{80}{20} \frac{63}{25} \frac{58}{33} \quad \checkmark$$

15

$$\frac{83}{33} \frac{82}{22} \frac{90}{15} \frac{110}{11} \frac{94}{9} 90 \frac{94}{13} \frac{112}{16} \frac{92}{20} \frac{85}{28} \frac{85}{33} \quad \checkmark$$

16

$$\frac{109}{25} \frac{102}{19} \frac{114}{14} \frac{123}{13} \frac{123}{10} \frac{114}{8} 111 \frac{117}{15} \frac{131}{17} \frac{134}{20} \frac{116}{21} \frac{108}{28} \frac{108}{33} \quad \checkmark$$

17

⊙

1.10 893.19 14.16 892.09

$$\frac{130}{16} \frac{141}{13} \frac{141}{10} \frac{128}{8} 127 \frac{132}{14} \frac{150}{16} \frac{121}{19} \frac{131}{21} \frac{130}{33} \quad \checkmark$$

18

$$\frac{16}{33} \frac{11}{24} \frac{15}{16} \frac{35}{14} \frac{33}{11} \frac{16}{9} 11 \frac{14}{12} \frac{27}{15} \frac{26}{16} \frac{14}{20} \frac{14}{33} \quad \checkmark$$

19

$$\frac{33}{33} \frac{27}{26} \frac{34}{22} \frac{30}{15} \frac{49}{11} \frac{32}{9} 25 \frac{28}{13} \frac{41}{15} \frac{43}{19} \frac{32}{21} \frac{31}{33} \quad \checkmark$$

893.19

20

89.2
 $\frac{56}{33} \frac{51}{28} \frac{47}{22} \frac{49}{16} \frac{61}{11} \frac{45}{8} 40 \frac{45}{14} \frac{66}{16} \frac{67}{19} \frac{50}{22} \frac{37}{30} \frac{37}{33}$ ✓

21

87.3
 $\frac{67}{33} \frac{60}{29} \frac{65}{15} \frac{83}{14} \frac{82}{11} \frac{63}{8} 59 \frac{64}{12} \frac{83}{14} \frac{85}{18} \frac{72}{19} \frac{51}{29} \frac{49}{33}$ ✓

22

~~23~~

85.8
 $\frac{86}{33} \frac{79}{29} \frac{84}{15} \frac{96}{13} \frac{95}{10} \frac{79}{8} 74 \frac{78}{12} \frac{94}{14} \frac{84}{18} \frac{85}{22} \frac{69}{28} \frac{67}{33}$ ✓

23

~~24~~

84.4
 $\frac{97}{33} \frac{91}{26} \frac{93}{15} \frac{107}{14} \frac{106}{11} \frac{92}{8} 89 \frac{91}{11} \frac{108}{13} \frac{98}{18} \frac{97}{22} \frac{86}{29} \frac{84}{33}$ ✓

⊙

2.07

886.49

8.77

884.42 ✓

24

~~25~~

83.1
 $\frac{46}{33} \frac{40}{18} \frac{36}{15} \frac{48}{14} \frac{47}{10} \frac{36}{8} 34 \frac{38}{11} \frac{49}{13} \frac{36}{17} \frac{39}{29} \frac{34}{33}$ ✓

25

~~26~~

82.4
 $\frac{57}{33} \frac{46}{15} \frac{54}{10} \frac{42}{8} 41 \frac{48}{11} \frac{52}{13} \frac{52}{16} \frac{45}{17} \frac{44}{33}$ ✓

26

~~27~~

BM. spike E. of Line 5.60

880.89

81.8
 $\frac{62}{33} \frac{56}{30} \frac{53}{15} \frac{60}{14} \frac{59}{10} \frac{51}{9} 47 \frac{51}{11} \frac{61}{13} \frac{60}{16} \frac{54}{17} \frac{53}{26} \frac{55}{33}$ ✓

27

~~28~~

81.5
 $\frac{63}{33} \frac{59}{29} \frac{60}{20} \frac{72}{12} \frac{52}{9} 50 \frac{54}{12} \frac{72}{14} \frac{70}{20} \frac{61}{27} \frac{58}{33}$ ✓

28

~~29~~

80.8
 $\frac{63}{33} \frac{60}{29} \frac{74}{22} \frac{70}{16} \frac{78}{11} \frac{64}{9} 57 \frac{65}{12} \frac{82}{15} \frac{78}{18} \frac{68}{24} \frac{64}{33}$ ✓

29

~~30~~

79.5
 $\frac{64}{33} \frac{63}{19} \frac{78}{24} \frac{83}{16} \frac{91}{11} \frac{71}{9} 70 \frac{74}{13} \frac{89}{15} \frac{87}{23} \frac{73}{25} \frac{61}{33}$ ✓

30

~~31~~

78.6
 $\frac{91}{33} \frac{89}{15} \frac{99}{11} \frac{82}{9} 79 \frac{82}{13} \frac{92}{15} \frac{92}{26} \frac{80}{33}$ ✓

BM. ⊙

2.26

890.29

6.16

880.33

on end NE Wing

890.29

+70 End Wing

31
~~32~~ +04 " "32
~~33~~33
~~34~~34
~~35~~35
~~36~~⊖ 12.07 902.23 0.13 890.1636
~~37~~37
~~38~~⊖ 9.93 910.35 1.81 900.4238
~~39~~

+80

39
~~40~~

B.M.

1.02 909.33

79.7
 $\frac{138}{33} \frac{136}{23} \frac{147}{18} \frac{129}{13} \frac{111}{9} 106 \frac{111}{14} \frac{136}{18} \frac{144}{25} \frac{129}{27} \frac{124}{33}$

80.1
 $\frac{137}{33} \frac{131}{25} \frac{137}{21} \frac{131}{14} \frac{106}{10} 102 \frac{107}{12} \frac{167}{19} \frac{160}{27} \frac{136}{33}$

80.5
 $\frac{108}{33} \frac{112}{24} \frac{118}{21} \frac{117}{14} \frac{100}{11} 98 \frac{104}{12} \frac{119}{14} \frac{116}{25} \frac{103}{33}$

82.0
 $\frac{100}{33} \frac{98}{25} \frac{103}{18} \frac{101}{13} \frac{87}{11} 83 \frac{89}{11} \frac{105}{14} \frac{101}{19} \frac{95}{29} \frac{88}{33}$

84.5
 $33 - \frac{72}{29} \frac{71}{19} \frac{75}{18} \frac{73}{13} \frac{61}{10} 58 \frac{62}{11} \frac{82}{14} \frac{71}{17} \frac{66}{28} \frac{66}{33}$

87.6
 $33 - \frac{27}{38} \frac{32}{25} \frac{45}{20} \frac{47}{13} \frac{27}{10} 27 \frac{30}{10} \frac{47}{13} \frac{23}{12} \frac{14}{33}$

91.7
 $\frac{92}{30} \frac{98}{24} \frac{119}{22} \frac{124}{15} \frac{111}{12} 105 \frac{110}{10} \frac{124}{11} \frac{92}{19} \frac{83}{24} \frac{74}{33}$

97.0
 $\frac{41}{33} \frac{46}{25} \frac{62}{20} \frac{70}{18} \frac{70}{14} \frac{56}{12} 52 \frac{51}{11} \frac{68}{13} \frac{32}{19} \frac{25}{27} \frac{17}{33}$

21.8
 $\frac{66}{31} \frac{76}{25} \frac{92}{23} \frac{99}{25} \frac{82}{13} 76 \frac{78}{10} \frac{90}{12} \frac{54}{19} \frac{47}{27} \frac{42}{33}$

6.8
 $\frac{41}{33} \frac{45}{27} \frac{52}{20} \frac{57}{18} \frac{57}{15} \frac{41}{12} 36 \frac{38}{9} \frac{47}{14} \frac{22}{18} \frac{13}{33}$

6.7
 $\frac{41}{33} \frac{44}{19} \frac{52}{21} \frac{56}{19} \frac{57}{15} \frac{41}{12} 37 \frac{38}{13} \frac{33}{33}$

spike in Maple Left Sta. 39 + 85

910.35

40
#

41
#

42
#

43
#

44
#

⊖ 8.78 909.39 9.74 900.61 ✓

45
#

46
#

47
#

48
#

49
#

3.6
 $\frac{82}{33} \frac{80}{26} \frac{84}{18} \frac{89}{16} \frac{89}{13} \frac{72}{10} 68 \frac{69}{9} \frac{83}{11} \frac{63}{18} \frac{58}{12} \frac{45}{33}$

1.5
 $\frac{109}{33} \frac{105}{30} \frac{104}{18} \frac{113}{13} \frac{93}{11} 89 \frac{92}{8} \frac{106}{11} \frac{107}{15} \frac{91}{17} \frac{78}{15} \frac{71}{33}$

0.2
 $\frac{130}{33} \frac{125}{28} \frac{118}{18} \frac{125}{13} \frac{105}{10} 102 \frac{103}{9} \frac{117}{11} \frac{107}{16} \frac{86}{33}$

99.8
 $\frac{135}{33} \frac{127}{30} \frac{124}{18} \frac{130}{16} \frac{131}{13} \frac{113}{11} 106 \frac{108}{9} \frac{121}{12} \frac{120}{15} \frac{111}{16} \frac{88}{33}$

99.6
 $\frac{135}{33} \frac{128}{30} \frac{123}{18} \frac{126}{13} \frac{111}{10} 108 \frac{110}{10} \frac{125}{12} \frac{101}{18} \frac{93}{28} \frac{83}{33}$

0.6
 $\frac{105}{33} \frac{95}{31} \frac{114}{22} \frac{113}{14} \frac{94}{11} 88 \frac{91}{9} \frac{110}{12} \frac{88}{17} \frac{54}{26} \frac{41}{33}$

98.9
 $\frac{123}{33} \frac{122}{19} \frac{127}{13} \frac{111}{10} 105 \frac{108}{9} \frac{120}{11} \frac{100}{17} \frac{83}{33}$

98.7
 $\frac{50}{18} \frac{138}{26} \frac{128}{20} \frac{140}{17} \frac{133}{13} \frac{116}{10} 107 \frac{110}{9} \frac{128}{11} \frac{106}{16} \frac{94}{33}$

0.3
 $\frac{122}{33} \frac{116}{30} \frac{114}{14} \frac{97}{11} 91 \frac{97}{9} \frac{104}{11} \frac{100}{17} \frac{97}{28} \frac{93}{33}$

3.1
 $\frac{63}{30} \frac{75}{25} \frac{98}{18} \frac{62}{17} \frac{82}{14} \frac{66}{11} 63 \frac{69}{10} \frac{82}{12} \frac{23}{18} \frac{24}{28} \frac{67}{33}$

50
~~51~~

909.39

⊖ 14.74 923.64 0.49 909.90 ✓

51
~~52~~

52
~~53~~

B.M.

3.21 920.43 ✓

9.1	9.3	4.6	6.6	06.9	6.1	4.7	4.6	7.9	7.8
<u>00</u>	<u>11</u>	<u>28</u>	<u>28</u>	<u>25</u>	<u>30</u>	<u>47</u>	<u>48</u>	<u>20</u>	<u>16</u>
<u>30</u>	<u>22</u>	<u>15</u>	<u>12</u>		<u>10</u>	<u>11</u>	<u>14</u>	<u>18</u>	<u>33</u>
<u>33</u>		<u>18</u>							

					11.5				
<u>85</u>	<u>97</u>	<u>112</u>	<u>140</u>	<u>129</u>	<u>121</u>	<u>123</u>	<u>135</u>	<u>105</u>	<u>97</u>
<u>33</u>	<u>24</u>	<u>20</u>	<u>19</u>	<u>12</u>		<u>9</u>	<u>11</u>	<u>18</u>	<u>33</u>
			<u>17</u>				<u>15</u>		

					16.5				
<u>52</u>	<u>50</u>	<u>65</u>	<u>90</u>	<u>78</u>	<u>71</u>	<u>73</u>	<u>92</u>	<u>44</u>	<u>42</u>
<u>33</u>	<u>14</u>	<u>20</u>	<u>14</u>	<u>13</u>		<u>10</u>	<u>13</u>	<u>21</u>	<u>29</u>
			<u>16</u>				<u>15</u>		<u>33</u>

spike in T.P. NE Cor. Inter.

Final X-Sections Through Sec. 11 Blackhawk Twp.

11/2/31 58
K.L.K.
F.C.S.
E.W.
D.S.B.

Sta. B.S. H.I. F.S. Elev.
B.M. 11.84 938.57 926.73

Dike in 2nd Cotton-wood S.E. Cor. Intersection

0
+20 = 15" X 20' C.P.
+33 = Ditches begin R. of Lt.

14.6
33 23.9
14.7
0 14.6 ✓
33

1

10.4 14.1 14.1 10.9 10.7 10.8 13.7 13.6 10.5
32 27 16 14 0 11 16 24 29 ✓

2

5.1 10.2 9.7 6.6 6.3 6.5 8.9 8.6 9.9
30 23 17 13 0 12 16 25 30 ✓

3

0.0 4.7 4.4 1.7 0.7 1.3 3.3 3.1 N.S.
31 25 18 13 0 12 15 24 30 ✓

0 3.21 941.00 0.78 937.79

3+75

0.3 3.7 3.4 1.9 1.5 6.0 2.6 2.6 N.S.
32 26 16 13 0 11 15 27 32 ✓

4

0.2 4.3 4.6 2.7 2.4 2.5 3.9 3.9 2.8 0.2
32 27 18 13 0 11 15 21 28 32 ✓

5

5.2 10.2 10.0 7.8 7.4 7.5 10.7 11.2 11.2 6.8
31 27 16 12 0 13 17 23 28 32 ✓

0 -0.39 928.04 12.57 928.43

6

N.S. 2.9 2.2 0.0 0.0 0.3 3.3 3.9 3.9 0.3
32 27 17 12 0 13 17 22 27 32 ✓

7

4.2 8.3 7.4 4.5 4.2 4.8 8.0 8.7 8.5 6.0
31 26 16 11 0 12 17 23 27 32 ✓

8

9.1 13.1 12.2 9.2 8.8 9.1 12.3 13.5 14.0 10.7
30 25 17 12 0 12 16 22 28 32 ✓

0 0.28 915.49 12.83 915.21

Sta. B.S. H.I. F.S. Elev.

915.49

9

^{15.3}
0.8 4.2 4.5 2.9 0.7 0.2 0.5 3.6 4.4 4.5 2.3 ✓
31 27 22 16 13 0 13 17 23 28 32

10

^{11.8}
5.2 7.9 7.9 6.5 4.2 3.7 4.0 6.7 7.5 7.6 4.9 ✓
31 28 22 16 12 0 14 17 22 28 32

11

^{6.9}
7.9 10.8 10.7 9.9 7.0 6.6 7.5 9.9 10.8 11.0 7.6 ✓
32 27 22 16 12 0 14 17 23 28 31

12

^{6.2}
11.0 13.7 13.5 12.5 9.9 9.3 10.1 12.3 13.3 13.1 9.9 ✓
31 27 22 16 11 0 14 18 23 28 32

13

B.M. 1132 915.56 1132 904.17 909.2 ^{3.7} 12.5 15.3 15.1 14.4 12.2 11.8 12.6 14.9 15.7 16.0 12.2 ✓
31 27 20 19 10 0 14 18 23 27 32
O -0.38 900.71 ✓ 14.47 901.09 *pike in tree left*

14

^{0.8}
0.3 3.2 3.2 2.6 0.3 10.1 0.3 2.6 3.3 3.7 0.3 ✓
30 25 19 14 10 0 14 19 22 28 32

15

^{98.6}
2.8 5.3 5.4 4.7 2.3 2.1 2.7 5.1 5.9 5.9 3.1 ✓
31 27 21 16 11 0 14 18 23 28 32

16

^{96.5}
11.5 7.7 7.6 6.7 4.7 4.2 4.6 6.7 7.7 8.0 5.4 ✓
31 26 24 15 10 0 13 17 21 27 32

17

^{94.9}
7.3 9.3 9.3 8.8 6.5 5.8 6.5 9.4 10.0 9.7 7.4 ✓
31 27 22 17 12 0 12 17 22 27 32

18

^{93.1}
9.4 11.6 11.2 10.6 8.4 7.6 8.1 11.0 11.0 9.4 ✓
32 27 22 17 12 0 13 17 26 31

Sta. B.S. H.L. F.S. Elev.

900.71

19

91.5
 $\frac{11.2}{32} \frac{13.2}{28} \frac{12.7}{22} \frac{11.1}{16} \frac{9.5}{11} \frac{9.2}{8} \frac{8.3}{12} \frac{12.6}{17} \frac{12.6}{26} \frac{10.8}{30}$

20

89.6
 $\frac{12.1}{32} \frac{14.7}{28} \frac{14.3}{22} \frac{13.0}{16} \frac{11.4}{12} \frac{11.1}{8} \frac{11.0}{12} \frac{14.2}{17} \frac{14.0}{24} \frac{11.6}{30}$

○

2.31 889.27 13.75 886.96

21

88.1
 $\frac{2.8}{32} \frac{4.6}{27} \frac{4.5}{22} \frac{4.0}{16} \frac{1.6}{13} \frac{1.2}{8} \frac{1.7}{12} \frac{3.9}{17} \frac{4.9}{24} \frac{5.0}{26} \frac{1.1}{30}$

22

88.8
 $\frac{4.7}{32} \frac{6.3}{27} \frac{6.3}{23} \frac{5.6}{17} \frac{2.9}{12} \frac{2.5}{8} \frac{2.7}{13} \frac{6.2}{17} \frac{6.3}{26} \frac{2.9}{30}$

23

85.3
 $\frac{6.0}{31} \frac{7.6}{28} \frac{7.5}{23} \frac{6.8}{19} \frac{4.3}{12} \frac{4.0}{8} \frac{4.3}{12} \frac{7.6}{17} \frac{7.8}{26} \frac{4.9}{30}$

24

84.1
 $\frac{7.2}{32} \frac{9.0}{27} \frac{8.6}{19} \frac{6.0}{14} \frac{5.2}{8} \frac{5.7}{13} \frac{8.4}{17} \frac{8.7}{26} \frac{6.3}{30}$

25

83.4
 $\frac{8.6}{32} \frac{9.7}{29} \frac{9.3}{19} \frac{6.2}{14} \frac{5.9}{8} \frac{6.3}{13} \frac{9.3}{18} \frac{9.8}{22} \frac{9.6}{26} \frac{7.6}{31}$

26 18"x20' C.P. Lt.

83.0
 $\frac{9.1}{32} \frac{10.7}{30} \frac{10.7}{24} \frac{9.4}{16} \frac{6.4}{13} \frac{6.3}{8} \frac{6.7}{12} \frac{9.9}{16} \frac{10.2}{27} \frac{8.4}{31}$

B.M.

8.43 889.32 8.43 880.84

880.0 like in brace-post 1/4 line fence E

27

82.4
 $\frac{8.8}{32} \frac{11.4}{26} \frac{11.1}{16} \frac{7.8}{12} \frac{6.9}{8} \frac{7.3}{12} \frac{10.1}{17} \frac{11.1}{26} \frac{11.0}{28} \frac{8.8}{31}$

28

81.9
 $\frac{8.6}{31} \frac{12.2}{27} \frac{12.1}{24} \frac{11.1}{18} \frac{7.9}{13} \frac{7.5}{8} \frac{7.9}{13} \frac{11.4}{17} \frac{12.2}{22} \frac{12.1}{27} \frac{9.2}{32}$

○

6.79 887.32 8.79 880.53

Sta. B.S. H.I. F.S. Elev.

887.32

29

30

B.M. 7.15 887.48 7.15 880.17 880.3

30+70 N. end wings

31+04 S. end wings.

32+00

33+00

18" x 20' C.C.

34+00

⊙ 13.34 898.64 2.18 885.30

35+00

36

37

⊙ 11.21 909.34 0.57 898.13

38

80.9
7.2 11.1 11.2 10.3 7.0 6.4 6.5 10.5 10.9 7.2
30 26 22 16 11 0 12 18 27 32 ✓

80.1
9.6 11.5 11.8 10.8 7.6 7.2 7.9 10.9 11.7 12.1 9.1
30 26 22 16 10 0 12 17 23 28 32 ✓

80.4
10.8 12.6 12.7 12.4 7.2 7.1 7.3 12.5 13.1 12.6 9.7
29 24 22 16 9 0 11 17 24 28 32 ✓

80.4
10.7 12.4 11.9 7.0 7.1 7.1 13.7 13.4 10.6
29 27 15 10 0 12 21 29 32 ✓

81.9
7.8 10.2 9.1 6.0 5.6 5.8 9.1 10.3 10.4 7.5
32 28 17 13 11 16 21 27 31 ✓

83.3
6.8 8.1 8.4 7.6 4.5 4.2 4.5 7.9 8.9 8.9 5.9
29 25 21 16 11 13 18 24 29 32 ✓

86.2
4.3 5.5 5.3 4.5 1.8 1.3 2.0 5.0 5.9 6.1 3.0
29 16 22 16 12 13 18 23 28 32 ✓

89.3
11.4 14.0 14.0 12.7 9.8 9.3 9.9 12.8 13.5 13.6 9.9
30 25 21 16 11 0 13 18 23 27 32 ✓

93.3
5.7 9.3 9.3 8.6 5.3 5.3 5.7 8.2 8.5 3.8
28 24 21 16 11 0 13 18 27 32 ✓

98.8
0.4 4.2 4.1 3.4 0.5 10.2 10.2 2.2 2.6 2.2 11.5
28 24 21 16 12 0 17 17 24 27 32 ✓

103.1
5.6 9.7 9.1 6.7 6.2 6.2 7.2 1.7 2.1 3.2
31 26 18 17 0 15 18 23 27 31 ✓

Sta.	B.S.	I.I.	F.S.	Elev.	
		<u>909.34</u>			
38+80					^{06.1} $\begin{array}{r} 2.9 \ 6.1 \ 6.0 \ 5.0 \ 3.0 \ 2.6 \ 2.3 \ 8.1 \ 4.2 \ 0.7 \\ 31 \ 23 \ 22 \ 17 \ 13 \ 0 \ 14 \ 19 \ 28 \ 31 \end{array}$
B.M.	-0.08	909.25	0.08	909.26	<u>909.34</u>
39					^{4.5} $\begin{array}{r} 2.9 \ 5.8 \ 5.9 \ 5.0 \ 3.2 \ 2.8 \ 2.5 \ 5.2 \ 5.4 \ 1.1 \\ 3.0 \ 24 \ 21 \ 16 \ 11 \ 0 \ 14 \ 20 \ 28 \ 32 \end{array}$
40					^{1.9} $\begin{array}{r} 6.9 \ 9.0 \ 9.0 \ 7.9 \ 5.2 \ 4.3 \ 4.4 \ 6.7 \ 7.5 \ 7.5 \ 3.7 \\ 32 \ 27 \ 24 \ 17 \ 14 \ 11 \ 0 \ 13 \ 20 \ 26 \ 31 \end{array}$
41					^{2.5} $\begin{array}{r} 9.7 \ 11.4 \ 11.2 \ 10.2 \ 7.8 \ 7.0 \ 7.1 \ 9.4 \ 9.4 \ 6.3 \\ 32 \ 28 \ 25 \ 18 \ 14 \ 0 \ 12 \ 16 \ 24 \ 30 \end{array}$
42					^{00.9} $\begin{array}{r} 11.5 \ 12.6 \ 12.7 \ 11.8 \ 9.2 \ 8.4 \ 8.3 \ 11.1 \ 10.7 \ 8.2 \\ 32 \ 28 \ 25 \ 18 \ 14 \ 0 \ 12 \ 16 \ 26 \ 30 \end{array}$
43					^{00.7} $\begin{array}{r} 12.3 \ 13.1 \ 12.9 \ 12.3 \ 9.5 \ 8.6 \ 8.6 \ 10.5 \ 11.5 \ 8.1 \\ 31 \ 28 \ 25 \ 18 \ 15 \ 0 \ 11 \ 14 \ 19 \ 25 \ 31 \end{array}$
44					^{901.0} $\begin{array}{r} 11.9 \ 12.9 \ 12.2 \ 12.3 \ 9.0 \ 8.3 \ 8.6 \ 10.6 \ 11.1 \ 11.3 \ 7.4 \\ 33 \ 29 \ 24 \ 18 \ 14 \ 0 \ 11 \ 15 \ 21 \ 26 \ 31 \end{array}$
○	1047	909.81	9.61	899.64	
45					^{01.0} $\begin{array}{r} 10.9 \ 13.1 \ 13.0 \ 12.1 \ 9.6 \ 8.8 \ 8.8 \ 11.1 \ 11.9 \ 11.3 \ 4.5 \\ 32 \ 30 \ 25 \ 19 \ 16 \ 0 \ 11 \ 15 \ 19 \ 28 \ 31 \end{array}$
46					^{0.4} $\begin{array}{r} 12.7 \ 14.3 \ 14.3 \ 12.9 \ 10.0 \ 9.4 \ 9.6 \ 11.6 \ 12.2 \ 11.1 \ 8.6 \\ 33 \ 29 \ 25 \ 18 \ 14 \ 0 \ 11 \ 13 \ 20 \ 25 \ 29 \ 31 \end{array}$
47	24" X 30' under E Rd.				^{1.3} $\begin{array}{r} 15.5 \ 15.3 \ 14.4 \ 9.2 \ 8.5 \ 8.6 \ 12.4 \ 13.2 \ 13.0 \ 10.1 \\ 31 \ 26 \ 21 \ 12 \ 0 \ 9 \ 14 \ 20 \ 25 \ 30 \end{array}$

Sta. B.S. H.I. F.S. Elev.

909.81

48

^{2.7}
 $\frac{12.5}{33} \frac{13.6}{29} \frac{13.3}{24} \frac{12.0}{18} \frac{7.8}{11} \frac{7.1}{0} \frac{7.3}{9} \frac{10.7}{14} \frac{11.5}{21} \frac{11.6}{29} \frac{9.7}{32}$ ✓

49

^{5.1}
 $\frac{7.1}{31} \frac{9.2}{28} \frac{9.2}{24} \frac{8.4}{18} \frac{5.3}{12} \frac{4.7}{0} \frac{5.1}{11} \frac{8.0}{15} \frac{9.3}{22} \frac{9.3}{28} \frac{7.0}{32}$ ✓

50

^{8.6}
 $\frac{0.2}{31} \frac{4.2}{27} \frac{4.4}{22} \frac{3.8}{16} \frac{1.5}{13} \frac{1.2}{0} \frac{1.0}{12} \frac{3.8}{16} \frac{5.0}{23} \frac{5.2}{27} \frac{2.0}{32}$

⊙

14.86 924.14 0.53 909.28

51

^{13.1}
 $\frac{5.8}{31} \frac{13.8}{26} \frac{13.7}{22} \frac{13.1}{17} \frac{11.2}{14} \frac{11.0}{0} \frac{11.1}{13} \frac{13.0}{17} \frac{13.9}{23} \frac{14.0}{27} \frac{10.0}{32}$ ✓

52

Double X-section to 52+75 →

^{17.9}
 $\frac{5.4}{32} \frac{9.2}{27} \frac{9.3}{23} \frac{8.6}{18} \frac{6.6}{14} \frac{6.2}{0} \frac{6.0}{13} \frac{7.8}{18} \frac{7.9}{23} \frac{7.3}{28} \frac{4.1}{33}$ ✓

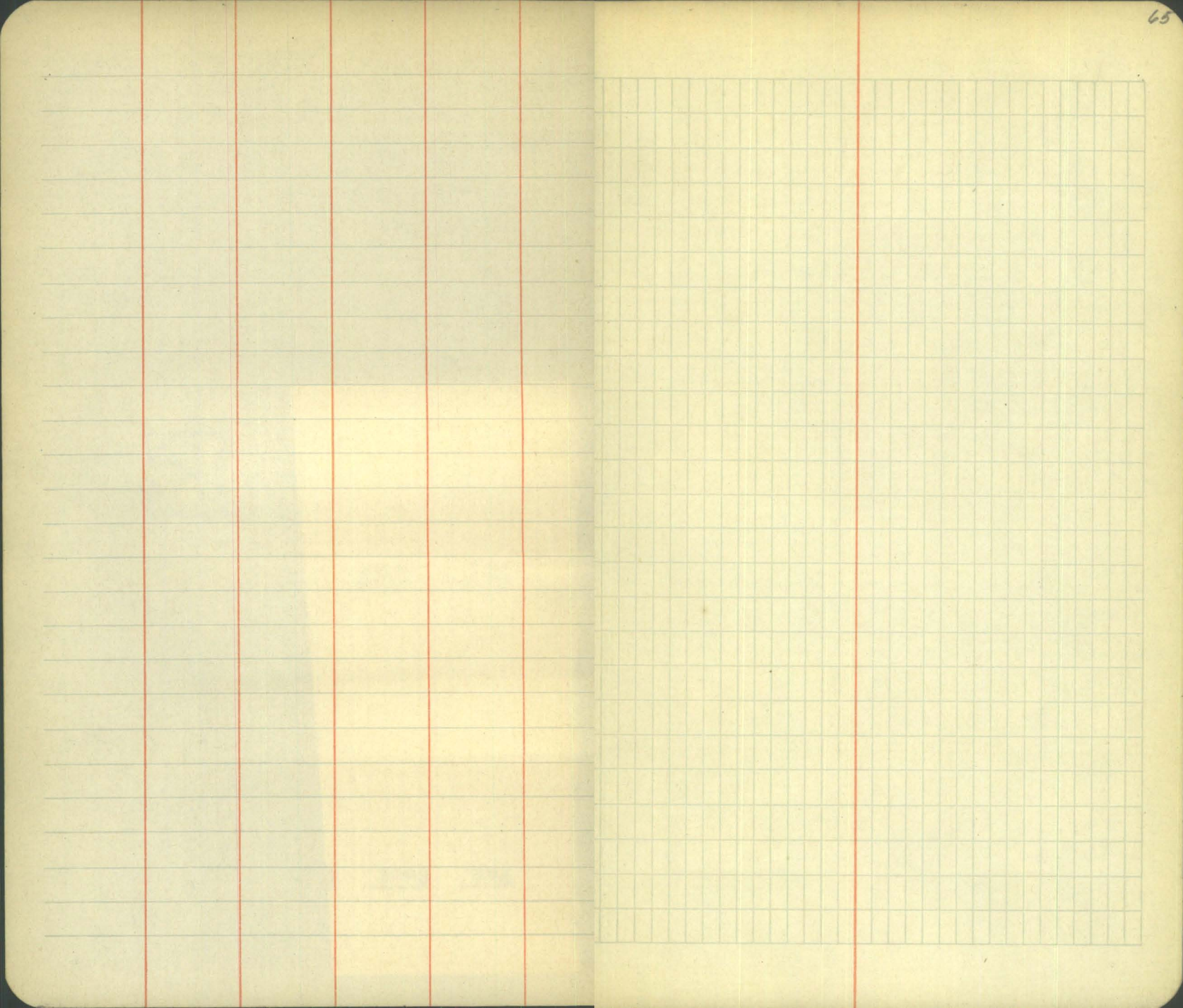
+75 = Ditches end Rt. & Lt.

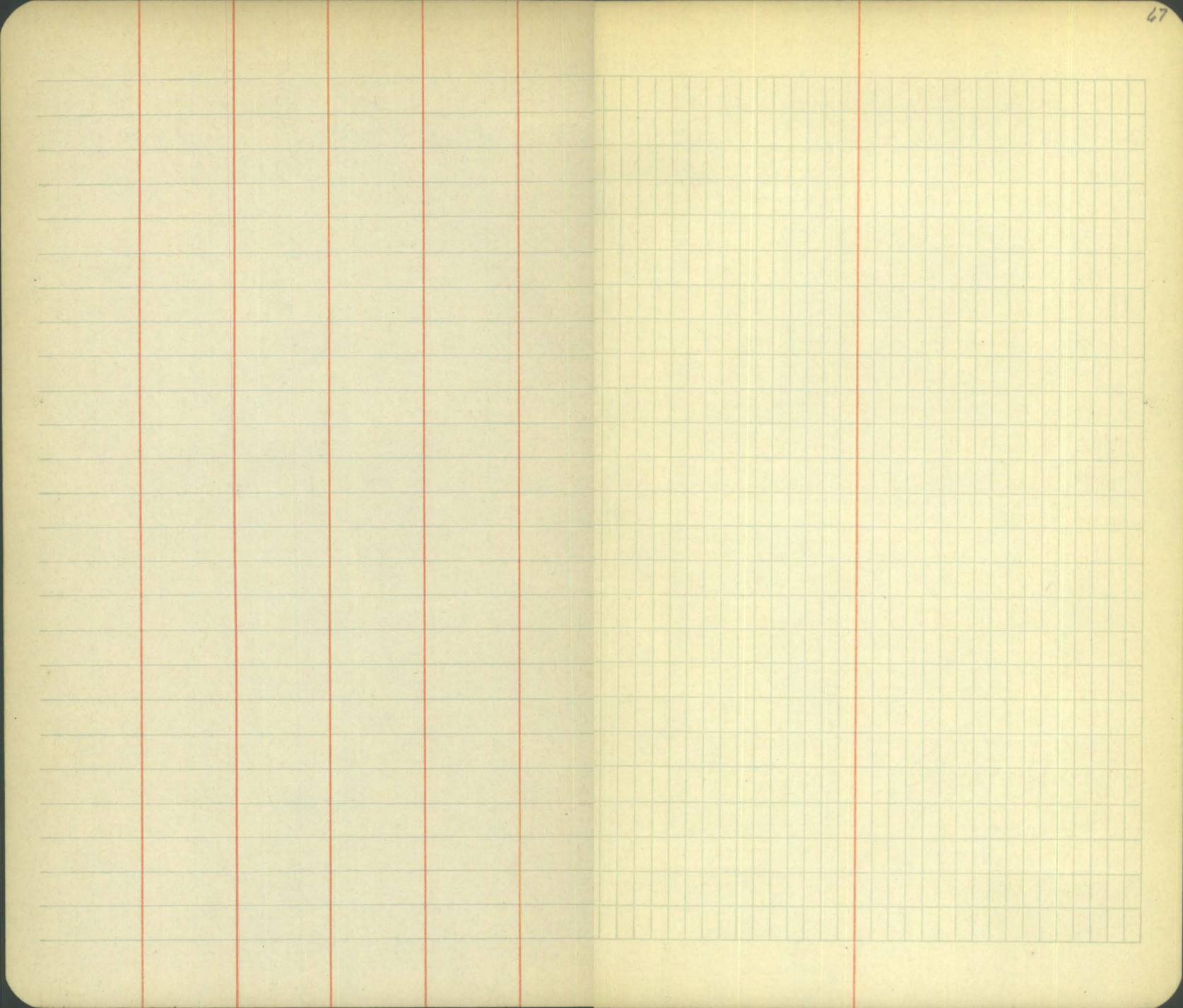
B.M.

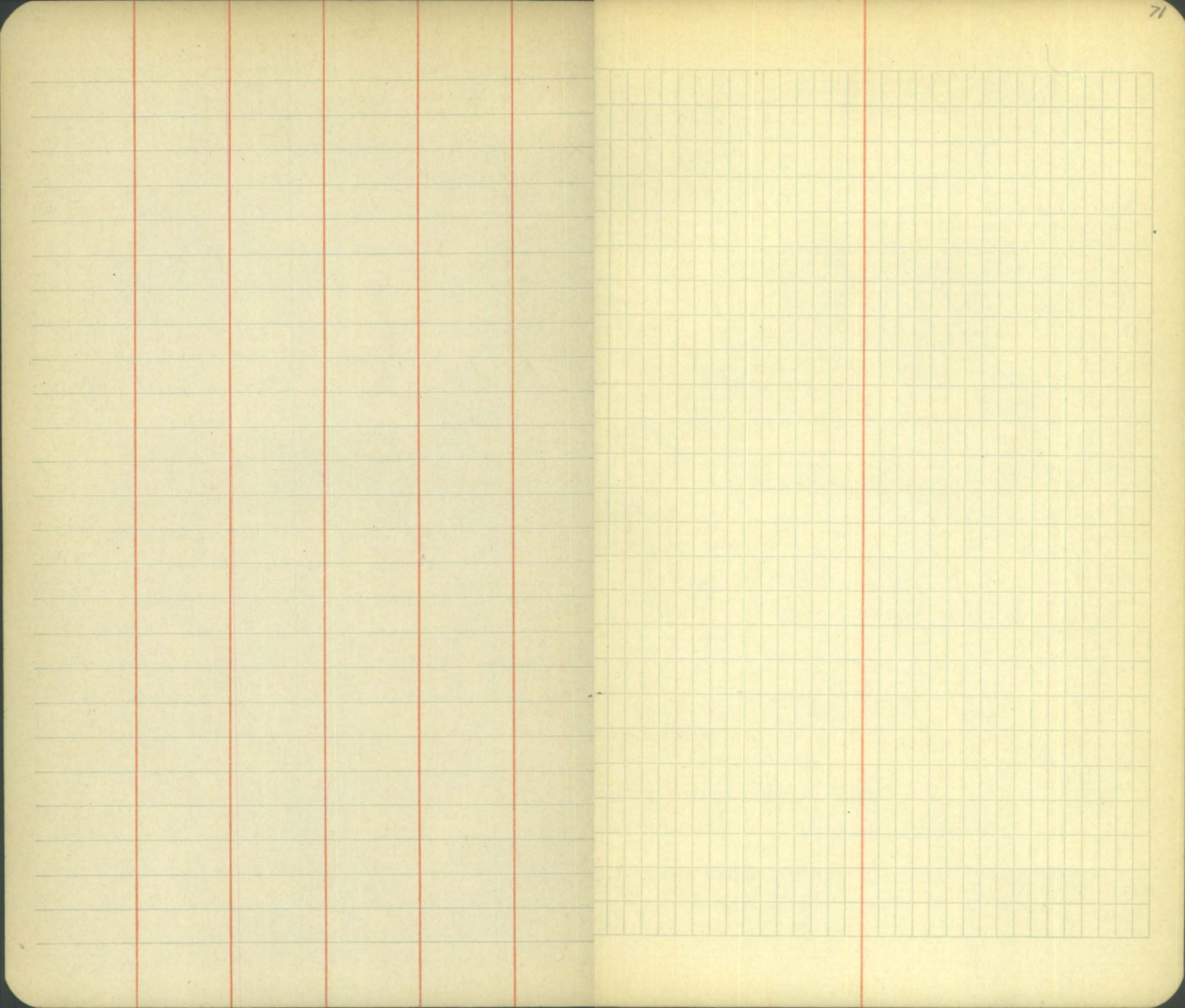
3.55 920.59 920.40 in Tel. Pole N.E. Cor. Inter-section

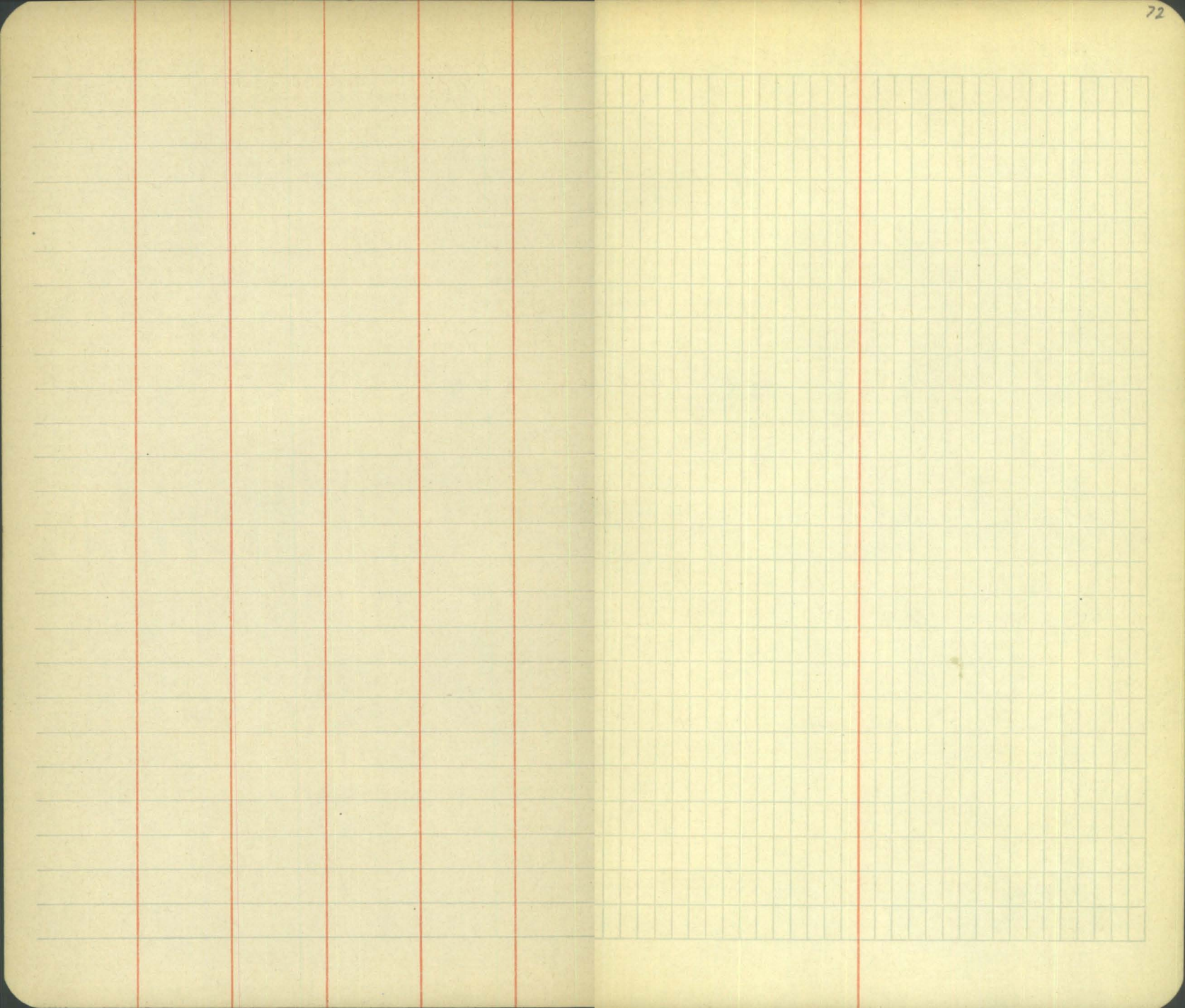
64-78

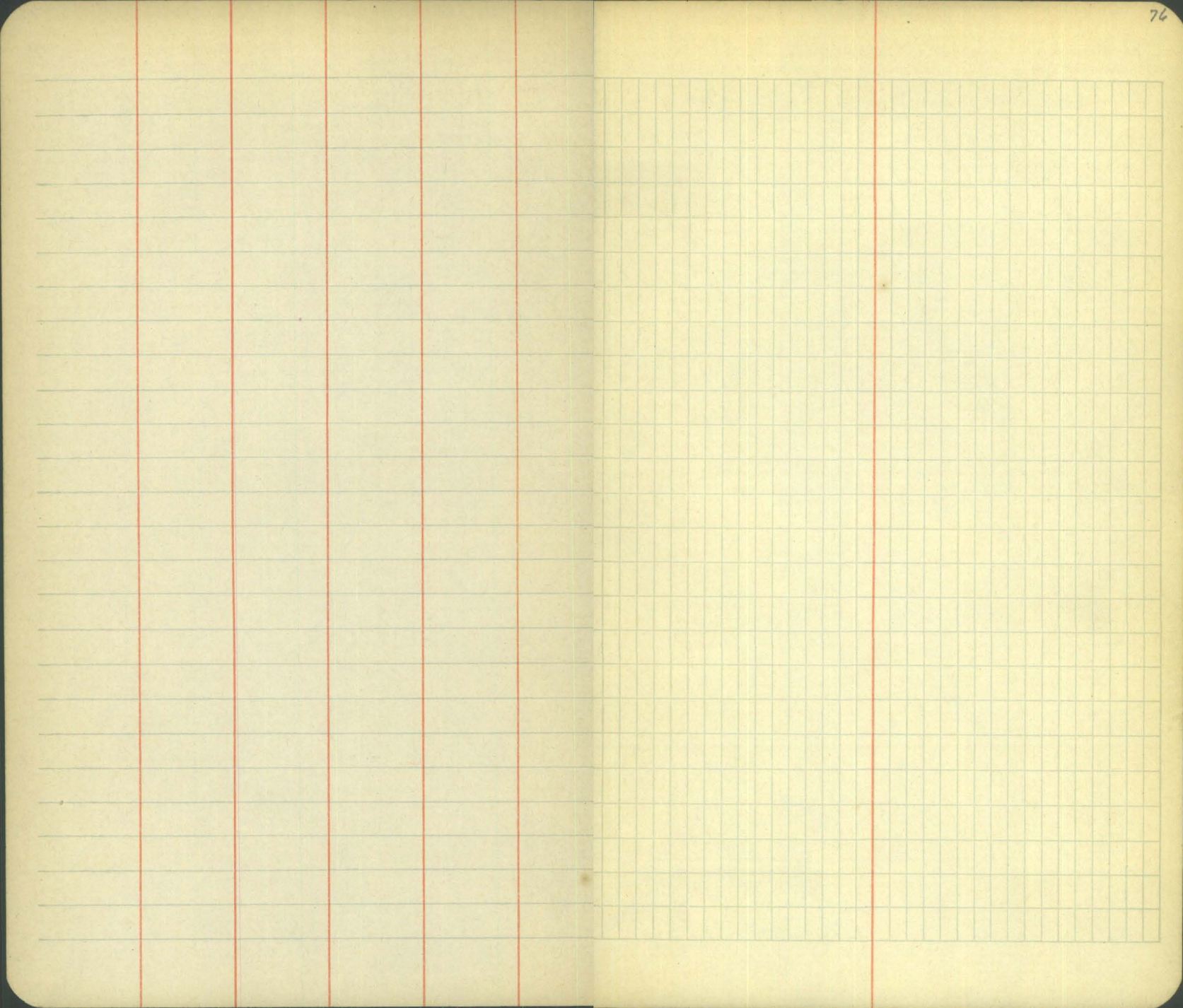
clean

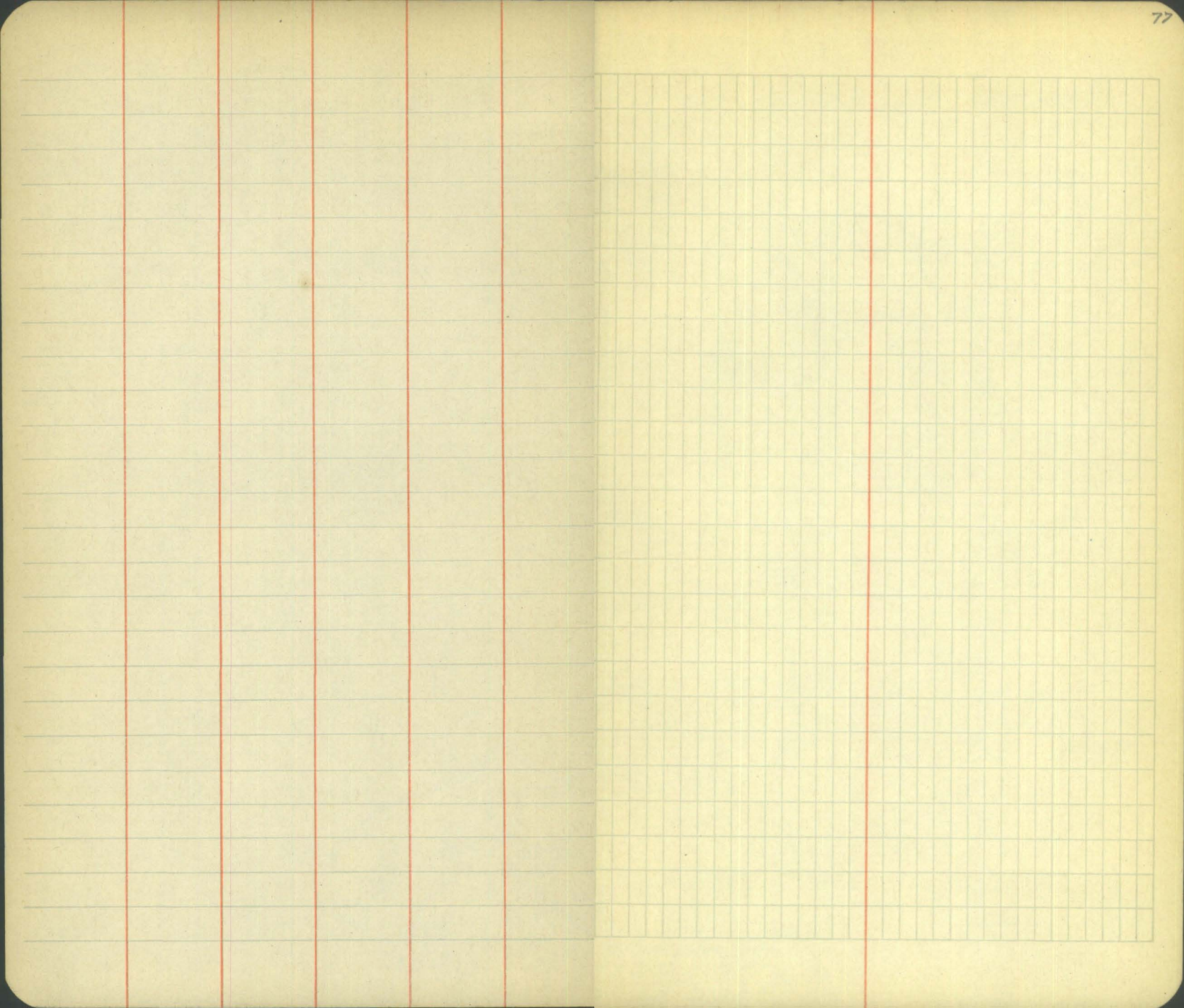












$\frac{43.04}{2840.6}$
 $\frac{40.03}{2642.0}$

$\frac{40.11}{2647.0}$

$\frac{40.11}{2647.0}$

$\frac{40.11}{2647.0}$

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EXAMPLE.

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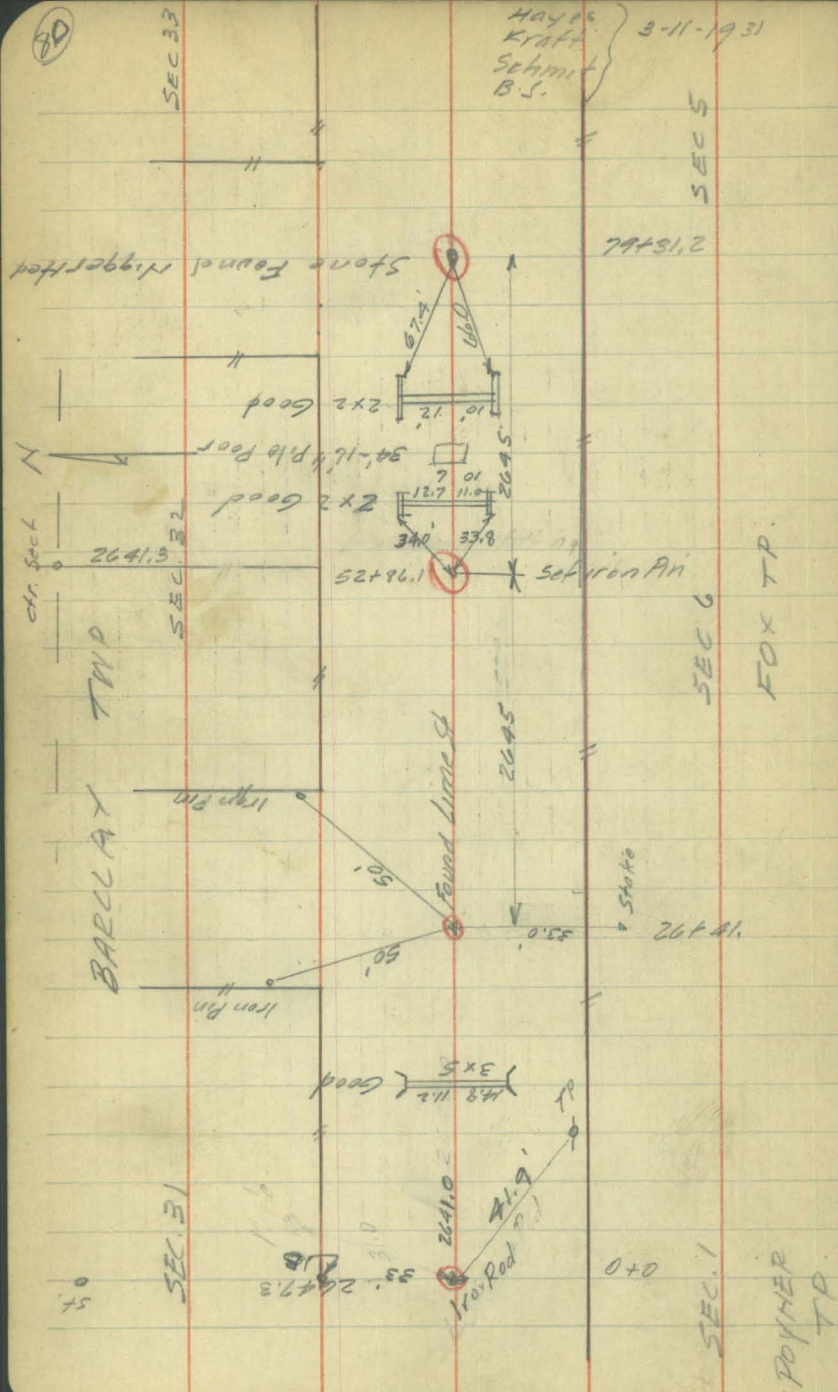
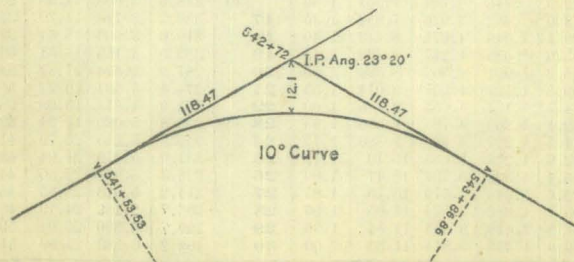


TABLE I. — Minutes in Decimals of a Degree.

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

TABLE II. — Inches in Decimals of a Foot.

1-16	3-32	1/8	3-16	1/4	5-16	3/8	1/2	5/8	3/4	7/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729
1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

TABLE III. — Radii, Ordinates and Deflections.

Deg.	Radius	Mid. Ord.	Tan. Def.	Chd. Def.	Def. for 1 Foot	Deg.	Radius	Mid. Ord.	Tan. Def.	Chd. Def.	Def. for 1 Foot
0° 10'	34377.7	.036	.145	.291	0.05'	7°	819.0	1.528	6.105	12.21	2.10'
20	17189.9	.073	.291	.582	0.10	20°	781.8	1.600	6.395	12.79	2.20
30	11459.4	.109	.436	.873	0.15	30	764.5	1.637	6.540	13.08	2.25
40	8594.4	.145	.582	1.164	0.20	40	747.9	1.673	6.685	13.37	2.30
50	6875.5	.182	.727	1.454	0.25	50	716.8	1.746	6.976	13.85	2.40
1	5729.6	.218	.873	1.745	0.30	20	688.2	1.819	7.266	14.53	2.50
10	4911.2	.255	1.018	2.036	0.35	30	674.7	1.855	7.411	14.82	2.55
20	4297.3	.291	1.164	2.327	0.40	40	661.7	1.892	7.556	15.11	2.60
30	3819.8	.327	1.309	2.618	0.45	50	637.3	1.965	7.846	15.69	2.70
40	3437.9	.364	1.454	2.909	0.50	20	614.6	2.037	8.136	16.27	2.80
50	3125.4	.400	1.600	3.200	0.55	30	603.8	2.074	8.281	16.56	2.85
2	2864.9	.436	1.745	3.490	0.60	40	593.4	2.110	8.426	16.85	2.90
10	2644.6	.473	1.891	3.781	0.65	50	573.7	2.183	8.716	17.43	3.00
20	2455.7	.509	2.036	4.072	0.70	30	546.4	2.292	9.150	18.30	3.15
30	2292.0	.545	2.181	4.363	0.75	40	521.7	2.402	9.585	19.16	3.30
40	2148.8	.582	2.327	4.654	0.80	50	499.1	2.511	10.02	20.04	3.45
50	2022.4	.618	2.472	4.945	0.85	20	478.3	2.620	10.45	20.91	3.60
3	1910.1	.655	2.618	5.235	0.90	30	459.3	2.730	10.89	21.77	3.75
10	1809.6	.691	2.763	5.526	0.95	40	441.7	2.839	11.32	22.64	3.90
20	1719.1	.727	2.908	5.817	1.00	50	425.4	2.949	11.75	23.51	4.05
30	1637.3	.764	3.054	6.108	1.05	20	410.3	3.058	12.18	24.37	4.20
40	1562.9	.800	3.199	6.398	1.10	30	396.2	3.168	12.62	25.24	4.35
50	1495.0	.836	3.345	6.689	1.15	40	383.1	3.277	13.05	26.11	4.50
4	1432.7	.873	3.490	6.980	1.20	50	370.8	3.387	13.49	26.97	4.65
10	1375.4	.909	3.635	7.271	1.25	20	359.3	3.496	13.92	27.84	4.80
20	1322.5	.945	3.781	7.561	1.30	30	348.5	3.606	14.35	28.70	4.95
30	1273.6	.982	3.926	7.852	1.35	40	338.3	3.716	14.78	29.56	5.10
40	1228.1	1.018	4.071	8.143	1.40	50	319.6	3.935	15.64	31.29	5.40
50	1185.8	1.055	4.217	8.433	1.45	20	302.9	4.155	16.51	33.01	5.70
5	1146.3	1.091	4.362	8.724	1.50	30	287.9	4.374	17.37	34.73	6.00
10	1109.3	1.127	4.507	9.014	1.55	40	274.4	4.594	18.22	36.44	6.30
20	1074.7	1.164	4.653	9.305	1.60	50	262.0	4.814	19.08	38.16	6.60
30	1042.1	1.200	4.798	9.596	1.65	20	250.8	5.035	19.94	39.87	6.90
40	1011.5	1.237	4.943	9.886	1.70	30	240.5	5.255	20.79	41.58	7.20
50	982.6	1.273	5.088	10.18	1.75	40	231.0	5.476	21.64	43.28	7.50
6	955.4	1.309	5.234	10.47	1.80	50	222.3	5.697	22.50	44.99	7.80
10	929.6	1.346	5.379	10.76	1.85	20	214.2	5.918	23.35	46.69	8.10
20	905.1	1.382	5.524	11.05	1.90	30	206.7	6.136	24.19	48.38	8.40
30	881.9	1.418	5.669	11.34	1.95	40	199.7	6.360	25.04	50.07	8.70
40	859.9	1.455	5.814	11.63	2.00	50	193.2	6.583	25.88	51.76	9.00

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

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

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

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
31°	1589.0	216.3	41°	2142.2	387.4	51°	2732.9	618.4
10'	1598.0	218.7	10'	2151.7	390.7	10'	2743.1	622.8
20	1606.9	221.1	20	2161.2	394.1	20	2753.4	627.2
30	1615.9	223.5	30	2170.8	397.4	30	2763.7	631.7
40	1624.9	226.0	40	2180.3	400.8	40	2773.9	636.2
50	1633.9	228.4	50	2189.9	404.2	50	2784.2	640.7
32	1643.0	230.9	42	2199.4	407.6	52	2794.5	645.2
10	1652.0	233.4	10	2209.0	411.1	10	2804.9	649.7
20	1661.0	235.9	20	2218.6	414.5	20	2815.2	654.3
30	1670.0	238.4	30	2228.1	418.0	30	2825.6	658.8
40	1679.1	241.0	40	2237.7	421.4	40	2835.9	663.4
50	1688.1	243.5	50	2247.3	425.0	50	2846.3	668.0
33	1697.2	246.1	43	2257.0	428.5	53	2856.7	672.7
10	1706.3	248.7	10	2266.6	432.0	10	2867.1	677.3
20	1715.3	251.3	20	2276.2	435.6	20	2877.5	682.0
30	1724.4	253.9	30	2285.9	439.2	30	2888.0	686.7
40	1733.5	256.5	40	2295.6	442.8	40	2898.4	691.4
50	1742.6	259.1	50	2305.2	446.4	50	2908.9	696.1
34	1751.7	261.8	44	2314.9	450.0	54	2919.4	700.9
10	1760.8	264.5	10	2324.6	453.6	10	2929.9	705.7
20	1770.0	267.2	20	2334.3	457.3	20	2940.4	710.5
30	1779.1	269.9	30	2344.1	461.0	30	2951.0	715.3
40	1788.2	272.6	40	2353.8	464.6	40	2961.5	720.1
50	1797.4	275.3	50	2363.5	468.4	50	2972.1	725.0
35	1806.6	278.1	45	2373.3	472.1	55	2982.7	729.9
10	1815.7	280.8	10	2383.1	475.8	10	2993.3	734.8
20	1824.9	283.6	20	2392.8	479.6	20	3003.9	739.7
30	1834.1	286.4	30	2402.6	483.4	30	3014.5	744.6
40	1843.3	289.2	40	2412.4	487.2	40	3025.2	749.6
50	1852.5	292.0	50	2422.3	491.0	50	3035.8	754.6
36	1861.7	294.9	46	2432.1	494.8	56	3046.5	759.6
10	1870.9	297.7	10	2441.9	498.7	10	3057.2	764.6
20	1880.1	300.6	20	2451.8	502.5	20	3067.9	769.7
30	1889.4	303.5	30	2461.7	506.4	30	3078.7	774.7
40	1898.6	306.4	40	2471.5	510.3	40	3089.4	779.8
50	1907.9	309.3	50	2481.4	514.3	50	3100.2	784.9
37	1917.1	312.2	47	2491.3	518.2	57	3110.9	790.1
10	1926.4	315.2	10	2501.2	522.2	10	3121.7	795.2
20	1935.7	318.1	20	2511.2	526.1	20	3132.6	800.4
30	1945.0	321.1	30	2521.1	530.1	30	3143.4	805.6
40	1954.3	324.1	40	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	380.6	40	2712.5	609.6	40	3352.6	908.8
50	2132.7	384.1	50	2722.7	614.0	50	3363.8	914.5

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

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

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

Angle	Tangent	External	Angle	Tangent	External	Angle	Tangent	External
91°	5830.5	2444.9	101°	6950.6	3278.1	111°	8336.7	4386.1
10	5847.5	2457.1	10	6971.3	3294.1	10	8362.7	4407.6
20	5864.6	2469.3	20	6992.0	3310.1	20	8388.9	4429.2
30	5881.7	2481.5	30	7012.7	3326.1	30	8415.1	4450.9
40	5898.8	2493.8	40	7033.6	3342.3	40	8441.5	4472.7
50	5916.0	2506.1	50	7054.5	3358.5	50	8468.0	4494.6
92°	5933.2	2518.5	102°	7075.5	3374.9	112°	8494.6	4516.6
10	5950.5	2531.0	10	7096.6	3391.2	10	8521.3	4538.8
20	5967.9	2543.5	20	7117.8	3407.7	20	8548.1	4561.1
30	5985.3	2556.0	30	7139.0	3424.3	30	8575.0	4583.4
40	6002.7	2568.6	40	7160.3	3440.9	40	8602.1	4606.0
50	6020.2	2581.3	50	7181.7	3457.6	50	8629.3	4628.6
93°	6037.8	2594.0	103°	7203.2	3474.4	113°	8656.6	4651.3
10	6055.4	2606.8	10	7224.7	3491.3	10	8684.0	4674.2
20	6073.1	2619.7	20	7246.3	3508.2	20	8711.5	4697.2
30	6090.8	2632.6	30	7268.0	3525.2	30	8739.2	4720.3
40	6108.6	2645.5	40	7289.8	3542.4	40	8767.0	4743.6
50	6126.4	2658.5	50	7311.7	3559.6	50	8794.9	4766.9
94°	6144.3	2671.6	104°	7333.6	3576.8	114°	8822.9	4790.4
10	6162.6	2684.7	10	7355.6	3594.2	10	8851.0	4814.1
20	6180.2	2697.9	20	7377.8	3611.7	20	8879.8	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	8936.8	4885.7
50	6234.6	2737.9	50	7444.6	3664.5	50	8965.0	4909.9
95°	6252.8	2751.3	105°	7467.0	3682.3	115°	8993.8	4934.1
10	6271.1	2764.8	10	7489.6	3700.2	10	9022.7	4958.6
20	6289.4	2778.3	20	7512.2	3718.2	20	9051.7	4983.1
30	6307.9	2792.0	30	7534.9	3736.2	30	9080.9	5007.8
40	6326.3	2805.6	40	7557.7	3754.4	40	9110.3	5032.6
50	6344.8	2819.4	50	7580.5	3772.6	50	9139.8	5057.6
96°	6363.4	2833.2	106°	7603.5	3791.0	116°	9169.4	5082.7
10	6382.1	2847.0	10	7626.6	3809.4	10	9199.1	5107.9
20	6400.8	2861.0	20	7649.7	3827.9	20	9229.0	5133.3
30	6419.5	2875.0	30	7672.9	3846.5	30	9259.0	5158.8
40	6438.4	2889.0	40	7696.3	3865.2	40	9289.2	5184.5
50	6457.3	2903.1	50	7719.7	3884.0	50	9319.5	5210.3
97°	6476.2	2917.3	107°	7743.2	3902.9	117°	9349.9	5236.2
10	6495.2	2931.6	10	7766.8	3921.9	10	9380.5	5262.3
20	6514.3	2945.9	20	7790.5	3940.9	20	9411.3	5288.6
30	6533.4	2960.3	30	7814.3	3960.1	30	9442.2	5315.0
40	6552.6	2974.7	40	7838.1	3979.4	40	9473.2	5341.5
50	6571.9	2989.2	50	7862.1	3998.7	50	9504.4	5368.2
98°	6591.2	3003.8	108°	7886.2	4018.2	118°	9535.7	5395.1
10	6610.6	3018.4	10	7910.4	4037.8	10	9567.2	5422.1
20	6630.1	3033.1	20	7934.6	4057.4	20	9598.9	5449.2
30	6649.6	3047.9	30	7959.0	4077.2	30	9630.7	5476.5
40	6669.2	3062.8	40	7983.5	4097.1	40	9662.6	5504.0
50	6688.8	3077.7	50	8008.0	4117.0	50	9694.7	5531.7
99°	6708.6	3092.7	109°	8032.7	4137.1	119°	9727.0	5559.4
10	6728.4	3107.7	10	8057.4	4157.3	10	9759.4	5587.4
20	6748.2	3122.9	20	8082.3	4177.5	20	9792.0	5615.5
30	6768.1	3138.1	30	8107.3	4197.9	30	9824.8	5643.8
40	6788.1	3153.3	40	8132.3	4218.4	40	9857.7	5672.3
50	6808.2	3168.7	50	8157.5	4239.0	50	9890.8	5700.9
100°	6828.3	3184.1	110°	8182.8	4259.7	120°	9924.0	5729.7
10	6848.5	3199.6	10	8208.2	4280.5	10	9957.5	5758.6
20	6868.8	3215.1	20	8233.7	4301.4	20	9991.0	5787.7
30	6889.2	3230.8	30	8259.3	4322.4	30	10025.0	5817.0
40	6909.6	3246.5	40	8285.0	4343.6	40	10059.0	5846.5
50	6930.1	3262.3	50	8310.8	4364.8	50	10093.0	5876.1

Table V. Corrections for use with table IV.

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		For Tangents Add													
ANGLE	CURVE	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°		.03	.06	.09	.13	.16	.19	.22	.25	.28	.31	.34	.38	.42	.46
15°		.04	.10	.14	.19	.24	.29	.34	.39	.45	.51	.53	.58	.63	.68
20°		.06	.13	.19	.26	.32	.39	.45	.51	.58	.65	.72	.79	.84	.90
25°		.08	.16	.24	.33	.40	.49	.58	.67	.75	.83	.90	.99	1.06	1.14
30°		.10	.19	.29	.39	.49	.59	.69	.79	.89	.99	1.09	1.20	1.29	1.39
35°		.11	.22	.34	.47	.58	.69	.79	.81	.92	1.04	1.29	1.42	1.54	1.66
40°		.13	.26	.40	.53	.67	.80	.93	1.06	1.20	1.34	1.49	1.64	1.79	1.94
45°		.15	.30	.44	.60	.76	.91	1.06	1.21	1.37	1.52	1.70	1.87	2.04	2.21
50°		.17	.34	.51	.68	.85	1.02	1.19	1.36	1.54	1.72	1.91	2.10	2.29	2.48
55°		.19	.38	.57	.76	.95	1.14	1.32	1.52	1.72	1.92	2.14	2.35	2.56	2.77
60°		.21	.42	.63	.84	1.05	1.27	1.49	1.71	1.94	2.17	2.38	2.60	2.83	3.07
65°		.23	.46	.69	.93	1.16	1.40	1.64	1.88	2.13	2.38	2.63	2.88	3.13	3.39
70°		.25	.51	.76	1.02	1.28	1.54	1.80	2.06	2.33	2.60	2.88	3.16	3.44	3.72
75°		.27	.56	.83	1.12	1.41	1.69	1.98	2.27	2.57	2.87	3.16	3.47	3.78	4.09
80°		.30	.61	.91	1.22	1.53	1.84	2.15	2.46	2.78	3.10	3.44	3.78	4.12	4.46
85°		.33	.66	1.00	1.33	1.68	2.02	2.36	2.70	3.05	3.40	3.77	4.14	4.55	4.89
90°		.36	.72	1.09	1.45	1.83	2.20	2.57	2.94	3.32	3.70	4.10	4.50	4.91	5.32
95°		.39	.79	1.19	1.55	2.00	2.40	2.80	3.20	3.61	4.02	4.49	4.98	5.38	5.83
100°		.43	.86	1.30	1.74	2.18	2.62	3.06	3.50	3.95	4.40	4.88	5.37	5.85	6.34

For Externals Add

ANGLE	CURVE	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°		.001	.003	.004	.006	.007	.008	.009	.011	.012	.014	.015	.017	.018	.020
15°		.003	.007	.010	.014	.018	.023	.027	.029	.032	.035	.039	.043	.047	.051
20°		.006	.011	.017	.022	.028	.034	.038	.045	.051	.057	.063	.070	.076	.083
25°		.009	.018	.027	.036	.046	.056	.065	.074	.083	.093	.106	.120	.127	.135
30°		.013	.025	.038	.051	.065	.078	.090	.103	.116	.129	.149	.170	.179	.188
35°		.018	.035	.054	.072	.086	.109	.131	.153	.175	.197	.213	.230	.247	.264
40°		.023	.046	.070	.093	.117	.141	.172	.203	.234	.265	.277	.290	.315	.341
45°		.030	.060	.093	.119	.153	.184	.216	.254	.289	.325	.351	.378	.411	.445
50°		.037	.075	.116	.151	.189	.227	.266	.305	.345	.384	.425	.467	.508	.550
55°		.046	.093	.142	.188	.236	.283	.332	.381	.420	.470	.530	.582	.641	.700
60°		.056	.112	.168	.225	.283	.340	.398	.457	.516	.575	.636	.697	.774	.851
65°		.067	.135	.204	.273	.343	.412	.483	.554	.625	.697	.771	.845	.922	1.01
70°		.080	.159	.249	.321	.403	.485	.568	.652	.735	.819	.906	.994	1.08	1.17
75°		.095	.182	.286	.381	.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	1.23	1.43	1.62	1.80	1.99	2.18	2.38	2.58
100°		.200	.401	.604	.809	1.01	1.22	1.43	1.64	1.85	2.06	2.28	2.50	2.73	2.96

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

Degree of Curve	Radius 50 sin. def. ang.	$\frac{1}{2}$ sub chord R = sin of def. angle				Length of arc for 100 ft.
		12.5 Ft.	15 Ft.	20 Ft.	25 Ft.	
30°	193.18	1° 51'	2° 17'	2° 58'	3° 43'	101.15
32°	181.39	1° 59'	2° 25'	3° 10'	3° 58'	101.33
34°	171.01	2° 06'	2° 33'	3° 21'	4° 12'	101.48
36°	161.80	2° 13'	2° 41'	3° 33'	4° 26'	101.66
38°	153.58	2° 20'	2° 49'	3° 44'	4° 40'	101.85
40°	146.19	2° 27'	2° 57'	3° 55'	4° 54'	102.06
42°	139.52	2° 34'	3° 05'	4° 07'	5° 08'	102.29
44°	133.47	2° 41'	3° 13'	4° 18'	5° 22'	102.53
46°	127.97	2° 48'	3° 21'	4° 29'	5° 36'	102.76
48°	122.92	2° 55'	3° 29'	4° 40'	5° 50'	103.00
50°	118.31	3° 02'	3° 38'	4° 51'	6° 04'	103.24
52°	114.06	3° 09'	3° 46'	5° 02'	6° 17'	103.54
54°	110.11	3° 16'	3° 54'	5° 13'	6° 31'	103.84
56°	106.50	3° 22'	4° 02'	5° 23'	6° 44'	104.14
58°	103.14	3° 29'	4° 10'	5° 34'	6° 57'	104.43
60°	100.00	3° 35'	4° 18'	5° 44'	7° 11'	104.72

CURVE FORMULAS

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

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

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

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

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

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

To find angle for a given distance and deflection.

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

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

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

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

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

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

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

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

Natural Sines

DEG.	0'	10'	20'	30'	40'	50'	DEG.	0'	10'	20'	30'	40'	50'	DEG.
0	0000	0029	0058	0087	0116	0145	89	40	6428	6450	6472	6494	6517	6539
1	0175	0204	0233	0262	0291	0320	88	41	6561	6583	6604	6626	6648	6670
2	0349	0378	0407	0436	0465	0494	87	42	6691	6713	6734	6756	6777	6799
3	0523	0552	0581	0610	0640	0669	86	43	6820	6841	6862	6884	6905	6926
4	0698	0727	0756	0785	0814	0843	85	44	6947	6967	6988	7009	7030	7050
5	0872	0901	0929	0958	0987	1016	84	45	7071	7092	7112	7133	7153	7173
6	1045	1074	1103	1132	1161	1190	83	46	7193	7214	7234	7254	7274	7294
7	1219	1248	1276	1305	1334	1363	82	47	7314	7333	7353	7373	7392	7412
8	1392	1421	1449	1478	1507	1536	81	48	7431	7451	7470	7490	7509	7528
9	1564	1592	1622	1650	1679	1708	80	49	7547	7566	7585	7604	7623	7642
10	1736	1765	1794	1822	1851	1880	79	50	7660	7679	7698	7716	7735	7753
11	1937	1965	1994	2022	2051	2079	78	51	7771	7790	7808	7826	7844	7862
12	2079	2108	2136	2164	2193	2221	77	52	7880	7898	7916	7934	7951	7969
13	2250	2278	2306	2334	2363	2391	76	53	7986	8004	8021	8039	8056	8073
14	2419	2447	2476	2504	2532	2560	75	54	8090	8107	8124	8141	8158	8175
15	2588	2616	2644	2672	2700	2728	74	55	8192	8208	8225	8241	8258	8274
16	2756	2784	2812	2840	2868	2896	73	56	8290	8307	8323	8339	8355	8371
17	2924	2952	2980	3007	3035	3062	72	57	8387	8403	8418	8434	8450	8466
18	3090	3118	3145	3173	3201	3228	71	58	8480	8496	8511	8526	8542	8557
19	3256	3283	3311	3338	3365	3393	70	59	8572	8587	8601	8616	8631	8646
20	3420	3448	3475	3502	3529	3557	69	60	8660	8675	8689	8704	8718	8732
21	3581	3609	3636	3663	3690	3717	68	61	8746	8760	8774	8788	8802	8816
22	3746	3773	3800	3827	3854	3881	67	62	8829	8843	8857	8870	8884	8897
23	3907	3934	3961	3987	4014	4041	66	63	8910	8923	8936	8949	8962	8975
24	4067	4094	4120	4147	4173	4200	65	64	8988	9001	9013	9026	9038	9051
25	4226	4253	4279	4305	4331	4358	64	65	9063	9075	9088	9100	9112	9124
26	4384	4410	4436	4462	4488	4514	63	66	9135	9147	9159	9171	9182	9194
27	4540	4566	4592	4617	4643	4669	62	67	9205	9216	9228	9239	9250	9261
28	4695	4720	4746	4772	4797	4823	61	68	9272	9283	9293	9304	9315	9325
29	4818	4844	4869	4894	4919	4945	60	69	9336	9346	9356	9367	9377	9387
30	5000	5025	5050	5075	5100	5125	59	70	9397	9407	9417	9426	9436	9446
31	5150	5175	5200	5225	5250	5275	58	71	9455	9465	9474	9483	9492	9502
32	5299	5324	5348	5373	5398	5422	57	72	9511	9520	9528	9537	9546	9555
33	5446	5471	5495	5519	5544	5568	56	73	9563	9572	9580	9588	9596	9605
34	5592	5616	5640	5664	5688	5712	55	74	9619	9621	9628	9636	9644	9652
35	5736	5760	5783	5807	5831	5854	54	75	9659	9667	9674	9681	9689	9696
36	5878	5901	5925	5948	5972	5995	53	76	9703	9710	9717	9724	9730	9737
37	6018	6041	6065	6088	6111	6134	52	77	9744	9750	9757	9763	9769	9775
38	6157	6180	6202	6225	6248	6271	51	78	9781	9787	9793	9799	9805	9811
39	6293	6316	6338	6361	6383	6406	50	79	9816	9822	9827	9833	9838	9843

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

Natural Cosines

Natural Tangents

deg.	0'	10'	20'	30'	40'	50'	deg.	0'	10'	20'	30'	40'	50'	deg.	
0	0000	0029	0058	0087	0116	0145	89	40	8391	8441	8491	8541	8591	8642	49
1	0175	0204	0233	0262	0291	0320	88	41	8693	8744	8796	8847	8899	8952	48
2	0349	0378	0407	0437	0466	0495	87	42	9004	9057	9110	9163	9217	9271	47
3	0524	0553	0582	0612	0641	0670	86	43	9325	9380	9435	9490	9545	9601	46
4	0699	0729	0758	0787	0816	0846	85	44	9657	9713	9770	9827	9884	9942	45
5	0875	0904	0934	0963	0992	1022	84	45	1.0000	1.0058	1.0117	1.0176	1.0235	1.0295	44
6	1051	1080	1110	1139	1169	1198	83	46	1.0355	1.0416	1.0477	1.0533	1.0599	1.0661	43
7	1228	1257	1287	1317	1346	1376	82	47	1.0724	1.0786	1.0850	1.0913	1.0977	1.1041	42
8	1405	1435	1465	1495	1524	1554	81	48	1.1106	1.1171	1.1237	1.1303	1.1369	1.1436	41
9	1584	1614	1644	1673	1703	1733	80	49	1.1504	1.1571	1.1640	1.1708	1.1778	1.1847	40
10	1763	1793	1823	1853	1883	1914	79	50	1.1918	1.1988	1.2059	1.2131	1.2203	1.2276	39
11	1944	1974	2004	2035	2065	2095	78	51	1.2349	1.2423	1.2497	1.2572	1.2647	1.2723	38
12	2126	2156	2186	2217	2247	2278	77	52	1.2799	1.2876	1.2954	1.3032	1.3111	1.3190	37
13	2309	2339	2370	2401	2432	2462	76	53	1.3270	1.3351	1.3432	1.3514	1.3597	1.3680	36
14	2493	2524	2555	2586	2617	2648	75	54	1.3764	1.3848	1.3934	1.4019	1.4106	1.4193	35
15	2679	2711	2742	2773	2805	2836	74	55	1.4281	1.4370	1.4460	1.4550	1.4641	1.4733	34
16	2867	2899	2931	2962	2994	3026	73	56	1.4826	1.4919	1.5013	1.5108	1.5204	1.5301	33
17	3057	3089	3121	3153	3185	3217	72	57	1.5399	1.5497	1.5597	1.5697	1.5798	1.5900	32
18	3249	3281	3314	3346	3378	3411	71	58	1.6003	1.6107	1.6212	1.6319	1.6426	1.6534	31
19	3443	3476	3508	3541	3574	3607	70	59	1.6643	1.6753	1.6864	1.6977	1.7090	1.7205	30
20	3640	3673	3706	3739	3772	3805	69	60	1.7321	1.7437	1.7556	1.7675	1.7797	1.7917	29
21	3839	3872	3906	3939	3973	4006	68	61	1.8040	1.8165	1.8291	1.8418	1.8546	1.8676	28
22	4040	4074	4108	4142	4176	4210	67	62	1.8807	1.8940	1.9074	1.9210	1.9347	1.9486	27
23	4245	4279	4314	4348	4383	4417	66	63	1.9626	1.9768	1.9912	2.0057	2.0204	2.0353	26
24	4452	4487	4522	4557	4592	4628	65	64	2.0503	2.0655	2.0809	2.0965	2.1123	2.1283	25
25	4663	4699	4734	4770	4806	4841	64	65	2.1445	2.1609	2.1775	2.1943	2.2113	2.2286	24
26	4877	4913	4950	4986	5022	5059	63	66	2.2450	2.2637	2.2817	2.2998	2.3183	2.3369	23
27	5095	5132	5169	5206	5243	5280	62	67	2.3559	2.3750	2.3945	2.4142	2.4342	2.4545	22
28	5317	5354	5392	5430	5467	5505	61	68	2.4751	2.4960	2.5172	2.5386	2.5605	2.5826	21
29	5543	5581	5619	5658	5696	5735	60	69	2.6051	2.6279	2.6511	2.6746	2.6985	2.7228	20
30	5774	5812	5851	5890	5930	5969	59	70	2.7475	2.7725	2.7980	2.8239	2.8502	2.8770	19
31	6009	6048	6088	6128	6168	6208	58	71	2.9042	2.9310	2.9600	2.9887	3.0178	3.0475	18
32	6249	6289	6330	6371	6412	6453	57	72	3.0777	3.1084	3.1397	3.1716	3.2041	3.2371	17
33	6494	6536	6577	6619	6661	6703	56	73	3.2709	3.3052	3.3402	3.3759	3.4124	3.4495	16
34	6745	6787	6830	6873	6916	6959	55	74	3.4874	3.5261	3.5656	3.6059	3.6470	3.6891	15
35	7002	7046	7089	7133	7177	7221	54	75	3.7321	3.7760	3.8208	3.8667	3.9136	3.9617	14
36	7265	7310	7355	7400	7445	7490	53	76	4.0108	4.0611	4.1126	4.1653	4.2193	4.2747	13
37	7536	7581	7627	7673	7720	7766	52	77	4.3315	4.3897	4.4494	4.5107	4.5736	4.6382	12
38	7813	7860	7907	7954	8002	8050	51	78	4.7046	4.7729	4.8430	4.9152	4.9894	5.0658	11
39	8098	8146	8195	8243	8292	8342	50	79	5.1446	5.2257	5.3093	5.3955	5.4845	5.5764	10
deg.	60'	80'	40'	30'	20'	10'	deg.	60'	80'	40'	30'	20'	10'	deg.	

deg.	0'	10'	20'	30'	40'	50'	deg.
80	5.6713	5.7694	5.8708	5.9758	6.0844	6.1970	9
81	6.3138	6.4348	6.5606	6.6912	6.8269	6.9682	8
82	7.1154	7.2687	7.4287	7.5958	7.7704	7.9530	7
83	8.1443	8.3450	8.5555	8.7769	9.0098	9.2553	6
84	9.5144	9.7882	10.078	10.385	10.711	11.059	5
85	11.430	11.826	12.250	12.706	13.197	13.727	4
86	14.300	14.924	15.605	16.350	17.169	18.075	3
87	19.081	20.206	21.470	22.903	24.542	26.432	2
88	28.636	31.242	34.368	38.189	42.964	49.104	1
89	57.290	68.750	85.940	114.588	171.885	343.770	0
deg.	60'	80'	40'	30'	20'	10'	deg.

Natural Cotangents

$$\begin{array}{r} 55+73.3 \\ 40+06.5 \\ \hline 594.6 \\ 15 \quad 66.8 \end{array}$$

$$9+89.1$$

$$435.6$$

$$\begin{array}{r} 1424.0 \\ 435.6 \\ \hline 9+88.8 \end{array}$$

$$\begin{array}{r} 29+84.8 \\ 24+95.1 \\ \hline 489.1 \end{array}$$

$$\begin{array}{r} 19+48.6 \\ 1424.4 \\ \hline 524.2 \end{array}$$

$$\begin{array}{r} 24+95.7 \\ 19+48.6 \\ \hline 5+47.1 \end{array}$$

$$\begin{array}{r} 37+38.9 \\ 29+84.8 \\ \hline 754.1 \end{array}$$

$$\begin{array}{r} 37+38.9 \\ 24+95.7 \\ \hline \end{array}$$

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

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

FOR SINGLE TRACK EMBANKMENT.

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

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

MADE IN GERMANY.