

CONSTRUCTION NOTES  
PRESCOTT CONNECTION

CO. PROJ. 23-60  
FILE NO. 4

ENGINEERS'  
FIELD BOOK  
No. 10403

# EUGENE DIETZGEN CO.

DRAWING MATERIALS, MATHEMATICAL and  
SURVEYING INSTRUMENTS

Chicago New York San Francisco New Orleans Pittsburg Toronto

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

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

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

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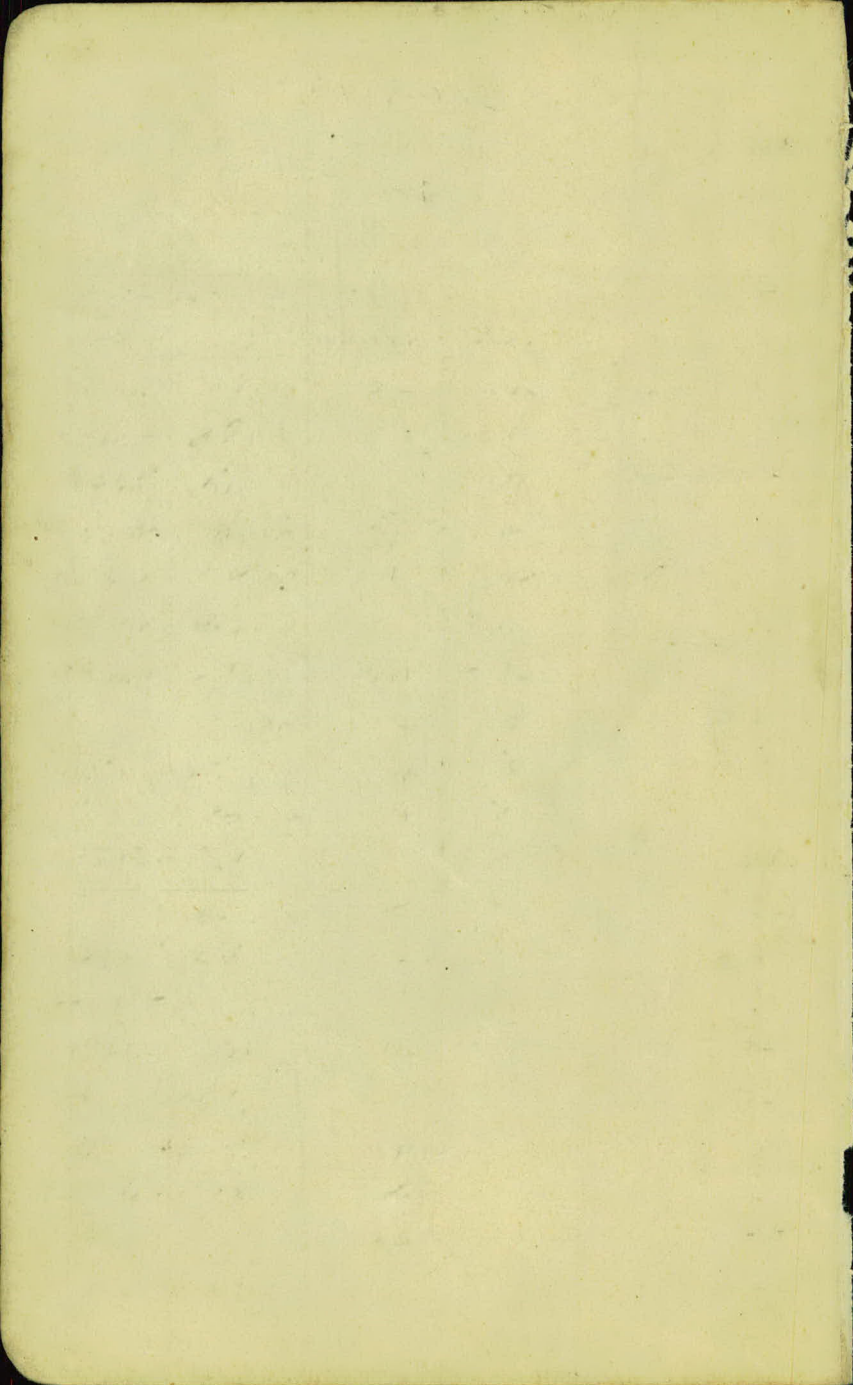
16.6  
47.6  
3.8

Book No 2

Proj. 23-650

100  
29.8  
100

21.6  
27



# INDEX

Page to Page	Class of Notes	Remarks
1 3	X-Sec. 23-60	70 to 79
4 5	" " "	145 to 153+
6	" " "	Curve left STA's Not Excess
7 8	X-Levels Int. STA's	
9 12	X-Sec. 23-60	80 to 96+65
13 17	X-Sec. " "	1245 to 145
20 26	X-Sec. " "	96+75 to 124
27	Levels for Classification	135+75 to 138+70
28 29	X-Sec. <sup>(void)</sup> Burns St. Conn.	0+70 to 3+75
30 36	X-Sec. 0+	0+00 to 41+65
37 39	Levels to figure Grade	0+00 to 20+00
40	X-Sec. Hertzell St. Conn.	
41	Grade Change	91+25 to 93+75
42 43	X-Levels Burns St. Conn.	0+25 to 8+88
44	X-Sec. " "	0+58 to 5+50
45	Measurement Foundation	wrecked House 297
46	Levels for Class. ✓	117+50 to 117+65
47 48	X-Sec.	42+00 to 48+00
49 50	X-Levels for Class. ✓	28+67 to 33+50
51 60	X-Sec.	52+00 to 70+00
61 62	" Burns St.	3+75 to 9+15
63	Levels for Class ✓	28 to 34
64	" June Est.	
65 67	X-Sec	48 to 53

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Sta	to Sta.	Class of Notes	Page	to Page
117+50	125+50	Ham Grade	68	70
		Colv. Notes	70	78

Original X sections

Sta.	Sta.	Page	Page.	Book
✓ 1+00	41+65	30	36	2
✓ 42+00	48+00	47	48	2
✓ 48+45	51+75	65	67	2
✓ 52+00	70+50	51	60	2
✓ 71+00	79+00	1	2	2
✓ 79+30	96+65	9	12	2
✓ 97+00	124+00	20	26	2
✓ 124+07	145+00	13	17	2
✓ 145+00	152+00	4	5	2
✓ 152+21	153+70	7	8	2

Additional X sections for borrow pits ect.

58+60	60+00	55	3	Lt.
99+25	104+00	32	3	Lt.
120+15	122+80	20	3	Lt.
48+50	Rt.	36	3	Rt.
✓ Burris St. Connect.	44-61-62		2	Rt.
✓ Hertzell St. So.	40		2	Lt.
Conleys FE Lt.	54		3	Lt.
McBeths FE Lt.	29		3	Lt.
89+00	93+50	27	3	Lt.

# Additional X Sections

Sta to Sta	Page to Page	Book	Remarks
29+00 30+30 <sup>1</sup>	61 61	3	Ramsey Co Property.
63+00 66+30 <sup>1</sup>	62 62	3	Rt.
64+00 66+30 <sup>1</sup>	63 63	3	Lt.

# Original Cross-sections

60' Section 20' R.B. in cuts 82' in fill

Sta	B.S.	H.I.	F.S.	Grade	Gr. Red.
B.M.	5.08	881.11 ✓			
70				869.0	12.1
+35				69.8	11.3
+50				70.15	10.9
<u>See page 60</u>					
71				71.3	9.8 ✓
+150				72.45	8.6 ✓
72				73.58	7.5 ✓
+20	7404				
+50				74.70	6.4 ✓
73				75.70	5.4 ✓
+50				76.72	4.4 ✓
74				77.27	3.8 ✓
T.P.	2.74	880.32 ✓	3.53	877.58 ✓	
+50				77.83	2.5 ✓
75				78.24	2.1 ✓
+50				78.50	1.9 ✓

400' V.C. M. 1.15'

Nesbitt  
VanCorki  
Murphy  
Nelsohn

4/2/24

1

♠

R

Spike in Elm. 30' R-72+25 Elev. 876.03

+0.54  $\frac{+7}{237} \frac{20}{253} \frac{21}{150} \frac{9.3}{42.9} \frac{7}{402} \frac{11.1}{40.4} \frac{9}{41.0} \frac{1.3}{40.3} \frac{12.0}{40.1} \frac{25.6}{256} (C.6) -0.54$   
 $\frac{6.3}{223} \frac{29.3}{448} \frac{14}{224} \frac{6.9}{10.3} \frac{5}{10.3} \frac{11.2}{10.1} \frac{10.3}{11.0} \frac{10.2}{11.1} \frac{10.8}{10.5} \frac{26.0}{260} (C.1.0)$

+0.4  $\frac{6.43}{29.2} \frac{29.2}{43.6} \frac{9}{14.0} \frac{16.9}{17.1} \frac{9.7}{17.1} \frac{9.7}{11.2} \frac{8}{16.1} \frac{9.3}{11.2} \frac{9.7}{11.2} \frac{9.6}{11.3} \frac{26.7}{26.7} (C.1.7) -0.4$

+0.06  $\frac{x}{28.8} \frac{6.0}{43.8} \frac{21}{44.1} \frac{5.7}{44.1} \frac{8}{44.1} \frac{6.2}{43.6} \frac{7.1}{45.7} \frac{7}{47} \frac{9.0}{48} \frac{8.3}{48.2} \frac{8.4x}{44.4} \frac{26.4}{26.4} -0.06$  ✓

$\frac{x}{28.2} \frac{5.4}{43.2} \frac{4.8}{43.8} \frac{5.5}{45.1} \frac{8.4}{42.9} \frac{7.6x}{41.0} \frac{26.0}{26.0}$  ✓

$\frac{x}{25.0} \frac{4.5}{43.0} \frac{8}{43.4} \frac{4.2}{43.3} \frac{4.9}{42.7} \frac{6.8x}{40.7} \frac{7.2}{40.3} \frac{6.2}{43.6} \frac{6.1}{44.3}$  ✓

$\frac{x}{27.2} \frac{4.2}{42.2} \frac{4.1}{43.3} \frac{3.7}{42.7} \frac{4.8x}{41.6} \frac{26.6}{26.6}$  ✓

$26.5 \frac{3.9}{41.5} \frac{3.9}{41.5} \frac{4.1x}{41.3} \frac{26.3}{26.3}$  ✓

$\frac{73+80}{20} = 00$

$24.5 \frac{x}{-0.5} \frac{4.3}{43} \frac{15.9}{-0.6} \frac{x}{-0.6} \frac{4.4}{44} \frac{4.3x}{-0.5} \frac{5.8}{5.8} \frac{3.8x}{+0.9} \frac{25.0}{25.0}$  ✓

$25.0 \frac{x}{-1.0} \frac{5.5}{5.5} \frac{17.7}{-1.1} \frac{x}{-1.1} \frac{3.6}{3.6} \frac{3.5x}{-1.0} \frac{17.5}{17.5} \frac{3.8}{-0.8} \frac{25}{25}$  ✓

$25.3 \frac{x}{-1.5} \frac{3.6}{3.6} \frac{18.3}{-1.5} \frac{x}{-1.5} \frac{3.7}{3.7} \frac{3.6x}{-1.5} \frac{18.3}{18.3} \frac{3.5}{-1.4} \frac{25.5}{25.5}$  ✓

$19.2 \frac{x}{-2.1} \frac{4.0}{4.0} \frac{4.1}{-2.2} \frac{4.0x}{-2.1} \frac{19.2}{19.2}$  ✓

Sta.	B.S.	H.I.	I.S.	Grade	Gr. Rod
		880.32 ✓			
76	-			878.62 ✓	1.7 ✓
	+20	* 78.64			
	+50 ✓			78.64	1.7 ✓
77	-			78.64	1.7 ✓
	+50 ✓			78.64	1.7 ✓
	0.00%				
78	-			78.64	1.7 ✓
	+140 ✓			78.64	1.7 ✓
79	✓			78.64	1.7 ✓
	* B.M.		8.39	871.93	
	+50 ✓			78.60	
	200' V.C. M.O.I.				
80	-			78.54	
	+50 ✓			78.40	
81	✓			78.24	
	* +50			78.04	
	- 0.4%				

4/2/24 (2)

L

E

R

$$\begin{array}{r} \times \\ 20.1 \\ \hline 4.4 \\ -2.7 \\ \hline \end{array}$$

$$\begin{array}{r} 43 \\ -2.6 \\ \hline \end{array}$$

$$\begin{array}{r} 40 \times \\ -2.3/19.5 \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ 20.2 \\ \hline 4.5 \\ -2.8 \\ \hline \end{array}$$

$$\begin{array}{r} 45 \\ -2.8 \\ \hline \end{array}$$

$$\begin{array}{r} 45 \times \\ -2.8/20.2 \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ 20.4 \\ \hline 4.1 \\ -2.9 \\ \hline \end{array}$$

$$\begin{array}{r} 46 \\ -2.9 \\ \hline \end{array}$$

$$\begin{array}{r} 44 \times \\ -2.7/20.1 \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ 22.2 \\ \hline 5.8 \\ -4.1 \\ \hline \end{array}$$

$$\begin{array}{r} 56 \\ -3.9 \\ \hline \end{array}$$

$$\begin{array}{r} 5.4 \times \\ -3.7/21.6 \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ 23.5 \\ \hline 6.7 \\ -5.0 \\ \hline \end{array}$$

$$\begin{array}{r} 6.6 \\ -4.9 \\ \hline \end{array}$$

$$\begin{array}{r} 6.1 \times \\ -4.4/22.6 \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ 24.9 \\ \hline 7.6 \\ -5.9 \\ \hline \end{array}$$

$$\begin{array}{r} 6.8 \\ -5.1 \\ \hline \end{array}$$

$$\begin{array}{r} 6.2 \times \\ -4.5/22.8 \\ \hline \end{array}$$

$$\begin{array}{r} 6.2 \times \\ -4.5/29.8 \\ \hline \end{array}$$

Forster

$$\begin{array}{r} \times \\ 21.1 \\ \hline 5.1 \\ -3.4 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ \hline 4.4 \\ -2.7 \\ \hline \end{array}$$

$$\begin{array}{r} 4.2 \\ -2.5 \\ \hline \end{array}$$

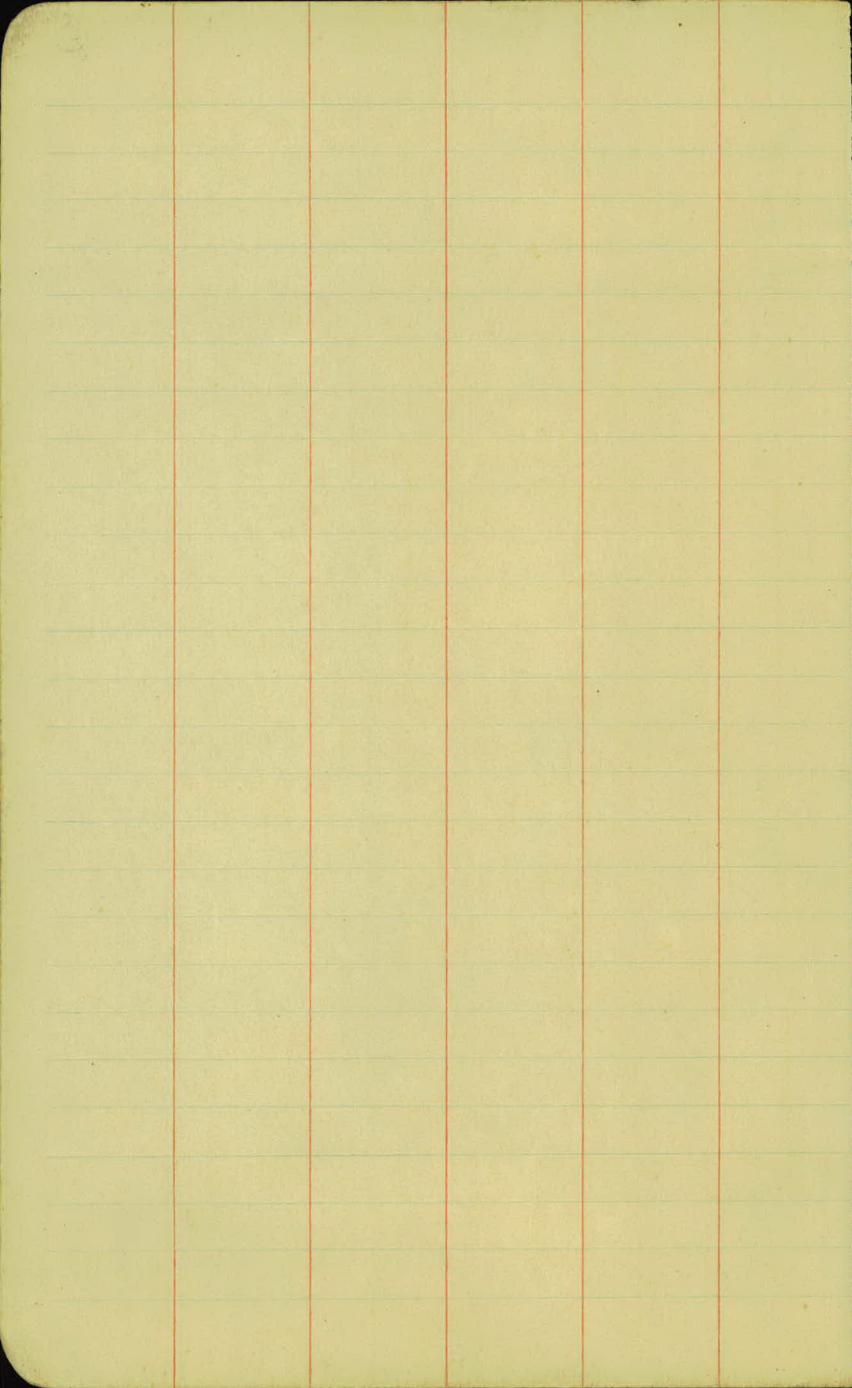
$$\begin{array}{r} 4.2 \times \\ -2.5/19.8 \\ \hline \end{array}$$

$$\begin{array}{r} 4.2 \times \\ -2.5/31.9 \\ \hline \end{array}$$

$$\begin{array}{r} \times \\ 25.4 \\ \hline 3.1 \\ -2.1 \\ \hline \end{array}$$

871.99 Spike 36' Trac 65' L-79+50

872.0

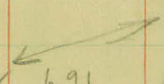




Original X-sec.

Sta	B.S.	H.I.	F.S.	Grade	Gr Rod
143				888.39	
	+50*			888.5	
144				888.6	
	+50			888.7	
BM.	9.75	894.59	✓		5
✓ 145				888.8	5.8 ✓
✓	+50			888.9	5.7 ✓
	+75			888.95	5.65 ✓
✓ 146				889.0	5.6 ✓
✓	+50			889.1	5.5 ✓
✓ 147				889.2	5.4 ✓
✓	+50			889.3	5.3 ✓
	+71.15*			889.34	
✓ 148				89.33	0.76 ✓
TR	2.41	890.09	✓	887.68	✓
✓	+50		6.91	88.96	1.1 ✓

+0.2  
 +0.2  
 +0.2



4/3/24

(4)

W.

£

R

Connor

Hosbitt

Murphy

JanKoski

Nelson

8848L spikes 24" OOK - 15'L - 142 + 24

$$\begin{array}{r} 244 \times 64 \\ -0.6 \end{array}$$

$$\begin{array}{r} 169 \times 6.4 \\ -0.6 \end{array}$$

$$\begin{array}{r} 6.4 \\ -0.6 \end{array}$$

$$\begin{array}{r} 6.3 \times \\ -0.5/16.8 \end{array}$$

$$\begin{array}{r} 6.8 \times \\ -1.0/24.0 \end{array}$$

✓

$$\begin{array}{r} 25 \times 60 \\ -0.3 \end{array}$$

$$\begin{array}{r} 165 \times 60 \\ -0.3 \end{array}$$

$$\begin{array}{r} 5.7 \\ 0.0 \end{array}$$

$$\begin{array}{r} 60 \\ -0.3/16.5 \end{array}$$

$$\begin{array}{r} 60 \\ -0.3/25 \end{array}$$

✓

$$\begin{array}{r} 25 \times 56.5 \\ +0.3 \end{array}$$

$$\begin{array}{r} 5.4 \\ +0.3 \end{array}$$

$$\begin{array}{r} 5.4 \times \\ 7.02/25.0 \end{array}$$

✓

$$\begin{array}{r} 25 \times 5.4 \\ +0.2 \end{array}$$

$$\begin{array}{r} 5.0 \\ +0.6 \end{array}$$

$$\begin{array}{r} 5.2 \times \\ +0.4/25.4 \end{array}$$

✓

$$\begin{array}{r} 25 \times 5.7 \\ +0.2 \end{array}$$

$$\begin{array}{r} 163 \times 57 \\ -0.2 \end{array}$$

$$\begin{array}{r} 5.2 \\ +0.2 \end{array}$$

$$\begin{array}{r} 5.5 \times \\ 0.0/25 \end{array}$$

✓

$$\begin{array}{r} 242 \times 62 \\ -0.8 \end{array}$$

$$\begin{array}{r} 172 \times 62 \\ -0.8 \end{array}$$

$$\begin{array}{r} 5.9 \\ -0.5 \end{array}$$

$$\begin{array}{r} 6.0 \times \\ -0.6/16.9 \end{array}$$

$$\begin{array}{r} 6.1 \times \\ -0.7/24.3 \end{array}$$

(20  
1.3) ✓

$$\begin{array}{r} 18.4 \times 6.9 \\ -1.6 \end{array}$$

$$\begin{array}{r} 6.4 \\ -1.1 \end{array}$$

$$\begin{array}{r} 6.4 \times \\ -1.1/17.7 \end{array}$$

$$\begin{array}{r} 6.5 \times \\ -1.2/23.8 \end{array}$$

(20  
0.8) ✓

$$\text{P.O.T. Hub. } 148 \times 100 \begin{array}{r} 18.9 \times 2.7 \\ -1.9 \end{array}$$

$$\begin{array}{r} 2.5 \\ -1.7 \end{array}$$

$$\begin{array}{r} 2.4 \times \\ -1.6/18.4 \end{array}$$

$$\begin{array}{r} 2.3 \times \\ -1.5/23.5 \end{array}$$

(20.05  
23.5) ✓

$$\begin{array}{r} 16.7 \times 2.9 \\ 1.3 \end{array}$$

$$\begin{array}{r} 2.5 \\ -1.4 \end{array}$$

$$\begin{array}{r} 2.4 \times \\ -1.3/18.0 \end{array}$$

$$\begin{array}{r} 2.5 \\ -1.4/23.6 \end{array}$$

(20.06  
23.6) ✓

Sta	+	Ht.	-	Grade	Gr. Rod
✓ 129		890.09 ✓		888.28	1.8 ✓
✓ +50				86.94	3.2 ✓
✓ 150				85.27	4.8 <u>4.6</u>
✓ +50				83.16	6.9 ✓
+71.5	* 6.10 ✓	894.55 ✓	11.64	82.14	878.45 ✓
✓ 151				880.70	3.9 ✓
+30				79.12	5.4 ✓
✓ +50				78.20	6.4 ✓
152				75.70	8.9 ✓
+50				73.20	11.4 ✓
+75				71.95	12.6 ✓
153				71.30	13.3 ✓
+25				71.40	13.2 ✓
+50				72.50	12.1 ✓
+75				73.40	11.2 ✓
+85	P.T. Curve Rt.			74.00	
B.M.			11.53	873.12 ✓	73.08

4/3/24

(5)

L      £      R

$$\begin{pmatrix} 000.4 \\ 23.4 \end{pmatrix} \begin{matrix} 23.4 \\ 3.4 \\ -1.6 \\ 0.1 \end{matrix} \begin{matrix} 3.2 \\ -1.4 \end{matrix} \begin{matrix} 3.1 \\ -1.3 \end{matrix} \begin{matrix} * \\ 17.2 \\ 2.9 \\ 1.1 \end{matrix} \begin{matrix} 23.8 \\ 3.0 \\ -1.2 \\ 0.6 \\ 0.8 \\ 2.38 \end{matrix}$$

$$\begin{pmatrix} 05.13 \\ 24.3 \end{pmatrix} \begin{matrix} 24.3 \\ 3.9 \\ -0.7 \end{matrix} \begin{matrix} 17.1 \\ 3.9 \\ -0.7 \end{matrix} \begin{matrix} 3.9 \\ -0.7 \end{matrix} \begin{matrix} * \\ 16.3 \\ -0.2 \end{matrix} \begin{matrix} 3.4 \\ 24.6 \\ 3.6 \\ -0.4 \end{matrix} \begin{pmatrix} 20.6 \\ 24.6 \end{pmatrix}$$

$$\begin{matrix} * \\ 25.0 \\ 4.6 \\ 0.0 \end{matrix} \quad \begin{matrix} 4.6 \\ 0.0 \end{matrix} \quad \begin{matrix} * \\ 25.3 \\ 4.3 \\ 10.3 \end{matrix}$$

$$\begin{matrix} * \\ 25.4 \\ 6.5 \\ 0.4 \end{matrix} \quad \begin{matrix} * \\ 80 \\ 6.9 \\ 0.0 \end{matrix} \quad \begin{matrix} 7.2 \\ -0.3 \end{matrix} \quad \begin{matrix} 16.2 \\ 7.2 \\ -0.3 \end{matrix} \quad \begin{matrix} * \\ 24.5 \\ 7.4 \\ -0.5 \end{matrix} \quad \begin{pmatrix} 20.15 \\ 24.5 \end{pmatrix}$$

$$\begin{matrix} * \\ 18.7 \\ 7.2 \\ -1.8 \end{matrix} \quad \begin{matrix} * \\ 20 \\ 7.1 \\ -3.2 \end{matrix} \quad \begin{matrix} 6.7 \\ -2.8 \\ 15.4 \\ 0.0 \end{matrix} \quad \begin{matrix} * \\ 17.2 \\ 4.7 \\ -0.8 \end{matrix} \quad \begin{matrix} * \\ 24.7 \\ 4.2 \\ -0.3 \end{matrix} \quad \begin{pmatrix} 20.17 \\ 24.7 \end{pmatrix}$$

$$\begin{matrix} * \\ 16.0 \\ 6.4 \\ 0.0 \end{matrix} \quad \begin{matrix} 5.1 \\ 1.3 \end{matrix} \quad \begin{matrix} * \\ 29.2 \\ 7.2 \\ -4.2 \end{matrix}$$

$$\begin{matrix} * \\ 25.0 \\ 8.9 \\ 0.0 \end{matrix} \quad \begin{matrix} 6.9 \\ +2.0 \end{matrix} \quad \begin{matrix} * \\ 29.2 \\ 4.4 \\ -4.2 \end{matrix}$$

\* rest Curves Lt. page 6

$$\begin{matrix} * \\ 10.3 \\ 13.2 \\ 0.0 \end{matrix} \quad \begin{matrix} 9.0 \\ +4.3 \end{matrix} \quad \begin{matrix} * \\ 32 \\ 6.2 \\ 7.1 \end{matrix} \quad \begin{matrix} * \\ 8.9 \\ 7.4 \\ +4.3 \end{matrix} \quad \begin{matrix} * \\ 5.0 \\ 5.8 \\ 3.2 \\ +7.2 \end{matrix}$$

$$\begin{matrix} * \\ 8.0 \\ 12.1 \\ 0.0 \end{matrix} \quad \begin{matrix} * \\ 5.0 \\ 7.0 \\ 7.1 \end{matrix} \quad \begin{matrix} * \\ 11.2 \\ 3.7 \\ 7.2 \end{matrix}$$

87286 Spk. in T.P. 10' L - 153+75

## Slope stakes Curve Left End Project

Sta.	+	H.I.	-	Grade	Gr. Rod.
BM.		84.55	✓		
52 + 21				74.7	9.9 ✓
+50				73.20	11.4 ✓
+75				71.95	12.6 ✓
TP	5.04	878.06	✓	11.53	873.02 ✓
53				70.70	7.4 ✓
+25				69.45	8.6 ✓
+50				68.20	9.9 ✓
+77.6	P.T.			66.80	11.3 ✓

L

E

R

87286 Spike TP 10 L - 153 + 7.5

$$\begin{array}{r} 29.0 \\ 240 \end{array}$$

$$\begin{array}{r} 17.0 \\ 99 \\ \hline 00 \end{array}$$

$$\begin{array}{r} 8.5 \\ +1.4 \end{array}$$

$$\begin{array}{r} 29.2 \\ 242 \end{array}$$

$$\begin{array}{r} 14 \\ 114 \\ \hline 00 \end{array}$$

$$\begin{array}{r} 100 \\ +1.4 \end{array}$$

$$\begin{array}{r} 29.2 \\ 242 \end{array}$$

$$\begin{array}{r} 15.0 \\ 12.6 \\ \hline 00 \end{array}$$

$$\begin{array}{r} 11.6 \\ +1.0 \end{array}$$

$$\begin{array}{r} 29.8 \\ 248 \end{array}$$

$$\begin{array}{r} 21.8 \\ 74 \\ \hline 00 \end{array}$$

$$\begin{array}{r} 5.7 \\ +1.7 \end{array}$$

$$\begin{array}{r} 25.0 \\ 86 \\ \hline 00 \end{array}$$

$$\begin{array}{r} 10.8 \\ -2.2 \end{array}$$

$$\begin{array}{r} 29.5 \\ 245 \end{array}$$

$$\begin{array}{r} 17.8 \\ 11.1 \\ \hline -1.2 \end{array}$$

$$\begin{array}{r} 11.4 \\ -1.5 \end{array}$$

$$\begin{array}{r} 17.4 \\ 18.8 \\ \hline -0.9 \end{array}$$

$$\begin{array}{r} 10.8 \\ +0.5 \end{array}$$

Cross Levels Intersection S.T.H. 3

Sta.	+	H.I.	-	Elev.
BM.	11.53	884.39 ✓		872.86
152+21			8.5	875.9 ✓
+50			9.2	75.2 ✓
+75			9.4	75.0 ✓
153			9.0	75.4 ✓
+18			8.0	76.4 ✓
+37				869.3 ✓
+43				870.0 ✓
+53				870.5 ✓
+70				871.0 ✓
BM.	5.04	877.90 ✓		872.86
153				875.4 ✓
+18				876.4 ✓

A/8/24

(7)

L

E

R

Spike in T.P. 10' L- 153+75

$$\frac{11.2}{88}$$

$$\frac{10.4}{24}$$

8.5

$$\frac{5.7}{19.}$$

$$\frac{4.4}{35}$$

✓

$$\frac{13.7}{40}$$

$$\frac{12.1}{23}$$

9.2

$$\frac{6.6}{21}$$

$$\frac{4.7}{86}$$

✓

$$\frac{13.8}{47}$$

$$\frac{11.7}{23}$$

9.4

$$\frac{6.8}{21}$$

$$\frac{5.0}{40}$$

✓

$$\frac{12.5}{29}$$

$$\frac{10.1}{23}$$

9.0

$$\frac{6.6}{28}$$

$$\frac{5.4}{47}$$

✓

$$\frac{12.8}{15}$$

8.0

$$\frac{6.4}{29}$$

$$\frac{5.2}{50}$$

✓

15.1

$$\frac{12.2}{12}$$

$$\frac{5.6}{28}$$

$$\frac{4.8}{50}$$

✓

14.4

$$\frac{11.1}{20}$$

$$\frac{4.8}{37}$$

$$\frac{3.8}{60}$$

✓

13.9

$$\frac{11.5}{32}$$

$$\frac{3.4}{50}$$

$$\frac{3.0}{65}$$

✓

13.4

$$\frac{9.8}{50}$$

$$\frac{10.4}{59}$$

$$\frac{7.5}{78}$$

$$\frac{6.2}{88}$$

$$\frac{10.9}{80}$$

$$\frac{11.1}{60}$$

$$\frac{10.2}{50}$$

2.5

✓

$$\frac{108}{76}$$

$$\frac{10.0}{58}$$

$$\frac{9.8}{32}$$

1.5

✓

Cont From Page 7

Sta.	+	H. 1	-	Elev.
153+37		877.90 ✓	86	869.3 ✓
+43			79	870.0 ✓
+53			74	870.5 ✓
+70			69	871.0 ✓

4/3/24

8

L                      C                      R

$$\frac{9.8}{45} \quad \frac{8.9}{22} \quad 86$$

$$\frac{9.5}{41} \quad \frac{8.5}{22} \quad 79 \quad \frac{79}{15}$$

$$\frac{8.6}{42} \quad \frac{9.2}{23} \quad 74 \quad \frac{6.5}{22} \quad \frac{6.5}{32}$$

$$69 \quad \frac{47}{31}$$

Original X-Sections

Sta	+	Ht.	-	Grade	Gr. Rod
	8.51	880.50	✓		
79				878.64	1.9 ✓
+30				78.6	1.9 ✓
+40				78.6	1.9 ✓
+50				878.60	1.9 ✓
80				878.54	2.0 ✓
+50 ✓				78.30	2.2 ✓
81 ✓				878.24	2.3 ✓
+50 ✓				78.0	2.5 ✓
82 ✓				877.8	2.7 ✓
TP	3.23	880.64	✓	3.09	877.41 ✓
+50 ✓				77.6	3.0 ✓
83 ✓				877.4	3.2 ✓

200 Y.C. M=0.1

-0.4%

4/6/24

9

L    C    R

871.99 ✓

$$325 \overline{) 76} \\ -57$$

$$18.3 \overline{) 2.1} \\ -1.5 \\ \hline 73.1 \overline{) 6.6} \\ -4.7$$

$$2.9 \\ -1.0 \\ \hline 5.2 \\ -3.3$$

$$2.9^y \\ -1.0/175 \\ \hline 2.5 \\ -2.6/10$$

$$3.9^y \\ -2.0/19.0$$

$$3.6 \\ \hline 4.7$$

$$31.8 \overline{) 45} \\ -2.6$$

$$19 \overline{) 3.9} \\ -2.0$$

$$3.3 \\ -1.4$$

$$3.2^y \\ -1.3/20$$

$$8.2 \\ -1.3/31.7$$

$$19.5 \overline{) 7.3} \\ -2.3$$

$$4.2 \\ -2.2$$

$$4.0^y \\ -2.0/19.0$$

$$3.6^y \\ -1.6/23.4$$

$$19.5 \overline{) 45} \\ -2.3$$

$$3.9 \\ -1.7$$

$$3.7^y \\ -1.5/18.3$$

$$3.8^x \\ -1.6/23.4$$

$$246 \overline{) 33} \\ -7.0$$

$$17.5 \overline{) 3.3} \\ -1.0$$

$$3.0 \\ -0.7$$

$$2.9^y \\ -0.6/16.9$$

$$2.7^y \\ -0.4/24.6$$

$$25.4 \overline{) 2.1} \\ +0.4$$

$$2.5 \\ 0.0$$

$$2.3^x \\ +0.2/25.2$$

$$25.7 \overline{) 2.0} \\ +0.7$$

$$1.9 \\ +0.8$$

$$1.6^y \\ \hline 4.1/26.1$$

$$425 \frac{00}{20}$$

$$+30 = \frac{00}{00}$$

$$17.6 \overline{) 4.2} \\ -1.2$$

$$8.9 \\ -0.7$$

$$3.8 \\ \frac{00}{00}/19$$

$$3.0^x \\ \frac{00}{00}/25.0$$

$$23.7 \overline{) 45} \\ -1.3$$

$$18.0 \overline{) 45} \\ -1.3$$

$$3.4 \\ -0.2$$

$$3.2 \\ \frac{00}{00}/4$$

$$2.4^x \\ +0.8/25.8$$

Cont From Page 9

88064 ✓

83+50 ✓				877.2	3.4 ✓
84 ✓				77.1	3.5 ✓
+30 ✓				77.1	3.5 ✓
+50 ✓				77.0	3.6 ✓
85 ✓				77.0	3.6 ✓
+50 ✓				77.0	3.6 ✓
TP ✓	4.31	882.61 ✓	2.34		878.30 ✓
86 ✓				77.0	5.6 ✓
+50 ✓	3.75	882.05 ✓		77.0	878.30- 5.1 ✓
87 ✓				77.0	5.1 ✓
+50 ✓				77.0	5.1 ✓
+85 ✓		87.88 = $\frac{00}{2}$		77.0	5.1 ✓
88 ✓				77.1	5.0 ✓
+50 ✓				77.2	4.9 ✓
89 ✓				77.5	4.6 ✓

L      £      R

$$\begin{array}{cccc} \times & & & \\ -2.8 & & & \\ \hline 20.2 & -1.5 & -0.4 & 00^x \\ & & 16 & 25 \end{array}$$

$$\begin{array}{cccccccc} \times & & & & & & & \\ -12.6 & -13.0 & -9.6 & -8.1 & & & & \\ \hline 36.9 & 30 & 25 & 12 & -5.8 & & -3.2^x & \\ \times & & & & & & & \\ -2.6 & -2.0 & -15.5 & -15.7 & -11.1 & -6.4 & & \\ \hline 50.4 & 46 & 34 & 32 & 24 & 8 & -4.8 & \\ \times & & & & & & & \\ -18.5 & -14.6 & -14.6 & -10.0 & -5.0 & -4.3 & & \\ \hline 45.8 & 36 & 34 & 24 & 11 & 7 & -3.7 & \end{array}$$

$$\begin{array}{cccc} \times & & & \\ -5.7 & -3.2 & & \\ \hline 24.6 & 17 & -2.3 & \\ & & 00 & \\ & & 16 & +0.9^x \\ & & & 25.9 \end{array}$$

+40:00

$$\begin{array}{cccc} \times & & & \\ -1.7 & 00 & & \\ \hline 23.3 & 14 & +0.4 & \\ & & +2.2 & \\ & & 16 & +2.4^x \\ & & & 27.4 \end{array}$$

$$+0.3-3 \quad \left( \frac{D.6.15}{24.5} \right) -0.2 \quad \frac{+0.3}{24.5} \quad \frac{+1.5}{19} \quad \frac{+1.5}{14} \quad +1.2 \quad \frac{+2.2^x}{28.6} \quad \left( \frac{+2.5}{28.6} \right) \quad -0.35$$

$$+0.8-5 \quad \left( \frac{-1.9}{18.6} \right) -0.9 \quad -0.4 \quad \frac{+0.5}{15} \quad +0.9 \quad \frac{+2.1}{29.1} \quad \left( \frac{+3.0}{29.1} \right) \quad -0.95$$

$$+0.9-5 \quad \left( \frac{-1.3}{17.2} \right) -0.1 \quad \frac{+0.1}{17} \quad \frac{+2.0}{9} \quad +2.0 \quad \frac{+3.7}{32.1} \quad \left( \frac{+4.8}{32.1} \right) \quad -1.1-5$$

+4-3=00

$$+0.9-5 \quad \left( \frac{-4.6}{22.3} \right) -3.3 \quad -2.6 \quad -0.5 \quad -0.4 \quad \frac{00}{5} \quad \frac{+2.1}{30.5} \quad \left( \frac{+3.2}{30.5} \right) \quad -1.1-5$$

$$+0.9-5 \quad \left( \frac{-5.3}{23.2} \right) -3.9 \quad -2.6 \quad -2.2 \quad \frac{00}{23} \quad \frac{+0.5}{28.9} \quad \left( \frac{+1.6}{28.9} \right) \quad -1.1-5$$

$$+0.9-5 \quad -2.2 \quad -1.9 \quad -1.4 \quad \frac{00}{20} \quad \frac{+0.7}{29.1} \quad -1.1-5$$

+13=00

$$+0.9-5 \quad -2.1 \quad \frac{+2.9}{48} \quad \left( \frac{+1.5}{26.5} \right) \quad \frac{+2.4}{26.5} \quad +2.9 \quad \frac{+3.1}{31.5} \quad \left( \frac{+4.2}{31.5} \right) \quad -1.1-5$$

$$+0.6-5 \quad \frac{0.0}{15} \quad \frac{+2.1}{73} \quad \frac{+2.7}{50} \quad \left( \frac{+3.2}{16} \right) \quad \frac{+3.8}{16} \quad +4.0 \quad \frac{+4.4}{32.1} \quad \left( \frac{+5.1}{32.1} \right) \quad -0.7-5$$

N -3.4 / 9.7

Cont. From page 10

TP	6.00	882.05 884.90 ✓	3.15		878.90
89+50		10° GR. 89+77 <sup>U</sup> Pt.		877.60	7.3 ✓
90				77.40	7.5 ✓
+50				76.90	8.0 ✓
+85				876.40	8.5 ✓
91				876.1	8.8 ✓
+50				75.15	9.7 ✓
92				74.2	10.7 ✓
TP	2.38	875.01 ✓	12.27		872.63 ✓
+25				73.73	1.3 ✓
+50				73.37	1.6 ✓
TP	0.91	864.91 ✓	11.01		864.00 ✓
+65				73.26	<del>8.5</del> 8.4 ✓
TP	1.10	854.51 ✓	11.50		853.41 ✓
+76				73.23	-18.7 ✓
+88				73.04	-18.5 ✓
93+				73.40	-18.9 ✓

Note: Grade change 91+50-93+50  
see page 41

3

L E R

-2.6 -2.3 +1.7 +3.6 +3.3 +3.7 +3.8 +4.5 / 31.0 (+5.0 / 31.0) ✓ -0.5  
 12.9 12.0 10.0 5.0 16 16 1.0

-3.0 +4.4 +4.7 +3.8 +3.9 +4.4 +5.3 / 30.3 ✓ 0.0  
 16.0 10.0 9.3 5.0 7.6

-3.0 +2.9 +3.8 +4.3 +5.0 +4.0 +4.6 +5.0 / 29.1 (+4.1 / 29.1) ✓ +0.9  
 14.8 12.0 9.0 5.4 18 18

-3.0 +1.5 +1.5 +2.2 +3.7 +5.4 +4.8 / 28.9 ✓  
 11.2 10.0 7.6 5.0 7.7

-3.0 +1.4 +1.8 +2.7 +4.4 +4.7 / 8 +5.9 / 8 +5.3 / 27.4 +4.4 / 29.4 ✓ +0.9  
 7.6 7.4 5.0 12.7 12.7

-3.0 +1.2 (+3.2) +2.1 +3.1 +3.7 +5.3 / 29.4 (+3.4 / 28.4) ✓ -0.7  
 11.1 3.1 18.2 18.7 9

(-2.4) -3.3 0.0 +1.1 +1.7 +2.7 (+1.8) +0.4 ✓ +0.4  
 23.6 23.6 6 26.8 26.8

+13.00

2.5 2.0 (-1.9) -9.5 -1.7 +0.4 / 16 (0.0 / 16) (+0.3) +0.7 / 25.3 ✓ +0.4  
 32.5 32.5

(-23.9) -22.8 -17.5 -12.9 -7.6 (-8.6) ✓ +0.2  
 54.2 54.2 36 17 31.7 31.7

-38.2 -34.0 -26.3 -21.2 -18.7 -16.7 -16.0 -16.1 (-16.9) ✓ 0.0  
 20 Top 77.3 66 47 36 15 24 44.1 44.1 20 Top

(-40.1) -40.3 -39.4 -33.4 -28.0 -24.9 -23.3 -23.7 -23.0 (+24.2) ✓ 0.2  
 77.3 77.3 64 46 37 18 26 54.5 54.6 20

-37.9 (-39.8) -31.1 -34.8 -36.0 -33.1 -31.3 -27.8 -27.9 -24.8 -25.7 ✓  
 76.9 76.9 69.7 42 29 24 41 49 57.8 57.8

-23.8 -22.4 -24.5 -23.1 -24.6 -22.5 -24.4 -25.9 -26.9 -0.3 ✓  
 54.1 54.1 37 15 12 35 50 59.4 59.4 20

Cont. From page 11

		854.51			
93 + 25	150 ✓ C.M. = 1.0635 +40% X	11.71	865.1 ✓	0.1	873.75 - 19.2
TP + 50		12.82	877.38 ✓	0.56	74.41
TP + 75		8.57	885.39 ✓	0.56	75.3
					853.41 864.56 ✓ 3.0 ✓ 876.82 ✓ 10.1 ✓
94 ✓	150 ✓ C.M. = 1.125 +20% X				76.17 9.2 ✓
+ 25					76.80
+ 50 ✓					77.17 8.2 ✓
+ 75					77.30
95 ✓	150 ✓ C.M. = 1.125 +20% X				77.17 8.2 ✓
B.M.				2.30	883.09 ✓
+ 25					76.80
+ 50 ✓					76.30 9.1 ✓
+ 75				75.86 9.5 ✓	
96 ✓					75.55 9.8 ✓
+ 15					75.4 10.0 ✓
+ 35					75.33 10.1 ✓
TP		10.75	885.61 ✓	10.53	874.86 ✓
+ 65				75.30 10.3 ✓	

See page 20

5/15/24

(12)

L                      £                      R

0.4       $\begin{pmatrix} -11.0 \\ 35.0 \end{pmatrix}$        $\begin{pmatrix} -9.6 \\ 33.0 \end{pmatrix}$        $\begin{pmatrix} -9.6 \\ 12 \end{pmatrix}$       -8.9       $\begin{pmatrix} -8.8 \\ 23 \end{pmatrix}$        $\begin{pmatrix} -10.5 \\ 35.8 \end{pmatrix}$        $\begin{pmatrix} -11.1 \\ 35.8 \end{pmatrix}$       ✓ -0.4  
2.2

0.6       $\begin{pmatrix} -1.7 \\ 18.6 \end{pmatrix}$        $\begin{pmatrix} -1.1 \\ 18.6 \end{pmatrix}$        $\begin{pmatrix} -1.2 \\ 16 \end{pmatrix}$       -0.9       $\begin{pmatrix} -0.6 \\ 18 \end{pmatrix}$   $\begin{pmatrix} 0.0 \\ 18 \end{pmatrix}$        $\begin{pmatrix} -0.9 \\ 26.7 \end{pmatrix}$        $\begin{pmatrix} 0.17 \\ 26.7 \end{pmatrix}$       ✓ +0.6  
2.2  
+55=00

+0.9       $\begin{pmatrix} +2.4 \\ 27.4 \end{pmatrix}$       +3.3      +3.3 ✓      +3.3       $\begin{pmatrix} +3.3 \\ 31.6 \end{pmatrix}$        $\begin{pmatrix} +4.4 \\ 31.6 \end{pmatrix}$       ✓ -1.1  
2.2

+0.9       $\begin{pmatrix} +3.3 \\ 28.3 \end{pmatrix}$        $\begin{pmatrix} +4.2 \\ 28.3 \end{pmatrix}$       +4.9      +4.8       $\begin{pmatrix} +5.9 \\ 33.3 \end{pmatrix}$       ✓ -1.1  
2.4

+0.9       $\begin{pmatrix} +3.3 \\ 28.3 \end{pmatrix}$        $\begin{pmatrix} +4.2 \\ 28.3 \end{pmatrix}$       +4.9      +4.8       $\begin{pmatrix} +5.9 \\ 33.3 \end{pmatrix}$       ✓ -1.1  
2.4

+0.8       $\begin{pmatrix} +2.5 \\ 27.5 \end{pmatrix}$       +3.3      +3.9      +4.0       $\begin{pmatrix} +4.9 \\ 31.9 \end{pmatrix}$        $\begin{pmatrix} +4.9 \\ 31.9 \end{pmatrix}$       ✓ -0.9  
2.0

0.6       $\begin{pmatrix} +2.7 \\ 27.2 \end{pmatrix}$       +2.8      +2.8      +2.7       $\begin{pmatrix} 2.7 \\ 29.6 \end{pmatrix}$        $\begin{pmatrix} 2.34 \\ 29.6 \end{pmatrix}$       ✓ -0.7  
1.2

5 PK 12'00K N'R- 94+75

0.4      -0.4  
0.3

+45=00

3       $\begin{pmatrix} +0.3 \\ 25.3 \end{pmatrix}$       +0.6       $\begin{pmatrix} 0.6 \\ 25.3 \end{pmatrix}$       0.9      -0.4       $\begin{pmatrix} 0.0 \\ 5 \end{pmatrix}$        $\begin{pmatrix} +2.7 \\ 28.0 \end{pmatrix}$        $\begin{pmatrix} +3.0 \\ 28.0 \end{pmatrix}$       ✓ -0.3  
0.0

2       $\begin{pmatrix} -5.1 \\ 22.9 \end{pmatrix}$        $\begin{pmatrix} -4.4 \\ 22.9 \end{pmatrix}$        $\begin{pmatrix} -3.7 \\ 10 \end{pmatrix}$       -2.0       $\begin{pmatrix} 0.0 \\ 11 \end{pmatrix}$        $\begin{pmatrix} +3.1 \\ 28.3 \end{pmatrix}$        $\begin{pmatrix} +3.3 \\ 28.3 \end{pmatrix}$       ✓ -0.2  
0.0

0       $\begin{pmatrix} -11.7 \\ 34.7 \end{pmatrix}$        $\begin{pmatrix} -11.1 \\ 34.7 \end{pmatrix}$        $\begin{pmatrix} -10.7 \\ 26 \end{pmatrix}$        $\begin{pmatrix} -7.7 \\ 13 \end{pmatrix}$       -3.1       $\begin{pmatrix} 0.0 \\ 12 \end{pmatrix}$       +2.2       $\begin{pmatrix} +2.8 \\ 27.8 \end{pmatrix}$       ✓ -0.0  
0.0

0       $\begin{pmatrix} -18.8 \\ 46.9 \end{pmatrix}$        $\begin{pmatrix} -17.9 \\ 46.9 \end{pmatrix}$        $\begin{pmatrix} 25.2 \\ 36.0 \end{pmatrix}$        $\begin{pmatrix} -9.4 \\ 18 \end{pmatrix}$       -3.9       $\begin{pmatrix} -1.4 \\ 9 \end{pmatrix}$        $\begin{pmatrix} 0.0 \\ 16 \end{pmatrix}$       ✓

0.0       $\begin{pmatrix} -14.1 \\ 39.1 \end{pmatrix}$        $\begin{pmatrix} -13.4 \\ 39.1 \end{pmatrix}$        $\begin{pmatrix} -7.6 \\ 17 \end{pmatrix}$       -4.2       $\begin{pmatrix} -0.5 \\ 16.8 \end{pmatrix}$        $\begin{pmatrix} 0.0 \\ 18 \end{pmatrix}$       +1.7       $\begin{pmatrix} +1.8 \\ 26.8 \end{pmatrix}$       ✓ -0.0

+58=00

0.0       $\begin{pmatrix} 0.0 \\ 23.6 \end{pmatrix}$       -1.4      -0.4       $\begin{pmatrix} 0.0 \\ 13 \end{pmatrix}$       +1.5      +3.9      ✓  
28.9

Original X-56.

Sta	B.S	I.H.	F.S	Grade	Gr. Rod
B.M. 120				835.76	
+50				36.94	
121				37.99	
+50				38.91	
122				39.76	
+50				40.61	
123				41.46	
+25				41.92	
+50				42.41	
TP	0.39		833.81 ✓	42.77	833.42
124				43.71	
+25				44.23	
+41				44.6	
+50				44.94	
+75				45.70	

300' V.C. M = 0.6

+11.7%

400' V.C. M = 1.65

D=2030' Lt. Maximorn Super - 20.3

L

E

R

$$\begin{array}{r} -19.7 \\ 47.6 \end{array}$$

$$\begin{array}{r} -18.4 \\ 47.6 \end{array}$$

$$-14.8$$

$$\begin{array}{r} -12.0 \\ 32.0 \end{array}$$

$$\begin{array}{r} -12.4 \\ 37.0 \end{array}$$

$$\begin{array}{r} -34.9 \\ 67.8 \end{array}$$

$$\begin{array}{r} -35.2 \\ 67.8 \end{array}$$

$$\begin{array}{r} -32.6 \\ 48 \end{array}$$

$$\begin{array}{r} -25.9 \\ 15 \end{array}$$

$$-27.2$$

$$\begin{array}{r} -22.0 \\ 33 \end{array}$$

$$\begin{array}{r} -17.4 \\ 46.1 \end{array}$$

$$\begin{array}{r} -18.3 \\ 46.1 \end{array}$$

$$\begin{array}{r} -33.6 \\ 50 \end{array}$$

$$\begin{array}{r} -32.0 \\ 50 \end{array}$$

$$\begin{array}{r} -32.0 \\ 50 \end{array}$$

$$\begin{array}{r} -31.0 \\ 30 \end{array}$$

$$-32.0$$

$$\begin{array}{r} -31.0 \\ 21 \end{array}$$

$$\begin{array}{r} -29.8 \\ 46 \end{array}$$

$$\begin{array}{r} -26.7 \\ 60.1 \end{array}$$

$$\begin{array}{r} -24.4 \\ 50 \end{array}$$

$$\begin{array}{r} -20.7 \\ 50 \end{array}$$

$$\begin{array}{r} -20.5 \\ 34 \end{array}$$

$$\begin{array}{r} -29.6 \\ 21 \end{array}$$

$$\begin{array}{r} -29.5 \\ 7 \end{array}$$

$$\begin{array}{r} -32.0 \\ 21 \end{array}$$

$$\begin{array}{r} -31.8 \\ 46 \end{array}$$

$$\begin{array}{r} -29.9 \\ 63.6 \end{array}$$

$$\begin{array}{r} -20.5 \\ 63.6 \end{array}$$

$$\begin{array}{r} -16.8 \\ 45.2 \end{array}$$

$$\begin{array}{r} -18.9 \\ 30 \end{array}$$

$$\begin{array}{r} -27.9 \\ 15 \end{array}$$

$$\begin{array}{r} -29.1 \\ 15 \end{array}$$

$$-29.0$$

$$\begin{array}{r} -21.9 \\ 9 \end{array}$$

$$\begin{array}{r} -18.4 \\ 10 \end{array}$$

$$\begin{array}{r} -18.8 \\ 21 \end{array}$$

$$\begin{array}{r} -29.1 \\ 51 \end{array}$$

$$\begin{array}{r} -30.1 \\ 65.2 \end{array}$$

$$\begin{array}{r} -21.6 \\ 65.2 \end{array}$$

Cont From page 12

D: 2030' H Super 20.5

Sta.	+	H.I.	-	Grade	Gr. Rod
	981	843.23 ✓			833.42
125				846.51	-3.2 ✓
+25				47.37	-4.2 ✓
✓ +50				48.29	-5.1 ✓
+75				49.25	-6.1 ✓
TP	12.05	854.72 ✓	0.56	842.67 ✓	
✓ 126				50.27	4.4 ✓
+25				51.34	3.4 ✓
✓ +50				52.46	2.2 ✓
TP	12.09	866.65 ✓	0.16	854.56 ✓	
+75				53.64	13.1 ✓
✓ 127				54.86	11.8 ✓
✓ +50				57.36	9.3 ✓
TP	12.14	877.28 ✓	1.51	865.14 ✓	
+75				58.61	18.7 ✓
✓ 128				59.86	17.4 ✓
+25				61.11	16.2 ✓
TP	11.90	883.28 ✓	5.90	871.38 ✓	
✓ +50				62.36	20.9 ✓

400' V.C. 165  
2010  
10

L E R

$$\begin{array}{cccccccccccc}
 -14.2 & \frac{+14.9}{41.3} & \frac{-15.5}{15} & \frac{-21.3}{9} & -24.5 & \frac{-28.1}{9} & \frac{-28.1}{16} & \frac{-24.2}{20} & \frac{-16.2}{22} & \frac{-16.9}{35} & \frac{-17.7}{46} & \frac{+18.6}{46}
 \end{array}$$

$$\begin{array}{cccccccc}
 \frac{(-12.9)}{38.5} & \frac{-12.3}{38} & -13.4 & \frac{-15.3}{4} & \frac{-27.3}{16} & \frac{-27.3}{20} & \frac{-14.2}{30} & \frac{-15.3}{43.0} & \frac{(-14)}{43}
 \end{array}$$

$$\begin{array}{cccccccccccc}
 \frac{(-12.5)}{37.9} & -11.9 & -11.7 & \frac{-11.5}{6} & \frac{-22.0}{18} & \frac{-22.7}{20} & \frac{-28.3}{26} & \frac{-2.8}{31} & \frac{-20.3}{35} & \frac{-14.6}{44} & \frac{-14.6}{46} & \frac{+13.6}{46}
 \end{array}$$

$$\begin{array}{cccccccccccc}
 \frac{(-8.5)}{29.6} & -7.7 & \frac{-9.8}{18} & -10.4 & \frac{-11.2}{21} & \frac{-15.6}{26} & \frac{-20.8}{21} & \frac{-25.4}{40} & \frac{-25.9}{48} & \frac{-21.3}{52.0} & \frac{-22.4}{52.0}
 \end{array}$$

$$\begin{array}{cccccccccccc}
 \frac{(-21)}{27.8} & \frac{+6.5}{27.8} & -8.6 & \frac{-10.5}{25} & \frac{-15.7}{33.0} & \frac{-22.7}{41.9} & \frac{-18.3}{47.5} & \frac{-19.2}{47.5} & -0.6 & \frac{(-2.0)}{18.7} & \frac{-1.8}{18.7} & -4.0 & \frac{(-4.8)}{6} & \frac{-5.8}{70} & \frac{-9.2}{22} & \frac{-15.2}{30} & \frac{-106}{338} & \frac{-117}{338}
 \end{array}$$

$$\begin{array}{cccccccccccc}
 \frac{+5.2}{30.2} & \frac{+4.0}{24} & \frac{+1.4}{20} & \frac{-0.0}{6} & -1.2 & \frac{-2.3}{6} & \frac{-6.6}{17} & \frac{-7.0}{14} & \frac{-8.8}{30.2} & \frac{(-9.7)}{30.2}
 \end{array}$$

$$\begin{array}{cccccccc}
 \frac{+7.6}{32.6} & \frac{+6.6}{25} & \frac{+2.1}{10} & \frac{00}{4} & -0.6 & \frac{-3.6}{12} & \frac{-4.1}{22.2} & \frac{(-4.5)}{22.2} \\
 \frac{+10.3}{25.3} & \frac{-2.8}{26} & \frac{+2.5}{7} & \frac{+0.4}{2} & \frac{+0.4}{2} & \frac{-2.3}{8} & \frac{-3.0}{26.5} & \frac{(-3.3)}{20.0} \\
 \frac{+4.9}{29.9} & \frac{+3.6}{18} & \frac{+2.0}{15} & \frac{+3.8}{3} & \frac{+3.8}{3} & \frac{+3.9}{13} & \frac{+5.1}{30.1}
 \end{array}$$

$$\begin{array}{cccccccc}
 \frac{+6.2}{31.2} & \frac{+5.7}{24} & \frac{+2.1}{16} & \frac{+8.8}{11} & +8.4 & \frac{+7.4}{11} & \frac{+8.4}{33.4} \\
 \frac{+7.4}{32.4} & \frac{+7.4}{28} & \frac{+10.4}{14} & +11.5 & \frac{+11.1}{36.1} \\
 \frac{+8.2}{23.2} & \frac{+11.8}{16} & +13.3 & \frac{+14.1}{20} & \frac{+14.1}{39.1}
 \end{array}$$

$$\begin{array}{cccc}
 \frac{+9.8}{34.8} & \frac{+9.6}{26} & \frac{+11.3}{21} & +13.4 & \frac{+14.6}{39.6}
 \end{array}$$

Cont. From page 14

Sta	+	H.I.	-	Grade	Gr. Ref
		883.28 ✓			
✓ 129				864.86	18.4 ✓
✓ +50				67.36	15.9 ✓
BM.	0.00			883.33	
✓ 130	0.00			69.86	13.4 ✓
	+5.00				
✓ +50				72.36	10.9 ✓
	+96" = D.T.				
✓ 131				74.86	8.4 ✓
	+11.73	892.69 ✓	2.32	880.96 ✓	
✓ +50				77.27	15.4 ✓
✓ 132				79.41	13.3 ✓
✓ +50				81.22	11.5 ✓
✓ 133				82.80	9.9 ✓
✓ +50				84.02	8.7 ✓
✓ 134				84.94	7.8 ✓
	+15" P.C.				
✓ +50				85.61	7.1 ✓

110° Rkt. ± 0.923 m.

L E R

$\begin{array}{r} +90 \\ \hline 340 \end{array}$	$\begin{array}{r} +10.7 \\ \hline 6 \end{array}$	+11.8	$\begin{array}{r} +12.9 \\ \hline 11 \end{array}$	$\begin{array}{r} +13.1 \times \\ \hline 38.1 \end{array}$	✓
--	--	-------	---	--	---

$\begin{array}{r} +7.6 \\ \hline 82.6 \end{array}$	$\begin{array}{r} +7.4 \\ \hline 26 \end{array}$	+9.3		$\begin{array}{r} +10.4 \\ \hline 35.4 \end{array}$	✓
--	--	------	--	---	---

Nail F.P. 35' R - 130 + 50

$\begin{array}{r} +6.4 \\ \hline 31.4 \end{array}$		+7.2		$\begin{array}{r} +8.3 \\ \hline 33.3 \end{array}$	✓
--	--	------	--	--	---

$\begin{array}{r} +5.0 \\ \hline 30.0 \end{array}$		+5.9		$\begin{array}{r} +7.9 \\ \hline 32.9 \end{array}$	✓
--	--	------	--	--	---

$\begin{array}{r} +3.5 \\ \hline 28.5 \end{array}$		+4.6		$\begin{array}{r} +7.6 \\ \hline 32.6 \end{array}$	✓
--	--	------	--	--	---

$\begin{array}{r} +2.0 \\ \hline 27.0 \end{array}$		+2.9		$\begin{array}{r} +5.3 \\ \hline 30.3 \end{array}$	✓
--	--	------	--	--	---

$\begin{array}{r} +1.1 \\ \hline 26.1 \end{array}$		+1.6		$\begin{array}{r} +3.7 \\ \hline 28.7 \end{array}$	✓
--	--	------	--	--	---

$\begin{array}{r} -0.2 \times \\ \hline 24.8 \end{array}$	$\begin{array}{r} -0.1 \times \\ \hline 16.2 \end{array}$	+0.4		$\begin{array}{r} +2.0 \times \\ \hline 27.0 \end{array}$	✓ 00
---	---	------	--	---	------

+60 = 00 / 00

$\begin{array}{r} -1.2 \times \\ \hline 23.8 \end{array}$	$\begin{array}{r} -1.2 \times \\ \hline 17.8 \end{array}$	-0.8	00 / 11	$\begin{array}{r} +0.5 \times \\ \hline 25.5 \end{array}$	✓ -0.1
---	---	------	---------	---	--------

$\begin{array}{r} (-2.5) \\ \hline 18.5 \end{array}$	$\begin{array}{r} -2.0 \\ \hline 18.5 \end{array}$	-1.5		$\begin{array}{r} -0.8 \times \\ \hline 16.8 \end{array}$	$\begin{array}{r} (-0.6) \\ \hline 16.8 \end{array}$	$\begin{array}{r} -0.5 \\ \hline 24.8 \end{array}$	✓ -0.3
--	--	------	--	---	--	--	--------

$\begin{array}{r} (-3.3) \\ \hline 20.5 \end{array}$	$\begin{array}{r} -2.4 \\ \hline 20.5 \end{array}$	-1.9	$\begin{array}{r} -1.2 \times \\ \hline 17.9 \end{array}$	$\begin{array}{r} (-0.6) \\ \hline 17.9 \end{array}$	$\begin{array}{r} -0.9 \\ \hline 25.7 \end{array}$	✓	-0.6 1.0
--	--	------	---	--	--	---	-------------

$\begin{array}{r} (-3.8) \\ \hline 24.3 \end{array}$	$\begin{array}{r} -2.4 \times \\ \hline 24.3 \end{array}$	-2.4	$\begin{array}{r} -1.6 \times \\ \hline 19.2 \end{array}$	$\begin{array}{r} (-0.7) \\ \hline 19.2 \end{array}$	$\begin{array}{r} -1.4 \\ \hline 26.7 \end{array}$	✓	-1.1 2.3
--	---	------	---	--	--	---	-------------

Cont. from page 15

Sta	+	H.I	-	Grade	Gr. Rod
✓ 135		892.69		885.90	6.8 ✓
	<del>+11</del> <del>8603</del>				
✓ +50				86.15	6.5 ✓
BM.	12.05	899.02 ✓	5.72	886.97 ✓	
✓ 136				86.3	12.7 ✓
✓ +50				86.45	12.5 ✓
✓ 137				86.6	12.4 ✓
	+15° PT.				
✓ +50				86.75	12.2 ✓
✓ 138			10.13	86.9	12.1 ✓
BM.	10.16	895.00 ✓		888.89 (New BM.) ✓	
✓ +50				87.05	7.9 ✓
✓ 139				87.2	7.8 ✓
	+218 P.C.				
✓ +50				87.35	7.6 ✓
✓ 140				87.5	7.5 ✓
✓ +50				87.65	7.3 ✓

D=100 R=109 2.31V  
 D=100 R=111 2.31V  
 D=100 R=111 2.31V  
 D=100 L=111 2.31V

+0.3%



Cont. From page 16.

Sto	+	H.I.	-	Grade	Gr. look
✓ 141		895.00 ✓		887.8	7.2 ✓
✓ +50				879.5	7.0 ✓
+70				88.0	7.0 ✓
✓ 142				88.10	6.9 ✓
+25				88.2	6.8 ✓
✓ +50				88.25	6.7 ✓
+75				88.3	6.7 ✓
+83				88.4	6.6 ✓
BM.			611	888.89 ✓	
✓ 143				88.39	6.6 ✓
+20					6.6 ✓
✓ +50				88.50	6.5 ✓
✓ 144				88.60	6.4 ✓
✓ +50				88.7	6.3 ✓
+935					
✓ 145				88.8	6.2 ✓
BM.					

100% V.C. M = 0.012%  
 0.30%  
 0.2%  
 P.T.

$$\begin{array}{cccccccc} -3.0 & (-0.4) & -1.5 & & 00 & +0.5 & (-0.4) & +1.4 & +0.9 \\ \frac{244}{211} & \frac{18.9}{18.9} & \frac{18.9}{18.9} & -0.4 & \frac{11}{11} & \frac{18.6}{18.6} & \frac{16.6}{16.6} & \frac{251}{251} & \checkmark \end{array}$$

$$\begin{array}{cccccccc} (-5.8) & -6.9 & +4.1 & +3.1 & -2.1 & -1.4 & -0.1 & (-1.0) & +0.3 & \checkmark \\ \frac{270}{270} & \frac{27.0}{27.0} & \frac{25.2}{25.2} & \frac{7.2}{7.2} & \frac{6}{6} & & \frac{17.5}{17.5} & \frac{17.5}{17.5} & \frac{244.5}{244.5} & \checkmark \end{array}$$

$$\begin{array}{cccccccc} (-5.6) & -6.7 & & & & & -0.4 & (-1.3) & +0.3 & \checkmark \\ \frac{26.7}{26.7} & \frac{26.7}{26.7} & & & & & \frac{18.0}{18.0} & \frac{18.0}{18.0} & \frac{24.5}{24.5} & \checkmark \end{array}$$

$$\begin{array}{cccccccc} (-4.8) & -5.9 & -7.8 & -5.0 & & & -2.1 & (-3.8) & & \checkmark \\ \frac{23.5}{23.5} & \frac{25.5}{25.5} & \frac{15}{15} & \frac{7}{7} & -4.5 & & \frac{27.7}{27.7} & \frac{24.2}{24.2} & & \checkmark \end{array}$$

$$\begin{array}{cccccccc} (-2.0) & -3.4 & -3.8 & & -4.8 & -4.3 & -5.0 & -4.1 & (-5.0) & \checkmark \\ \frac{23.1}{23.1} & \frac{22.1}{22.1} & \frac{15}{15} & & & \frac{15}{15} & \frac{19}{19} & \frac{23.5}{23.5} & \frac{23.0}{23.0} & \checkmark \end{array}$$

$$\begin{array}{cccccccc} (-2.6) & -3.7 & & & -2.4 & & -5.8 & (-2.7) & & \checkmark \\ \frac{22.2}{22.2} & \frac{22.2}{22.2} & & & & & \frac{27.6}{27.6} & \frac{21.6}{21.6} & & \checkmark \end{array}$$

$$\begin{array}{cccccccc} 00 & -1.1 & -3.5 & -2.0 & -2.4 & -2.7 & -2.4 & (-3.3) & & \checkmark \\ \frac{27.3}{27.3} & \frac{27.3}{27.3} & \frac{7.6}{7.6} & \frac{7.2}{7.2} & & \frac{18}{18} & \frac{21.0}{21.0} & \frac{20.2}{20.2} & & \checkmark \end{array}$$

$$\begin{array}{cccccccc} (+1.4) & +0.3 & +0.3 & 00 & +0.1 & -3.2 & -3.1 & (-4.0) & & \checkmark \\ \frac{26.7}{26.7} & \frac{26.7}{26.7} & \frac{7.3}{7.3} & & \frac{5}{5} & \frac{7.6}{7.6} & \frac{22.0}{22.0} & \frac{22.0}{22.0} & & \checkmark \end{array}$$

Spiko 10" Box Elder 75' R-142+75

$$\begin{array}{cccccccc} (+0.3) & -0.8 & +0.6 & +1.3 & & & +1.6 & (+0.7) & & \checkmark \\ \frac{27.4}{27.4} & \frac{27.6}{27.6} & \frac{14}{14} & & & & \frac{25.7}{25.7} & \frac{25.7}{25.7} & & \checkmark \end{array}$$

$$\begin{array}{cccccccc} & -1.1 & & 0.0 & & +1.9 & & & & \checkmark \\ & \frac{25.3}{25.3} & & & & \frac{26.0}{26.0} & & & & \checkmark \end{array}$$

$$\begin{array}{cccccccc} -1.4 & 00 & -1.1 & -0.2 & 00 & +1.1 & (+0.2) & & & \checkmark \\ \frac{26.8}{26.8} & \frac{18.3}{18.3} & \frac{18.3}{18.3} & & \frac{5}{5} & \frac{25.2}{25.2} & \frac{25.2}{25.2} & & & \checkmark \end{array}$$

$$\begin{array}{cccccccc} -1.4 & 00 & -1.1 & -0.4 & 00 & (-0.9) & -0.2 & & & \checkmark \\ \frac{27.0}{27.0} & \frac{18.3}{18.3} & \frac{18.3}{18.3} & & \frac{17.4}{17.4} & \frac{17.4}{17.4} & \frac{24.3}{24.3} & & & \checkmark \end{array}$$

$$\begin{array}{cccccccc} -2.0 & (-0.4) & -1.5 & -0.7 & -0.4 & (-1.2) & -0.4 & & & \checkmark \\ \frac{26.4}{26.4} & \frac{18.9}{18.9} & \frac{18.9}{18.9} & & \frac{17.8}{17.8} & \frac{17.8}{17.8} & \frac{23.6}{23.6} & & & \checkmark \end{array}$$

$$\begin{array}{cccccccc} -1.1 & 00 & -0.7 & 0.6 & -0.6 & (-1.2) & -0.6 & & & \checkmark \\ \frac{24.6}{24.6} & \frac{16}{16} & \frac{16}{16} & & \frac{17.8}{17.8} & \frac{17.8}{17.8} & \frac{23.8}{23.8} & & & \checkmark \end{array}$$

Approach From Lt Sta. 142+00

Sta.	+	H.I.	-	Grade	Gr. Rod
B.M.	1.01	889.90			
	Grade at shldr. Sta. 142+00			87.0	
2+00	Toe Slope at 142+00			86.20	3.7
	+14			84.70	5.2
	+35			82.50	7.6
	+50			80.70	9.2
79	3.75	881.35	12.30		877.60
2+92.2				76.06	5.3
3	+15			73.6	7.8

Void

L E R

888.89 Spike 10' Box Elder 75'R-142+75

$$\begin{array}{r} \checkmark \\ -4.2 \\ \hline 18.3 \end{array} \quad \begin{array}{r} \checkmark \\ -5.6 \\ \hline 10 \end{array} \quad -4.0 \quad \begin{array}{r} \checkmark \\ -3.4 \\ \hline 11 \end{array} \quad \begin{array}{r} \checkmark \\ -2.4^x \\ \hline 15.3 \end{array}$$

$$\begin{array}{r} \checkmark \\ -4.4 \\ \hline 18.6 \end{array} \quad \begin{array}{r} \checkmark \\ -2.6 \\ \hline 7 \end{array} \quad -2.1 \quad \begin{array}{r} \checkmark \\ -2.6 \\ \hline 7 \end{array} \quad \begin{array}{r} \checkmark \\ -2.0^x \\ \hline 15.0 \end{array}$$

$$-3.6 \quad \begin{array}{r} \checkmark \\ -3.7 \\ \hline 11 \end{array} \quad \begin{array}{r} \checkmark \\ -2.1 \\ \hline 5 \end{array} \quad -1.4 \quad \begin{array}{r} \checkmark \\ -1.8 \\ \hline 3 \end{array} \quad \begin{array}{r} \checkmark \\ -0.9 \\ \hline 13.4 \end{array}$$

$$\begin{array}{r} \checkmark \\ -4.1 \\ \hline 18.2 \end{array} \quad \begin{array}{r} \checkmark \\ -3.6 \\ \hline 10 \end{array} \quad -1.8 \quad \begin{array}{r} \checkmark \\ -0.8 \\ \hline 11 \end{array} \quad \begin{array}{r} \checkmark \\ -0.8^x \\ \hline 15.2 \end{array}$$

$$\begin{array}{r} \times \\ -2.3 \\ \hline 15.5 \end{array} \quad \begin{array}{r} \times \\ -2.3 \\ \hline 13 \end{array} \quad \begin{array}{r} \times \\ -1.5 \\ \hline 11 \end{array} \quad -0.5 \quad \begin{array}{r} \times \\ -0.6^x \\ \hline 12.9 \end{array}$$

$$\begin{array}{r} \checkmark \\ -1.5 \\ \hline 14.3 \end{array} \quad \begin{array}{r} \checkmark \\ -0.8 \\ \hline 10 \end{array} \quad 0.0 \quad \begin{array}{r} \checkmark \\ 0.0^x \\ \hline 12 \end{array}$$

Approach Sta. 142+

Sta.	+	1+1.	-	Grade	Gr Rod.
B.M.	5.75	894.64			
Grade of Shldr. Rt 142+00.				89.2	
1+60 Toe slope Rt 142+00				89.3	5.3
1+25				89.8	4.8
1+00				90.3	4.3
0+85				90.6	4.0
0+50				91.3	3.3
0+30				91.7	2.9

0.90  
- 2.00

Void

L C R

889.89 Spike 10" Bot Elder 75'R 142+75

~~$\frac{-1.2}{32}$   $\frac{-3.1}{23}$   $\frac{-3.3}{17.0}$  -40  $\frac{-4.3}{18.5}$   $\frac{-5.1}{26}$   $\frac{-6.0}{32}$   $\frac{-5.0}{39}$~~

~~$\frac{-1.0}{30}$   $\frac{-1.7}{14.6}$  -24  $\frac{-2.9}{11}$   $\frac{-4.8}{19.2}$   $\frac{-5.1}{29}$   $\frac{-2.8}{42}$~~

~~$\frac{-1.5}{28}$   $\frac{-1.7}{14.6}$  -2.2  $\frac{-3.6}{3}$   $\frac{-3.6}{8}$   $\frac{-2.0}{15.0}$   $\frac{-0.9}{19}$   $\frac{-0.8}{24}$~~

~~$\frac{1.3}{13.9}$   $\frac{-1.6}{7}$   $\frac{-2.9}{5}$  -2.8  $\frac{-0.8}{8}$   $\frac{-0.6}{12.9}$~~

~~$\frac{-1.0}{13.5}$   $\frac{0.0}{8}$   $\frac{0.0}{6}$   $\frac{-0.5}{7}$  -0.3  $\frac{-0.6}{12.9}$~~

$\frac{0.0}{12}$  0.0  $\frac{0.0}{14}$

Original X-2cc.

Sta	+	↑	-	Grade	Grade Rod
		885.61			
96	75			75.36	
97	✓			75.55	10.0 ✓
	+25			75.86	
	+50			76.30	9.3 ✓
98	✓			77.05	8.5 8.6
	450 ✓			77.30	8.3 ✓
99	✓			77.05	8.5 8.6
	+50			76.30	9.3 ✓
100		885.74	2.62	882.99	
	100			75.17	10.5 10.6
	450			73.80	11.9 ✓
101				72.17	13.5 13.6
	450			70.30	15.4 ✓
102				68.17	17.5 17.6

Note: for add. X-2cc Notes 500 Book Page 32

L

L

R

$$+73 = \frac{00}{25}$$

$$\begin{array}{r} +1.5 \\ \hline 26.5 \end{array} \quad +4.8$$

$$\begin{array}{r} +6.4 \\ \hline 31.4 \end{array} \quad \checkmark$$

$$\begin{array}{r} +1.6 \\ \hline 26.6 \end{array} \quad +4.0$$

$$\begin{array}{r} +5.3 \\ \hline 30.3 \end{array} \quad \checkmark$$

$$+75 \frac{00}{25} \quad +90:00$$

$$\begin{array}{r} (-2.8) \\ \hline 19.8 \end{array} \quad \begin{array}{r} -2.5 \\ \hline 19.8 \end{array} \quad -0.7$$

$$\frac{00}{6} \quad +\frac{2.7}{27.7} \quad \checkmark$$

$$+30:00$$

$$\begin{array}{r} (-4.2) \\ \hline 21.7 \end{array} \quad \begin{array}{r} -3.8 \\ \hline 21.7 \end{array} \quad \frac{00}{4} \quad +0.7$$

$$+\frac{2.3}{9} \quad +\frac{5.3}{30.3} \quad \checkmark$$

$$\begin{array}{r} (-4.4) \\ \hline 23.0 \end{array} \quad \begin{array}{r} -4.0 \\ \hline 23.0 \end{array} \quad 00$$

$$+\frac{1.4}{10} \quad +\frac{3.8}{28.8} \quad \checkmark$$

$$+25 \frac{00}{25}$$

$$\begin{array}{r} +1.9 \\ \hline 26.9 \end{array} \quad +3.9$$

$$\begin{array}{r} +5.1 \\ \hline 30.1 \end{array} \quad \checkmark 00$$

00

$$\begin{array}{r} (+4.8) \\ \hline 29.5 \end{array} \quad +\frac{4.9}{29.5} \quad +\frac{7.1}{x}$$

$$+\frac{6.5}{31.6}$$

$$\left( +\frac{6.6}{31.6} \right) \quad \checkmark -0.1$$

0.1

$$\begin{array}{r} (+4.7) \\ \hline 29.7 \end{array} \quad +\frac{5.1}{29.7} \quad +\frac{6.5}{20} \quad +\frac{7.9}{x}$$

$$+\frac{7.7}{33.1} \quad \left( +\frac{8.1}{33.1} \right) \quad \checkmark -0.4$$

0.4

$$\begin{array}{r} -8.9 \\ \hline 41.12 \end{array}$$

$$+1 \frac{29}{260} \quad \left( +\frac{1.0}{260} \right) \quad +\frac{1.7}{26} \quad +\frac{6.7}{9} \quad +\frac{7.1}{x}$$

$$+\frac{9.1}{34.8} \quad \left( +\frac{9.8}{34.8} \right) \quad \checkmark -0.7$$

0.7

$$\begin{array}{r} -5.5 \\ \hline 30 \end{array}$$

$$+1 \frac{32}{38} \quad \left( +\frac{2.0}{27} \right) \quad +\frac{2.8}{27} \quad +\frac{5.8}{15} \quad +\frac{8.6}{x}$$

$$+\frac{10.1}{14} \quad -\frac{11.0}{36.8} \quad \left( +\frac{11.8}{36.8} \right) \quad \checkmark -0.8$$

0.8

$$\begin{array}{r} -2.5 \\ \hline 47 \end{array}$$

$$+1 \frac{38}{29.7} \quad +\frac{3.7}{29.7} \quad +\frac{4.5}{28.7} \quad +\frac{10.8}{x}$$

$$+\frac{12.4}{38.2} \quad \left( +\frac{13.2}{38.2} \right) \quad \checkmark -0.8$$

0.8

Cont from page 20

Station	+	T	-	Elev	
		885.74			
102+50 X				65.80	11' 19.9 ✓
103 ✓				63.30	2' 22.4 ✓
⊙	3.21	879.48 ✓	9.47	876.27 ✓	
+50				60.80	18' 18.7 ✓
104 ✓				58.30	21' 21.2 ✓
+25				57.05	
+50 ✓				55.80	23.7 ✓
+75				54.55	24.9 ✓
⊙	0.78	868.05 ✓	12.21	867.27 ✓	
105 ✓				53.30	14.8 ✓
+25				52.05	16.0 ✓
⊙	0.27	55.50 ✓	12.82	55.23 ✓	
+50				50.80	RJW? 17.2 4.3 ✓
BM.	7.20	55.61 ✓	7.20	48.30 ✓	Corrected hor
+70				49.80	5.8 ✓
⊙	1.31	45.40 ✓	11.52	44.09 ✓	
106				48.30	-2.90 ✓
⊙	0.34	33.96 ✓	11.78	3362-TP ✓	
+30 ✓				846.80	-12.8 ✓
TP.	1.40	35.16 ✓	0.20	33.76 ✓	

28.05  
12.52  
55.23 +  
0.27  
55.50 E

L

R

$$\frac{+16}{50} - \frac{-49}{58}$$

$$\frac{+6.0}{42} + \frac{6.7}{37.7}$$

$$\frac{+16}{58} - \frac{-42}{59}$$

$$\frac{+6.4}{46} + \frac{8.8}{33.8}$$

$$+ \frac{13.7}{39.7}$$

$$\left( + \frac{14.3}{41.3} \right)$$

$$+ \frac{17.5}{42.5}$$

$$+ \frac{15.6}{40.6}$$

$$+ \frac{13.6}{38.6}$$

$$+ \frac{11.3}{36.3}$$

$$+ \frac{8.0}{33}$$

$$+ \frac{7.5}{31.7}$$

$$+ \frac{9.6}{33.8}$$

$$+ \frac{14.2}{39.7}$$

$$+ \frac{16.6}{41.3}$$

$$+ \frac{15.9}{28}$$

$$+ \frac{13.5}{22}$$

$$+ \frac{10.3}{12}$$

$$+ \frac{6.9}{9}$$

$$+ \frac{4.2}{7}$$

$$+ \frac{12.5}{x}$$

$$+ \frac{12.2}{7} + \frac{13.5}{x}$$

$$+ \frac{14.0}{x}$$

$$+ \frac{16.1}{30} + \frac{16.5}{x}$$

$$+ \frac{16.4}{x}$$

$$+ \frac{14.0}{x}$$

$$- \frac{10.6}{x}$$

$$+ \frac{7.0}{0}$$

$$+ \frac{0.2}{x}$$

$$+ \frac{13.3}{39.1} \left( + \frac{14.1}{39.1} \right)$$

$$+ \frac{14.0}{39.8} \left( + \frac{14.8}{39.8} \right)$$

$$+ \frac{13.9}{39.4} \left( + \frac{14.4}{39.4} \right)$$

$$+ \frac{18.2}{43.5} \left( + \frac{18.5}{43.5} \right)$$

$$+ \frac{17.4}{42.4}$$

$$+ \frac{15.5}{40.5}$$

$$+ \frac{12.7}{37.2}$$

$$+ \frac{7.6}{32.6}$$

$$+ \frac{0.4}{25.4}$$

50K 15' Oak. 50' L-105 + 75 (21.848.41)

$$105 + 52 = \frac{00}{25} \text{ on right}$$

$$\frac{00}{25} - \frac{2.1}{19.2} \left( \frac{2.3}{19.2} - \frac{3.5}{19} - \frac{4.7}{10} - \frac{5.8}{0} - \frac{5.3}{11} \left( - \frac{4.3}{21.9} \right) - \frac{3.9}{21.9} \right)$$

$$- \frac{11.9}{35.1} \left( - \frac{12.5}{35.9} + \frac{14.3}{29} - \frac{15.4}{22} - \frac{15.3}{x} - \frac{12.6}{21} \left( - \frac{12.3}{35.6} \right) - \frac{11.7}{35.6} \right)$$

$$\left( - \frac{28.0}{59.9} \right) - \frac{26.6}{59.9} - \frac{21.5}{28} - \frac{18.8}{12} - \frac{17.7}{x} - \frac{17.0}{6} - \frac{15.6}{33} \left( \frac{16.8}{44} \right) - \frac{16.0}{44}$$

Cont. From page 21

Sta.	+	$\bar{\pi}$	-	Grade	Gr. Rod
		835.16			
106				845.82	-10.6
107				843.45	-8.3
TP	0.68	827.84	8.00	827.16	
+50				841.25	-13.5
+80				840.01	
108				839.19	-11.4
+50				837.32	-9.5
109				835.58	-7.8
+30				834.63	
+50				834.00	-6.7
TP	+ 7.98	833.65	2.17	825.67	
+10				832.45	-1.2
+50				30.89	2.8
111				829.34	4.4
TP	3.38	824.66	12.37	821.28	
+50				821.79	-3.1
112				826.23	-1.6

300' VC 17 = .768

X

-3.1190

L E R

$$-\frac{314}{661} \left( -\frac{330}{661} \right) - \frac{249}{39} - \frac{210}{27} - \frac{183}{3} - 17.2 - \frac{160}{35} - \left( -\frac{170}{43.3} \right) - \frac{167}{43.3} \quad \checkmark$$

$$\left( -\frac{23.2}{52.9} \right) - \frac{226}{52.9} - \frac{19.5}{40} - \frac{170}{24} - 16.8 \quad \left( -\frac{18.4}{45.0} \right) - \frac{17.5}{45.0} \quad \checkmark \text{ R/Line 00}$$

$$-\frac{259}{58.5} \left( -\frac{27.6}{58.5} \right) - \frac{15.9}{39} - \frac{17.8}{27} - 16.9 \quad \left( -\frac{18.4}{45.3} \right) - \frac{17.9}{45.3} \quad \checkmark -0.4$$

$$\text{RW} \quad -\frac{17.4}{74.5} \left( -\frac{18.9}{4.5} \right) - \frac{15.5}{39} - 16.0 \quad \left( -\frac{17.6}{44.2} \right) - \frac{17.4}{44.2} \quad \checkmark -0.6$$

$$-\frac{16.8}{45.7} \left( -\frac{18.7}{45.7} \right) - \frac{14.9}{40} - 15.4 \quad \left( -\frac{15.2}{40.8} \right) - \frac{15.5}{40.8} \quad \checkmark -1.0$$

$$-\frac{13.2}{39.3} \left( -\frac{14.9}{39.3} \right) - 12.2 \quad \left( -\frac{10.8}{33.5} \right) - \frac{11.3}{33.5} \quad \checkmark$$

$$-\frac{6.5}{28.3} \left( -\frac{8.3}{28.3} \right) - 6.6 \quad \left( -\frac{7.4}{27.1} \right) - \frac{7.7}{27.1} \quad \checkmark$$

$$-\frac{2.0}{20.5} \left( -\frac{3.3}{20.5} \right) - 2.6 \quad \left( -\frac{2.8}{14.5} \right) - \frac{3.5}{19.5} \quad \checkmark$$

$$-\frac{1.2}{14.4} \left( -\frac{2.4}{14.4} \right) - 2.0 \quad \left( -\frac{1.8}{18.4} \right) - \frac{2.6}{18.4} \quad \checkmark$$

$$-\frac{3.2}{23.2} \left( -\frac{4.6}{23.2} \right) - \frac{2.9}{8} - 3.4 - \frac{3.1}{3} - \frac{5.8}{19} \left( -\frac{5.3}{24.2} \right) - \frac{5.8}{24.2} \quad \checkmark$$

$$-\frac{7.6}{24.9} \left( -\frac{9.5}{24.9} \right) - \frac{7.1}{7} \left( -\frac{5.3}{23.2} \right) - \frac{5.8}{23.2} \quad \checkmark$$

$$-\frac{7.6}{24.9} \left( -\frac{9.5}{24.9} \right) - 7.1 \left( -\frac{5.7}{25.1} \right) - \frac{6.4}{25.1} \quad \checkmark -1.0$$



Sta		824.66	-	Elev	
112+50				824.67	00
112+71 <sup>3</sup> -P.T.				824.02	
1					
113	✓			823.11	16
TP	5.11	818.21	11.56	813.10	✓
+30				822.19	
+50	✓			21.60	3.6 -3.4
+70					
114	✓			20.41	-2.2
+30				19.88	-1.7
TP-Stub	3.03	810.76	10.48	807.73	✓
+50				19.61	-8.8
+75				19.38	-8.6
+95				19.25	-8.5
115+15				19.19	-8.4

400 + 3.11 = 3.21  
 X

$$-\frac{5.1}{25.7} \left( -\frac{6.4}{25.7} \right) - 5.1 \left( -\frac{4.2}{22.7} \right) - \frac{4.5}{22.7} \quad \checkmark -0.7$$

$$-\frac{5.8}{26.5} \left( -\frac{6.9}{26.5} \right) - 5.1 \left( -\frac{4.6}{22.5} \right) - \frac{4.8}{22.5} \quad \checkmark -0.6$$

$$-\frac{6.0}{26.3} \left( -\frac{6.8}{26.3} \right) - 5.9 \left( -\frac{5.9}{24.1} \right) - \frac{5.6}{24.1} \quad \checkmark -0.5$$

$$-\frac{7.6}{28.4} \left( -\frac{5.4}{28.4} \right) - 8.1 \left( -\frac{10.1}{32.8} \right) - \frac{9.7}{32.8} \quad \checkmark -0.2$$

$$-\frac{15.8}{33.2} \left( -\frac{11.3}{33.2} \right) - 10.6 \left( -\frac{10.5}{31.3} \right) - \frac{9.5}{31.3} \quad \checkmark 00$$

$$-\frac{11.1}{34.7} \left( -\frac{11.7}{34.7} \right) - \frac{11.1}{21} - \frac{17.8}{6} - \frac{17.8}{x} - \frac{17.3}{12} \left( -\frac{15.3}{40.9} \right) - \frac{14.6}{40.9} \quad \checkmark$$

$$-\frac{17.9}{45.8} \left( -\frac{13.8}{45.8} \right) - \frac{20.1}{38} - \frac{21.6}{32} - \frac{20.5}{18} - \frac{13.6}{6} - 12.3 - \frac{10.1}{22} \left( -\frac{10.6}{32.4} \right) - \frac{9.6}{32.4} \quad \checkmark$$

$$\left( -\frac{20.0}{47.5} \right) - \frac{20.7}{41} - \frac{23.1}{37} - \frac{23.1}{32} - \frac{18.1}{22} - \frac{16.0}{13} - 14.4 - \frac{12.8}{16} \left( -\frac{12.3}{35.5} \right) - \frac{11.2}{35.5} \quad \checkmark$$

$$-\frac{21.2}{51.8} \left( -\frac{22.3}{51.8} \right) - \frac{21.8}{48} - \frac{24.9}{43} - \frac{24.4}{36} - \frac{21.4}{31} - 18.4 - \frac{16.4}{32} \left( -\frac{16.2}{42.1} \right) - \frac{15.4}{42.1} \quad \checkmark$$

Cont. From page 23

↑

5/8	+	810.76	-	Elev.	
115+30				819.18	-8.4
TP	4.88	803.80	1184	798.92	
+35				19.17	-15.4
+55				19.26	-15.5
B.M.	(Corrected to 795.74)		7.94	795.80	
+72				19.36	15.6
TP	12.62	803.68 816.62	0.08	803.60	
116 ✓		816.22		19.64	-3.0
+100					
+15				19.85	-3.2
TP	11.45	822.43 827.83	0.24	815.92 816.38	
+50				20.45	7.3
117 ✓				21.66	6.1
+30				22.59	
+50				23.25	4.9
+13.313%					
118				24.91	2.9
TP	11.93	832.80 839.20	0.56	826.87 827.27	
118 +33 = 116 + 86.8				26.00	13.2
117				26.44	12.8
+20				27.10	12.0
+35				27.60	11.5

L Φ R

$$\frac{-274}{61} \left( \frac{-288}{61} \right) - \frac{266}{45} - \frac{249}{25} - \frac{202}{12} - \frac{202}{x} \left( \frac{-187}{457} \right) - \frac{178}{457}$$

$$\frac{-284}{62} \left( \frac{-298}{62} \right) - \frac{289}{58} - \frac{280}{27} - \frac{274}{x} - \frac{257}{30} \left( \frac{-288}{541} \right) - \frac{227}{541}$$

$$\frac{-199}{499} \left( \frac{-209}{499} \right) - \frac{258}{46} - \frac{265}{22} - \frac{280}{14} - \frac{272}{14} - 241 - \frac{225}{6} - \frac{222}{27} - \frac{209}{43} \left( \frac{-217}{511} \right) - \frac{207}{511}$$

Nail in 24' Cottonwood 90' P. 115+50 Elev. 795.74

$$\frac{-148}{412} \left( \frac{-155}{412} \right) - \frac{154}{29} - \frac{229}{10} - \frac{276}{4} - \frac{261}{45} \left( \frac{-269}{587} \right) - \frac{256}{587}$$

$$\frac{-52}{303} \left( \frac{-90}{303} \right) - 83 - \frac{90}{4} \left( \frac{101}{314} \right) - \frac{92}{318}$$

$$\frac{-59}{259} \left( \frac{-64}{259} \right) - 4.8 \left( \frac{-89}{251} \right) - \frac{54}{251}$$

$$\frac{-35}{217} \left( \frac{-42}{217} \right) - 39 - \frac{54}{234} - \frac{49}{234}$$

$$\frac{-39}{219} \left( \frac{-43}{219} \right) - 3.8 \left( \frac{-41}{216} \right) - \frac{8.7}{216}$$

$$\frac{-35}{213} \left( \frac{-3.9}{213} \right) - 2.1 \left( \frac{-0.8}{17.1} \right) - \frac{0.7}{17.1} - \frac{00}{25}$$

(D.C.O.G.)	-1.64	+80.00		
78.6	23.6	60.4	+1.8	+541
		76.6		304
	+18.00			
	+0.9			+88x
	26.9	+4.7		338

$$+3.3 \quad +5.1 \quad +7.2 \quad +9.9 \quad +11.3^x$$

$$28.3 \quad 15 \quad 18 \quad 36.3$$

$$+4.0 \quad +6.3 \quad +8.5 \quad +10.5 \quad +11.6$$

$$29.0 \quad 13 \quad 16 \quad 36.6$$

Cont. from page 24

Sta	+	∩	-	Grade	Gr. Rod
		839.20			
		838.80			
117+50				828.20	11.0 10.5
+80				829.20	10.0 9.5
118				829.75	9.4 9.1
+20				830.41	8.8 8.4
+50	X			831.41	7.8 7.4
119				832.99	6.2 5.5
+25				833.8	5.4 5.0
+50				834.44	4.8 4.4
TP	12.74	851.28 851.68	0.26	838.54 839.94	
+70				835.1	16.6 16.0
120				835.76	15.8 15.0
+25				836.40	15.3 14.5
+50				836.94	14.8 14.0
+80				837.6	14.1 13.5
121+35				838.6	13.1 12.5
+50				839.19	12.5 12.0
+65	X			839.61	12.2 11.5
+85					
TP	12.90	863.33 863.73	0.85	850.43 860.83	
122+20				840.10	23.6 23.0
TP	1.71	853.38 853.78	11.66	857.67 852.07	
+40				840.28	13.5 13.0

300' V.C. M = 0.60

L K R

$\begin{array}{r} +40 \\ 290 \end{array}$ 
 $\begin{array}{r} +41 \\ 280 \end{array}$ 
 $\begin{array}{r} +49 \\ 110 \end{array}$ 
 $\begin{array}{r} +50 \\ 300 \end{array}$ 
 $+9.0$ 
 $+5.0$

$\begin{array}{r} +10.3 \\ 25.3 \end{array}$ 
 $\begin{array}{r} +5.8 \\ 17.0 \end{array}$ 
 $\begin{array}{r} +4.5 \\ 12 \end{array}$ 
 $\begin{array}{r} +6.6 \\ 31.6 \end{array}$ 
 $\begin{array}{r} +6.4 \\ 31.4 \end{array}$

$\begin{array}{r} -14 \\ 236 \end{array}$ 
 $\begin{array}{r} 00 \\ 16 \end{array}$ 
 $\begin{array}{r} +16 \\ 6 \end{array}$ 
 $+2.2$

$\begin{array}{r} +11.0 \\ 14 \end{array}$ 
 $\begin{array}{r} +5.6 \\ 36 \end{array}$ 
 $\begin{array}{r} +6.5 \\ 31.5 \end{array}$

$\begin{array}{r} +1.9 \\ 23.1 \end{array}$ 
 $\begin{array}{r} 00 \\ 15 \end{array}$ 
 $\begin{array}{r} +11 \\ 8 \end{array}$ 
 $+2.8$

$\begin{array}{r} +3.8 \\ 5 \end{array}$ 
 $\begin{array}{r} +71 \\ 19 \end{array}$ 
 $\begin{array}{r} +2.9 \\ 34.9 \end{array}$

$\begin{array}{r} 00 \\ 24 \end{array}$ 
 $\begin{array}{r} +0.7 \\ 19 \end{array}$ 
 $\begin{array}{r} +2.4 \\ 14 \end{array}$ 
 $\begin{array}{r} +3.6 \\ 9 \end{array}$ 
 $+6.1$ 
 $\begin{array}{r} +0.0 \\ 25 \end{array}$ 
 $\begin{array}{r} +3.3 \\ 23 \end{array}$ 
 $+7.9$ 
 $\begin{array}{r} +0.5 \\ 25.5 \end{array}$ 
 $\begin{array}{r} +3.1 \\ 19 \end{array}$ 
 $\begin{array}{r} +4.5 \\ 15 \end{array}$ 
 $+9.8$

$\begin{array}{r} +10.3 \\ 13 \end{array}$ 
 $\begin{array}{r} +17.9 \\ 27 \end{array}$ 
 $\begin{array}{r} +15.5 \\ 20 \end{array}$ 
 $\begin{array}{r} +20.0 \\ 46.0 \end{array}$ 
 $\begin{array}{r} +20.4 \\ 50.4 \end{array}$ 
 $\begin{array}{r} +24.3 \\ 49.3 \end{array}$

$\begin{array}{r} +0.6 \\ 25.6 \end{array}$ 
 $\begin{array}{r} +5.7 \\ 13 \end{array}$ 
 $+11.2$ 
 $\begin{array}{r} 00 \\ 23 \end{array}$ 
 $\begin{array}{r} +4.6 \\ 13 \end{array}$ 
 $+9.6$ 
 $\begin{array}{r} +2.6 \\ 27.6 \end{array}$ 
 $\begin{array}{r} +8.8 \\ 12 \end{array}$ 
 $+12.2$ 
 $\begin{array}{r} +3.8 \\ 28.8 \end{array}$ 
 $\begin{array}{r} +4.6 \\ 27.5 \end{array}$ 
 $\begin{array}{r} +8.5 \\ 18 \end{array}$ 
 $+17.6$ 
 $\begin{array}{r} +4.0 \\ 29.0 \end{array}$ 
 $\begin{array}{r} +12.4 \\ 10 \end{array}$ 
 $+16.5$ 
 $\begin{array}{r} +4.4 \\ 29.4 \end{array}$ 
 $\begin{array}{r} +10.4 \\ 12 \end{array}$ 
 $+14.2$ 
 $\begin{array}{r} +6.9 \\ 31.9 \end{array}$ 
 $+11.6$ 
 $\begin{array}{r} +7.0 \\ 32.0 \end{array}$ 
 $\begin{array}{r} +10.8 \\ 18 \end{array}$ 
 $+16.1$

$\begin{array}{r} +15.3 \\ 14 \end{array}$ 
 $\begin{array}{r} +14.9 \\ 15 \end{array}$ 
 $\begin{array}{r} +17.0 \\ 18 \end{array}$ 
 $\begin{array}{r} +23.1 \\ 24 \end{array}$ 
 $\begin{array}{r} +24.1 \\ 20 \end{array}$ 
 $\begin{array}{r} +20.8 \\ 19 \end{array}$ 
 $\begin{array}{r} +18.2 \\ 7 \end{array}$ 
 $\begin{array}{r} +18.6 \\ 9 \end{array}$ 
 $\begin{array}{r} +23.9 \\ 40 \end{array}$ 
 $\begin{array}{r} +26.8 \\ 57.8 \end{array}$ 
 $\begin{array}{r} +25.1 \\ 45 \end{array}$ 
 $\begin{array}{r} +30.9 \\ 44 \end{array}$ 
 $\begin{array}{r} +24.1 \\ 20 \end{array}$ 
 $\begin{array}{r} +20.8 \\ 19 \end{array}$ 
 $\begin{array}{r} +18.2 \\ 7 \end{array}$ 
 $\begin{array}{r} +26.0 \\ 25 \end{array}$ 
 $\begin{array}{r} +26.4 \\ 39 \end{array}$ 
 $\begin{array}{r} +28.0 \\ 41 \end{array}$ 
 $\begin{array}{r} +26.0 \\ 32 \end{array}$ 
 $\begin{array}{r} +29.0 \\ 48 \end{array}$ 
 $\begin{array}{r} +29.7 \\ 54.7 \end{array}$ 
 $\begin{array}{r} +25.7 \\ 50.7 \end{array}$ 
 $\begin{array}{r} +26.8 \\ 57.8 \end{array}$ 
 $\begin{array}{r} +27.3 \\ 50 \end{array}$ 
 $\begin{array}{r} +29.5 \\ 54.5 \end{array}$ 
 $\begin{array}{r} +30.0 \\ 40 \end{array}$ 
 $\begin{array}{r} +30.8 \\ 50 \end{array}$ 
 $\begin{array}{r} +31.2 \\ 56.2 \end{array}$ 
 $\begin{array}{r} +27.5 \\ 52.5 \end{array}$ 
 $\begin{array}{r} +27.6 \\ 48 \end{array}$ 
 $\begin{array}{r} +28.8 \\ 50 \end{array}$ 
 $\begin{array}{r} +29.0 \\ 54.0 \end{array}$ 
 $\begin{array}{r} +29.5 \\ 54.5 \end{array}$

$\begin{array}{r} +5.4 \\ 30.4 \end{array}$ 
 $\begin{array}{r} +11.0 \\ 8 \end{array}$ 
 $+13.1$

$\begin{array}{r} +17.2 \\ 17 \end{array}$ 
 $\begin{array}{r} +23.5 \\ 41 \end{array}$ 
 $\begin{array}{r} +26.7 \\ 50.0 \end{array}$ 
 $\begin{array}{r} +26.9 \\ 51.9 \end{array}$

$\begin{array}{r} +5.2 \\ 30.2 \end{array}$ 
 $\begin{array}{r} +7.7 \\ 22 \end{array}$ 
 $+13.5$

$\begin{array}{r} +18.5 \\ 19 \end{array}$ 
 $\begin{array}{r} +23.0 \\ 34 \end{array}$ 
 $\begin{array}{r} +27.9 \\ 52.8 \end{array}$

Cont from page 25

No	+	T	-	Erode	Gr. Rod
122+75		<del>853.78</del> 853.38		841.02	<u>12.8</u> 12
123	X			841.46	<u>12.3</u> 11
TP	5.16	<del>847.12</del> <u>847.52</u>	11.42	<del>841.96</del> <u>842.36</u>	
+5.0				842.41	<u>5.1</u> 4.7
+75				842.97	<u>4.5</u> 4.
TP	0.55	<del>837.56</del> <u>837.96</u>	10.11	<del>837.01</del> <u>837.41</u>	
124	Aug 1.5			843.57	
TP			4.86	<u>833.40</u> <sup>832.70</sup>	

L	E	R
$\frac{+2.5}{27.5}$	$+9.5$	$\frac{+16.9}{27}$ $\frac{+23.9}{48.9}$

$\frac{00}{23.3}$	$\frac{+2.9}{9}$	$+5.4$	$\frac{+11.4}{21}$	$\frac{+18.2}{43.2}$
-------------------	------------------	--------	--------------------	----------------------

$\frac{-10.6}{33.8}$	$\frac{-11.6}{33.8}$	$\frac{+30.00}{-}$	$-3.3$
----------------------	----------------------	--------------------	--------

$\frac{00}{11.5}$	$\frac{+4.5}{19.5}$
$12.3$	$+6.2 = \frac{00}{25}$

$\frac{-14.7}{39.0}$	$\frac{-4.0}{29.0}$	$-7.8$
----------------------	---------------------	--------

$\frac{-3.5}{22.3}$	$\frac{-3.9}{22.3}$
---------------------	---------------------

$$\begin{array}{r} 841.46 \\ 18.20 \\ \hline 859.66 \end{array}$$

# Levels for Classification

Sto	+	$\pi$	-	Elev.
BM.	6.15	89504		588.89
135+75 =	00 of Rock			

136

136+50

137

+50

138

+50

+70 = 00 of Rock

Hesbitt  
 Murphy  
 Ahlberg  
 Nelson

5/21/24  
 1.P.M.

(27)

L       $\Phi$       R

Nail 10' Box Elder 75'R-142+75

All Rod Readings

$$\begin{array}{r} 86.0 \\ \times 9.0 \\ \hline 15.4 \end{array} \quad \begin{array}{r} 86.2 \\ \times 8.8 \\ \hline 28.2 \end{array} \quad \begin{array}{r} 8.7 \\ \hline \end{array}$$

$$\begin{array}{r} 87.0 \\ \times 7.1 \\ \hline 6.9 \end{array} \quad \begin{array}{r} 89.2 \\ \times 5.8 \\ \hline 30.6 \end{array} \quad \begin{array}{r} 8.5 \\ \hline \end{array}$$

$$\begin{array}{r} 86.8 \\ \times 2.2 \\ \hline 15.4 \end{array} \quad \begin{array}{r} 92.2 \\ \times 2.8 \\ \hline 23 \end{array} \quad \begin{array}{r} 8.4 \\ \hline \end{array}$$

$$\begin{array}{r} 89.5 \\ \times 5.5 \\ \hline 14.7 \end{array} \quad \begin{array}{r} 92.4 \\ \times 2.6 \\ \hline 30.8 \end{array} \quad \begin{array}{r} 8.2 \\ \hline \end{array}$$

$$\begin{array}{r} 89.2 \\ \times 5.8 \\ \hline 50 \end{array} \quad \begin{array}{r} 90.4 \\ \times 4.6 \\ \hline 49 \end{array} \quad \begin{array}{r} 9.5 \\ \times 2.5 \\ \hline 29.0 \end{array} \quad \begin{array}{r} 8.1 \\ \hline \end{array}$$

$$\begin{array}{r} 87.3 \\ \times 5.7 \\ \hline 14.6 \end{array} \quad \begin{array}{r} 90.4 \\ \times 4.6 \\ \hline 28.6 \end{array} \quad \begin{array}{r} 7.9 \\ \hline \end{array}$$

92 ~

X-586. Burris St. Connection

Sta	+	π	-	Grade	Gr Rod
B.M.	2.76	746.80			
-0+70	-32+50			731.5	9.3
-0+20	-32+00			728.50	12.3
0+30	+5.040			726.00	15.2
0+70	X			724.00	
0+80				723.63	17.2
Void					
1+30				722.68	18.1
1+70				723.00	
1+80	-30+00			723.63	17.2
2+30	-29+50			725.28	15.5
+70	X			728.00	
2+80	-29+00			728.80	12.0

-80%

Abbott  
Murphy  
Liberg  
Olson

5/22/24

28

L                      k                      R

Hall in Cottonwood 45 R-30+30 E. 738.04

$$\begin{array}{cccccc}
 \times \frac{+7.9}{7} & \frac{+5.8}{4} & +5.3 & \frac{+6.0}{5} & \frac{+6.2}{2.12} & 
 \end{array}$$

$$\begin{array}{cccccc}
 \frac{+10.4}{10.4} & \frac{+8.7}{7} & \frac{+8.2}{4} & +6.9 & \frac{+7.3}{3} & \frac{+7.7}{9} & \frac{+7.7}{22.7} \times
 \end{array}$$

$$\begin{array}{cccccc}
 \times \frac{+13.7}{12.4} & \frac{+13.8}{9} & \frac{+13.3}{4} & +12.7 & \frac{+11.9}{2} & \frac{+9.9}{6} & \frac{+9.5}{13} & \frac{+10.0}{15} & \frac{+9.8}{24.9} \times
 \end{array}$$

$$\begin{array}{cccccc}
 \times \frac{+15.1}{14.7} & \frac{+15.0}{4} & +14.5 & \frac{+14.6}{2} & \frac{+11.7}{7} & \frac{+11.0}{12} & \frac{+11.4}{15} & \frac{+10.9}{20.9}
 \end{array}$$

$$\begin{array}{cccccc}
 \times \frac{+15.7}{17.8} & \frac{+15.8}{14} & \frac{+14.8}{6} & \frac{+13.7}{3} & +13.5 & \frac{+13.1}{3} & \frac{+11.8}{9} & \frac{+11.9}{14} & \frac{+11.3}{26.3}
 \end{array}$$

$$\begin{array}{cccccc}
 \times \frac{+15.3}{21.0} & \frac{+14.6}{9} & \frac{+13.0}{7} & \frac{+12.0}{x} & \frac{+10.7}{2} & \frac{+10.0}{9} & \frac{+9.8}{2.2} & \frac{+9.2}{24.2} \times
 \end{array}$$

$$\begin{array}{cccccc}
 \times \frac{+13.5}{23.0} & \frac{+13.0}{17} & \frac{+10.9}{10} & \frac{+8.9}{x} & \frac{+6.9}{14} & \frac{+6.5}{21.5} \times
 \end{array}$$

$$\begin{array}{cccccc}
 \times \frac{+9.5}{24.0} & \frac{+8.7}{16} & \frac{+6.7}{5} & \frac{+5.6}{x} & \frac{+3.5}{11} & \frac{+2.6}{12} & \frac{+2.6}{17.6} \times
 \end{array}$$

Sta.	+	$\pi$	-	Grade	Gr. Rod
		740.80			
2+90				729.60	11.2
3				730.40	10.4
+25	0.0%			732.40	8.4
P.T +45±				734.00	6.8
+75		used old Ground		738.20	2.6

5/22/24

29

L

E

R

$$\begin{array}{ccccccc}
 +\frac{8.7}{20.0} & +\frac{7.8}{12} & +\frac{5.0}{x} & +\frac{3.1}{4} & +\frac{2.3}{8} & +\frac{2.3}{13} & +\frac{2.6}{17.6}
 \end{array}$$

$$\begin{array}{ccccccc}
 \times +\frac{8.6}{23.6} & +\frac{7.1}{14} & +\frac{2.4}{x} & +\frac{1.8}{3} & +\frac{1.9}{12} & +\frac{1.3}{16.3} & \times
 \end{array}$$

$$\begin{array}{ccccccc}
 \times +\frac{4.1}{19.1} & +\frac{2.8}{11} & +\frac{1.3}{5} & +1.4 & +\frac{1.7}{8} & +\frac{1.1}{16.1} & \times
 \end{array}$$

$$\begin{array}{ccccccc}
 \times +\frac{2.8}{17.8} & +\frac{2.1}{15} & +\frac{1.6}{9} & +1.7 & +\frac{1.4}{9} & +\frac{1.3}{13} & +\frac{1.0}{16.0} \times
 \end{array}$$

$$\begin{array}{ccccccc}
 \times +\frac{0.0}{15} & & & +0.0 & & & \frac{0.0}{15} \times
 \end{array}$$

X-Sections - 23-60

Sta.	+	$\pi$	-	Grade	Gr. Rod.
B.M.	4.25	74229 ✓			
33+00				734.00 ✓	8.3 ✓
32+50				731.50 ✓	10.8
32				729.00 ✓	13.3
31+50 ✓				726.50	15.8
31				724.00	18.3
30+50				721.50	20.8 ✓
B.M.	2.65	740.69 ✓		(738.04)	
30+25				720.25	20.4 ✓
30				719.00	21.7
29+50				716.50	24.2 ✓
29				714.00	26.7 ✓
TP	4.31	734.02 ✓	10.98	(729.71) ✓	
+67				712.50	21.5 ✓
+62				712.30	21.7 ✓
+38				711.40	22.6 ✓

+5.0%



L      £      R

738.04 (Nail Cottonwood 45 R. 30 + 30

$$^x \frac{+2.1}{23.4} \frac{+3.9}{20} \frac{+4.8}{15} \frac{+4.6}{13} \frac{+4.8}{3} +4.5 \quad \frac{+3.9}{8} \frac{+4.1}{12} \frac{+6.7}{19} \frac{+7.8^x}{30} \quad \text{R/W}$$

$$\text{R/W } \sum \frac{+5.8}{30.0} \frac{+6.1}{12} +6.2 \quad \frac{+6.0}{4} \frac{+5.7}{11} \frac{+8.3}{17} \frac{+9.3}{24} \frac{+9.5^x}{30} \quad \text{R/W}$$

$$\text{Street } \frac{+7.1}{32.1} \frac{+7.5}{7} +7.4 \quad \frac{+7.4}{6} \frac{+6.6}{15} \frac{+10.5}{25} \frac{+10.8^x}{30} \quad \text{R/W}$$

$$\frac{+9.8}{34.8} \frac{+9.2}{12} +8.9 \quad \frac{+9.2}{6} \frac{+8.6}{9} \frac{+8.8}{15} \frac{+2.1}{23} \frac{+13.1^x}{34.0} \quad \text{R/W}$$

$$^x \frac{+12.4}{37.4} \frac{+12.4}{29} \frac{+11.2}{19} \frac{+9.9}{14} +10.4 \quad \frac{+11.0}{13} \frac{+11.2}{20} \frac{+13.7}{26} \frac{+14.7}{32} \frac{+14.9^x}{39.9}$$

$$^x \frac{+10.1}{35.1} \frac{+8.8}{22} +10.8 \quad \frac{+12.6}{9} \frac{+13.2}{22} \frac{+12.8}{26} \frac{+15.3}{37} \frac{+15.7^x}{40.7}$$

$$^x \frac{+8.0}{33.0} \frac{+9.0}{20} +13.0 \quad \frac{+13.5}{6} \frac{+13.1}{10} \frac{+14.2}{27} \frac{+14.7}{38} \frac{+15.9^x}{40.9} \frac{+16.0}{45} \frac{+17.4}{47} \frac{+18.0}{60}$$

$$^x \frac{+10.3}{35.3} \frac{+10.3}{32} \frac{+11.3}{27} \frac{+13.0}{19} +14.7 \quad \frac{+15.2}{8} \frac{+14.4}{10} \frac{+14.4}{5} \frac{+14.9}{30} \frac{+15.5^x}{40.5} \frac{+16.8}{44} \frac{+17.7}{49.5} \frac{+18.0}{63}$$

$$\frac{+13.0}{44} \frac{+14.6}{31} \frac{+16.3}{6} +16.4 \quad \frac{+15.8}{12} \frac{+16.0}{35} \frac{+16.9^x}{49} \frac{+17.4}{47} \frac{+18.2}{51} \frac{+21.1}{62} \frac{+22.3}{72}$$

$$^x \frac{+12.8}{37.8} \frac{+13.7}{29.0} +15.0 \quad \frac{+15.1}{10} \frac{+16.0}{24} \frac{+16.5}{33} \frac{+17.5}{39} \frac{+17.6}{45} \frac{+18.3}{46} \frac{+20.8}{60} \frac{+23.3}{73} \frac{+24.5}{83}$$

$$^x \frac{+11.5}{36.5} +15.0 \quad \frac{+15.6}{10} \frac{+13.5}{13} \frac{+15.4}{30} \frac{+16.2}{33} \frac{+17.4^x}{42.4}$$

$$\frac{+7.8}{32.8} +11.7 \quad \frac{+14.1}{20} \frac{+16.0}{41.0}$$

$$^x \frac{+7.8}{32.8} +11.7 \quad \frac{+15.7^x}{40.7}$$

Sta.	+	$\bar{x}$	-	Grade	G Rod
		734.02 ✓			
28 +15				710.65	23.3 ✓
28+				710.25	23.7 ✓
+90				710.00	24.0 ✓
+79				709.80	24.2 ✓
+68				709.60	
+50				709.30	24.7 ✓
TP	0.25	722.50 ✓	11.77	(722.25) ✓	
+25				709.10	13.4 ✓
27 ✓				709.00	13.5 ✓
26+72				709.00	13.5 ✓
TP	3.07	713.06 ✓	12.51	(709.99) ✓	
TP	0.44	710.43 ✓		(709.99)	
26+35				709.0	14.3 ✓
26				709.0	14 ✓
25+60				709.0	14 ✓

M = 12.5  
 200 ✓

0.0

L      E      R

	Joe R. Sosa								
	$\frac{+17.5}{42.5}$	$\frac{+17.4}{34}$	$\frac{+12.54}{24}$	$+13.4$	$\frac{+16.0}{35}$	$\frac{+16.0^*}{41.0}$			
	$\frac{+17.7}{42.7}$	$\frac{+18.2}{39}$	$\frac{+18.1}{30}$	$\frac{+17.5}{19}$	$\frac{+14.2}{11}$	$+13.9$	$\frac{+15.8}{37}$	$\frac{+15.8^*}{40.8}$	
x	$\frac{+16.0}{41.0}$	$\frac{+17.0}{34}$	$\frac{+18.3}{29}$	$\frac{+18.1}{19}$	$\frac{+17.6}{11}$	$\frac{+14.0}{2}$	$+14.0$	$\frac{+14.4}{9}$	$\frac{+15.7}{40.7}$
	$\frac{+14.5}{39.5}$	$\frac{+16.1}{31}$	$\frac{+16.9}{24}$	$\frac{+18.2}{17}$	$\frac{+18.3}{9}$	$+17.7$	$\frac{+13.8}{9}$	$\frac{+14.6}{21}$	$\frac{+15.3^*}{40.3}$
	$\frac{+8.5}{33.5}$	$\frac{+9.6}{25}$	$\frac{+16.6}{5}$	$+18.1$	$\frac{+18.5}{18}$	$\frac{+18.4}{27}$	$\frac{+15.5}{35}$	$\frac{+15.4}{40.4}$	
		$\frac{+6.2}{31.2}$	$\frac{+7.6}{19}$	$+9.8$	$\frac{+17.6}{21}$	$\frac{+15.6}{32}$	$\frac{+18.5}{20}$	$\frac{+18.3^*}{43.3}$	
		$\frac{+4.5}{29.5}$	$\frac{+5.0}{17}$	$+5.8$	$\frac{+9.6}{26}$			$\frac{+18.1}{43.1}$	
	$\frac{+0.5}{25.5}$	$\frac{+2.0}{13}$	$+2.4$		$\frac{+3.5}{14}$	$\frac{+2.5}{22}$	$\frac{+1.6^*}{26.6}$		

$26+70 = \frac{96}{25}$        $26+48 = \frac{74}{x}$        $26+57 = \frac{83}{25}$

5/23/24

	$-\frac{23}{195}$	$-3.1$	$-\frac{25}{202}$		
	$-\frac{33}{47}$	$-\frac{23}{41}$	$-\frac{16}{32}$	$\frac{19}{22}$	$\frac{14}{18}$
				$-\frac{3.1}{17}$	$-3.7$
					$-\frac{4.9}{23.4}$
	$\frac{+2.9}{39}$	$-\frac{0.5}{32}$	$-\frac{0.2}{24}$	$\frac{+}{16.5}$	$-\frac{0.6}{12}$
				$-4.9$	$-\frac{5.8}{18}$
					$-\frac{6.3}{25.5}$

Sta	+	Σ	-	Grade	Gr. Rod
		710.43 ✓			
25				709.00	1.4 ✓
24+50				709.00	1.4 ✓
24				709.00	1.4 ✓
23+50				709.00	1.4 ✓
IP	2.00	711.28 ✓	115	(709.28)	✓
23				709.00	2.3 ✓
22				709.00	2.3 ✓
21				709.00	2.3 ✓
BM.			614	(705.14)	✓
20+60				709.00	2.3 ✓
BM.	7.90	713.04 ✓		(705.14)	
20				709.00	4.0 ✓
+50				709.00	4.0 ✓
19				709.00	4.0 ✓
+50				709.00	4.0 ✓
18				709.00	4.0 ✓
+50				709.00	4.0 ✓
17				709.00	4.0 ✓

L      E      R

$$\begin{array}{ccccccc} -3.6 & -0.7 & \times \frac{-0.5}{16.8} & \frac{4}{15} & -0.8 & -\frac{5.2}{7} & -\frac{6.7}{15} & -\frac{7.4}{27.1} \end{array}$$

$$\begin{array}{ccccccc} \times \frac{-3.4}{21.1} & -\frac{0.7}{16} & -\frac{4}{7} & -0.7 & -\frac{0.7}{3} & -\frac{6.5}{18} & -\frac{7.2}{26.8} \end{array}$$

$$\begin{array}{ccccccc} \times \frac{-3.8}{21.7} & -\frac{3.8}{19} & -\frac{0.3}{4} & \frac{4}{-0.2} & -\frac{0.5}{9} & -\frac{6.4}{22} & -\frac{6.7}{26.1} \end{array}$$

$$\begin{array}{ccccccc} \times \frac{-3.8}{21.7} & -\frac{3.7}{20} & -\frac{0.3}{11} & 0.0 & -\frac{0.6}{12} & -\frac{1.2}{16} & -\frac{5.8}{26.6} \end{array}$$

19

$$\begin{array}{ccccccc} -\frac{4.2}{22.3} & -\frac{3.8}{20} & -\frac{0.5}{11} & 0.0 & -\frac{0.3}{12} & -\frac{5.8}{24.4} \end{array}$$

19

+50=19

$$\begin{array}{ccccccc} \times \frac{-3.5}{20.3} & -\frac{3.5}{19} & -\frac{0.7}{11} & -0.3 & -\frac{0.9}{12} & -\frac{4.5}{22.8} \end{array}$$

18

$$\begin{array}{ccccccc} -\frac{4.2}{22.3} & -\frac{3.9}{19} & -\frac{1.0}{12} & -0.8 & -\frac{0.4}{10} & -\frac{4.6}{22.9} \end{array}$$

Spike Cottonwood Rt 20+80 El. 705.14

$$\begin{array}{ccccccc} \times \frac{4.7}{23.1} & -\frac{4.5}{21} & -\frac{0.8}{11} & -0.2 & -\frac{0.6}{9} & -\frac{1.4}{13} & -\frac{1.7}{18.6} \end{array}$$

16 32

$$\begin{array}{ccccccc} + \frac{-4.3}{22.5} & -\frac{1.0}{11} & -\frac{0.5}{9} & -0.3 & -\frac{0.6}{10} & -\frac{1.1}{13} & -\frac{3.8}{21.7} \\ \times \frac{4.9}{23.4} & -\frac{1.0}{12} & -\frac{0.5}{8} & -0.4 & -\frac{0.6}{9} & -\frac{1.0}{12} & -\frac{4.1}{22.2} \\ \times \frac{-3.8}{21.7} & -\frac{1.0}{12} & -\frac{0.4}{10} & -0.2 & -\frac{0.5}{10} & -\frac{1.0}{14} & -\frac{4.5}{24.0} \end{array}$$

(old too)

$$\begin{array}{ccccccc} \times \frac{-2.8}{19.2} & -\frac{0.6}{14} & \frac{0.0}{11} & 0.0 & -\frac{0.1}{10} & -\frac{0.5}{13} & -\frac{5.2}{23.8} \end{array}$$

$$\begin{array}{ccccccc} \times \frac{-3.7}{21.6} & \frac{0.8}{14} & 0.0 & 0.0 & -\frac{0.5}{11} & -\frac{4.6}{22.9} \\ + \frac{-4.1}{22.2} & -\frac{0.3}{14} & 0.0 & 0.0 & -\frac{0.4}{11} & -\frac{4.8}{23.2} \end{array}$$

Sta	+	↑	-	Grade	Gr Rod
		713.04 ✓			
+50				709.00	
16				709.0	4.0 ✓
+50				709.05	3.95 ✓
TP	3.27	712.25 ✓	4.06	708.98 ✓	
15				709.10	3.2 ✓
+50				709.15	3.1 ✓
14				709.20	3.1 ✓
+50				709.25	3.0 ✓
13				709.3	3.0 ✓
+50				709.35	2.9 ✓
12				709.40	2.9 ✓
+50				709.45	2.8 ✓
TP	1.92	711.60 ✓	2.87	709.50	2.8 ✓
+56: end Rip Repair &				709.68 ✓	
+50				709.55	2.05 ✓
10				709.6	2.0 ✓
+50				709.65	1.95 ✓
9				709.7	1.9 ✓
8				709.8	1.8 ✓
+50					
7				709.9	1.7 ✓
6+40 <sup>5</sup>				709.95	1.6 ✓
6				710.00	1.6 ✓
TP	1.90	711.42 ✓	2.08	709.52 ✓	
5 +50				710.05	1.4 ✓

L      \$      R

	23.4	-0.4		-0.3	-0.4 x			
	211	12	-0.2	10	22.6			
x	-4.3	-0.2		-0.3	-4.2 x			
	22.5	11	0.0	12	22.3			
x	-4.0	-0.1		-0.5	-4.2	-4.4 x		
	22.0	12	+0.1	11	21	22.6		
x	-3.0	-0.1		+0.5	-3.0 x			
	19.5	10	0.0	14	21.7			
x	-5.4	-0.4		-0.4	-1.2	-3.1	-3.9 x	
	24.1	13	0.0	11	14	20	21.9	
x	-6.4	-0.3		-0.3	-3.7	-4.0 x		
	25.6	12	0.0	11	20	22.0		
x	-6.5	-0.1		-0.0	-4.2 x			
	25.9	12	0.0	10	22.3			
x	-6.5	-0.2		-0.2	-4.7 x			
	25.8	11	0.0	12	23.1			
x	-6.0	-0.7		-0.7	-4.6	-4.6 x		
	25.0	11	-0.6	11	22	22.9		
x	-7.2	-0.6		-0.7	5.2 x			
	26.8	10	-0.3	12	23.2			
x	-7.6	-0.5		-0.6	-5.0 x			
	27.4	11	-0.2	13	23.5			
x	-7.5	-0.3		-0.8	-0.6	-6.6 x		
	27.3	10	0.0	12	15	24.4		
x	-7.7	-0.3		-0.3	-2.0			
	31.6	12	0.0	11	15			
x	-7.6	-0.5		-0.4	-1.5			
	30.4	11	-0.1	12	15			
x	-7.7	-0.6		-0.5	-2.1			
	31.6	12	-0.2	10	15			
x	-7.5	-0.9		-1.1	-2.3			
	31.8	11	-0.5	11	15			
	-7.9	-0.8		-0.6	-1.0	-2.6		
	31.9	13	-0.4	8	12	16		
40.4	(-8.9)	-8.4	-7.0	-1.3	-0.8	-2.7	(-2.3)	-0.4
	31.2	22	22	15	9	12	14	
40.6	(-9.0)	-8.4	-8.3	-0.5	-0.8	-2.6	(-2.0)	-0.6
	34.5	21	21	13	8	12	14	
40.9	(-9.5)	-8.6	-7.1	-1.3	-0.8	-2.2	(-1.3)	-0.9
	34.3	26	13	10	9	14	14	
40.9	(-9.2)	-8.3	-8.2	-0.8	-1.1	-2.3	(-1.4)	-0.9
	33.8	32	23	12	9	14	14	

Sta	+	$\pi$	-	Grade	Gr Rod
		711.42 ✓			
5				710.10	1.3 ✓
4+50				710.15	1.3 ✓
4				710.20	1.2 ✓
3+50				710.30	1.1 ✓
3				710.68	0.7 ✓
TP	12.81	714.63 ✓	9.60	701.82 ✓	
2+50				711.19	3.4 ✓
2				711.90	2.7 ✓
1+50				712.70	1.9 ✓
1				713.50	1.1 ✓
			0.91	713.72 ✓	floor Bridge

-0.10%  
 -1.60%  
 200' VC 11:37

L      ♀      R

+0.9	$\left(\frac{-9.5}{24.3}\right)$	$\frac{-8.6}{34.3}$	$\frac{-7.0}{26}$	$\frac{-1.0}{13}$	-1.0	$\frac{-1.7}{16}$	$\frac{-2.5}{15}$	$\left(\frac{-1.6}{15}\right)$	-0.9
-0.9	$\left(\frac{-0.8}{36.7}\right)$	$\frac{-0.9}{36.7}$	$\frac{-8.3}{31}$	$\frac{-1.8}{16}$	$\frac{-1.6}{12}$	-1.4	$\frac{-1.8}{8}$	$\frac{-3.3}{13}$	$\left(\frac{-2.4}{13}\right)$
+0.9	$\left(\frac{-10.5}{37.8}\right)$	$\frac{-9.6}{37.8}$	$\frac{-8.8}{32}$	$\frac{-2.0}{14}$	-1.6	$\frac{-1.8}{8}$	$\frac{-3.1}{13}$	$\left(\frac{-2.2}{13}\right)$	-0.9
+0.9	$\left(\frac{-11.3}{39.0}\right)$	$\frac{-10.4}{39.0}$	$\frac{-9.7}{32}$	$\frac{-2.5}{14}$	$\frac{-1.9}{10}$	-1.8	$\frac{-2.0}{10}$	$\frac{-3.1}{14}$	$\left(\frac{-2.2}{14}\right)$
+0.9	$\frac{-12.4}{40.6}$	$\frac{-11.5}{40.6}$	$\frac{-9.6}{28}$	$\frac{-3.9}{16}$	$\frac{-2.4}{9}$	-2.5	$\frac{-2.4}{10}$	$\frac{-3.5}{14}$	$\left(\frac{-2.6}{14}\right)$
+0.9	$\left(\frac{-14.0}{43.0}\right)$	$\frac{-13.1}{43.0}$	$\frac{-12.4}{39}$	$\frac{-3.2}{15}$	-2.8	$\frac{-3.0}{10}$	$\frac{-4.7}{15}$	$\left(\frac{-3.8}{15}\right)$	-0.9
+0.9	$\left(\frac{-15.0}{43.5}\right)$	$\frac{-14.1}{43.5}$	$\frac{-11.5}{32}$	$\frac{-3.9}{17}$	$\frac{-3.2}{13}$	-3.0	$\frac{-3.4}{11}$	$\frac{.53}{18}$	$\left(\frac{-4.4}{18}\right)$
+0.5	$\frac{14.2}{14.2}$	$\left(\frac{-5.2}{22}\right)$	$\frac{-4.7}{22}$	$\frac{-2.3}{15}$	-1.6	$\frac{-1.9}{12}$	$\frac{-4.0}{19}$	$\left(\frac{-3.5}{19}\right)$	-0.5
		$\frac{-3.5}{20}$	$\frac{-0.6}{14}$	-0.2		$\frac{-0.4}{11}$	$\frac{-3.1}{19}$		

35+3 - 36" turn 50.2

Sta	+	∓	-	Grade	Gr. Rod
BM	764	745.68 ✓		738.04 ✓	
33+46.4				736.32	
+50				736.50	9.2 ✓
34				738.78	6.9 ✓
+50				740.75	4.9 ✓
35				742.36	3.3 ✓
+46.4				743.52	
+50				743.60	2.1 ✓
36				744.70	1.0 ✓
BM set	8.38	752.17 ✓	1.89	743.79 ✓	
+50				745.80	6.4 ✓
37				746.90	5.3 ✓
+50				748.00	4.2 ✓
38				749.1	3.1 ✓
77	9.35	750.96 ✓	2.56	749.61 ✓	

+5.00  
 200.16  
 17 = 0.7  
 2.2  
 0.6

L                      C                      R

6/3/24

35

Spike in cottonwood 45' P of 30+30

$$+\frac{32}{282} - \frac{23}{22} + \frac{33}{15} \text{ C 32} + \frac{31}{8} + \frac{40}{10} + \frac{52}{22} + \frac{46}{296}$$

$$+\frac{19}{269} + \frac{13}{20} + \frac{18}{15} + 15 + \frac{28}{21} + \frac{29}{279}$$

$$+\frac{4}{25} + \frac{20}{21} + \frac{03}{18} \frac{00}{x} \frac{00}{5} + \frac{16}{21} + \frac{16}{266}$$

$$\frac{-0.4}{206} \left( DC + \frac{16}{24} \right) - \frac{04}{16} - \frac{08}{4} - \frac{09}{2} - \frac{07}{1} \frac{00}{17} + \frac{07}{257}$$

$$\frac{-08}{212} \left( DC + \frac{12}{24} \right) - \frac{12}{178} - \frac{08}{14} - 09 \frac{00}{12} + \frac{05}{255}$$

$$\frac{-09}{241} \left( DC + \frac{11}{24} \right) - \frac{14}{191} - \frac{08}{13} - \frac{10}{1} - \frac{06}{8} \frac{00}{17} + \frac{10}{26}$$

Spike in 36' tree 50' L of 35+30

$$\frac{-13}{237} \left( DC + \frac{09}{27} \right) - \frac{16}{184} - \frac{10}{12} - 12 \frac{00}{20} \text{ save tree}$$

$$\frac{-11}{239} \left( DC + \frac{09}{239} \right) - \frac{17}{186} - \frac{11}{12} - 09 - \frac{12}{5} \frac{00}{17} + \frac{13}{263}$$

$$\frac{-11}{239} \left( DC + \frac{09}{239} \right) - \frac{11}{177} - \frac{10}{12} - 08 \frac{00}{14} + \frac{14}{11} + \frac{22}{272}$$

$$\frac{-02}{209} \left( DC + \frac{18}{248} \right) - \frac{06}{169} - \frac{05}{12} - 04 - \frac{11}{10} \frac{00}{13} + \frac{25}{17} + \frac{22}{22} + \frac{42}{292}$$

Sta	+	+	-	Elev	
			758.96	✓	
38+50				750.32	8.6 ✓
39				751.78	7.2 ✓
+ 25				752.58	6.4 ✓
+ 70				754.2	4.8 ✓
40+00				755.40	3.6 ✓
TP. <sup>BM</sup> Set	1019	765.06	4.09	754.87	✓
40+30				756.6	8.5 ✓
40+75				758.5	6.6 ✓
41+00				759.5	5.6 ✓
41+30				760.7	4.4 ✓
41+65				762.1	3.0 ✓
T.P. -			2.25	762.81	✓

Continued on Page 47



5/24/24

<sup>Lands</sup>  
X-~~Sections~~ old road from end of bridge to 20+00

	+	$\pi$	-	Elev.
B.M.	5.43	713.57		705.14

20+00

19

18

17

16

15

TP	5.02	713.97	4.62	708.95
----	------	--------	------	--------

14

13

12

11

10+55 Begin Rip Rap on Right

L

C

R

Spike in Cottonwood - Rt of 20+20 - Elev 705 m

$$\begin{array}{r} 708.4 \\ 5.2 \\ \hline 70 \end{array}$$

$$\begin{array}{r} 708.8 \\ 4.8 \\ \hline X \end{array}$$

$$\begin{array}{r} 708.4 \\ 5.2 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 708.6 \\ 5.0 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 708.9 \\ 4.7 \\ \hline \end{array}$$

$$\begin{array}{r} 708.7 \\ 4.9 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 709.1 \\ 4.5 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 709.0 \\ 4.6 \\ \hline \end{array}$$

$$\frac{4.6}{8}$$

$$\begin{array}{r} 708.5 \\ 4.8 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 709.0 \\ 4.6 \\ \hline \end{array}$$

$$\begin{array}{r} 708.8 \\ 4.8 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 709.0 \\ 4.6 \\ \hline 10.5 \end{array}$$

$$\begin{array}{r} 709.0 \\ 4.6 \\ \hline \end{array}$$

$$\begin{array}{r} 708.8 \\ 4.8 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 709.1 \\ 4.5 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 709.1 \\ 4.5 \\ \hline \end{array}$$

$$\begin{array}{r} 708.5 \\ 5.1 \\ \hline 11.5 \end{array}$$

$$\begin{array}{r} 708.8 \\ 5.2 \\ \hline 11.5 \end{array}$$

$$\begin{array}{r} 709.2 \\ 4.8 \\ \hline \end{array}$$

$$\begin{array}{r} 708.8 \\ 5.2 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 709.1 \\ 4.9 \\ \hline 10.5 \end{array}$$

$$\begin{array}{r} 709.2 \\ 4.8 \\ \hline \end{array}$$

$$\begin{array}{r} 709.1 \\ 4.9 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 708.7 \\ 5.3 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 709.0 \\ 5.0 \\ \hline \end{array}$$

$$\begin{array}{r} 708.9 \\ 5.1 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 709.1 \\ 4.9 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 709.5 \\ 4.5 \\ \hline \end{array}$$

$$\begin{array}{r} 709.3 \\ 4.7 \\ \hline 10 \end{array}$$

713.97

10

9

8

7

TP

5.27

713.72

552

708.45

6+50

6

5+50

5

4+50

4

3+50

L

E

R

$$\frac{7090}{5.0} = 9$$

$$\frac{7094}{4.6}$$

$$\frac{7093}{4.7} = 11$$

$$\frac{7081}{5.9} = 17 \text{ RPRP}$$

$$\frac{7089}{5.1} = 11$$

$$\frac{7092}{4.8}$$

$$\frac{7088}{5.2} = 11$$

$$\frac{7075}{6.5} = 16 \text{ R}$$

$$\frac{7092}{4.8} = 11.5$$

$$\frac{7095}{4.5}$$

$$\frac{7091}{4.9} = 9$$

$$\frac{7074}{6.6} = 16 \text{ R}$$

$$\frac{7088}{5.2} = 11$$

$$\frac{7092}{4.8}$$

$$\frac{7091}{4.9} = 9$$

$$\frac{7073}{6.7} = 15 \text{ R}$$

$$\frac{7093}{4.4} = 11.5$$

$$\frac{7095}{4.2}$$

$$\frac{7092}{4.5} = 10$$

$$\frac{7073}{6.4} = 15.5$$

$$\frac{7089}{4.8} = 12$$

$$\frac{7094}{4.3}$$

$$\frac{7091}{4.6} = 9$$

$$\frac{7081}{5.6} = 14$$

$$\frac{7087}{5.0} = 13$$

$$\frac{7092}{4.5}$$

$$\frac{7089}{4.8} = 9.5$$

$$\frac{7078}{5.9} = 14$$

$$\frac{7086}{5.1} = 13.5$$

$$\frac{7089}{4.8}$$

$$\frac{7084}{5.3} = 8.5$$

$$\frac{7075}{6.2} = 14.5$$

$$\frac{7083}{5.4} = 14.5$$

$$\frac{7087}{5.0}$$

$$\frac{7082}{5.5} = 13$$

$$\frac{7069}{6.8} = 13$$

$$\frac{7082}{5.5} = 14$$

$$\frac{7086}{5.1}$$

$$\frac{7086}{5.1} = 10$$

$$\frac{7077}{6.0} = 13$$

$$\frac{7085}{5.2} = 11$$

$$\frac{7085}{5.2}$$

$$\frac{7083}{5.4} = 9$$

$$\frac{7073}{6.4} = 13$$

+

$\pi$

-

Elev.

713.72

3+00

2+50

2

1+50

1+00

End Bridge

$$\frac{60}{13} \quad \frac{708.2}{54} \quad \frac{54}{9} \quad \frac{65}{13}$$

$$\frac{58}{13} \quad \frac{708.4}{53} \quad \frac{55}{10} \quad \frac{72}{15}$$

$$\frac{48}{12.5} \quad \frac{708.9}{48} \quad \frac{51}{10.5} \quad \frac{71}{18}$$

$$\frac{29}{17} \quad \frac{711.1}{7.6} \quad \frac{28}{11} \quad \frac{51}{19}$$

$$\frac{35}{20} \quad \frac{09}{11} \quad \frac{713.3}{0.4} \quad \frac{05}{11} \quad \frac{33}{19}$$

£ Bondsc = 713.72

# Hertzell St Connection (South)

Grade.

0+00 Shldr. 15' Lt. - 3x+03<sup>8</sup>

729.20

B.M. 4.00 742.04 / 728.04 B.M.

0+10 = 00 EXCOV.

50%  
↓

~~0+00~~<sup>17</sup>

729.2

12.8 ✓

~~0+20~~<sup>37</sup>

730.2

11.8 ✓

~~0+50~~<sup>67</sup>

731.7

10.3 ✓

~~0+60~~<sup>77</sup>

732.7

9.8 ✓

$$+\frac{68}{218} + \frac{70}{7} + \frac{76}{x} + \frac{81}{14} + \frac{84}{224}$$



$$+\frac{50}{20} + \frac{59}{6} + \frac{60}{x} + \frac{58}{16} + \frac{50}{19} + \frac{50}{20}$$



$$+\frac{10}{16} + \frac{14}{x} + \frac{08}{3} + \frac{09}{5} - \frac{05}{7} - \frac{06}{12} + \frac{00}{13} + \frac{51}{201}$$



$$\frac{00}{13} + \frac{00}{x} - \frac{03}{2} - \frac{14}{3} - \frac{07}{14} + \frac{00}{15}$$

Grade change 91+50 - 93+50  
 acct excess dirt & no change to west

	New Grade	Old Grade	Raised
91+25 <del>X</del> -1.9	75.62	75.62	0.0
+50	75.19	75.15	0.04
92	74.56	74.20	0.36
+25	74.37	73.73	0.64
+50	74.20	73.37	0.83
+75	74.12	73.23	0.89
93	74.11	73.40	0.71
+25	74.19	73.75	0.34
+50	74.52	74.47	0.05
+75	75.30	75.30	0.0

200' VC 17 = 0.6375

50' VC 17 = 0.456%

50' VC 17 = 4.0%

150' VC

This image shows a blank sheet of graph paper. The paper is cream-colored and features a grid of light green lines. A vertical red line runs down the center of the page, creating two columns of equal width. The grid consists of 20 columns and 30 rows. The page is otherwise empty of any text or markings.

Levels  
X. ~~Sections~~ for Bureau St. Connection  
± 00. - elev.

0+25

0+50

0+75

1+00

1+25

1+50

1+75

2+00

2+50

3+00

3+50

L. C. R.

$$+\frac{07}{9} + \frac{18}{16} + \frac{14}{25}$$

$$-\frac{08}{25} - \frac{11}{20} - \frac{07}{11}$$

$$+\frac{07}{4} + \frac{06}{25}$$

$$-\frac{07}{25}$$

$$+\frac{07}{25}$$

$$+\frac{13}{25} + \frac{03}{10}$$

$$-\frac{04}{25}$$

$$+\frac{20}{25}$$

$$-\frac{17}{25}$$

$$+\frac{38}{25} + \frac{22}{18}$$

$$-\frac{06}{3} - \frac{23}{25}$$

$$+\frac{46}{25} + \frac{32}{17} + \frac{20}{16}$$

$$-\frac{19}{8} - \frac{36}{25}$$

$$+\frac{43}{25} + \frac{15}{8} + \frac{10}{7}$$

$$-\frac{25}{18} - \frac{39}{25}$$

$$+\frac{40}{25} + \frac{14}{11}$$

$$-\frac{13}{16} - \frac{23}{25}$$

$$+\frac{39}{25} + \frac{31}{22} + \frac{14}{12}$$

$$-\frac{07}{12} - \frac{20}{25}$$

$$+\frac{26}{25} + \frac{22}{20}$$

$$-\frac{12}{25}$$

4+00

4+77

5+00

+53.7

6

6+50

7

7+50

+75

8

8+25

8+50

8+881

$$+\frac{26}{25} + \frac{07}{8}$$

$$-\frac{14}{25}$$

$$+\frac{14}{25}$$

$$-\frac{1}{25}$$

$$+\frac{24}{25} + \frac{18}{23}$$

$$-\frac{12}{25}$$

$$+\frac{16}{25}$$

$$-\frac{18}{15} - \frac{22}{25}$$

$$+\frac{24}{25} + \frac{14}{10}$$

$$-\frac{13}{25}$$

$$+\frac{30}{25} + \frac{26}{22}$$

$$-\frac{10}{6} - \frac{24}{25}$$

$$+\frac{29}{25} + \frac{17}{12}$$

$$-\frac{21}{25}$$

$$+\frac{41}{25} + \frac{20}{14}$$

$$-\frac{25}{25}$$

$$+\frac{42}{25} + \frac{17}{14}$$

$$-\frac{21}{12} - \frac{44}{25}$$

$$+\frac{39}{25} + \frac{30}{14}$$

$$-\frac{30}{17}$$

$$-\frac{48}{25}$$

$$+\frac{14}{25}$$

$$-\frac{19}{6}$$

$$-\frac{37}{25} \text{ (LR)}$$

$$+\frac{13}{25} + \frac{00}{6}$$

$$\frac{00}{12}$$

$$-\frac{17}{25} - \frac{14}{13} - \frac{05}{11}$$

$$-\frac{06}{9}$$

$$-\frac{17}{25}$$

X-sections Burris St. Conn.

Sta.	+	∓	-	Grade	Gr Rod
B.M.	1093.	754.72 ✓		743.79	
0+58				742.65	12.0 ✓
0+60					
1+00				744.65	10.0 ✓
+25				745.81	8.9 ✓
+50				746.80	7.9 ✓
T.P.	643	759.89 ✓	126	753.46 ✓	
+75				747.61	12.3 ✓
2				748.24	11.7 ✓
+25				748.70	11.2 ✓
+50				748.98	10.9 ✓
+86				749.07	10.8 ✓
3				749.00	10.9 ✓
3+50				748.68	11.2 ✓
T.P.	658	754.01 ✓	12.46	747.43 ✓	



Measurements on Sub-structure of wrecked  
House for loose Rock

$5^0 \times 26 \times 1^5 =$	60 ft	} loose rock in sub- structure
$4^5 \times 23 \times 1^5 =$	" "	
$3 \times 1^5 \times 4^5 =$	" "	
$14^0 \times 2^0 \times 8^0 =$	" "	
$6^6 \times 2^0 \times 4^5 =$	" "	
$11^0 \times 1^5 \times 4^5 =$	" "	
$21^0 \times 1^6 \times 3^0 =$	" "	
$9^5 \times 1^5 \times 2^0 =$	" "	
$9^0 \times 2^0 \times 7^5 =$	" "	
$33^5 \times 1^5 \times 3^0 =$	" "	
$22^0 \times 2^0 \times 3^0 =$	" "	
$22^0 \times 2^2 \times 8^0 =$	" "	
$11^5 \times 2^0 \times 8^0 =$	" "	
$4^0 \times 1^5 \times 4^0 =$	" "	
$4^0 \times 1^0 \times 6^0 =$	" "	
$14^0 \times 2^0 \times 8^0 =$	" "	

$$13^4 \times 9 \times 8^0 =$$

$$13^8 \times 4 \times 8^0 =$$

60 ft } Deduct from  
earth total  
" " } add basement.

Nesbitt  
Murphy  
Ahlberg  
Nelson

6/2/24

45

12-10-24  
Rutberg  
Nelson

6-5-24

Levels for classification

540	+	X	-	Elev.
BM.	11.21	806.95		795.74
TP	12.33	818.53	0.75	806.20
TP	12.62	831.06	0.09	818.44

117+50= 00. of Rock. Ditch on R only.

118

118+33= 116+56<sup>b</sup>

TP	6.94	836.11	1.89	829.17
----	------	--------	------	--------

117

+20

+35

+50

+65 End Rock Indication

L

E

R

$$\frac{6.0}{14}$$

$$\frac{5.1}{10}$$

$$\frac{4.0}{2.8}$$

$$\frac{6.2}{1}$$

$$\frac{5.8}{2.5}$$

$$\frac{2.7}{1.3}$$

$$\frac{2.2}{1.7}$$

$$\frac{1.7}{2.8}$$

$$\frac{5.1}{1}$$

$$\frac{7.1}{2.6}$$

$$\frac{4.7}{0}$$

$$\frac{3.9}{3.1}$$

$$\frac{9.0}{1}$$

$$\frac{6.6}{1.5}$$

$$\frac{2.6}{3.2}$$

$$\frac{8.4}{1}$$

$$\frac{4.0}{X}$$

$$\frac{5.3}{1.1}$$

$$\frac{3.8}{3.1}$$

$$\frac{7.9}{1}$$

Original X-sec.

Cont. from P. 36

Sta	+	T	-	Elev.	
T.P.	9.82	772.63	✓	762.81	✓
42+00				763.60	9.0 ✓
42+13	$\frac{8.00}{x}$				
42+50				765.7	6.9 ✓
T.P.	9.57	778.18	✓	4.02	768.61 ✓
43+00				767.9	10.3 ✓
43+50				770.13	8.1 ✓
44+00				772.50	5.7 ✓
T.P.	10.60	785.81	✓	2.97	775.21 ✓
44+50				774.9	10.9 ✓
45				777.3	8.5 ✓
+50	$\frac{8.00}{x}$			779.7	6.1 ✓
T.P.	9.70	790.21	✓	5.30	780.51 ✓
46				782.1	8.1 ✓
T.P.	6.91	792.98	✓	4.14	786.07 ✓

L  $\neq$  R

From here on record - Rod Readings (Waltangle)  
 in all cases where minus rod is recorded it is to  
 be added to grade Rod.

$$\left(\frac{-44}{21.9}\right) \quad \frac{130}{22.0} \quad \frac{125}{18} \quad \frac{103}{x} \quad \frac{90}{3} \quad \frac{83}{5} \quad \frac{80}{18} \quad \frac{44}{26} \quad \left(\frac{40}{30.0}\right)$$

$$\left(\frac{-34}{20.7}\right) \quad \frac{130}{20.7} \quad \frac{99}{16} \quad \frac{63}{3} \quad \frac{50}{x} \quad \frac{51}{11} \quad \frac{24}{21} \quad \left(\frac{15}{30.4}\right)$$

$$\left(\frac{-21}{15.4}\right) \quad \frac{122}{16.9} \quad \frac{115}{14} \quad \frac{108}{10} \quad \frac{95}{7} \quad \frac{96}{x} \quad \frac{88}{7} \quad \frac{57}{17} \quad \left(\frac{53}{20}\right) \text{ Sheep Barn}$$

? 21.0

$$\left(\frac{-22}{19.0}\right) \quad \frac{101}{19.0} \quad \frac{14}{5} \quad \frac{84}{10} \quad \frac{81}{0} \quad \frac{73}{3} \quad \frac{52}{13} \quad \frac{21}{21.0} \quad \frac{39}{24.1} \quad \left(\frac{042}{24.1}\right) \quad \left(\frac{-37}{21.0}\right)$$

$$\left(\frac{-31}{20.2}\right) \quad \frac{85}{20.2} \quad \frac{71}{13} \quad \frac{59}{x} \quad \frac{54}{3} \quad \frac{30}{10} \quad \frac{10}{24.4} \quad \left(\frac{047}{24.4}\right) \quad \left(\frac{40}{21.0}\right)$$

$$\left(\frac{-31}{20.2}\right) \quad \frac{137}{20.2} \quad \frac{21}{x} \quad \frac{109}{7} \quad \frac{84}{10} \quad \frac{54}{24.8} \quad \left(\frac{135}{24.8}\right) \quad \left(\frac{48}{21.0}\right)$$

$$\left(\frac{-42}{21.7}\right) \quad \frac{23}{21.7} \quad \frac{120}{8} \quad \frac{46}{7} \quad \frac{85}{3} \quad \frac{72}{10} \quad \frac{43}{22} \quad \frac{34}{24.6} \quad \left(\frac{51}{24.6}\right) \quad \left(\frac{3.8}{21.4}\right)$$

$$\left(\frac{-65}{25.3}\right) \quad \frac{123}{25.3} \quad \frac{106}{9} \quad \frac{77}{x} \quad \frac{61}{4} \quad \frac{46}{9} \quad \frac{18}{22} \quad \frac{13}{24.4} \quad \left(\frac{048}{24.4}\right) \quad \left(\frac{40}{21.5}\right)$$

$$\left(\frac{-80}{27.4}\right) \quad \frac{157}{27.4} \quad \frac{143}{13} \quad \frac{99}{x} \quad \frac{51}{6} \quad \frac{73}{10} \quad \frac{21}{23} \quad \left(\frac{045}{27.3}\right) \quad \left(\frac{44}{21.7}\right)$$

Cont. from page 47

Station	+	T	-	Elev	
			792.98 ✓		
46+50				784.5	8.5 ✓
47+00				786.9	6.1 ✓
T.P.	12.02	796.77 ✓	8.23	784.75 ✓	
47+50				789.3	7.5 ✓
48	+4.8%			791.7	5.1 ✓
48+25				792.9	3.9 ✓
T.P.	2.65	788.24 ✓	11.18	785.59 ✓	
+50				794.10	
+52 <sup>16</sup>				794.20	
B.M.				792.34	
47+50				789.3	-1.1 ✓
48				791.7	-3.5 ✓
B.M.	10.03	789.10 ✓	11.17	777.07 ✓	
48+25				792.9	-5.8 ✓
48+00				791.7	-4.6 ✓

6/9/24

L

±

R

$$\left(\frac{-118}{32.9}\right) \left(\frac{197}{32.8}\right) \frac{176}{21} \frac{141}{13} \frac{118}{7} \frac{55}{10} \frac{68}{12} \frac{37}{24.4} \left(\frac{0.48}{2.44}\right) \left(\frac{+3.9}{21.2}\right)$$

$$\left(\frac{-139}{35.5}\right) \left(\frac{93}{45.5}\right) \frac{90}{33} \frac{155}{24} \frac{90}{4} \frac{61}{10} \frac{0.9}{34.6} \left(\frac{0.50}{2.46}\right) \left(\frac{+4.2}{21.6}\right)$$

Top of Stake Station 47+00

0.4

$$\frac{138}{6} \frac{11.7}{2} \frac{18}{10.5} \frac{25}{12} \frac{6.7}{15} \frac{3.9}{24.0} \left(\frac{2.46}{2.46}\right) \left(\frac{+3.6}{21.3}\right) -0.4$$

0.7

$$\frac{12.2}{11} \frac{31}{8.6} \frac{3.9}{16} \frac{1.7}{22} \frac{1.1}{24.4} \left(\frac{+4.7}{2.44}\right) \left(\frac{+3.3}{21.2}\right) -0.7$$

0.9

$$\frac{6.7}{x} \frac{0.5 + 5.3}{2.2} \frac{+6.2}{2.1} \left(\frac{+4}{21.6}\right) -0.9$$

Top of E Con Soil Cuts Caping

$$\left(\frac{-14.6}{40.9}\right) \left(\frac{126.11.5}{40.933}\right) \frac{8.0}{18} \frac{6.4}{14} \quad (-1.1)$$

$$\frac{9.7}{3.5} \frac{7.7}{2.4} \quad (-3.5)$$

Na. I.T.R. 45' L- 47+00 (E1 77707)

0.9

$$\left(\frac{-5.5}{41.7}\right) \frac{9.3}{41.7} \frac{8.0}{3.5} \frac{4.1}{21} \quad (-3.6)$$

0.7

$$\left(\frac{-16.4}{41.4}\right) \frac{10.3}{41.4}$$

## Levels on Rock Exc.

Sta	+	$\pi$	-	Elev
BM	0.70	738.74		738.04
TP	3.65	729.81	12.58	726.16

28+67

29+00

+50

30+00

6/17/24

BM	0.25	738.29		738.04
	7.77	733.24	12.82	725.47

29+50

30+00

30+25

30+50

31+00

L E R

$$\frac{84}{32}$$

$$\frac{34}{32}$$

x

$$\frac{38}{8}$$

$$\frac{17.3}{}$$

$$\frac{68}{23}$$

x

$$\frac{10}{19}$$

$$\frac{15.8}{}$$

$$\frac{40}{15}$$

x

$$\frac{20}{17}$$

$$\frac{12.5}{}$$

$$\frac{29}{7}$$

x

$$\frac{10}{5}$$

$$\frac{10.8}{}$$

$$\frac{93}{25}$$

x

$$\frac{36}{17}$$

$$\frac{16.7}{}$$

$$\frac{81}{18}$$

x

$$\frac{46}{18}$$

$$\frac{14.2}{}$$

$$\frac{93}{29}$$

$$\frac{82}{13}$$

x

$$\frac{48}{22}$$

$$\frac{12.9}{}$$

$$\frac{83}{31}$$

x

$$\frac{59}{7}$$

$$\frac{47}{25}$$

$$\frac{11.7}{}$$

$$\frac{60}{28}$$

x

$$\frac{52}{7}$$

$$\frac{38}{16}$$

$$\frac{9.2}{}$$

Station	+	$\pi$	-	Elev
		732.24		
31+50				
T.P.	7.76	740.05	0.95	732.29
32				
32+50				
33				
33+50				

L

£

R

$$\frac{4.5}{24}$$

$$\frac{2.5}{4}$$

$$\frac{1.5}{2.5}$$

$$\frac{6.7}{}$$

x

$$\frac{70}{1.5}$$
  
*Abstract*

$$\frac{6.7}{24}$$

$$\frac{11.1}{}$$

$$\frac{7.5}{4}$$

$$\frac{6.0}{4}$$

$$\frac{5.1}{24}$$

$$\frac{6.6}{}$$

$$\frac{6.1}{10}$$

$$\frac{5.0}{4}$$

$$\frac{4.0}{24}$$

$$\frac{6.1}{}$$

$$\frac{3.7}{4}$$

$$\frac{3.7}{26}$$

$$\frac{3.6}{}$$

X-section 5. 23-60

500 page 67

Notes: page 51-60 Carry  
H.L. from bottom to top

Sta.	+ (top 20 ft Lt)	$\pi$	-	Grade	Fr. Rod.
52	(top 20 ft Lt)			808.17	8.6 ✓
52+15				808.68	8.1 ✓
52+60	(top 20 ft Lt)			810.23	6.6 ✓
52+75				810.7	6.1 ✓
52+85				811.05	5.7 ✓
53	(top 19.0 ft Lt)			811.60	5.2 ✓
53+25				812.50	4.3 ✓
53+50	(top 19.0 ft Lt)			813.40	3.4 ✓
IP #4	0.72	816.75 ✓	12.27	816.03 ✓	
51+50				806.32	22.0 ✓
51+75				807.25	21.0 ✓
52				808.17	20.1 ✓
52+1.5				808.68	19.6 ✓
		628.30 ✓			

Page	L	+	R
0.1		$\frac{11.6}{6.5}$	$\frac{4.6}{11}$
0.1		$\frac{11.7}{11}$	$\frac{8.1}{3}$
0		$\frac{130}{11.5}$	$\frac{9.7}{4}$
0.1		$\frac{12.3}{9}$	$\frac{100}{44}$
0.2		$\frac{13.1}{11}$	$\frac{5.7}{3.5}$
0.3		$\frac{11.7}{2.2}$	$\frac{9.3}{7.5}$
0.5		$\frac{-0.4}{16.6}$	$\frac{5.2}{16.6}$
0.7	10%	$\frac{-5.9}{25.1}$	$\frac{9.5}{25.1}$
			$\frac{3.4}{8.5}$
			$\frac{12.0}{24.7}$
			$\frac{+10.3}{24.7}$
			$\frac{180}{34.2}$
			$\frac{+14.4}{34.2}$
			$\frac{+15.2}{40.2}$
			$\frac{+9.2}{24.1}$
			$\frac{6.0}{40.2}$
			$\frac{+10.6}{24.7}$
			$\frac{4.4}{40.8}$
			$\frac{+15.2}{40.8}$
			$\frac{12.6}{17.5}$
			$\frac{9.1}{24.8}$
			$\frac{+10.6}{24.8}$
			$\frac{3.4}{41.3}$
			$\frac{+16.3}{41.3}$

Cont. from page 51

Sto	+	$\pi$	-	Grade	Gr. Rod
52+60				810.22	18.1 ✓
52+75				810.7	17.6 ✓
52+85				811.05	17.2 ✓
53+00				811.6	16.7 ✓
53+25				812.5	15.8 ✓
53+50				813.4	14.9 ✓
53+75				814.4	13.9 ✓
BM.	12.58	828.30 ✓		815.72 ✓	-26.3 ✓
54		788.9 ✓		815.30	-26.4 ✓
TP	0.86	788.94 ✓	12.19	788.06 ✓	
53+75				814.4	-14.1 ✓
54				815.30	-15.0 ✓
54+25				816.20	-15.9 ✓
TP#2	0.71	800.25 ✓	12.31	799.54 ✓	
53+75		811.85 ✓		814.4	-2.5 ✓

L E R

$$\frac{12.0}{17} \quad \frac{8.4}{244.4} \quad \left( \frac{+9.7}{244.4} \right) \quad \frac{6.7}{4.4} \quad \left( \frac{+16.4}{4.4} \right) \quad 10$$

$$\frac{12.6}{17} \quad \frac{9.7}{22} \quad \frac{9.2}{23.6} \quad \left( \frac{+8.2}{23.6} \right) \quad \frac{1.0}{4.5} \quad \left( \frac{+1.5}{4.5} \right) \quad 10.1$$

$$\frac{13.0}{135} \quad \frac{8.4}{238} \quad \left( \frac{+8.6}{238} \right) \quad \frac{-1.6}{43.6} \quad \left( \frac{+18.6}{43.6} \right) \quad +0.2$$

$$\frac{12.6}{8.5} \quad \frac{7.6}{207} \quad \frac{5.9}{248} \quad \left( \frac{+10.5}{248} \right) \quad \frac{-1.2}{45.6} \quad \left( \frac{+20.6}{45.6} \right) \quad 10.3$$

$$\frac{12.6}{4} \quad 108 \quad \frac{6.2}{11} \quad \frac{2.8}{22} \quad \frac{0.5}{26.9} \quad \left( \frac{+14.8}{26.9} \right) \quad \frac{+1.1}{49.0} \quad \left( \frac{+24.0}{49.0} \right) \quad 10.7$$

$$11.1 \quad \frac{9.3}{6} \quad \frac{4.2}{17} \quad \frac{0.0}{26.6} \quad \left( \frac{+14.2}{26.6} \right) \quad \frac{-0.3}{49.5} \quad \left( \frac{+24.5}{49.5} \right) \quad 10.7$$

$$13.5 \quad \frac{8.5}{11} \quad \frac{4.4}{20} \quad \frac{1.5}{26.3} \quad \left( \frac{+11.6}{26.3} \right) \quad \frac{-10.9}{49.0} \quad \left( \frac{+21.0}{49.0} \right) \quad 10.7$$

$$\frac{5.5}{5.0} \quad \frac{11.1}{15.0} \quad \frac{9.8}{8.2} \quad \frac{18.1}{79} \quad \frac{130}{74} \quad \frac{10.9}{64}$$

$$\frac{-25.2}{56.0} \quad \frac{-2.5}{56.0} \quad \frac{7.4}{50} \quad \frac{2.2}{88}$$

$$\frac{12.1}{50} \quad \frac{9.3}{44} \quad \frac{4.3}{35}$$

$$\frac{28.8}{66.3} \quad \frac{-28.6}{61.3} \quad \frac{10.9}{45} \quad \frac{11.7}{39} \quad \frac{3.8}{2.7}$$

$$\frac{10.5}{32} \quad \frac{8.2}{27.5} \quad \frac{5.5}{20} \quad \frac{4.0}{16} \quad \frac{2.0}{7.3} \quad \frac{0.5}{2}$$

Sto	+	X	-	Grade	Gr. Rod
54				815.3	- 3.4 ✓
54+25				816.2	- 4.3 ✓
TP	0.01	811.25 ✓	12.56	811.84 ✓	
54				815.3	9.1 ✓
54+25				816.2	8.2 ✓
54+56				817.3	7.1 ✓
54+75				818.0	6.4 ✓
54+90				818.4	6.0 ✓
55+00				819.0	5.4 ✓
B.M.	8.68	822.46 ✓		815.72 ✓	
54+55				817.3	0.3 ✓
54+75				818.0	-0.4 ✓
54+90				818.4	-0.8 ✓
55+06				819.0	-1.4 ✓
B.M.			1.83	815.79 ✓	
55+25				819.9	-2.3 ✓
TP	12.01	817.62 ✓ 805.72 ✓	0.11	805.61 ✓	

L C R

$$\frac{12.5}{27.5} \quad \frac{10.0}{22} \quad \frac{49}{11} \quad \frac{23}{6}$$

$$\frac{11.8}{19} \quad \frac{83}{13} \quad \frac{39}{3} \quad 2.5$$

$$12.1 \quad \frac{8.0}{8.4} \left( \frac{00}{8.4} \right) \frac{1.6}{20.5} \frac{00}{23.5} \left( \frac{48.0}{23.5} \right) \frac{11.9}{44.0} \frac{11.9}{44.0}$$

$$\frac{12.7}{5} \quad \frac{9.8}{10} \quad \frac{71}{16.5} \left( \frac{00}{16.5} \right) \frac{44.3}{20.9} \left( \frac{44.3}{20.9} \right) \frac{11.4}{36.4} \frac{11.4}{36.4}$$

$$\frac{6.0}{27.0} \quad \left( \frac{0.042}{27.0} \right)$$

$$\frac{5.6}{22.2} \quad \left( \frac{0.034}{22.2} \right)$$

$$\frac{51}{17} \left( \frac{00}{17} \right) \quad \frac{2.5}{22.1} \left( \frac{+2.6}{22.1} \right)$$

$$\frac{5.5}{15} \quad \frac{4.5}{15} \left( \frac{00}{15} \right) \frac{4.0}{16} \frac{1.5}{22.5} \left( \frac{+3.0}{22.5} \right)$$

$$\frac{14.2}{15} \quad \frac{13.0}{4} \quad 11.3 \quad \frac{10.0}{5} \quad \frac{8.4}{9} \quad \frac{5.4}{15} \quad \frac{2.4}{20.8} \left( \frac{-3.4}{20.8} \right)$$

$$\frac{11.2}{23} \quad \frac{8.7}{10} \quad 6.8 \quad \frac{5.4}{7} \quad \frac{2.7}{15} \quad \frac{1.0}{14.8} \quad \frac{-2.7}{14.8}$$

$$\left( \frac{-2.0}{50.0} \right) \frac{20.3}{50.0} \quad \frac{16.3}{38} \quad \frac{12.0}{3.5} \quad \frac{8.3}{12} \quad 5.7 \quad \frac{4.4}{6} \quad \frac{3.0}{10.5} \quad \frac{1.6}{11.5} \quad \frac{0.2}{13}$$

$$\frac{11.0}{16} \quad 7.0 \quad \frac{5.7}{5} \quad \frac{4.5}{8} \quad \frac{0.4}{12}$$

(E1.815.72)

$$12.2 \quad \frac{8.6}{9} \quad \frac{5.1}{19} \quad \frac{2.3}{25.6} \left( \frac{-6.3}{25.6} \right)$$

Cont. from page 53

Sto.	+	∇	-	Grade	Gr Rod.
54+55				817.3	-11.6 ✓
54+75				818.0	<del>-12.4</del> -12.3 ✓
55+00				819.0	<del>-13.4</del> -13.3 ✓
55+25				819.9	-14.2 ✓
55+50				820.8	-15.1 ✓
TP	11.87	808.72 ✓	0.89	793.85 ✓	
55+25				819.9	-25.2 ✓
55+50				820.8	-26.1 ✓
TP	12.27	794.74 ✓	0.08	782.47 ✓	
TP	5.07	782.55 ✓		777.48 ✓	
55+25				819.9	-53.4 ✓
TP	0.77	766.51 ✓	12.20	765.74 ✓	
55+25				819.9	-42.0 ✓
55+50				820.8	-42.9 ✓
TP	0.46	777.94 ✓	10.92	777.48 ✓	
55+68				821.50	-33.1 ✓
TP	3.81	788.40 ✓	12.85	784.59 ✓	
55+68				821.5	-24.1 ✓
		797.44 ✓			

L L R

$$\begin{array}{r} (-170) \ 5.7 \ 4.0 \\ \hline 443 \ 443 \ 31 \end{array}$$

$$\begin{array}{r} (-153) \ 3.3 \ 3.1 \\ \hline 419 \ 419 \ 39 \end{array}$$

$$\begin{array}{r} 9 \ 2.10 \ 15.8 \ 12.9 \ 9.3 \ 5.5 \ 1.8 \\ 0 \ 670 \ 89 \ 53 \ 45 \ 35 \ 24 \end{array}$$

$$\begin{array}{r} 8.3 \\ \hline 18 \end{array} \quad 0.3$$

$$13.2 \quad \begin{array}{r} 4.0 \\ \hline 5 \end{array} \quad \begin{array}{r} 5.4 \\ \hline 24.5 \end{array} \quad \begin{array}{r} 4.2 \\ \hline 38.6 \end{array} \quad \begin{array}{r} 2.6 \\ \hline 46 \end{array} \quad \begin{array}{r} 1.9 \\ \hline 47.2 \end{array} \quad \begin{array}{r} (-19.0) \\ \hline 47.2 \end{array}$$

$$\begin{array}{r} 14.7 \\ \hline 63 \end{array} \quad \begin{array}{r} 9.7 \\ \hline 40 \end{array} \quad \begin{array}{r} 0.7 \\ \hline 2.3 \end{array}$$

$$\begin{array}{r} 15.1 \\ \hline 26 \end{array} \quad \begin{array}{r} 6.4 \\ \hline 11 \end{array}$$

Top Rock 20' L 55+65

$$\begin{array}{r} \text{cut} \quad (-61.8) \ 6.6 \ 9.7 \ 4.7 \\ \text{row} \quad 2172.0 \ 112.0 \ 709.0 \ 100 \end{array}$$

$$\begin{array}{r} 4.8 \\ \hline 75 \end{array}$$

$$\begin{array}{r} 9.4 \quad (-53.8) \\ 96.8 \quad 96.8 \\ 10.2 \ 11.2 \ 15.4 \ 14.0 \ 9.2 \ 3.6 \ 1.4 \\ 94 \ 85 \ 77 \ 64 \ 56 \ 41 \ 31 \end{array}$$

Top Rock, 20' L 55+65

$$\begin{array}{r} -38.2 \ 4.4 \ 7.1 \ 6.6 \ 5.8 \ 8.9 \\ 71.6 \ 74.6 \ 62 \ 43 \ 21 \ 15 \end{array} \quad 9.5 \quad \begin{array}{r} 8.0 \\ \hline 70 \end{array}$$

$$\begin{array}{r} 9.6 \ 4.0 \ 3.8 \ 2.6 \ 1.8 \ 0.4 \\ 29 \ 40 \ 47 \ 48 \ 57 \ 58.4 \end{array} \quad \begin{array}{r} (-26.9) \\ \hline 58.4 \end{array}$$

Sto	+	A	-	Grade	Gr Rod.
55+80				822.0	-24.6 ✓
TP	0.91	797.44 ✓	12.12	796.53 ✓	
56+00				822.7	-14.0 ✓
TP	0.73	808.66 ✓	11.70	807.93 ✓	
56+00				822.7	-3.1 ✓
56+25				823.6	-4.0 ✓
TP	0.60	819.63 ✓	12.12	819.03 ✓	
56+25				823.6	7.6 ✓
56+50				824.5	6.7 ✓
56+75				825.4	5.8 ✓
TP	0.60	831.15 ✓	11.70	830.55 ✓	
56+50				824.5	17.5 ✓
TP	1.97	842.25 ✓	11.68	840.28 ✓	
56+75				825.4	26.6 ✓
TP	11.68	851.96 ✓	1.66	840.28 ✓	
57+00				826.4	15.5 ✓
57+25				827.4	14.5 ✓
57+50				828.3	13.6 ✓
57+75				829.2	12.7 ✓
		841.94 ✓			

L

E

R

55

$$\begin{array}{r} 346 \\ 693 \end{array} \begin{array}{r} 94 \\ 693 \end{array} \begin{array}{r} 116 \\ 60 \end{array} \begin{array}{r} 109 \\ 50 \end{array} \begin{array}{r} 8.5 \\ 40 \end{array} \begin{array}{r} 70 \\ 21 \end{array} \begin{array}{r} 7.9 \\ 16 \end{array} \begin{array}{r} 6.4 \\ \times \end{array} \begin{array}{r} 61 \\ 5 \end{array} \begin{array}{r} 3.3 \\ 13 \end{array} \begin{array}{r} -1.6 \\ 27 \end{array} \begin{array}{r} -4.3 \\ 44 \end{array} \begin{array}{r} -4.9 \\ 51.4 \end{array} \begin{array}{r} (-21.9) \\ 51.4 \end{array} \quad \checkmark$$

$$\begin{array}{r} (-26.3) \\ 57.5 \end{array} \begin{array}{r} 121 \\ 57.5 \end{array} \begin{array}{r} 11.9 \\ 47 \end{array} \begin{array}{r} 9.3 \\ 33 \end{array} \begin{array}{r} 6.4 \\ 20 \end{array} \begin{array}{r} 5.6 \\ \times \end{array} \begin{array}{r} 33 \\ 16 \end{array} \quad \checkmark$$

$$\begin{array}{r} 10.2 \\ 27 \end{array} \begin{array}{r} 7.4 \\ 35.1 \end{array} \begin{array}{r} (-12.0) \\ 35.1 \end{array} \quad +0.9 \quad \checkmark$$

$$\begin{array}{r} (-18.1) \\ 44.8 \end{array} \begin{array}{r} 14.0 \\ 44.8 \end{array} \begin{array}{r} 8.9 \\ 76 \end{array} \begin{array}{r} 4.6 \end{array} \quad \checkmark$$

$$\begin{array}{r} 130 \\ 12 \end{array} \begin{array}{r} 9.3 \\ 20.5 \end{array} \begin{array}{r} 10.6 \\ 21.7 \end{array} \begin{array}{r} (-4.2) \\ 21.7 \end{array} \begin{array}{r} 6.2 \\ 32.1 \end{array} \quad +0.8 \quad \checkmark$$

$+31.03$   
 $25$

$$\begin{array}{r} (-5.0) \\ 22.1 \end{array} \begin{array}{r} 12.1 \\ 22.1 \end{array} \begin{array}{r} 10.3 \\ 14.5 \end{array} \begin{array}{r} 8.3 \\ \times \end{array} \begin{array}{r} 6.0 \\ 8 \end{array} \quad \checkmark$$

$+61 = \frac{0.0}{25}$

$$\begin{array}{r} 14.2 \\ 29.2 \end{array} \begin{array}{r} 2.4 \\ 29.2 \end{array} \begin{array}{r} 0.6 \\ 22 \end{array} \quad \checkmark$$

$$\begin{array}{r} 12.3 \\ 21 \end{array} \begin{array}{r} 4.0 \\ 35.0 \end{array} \begin{array}{r} +13.0 \\ 35.0 \end{array} \quad \checkmark$$

$$\begin{array}{r} 158 \\ \times \end{array} \begin{array}{r} 12.8 \\ 16 \end{array} \begin{array}{r} 11.4 \\ 19 \end{array} \begin{array}{r} 5.7 \\ 35 \end{array} \begin{array}{r} 0.2 \\ 50.6 \end{array} \begin{array}{r} +2.56 \\ 50.6 \end{array} \quad \checkmark$$

$$\begin{array}{r} +4.9 \\ 27.8 \end{array} \begin{array}{r} 11.4 \\ 22.9 \end{array} \begin{array}{r} 6.5 \\ 17.5 \end{array} \quad \checkmark$$

$$\begin{array}{r} +5 \\ 26.5 \end{array} \begin{array}{r} 13.8 \\ 36.5 \end{array} \begin{array}{r} 12.3 \\ 25.7 \end{array} \begin{array}{r} 10.2 \\ 18 \end{array} \begin{array}{r} 3.7 \\ 5 \end{array} \begin{array}{r} 1.6 \\ \times \end{array} \quad \checkmark$$

$$\begin{array}{r} 5.5 \\ 76 \end{array} \begin{array}{r} 14.4 \\ 16 \end{array} \begin{array}{r} 7.0 \\ \times \end{array} \quad \checkmark$$

$$\begin{array}{r} +5.2 \\ 37.8 \end{array} \begin{array}{r} 28.0 \\ 37.8 \end{array} \begin{array}{r} 24.3 \\ 2.9 \end{array} \begin{array}{r} 20.5 \\ 20 \end{array} \begin{array}{r} 0.0 \\ 44 \end{array} \begin{array}{r} 12.8 \\ 41.4 \end{array} \begin{array}{r} -10.6 \\ \times \end{array} \quad \checkmark$$

Cont from page 55

Sta.	+	T	-	Grade	
58+00				830.1	11.8 ✓
58+30				831.2	10.7 ✓
58+60				832.3	9.6 ✓
TP	1.66	841.94 ✓	12.22	840.28 ✓	
57+00				826.4	26.1 ✓
57+25				827.4	25.1 ✓
57+50				828.3	24.2 ✓
57+75				829.2	23.3 ✓
58+00				830.1	22.4 ✓
58+30				831.2	21.3 ✓
58+60				832.3	20.2 ✓
TP	0.72	852.50 ✓	12.73	851.78 ✓	
57+00				826.4	38.1 ✓
57+25				827.4	37.1 ✓
		864.51 ✓			

L

C

R

$$\frac{-11.0}{31.8}$$

$$\frac{23.1}{31.8}$$

$$\frac{0.0}{11}$$

$$\frac{12.4}{11}$$

$$\frac{7.2}{2.5}$$

$$\frac{5.9}{x}$$

$$\frac{0.0}{21.5}$$

$$\frac{11.2}{21.5}$$

$$\frac{5.8}{12}$$

$$\frac{4.81}{33.1}$$

$$\frac{1.8}{33.1}$$

$$\frac{1.1}{39}$$

(Mid g. below estimates)

$$\frac{10.0}{x}$$

$$\frac{6.5}{11}$$

$$\frac{12.2}{x}$$

$$\frac{5.8}{16}$$

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

$$\frac{15.1}{11}$$

$$\frac{7.3}{2.6}$$

$$\frac{9.0}{15}$$

$$\frac{16.3}{12}$$

$$\frac{9.5}{x}$$

$$\frac{11.7}{29}$$

$$\frac{0.3}{x}$$

$$\frac{11.6}{30}$$

$$\frac{10.8}{42}$$

$$\frac{13.3}{47}$$

$$\frac{12.3}{50.0}$$

$$\left( + \frac{25.0}{50.0} \right)$$

$$\frac{12.6}{31}$$

$$\frac{8.7}{44}$$

$$\frac{6.0}{53}$$

$$\left( + \frac{30.3}{53} \right)$$

Cont. from page 66

Sta	T	T	-	Elev	
57+50				828.3	36.7 ✓
57+75				829.7	35.3 ✓
58+00				830.1	34.4 ✓
58+30				831.7	33.3 ✓
TP	5.68	864.51 ✓	336	858.83 ✓	
58+60				832.3	29.9 ✓
58+85				833.7	29.0 ✓
59+05				834.0	28.7 ✓
TP	336	862.19 ✓	86.2	858.83 ✓	
59+05				834.0	33.5 ✓
59+25		867.45		834.7	32.8 ✓
59+50				835.6	31.9 ✓
TP	9.41	867.45 ✓	1.31	858.04 ✓	
		859.41 ✓			

$$\times \frac{12.5}{58} \frac{90}{51.4} \left( \frac{+264}{51.4} \right)$$

$$\times \frac{96}{499} \left( \frac{+249}{499} \right)$$

$$\frac{13.4}{51} \frac{103}{40} \frac{50}{538} \left( \frac{+288}{538} \right)$$

$$\frac{14.1}{17} \frac{97}{39} \frac{52}{42} \frac{37}{34} \left( \frac{+291}{541} \right)$$

$$\frac{113}{3} \frac{100}{x} \frac{54}{15} \frac{12}{28} \left( \frac{+307}{557} \right)$$

$$\left( \frac{+145}{395} \right) \frac{147}{285} \frac{83}{19} \frac{32}{x} \frac{02}{105} \left( \frac{+303}{553} \right)$$

$$\left( \frac{0166}{416} \right) \frac{116}{416} \frac{63}{25} \frac{20}{10} \times$$

Hand about 58470-

$$\frac{55}{x} \frac{46}{12} \frac{44}{3} \frac{43}{542} \left( \frac{+292}{542} \right)$$

$$\frac{68}{15} \frac{1}{17} \frac{57}{20} \frac{52}{523} \left( \frac{+273}{523} \right)$$

$$\frac{95}{28} \frac{87}{478} \left( \frac{+228}{478} \right)$$

59.2

6-13-24

Cont from page 57

Sta	+	T	-	Elev	
59+25				8347	25° 24.7 ✓
59+50				8356	24° 23.8 ✓
59+75				8365	23° 22.9 ✓
TP	11.77	859.41 ✓	1.25	847.64 ✓	
60+00				8375	11.4 ✓
60+40				8390	9.9 ✓
TP	10.06	848.89 ✓	1.60	838.83 ✓	
60+50				8394	11 1.0 ✓
B.M.					
TP	12.52	840.43 ✓	0.41	827.91 ✓	
60+85				840.6	-12.3 ✓
TP	7.15	828.32 ✓	10.16	821.17 ✓	
61+25				842.1	-10.8 ✓
TP	0.36	831.33 ✓	11.12	830.97 ✓	
61+50				843.0	-0.9 ✓
62+00				844.9	-2.8 ✓
	5.13	842.09 ✓		836.96 ✓	

L                      ♀                      R

$$\left( \frac{+165}{415} \right) \frac{85}{415} \frac{47}{218} \frac{27}{210}$$

$$\left( \frac{+133}{343} \right) \frac{109}{343} \frac{80}{29} \frac{49}{13} \frac{33}{8} \frac{30}{x} \frac{12}{28}$$

$$\left( \frac{+92}{342} \right) \frac{143}{342} \frac{110}{25} \frac{101}{17} \frac{85}{12} \frac{18}{x} \frac{68}{21} \frac{63}{410} \left( \frac{+160}{410} \right)$$

$$\frac{48}{298} \frac{73}{298} \frac{54}{22} \frac{12}{15} \frac{25}{x} \frac{17}{19} \frac{14}{343} \left( \frac{+93}{343} \right)$$

$$\frac{-12}{177} \frac{117}{177} \frac{11}{65} \frac{99}{x} \frac{95}{15} \left( \frac{+5}{65} \right) \frac{14}{22} \frac{30}{11/224}$$

$$\frac{-47}{225} \frac{10}{225} \frac{59}{18} \frac{50}{x} \frac{47}{21} \frac{15}{223} \left( \frac{-46}{223} \right) \frac{40}{288} \frac{15}{282}$$

Nail 10" Bottom 60 R-60+60 E/ 837.71

On hub.

Edge of dth

$$\left( \frac{-240}{56} \right) \frac{130}{56} \frac{18}{37} \frac{99}{26} \frac{73}{x} \frac{74}{8} \frac{40}{17} \frac{19}{3} \frac{10}{390} \left( \frac{-147}{390} \right)$$

$$\frac{-15}{307} \frac{43}{307} \frac{13}{17} \frac{13}{x} \frac{07}{15} \frac{18}{370} \left( \frac{-140}{370} \right)$$

$$\left( \frac{-95}{305} \right) \frac{78}{305} \frac{96}{12} \frac{96}{x} \frac{80}{324} \left( \frac{-101}{324} \right)$$

$$\left( \frac{-79}{218} \right) \frac{51}{218} \frac{55}{13} \frac{68}{x} \frac{64}{18} \frac{55}{305} \left( \frac{+95}{305} \right)$$

Top of ♀ state of 62+50



Top of @ stake of 62+50

$$\left(\frac{-191}{463}\right) \frac{0.5}{443} \frac{98}{20} \times$$

✓ +0.7

$$\left(\frac{-289}{613}\right) \frac{100}{613} \frac{14}{28} \times$$

✓ +0.7

$$\left(\frac{-94}{30.2}\right) \frac{94}{2.98} \frac{107}{11} \frac{13}{2} \frac{65}{275} \left(\frac{-8.1}{28.1}\right) \frac{50}{35.0} \left(\frac{225}{356}\right)$$

✓ +0.7

Top of stump on @ of 62+90

$$\frac{13}{X} \frac{100}{10} \frac{64}{226} \left(\frac{-48}{22.6}\right) \frac{38}{310} \left(\frac{+34}{310}\right)$$

✓ +0.7

$$\frac{93}{2} \frac{43}{18} \frac{38}{206} \left(\frac{33}{205}\right) \frac{15}{288} \left(\frac{+33}{288}\right) + 0.7$$

✓ +0.7

$$\left(\frac{-17.1}{43.5}\right) \frac{25.1}{43.5} \frac{70}{20} \frac{14}{8} \frac{5}{10} \frac{38}{25.6} \left(\frac{+26}{25.6}\right)$$

✓ +0.7

$$\left(\frac{-24}{23.5}\right) \frac{3.0}{23.5} \frac{11.6}{18} \frac{14}{X} \frac{13}{26} \left(\frac{+7.1}{32.1}\right) -$$

✓ +0.7

$$\left(\frac{+17}{26.9}\right) \frac{16.5}{36.9} \frac{11.5}{10} \frac{18}{X} \frac{10}{20} \frac{42}{37.7} \left(\frac{+12.7}{37.7}\right)$$

✓ +0.7

$$\left(\frac{+35}{24.5}\right) \frac{13.5}{24.5} \frac{11.6}{21} \frac{13}{X} \frac{38}{24} \frac{3.9}{37.6} \left(\frac{-11.6}{37.6}\right)$$

✓ +0.7

Cont from page 59

Sto	+	⌘	-	Grade	Gr Rod
65				855.28	14.6 ✓
65+50 ✓				856.98	12.9 ✓
65+90				858.34	11.6 ✓
66+00 ✓				858.61	
66+25				859.48	10.4 ✓
FP	4.85	869.85 ✓	8.25	865.00 ✓	
66+50 ✓				860.31	13.0 ✓
67 ✓				861.8	11.6 ✓
BM.			9.28	860.57.	
67+50 ✓				863.1	10.2 ✓
68 ✓				864.38	8.9 ✓
FP	1.00	873.25 ✓	5.69	872.25 ✓	
68+50 ✓				865.53	12.4 ✓
69 ✓				866.68	11.2 ✓
+30				67.37	10.5 ✓
69+50				867.83	10.1 ✓
70				869.00	8.9 ✓
+50 ✓				870.15	7.7 ✓
	1.91	877.94 ✓		876.03 ✓	

+8.4%

200 V.C. - 11.0.275

+2.3

L      ±      R

$$0.7 \quad \begin{pmatrix} 00 \\ 25.0 \end{pmatrix} \quad \begin{pmatrix} 15.3 \\ 25.0 \end{pmatrix} \quad \begin{pmatrix} 12.1 \\ 16.5 \end{pmatrix} \quad 8.6 \quad \begin{pmatrix} 5.5 \\ 2.0 \end{pmatrix} \quad \begin{pmatrix} 3.7 \\ 35.2 \end{pmatrix} \quad \begin{pmatrix} +10.2 \\ 35.2 \end{pmatrix} \quad \checkmark +0.7$$

$$0.7 \quad \begin{pmatrix} +2.7 \\ 27.7 \end{pmatrix} \quad \begin{pmatrix} 10.9 \\ 27.7 \end{pmatrix} \quad \begin{pmatrix} 9.8 \\ 22 \end{pmatrix} \quad 7.2 \quad \begin{pmatrix} 5.0 \\ 2.1 \end{pmatrix} \quad \begin{pmatrix} 3.3 \\ 33.9 \end{pmatrix} \quad \begin{pmatrix} +8.9 \\ 33.9 \end{pmatrix} \quad \checkmark +0.7$$

$$0.3 \quad \begin{pmatrix} 06.08 \\ 33.8 \end{pmatrix} \quad \begin{pmatrix} 13.1 \\ 23.8 \end{pmatrix} \quad \begin{pmatrix} 10.0 \\ 18.3 \end{pmatrix} \quad \begin{pmatrix} 11.9 \\ 13.3 \end{pmatrix} \quad 9.7 \quad \begin{pmatrix} 2.4 \\ 7.2 \end{pmatrix} \quad \begin{pmatrix} 4.6 \\ 31.7 \end{pmatrix} \quad \begin{pmatrix} +4.7 \\ 31.7 \end{pmatrix} \quad \checkmark +0.3$$

$$0.2 \quad \begin{pmatrix} +1.0 \\ 26.0 \end{pmatrix} \quad \begin{pmatrix} 9.6 \\ 26.0 \end{pmatrix} \quad \begin{pmatrix} 7.4 \\ 15 \end{pmatrix} \quad 5.4 \quad \begin{pmatrix} 3.0 \\ 2.2 \end{pmatrix} \quad \begin{pmatrix} 2.2 \\ 33.0 \end{pmatrix} \quad \begin{pmatrix} +8.0 \\ 33.0 \end{pmatrix} \quad \begin{pmatrix} +8.4 \\ 40.4 \end{pmatrix} \quad \checkmark +0.2$$

$$0.0 \quad \begin{pmatrix} 10.7 \\ 25.7 \end{pmatrix} \quad \begin{pmatrix} 12.3 \\ 25.7 \end{pmatrix} \quad \begin{pmatrix} 9.6 \\ 13 \end{pmatrix} \quad 7.7 \quad \begin{pmatrix} 5.0 \\ 2.6 \end{pmatrix} \quad \begin{pmatrix} 4.6 \\ 32.4 \end{pmatrix} \quad \begin{pmatrix} +8.4 \\ 32.4 \end{pmatrix} \quad \begin{pmatrix} +8.4 \\ 46.4 \end{pmatrix} \quad \checkmark 0.0$$

$$0 \quad \begin{pmatrix} 13.5 \\ 27.5 \end{pmatrix} \quad \begin{pmatrix} 00 \\ 19.5 \end{pmatrix} \quad \begin{pmatrix} 11.5 \\ 19.5 \end{pmatrix} \quad \begin{pmatrix} 10.8 \\ 18 \end{pmatrix} \quad 8.1 \quad \begin{pmatrix} 5.0 \\ 2.0 \end{pmatrix} \quad \begin{pmatrix} 3.9 \\ 32.6 \end{pmatrix} \quad \begin{pmatrix} +7.6 \\ 32.6 \end{pmatrix} \quad \begin{pmatrix} +8.3 \\ 53.8 \end{pmatrix} \quad \checkmark 0.0$$

Top S.W. Cor. Caping Cattle Pass 67+10

$$\begin{pmatrix} +2.4 \\ 27.4 \end{pmatrix} \quad \begin{pmatrix} 7.8 \\ 27.4 \end{pmatrix} \quad \begin{pmatrix} 7.2 \\ 23 \end{pmatrix} \quad 6.2 \quad \begin{pmatrix} 4.9 \\ 2.3 \end{pmatrix} \quad \begin{pmatrix} 4.2 \\ 31.0 \end{pmatrix} \quad \begin{pmatrix} +6.0 \\ 31.0 \end{pmatrix} \quad \checkmark$$

$$\begin{pmatrix} 5.0 \\ 36.0 \end{pmatrix} \quad \begin{pmatrix} 8.9 \\ 36.0 \end{pmatrix} \quad \begin{pmatrix} 4.0 \\ 27 \end{pmatrix} \quad \begin{pmatrix} 3.7 \\ 23 \end{pmatrix} \quad 3.3 \quad \begin{pmatrix} 3.3 \\ 1 \end{pmatrix} \quad \begin{pmatrix} 2.7 \\ 31.2 \end{pmatrix} \quad \begin{pmatrix} +6.2 \\ 31.2 \end{pmatrix} \quad \checkmark$$

$$\begin{pmatrix} +2.7 \\ 27.7 \end{pmatrix} \quad \begin{pmatrix} 9.7 \\ 27.7 \end{pmatrix} \quad \begin{pmatrix} 6.5 \\ 14 \end{pmatrix} \quad 6.8 \quad \begin{pmatrix} 6.0 \\ 2.3 \end{pmatrix} \quad \begin{pmatrix} 6.0 \\ 31.4 \end{pmatrix} \quad \begin{pmatrix} +6.4 \\ 31.4 \end{pmatrix} \quad \checkmark$$

$$\begin{pmatrix} +0.4 \\ 25.4 \end{pmatrix} \quad \begin{pmatrix} 10.8 \\ 25.4 \end{pmatrix} \quad \begin{pmatrix} 10.2 \\ 10 \end{pmatrix} \quad 7.2 \quad \begin{pmatrix} 6.3 \\ 3 \end{pmatrix} \quad \begin{pmatrix} 5.3 \\ 30.9 \end{pmatrix} \quad \begin{pmatrix} +5.9 \\ 30.9 \end{pmatrix} \quad \checkmark$$

$$\begin{pmatrix} +0.3 \\ 23.3 \end{pmatrix} \quad \begin{pmatrix} 10.2 \\ 23.3 \end{pmatrix} \quad \begin{pmatrix} 9.9 \\ 14 \end{pmatrix} \quad 9.9 \quad \begin{pmatrix} 6.1 \\ 10 \end{pmatrix} \quad \begin{pmatrix} 5.6 \\ 29.9 \end{pmatrix} \quad \begin{pmatrix} +4.9 \\ 29.9 \end{pmatrix} \quad \checkmark$$

$$\begin{pmatrix} +4.3 \\ 34.3 \end{pmatrix} \quad \begin{pmatrix} 5.8 \\ 34.3 \end{pmatrix} \quad \begin{pmatrix} 9.5 \\ 20 \end{pmatrix} \quad \begin{pmatrix} 9.4 \\ 9 \end{pmatrix} \quad 9.5 \quad \begin{pmatrix} 9.4 \\ 9 \end{pmatrix} \quad \begin{pmatrix} 5.6 \\ 19 \end{pmatrix} \quad \begin{pmatrix} 5.3 \\ 29.5 \end{pmatrix} \quad \begin{pmatrix} +4.9 \\ 29.5 \end{pmatrix} \quad \checkmark$$

$$\begin{pmatrix} +4.0 \\ 25.6 \end{pmatrix} \quad \begin{pmatrix} 4.9 \\ 25.6 \end{pmatrix} \quad \begin{pmatrix} 8.7 \\ 17 \end{pmatrix} \quad 8.0 \quad \begin{pmatrix} 8.2 \\ 11 \end{pmatrix} \quad \begin{pmatrix} 8.6 \\ 23 \end{pmatrix} \quad \begin{pmatrix} 5.9 \\ 28.0 \end{pmatrix} \quad \begin{pmatrix} +3.9 \\ 28.0 \end{pmatrix} \quad \checkmark$$

$$\begin{pmatrix} +4.3 \\ 29.3 \end{pmatrix} \quad \begin{pmatrix} 3.4 \\ 29.3 \end{pmatrix} \quad \begin{pmatrix} 3.8 \\ 14 \end{pmatrix} \quad \begin{pmatrix} 6.9 \\ 10 \end{pmatrix} \quad 6.9 \quad \begin{pmatrix} 6.4 \\ 14 \end{pmatrix} \quad \begin{pmatrix} 6.4 \\ 23 \end{pmatrix} \quad \begin{pmatrix} 6.8 \\ 25.9 \end{pmatrix} \quad \begin{pmatrix} +0.9 \\ 25.9 \end{pmatrix} \quad \checkmark$$

Elev 50 297 W 25

X-sec. Borris St. Conn.

Cont. from page (44)

Sta	+	$\pi$	-	Grade
		754.01 ✓		
4+00				48.35 57 ✓
4+50				48.16 59 ✓
5				48.21 58 ✓
5+50				48.53 55 ✓
6+00				49.10 49 ✓
(Monday) T.P.	4.50	755.49 ✓	3.02	750.99 ✓
6+50				49.80 57 ✓
7				51.2 43 ✓
T.P.	9.52	761.21 ✓	3.80	751.69 ✓
7+50				54.00 72 ✓
7+75				55.7 55 ✓
8+00				57.5 3.7 ✓
8+25				59.2 2.0 ✓
T.P.	8.74	768.40 ✓	1.75	759.46 ✓
8+50				61.0 74 ✓

200' VC

11.4'

100' VC

17.0%

## L E R

$$\begin{array}{l} DC \\ 67 \\ 148 \end{array} \quad \begin{array}{l} 64 \\ 12 \end{array} \quad \begin{array}{l} 75 \\ x \end{array} \quad \begin{array}{l} 84 \\ 151 \end{array}$$

$$\begin{array}{l} DC \\ 147 \end{array} \quad \begin{array}{l} 72 \\ 139 \end{array} \quad \begin{array}{l} 80 \\ x \end{array} \quad \begin{array}{l} 87 \\ 154 \end{array}$$

$$\begin{array}{l} DC \\ 45 \\ 191 \end{array} \quad \begin{array}{l} 70 \\ 128 \end{array} \quad \begin{array}{l} 86 \\ x \end{array} \quad \begin{array}{l} 106 \\ 167 \end{array}$$

$$\begin{array}{l} DC \\ 60 \\ 148 \end{array} \quad \begin{array}{l} 70 \\ 128 \end{array} \quad \begin{array}{l} 72 \\ x \end{array} \quad \begin{array}{l} 88 \\ 160 \end{array}$$

$$\begin{array}{l} 40 \\ 210 \end{array} \quad \begin{array}{l} 49 \\ 11 \end{array} \quad \begin{array}{l} 67 \\ x \end{array} \quad \begin{array}{l} 74 \\ 148 \end{array}$$

Bent nail in fence post.

$$\begin{array}{l} 41 \\ 186 \end{array} \quad \begin{array}{l} 45 \\ 12 \end{array} \quad \begin{array}{l} 67 \\ x \end{array} \quad \begin{array}{l} 74 \\ 6 \end{array} \quad \begin{array}{l} 81 \\ 146 \end{array}$$

$$\begin{array}{l} 29 \\ 134 \end{array} \quad \begin{array}{l} 30 \\ 12 \end{array} \quad \begin{array}{l} 51 \\ x \end{array} \quad \begin{array}{l} 64 \\ 141 \end{array}$$

$$\begin{array}{l} 66 \\ 176 \end{array} \quad \begin{array}{l} 72 \\ 12 \end{array} \quad \begin{array}{l} 93 \\ x \end{array} \quad \begin{array}{l} 118 \\ 167 \end{array}$$

$$\begin{array}{l} 50 \\ 175 \end{array} \quad \begin{array}{l} 55 \\ 12 \end{array} \quad \begin{array}{l} 76 \\ x \end{array} \quad \begin{array}{l} 97 \\ 12 \end{array} \quad \begin{array}{l} 107 \\ 188 \end{array}$$

$$\begin{array}{l} 20 \\ 87 \end{array} \quad \begin{array}{l} 37 \\ 9 \end{array} \quad \begin{array}{l} 44 \\ 4 \end{array} \quad \begin{array}{l} 53 \\ x \end{array} \quad \begin{array}{l} 83 \\ 14 \end{array} \quad \begin{array}{l} 85 \\ 191 \end{array}$$

$$\begin{array}{l} 11 \\ 179 \end{array} \quad \begin{array}{l} 23 \\ x \end{array} \quad \begin{array}{l} 42 \\ 6 \end{array} \quad \begin{array}{l} 47 \\ 7 \end{array} \quad \begin{array}{l} 53 \\ 16 \end{array}$$

$$\begin{array}{l} DC \\ 15 \\ 175 \end{array} \quad \begin{array}{l} 79 \\ 175 \end{array} \quad \begin{array}{l} 79 \\ 118 \end{array} \quad \begin{array}{l} 78 \\ 4 \end{array} \quad \begin{array}{l} 85 \\ 76 \end{array} \quad \begin{array}{l} 79 \\ 5 \end{array} \quad \begin{array}{l} 81 \\ 7 \end{array} \quad \begin{array}{l} 86 \\ 128 \end{array}$$

Cont. from page 61

$5\frac{1}{2}$	+	$\pi$	-	Elev.	
8+88.1		768.4	✓	63.7	47 ✓
9+00				64.5	
9+15				65.5	29 ✓

700  
+ 200

L      <      R

(62)

$$\frac{5.9}{12.8}$$

$$\frac{4.9}{10}$$

$$\frac{4.7}{x}$$

$$\frac{5.4}{7}$$

$$\frac{5.6}{12.5}$$



$$\frac{2.6}{10}$$

3.3

$$\frac{2.7}{10}$$

Used old ground at 9+15  
for beginning of grading



Levels for Rock Classification

Sta.	+	π	-	Elev.
BM	8.20	713.34		705.14
26+72				
TP	9.10	718.64	3.80	709.54
27				
11				
+25				
+50				

Balance R.R. Dump is 90% loose Rock  
10% Earth.

Levels for June Est.

6/24/24

B.M.	9.90	719.44		709.54
26+72			11.4	
27			11.7	
+25			7.3	
+50				

+70 = End. Exc.

Nesbitt  
Ahlberg  
Velson  
Dorr

6/23/24

(63)

L

L

R

Spike Cottonwood R-20+80

$$\begin{array}{r} \text{Top Rock} \\ \hline 40 \\ 23 \end{array}$$

(4.3)

$$\begin{array}{r} 34 \\ \hline 26 \end{array} \text{ Top Rock}$$

$$\begin{array}{r} \text{Top Rock} \\ \hline 76 \\ 27 \end{array}$$

(2.8)

$$\begin{array}{r} 60 \\ \hline 31 \end{array} \text{ Top Rock}$$

$$\begin{array}{r} \text{Top Rock} \\ \hline 46 \\ 28 \end{array}$$

(1.6)

$$\begin{array}{r} 66 \\ \hline X \end{array} \text{ Top Rock}$$

$$\begin{array}{r} \text{Top Rock} \\ \hline 36 \\ 30 \end{array}$$

(1.2)

$$\begin{array}{r} 11.3 \\ \hline 22 \end{array}$$

11.4

$$\begin{array}{r} 11.1 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 12.2 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 12.3 \\ \hline 21 \end{array}$$

$$\begin{array}{r} 11.7 \\ \hline 22 \end{array}$$

11.7

$$\begin{array}{r} 10.3 \\ \hline 20 \end{array}$$

$$\begin{array}{r} 8.5 \\ \hline 23 \end{array}$$

7.3

$$\begin{array}{r} 5.4 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 4.6 \\ \hline 27 \end{array}$$

$$\begin{array}{r} 4.2 \\ \hline 13 \end{array}$$

Levels for June Estimate

Sta	+	$\pi$	-	Elev.
B17	1.91	739.95		738.04
TP	4.75	732.01	12.69	727.26
28+67			85	723.5
29			107	721.3
+50			40	728.0
30			50	727.0
+25				
+50			3.8	728.2
31			36	728.4
+50			2.4	279.6
TP	11.21	740.49	2.73	729.28
32			6.4	734.1
+50			56	734.9
33			4.6	735.9
+50			4.2	736.3
TP	9.22	747.21	2.50	737.99
34			88	738.4

Note: Completed to 38+50 L + 57+50 R  
 Hertz 2011 St. Approach Complete.

6/23/24

64

L                      ♀                      R

Spike Cottonwood 45' E - 30+30

toe slope  $\frac{10.7}{32}$       8.5       $\frac{6.4}{11}$  ← old ground.

toe slope  $\frac{9.2}{31}$        $\frac{8.3}{12}$        $\frac{10.4}{7}$       10.7       $\frac{6.7}{14}$        $\frac{2.6}{20}$  ← old ground

toe slope  $\frac{9.0}{25}$        $\frac{7.1}{12}$       4.0       $\frac{4.8}{12}$  ← toe slope       $\frac{old\ ground}{19}$

toe  $\frac{7.8}{30}$        $\frac{7.7}{6}$       5.0       $\frac{4.3}{16}$  ← toe slope

toe slope  $\frac{8.8}{25}$        $\frac{8.5}{12}$       3.8       $\frac{3.8}{25}$  ← toe

toe  $\frac{4.1}{28}$       2.6       $\frac{3.2}{28}$  ← toe

toe  $\frac{3.4}{26}$       2.4       $\frac{2.5}{14}$        $\frac{1.0}{19}$        $\frac{0.4}{26}$  ← toe

toe  $\frac{10.4}{24}$        $\frac{9.4}{5}$       6.4       $\frac{6.6}{25}$  ← toe

toe  $\frac{8.0}{24}$        $\frac{8.0}{4}$       5.6       $\frac{5.1}{24}$  ← toe

$\frac{7.9}{24}$       4.6       $\frac{4.4}{26}$

4.2

10.0  $\frac{7.7}{19}$        $\frac{8.4}{15}$       8.8       $\frac{2.6}{14}$        $\frac{10.5}{19}$        $\frac{10.8}{24}$

Sto.	+	T	-	Grade	Gr Rod
B.M.	10.03	787.10 ✓		777.07	
48+45				793.5	-6.4 ✓
+62				794.00	-6.9 ✓
B.M.	10.99	803.33 ✓		792.34	
48+45				793.5	9.8 ✓
+62				794.00	9.3 ✓
Note: following sections carry turns from bottom to top of page.					
48+75				795.29	-18.6 ✓
48+88				795.38	-19.2 ✓
TR	0.50	776.70	1248	776.20 ✓	
49		(top 14 ft.)		796.44	-7.7 ✓
49+10				797.07	-8.4 ✓
TR	0.58	788.68 ✓ 800.08 ✓	11.98	788.10 ✓	

L I R

No. 1 TPA 5 L 27+80

$$8 \begin{array}{r} 46.9 \\ \underline{42.2} \end{array} \quad \begin{array}{r} 8.8 \\ \underline{42.2} \end{array} \quad \begin{array}{r} 4.3 \\ \underline{2.6} \end{array} \quad \begin{array}{r} 0.0 \\ \underline{12.8} \end{array}$$

$$9 \begin{array}{r} -17.8 \\ \underline{44.4} \end{array} \quad \begin{array}{r} 9.1 \\ \underline{44.4} \end{array} \quad \begin{array}{r} 8.3 \\ \underline{4.0} \end{array} \quad \begin{array}{r} 4.1 \\ \underline{3.0} \end{array}$$

Top 3 E. Cor South Cuts Caping 48+50

$$12.8 \quad \begin{array}{r} 10.5 \\ \underline{9} \end{array} \quad \begin{array}{r} 5.4 \\ \underline{26.0} \end{array} \quad \begin{array}{r} -5.3 \\ \underline{26.0} \end{array}$$

$$\begin{array}{r} 15.8 \\ \underline{11} \end{array} \quad \begin{array}{r} 9.3 \\ \underline{10.9} \end{array} \quad \begin{array}{r} 8.1 \\ \underline{6} \end{array} \quad \begin{array}{r} 5.1 \\ \underline{15} \end{array} \quad \begin{array}{r} 4.9 \\ \underline{25} \end{array} \quad \begin{array}{r} +5.3 \\ \underline{25} \end{array}$$

$$\begin{array}{r} 15.6 \\ \underline{72.7} \end{array} \quad \begin{array}{r} -35.1 \\ \underline{72.7} \end{array}$$

$$\begin{array}{r} 15.1 \\ \underline{6.0} \end{array} \quad \begin{array}{r} 1.8 \\ \underline{4.7} \end{array} \quad \begin{array}{r} 6.0 \\ \underline{3.5} \end{array} \quad \begin{array}{r} 4.3 \\ \underline{2.7} \end{array} \quad \begin{array}{r} 3.2 \\ \underline{9} \end{array} \quad \begin{array}{r} 0.8 \\ \underline{8} \end{array} \quad 0.0$$

$$\begin{array}{r} 13.4 \\ \underline{6.6} \end{array} \quad \begin{array}{r} 13.4 \\ \underline{70.3} \end{array} \quad \begin{array}{r} -33.5 \\ \underline{70.3} \end{array}$$

$$\begin{array}{r} 14.0 \\ \underline{6.1} \end{array} \quad \begin{array}{r} 14.0 \\ \underline{5.0} \end{array} \quad \begin{array}{r} 10.0 \\ \underline{4.5} \end{array} \quad \begin{array}{r} 9.7 \\ \underline{4.0} \end{array} \quad \begin{array}{r} 9.5 \\ \underline{2.8} \end{array} \quad \begin{array}{r} 7.8 \\ \underline{9} \end{array} \quad 6.8 \quad \begin{array}{r} 14.1 \\ \underline{11} \end{array} \quad \begin{array}{r} 3.1 \\ \underline{18} \end{array} \quad 5.00$$

$$\begin{array}{r} 14.2 \\ \underline{5.6} \end{array} \quad \begin{array}{r} 14.2 \\ \underline{4.6} \end{array} \quad \begin{array}{r} 13.6 \\ \underline{3.4} \end{array} \quad \begin{array}{r} 9.5 \\ \underline{1.8} \end{array} \quad \begin{array}{r} 11.4 \\ \underline{1.0} \end{array} \quad \begin{array}{r} 11.7 \\ \underline{3} \end{array} \quad 10.3 \quad \begin{array}{r} 13.0 \\ \underline{3} \end{array} \quad \begin{array}{r} 8.7 \\ \underline{7} \end{array} \quad \begin{array}{r} 7.3 \\ \underline{15} \end{array} \quad \begin{array}{r} 9.2 \\ \underline{15} \end{array} \quad \begin{array}{r} 8.8 \\ \underline{2.7} \end{array} \quad \begin{array}{r} 6.4 \\ \underline{2.9} \end{array} \quad \begin{array}{r} 5.6 \\ \underline{3.7} \end{array} \quad 0.0$$

$$\begin{array}{r} -19.6 \\ \underline{49.4} \end{array} \quad \begin{array}{r} 10.3 \\ \underline{49.4} \end{array} \quad \begin{array}{r} 8.2 \\ \underline{3.9} \end{array} \quad \begin{array}{r} 5.1 \\ \underline{2.8} \end{array} \quad \begin{array}{r} 5.1 \\ \underline{2.2} \end{array} \quad \begin{array}{r} 14.6 \\ \underline{12} \end{array} \quad 5.5 \quad \begin{array}{r} 6.9 \\ \underline{13} \end{array} \quad \begin{array}{r} 6.8 \\ \underline{2.2} \end{array} \quad \begin{array}{r} 2.8 \\ \underline{2.3} \end{array} \quad \begin{array}{r} 4.8 \\ \underline{29.5} \end{array} \quad \begin{array}{r} 0.9 \\ \underline{33.0} \end{array} \quad \begin{array}{r} -8.4 \\ \underline{33.0} \end{array}$$

Sto	+	π	-	Grade	Gr Rod
49+25				797.55	2.5 ✓
49+38				798.11	2.0 ✓
TP	1.45	800.08 ✓	12.81	798.63 ✓	
49+25				797.55	13.8 13.9 ✓
49+38				798.11	13.3 ✓
49+50		(top 24 ft Lt.)		798.62	12.8 ✓
49+75				799.69	11.7 ✓
50		(top 300 ft Lt.)		800.71	10.7 ✓
50+25				801.69	9.7 ✓
TP	0.12	811.44 ✓	12.70	811.32 ✓	
B.M.			7.15	816.87 ✓	
49+75				799.69	24.3 ✓
50+00				800.71	23.3 ✓
50+25				801.69	22.3 ✓
50+50		(top 232 ft Lt.)		802.64 ✓	21.4 ✓
50+75				803.54	20.5 ✓
51		(top 200 ft Lt.)		804.47	19.5 ✓
51+25				805.40	18.6 ✓
TP #4	7.99	824.02 ✓		816.03 ✓	
50+50				802.64	2.3 2.2 ✓
		804.87 ✓			

Hessitt  
 Ahlberg  
 Nelson  
 Orr

130	12.6	11.5	9.0	7.6	5.9	(1.5)	49+20 <sup>00</sup>
341	33	29	21	13	12	40	79.5
		(-7.7)	8.8	7.5	4.5		
		(28.6)	28.6	24	14		

$$\frac{11.5}{21.1} \quad \left( \frac{+3.2}{21.1} \right)$$

12.8	11.7	10.4	8.6	7.1	(+5.3)
3		3	14	22.2	22.2

(0.0)	11.9	10.9	8.3	6.3	4.1	(+9.6)
19.5	19.5	10	13	24.3	24.3	24.3

(+1.9)	8.9	8.3	6.0			-0.9
20.5	20.5	16	8			
			3.9			

(+3.8)	6.0	5.0	2.7			-0.9
21.4	21.4	18	10			

(+2.0)	6.8	8.0				-0.9
20.5	20.5	10.5				

	12.9	11.1	(+1.41)			
	16	26.6	26.6			
11.8	10.2	8.6	6.9	+1.73		-0.9
	6	15	28.2	28.2		

13.0	11.1	8.2	5.6	4.5	(+1.17)	-0.9
5		9	2.3	28.9	28.9	

14.4	12.3	8.5	4.8	2.3	(+2.0)	-0.9
7		6	19	29.5	29.5	

14.2	11.8	9.6	4.7	1.4	(+2.0)	-0.9
	6	10	21.5	29.5	29.5	

16.2	12.4	6.2	3.5	(+1.67)		-0.7
	8	2.2	27.9	27.9		

17.0	14.5	9.0	5.1	(+1.41)		-0.6
	7	20	26.6	26.6		

DC 1.6	1.8	1.4			
19.8	19.8	18			

Cont from page 66

Sto	+	π	-	Grade	Gr Rod
50+75				803.54	(1.4) ✓
51+00				804.47	0.4 ✓
51+25				805.40	-0.5 ✓
51+50	(top 19.0% Lt.)			806.32	-1.4 ✓ (-1.3)
51+75				807.25	-2.4 ✓
52				808.17	-3.3 ✓
52+15				808.68	-3.8 ✓
52+60				810.23	-5.3 ✓
52+75				810.70	-5.8 ✓
52+85				811.05	-6.2 ✓
53				811.60	-6.7 ✓
TP	0.43	804.87 ✓	12.31	804.44 ✓	10.4
51+50				806.32	(10.5) ✓
51+75		816.75 ✓		807.25	9.5 ✓

L L R

9  $\frac{-5.8}{25.0}$   $\frac{5.8}{25.0}$   $\frac{3.0}{18}$   $\frac{0.5}{14}$

7  $\frac{-15.4}{40.1}$   $\frac{14.4}{40.1}$   $\frac{8.5}{27}$   $\frac{2.5}{12}$   $\frac{0.4}{7}$

0  $\frac{-13.3}{37.1}$   $\frac{11.6}{37.1}$   $\frac{8.4}{27}$   $\frac{1.3}{9}$

3  $\frac{-12.5}{35.0}$   $\frac{10.3}{35.0}$   $\frac{9.0}{31}$   $\frac{5.1}{21}$

0.2  $\frac{-28.4}{60.8}$   $\frac{24.4}{60.8}$   $\frac{19.7}{49}$   $\frac{16.0}{39}$   $\frac{13.0}{32}$   $\frac{9.1}{23}$

$\frac{25.8}{63.7}$   $\frac{-30.6}{63.7}$

0  $\frac{21.4}{52}$   $\frac{13.5}{48}$   $\frac{13.0}{28}$   $\frac{13.0}{34}$   $\frac{6.0}{2.0}$

$\frac{23.3}{57}$   $\frac{30.4}{65.9}$   $\frac{32.1}{65.9}$

1  $\frac{21.0}{52}$   $\frac{17.0}{45}$   $\frac{13.0}{38}$   $\frac{11.1}{34}$   $\frac{4.3}{2.1}$

$\frac{26.8}{60}$   $\frac{27.8}{69.7}$   $\frac{-34.8}{69.7}$

0.0  $\frac{23.0}{52}$   $\frac{20.1}{46}$   $\frac{17.2}{42}$   $\frac{13.0}{34}$   $\frac{10.7}{28}$   $\frac{6.2}{2.1}$

$\frac{-27.4}{59.1}$   $\frac{20.4}{59.1}$

0.1  $\frac{17.2}{47}$   $\frac{14.4}{35}$   $\frac{12.0}{30.5}$   $\frac{9.4}{25}$   $\frac{6.1}{19}$

0.2  $\frac{-21.0}{50.0}$   $\frac{14.0}{50.0}$   $\frac{13.2}{40}$   $\frac{11.1}{34.5}$   $\frac{7.9}{2.6}$   $\frac{4.0}{1.6}$

0.3  $\frac{-12.9}{36.5}$   $\frac{5.9}{36.5}$   $\frac{8.2}{29.5}$

0.3  $\frac{12.3}{8}$   $9.3$   $\frac{4.9}{13}$

0.2  $\frac{12.3}{5}$   $10.0$   $\frac{9.5}{1}$   $\frac{6.5}{1.0}$

X-580 for New Grade. 117 to 125

Sta.	+	∏	-	Grade	Gr Rod
B.M.	10.86	806.60		795.74	
TP	11.68	808.16	0.12	806.48	
TP	9.95	827.89	0.22	817.94	
TP	8.80	836.09	0.60	827.29	
117+20 ✓				27.70	8.4 6.19
+35				28.30	
+50 ✓				28.90	7.2
+80				30.10	
118 ✓				30.90	5.2
+20				31.70	
+50 ✓				32.90	3.2
119 ✓				34.90	1.2
TP	9.30	844.06	1.33	834.76	
+25				35.87	
+50 ✓				36.76	7.30

Nesbitt  
Nelson  
Ahlberg  
Dow

7/15/24

(68)

L

±

R

Mail in Cotton road 90 R-15+50

Hub Rt 117

$\frac{00}{26.6}$

$\frac{-2.2}{15}$

-2.20

$\frac{-3.2}{19.8}$

$\frac{00}{25.6}$

$\frac{-3.8}{20.7}$

-2.8

$\frac{-4.5}{21.8}$

$\frac{00}{27.5}$

$\frac{-4.1}{21.2}$

-2.4

$\frac{-3.9}{15.0}$

$\frac{00}{25.0}$

$\frac{-4.2}{21.3}$

~~2.2~~

$\frac{+3.7}{28.7}$

Cont. from page 68

Sta.	+	$\pi$ 844.06	-	Grade	Gr. Rod.
119+70				37.44	
120 ✓				38.36	5.70
+25				39.06	
+50 ✓				39.67	4.40
+80				40.34	
121 ✓				40.73	3.33
IP	8.16	851.91	0.31	843.75	
+35				41.37	
+65				41.92	10.0
+85				42.28	
122+20 ✓				42.91	9.0
+40				43.28	
+75				43.92	8.0
TP	3.27	847.88	7.30	844.61	

L      ♀      R

$$\frac{-3.3}{20.0}$$

-2.0

$$\frac{+2.6}{27.6}$$

$$\frac{+1.7}{26.7}$$

-0.1

$$\frac{+4.0}{29.0}$$

$$\frac{+1.6}{29.0} \quad \frac{00}{25.5} -0.6$$

$$\frac{+3.4}{27.5} \quad \frac{00}{27.5}$$

0.0

$$\frac{+10.0}{38.0}$$

$$\frac{00}{25.8}$$

$$\frac{+7.5}{32.5}$$

$$\frac{\cancel{+1.0}}{32.5} \quad \frac{00}{25}$$

-1.0

$$\frac{+8.0}{32.5}$$

Cont. from page 69

Sto	+	T	-	Grade	Grr Rod.
		847.88			
123				44.38	3.80
+50 <sup>v</sup>				45.29	2.6
+75				45.75	
12407 <sup>v</sup>				46.33	1.55
+25				46.66	
+41				46.93	
+50 <sup>v</sup>				47.12	0.76
+75				47.57	
125 <sup>v</sup>				48.03	-0.15
+25				48.59	
+50 <sup>v</sup>				49.14	-1.26
TP	9.88	857.44	0.32	847.56	

L      ♀      R

$$\frac{-2.0}{18.0}$$

$$-2.8$$

$$\frac{-1.30}{36.5}$$

$$-4.8$$

$$\frac{-2.2}{18.3}$$

$$\frac{-6.2}{28.5}$$

$$-5.5$$

$$\frac{-3.6}{20.4}$$

$$\frac{-5.6}{27.0}$$

$$\frac{-4.7}{23.8}$$

$$\frac{-3.7}{24.0}$$

$$\frac{-3.8}{23.5}$$

$$\frac{-2.1}{21.0}$$

$$\frac{-2.1}{21.0}$$

67+10 - WA6x32'

H.I. = 871.6

Inv R = 853.7

Inv L = 853.0

Grade 67+10 = 861.9

7/2/24

153+14

Place 40' x 24" P.3. (Massey)

Hub out 8'

△  
Cut. 3'

<

22'

x

18'

>

Hub out

△  
Cut. 5'

Haul G.B.A

BM. 872.86  
+ 2.74  
= 875.60

Grade 153+14 = 871.30

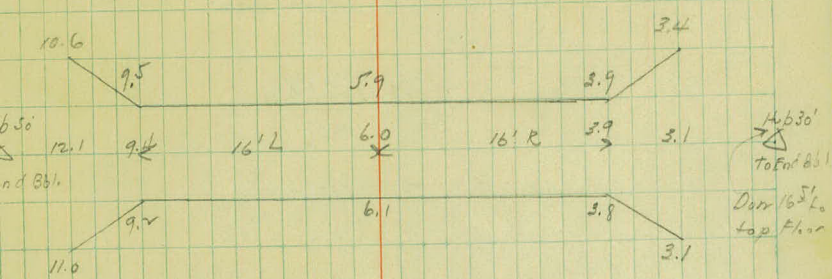
Inv. Rt: 866.00

Inv Lt: 865.60

Nesbitt  
Murphy  
Abblberg  
Naldorn

6/17/24

71



26+22- P 40' x 24" P<sub>3</sub>

6/3/24

Hub 2' out



Down 2' to top floor

19' L



21' R

Hub 2' out

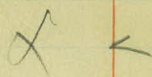


Down 2' to top floor

Inv. Rt = 705.00

Inv. Lt = 704.50 (Haul 496.2')

8A+20- P 64' x 24" P<sub>3</sub>



48'



16'

(16' - 22520' Haul Hastings)

(48' - 10760' Haul Prescott)

49+00 P. 112' x 36" P<sub>3</sub>



74'



38'



Inv. R = 787.8

Inv. L = 761.1

Col. Grade = .238 per ft.

55+70 P. 168' x 24" P<sub>3</sub>



104'



64'



(Haul

41+70 P 40' x 24" P<sub>3</sub>

Hub 4' to end 861



00-top floor



24'



16'



Hub 4' to end 861

Down 5' to floor

Inv. R = 757.96

Inv. L = 757.56 (Haul 6240 - Prescott)

4692

2622

2070

72

2070

4170

6240

Prescott.

0+00 = Left end P<sub>2</sub>

0+00 = Fill 09

0+15 = " 1<sup>8</sup>

0+48 = " 2<sup>4</sup>

0+60 = " 2<sup>5</sup>

0+75 = Fill 06

0+90 = " 2<sup>4</sup>

1+12 = " 09

W33x90 Sta. 61+00 10° Skew.

BM 32.9 Ground El. 61+50

$\pi \frac{1.3}{34.2}$

Inv R = 23.0 Gr. Rod = 11.2

Inv L = 20.0 Gr. Rod = 14.2

-0+04		11.2
0+00	End bbl. on R	11.2
0+15		11.7
0+25		12.0
0+35		12.4
0+42		13.6
0+67		13.4
0+90		14.2
0+94		14.2

Hub 20' to & at end Bbl.



Hub 20' to & at end Bbl.

Down 5' to top floor

			Φ	R
$\frac{7.9}{6}$	$\frac{7.9}{5}$	$\frac{10.2}{2}$	10.8	$\frac{11.1}{6}$
		$\frac{9.2}{4}$	11.1	$\frac{11.6}{4}$
	$\frac{9.6}{4}$	$\frac{9.6}{1}$	12.3	$\frac{12.3}{4}$
		$\frac{12.2}{4}$	12.2	$\frac{12.2}{4}$
		$\frac{12.5}{4}$	12.5	$\frac{11.0}{4}$
		$\frac{11.5}{4}$	10.3	$\frac{9.1}{4}$
		$\frac{10.3}{4}$	9.1	$\frac{8.9}{4}$
		$\frac{13.9}{4}$	13.9	$\frac{13.9}{4}$
		$\frac{16.0}{6}$	15.1	$\frac{15.3}{6}$

Hub 7/2  
40' to bbl.  
Down 6' to top floor

+ 124+45

Place 136' - 36" P<sub>3</sub> 61'R-75'L

Inv R = 813.70

Inv L = 812.00 (Haul 5574')

RA6x

Sta 126+66 ✓ 5/28/24

Grade El 126+16 = 851.1

Inv R = 430

Inv L = 430

BM 38.8

10.4

HI. 49.2

5.1  
8.0  
- 4.3'

6.2  
4.3  
- 6.2

2.0  
3.0

6.2  
1.0  
- 4.3

2.0

6.2  
2.3  
- 3.9

142+00 P. 48' x 24" P<sub>3</sub>

(3696' Haul. 6816)

153+00 48' x 24" P<sub>3</sub>

Nesbitt  
Murphy  
Ahlberg  
Nelson

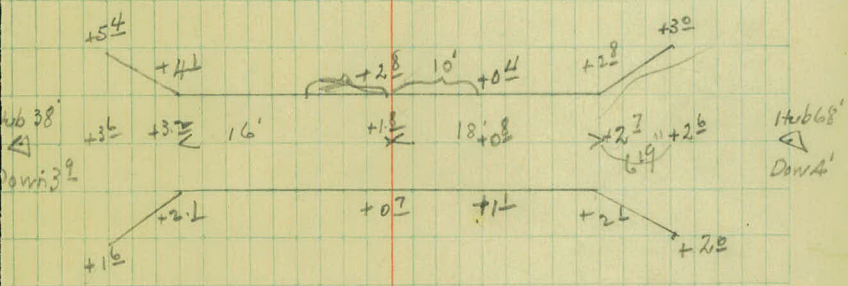
74

L E R

5/19/24

Hub 2' out ← 75' × 61' → Δ Hub 2' out.

B & G Depot



X

5/13/24

92+88 Place 136'-36" P<sub>3</sub> (162' Est.)

56' R - 80' L

Inv R =

Inv L =

(64'-15269' Haul C.B.G.)  
(72'-21605' Haul Hastings)

5/15/24

96+15 Place 64'-24" P<sub>3</sub> (96' Est.)

16' R - 48' L

Inv R = 72.0

Inv L = 57.0

(14919' Haul C.B.G.)

+

BM. 848.41  
+ 0.91  
= 849.32

Levels for New Col. location  
at 105+78<sup>A</sup>

0+00

$\frac{85}{4}$  8.5  $\frac{27}{4}$

0+18

$\frac{86}{4}$  8.6  $\frac{86}{4}$

0+36

$\frac{79}{4}$  8.3  $\frac{76}{2}$  39

0+42

$\frac{3.2}{7}$   $\frac{6.0}{6}$   $\frac{6.2}{4}$   $\frac{6.6}{7}$  7.1  $\frac{8.3}{2}$   $\frac{78.6}{3}$   $\frac{8.6}{3}$

0+43

< 80' x 56' >

tootofloor 48' x 16' > +3.5' to floor



W46 x 100' at Sta <sup>115+36</sup> 117+10 07°00' SKov  
Standard

117+10      L      E      R  

$$\begin{array}{r} -27.5 \\ \hline 61.3 \end{array}$$

+25      
$$\begin{array}{r} -220 \\ \hline 53.0 \end{array}$$
      
$$\begin{array}{r} -250 \\ \hline 57.5 \end{array}$$

Note: sta. changed  
acct cutting out  
one equation

Colvert 52' Lt - 48' Rt.

BM. 795.73 Tree 2' R. 117+20

$$\begin{array}{r} 7.77 \\ \hline \text{H.I. } 803.50 \end{array}$$

Inv. Rt = 793.7

" Lt = 791.7

Spike in Tree 80' R - +2° to top floor



W46 x 3A' - Sta 105+75 for Connley

BM. 
$$\begin{array}{r} 848.41 \\ \hline 2.75 \end{array}$$

H.I. 851.16

Spk 15" oak 50' L - 105+75

Grade 105+75 = 849.55

Inv. Rt = 841.5

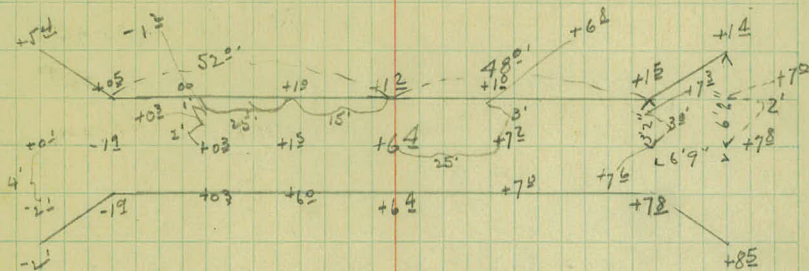
Inv. Lt = 841.1

Note: 5/16/24 W46x3A Moved to 105+78.5  
and changed to W46x36 18' R - 18' L  
Same Invert. Acct rock.

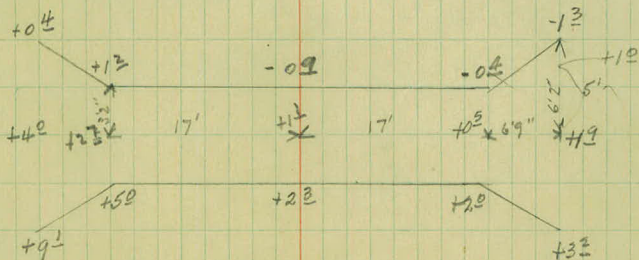
Same Exc. used acct partly done

Nesbitt  
 Murphy  
 Ahlberg  
 Nelson  
 JonKoski

5/9/24 (76)



5/12/24



X WA6 X 32 - Sta. 79+40 ✓

HI. - 880.50

32

Grade Sta. 79+40 = 878.60

Inv. Rt = 870.60 Cor. Rod 9.9

99

Inv. Lt = 70.20 Gr. Rod. 103

101  
51  
103  
104

Nail Cor. F.P. Down 7' to top Floor For Rt

" F.P. " 5' " " " For Lt

X WA6 X 34 Sta. 48+50 ✓

Grade Sta. 48+00 =  $\begin{matrix} \text{E} & \text{R} & \text{L} \\ 94^1 & 95^2 & 93^2 \end{matrix}$  acc't Super.

Inv R = 850

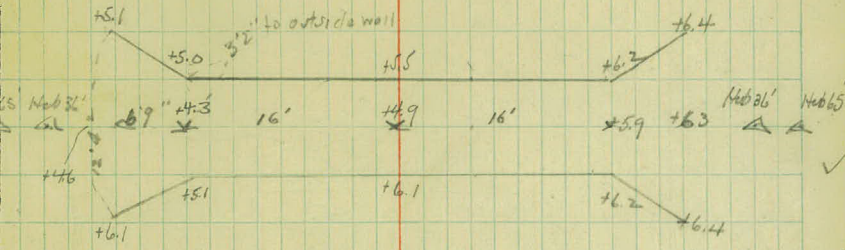
Inv L = 846

Nail in apple tree 00 to floor of Culv.

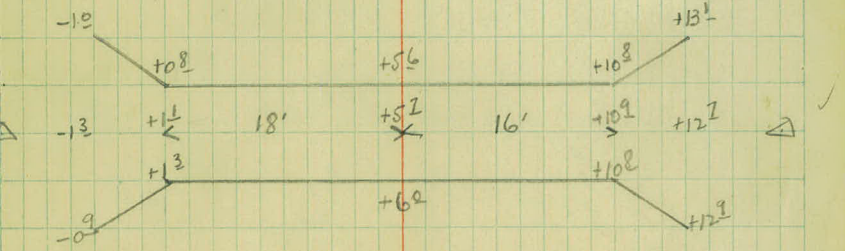
A/6/24

8  
76

77



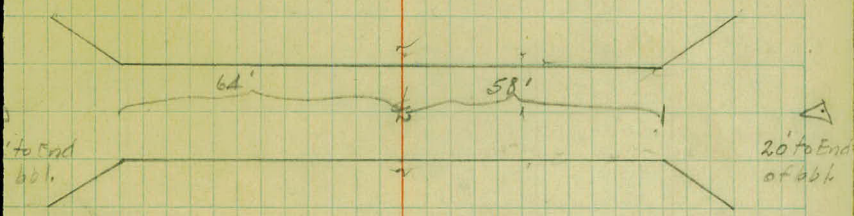
Note: Standard type staked on .07° skew to fit lane.





4/5/24

78



0 to 20 in cross sections for Culv. Exp. is North End of bbl. of Culv.

Void

Gr. Rod.

3.0	10/1.3 +1.7	8/2.8 +0.2	3/3.0 +0.0	2.5 +0.5	2.8 +0.4	2.7 +0.3	1.1 +1.9
3.2	10/2.2 +1.0	9/2.9 +0.3	4/3.1 +0.1	2.8 +0.4	2.9 +0.3	2.2 +1.0	1.5 +1.7
3.8		11/3.4 +0.4	3/3.8 +0.0	3.6 +0.2	3.4 +0.4	1.1 +2.7	
4.4		10/3.6 +0.3	8/4.3 +0.1	4.3 +0.1	4.4 +0.2	3.2 +1.2	1.8 +2.6
5.0	13/4.0 +1.0	9/5.0 +0.0	5/4.8 +0.2	4.7 +0.3	4.5 +0.3	3.9 +1.1	2.7 +1.7
5.6	13/4.5 +1.1	8/5.5 +0.1	5/5.2 +0.4	5.5 +0.1	5.5 +0.1	4.6 +1.0	2.8 +2.8
6.2		10/4.9 +1.3	8/5.8 +0.4	5.8 +0.4	6.0 +0.2	3.8 +2.4	
6.4		12/4.7 +1.7	10/5.9 +0.5	6.2 +0.2	6.4 +0.0	3.9 +2.5	

751.69

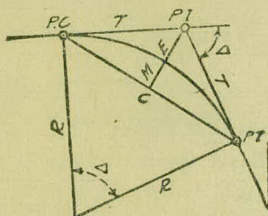
952

76

21

# DIETZGEN'S RAILROAD CURVE AND REDUCTION TABLES

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## CURVE FORMULAS

Radius= $R = \frac{50}{\sin. \frac{D}{2}}$  (1) Degree of Curve= $D$  and  $\sin. \frac{D}{2} = \frac{50}{R}$  (2)

Tangent= $T = R \tan \frac{\Delta}{2}$  (3) Length of Curve= $L = 100 \frac{\Delta}{D}$  (4)

Middle ordinate= $M = R(1 - \cos. \frac{\Delta}{2})$  (5)  $= R \text{vers} \frac{\Delta}{2}$  (6)

External= $E = T \tan \frac{\Delta}{4}$  (7)  $= R \div \cos. \frac{\Delta}{2} - R$  (8)  $= R \text{exsec} \frac{\Delta}{2}$  (9)

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

## EXPLANATION AND USE OF TABLES

**Stations.**—Given P. I.=Sta. 161 + 60.35 to find Sta. of P. C. and P. T.  $\Delta = 62^\circ 10'$   $D = 8^\circ 20'$ . From Table IV for  $1^\circ$  curve  $T = 3454.1$  and  $\div 8\frac{1}{3} = 414.49$  ft. From Table V correction = .36 or  $T = 414.85$  ft. P. C.=Sta. P.I.— $T = 157 + 45.50$ . Also from (4)  $L = 746.00$  and P. T.=Sta. P. C. +  $L = 164 + 91.50$ .

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

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

**Externals.**—May be found in similar manner to tangents. Thus  $E$  for curve above is 91.37. For from Table IV for  $1^\circ$  curve  $E = 960.6$  for  $8^\circ 20' = 960.6 \div 8\frac{1}{3} = 91.27$  and from Table V correction = .10 or  $E = 91.37$  ft. Or suppose  $\Delta = 32^\circ$  and  $E$  is measured and found to be 42 ft. What is  $D$ ? From Table IV  $E = 230.9$  and  $\div 42 = 5.5$  or  $D = 5^\circ 30'$ .

TABLE I.—MINUTES IN DECIMALS OF A DEGREE.

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

TABLE II.—INCHES IN DECIMALS OF A FOOT.

1-16	3-32	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. Offset	Def. for 1 Foot	Deg.	Radius	Mid. Ord.	Tan. Offset	Def. for 1 Foot
0° 10'	34377.5	.036	.145	0.05'	7°	819.02	1.528	6.105	2.10'
20	17188.8	.073	.291	0.10	20'	781.84	1.600	6.395	2.20
30	11459.2	.109	.436	0.15	30	764.49	1.637	6.540	2.25
40	8594.42	.145	.582	0.20	40	747.89	1.673	6.685	2.30
50	6875.55	.182	.727	0.25	3	716.78	1.746	6.976	2.40
1	5729.65	.218	.873	0.30	20	688.16	1.819	7.266	2.50
10	4911.15	.255	1.018	0.35	30	674.69	1.855	7.411	2.55
20	4297.28	.291	1.164	0.40	40	661.74	1.892	7.556	2.60
30	3819.83	.327	1.309	0.45	9	637.28	1.965	7.846	2.70
40	3437.87	.364	1.454	0.50	20	614.56	2.037	8.136	2.80
50	3125.36	.400	1.600	0.55	30	603.80	2.074	8.281	2.85
2	2884.93	.436	1.745	0.60	40	593.42	2.110	8.426	2.90
10	2644.58	.473	1.891	0.65	10	573.69	2.183	8.716	3.00
20	2455.70	.509	2.036	0.70	30	546.44	2.292	9.150	3.15
30	2292.01	.545	2.181	0.75	11	521.67	2.402	9.585	3.30
40	2148.79	.582	2.327	0.80	30	499.06	2.511	10.02	3.45
50	2022.41	.618	2.472	0.85	12	478.34	2.620	10.45	3.60
3	1910.08	.655	2.618	0.90	30	459.28	2.730	10.89	3.75
10	1809.57	.691	2.763	0.95	13	441.68	2.839	11.32	3.90
20	1719.12	.727	2.908	1.00	30	425.40	2.949	11.75	4.05
30	1637.28	.764	3.054	1.05	14	410.28	3.058	12.18	4.20
40	1562.88	.800	3.199	1.10	30	396.20	3.168	12.62	4.35
50	1494.95	.836	3.345	1.15	15	383.07	3.277	13.05	4.50
4	1432.69	.873	3.490	1.20	30	370.78	3.387	13.49	4.65
10	1375.40	.909	3.635	1.25	16	359.27	3.496	13.92	4.80
20	1322.53	.945	3.718	1.30	30	348.45	3.606	14.35	4.95
30	1273.57	.982	3.926	1.35	17	338.27	3.716	14.78	5.10
40	1228.11	1.018	4.071	1.40	18	319.62	3.935	15.64	5.40
50	1185.78	1.055	4.217	1.45	19	302.94	4.155	16.51	5.70
5	1146.28	1.091	4.362	1.50	20	287.94	4.374	17.37	6.00
10	1109.33	1.127	4.507	1.55	21	274.37	4.594	18.22	6.30
20	1074.68	1.164	4.653	1.60	22	262.04	4.814	19.08	6.60
30	1042.14	1.200	4.798	1.65	23	250.79	5.035	19.94	6.90
40	1011.51	1.237	4.943	1.70	24	240.49	5.255	20.79	7.20
50	982.64	1.273	5.088	1.75	25	231.01	5.476	21.64	7.50
6	955.37	1.309	5.234	1.80	26	222.27	5.697	22.50	7.80
10	929.57	1.346	5.379	1.85	27	214.18	5.918	23.35	8.10
20	905.13	1.382	5.524	1.90	28	206.68	6.139	24.19	8.40
30	881.95	1.418	5.669	1.95	29	199.70	6.360	25.04	8.70
40	859.92	1.455	5.814	2.00	30	193.18	6.583	25.88	9.00

Note. Chord Deflection=2 times tangent deflection.

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

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

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

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
31°	1589.0	216.3	41°	2142.2	387.4	51°	2732.9	618.4
10'	1598.0	218.7	10'	2151.7	390.7	10'	2743.1	622.8
20	1606.9	221.1	20	2161.2	394.1	20	2753.4	627.2
30	1615.9	223.5	30	2170.8	397.4	30	2763.7	631.7
40	1624.9	226.0	40	2180.3	400.8	40	2773.9	636.2
50	1633.9	228.4	50	2189.9	404.2	50	2784.2	640.7
32	1643.0	230.9	42	2199.4	407.6	52	2794.5	645.2
10	1652.0	233.4	10	2209.0	411.1	10	2804.9	649.7
20	1661.0	235.9	20	2218.6	414.5	20	2815.2	654.3
30	1670.0	238.4	30	2228.1	418.0	30	2825.6	658.8
40	1679.1	241.0	40	2237.7	421.4	40	2835.9	663.4
50	1688.1	243.5	50	2247.3	425.0	50	2846.3	668.0
33	1697.2	246.1	43	2257.0	428.5	53	2856.7	672.7
10	1706.3	248.7	10	2266.6	432.0	10	2867.1	677.3
20	1715.3	251.3	20	2276.2	435.6	20	2877.5	682.0
30	1724.4	253.9	30	2285.9	439.2	30	2888.0	686.7
40	1733.5	256.5	40	2295.6	442.8	40	2898.4	691.4
50	1742.6	259.1	50	2305.2	446.4	50	2908.9	696.1
34	1751.7	261.8	44	2314.9	450.0	54	2919.4	700.9
10	1760.8	264.5	10	2324.6	453.6	10	2929.9	705.7
20	1770.0	267.2	20	2334.3	457.3	20	2940.4	710.5
30	1779.1	269.9	30	2344.1	461.0	30	2951.0	715.3
40	1788.2	272.6	40	2353.8	464.6	40	2961.5	720.1
50	1797.4	275.3	50	2363.5	468.4	50	2972.1	725.0
35	1806.6	278.1	45	2373.3	472.1	55	2982.7	729.9
10	1815.7	280.8	10	2383.1	475.8	10	2993.3	734.8
20	1824.9	283.6	20	2392.8	479.6	20	3003.9	739.7
30	1834.1	286.4	30	2402.6	483.3	30	3014.5	744.6
40	1843.3	289.2	40	2412.4	487.2	40	3025.2	749.6
50	1852.5	292.0	50	2422.3	491.0	50	3035.8	754.6
36	1861.7	294.9	46	2432.1	494.8	56	3046.5	759.6
10	1870.9	297.7	10	2441.9	498.7	10	3057.2	764.6
20	1880.1	300.6	20	2451.8	502.5	20	3067.9	769.7
30	1889.4	303.5	30	2461.7	506.4	30	3078.7	774.7
40	1898.6	306.4	40	2471.5	510.3	40	3089.4	779.8
50	1907.9	309.3	50	2481.4	514.3	50	3100.2	784.9
37	1917.1	312.2	47	2491.3	518.2	57	3110.9	790.1
10	1926.4	315.2	10	2501.2	522.2	10	3121.7	795.2
20	1935.7	318.1	20	2511.2	526.1	20	3132.6	800.4
30	1945.0	321.1	30	2521.1	530.1	30	3143.4	805.6
40	1954.3	324.1	40	2531.1	534.2	40	3154.2	810.9
50	1963.6	327.1	50	2541.0	538.2	50	3165.1	816.1
38	1972.9	330.2	48	2551.0	542.2	58	3176.0	821.4
10	1982.2	333.2	10	2561.0	546.3	10	3186.9	826.7
20	1991.5	336.3	20	2571.0	550.4	20	3197.8	832.0
30	2000.9	339.3	30	2581.0	554.5	30	3208.8	837.3
40	2010.2	342.4	40	2591.0	558.6	40	3219.7	842.7
50	2019.6	345.5	50	2601.1	562.8	50	3230.7	848.1
39	2029.0	348.6	49	2611.2	566.9	59	3241.7	853.5
10	2038.4	351.8	10	2621.2	571.1	10	3252.7	858.9
20	2047.8	354.9	20	2631.3	575.3	20	3263.7	864.3
30	2057.2	358.1	30	2641.4	579.5	30	3274.8	869.8
40	2066.6	361.3	40	2651.5	583.8	40	3285.8	875.3
50	2076.0	364.5	50	2661.6	588.0	50	3296.9	880.8
40	2085.4	367.7	50	2671.8	592.3	60	3308.0	886.4
10	2094.9	371.0	10	2681.9	596.6	10	3319.1	892.0
20	2104.3	374.2	20	2692.1	600.9	20	3330.3	897.5
30	2113.8	377.5	30	2702.3	605.3	30	3341.4	903.2
40	2123.3	380.8	40	2712.5	609.6	40	3352.6	908.8
50	2132.7	384.1	50	2722.7	614.0	50	3363.8	914.5

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

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

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

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

TABLE V.—CORRECTIONS FOR TANGENTS AND EXTERNALS.

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

## FOR TANGENTS ADD

Central Angle	DEGREE OF CURVE													
	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°	.03	.06	.09	.13	.16	.19	.22	.25	.28	.31	.34	.38	.42	.46
15°	.04	.10	.14	.19	.24	.29	.34	.39	.45	.51	.53	.58	.63	.68
20°	.06	.13	.19	.26	.32	.39	.45	.51	.58	.65	.72	.79	.84	.90
25°	.08	.16	.24	.33	.40	.49	.58	.67	.75	.83	.90	.99	1.06	1.14
30°	.10	.19	.29	.39	.49	.59	.69	.79	.89	.99	1.09	1.20	1.29	1.39
35°	.11	.22	.34	.47	.58	.69	.79	.81	.92	1.04	1.29	1.42	1.54	1.66
40°	.13	.26	.40	.53	.67	.80	.93	1.06	1.20	1.34	1.49	1.64	1.79	1.94
45°	.15	.30	.44	.60	.76	.91	1.06	1.21	1.37	1.52	1.70	1.87	2.04	2.21
50°	.17	.34	.51	.68	.85	1.02	1.19	1.36	1.54	1.72	1.91	2.10	2.29	2.48
55°	.19	.38	.57	.76	.95	1.14	1.32	1.52	1.72	1.92	2.14	2.35	2.56	2.77
60°	.21	.42	.63	.84	1.05	1.27	1.49	1.71	1.94	2.17	2.38	2.60	2.83	3.07
65°	.23	.46	.69	.93	1.16	1.40	1.64	1.88	2.13	2.38	2.63	2.88	3.13	3.39
70°	.25	.51	.76	1.02	1.28	1.54	1.80	2.06	2.33	2.60	2.88	3.16	3.44	3.72
75°	.27	.56	.83	1.12	1.40	1.69	1.98	2.27	2.57	2.87	3.16	3.45	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	4.40	4.98	5.38	5.83
100°	.43	.86	1.30	1.74	2.18	2.62	3.06	3.50	3.95	4.40	4.88	5.37	5.85	6.34
110°	.51	1.03	1.56	2.08	2.61	3.14	3.67	4.21	4.76	5.31	5.86	6.43	7.01	7.60
120°	.62	1.25	1.93	2.52	3.16	3.81	4.45	5.11	5.77	6.44	7.12	7.80	8.50	9.22

## FOR EXTERNALS ADD

Central Angle.	DEGREE OF CURVE													
	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°	.001	.003	.004	.006	.007	.008	.009	.011	.012	.014	.015	.017	.018	.020
15°	.003	.007	.010	.014	.018	.023	.027	.029	.032	.035	.039	.043	.047	.051
20°	.006	.011	.017	.022	.028	.034	.038	.045	.051	.057	.063	.070	.076	.083
25°	.009	.018	.027	.036	.046	.056	.065	.074	.083	.093	.106	.120	.127	.135
30°	.013	.025	.038	.051	.065	.078	.090	.103	.116	.129	.149	.170	.179	.188
35°	.018	.035	.054	.072	.086	.109	.131	.153	.175	.197	.213	.230	.247	.264
40°	.023	.046	.070	.093	.117	.141	.172	.203	.234	.265	.277	.290	.315	.341
45°	.030	.060	.093	.119	.153	.184	.216	.254	.289	.325	.351	.378	.411	.445
50°	.037	.075	.116	.151	.189	.227	.266	.305	.345	.384	.425	.467	.508	.550
55°	.046	.093	.142	.188	.236	.283	.332	.381	.420	.479	.530	.582	.641	.700
60°	.056	.112	.168	.225	.283	.340	.398	.457	.516	.575	.636	.697	.774	.851
65°	.067	.135	.204	.273	.343	.412	.483	.554	.625	.697	.771	.845	.922	1.01
70°	.080	.159	.240	.321	.403	.485	.568	.652	.735	.819	.906	.994	1.08	1.17
75°	.095	.182	.266	.353	.440	.528	.618	.707	.797	.897	1.07	1.18	1.29	1.39
80°	.110	.220	.332	.445	.558	.671	.787	.903	1.02	1.13	1.25	1.38	1.50	1.62
85°	.128	.259	.391	.524	.657	.790	.926	1.06	1.20	1.34	1.47	1.62	1.76	1.91
90°	.149	.299	.450	.603	.756	.910	1.07	1.22	1.38	1.54	1.70	1.87	2.03	2.20
95°	.174	.350	.522	.706	.885	1.06	1.25	1.43	1.62	1.80	1.99	2.18	2.38	2.58
100°	.200	.401	.604	.809	1.01	1.22	1.43	1.64	1.85	2.06	2.28	2.50	2.73	2.96
110°	.268	.536	.806	1.08	1.35	1.63	1.91	2.20	2.48	2.76	3.05	3.35	3.66	3.96
120°	.360	.721	1.08	1.45	1.82	2.19	2.57	2.95	3.33	3.73	4.11	4.50	4.91	5.32

# VIII

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

FOR SUB-CHORDS ADD										Excess of arc per 100 ft.	LONG CHORDS				
D	10	20	30	40	50	60	70	80	90		D	200	300	400	500
4°	.00	.00	.01	.01	.01	.01	.01	.01	.06	.02	1	199.99	299.97	399.92	499.85
6	.00	.01	.01	.02	.02	.02	.02	.01	.01	.05	2	199.97	299.88	399.70	499.39
8	.01	.02	.02	.03	.03	.03	.03	.02	.01	.08	3	199.93	299.73	399.32	498.63
10	.01	.02	.03	.04	.05	.05	.05	.04	.02	.13	4	199.88	299.51	398.78	497.57
12	.02	.04	.05	.06	.07	.07	.07	.05	.03	.18	5	199.81	299.24	398.10	496.20
14	.02	.05	.07	.08	.09	.10	.09	.07	.04	.25	6	199.73	298.90	397.26	494.53
16	.03	.06	.09	.11	.12	.12	.12	.09	.05	.33	7	199.63	298.51	396.28	492.57
18	.04	.08	.11	.14	.15	.16	.15	.12	.07	.41	8	199.51	298.05	395.14	490.31
20	.05	.10	.14	.17	.19	.20	.18	.15	.09	.51	9	199.38	297.54	393.86	487.75
22	.06	.12	.17	.21	.23	.24	.22	.18	.10	.62	10	199.24	296.96	392.42	484.90
24	.07	.14	.20	.25	.28	.28	.26	.21	.12	.74	12	198.90	295.63	389.12	478.34
26	.09	.17	.24	.29	.32	.33	.31	.25	.15	.86	14	198.51	294.06	385.22	470.65
28	.10	.19	.27	.34	.37	.38	.36	.29	.17	1.00	16	198.05	292.25	380.76	461.86
30	.11	.22	.31	.39	.43	.44	.41	.33	.19	1.15	18	197.54	290.21	375.74	452.02
32	.13	.25	.36	.44	.49	.50	.47	.38	.22	1.31	20	196.96	287.94	370.17	441.15
34	.15	.28	.40	.50	.55	.57	.53	.43	.25	1.48	22	196.32	285.44	364.06	429.30
36	.17	.32	.45	.56	.62	.64	.59	.48	.28	1.66	24	195.63	282.71	357.43	416.53
38	.18	.36	.51	.62	.70	.71	.66	.53	.31	1.86	26	194.87	279.76	350.30	402.89
40	.21	.40	.56	.69	.77	.79	.73	.59	.35	2.06	28	194.06	276.59	342.69	388.43
42	.23	.44	.62	.76	.85	.87	.81	.65	.38	2.28	30	193.18	273.20	334.61	373.20
44	.25	.48	.68	.84	.94	.96	.89	.72	.42	2.50	32	192.25	269.61	326.08	357.28
46	.27	.52	.75	.92	1.02	1.05	.98	.78	.46	2.74	34	191.26	265.81	317.12	340.73
48	.30	.57	.81	1.00	1.12	1.14	1.06	.86	.50	2.99	36	190.21	261.80	307.77	323.61
50	.32	.62	.89	1.09	1.21	1.24	1.15	.93	.55	3.24	38	189.10	257.60	298.03	305.99
52	.35	.67	.96	1.18	1.31	1.35	1.25	1.01	.59	3.52	40	187.94	253.21	287.94	287.94
54	.38	.73	1.04	1.28	1.42	1.46	1.35	1.09	.64	3.80	42	186.72	248.63	277.51	269.54
56	.41	.78	1.12	1.38	1.53	1.57	1.46	1.17	.69	4.09	44	185.44	243.87	266.78	250.85
58	.44	.84	1.20	1.48	1.65	1.69	1.57	1.26	.74	4.40	46	184.10	239.93	255.73	231.95
60	.47	.91	1.29	1.59	1.76	1.81	1.68	1.35	.80	4.72	48	182.71	233.83	244.51	212.92

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

TABLE VII.—MIDDLE ORDINATES FOR RAILS IN FEET.

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

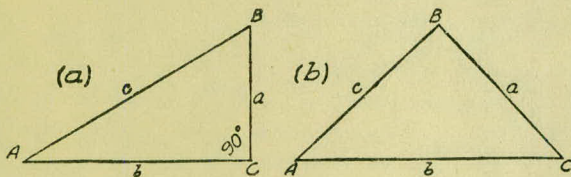
## SLOPE REDUCTIONS.

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

See fig. (a).

## TRIGONOMETRICAL FORMULAS.

$$\begin{aligned} \sin. & A = \frac{a}{c} \\ \cos. & A = \frac{b}{c} \\ \tan. & A = \frac{a}{b} \\ \cot. & A = \frac{b}{a} \\ \sec. & A = \frac{c}{b} \\ \operatorname{cosec.} & A = \frac{c}{a} \end{aligned}$$



## FORMULA FOR SOLVING TRIANGLES.

Given	Sought.	Right triangles. See fig. (a).
$a, c$	$A, B, b$	$\sin. A = \frac{a}{c}, \cos. B = \frac{a}{c}, b = \sqrt{(c+a)(c-a)}$
$a, b$	$A, B, c$	$\tan. A = \frac{a}{b}, \cot. B = \frac{a}{b}, c = \sqrt{a^2 + b^2}$
$A, a$	$B, b, c$	$B = 90^\circ - A, b = a \cot. A, c = \frac{a}{\sin. A}$
$A, b$	$B, a, c$	$B = 90^\circ - A, a = b \tan. A, c = \frac{b}{\cos. A}$
$A, c$	$B, a, b$	$B = 90^\circ - A, a = c \sin. A, b = c \cos. A$
Given	Sought.	Oblique triangles. See fig. (b).
$A, B, a$	$b$	$b = \frac{a \sin. B}{\sin. A}$
$A, a, b$	$B$	$\sin. B = \frac{b \sin. A}{a}$
$a, b, C$	$A - B$	$\tan. \frac{1}{2} (A - B) = \frac{(a-b) \tan. \frac{1}{2} (A+B)}{a+b}$
$a, b, c$	$A$	$\left\{ \begin{aligned} \text{If } s = \frac{1}{2} (a+b+c), \sin. \frac{1}{2} A &= \sqrt{\frac{(s-b)(s-c)}{bc}} \\ \cos. \frac{1}{2} A &= \sqrt{\frac{s(s-a)}{bc}}, \tan. \frac{1}{2} A = \sqrt{\frac{(s-b)(s-c)}{s(s-a)}} \\ \sin. A &= \frac{2 \sqrt{(s-a)(s-b)(s-c)s}}{bc} \end{aligned} \right.$
$A, B, C, a$	area	$\text{area} = \frac{a^2 \sin. B \sin. C}{2 \sin. A}$
$A, b, c$	area	$\text{area} = \frac{1}{2} bc \sin. A$
$a, b, c$	area	$s = \frac{1}{2} (a+b+c), \text{area} = \sqrt{s(s-a)(s-b)(s-c)}$

TABLE VIII.—NATURAL TRIGONOMETRICAL FUNCTIONS.

Angle	Sine.	Tan.	Cotg.	Cosin.		Angle	Sine.	Tan.	Cotg.	Cosin.	
0	0	0	∞	1	90	8	.1392	.1405	7.115	.99027	82
10	.0029	.0029	343.8	1	50	10	.1421	.1435	6.968	.98986	50
20	.0058	.0058	171.9	.99998	40	20	.1449	.1465	6.827	.98944	40
30	.0087	.0087	114.6	.99996	30	30	.1478	.1495	6.691	.98902	30
40	.0116	.0116	85.94	.99993	20	40	.1507	.1524	6.561	.98858	20
50	.0145	.0145	68.75	.99989	10	50	.1536	.1554	6.435	.98814	10
1	.0175	.0175	57.29	.99985	89	9	.1564	.1584	6.314	.98769	81
10	.0204	.0204	49.10	.99979	50	10	.1593	.1614	6.197	.98723	50
20	.0233	.0233	42.96	.99973	40	20	.1622	.1644	6.084	.98676	40
30	.0262	.0262	38.19	.99966	30	30	.1650	.1673	5.976	.98629	30
40	.0291	.0291	34.37	.99958	20	40	.1679	.1703	5.871	.98580	20
50	.0320	.0320	31.24	.99949	10	50	.1708	.1733	5.769	.98531	10
2	.0349	.0349	28.64	.99939	88	10	.1736	.1763	5.671	.98481	80
10	.0378	.0378	26.43	.99929	50	10	.1765	.1793	5.576	.98430	50
20	.0407	.0407	24.54	.99917	40	20	.1794	.1823	5.485	.98378	40
30	.0436	.0437	22.90	.99905	30	30	.1822	.1853	5.396	.98325	30
40	.0465	.0466	21.47	.99892	20	40	.1851	.1883	5.309	.98272	20
50	.0494	.0495	20.21	.99878	10	50	.1880	.1914	5.226	.98218	10
3	.0523	.0524	19.08	.99863	87	11	.1908	.1944	5.145	.98163	79
10	.0552	.0553	18.07	.99847	50	10	.1937	.1974	5.066	.98107	50
20	.0581	.0582	17.17	.99831	40	20	.1965	.2004	4.989	.98050	40
30	.0610	.0612	16.35	.99813	30	30	.1994	.2035	4.915	.97992	30
40	.0640	.0641	15.60	.99795	20	40	.2022	.2065	4.843	.97934	20
50	.0669	.0670	14.92	.99776	10	50	.2051	.2095	4.773	.97875	10
4	.0698	.0699	14.30	.99758	86	12	.2079	.2126	4.705	.97815	78
10	.0727	.0729	13.73	.99736	50	10	.2108	.2156	4.638	.97754	50
20	.0756	.0758	13.20	.99714	40	20	.2136	.2186	4.574	.97692	40
30	.0785	.0787	12.71	.99692	30	30	.2164	.2217	4.511	.97630	30
40	.0814	.0816	12.25	.99668	20	40	.2193	.2247	4.449	.97566	20
50	.0843	.0845	11.83	.99644	10	50	.2221	.2278	4.390	.97502	10
5	.0872	.0875	11.43	.99619	85	13	.2250	.2309	4.331	.97437	77
10	.0901	.0904	11.06	.99594	50	10	.2278	.2339	4.275	.97371	50
20	.0929	.0934	10.71	.99567	40	20	.2306	.2370	4.219	.97304	40
30	.0958	.0963	10.39	.99540	30	30	.2334	.2401	4.165	.97237	30
40	.0987	.0992	10.08	.99511	20	40	.2363	.2432	4.113	.97169	20
50	.1016	.1022	9.788	.99482	10	50	.2391	.2462	4.061	.97100	10
6	.1045	.1051	9.514	.99452	84	14	.2419	.2493	4.011	.97030	76
10	.1074	.1080	9.255	.99421	50	10	.2447	.2524	3.962	.96959	50
20	.1103	.1110	9.010	.99390	40	20	.2476	.2555	3.914	.96887	40
30	.1132	.1139	8.777	.99357	30	30	.2504	.2586	3.867	.96815	30
40	.1161	.1169	8.556	.99324	20	40	.2532	.2617	3.821	.96742	20
50	.1190	.1198	8.345	.99290	10	50	.2560	.2648	3.776	.96667	10
7	.1219	.1228	8.144	.99255	83	15	.2588	.2679	3.732	.96593	75
10	.1248	.1257	7.953	.99219	50	10	.2616	.2711	3.689	.96517	50
20	.1276	.1287	7.770	.99182	40	20	.2644	.2742	3.647	.96440	40
30	.1305	.1317	7.596	.99144	30	30	.2672	.2773	3.606	.96363	30
40	.1334	.1346	7.429	.99106	20	40	.2700	.2805	3.566	.96285	20
50	.1363	.1376	7.269	.99067	10	50	.2728	.2836	3.526	.96206	10
					82						74
	Cosin.	Cotg.	Tan.	Sine.	Angle.		Cosin.	Cotg.	Tan.	Sine.	Angle.

76281  
982  
17 263

TABLE VIII.—NATURAL TRIGONOMETRICAL FUNCTIONS.

Angle	Sine.	Tan.	Cotg.	Cosin.		Angle	Sine.	Tan.	Cotg.	Cosin.	
<b>16</b>	.2756	.2867	3.487	.96126	<b>74</b>	<b>24</b>	.4067	.4452	2.246	.91355	<b>66</b>
10	.2784	.2899	3.450	.96046	50	10	.4094	.4487	2.229	.91236	50
20	.2812	.2931	3.412	.95964	40	20	.4120	.4522	2.211	.91116	40
30	.2840	.2962	3.376	.95882	30	30	.4147	.4557	2.194	.90996	30
40	.2868	.2994	3.340	.95799	20	40	.4173	.4592	2.177	.90875	20
50	.2896	.3026	3.305	.95715	10	50	.4200	.4628	2.161	.90753	10
<b>17</b>	.2924	.3057	3.271	.95615	<b>73</b>	<b>25</b>	.4226	.4663	2.145	.90631	<b>65</b>
10	.2952	.3089	3.237	.95545	50	10	.4253	.4699	2.128	.90507	50
20	.2979	.3121	3.204	.95459	40	20	.4279	.4734	2.112	.90383	40
30	.3007	.3153	3.172	.95372	30	30	.4305	.4770	2.097	.90259	30
40	.3035	.3185	3.140	.95284	20	40	.4331	.4806	2.081	.90133	20
50	.3062	.3217	3.108	.95195	10	50	.4358	.4841	2.066	.90007	10
<b>18</b>	.3090	.3249	3.078	.95106	<b>72</b>	<b>26</b>	.4384	.4877	2.050	.89879	<b>64</b>
10	.3118	.3281	3.048	.95015	50	10	.4410	.4913	2.035	.89752	50
20	.3145	.3314	3.018	.94924	40	20	.4436	.4950	2.020	.89623	40
30	.3173	.3346	2.989	.94832	30	30	.4462	.4986	2.006	.89493	30
40	.3201	.3378	2.960	.94740	20	40	.4488	.5022	1.991	.89363	20
50	.3228	.3411	2.932	.94646	10	50	.4514	.5059	1.977	.89232	10
<b>19</b>	.3256	.3443	2.904	.94552	<b>71</b>	<b>27</b>	.4540	.5095	1.963	.89101	<b>63</b>
10	.3283	.3476	2.877	.94457	50	10	.4566	.5132	1.949	.88968	50
20	.3311	.3508	2.850	.94361	40	20	.4592	.5169	1.935	.88835	40
30	.3338	.3541	2.824	.94264	30	30	.4617	.5206	1.921	.88701	30
40	.3365	.3574	2.798	.94167	20	40	.4643	.5243	1.907	.88566	20
50	.3393	.3607	2.773	.94068	10	50	.4669	.5280	1.894	.88431	10
<b>20</b>	.3420	.3640	2.747	.93969	<b>70</b>	<b>28</b>	.4695	.5317	1.881	.88295	<b>62</b>
10	.3448	.3673	2.723	.93869	50	10	.4720	.5354	1.868	.88158	50
20	.3475	.3706	2.699	.93769	40	20	.4746	.5392	1.855	.88020	40
30	.3502	.3739	2.675	.93667	30	30	.4772	.5430	1.842	.87882	30
40	.3529	.3772	2.651	.93565	20	40	.4797	.5467	1.829	.87743	20
50	.3557	.3805	2.628	.93462	10	50	.4823	.5505	1.816	.87603	10
<b>21</b>	.3584	.3839	2.605	.93358	<b>69</b>	<b>29</b>	.4848	.5543	1.804	.87462	<b>61</b>
10	.3611	.3872	2.583	.93253	50	10	.4874	.5581	1.792	.87321	50
20	.3638	.3906	2.560	.93148	40	20	.4899	.5619	1.780	.87178	40
30	.3665	.3939	2.539	.93042	30	30	.4924	.5658	1.767	.87036	30
40	.3692	.3973	2.517	.92935	20	40	.4950	.5696	1.756	.86892	20
50	.3719	.4006	2.496	.92827	10	50	.4975	.5735	1.744	.86748	10
<b>22</b>	.3746	.4040	2.475	.92718	<b>68</b>	<b>30</b>	.5000	.5774	1.732	.86603	<b>60</b>
10	.3773	.4074	2.455	.92609	50	10	.5025	.5812	1.720	.86457	50
20	.3800	.4108	2.434	.92499	40	20	.5050	.5851	1.709	.86310	40
30	.3827	.4142	2.414	.92388	30	30	.5075	.5890	1.698	.86163	30
40	.3854	.4176	2.394	.92276	20	40	.5100	.5930	1.686	.86015	20
50	.3881	.4210	2.375	.92164	10	50	.5125	.5969	1.675	.85866	10
<b>23</b>	.3907	.4245	2.356	.92050	<b>67</b>	<b>31</b>	.5150	.6009	1.664	.85717	<b>59</b>
10	.3934	.4279	2.337	.91936	50	10	.5175	.6048	1.653	.85567	50
20	.3961	.4314	2.318	.91822	40	20	.5200	.6088	1.643	.85416	40
30	.3987	.4348	2.300	.91706	30	30	.5225	.6128	1.632	.85264	30
40	.4014	.4383	2.282	.91590	20	40	.5250	.6168	1.621	.85112	20
50	.4041	.4417	2.264	.91472	10	50	.5275	.6208	1.611	.84959	10
					<b>66</b>						<b>58</b>
	Cosin.	Cotg.	Tan.	Sine.	Angle.		Cosin.	Cotg.	Tan.	Sine.	Angle.

TABLE VIII.—NATURAL TRIGONOMETRICAL FUNCTIONS.

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

TABLE IX.—CALCULATION OF EARTHWORK.

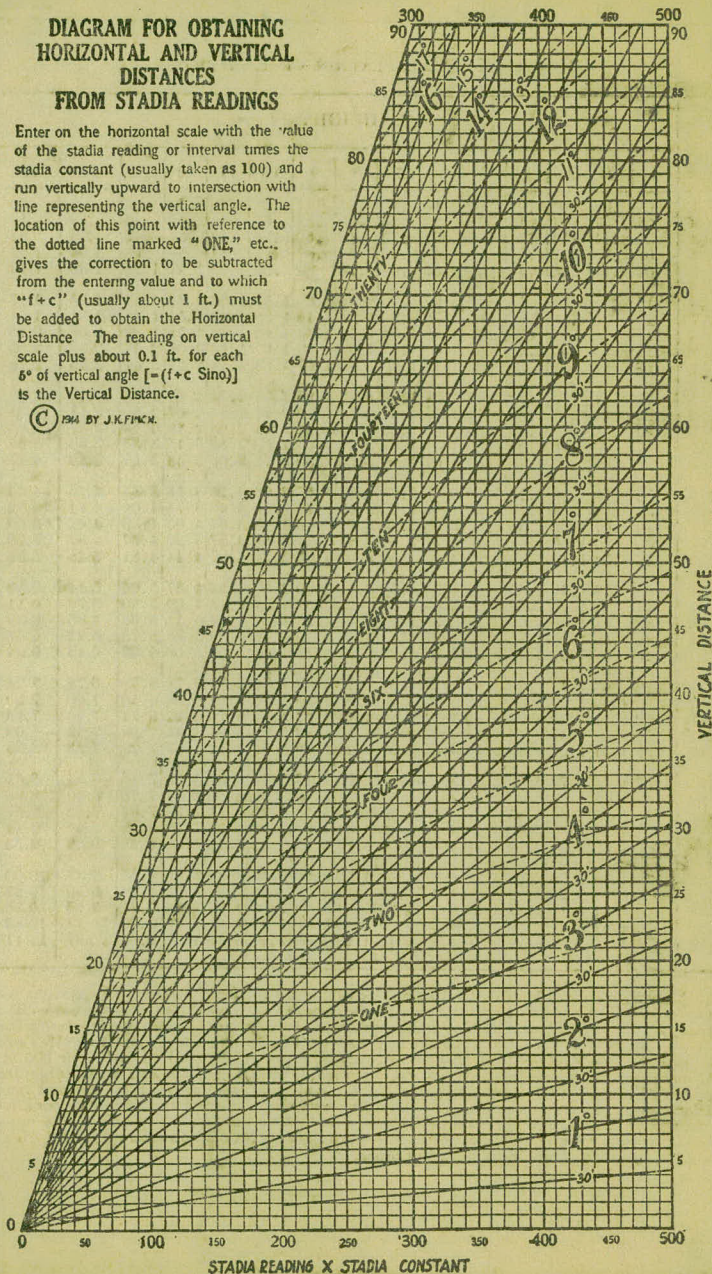
Width	HEIGHT														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	.02	.04	.06	.07	.09	.11	.13	.15	.17	.18	.20	.22	.24	.26	.28
2	.04	.07	.11	.15	.18	.22	.26	.30	.33	.37	.41	.44	.48	.52	.56
3	.06	.11	.17	.22	.28	.33	.39	.44	.50	.56	.61	.67	.72	.78	.83
4	.07	.15	.22	.30	.37	.44	.52	.59	.67	.74	.81	.89	.96	1.04	1.11
5	.09	.19	.28	.37	.46	.56	.65	.74	.83	.93	1.02	1.11	1.20	1.30	1.39
6	.11	.22	.33	.44	.56	.67	.78	.89	1.00	1.11	1.22	1.33	1.44	1.55	1.67
7	.13	.26	.39	.52	.65	.78	.91	1.04	1.16	1.30	1.42	1.55	1.68	1.81	1.94
8	.15	.30	.44	.59	.74	.89	1.04	1.19	1.33	1.48	1.63	1.78	1.92	2.08	2.22
9	.17	.33	.50	.67	.83	1.00	1.17	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50
10	.18	.37	.56	.74	.93	1.11	1.30	1.43	1.67	1.85	2.04	2.22	2.41	2.59	2.78
11	.20	.41	.61	.82	1.02	1.22	1.43	1.63	1.83	2.04	2.24	2.44	2.65	2.85	3.06
12	.22	.44	.67	.89	1.11	1.33	1.56	1.78	2.00	2.22	2.44	2.67	2.89	3.11	3.33
13	.24	.48	.72	.96	1.20	1.44	1.68	1.92	2.16	2.41	2.65	2.89	3.13	3.37	3.61
14	.26	.52	.78	1.04	1.30	1.55	1.81	2.08	2.33	2.59	2.85	3.11	3.37	3.63	3.89
15	.28	.55	.83	1.11	1.39	1.67	1.94	2.22	2.50	2.78	3.06	3.33	3.61	3.89	4.17
16	.30	.59	.89	1.18	1.48	1.78	2.07	2.37	2.67	2.96	3.26	3.56	3.85	4.15	4.44
17	.31	.63	.94	1.26	1.57	1.89	2.20	2.52	2.83	3.15	3.46	3.78	4.09	4.41	4.72
18	.33	.67	1.00	1.33	1.67	2.00	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00
19	.35	.70	1.06	1.41	1.76	2.11	2.46	2.82	3.17	3.52	3.87	4.22	4.57	4.92	5.28
20	.37	.74	1.11	1.48	1.85	2.22	2.59	2.96	3.33	3.70	4.07	4.44	4.81	5.18	5.56
21	.39	.78	1.17	1.55	1.94	2.33	2.72	3.11	3.50	3.89	4.28	4.67	5.06	5.44	5.83
22	.41	.81	1.22	1.63	2.04	2.44	2.85	3.26	3.67	4.07	4.48	4.89	5.30	5.70	6.11
23	.43	.85	1.28	1.70	2.13	2.56	2.98	3.41	3.83	4.26	4.68	5.11	5.54	5.96	6.39
24	.44	.89	1.33	1.78	2.22	2.67	3.11	3.56	4.00	4.44	4.89	5.33	5.78	6.22	6.67
25	.46	.92	1.39	1.85	2.31	2.78	3.24	3.70	4.17	4.63	5.09	5.56	6.02	6.48	6.94
26	.48	.96	1.44	1.92	2.41	2.89	3.37	3.85	4.33	4.82	5.30	5.78	6.26	6.74	7.24
27	.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50
28	.52	1.04	1.55	2.07	2.59	3.11	3.63	4.15	4.67	5.18	5.70	6.22	6.74	7.26	7.78
29	.54	1.07	1.61	2.15	2.68	3.22	3.76	4.30	4.83	5.37	5.91	6.44	6.98	7.52	8.06
30	.56	1.11	1.67	2.22	2.78	3.33	3.89	4.44	5.00	5.55	6.11	6.67	7.22	7.78	8.33
31	.57	1.15	1.72	2.30	2.87	3.44	4.02	4.59	5.17	5.74	6.32	6.89	7.46	8.04	8.61
32	.59	1.18	1.78	2.37	2.96	3.56	4.15	4.74	5.33	5.92	6.52	7.11	7.70	8.30	8.89
33	.61	1.22	1.83	2.44	3.05	3.67	4.28	4.89	5.50	6.11	6.72	7.33	7.94	8.55	9.17
34	.63	1.26	1.89	2.52	3.15	3.78	4.40	5.04	5.67	6.29	6.93	7.56	8.18	8.81	9.44
35	.65	1.30	1.94	2.59	3.24	3.89	4.53	5.18	5.83	6.48	7.13	7.78	8.42	9.08	9.72
36	.67	1.33	2.00	2.67	3.33	4.00	4.66	5.33	6.00	6.67	7.33	8.00	8.67	9.33	10.00
37	.68	1.37	2.06	2.74	3.42	4.11	4.79	5.48	6.17	6.85	7.54	8.22	8.91	9.59	10.28
38	.70	1.41	2.11	2.82	3.52	4.22	4.92	5.63	6.33	7.03	7.74	8.44	9.15	9.85	10.56
39	.72	1.44	2.17	2.89	3.61	4.33	5.05	5.78	6.50	7.22	7.95	8.67	9.39	10.11	10.83
40	.74	1.48	2.22	2.96	3.70	4.44	5.18	5.92	6.67	7.41	8.15	8.89	9.63	10.37	11.11

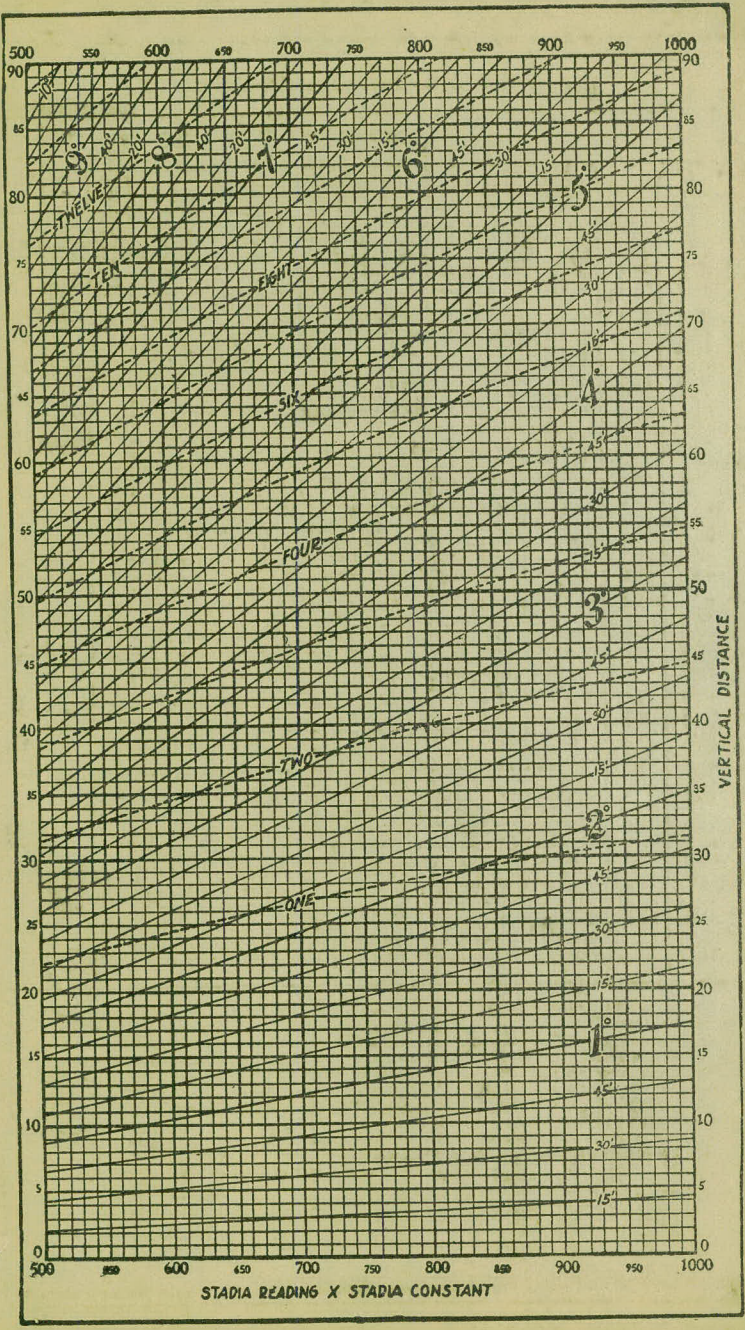
Table gives cu. yds. in 1 ft. of a triangle of given width and height. Corrections for tenths of width are one tenth the values found under each height considering the widths from 1 to 9 as tenths and similarly the corrections for tenths of height are one tenth the figures opposite width considering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

# DIAGRAM FOR OBTAINING HORIZONTAL AND VERTICAL DISTANCES FROM STADIA READINGS

Enter on the horizontal scale with the value of the stadia reading or interval times the stadia constant (usually taken as 100) and run vertically upward to intersection with line representing the vertical angle. The location of this point with reference to the dotted line marked "ONE," etc., gives the correction to be subtracted from the entering value and to which "f+c" (usually about 1 ft.) must be added to obtain the Horizontal Distance. The reading on vertical scale plus about 0.1 ft. for each  $6^\circ$  of vertical angle [ $=(f+c \text{ Sino})$ ] is the Vertical Distance.

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STADIA READING X STADIA CONSTANT

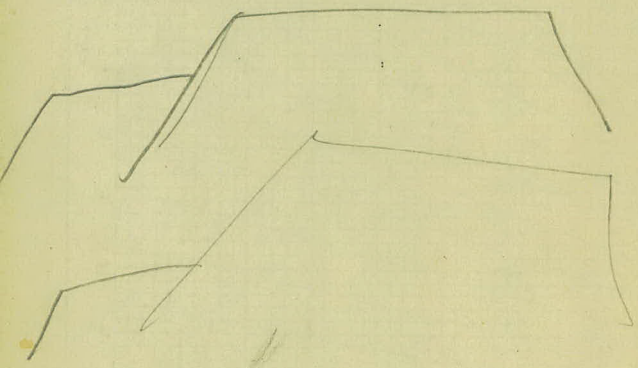
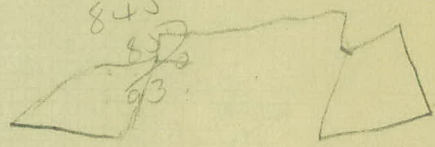
VERTICAL DISTANCE

$$\begin{array}{r} 80841 \\ 1050 \\ \hline 81891 \\ 130 \\ 14 \\ \hline 1808 \\ 450 \\ \hline 2258 \end{array}$$

$$\begin{array}{r} 300 \\ \hline 42240 \\ 1358 \\ \hline 5574 \end{array}$$

$$\begin{array}{r} 749 \\ 109 \\ \hline 858 \end{array}$$

$$\begin{array}{r} 845 \\ 850 \\ \hline 93 \end{array}$$



74568

74236  
332

35

127  
111  
1046  
160  
150  
200

376 10 ✓ 2  
369  
30  
1600  
1000  
102  
100  
100

369  
37.2

12.7  
20  
15.1  
13.9  
1.2  
42.4  
3.3  
39.1  
10.0  
49.5

1046  
53  
138  
230  
1438

51.3  
8.0  
43.3

139.031  
111  
90 2800  
2700  
100  
34.2  
11  
23.2

49.2  
43.0  
6.2  
28  
3.9

23.0  
3  
200

1031  
31  
155  
93  
1085    111  
11  
122

18  
6  
78

78  
1080  
1296  
1043  
75

34.2  
23.0  
11.2  
14.2  
10.35  
3.85

142  
127  
1.5

130  
127  
3

BH

nail in tree 53 + 15 Lt.

E1. 810.25

Wm Nelson  
St Paul Minn

3809<sup>#</sup> = 1584.54  
3239<sup>#</sup>  
1459<sup>#</sup> 64/154

166  
226  
356

Chamber  
136  
36<sup>1</sup> P<sub>3</sub> @ 5.35 = 727.60

100  
6  
93

Installation

136.00  
863.60

+ 5 mt haul

128  
631  
640  
384  
768  
84

1584  
641  
598  
- 32  
8  
70

4943.

762.3  
771.6  
4.7  
3  
no  
1.3

201  
201  
51.2  
472.4  
137.0  
2640  
16.5

128  
153  
640  
350  
586  
20010  
2420

Martin H. Nelson

OF  
RAMSEY COUNTY  
COUNTY HIGHWAY CONSTRUCTION

County Project No. ....

Bridges and Culverts. Return showing progress to ..... 192.... Div. .... M. .... to M. Sta. .... to Sta. .... Asst. Eng.

STATION From To	PORTABLE CULVERTS		MONOLITHIC CULVERTS		BRIDGES			REMARKS
	P.1 Haul Ton Mi.	Cu. Yds.	Concrete Cu. Yds.	Reinf. Steel Lbs.	Str. Steel Lbs.	Piling Lin. Ft.		
			79t 200' R - 200' Lt.	84t L + R + 50' R - 200' Lt.	116t Length on A.F.E.	119t 300 m L	125t "	142t Town Road Xing - G.R. Both Sides 23-66 for Guide
					98 - 150' Lt		127t Lengthened. 24' on L on R - 40'	300' on L at 136t
					96t - 150' Lt.		33' " " " 32'	

126 + 73  
40  
127 15

Total to date  
Previously Returned  
Done during Month

To be prepared in duplicate  
Monthly.

~~2~~  
12.50

~~741.55~~  
~~129.11~~  
~~12.50~~

744.04  
12.50  
731.54

732.64  
12.14  
720.50

-71

1

201  
57  
08

136125  
133120  
6  
8/3-05  
38

329.0  
270.2  
78.8

△ 16° 32'  
D 352  
T 270.2  
L 306.6

329.0  
270.2  
78.8

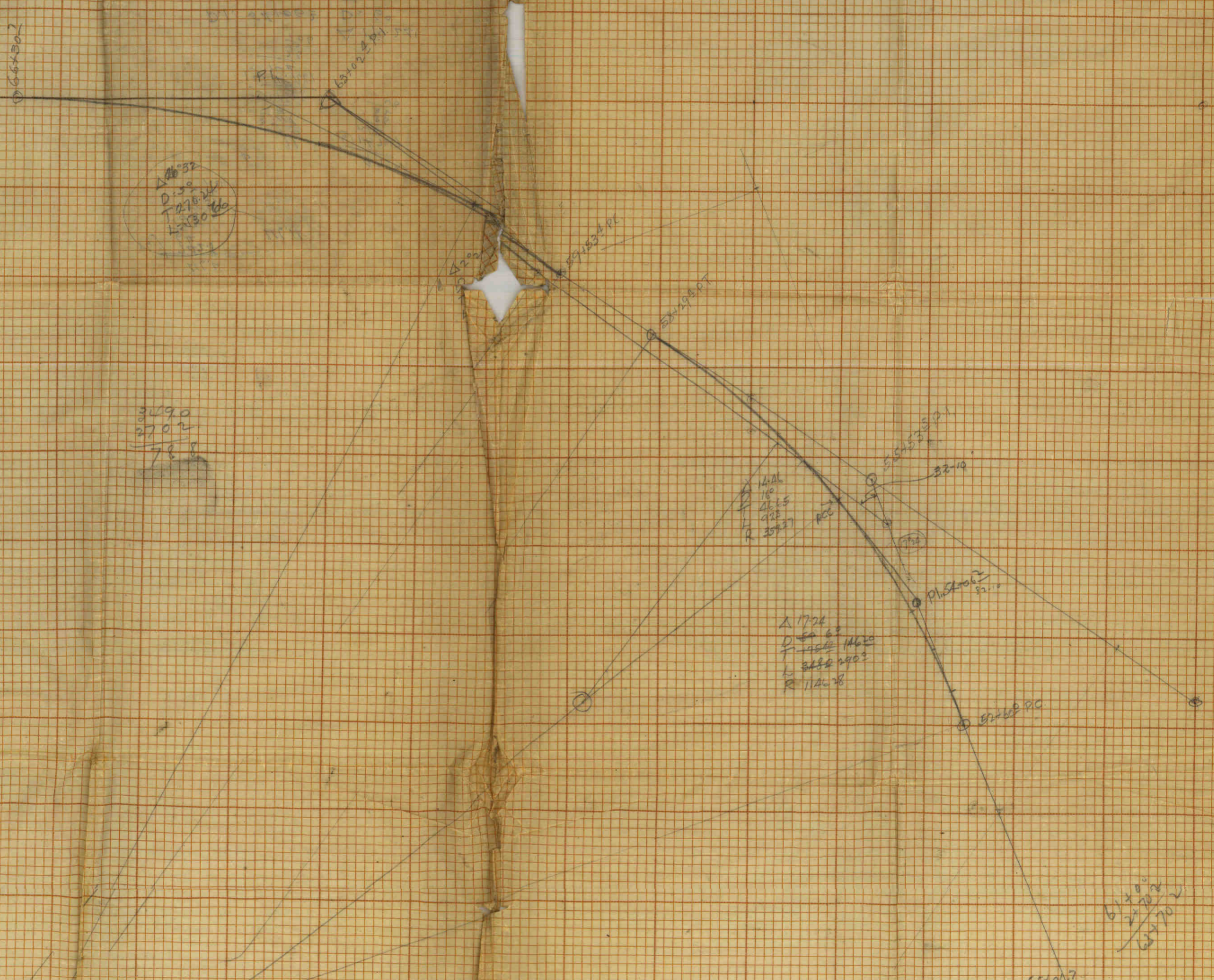
△ 14° 16'  
D 160  
T 42.65  
L 135.27

△ 17° 24'  
D 146.2  
T 146.2  
L 240.3  
R 1126.38

614.00  
270.2  
343.8

550.07  
270.2  
820.27

614.00  
270.2  
343.8





DISTANCES FROM CENTER OF ROADWAY FOR  
CROSS-SECTIONING.

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

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

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

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