1048

DIETZGEN

ENGINEERS

FIELD BOOK

No. 203

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)÷2 or 2 ft. added to 30.6 =32.6. For slopes of 1 on 1½ see inside of back cover.

73' NW of Br W side Mon 1018

Prop. Widening Morena Blvd. - Bldgs etc (1932) 21

12/27/18 Gregory

Survey of
Rose Canon Road Relocation

See book 1049-1 for X sections

9+60.0 △ 2°36' L

6+46.6 = N.E. Bridge

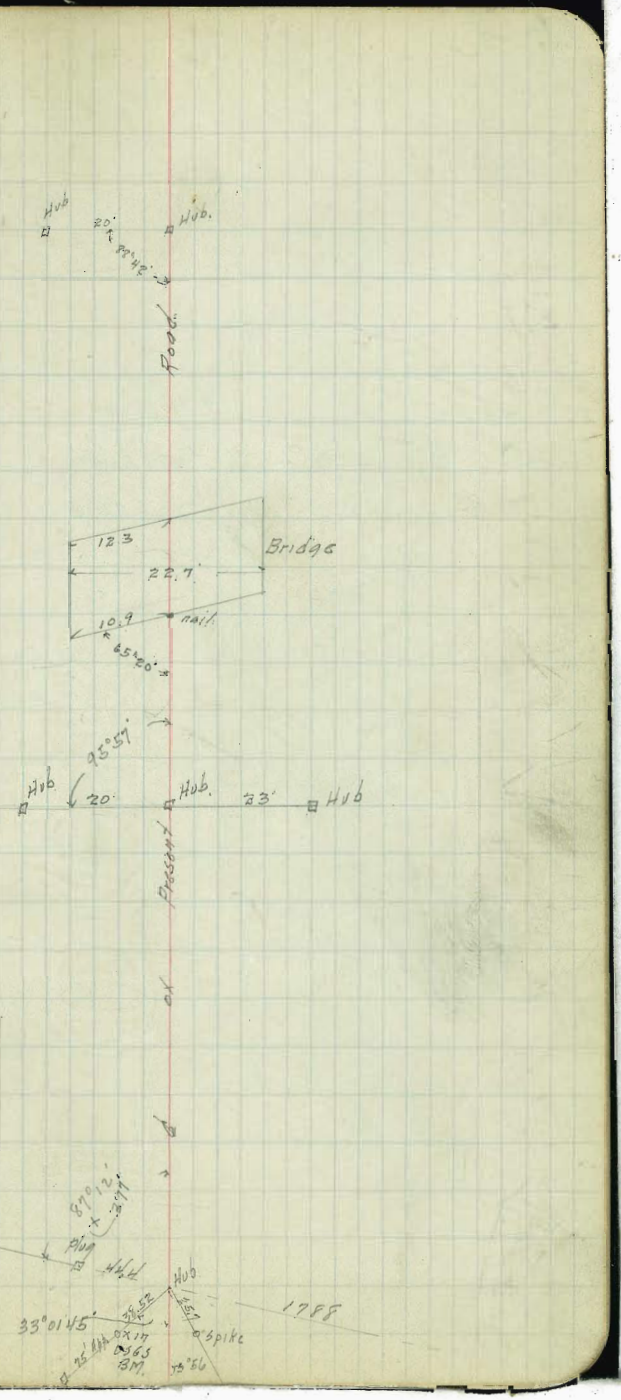
6+02.4 = S.E. Bridge

5+81.38 E.C. R=550

5+24.47 △ 11°54' R St = 57.32

4+67.15 P.C. Lc = 114.23

0+00

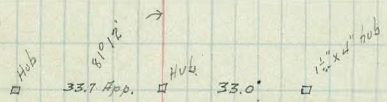


22+21.30 △ L

20+11.50 E.C. R = 300

19+64.79 △ 17°36' L St = 46.44

19+18.35 PC Lc = 92.15



Culvert at 79+59

+5.35 15.65 10.3 B.M. & Sta 79+50

Culvert at 85+83 S. curb line Milton St

+5.51 16.11 10.6 B.M. Hub & Sta 85+69.01 on Hub

Culvert 86+35 N curb line Milton St

+5.51 16.11 B.M. Hub & Sta 85+69.01 on Hub

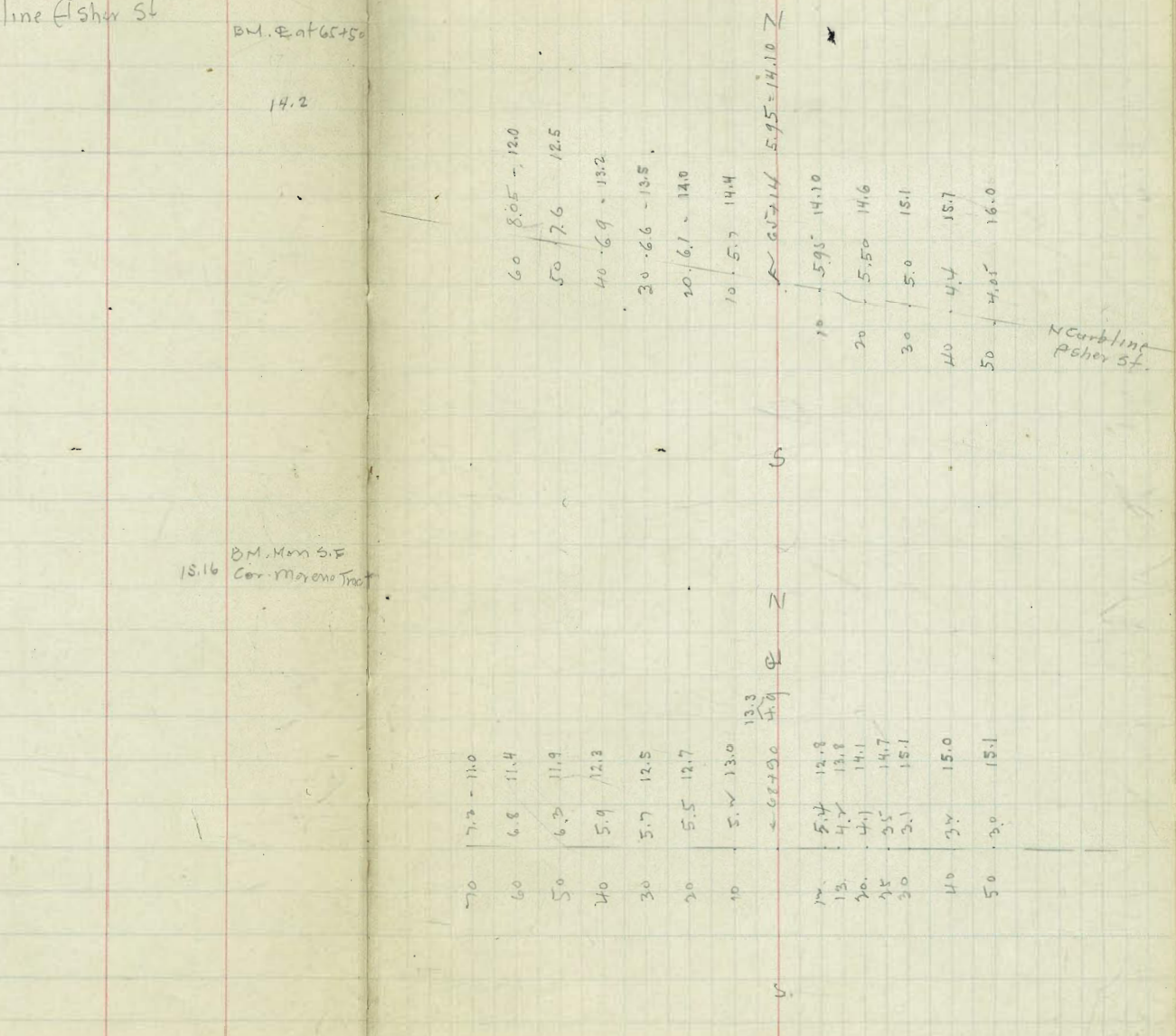
Culvert -65+14 N. Curb line of Fisher St

BM. E at 65+50

+5.85 20.05 14.2

Culvert at 68+90

+3.03 18.19 15.16 BM. Mon S.E Cor. Moreno Tract



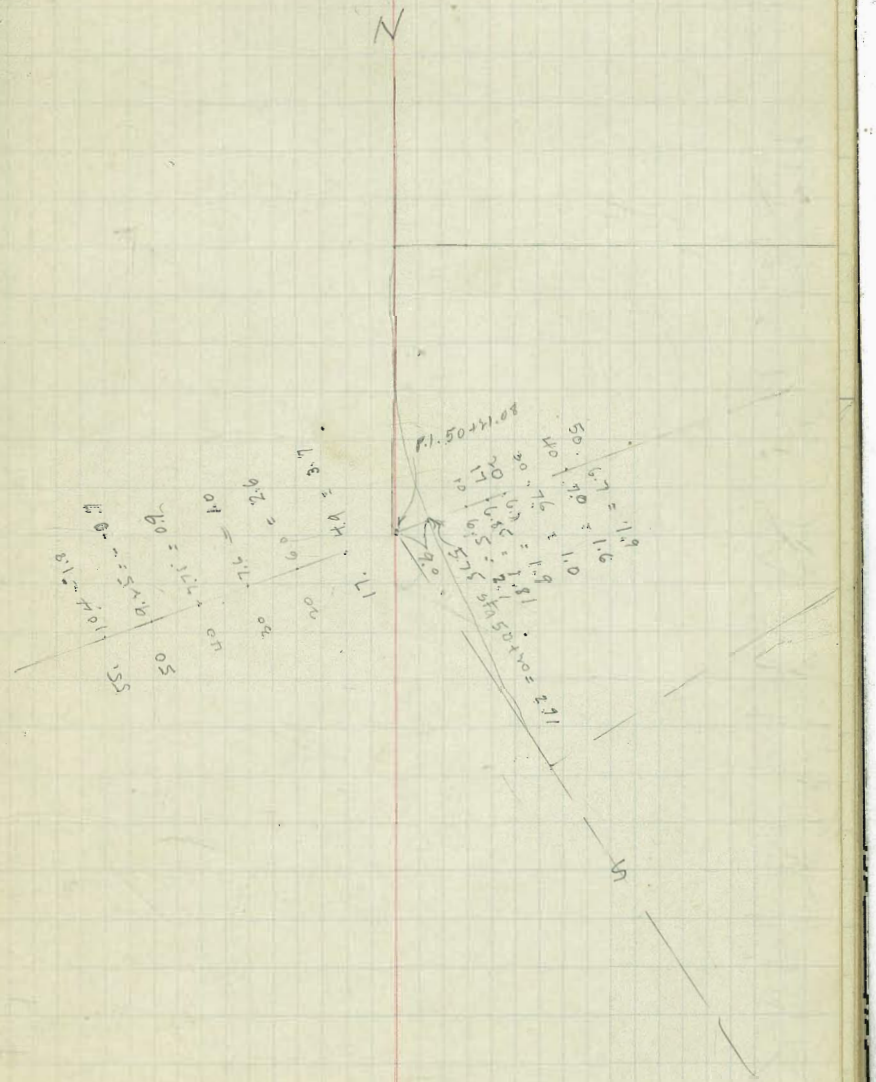
Culvert at 5 at 70

+.606 8.56

SPK in Telpole Nail 2.50

P.I. -5.55'

℄ Road



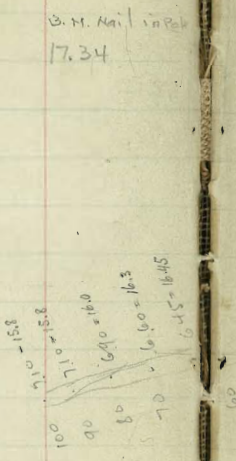
Culvert at 23+30

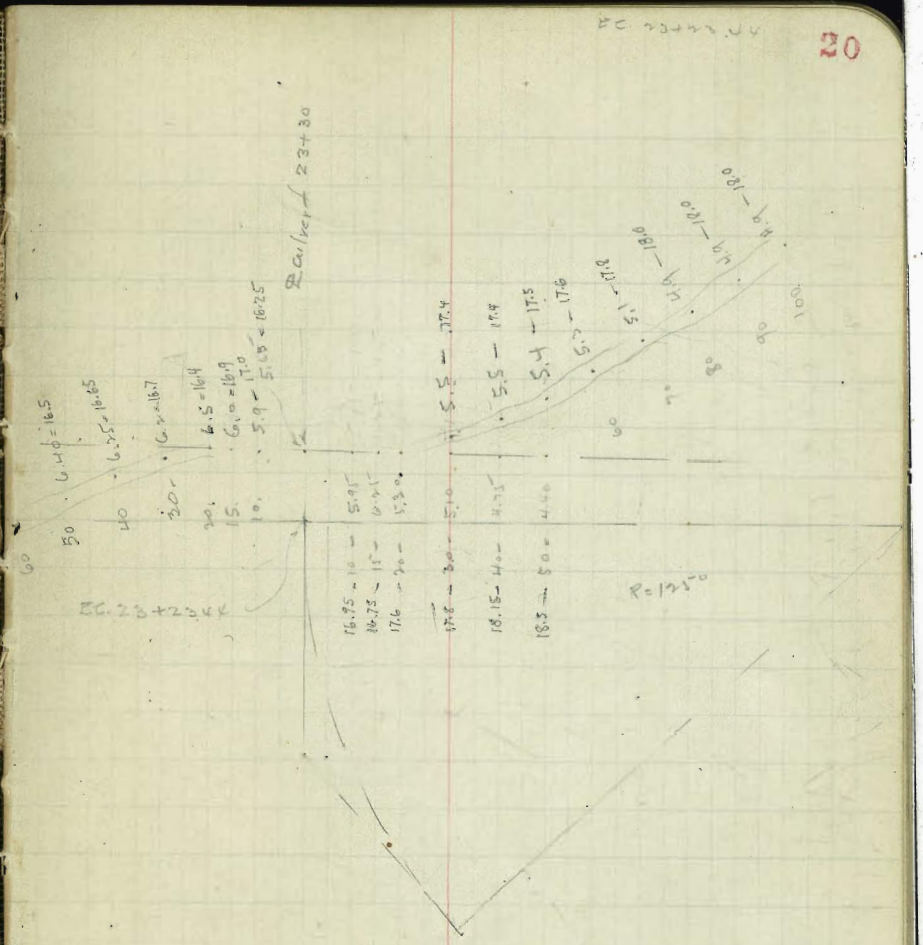
N

+5.56 . 23.90

C. M. Nail in Pole
17.34

℄ -5.61'
5 Lt -5.65'
5 R -5.61'



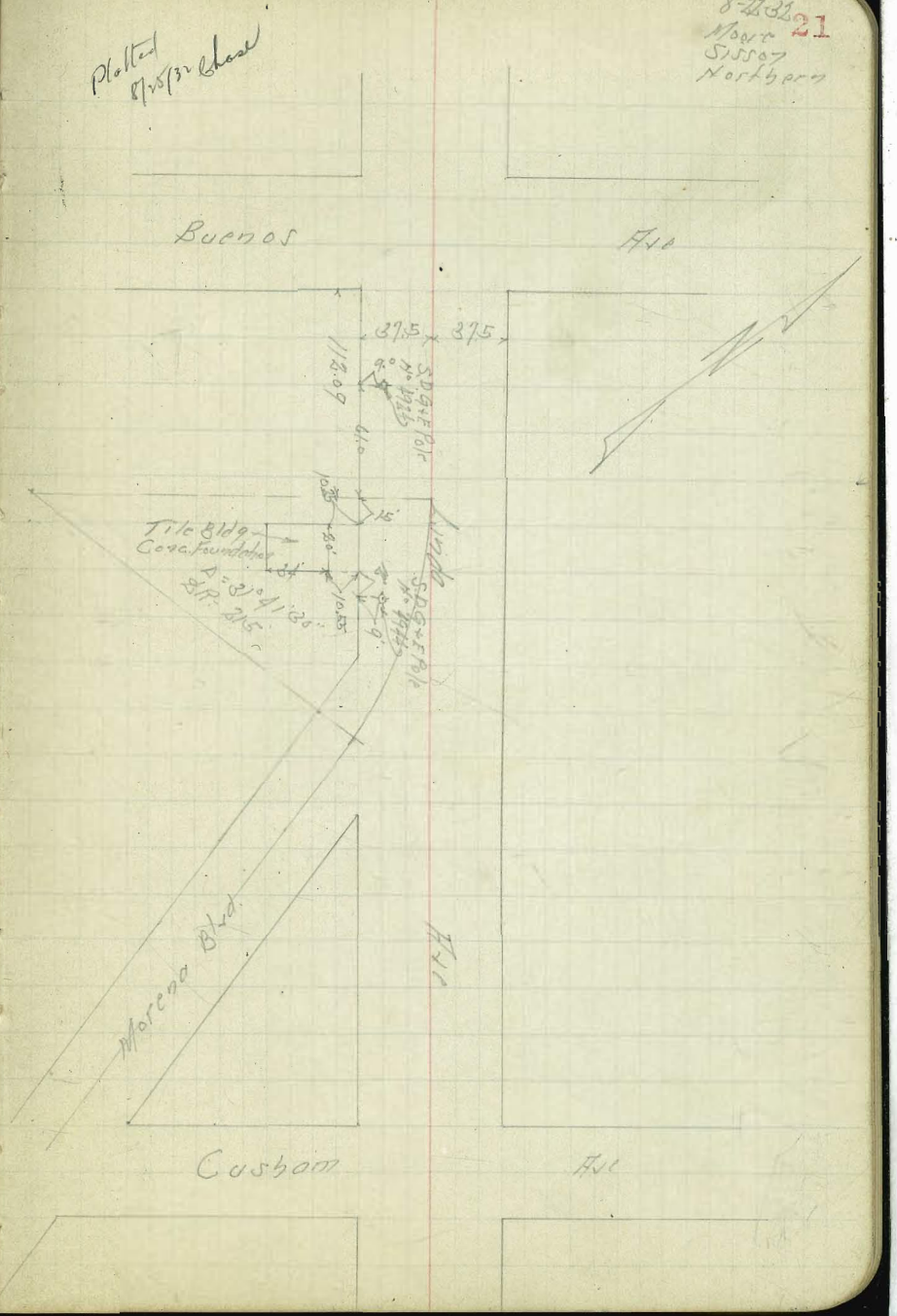


Proposed Widening of Curves
Morena Boulevard

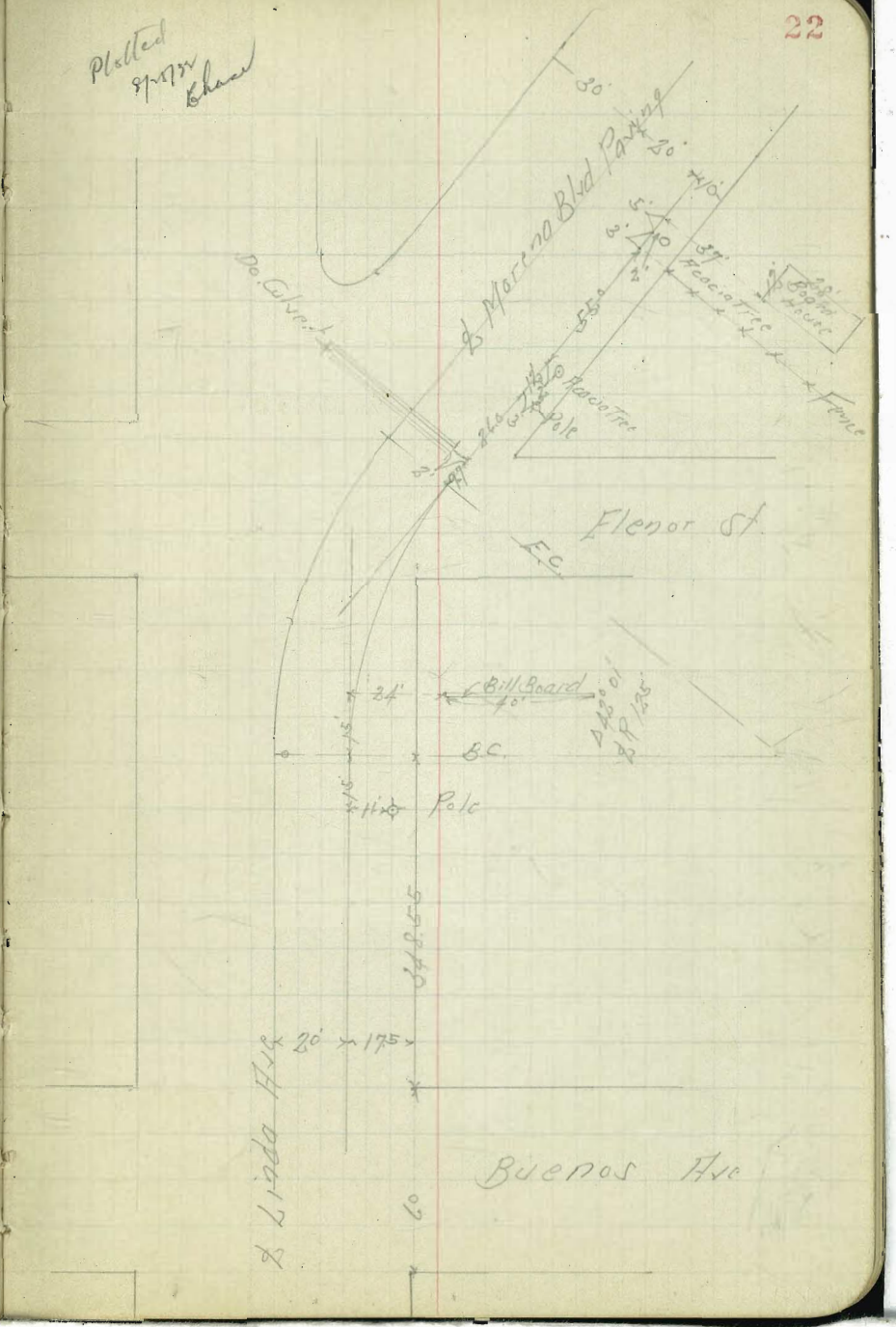
Platted
8-15-32 Eckert

8-22-32
Moore
Sisson
Northern

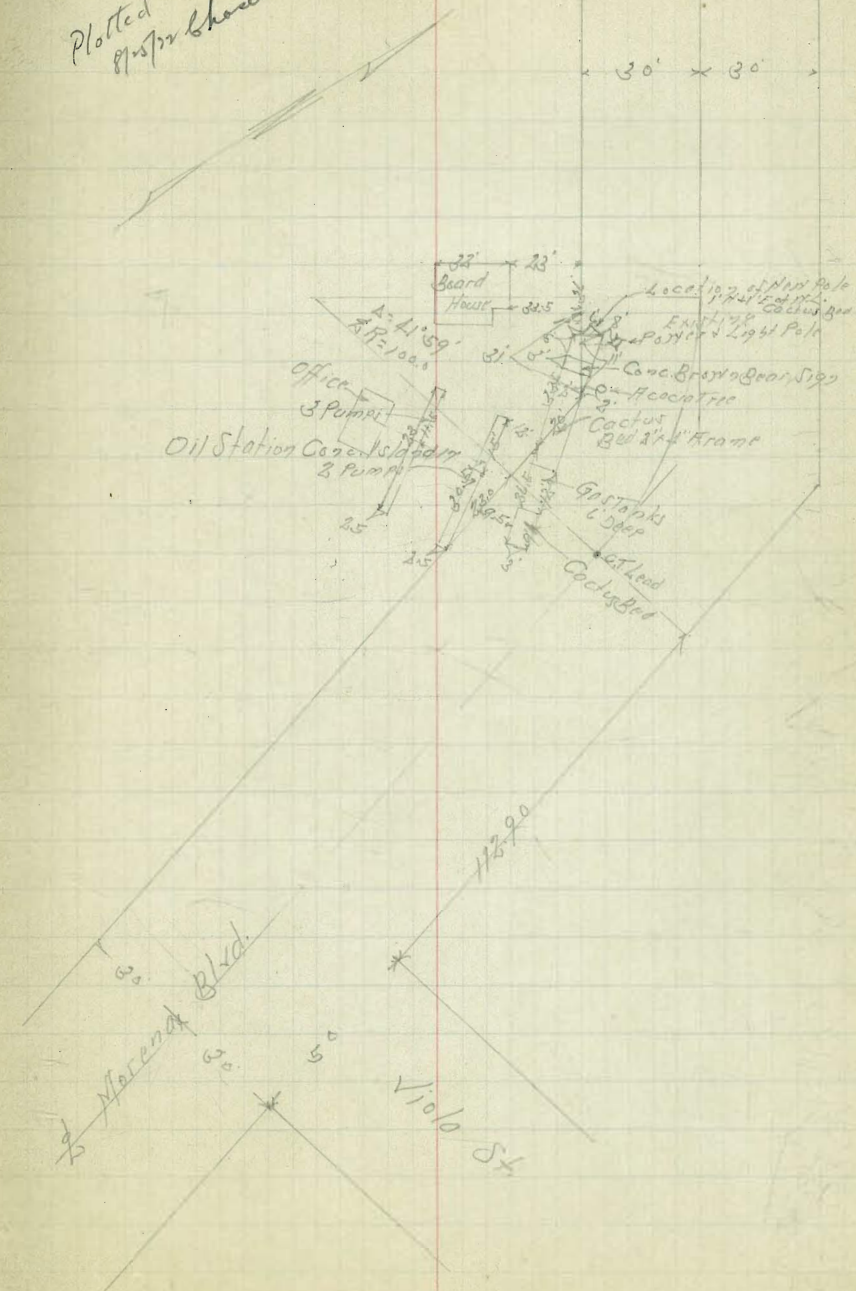
21



Plotted 8-27-37 Rhead

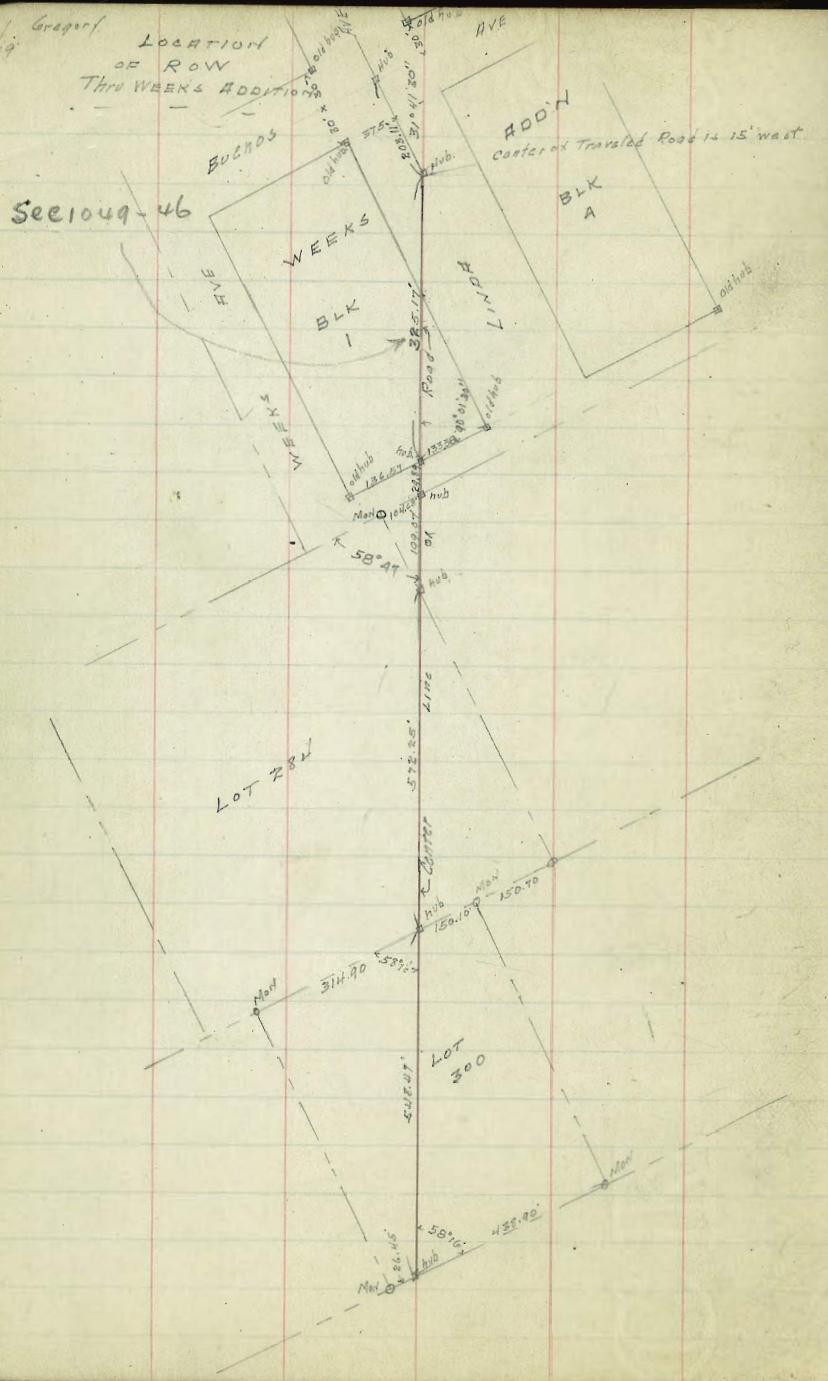


Plotted


30'
30'
22'
23'
Board House
33.5
Δ=41°59'
R=100.0
Office
3 Pumps
Oil Station Conc. Island
2 Pumps
25
25
31'
Existing Power & Light Pole
Conc. Brown Bear Sign
Acacia Tree
Cactus Bed 2'x4" Frame
Gas Tanks 6' Deep
Cactus Bed
112.90
30
Moreno Blvd.
30
50
Viola St.

3/8/19 Gregory

LOCATION OF ROW THRU WEEKS ADDITION



1/10/19 Gregory Levels on Morena Blvd or Boulevard from NL. Old Town to So End Rose Canon

For Alignment notes see Book 1049 - Page 46

B.M.	3.80	26.25		22.45	N/on SW Buenos + Linda
T.P.	2.50	17.22	11.53	14.72	

NL. Old Town = SL. Pueblo Lot 300

Boulevard 80' wide here

BOOK 1057 Nor SECTION 15

E		9.5	7.7
+15.5		3.0	14.2
+22.38		2.8	14.4
+40 = ℄		2.8	14.4
+16.		8.3	13.9
+17.62		4.7	12.5
+26		8.2	9.0
+40 = W		8.4	8.8

All distances Given are on Center Line

24.74' No. on ℄ = Sta 0.0

SEE RE X

W		9.3	7.9
+11		7.6	9.6
+18		8.1	9.1
+25		3.6	13.6
+26		3.2	14.0 edge
C		3.0	14.2
+15		3.1	14.1
+21		3.1	14.1 edge
+31		8.8	8.4
E		9.5	7.7

50' No. of 00

E		10.6	6.6
+14		8.9	8.3

17.2

+23		3.5	13.7
+25		3.3	13.9
C		2.9	14.3
+13		3.1	14.1
+15		4.4	12.8
+22		8.9	8.3
+28		8.0	9.2
W		8.6	8.6

100' No. of 00 on ℄

W		10.7	6.5
+14		8.0	9.2
+17		9.2	8.0
+20		9.0	8.2
+25		5.4	11.8
+29		3.3	13.9
C		3.1	14.1
+15		3.4	13.8
+17		3.5	13.7
+28		8.3	8.9
E		10.8	6.4

150' No.

E		10.3	6.9
+12		8.3	8.9
+22		3.2	14.0
+25		3.3	13.9
C		2.9	14.3

+ 12	3.3	13.9
+ 15	5.5	11.7
+ 21	9.1	8.1
+ 28	8.3	8.9
+ 33	9.7	7.5
W	9.7	7.5
200' No.		
W	9.6	7.6
+ 14	8.3	8.9
+ 19	8.6	8.6
+ 25	5.6	11.6
+ 28	3.3	13.9
C	3.0	14.2
+ 15	3.1	14.1
+ 17	3.0	14.2
+ 28	7.9	9.3
E	9.4	7.8
250' No.		
E	11.5	5.7
+ 12	9.3	7.9
+ 23	3.6	13.6
+ 25	3.3	13.9
C	3.0	14.2
+ 12	3.2	14.0
+ 15	5.0	12.2
+ 20	8.0	9.2

+ 26	7.8	9.4
W	10.3	6.9
300' No.		
W	11.1	6.1
+ 20	8.0	9.2
+ 25	4.6	12.6
+ 27	3.2	14.0
C	2.9	14.3
+ 15	3.2	13.8
+ 17	3.6	13.6
+ 28	9.1	8.1
E	12.0	5.2
350' No.		
E	13.0	4.2
+ 12	10.5	6.7
+ 23	3.3	13.9
+ 25	3.3	13.9
C	2.8	14.4
+ 12.5	3.1	14.1
+ 15	4.8	12.4
+ 22	8.7	8.5
+ 25	8.2	9.0
W	10.8	6.4
400' No.		
W	11.6	5.6
+ 14	8.4	8.8

+19			8.3	8.9
+25			5.0	13.2
+28			3.0	14.2
C			2.7	14.5
+15			3.2	14.0
+17			3.3	13.9
+27			10.2	7.0
E			12.8	4.4
		450' No.		
E			12.5	4.7
+16			9.0	8.2
+23			3.2	14.0
+25			3.1	14.1
C			2.6	14.6
+12			2.8	14.4
+15			4.9	12.3
T.P.	1.61	16.14	2.69	14.53
+20			7.4	8.7
+24			6.6	9.5
+38			11.1	5.0
W			11.0	5.1
		500' No		
W			11.2	4.9
+13			7.0	9.1
+20			6.9	9.2
+25			3.8	12.3

+28.0		2.0	14.1
C		1.6	14.5
+15		2.1	14.0
+16		2.3	13.8
+31		11.9	4.2
E		12.7	3.4
	550' No.		
E		12.0	4.1
+11		11.0	5.1
+23		2.1	14.0
+25		2.1	14.0
C		1.6	13.5
+11		1.6	13.5
+15		4.3	11.8
+20		7.0	9.1
+24		7.3	8.8
W		11.8	4.3
	600' No.		
W		11.2	4.9
+9		9.0	7.1
+20		6.6	9.5
+25		3.3	12.8
+27		2.1	14.0
C		1.7	14.4
+15		2.2	13.9
~~+15~~ +17		2.3	13.8

+24		7.7	8.4
+29		9.6	6.5
E		10.5	5.6
	650' No.		
E		11.0	5.1
+12		10.0	6.1
+23		2.3	13.8
+25		2.2	13.9
C		1.5	14.6
+12		1.9	14.2
+15		3.7	12.4
+20		7.3	8.8
+25		6.9	9.2
+35		9.7	6.4
W		10.0	6.1
	700' No.		
W		6.6	9.5
+15		6.0	10.1
+25		1.5	14.6
C		1.2	14.9
+15		2.0	14.1
+18		2.2	13.9
+30		10.2	5.9
E		11.0	5.1

	750' No		
E		10.6	5.5
+9		8.9	7.2
+21		1.0	15.1
+25		0.9	15.2
C		0.4	15.7
+15		1.0	15.1
+25		1.6	14.5
W		0.6	15.5
	800' No.		
W		0.5	15.6
+20		0.8	15.3
+26		0.8	15.3
C		0.3	15.8
+15		0.2	15.9
+26		0.2	15.9
E		6.0	10.1
T.P.	5.09 21.11	0.09	16.05
	850' No		
E		8.6	12.5
+12		4.0	17.1
+25		4.7	16.4
C		4.7	16.4
+15		5.0	16.1
+25		5.1	16.0
W		4.2	16.9

21.14

900' No.

W	1.6	19.5
+20	4.1	17.0
+25	4.3	16.8
C	3.9	17.2
+15	4.3	16.8
+27	4.5	16.6
E	9.1	12.0

925' No.

E	9.6	11.5
+12	6.1	15.0
+15	3.7	17.4
+25	3.9	17.2
C	3.7	17.4
+15	3.8	17.3
+22	5.6	15.5
+28	5.5	15.6
+32	3.4	17.7
W	1.9	19.2

950' No

W	4.1	17.0
+5	5.9	15.2
+18	5.4	16.7
+25	3.7	17.4
C	3.5	17.6
+15	3.8	17.3
+21	3.8	17.3

21.14

E	10.4	10.7

1000' No

E	12.2	8.9
+11	10.8	10.3
+25	3.5	17.6
C	3.2	17.9
+15	3.5	17.6
+28	4.5	16.6
+33	5.8	15.3
W	5.4	15.7

1050' No.

W	4.0	(16.1) 17.1
+10	3.7	17.4
+25	2.8	18.3
C	2.8	18.3
+15	2.9	18.2
+27	10.2	10.9
E	11.3	9.8

1100 No.

E	9.1	12.0
+16	8.0	13.1
+25	3.4	17.7
+26	2.8	18.3 edge
C	2.6	18.5
+15	2.6	18.5
+25	2.8	18.3

		21.14			
W			3.7	17.4	
		1150' No.			
W			2.6	18.5	
+15			2.3	18.8	
C			2.1	19.0	
+14			2.4	18.7	edge
+15			2.9	18.2	
+18			4.5	16.6	
E			5.0	16.0	
		1200' No.			
E			2.5	18.6	
+25			1.7	19.4	
C			1.7	19.4	
+15			1.7	19.4	
W			1.6	19.5	
T.P.	5.17	25.71	0.60	20.54	
		1250 No.			
W			4.0	21.7	
+7			4.0	21.7	
+25			5.4	20.3	
C			5.6	20.1	
+12			5.4	20.3	
+15			4.9	20.8	
E			5.5	20.2	
		1300' No.			
E			5.0	20.7	

		25.71			
+25			4.4	21.3	
+28			4.8	20.9	
C			4.6	21.1	
+15			4.2	21.5	
+33			3.1	22.6	
W			3.1	22.6	
		1350' No.			
W			3.9	21.8	
+6			4.4	21.3	
+9			5.0	20.7	
+25			5.1	20.6	
C			5.1	20.6	
+15			5.3	20.4	
E			4.9	20.8	
		1400' No			
E			5.1	20.6	
+25			5.5	20.2	
C			5.3	20.4	
+15			5.5	20.2	
W			5.2	20.5	
		1450' No.			
W			5.4	20.3	
+25			5.7	20.0	
C			5.5	20.2	
+15			5.6	20.1	
E			5.3	20.4	
CHK	5.20	27.64 ✓	3.27	24.44 ✓ CHK	

27.64

1500' No.

E	7.3	20 3
+25	7.4	20 2
C	7.5	20 1
+15	7.6	20 0
W	7.4	20 2

1550' No.

W	7.2	20 4
+25	7.4	20 2
C	7.3	20 3
+15	7.2	20 4
+30	7.1	20 5
E	6.1	21 5

1600' No.

E	5.6	22 0
+20	6.6	21 0
+25	6.6	21 0
C	6.9	20 7
+15	7.1	20 5
W	7.0	20 6

Book 1057
Re Sections
SEE for

1643.52' No. = SECT A see sketch

W	6.9	20 7
~~+6~~ +8	6.7	20 9
+9	7.4	20 2
C	6.6	21 0
+15	6.3	21 3
E	5.5	22 1

27.64

SECTION B = △ Point on ctr Line = STA 1650.11

E	5.4	22 2
+25	6.4	21 2
C	6.3	21 3
+15	6.5	21 1
+33	7.3	20 3
+34	6.6	21 0
W	6.9	20 7

80' wide

SECTION C = STATION 1665.52 BLVD = 75' wide

W	6.9	20 7
+7	6.6	21 1
+7.5	7.4	20 2
+~~11~~.5	6.6	21 0
C	6.3	21 3
+15	6.3	21 3

+~~00~~ nn.5	6.5	211
+ n8	5.1	225
E	5.8	218
17+0.0		
E	5.6	220
+45	6.8	208
+nn.5'	6.n	214
+37.5 = C	6.6	210
+5n.5 = Ctr+15	7.0	206
W	6.5	211
17+50		
W	6.1	215
+10	6.0	216
+13	6.7	209
+nn.5	6.3	213
+37.5=C	6.n	214
+15	6.3	213
+19	5.9	217
+n3	6.9	207
E	6.1	215
18+00		
E	5.8	218
+17.5	5.9	217
+17.5'	5.4	222
+nn.5	6.0	216
+37.5 C	5.9	217

+15	6.n	214
+19	58	218
W	5.7	219
18+23.22 = S.L. Buenos		
W	5.4	222
+17.5	5.7	219
+nn.5	6.0	216
C	5.7	219
+15	5.9	217
E	5.6	220
18+53.22 = ctr Buenos		
E	5.2	224
+nn.5	5.3	223
C	5.5	221
+15	5.3	223
+15 W	4.9	227
18+83.nn = N.L. Buenos		
W	4.6	230
+10	4.6	230
+15	5.1	225
+nn.5'	5.3	223
C	5.4	222
+15	5.3	223
+n0	4.9	227
E	5.3	223

	17.6		
	19+00		
E		5.0	22.6
+18		5.3	22.3
+17.5		5.5	22.1
C		5.4	22.2
+13.5		5.4	22.2
+15		4.9	22.7
+17.5		5.0	22.6
+17.5		4.4	23.2
W		4.1	23.5
	19+50		
W		3.3	24.3
+10		3.8	23.8
+15		4.6	23.0
+17.5		4.9	22.7
+17.5		5.4	22.2
C		5.5	22.1
+15		5.7	21.9
E		5.3	22.3
	20+00		
E		7.1	20.5
+17.5		7.0	20.6
C		6.6	21.0
+14.5		6.3	21.3
+15		5.9	21.7
+17.5		5.9	21.7

+32.5		5.1	22.5
W		4.7	22.9
	20+50		
W		8.4	19.2
+17.5		8.0	19.6
C		7.7	19.9
+15		8.4	19.2
+17.5		8.9	18.7
E		8.5	19.1
	21+00		
E		9.1	18.5
+17		9.7	17.9
+17.5		9.3	18.3
C		8.8	18.8
+15		9.2	18.4
W		9.3	18.3
	21+50		
W		10.2	17.4
+10		10.2	17.4
+15		10.9	16.7
+17.5		10.1	17.5
C		9.9	17.7
+15		10.3	17.3
E		9.4	17.9

		27.64			
		22+00			
E			10.4	17	2
+22.5			10.7	16	9
C			10.2	17	4
+15			10.6	17	0
+22.5			11.4	16	2
+27.5			11.1	16	5
W			11.0	16	6
		22+50			
W			11.2	16	4
+15			11.5	16	1
+22.5			10.4	17	2
C			10.2	17	4
+15			10.4	17	2
+22.0			10.9	17	7
E			10.2	17	4
T.P.	6.33	23.67	10.30	17.34	111/ in pole NW. Blvd. + A-pt
Taken on Radius Line 22+79.77 = Δ pt.					
E			6.4	17	3
+6			7.1	16	6
+10			6.4	17	3
+22.5			6.5	17	2
C			6.4	17	3
+15			6.4	17	3
+33.0 = W			7.0	16	7

	23.67			
Drain needed.	23+00			
			Boul. = 75' wide	
			Boul. = 60' wide	
W		6.4	17	3
+15		6.8	16	9
C		6.4	17	3
+15		6.4	17	3
+22		6.4	17	3
+30 = E		7.0	16	7
	23+50			
E		5.4	18	3
+13		6.1	17	6
+15		6.8	16	9
C		6.4	17	3
+15		6.8	16	9
W		6.7	17	0
	24+00			
W		6.6	17	1
+15		6.8	16	9
C		6.6	17	1
+15		6.6	17	1
E		6.0	17	7
	24+50			
E		5.4	18	3
+15		6.2	17	5
+15.5		6.6	17	1
C		6.3	17	4

23.67

+15		6.5	17.2
+19		6.7	17.0
+19.5		6.0	17.7
+30 = W		6.3	17.4
	25+00		
W		5.8	17.9
+9		5.9	17.8
+9.1		6.6	17.1
+15		6.2	17.5
+30 C		5.8	17.9
+14		6.1	17.6
+15		5.6	18.1
+30 E		5.2	18.5
	25+50		
E		4.5	19.2
+15		5.2	18.5
+16		6.0	17.7
C		5.5	18.2
+15		5.8	17.9
+19		6.0	17.7
+20		5.4	18.3
W		5.3	18.4
	26+00		
W		5.6	18.1
+15		5.6	18.1
C		5.3	18.4

23.67

+13		5.5	18.2
+15		4.7	19.0
E		4.3	19.4
	26+50		
E		3.3	20.4
+7		3.7	20.0
+15		4.6	19.1
+17		5.4	18.3
C		4.9	18.8
+15		5.2	18.5
W		5.7	18.0
	27+00		
W		4.4	19.3
+7		5.1	18.5
+15		5.0	18.7
C		4.6	19.1
+12		4.9	18.8
+15		3.8	19.9
+17		2.9	20.8
E		2.5	21.2
	27+50		
E		1.8	21.9
+13		2.3	21.4
+15		3.2	21.5
+18.5		4.7	19.0
C		4.4	19.3

23.67

+15		4.9	18 8
W		4.9	18 8 = 5T. on R.
	28+00		
W		2.8	20 9
+3		2.6	21 1
+6		4.6	19 1
+15		4.4	19 3
+30 = C		4.1	19 6
+11.5		4.3	19 4
+15		2.2	21 5
E		1.1	22 6
	28+50		
E		0.7	23 0
+13		1.5	22 2
+15		2.6	21 1
+18		3.9	19 8
C		3.7	20 0
+15		4.1	19 6
+23		4.1	19 6
+26		1.6	22 1
W		1.7	22 0
	29+00		
W		3.6	20 1
+15		3.9	19 8
C		3.4	20 3
+13		3.8	19 9

23.67

+15		2.8	20 9
+19		0.9	22 8
E		0.3	23 4
	29+50		
E		0.2	23 5
+14		0.5	23 2
+15		2.2	21 5
+17		3.3	20 4
C		3.1	20 6
+15		3.4	20 3
+21		3.4	20 3
+25		1.8	21 9
W		2.2	21 5
	30+00		
W		4.8	18 9
+15		2.8	20 9
+18		3.4	20 3
C		2.9	20 8
+13		3.0	20 7
+15		2.4	21 3
+20		1.5	22 2
E		1.2	22 5
	30+50		
E		1.8	21 9
+15		2.3	21 4
+17		2.8	20 9

		23.67			
+30 = C			2.9	20 8	
+11			3.3	20 4	
+13			2.7	21 0	
+15			3.6	20 1	
+20			6.0	17 7	
W			6.5	17 2	
		31+00			
+3 W			5.1	18 6	
+7			4.8	18 9	
+15			2.6	21 1	
+20			3.1	20 6	
C			2.7	21 0	
+15			2.4	21 3	
+17			2.0	21 7	
E			1.5	22 2	
		31+50			
E			0.0	23.7	
+13			1.1	22 6	
+15			2.0	21.7	
C			2.5	21.2	
+11			3.3	20 4	
+15			1.4	22 3	
+17			0.6	23.1	
W			1.1	22 6	
T.P.	3.3 W	2.6.29	1.90	21.97	unit to West of Apt in pole

25.29

This section taken on radius line	31+96.15	Δ	41°59' L	
W		3.7	22 1	
+4		3.0	22 3	
+9		5.6	19 7	
+17		5.0	20 3	
C		3.9	21 4	
+5		3.8	21 5	
+7		3.0	22 3	
+13		2.3	23 0	
+15		1.2	24 1	
+17		1.1	24 2	
+31 E		0.5	24 8	
	32+50			
E		1.8	23 5	
+7		2.3	23.0	
+8		4.0	21 3	
+15		5.6	19 7	
C		5.9	19 4	
+17		7.0	18 3	
+15		5.6	19 7	
+16		4.4	20 9	
W		5.0	20 3	
	33+00			
W		7.3	18 0	
+10		6.7	18 6	
+15		8.1	17 2	

+18		8.6	16 7
C		7.7	17 6
+15		7.6	17 7
E		4.9	20 4
	33+50		
chk. B.M.		3.0 ✓	22.25 = MoN P1 ox Stg 22.34 33+25
E		6.4	18 9
+11.9		9.0	16 3
+12		9.9	15 4
+15		9.6	15 7
C		9.6	15 7
+15		10.0	15 3
+19		9.6	15 7
+21		8.6	16 7
W		9.1	16 2
	34+00		
W		10.6	14 7
+15		11.2	14 1
+18		12.0	13 3
C		11.4	13 9
+15		11.6	13 7
+18		11.7	13 6
+20		10.3	15 0
+28		6.8	18 5
E		6.6	18 7

	34+25		
E		6.9	18 4
+4		8.0	17 3
+9		11.5	13 8
+12		12.6	12 7
+15		12.4	12 9
C		12.3	13 0
+13		12.5	12 5
+15		11.8	13 5
W		11.4	13 9
	34+50		
W		14.5	10 8
+15		13.0	12 3
C		13.2	12 1
+15		13.6	11 7
+19		12.4	12 9
E		9.8	15 5
T.P.	0.31 12.74	12.86	12.43 ✓
	34+80		
E		4.1	8 6
+12		3.1	9 6
+15		2.0	10 7
C		1.7	11 0
+13		2.0	10 7
+15		3.2	9 5
+20		5.8	6 9

12.74

W		6.7	6 0
	35+00		
W		8.1	4 6
+8		7.2	5 5
+15		4.4	8 3
+17		3.2	9 5
C		2.4	10 3
+15		2.5	10 2
+17		2.6	10 1
+23		5.9	6 8
E		5.2	7 5
	35+50		
E		7.5	5 2
+7		7.4	5 3
+13		4.0	8 7
+15		3.8	8 9
C		3.5	9 2
+18		4.2	8 5
+15		4.6	8 1
+21		7.6	5 1
W		8.8	3 9
	36+00		
W		9.0	3 7
+7		7.1	5 0
+15		5.8	6 9
+17		4.3	8 4

12.74

C		4.2	8 5
+15		4.6	8 1
+18		4.9	7 8
+23		7.7	5 0
E		8.6	4 1
	36+50		
E		9.0	3 7
+7		8.4	4 3
+13		5.2	7 5
+15		4.9	7 8
C		4.4	8 3
+13		5.1	7 6
+15		6.1	6 6
+21		8.3	4 4
W		9.5	3 2
	37+00		
W		9.2	3 5
+10		8.1	4 6
+15		5.6	7 1
+18		4.9	7 8
C		4.6	8 1
+15		4.7	8 0
+17		5.2	7 5
+23		8.6	3 9
E		9.4	3 3

	12.74		
	37+50		
E			
+7	9.3	3.4	
+13	8.4	4.3	
+15	5.4	7 3	
C	4.9	7 8	
+12	4.5	8 2	
+15	4.8	7 9	
+22	5.6	7 1	
W	8.1	4 6	
	8.8	3 9	X
	38+00		
W			
+7	8.5	4 2	
+15	8.0	4 7	
+17	4.9	7 8	
C	4.4	8 3	
+15	4.2	8 5	
+20	4.7	8 0	
~~W~~ E	7.3	5 4	
	9.2	3 5	
	38+39.09		
~~W~~ E	8.4	4 3	
+10	6.8	5 9	
+15	4.3	8 4	
C	4.1	8 6	
+12	4.5	8 2	
+15	5.4	7 3	

+22	7.7	5.0	BLVD. 60' WIDE
+30=W	8.6	4 1	BLVD 75' WIDE.
	39+00		
W	7.1	5 6	
+2	7.7	5 0	
+14	7.7	5 0	
+22.5	4.5	8 2	
+37.5=C	3.9	8 8	
+15	4.2	8 5	
+16	4.2	8 5	
+19	6.3	6 4	
+29	8.7	4 0	
+33	8.4	4 3	
+37.5 E	7.1	5 6	
	39+50		
E	6.7	6 0	
+3	8.1	4 6	
+11	7.5	5 2	
+18	5.9	6 8	
+21	4.2	8 1	
+22.5	4.1	8 6	
+37.5=C	3.8	8 9	
+15	4.6	8 1	
+22	7.2	5 5	
W	7.3	5 4	

12.74

		40+00		
W			7.1	56
+14			7.2	55
+22.5			4.9	78
+30			4.1	86
C			3.4	88
+15			4.2	85
+16.5			4.5	82
+21			6.8	79
+30			8.6	41
E			6.5	62
		40+50		
E			6.4	63
+14			7.1	56
+20			4.3	84
+22.5			4.2	85
C			3.8	89
+11			4.1	86
+15			4.5	82
+17			4.8	79
+22			6.9	58
W			7.0	57
		41+00		
W			6.6	61
+18			6.7	60
+22.5			4.3	84

C			3.7	90
+15			4.3	84
+20			7.0	57
E			7.1	56
T.P.	4.87	13.82	3.79	8.95
		41+25		
E			8.3	55
+15			7.9	59
+22.5			4.9	89
+24			4.4	94
C			4.3	95
+13.5			4.6	92
+15			5.3	85
+23			7.6	62
W			7.3	65
		41+34		
W			7.3	65
+11			7.4	64
+22.5			4.8	90
+26			4.5	93
C			4.1	97
+15			4.0	98
+24			8.1	57
+34.5 = E			8.8	50

13.8 ~

41+48 = 3 E. cor Bridge

E		10.0	3 8	
+22.5		10.7	3 1	
+23		5.3	7.5	Top Bkhd
+26		3.8	10.0	on bridge
C		3.9	9.9	
+10		3.9	9.9	
+23		7.4	6 4	
W		8.0	5 8	

41+54 = 5 W. cor Bridge

W		8.5	5 3	
+22.5		7.8	6 0	
+26		7.8	6 0	
+26	use for back sect. only	4.0	9.8	on bridge
C		8.4	5.4	below ✓
+15		10.0	3.8	✓ ✓
E		10.6	3.2	
T.P.	1.80	11.10	4.52	9.30 3 PK in No. Post ex Fence W. side of Br.

41+69

E		5.2	5 9	
+22.5		5.9	5 2	
+25		6.5	4 6	
+25	use for sect. abuts only	1.0	10.1	on Nose
C		6.8	4.3	below bridge
+10		8.6	4.6	below bridge
+15		8.0	3.1	
W		7.3	3.8	

41+75

W	7.6	3	5
+15.0	6.9	4	2
+22.5	6.0	5	1
+27	1.0	10	1
C	1.0	10	1
+12	1.2	9	9
+15	2.1	9	0
+23	4.2	6	9
+23.5	5.7	5	4
E	5.2	5	9

41+86.0

E	5.1	6	0
+12	5.3	5	8
+22.5	2.5	8	6
+25	1.6	9	5
C	1.4	9	7
+13	2.0	9	1
+15	2.8	8	3
+20	4.4	6	7
W	6.2	4	9

42+25

W	6.1	5	0
+19	5.1	6	0
+22.5	3.7	7	4
+24	3.1	8	0

11.10

C	2.7	84
+15	3.2	89
+18	5.2	59
E	5.0	61
43+00		
E	5.1	60
+17	5.8	53
+22.5	3.9	72
C	3.6	75
+15	4.4	67
+24	6.4	47
W	6.3	48
43+50		
W	6.3	48
+13	6.8	43
+22.5	4.7	64
C	4.1	70
+15	4.7	64
+27	5.6	55
E	5.3	58
44+00		
E	5.6	55
+22.5	4.9	62
C	4.4	67
+15	4.9	62
+26	6.9	42

11.1

W	6.6	45
45+00		
W	7.3	38
+12	7.0	41
+17	6.1	50
+22.5	5.6	55
C	5.1	60
+15	5.5	56
+26	6.1	50
E	5.7	54
46+00		
E	6.6	45
+10	7.0	41
+22.5	6.5	46
C	6.3	48
+15	6.6	45
+28	7.8	33
W	7.5	36
47+00		
W	8.0	31
+12	7.8	33
+18	7.0	41
+22.5	7.6	35
C	7.2	39
+15	7.7	34
+19	7.4	37

	11.10		
E		7.4	37
	47+50		
E		8.6	25
+6		8.8	23
+22.5		8.2	29
C		7.3	38
+15		7.8	33
+20		7.7	34
+37.5=W		8.2	29
	48+00		
W		8.4	27
+22.5		8.1	30
C		7.6	35
+15		8.1	30
+18		8.1	30
+22		9.5	16
+30		9.3	19
E		6.9	42
	48+50		
E		7.8	33
+7		10.2	09
+16		10.1	10
+21		8.0	31
+22.5		8.2	29
C		8.0	31
+15		8.0	31
+18		9.0	21
W		8.7	24
	49+00		
W		9.1	20
+15		9.2	19
+22.5		8.6	25
C		8.4	27
+15		8.6	25
+23		11.0	01
+28		10.9	02
E		9.2	1.9
	49+50		
E		10.4	07
+5		10.9	02
+15		10.6	05
+22.5		8.8	23
C		8.5	26
+15		8.2	29
+19		8.3	28
+23		10.1	10
W		9.3	18
	50+00		
W		10.2	09
+15		10.3	08
+22.5		7.6	35
C		8.2	29

+15			9.1	2 0
+21			9.1	2.0=edge road
+23			10.1	1 0
E			10.6	0 5
new B.M.	10.29	11.79	8.60	2.50 spk in pole Rt of Sta 50+85
Taken on Radius line		50+21.08	Δ 36°14½' Rt	
E			12.2	0 6
+13			11.1	1.7 edge road
+23.5			10.6	2 2
C			9.6	3 2
+9			9.2	3 6
+15			12.1	0 7
W			11.6	1 2
		50+50		
W			12.7	0 1
+15			12.5	0 3
+22.5			9.5	3 3
+37.5=C			9.8	3 0
+15			10.6	2 2
+19			10.8	2 0
+24			11.6	1 2
E			11.6	1 2
		51+00		
E			10.3	2 5
+22.5			9.9	2 9
C			9.6	3 2

+10		9.3	3 5
+15		9.4	3 4
+19		9.9	2 9
+24		12.3	0 5
W		13.0	- 0 2
	51+50		
W		11.9	0 9
+15		10.6	2 2
+22.5		9.2	3 6
C		8.9	3 9
+13		8.4	4 4
+15		8.8	4 0
+24		7.9	4 9
E		7.3	5 5
	52+00		
E		4.2	8 6
+14		5.5	7 3
+17		7.9	4 9
+22.5		8.4	4 4
C		8.1	4 7
+15		8.3	4 5
+24		8.8	4 0
W		9.8	3 0
	52+50		
W		8.8	4 0
+13		7.3	5 5

	IN.79		
+22.5		7.6	52
C		7.2	55
+15		7.9	49
+18		7.8	50
+23		2.4	104
E		1.2	116
	53+00		
E		+0.3	131
+15		1.7	111
+19		7.1	57
+22.5		7.3	55
C		6.4	64
+15		6.7	61
+22		6.6	62
+25		8.0	48
W		9.8	30
	53+50		
W		10.6	22
+8		9.6	36
+16		6.6	62
+22.5		6.5	63
C		6.1	67
+15		6.7	61
+19		5.7	71
+22		1.0	118
E		+1.2	140

		Morena	49
54+00			
E		+1.9	147
+16		-1.0	118
+20		5.7	71
+22.5		6.4	64
C		5.9	69
+15		6.4	64
+20		6.5	63
+26		9.5	33
W		10.5	23
54+50			
W		10.0	28
+15		8.4	44
+22.5		6.2	66
C		5.5	73
+15		5.8	70
+17		5.6	72
+25		0.3	125
E		+1.9	147
55+00			
E		+2.3	151
+16		1.0	118
+20		4.5	83
+22.5		5.1	77
C		4.9	79
+15		5.5	73

		17.79		
+22			9.8	30
W			11.8	10
		55+50		
W			12.0	08
+15			10.1	27
+23			4.6	82
C			4.1	87
+15			4.3	85
E			+3.8	166
		55+99.37 = PC, 3° R.		
E			+6.1	189
+18			1.9	109
+22.5			2.8	100
C			2.6	102
+14			2.9	99
+15			4.2	86
+22			9.0	38
W			12.0	08
T.P.	12.37	24.53	0.63	12.16
		56+50		
-20	SECTIONS FROM HERE ON ARE TAKEN ON 30' ROAD ONLY ON ACCOUNT OF NOT STAYING IN THE CENTRE OF R.O.W.		22.4	21
-10			20.9	36
W line of 30'			14.4	101
+20			13.0	115
HS=C			12.5	120
E			12.7	118

	27.53	
	57+00	
E line of 30'	11.1	134
+3	10.6	139
HSC	10.6	139
+26	10.7	138
+30 = W	14.0	105
+9	19.0	55
+30	21.1	34
	57+50	
-20	19.9	46
-8	17.5	70
W	13.3	111
+6	8.3	162
+15 = C	8.1	164
E	8.6	159
	57+85	
E	6.4	181
+15	6.4	181
+21	6.8	177
+23	6.5	180
+30 = W	12.0	124
+14	14.9	96
+15	17.3	71

58+21.62 = P.C. of 500' Rad. curve

-14	13.7	108
-7	12.2	123
W	7.9	166
+4	4.5	200
+8	4.2	202
+10	4.7	198
+15	4.5	200
+30 = E	4.9	196
58+50		
E	4.0	205
+6	3.7	208
+15	3.8	207
+20	4.0	205
+21	3.4	211
+27	4.2	203
+30 = W	5.8	187
+9	9.2	153
59+00		
-2	5.1	194
W	3.3	212
+6	2.6	219
+8	3.3	212
+15	3.0	215
+23	2.9	216
+30 = E	3.1	214

59+50			
E	2.8	217	
+15	2.5	220	
+25	2.6	219	
+30 = W	1.6	229	
60+00			
W	2.4	221	
+15	2.6	219	
+26	2.9	216	edge road
+30 = E	1.2	233	
60+10			
E	+4.7	~~+98~~ 29.2	
+2	1.8	227	
+5	3.1	214	
+15	2.8	217	
+30 = W	2.4	221	
60+25			
W	2.6	219	= edge road
+15	3.1	214	
+23	3.0	215	edge
+25	2.2	223	
+30 = E	+3.9	284	
T.P. 5.78	28.54 ✓	1.77	22.76 on Mon Left of Sta 59+00
60+49.31 = E.C.			
E	1.1	274	
+4	1.4	271	

		2.854			
+8			6.5	22	0
+11			7.5	21	0
+15.0			7.6	20	9
+24			7.0	21	5
+30 = W.			7.0	21	5
T.P.	2.42	25.18 ✓	5.78	22.76 ✓	
		61+00			
W			4.5	20	7 ctr road
+15			5.0	20	2
+20			5.1	20	1
+26			0.8	24	4
E			0.2	25	0
+10			+0.8	26	0
		61+50			
-10			2.5	22	7
E			3.2	22	0
+2			4.9	20	3
+9			5.2	19	8
+10			6.0	19	2
+15			5.7	19	5
+30 = W			5.5	19.7	ctr travel.
		61+75			
W			6.1	19.1	ctr travel.
+15			6.2	19	0
+22			6.5	18	7
+23			6.1	19	1

Morena

		2518			
+30 = E			5.6	19	6
+5			5.3	19	9
+10			4.1	21	1
		62+00			
-10			5.6	19	6
E			6.6	18	6
+7			7.0	18	2
+15			6.7	18	5
+30 = W			6.8	18	4
T.P.	1.16	18.72 ✓	7.62	17.56 ✓	
		62+50			
W			1.5	17	2
+15			1.3	17	4
+19			1.6	17	1
+26			1.3	17	4
+28			0.1	18	6
+30 = E			0.0	18	7
+10			0.2	18	5
		63+00			
-10			0.6	18	1
E			0.8	17	9
+1			1.0	17	7
+2.5			2.1	16	6
+4			2.2	16	5
+15			1.9	16	8
+30 = W			2.3	16	4

	63+50		
W		2.8	159
+15		2.1	163
+26		3.0	157
+30=E		1.7	170
+10		1.7	170
	64+00		
-10		1.8	169
E		2.5	162
+3		2.8	159
+4		3.7	150
+15		3.0	157
+30=W		3.1	156
	64+50		
W		3.9	148
+15		3.7	150
+24		4.2	145
+26		4.0	147
+27		3.0	157
+30=E		2.9	158
+10		2.8	159
	64+80		
-10		3.2	155
E		4.1	146
+6		4.5	142
+15		4.2	145

+30=W		4.3	144
	65+00		
W		4.6	141
+8		4.3	144
+15		4.5	142
+30=E		4.4	143
+10		3.6	151
	65+12		
-10		3.3	154
E		3.7	150
+5		4.7	140
+15		4.6	141
+21		4.4	143
+30=W		4.7	140
	65+50		
W		4.9	138
+15		4.5	142
+25		4.8	139
+28		3.8	149
+30=E		3.8	149
+10		3.7	150
	66+00		
-10		3.8	149
E		3.8	149
+5		5.1	136
+15		4.7	140

	18.72		
+30 = W		5.2	13 5
	66+50		
W		5.1	13 6
+15		4.7	14 0
+25		5.2	13 5
+30 = E		3.9	14 8
+10		3.8	14.9
	67+00		
-10		4.0	14 7
E		4.3	14 4
+5		5.5	13 2
+15		5.1	13 6
+30 = W		5.4	13 3
	67+50		
W		5.6	13 1
+15		5.2	13 5
+25		5.6	13 1
+28		4.4	14 3
+30 = E		4.4	14 3
+10		4.4	14 3
	68+00		
-10		4.5	14 2
E		4.6	14 1
+4		4.6	14 1
+4		5.6	13 1
+15		5.3	13 4

	18.72		
+30 = W		5.8	12.9
	68+50		
W		5.9	12 8
+15		5.4	13 3
+27		5.7	13 0
+28		4.7	14 0
+30 = E		4.6	14 1
+10		4.5	14 2
	69+00		
-10		4.7	14.0
E		4.7	14.0
+2		4.6	14.1
+3		5.9	12.8
+15		5.4	13 3
+30 = W		5.8	12 9
	69+50		
W		5.8	12 9
+15		5.6	13 1
+25		6.0	12 7
+26		5.0	13 7
+30 = E		4.5	14 2
+10		4.3	14 4
T.P. 2.15	17.31	3.56	15 1.6 Mon. S.E. cor. Moreno Tract.
	69+61		
-10.5		3.5	13 8
E		3.8	13 5

+6		4.7	12 6
+15		4.3	13 0
+30=W		4.4	12 9
	69+62		
W		4.4	12 9
+15		4.3	13 0
+45		4.7	12 6
+30=E		3.9	13 4
+50		4.0	13.3
+10.5		2.2	15 1
	69+66		
-10.5		1.9	15 4
-3		2.7	14 6
E		4.2	13 1
+6		4.6	12 7
+15		4.3	13 0
+30=W		4.4	12 9
	69+71		
W		4.4	12 9
+15		4.3	13 0
+45		4.4	12 9
+46		2.3	15 0
+30=E		2.1	15 2
+10.5		2.0	15 3
	70+00		
-10.5		2.0	15 3

E		2.1	15 2
+4		2.5	14 8
+7		4.9	12 4
+15		4.3	13 0
+30=W		4.4	12 9
	70+50		
W		4.5	12 8
+15		4.5	12.8
+25		4.9	12.4
+27		2.1	15.2
+30=E		1.9	15.4
+10.5		1.6	15.7
	71+00		
-10.5		1.6	15.7
E		1.5	15.8
+4		2.6	14 7
+6		5.0	12 3
+15		4.6	12 7
+30=W		4.9	12 4
	71+50		
W		5.0	12 3
+15		4.7	12 6
+20		4.7	12 6
+24		5.3	12 0
+27		4.0	15 3
+30=E		1.8	15 5
+10.5		1.6	15 7

72+00

-10.5	1.8	155
E	2.0	153
+3	2.2	151
+6	5.6	117
+10	5.2	121
+15	5.2	121
+21	5.0	123
+30=W	5.4	119

72+50

W	5.6	117
+10	5.3	120
+15	5.4	119
+17	5.4	119
+24.5	6.0	113
+27	2.9	144
+30=E	2.5	148
+10.5	2.6	147

73+15

-10.5	1.9	154
E	2.3	150
+3	2.9	144
+6	6.5	108
+13	5.8	115
+15	5.8	115
+21	5.8	11.5

+30=W	6.3	110

73+50

W	6.6	107
+9	6.1	112
+15	6.3	110
+17	6.2	111
+24	6.7	106
+27	3.8	195
+30=E	3.4	139
+10.5	2.9	144

74+00

-10.5	4.0	133
E	4.8	125
+2	5.2	121
+4	6.8	105
+12	6.4	109
+15	6.5	108
+20	6.5	108
+30=W	7.0	103

74+50

W	6.9	104
+9	6.5	108
+15	6.7	106
+18	6.6	107
+29	6.8	105
+30=E	5.4	119
+10.5	5.4	119

17.31

75+14.5 = 12" concrete pipe

-10.5		7.9	9 4
E		8.1	9 2
+2		8.2	8.9 = End of pipe flowline
+5		6.8	10.5
+15		6.9	10 4
+21		6.8	10 5
+30 = W		7.2	10 1
+12.7		10.0	7.3 = Flow line N. end pipe

75+50

W		7.2	10 1
+8		6.8	10 5
+15		6.9	10 4
+24		6.8	10 5
+30 = E		7.0	10 3
+10.5		6.2	11.1
T.P.	4.53	15.03	10.50

75+65

-10.5		3.6	11 4
E		4.2	10 8
+5		4.5	10 5
+6		4.8	10 2
+15		4.7	10 3
+22		4.6	10 4
+30 = W		5.0	10 0

15.03 Morena

76+05

W	4.8	10 2
+8	4.7	10 3
+15	4.9	10 1
+23	5.2	9 6
+24	4.9	10 1
+30 = E	4.8	10 2
+10.5	4.6	10 4

76+50

-10.5	4.1	10 9
E	4.4	10 6
+5	4.8	10 2
+6	5.2	9 6
+9	5.0	10 0
+15	4.8	10 2
+24	4.6	10 4
+30 = W	4.8	10 2

77+00

W	4.7	10 3
+7	4.5	10 5
+15	4.8	10 2
+22	4.8	10 2
+25	5.2	9.8
+26	4.6	10 4
+30 = E	4.3	10 7
+10.5	3.6	11 4

15.03

77+50		
-10.5	3.5	11 5
E	4.5	10.5
+6	5.1	9 9
+15	4.7	10 3
+20	4.5	10.5
+30=W	4.9	10 1
78+00		
W	5.0	10 0
+8	4.7	10 3
+15	4.8	10 2
+24	5.1	9 9
+30=E	4.6	10 4
+ +10.5	4.3	10 7
78+50		
-10.5	4.3	10 7
E	4.9	10 1
+4	5.1	9 9
+5	5.5	9 5
+15	5.0	10 0
+23	4.8	10 2
+30=W	5.1	9 9
79+00		
W	5.0	10 0
+8	4.7	10 3
+15	4.8	10 2
+23	5.3	9 7
+24	4.9	10 1
+30=E	5.1	9 9
+10.5	4.6	10 4
79+50		
-10.5	4.5	10 5
E	4.6	10 4
+7	4.6	10 4
+8	4.9	10 1
+15	4.7	10 3
+22	4.5	10 5
+30=W	4.8	10 2
80+00		
W	4.5	10 5
+7	4.4	10 6
+15	4.5	10 5
+21	4.4	10 6
+30=E	4.3	10 7
+10.5	4.0	11 0
80+50		
-10.5	3.8	11 2
E	4.1	10 9
+7	4.5	10 5
+15	4.3	10 7
+23	4.1	10 9
+30=W	4.3	10 7

15.03

81+00			
W	4.0	11	0
+4	3.8	11	2
+15	4.0	11	0
+25	4.3	10	7
+27	3.5	11	5
+30=E	3.3	11	7
+10.5	2.8	12	2
81+50			
-10.5	1.7	13	3
E	2.2	12	8
+2	2.2	12	8
+5	4.2	10	8
+15	4.0	11	0
+27	3.7	11	3
+30=W	4.0	11	0
81+93			
W	3.9	11	1
+8	3.7	11	3
+15	4.0	11	0
+23	4.1	10	9
+26	3.1	11	9
+27	1.3	13	7
+30=E	1.4	13	6
+10.5	1.1	13	9

82+50			
-10.5	3.5	11	5
E	3.7	11	3
+7	3.9	11	1
+15	3.8	11	2
+22	3.6	11	4
+30=W	3.8	11	2
83+00			
W	3.7	11	3
+6	3.5	11	5
+15	3.7	11	3
+23	3.9	11	1
+26	2.0	13	0
+30=E	1.8	13	2
+10.5	1.0	14	0
83+35			
-10.5	0.3	14	7
E	0.8	14	2
+2	0.8	14	2
+6	3.1	11	9
+8	3.6	11	4
+15	3.6	11	4
+22	3.4	11	6
+30=W	3.7	11	3

15.03

84+00

W	3.8	11	2
+6	3.6	11	4
+15	3.7	11	3
+23	3.8	11	2
+25	2.8	12	2
+27	1.4	13	6
+30 = E	1.4	13	6
+10.5	0.7	14	3

84+50

-10.5	1.0	14	0
E	1.6	13	4
+4	1.7	13	3
+6	4.3	10	7
+15	4.1	10	9
+24	3.9	11	1
+30 = W	4.2	10	8

85+00

W	4.3	10	7
+6	4.1	10	9
+15	4.3	10	7
+22.5	4.5	10	5
+27	1.9	13	1
+30 = E	1.9	13	1
+10.5	1.5	13	5

85+69.01 = 32 Milton St.

-10.5	1.5	13	5
E	1.9	13	1
+3	2.3	12	7
+7	4.6	10	4
+15	4.4	10	6
+22	4.3	10	7
+30 = W	4.5	10	5
TP 3.50 14.00	4.53	10	50

86+10

W	3.7	10	3
+9	3.5	10	5
+15	3.6	10	4
+22	3.7	10	3
+30 = E	1.6	12	4
+10.5	1.7	12	3

86+17

-10.5	3.1	10	9
E	3.4	10	6
+8	3.6	10	4
+15	3.7	10	3
+22	3.5	10	5
+30 = W	3.7	10	3

86+30

W	4.0	10	0
+9	3.7	10	3 = ctr Trail

14.00

+15	3.9	10	1
+21	3.8	10	2
+25	1.7	12	3
+30 = E	1.7	12	3
+10.5	1.6	12	4
87+00			
-10.5	1.8	12	2
E	1.9	12	1
+4	2.0	12	0
+9	4.2	9	8
+15	4.2	9	8
+21	4.0	10.0	ctr travel
+30 = W	4.2	9	8
87+50			
W	4.2	9	8
+9	4.0	10.0	ctr travel
+15	4.2	9	8
+21	4.4	9	6
+26	2.3	11	7
+30 = E	2.2	11	8
+10.5	2.1	11	9
88+00			
-10.5	3.5	10	5
E	3.0	11	0
+4	3.1	10	9
+9	4.5	9	5

14.0

+15	4.2	9	8
+22	4.1	9	9 ctr travel
+30 = W	4.3	9	7
88+50			
W	4.5	9	5
+8	4.3	9	7 ctr travel
+15	4.4	9	6
+21	4.6	9	4
+21.1	4.0	10	0
+30 = E	4.0	10	0
+10.5	4.2	9	8
89+00			
-10.5	5.0	9	0
-1	4.9	9	1
E	4.2	9	2
+5	4.3	9	7
+6	4.7	9	3
+15	4.6	9	4
+23	4.5	9	5 ctr travel
+30 = W	4.7	9	3
89+50			
W	4.9	9	1
+7	4.7	9	3
+15	4.8	9	2
+19	4.9	9	1
+21	4.2	9	8

	14.0		
+30 = E	4.6	94	
+10	4.9	91	
+10.5	5.0	90	
	90+00		
-10.5	4.2	98	
-7	4.7	93	
-5	5.1	89	
E	4.2	98	
+8	4.4	96	
+10	4.9	91	
+15	4.9	91	
+21	5.0	90	
+30 = W	5.2	88	
	90+50		
W	5.2	88	
+15	5.1	89	
+20	5.3	87	
+22	4.3	97	
+30 = E	4.0	100	
+5	5.2	88	
+7	4.4	96	
+10.5	4.4	96	
	91+00		
-10.5	4.8	92	
-7	4.9	91	
-5	4.6	94	
E	4.7	93	
+8	4.8	92	
+10	5.4	86	
+15	5.3	87	
+30 = W	5.3	87	
	91+50		
W	5.5	85	
+15	5.4	86	
+20	5.5	85	
+22	5.1	89	
+30 = E	5.3	87	
+5	6.1	79	
+7	5.6	84	
+10.5	5.4	86	
	92+00		
-10.5	5.8	82	
-5	6.4	76	
E	5.4	86	
+8	5.2	88	
+9	5.8	82	
+15	5.5	85	
+30 = W	5.6	84	
	92+50		
W	5.6	84	
+15	5.4	86	
+20	5.6	84	
+21	5.2	88	

		14.0		
+30 = E			5.2	88
+4			6.9	71
+10.5			6.3	77
		92+65		
-10.5			6.1	79
-5			7.0	70
E			6.1	79
+9			5.2	88
+10			5.7	83
+15			5.5	85
+30 = W			5.6	84
		92+67.3	= 2 ox 24" concrete pipe	
-7.8 = West end pipe			9.10	4.9 = flow line outlet
W			5.6	84
+15			5.6	84
+20			5.7	83
+21			5.2	88
+25 = east end pipe			5.3 8.10	87 5.9 = flow line
+30 = E			7.6	64
+4			7.2	68
+10.5			6.3	77
		92+70		
-10.5			6.3	77
-4			7.2	68
E			6.4	76
+5			5.2	88

			Moreno	83
+9			5.1	89
+10			5.7	83
+15			5.6	84
+30 = W			5.6	84
		93+00		
W			5.7	83
+9			5.6	84
+15			5.7	83
+20			5.8	82
+21			5.3	83
+29			5.9	81
+30 = E			6.4	76
+3			6.6	74
+10.5			5.9	81
T.P.	7.12	15.45	5.67	8.33
		93+50		
-10.5			6.8	87
E			7.0	85
+2			7.5	80
+4			7.2	83
+5			6.5	90
+10			6.6	89
+11			7.3	82
+15			7.2	83
+30 = W			7.4	81

15.45

94+00

W		7.2	83
+9		7.0	85 ctr travel
+15		7.1	84
+19		7.3	82
+20		6.6	89
+22		6.5	90
+23		7.2	83
+26		7.2	83
+29		6.2	83
+30 = E		5.9	86
+10.5		6.2	83

94+30

-10,5		6.6	79
E		6.8	77
+15		6.9	76
+21		6.8	77
+30=W		7.1	84

94+86.10 = P.C.

W		6.9	86
+8		6.5	90
+15		6.6	89
+23		6.8	87
+24		6.3	92
+30=E		5.9	96
+10.5		5.9	96

95+00

E		6.3	92
+10		6.8	87
+15		6.7	88
+21		6.5	90
+30=W		6.8	87

95+50

W		6.3	92
+8		6.1	94 ctr. Travel
+15		6.3	92
+21		6.5	90
+26		4.9	106
+30=E		4.9	106

96+00

E		3.6	119
+3		3.8	117
+5		5.3	102
+9		6.2	93
+15		5.9	96
+20		5.8	97
+30=W		6.0	95

96+50

W		5.5	100
+11		5.2	103
+15		5.4	101
+23		5.6	99

15.45

+23.1		5.1	10 4
+27		4.7	10 8
+30 = E		3.8	12 7
+5		3.5	13 0
	97+00		
-5		2.1	13 4
E		3.8	11 7
+3		4.4	11 1
+3.1		5.2	10 3
+15		4.6	10.9 ctr travel
+30 = W		4.9	10 6
	97+50		
W		3.9	11 6
+4		4.2	11 3
+15		4.1	11 4
+21		4.1	11 4
+30 = E		4.6	10 9
+3		3.9	11 9
	98+00		
-4		4.1	11 4
E		3.8	11 7
+8		3.4	12.1 ctr travel
+15		3.6	11.9
+21		3.6	11 9
+25		3.4	12 1
+30 = W		3.6	11 9

15.45 Morena 85

98+50			
-5		3.6	11 9
W		3.2	12 3
+7		3.7	12 8
+15		3.0	12 5
+20		3.2	12 3
+30 = E		2.9	12 6
99+00			
E		2.2	13 3 ctr travel
+12		2.5	13 0
+15		2.2	13 3
+30 = W		3.0	12.5
+5		3.5	12 0
chk B.M.		4.27	11.18 = 11.33 correct. MON inside ROW Fence SW Jellet + Morena
99+50			
-5		2.4	13 1
W		1.8	13 7
+6		1.2	14 1
+15		1.5	14 0
+22		1.8	13 7
+30		1.5	14 0 ctr travel
99+80.59 = E.C.			
E		1.1	14 4
+7		1.4	14 1
+15		1.1	14 4
+22		0.8	14 7

15.45

+30=W			1.6	139
+5			1.7	138
+8		✓	4.1	144
T.P.	7.64	18.82	4.27	11.18
		100+25		
-10			6.9	119
-2			6.4	124
W			4.2	146
+7			3.5	153
+15			3.6	152
+22			3.5	153
+27			4.0	148
+30=E			3.9	149
		100+50		
E			3.6	152
+6			2.9	159
+15			3.2	156
+28			3.5	153
+30=W			6.2	126
+10			6.7	121
		101+00		
-6			6.2	126
W			6.1	127
+4			5.4	134
+7			2.8	160
+15			2.7	161
+29			2.4	164

+30=E	2.8	160	
+1	3.1	157	
+5	3.1	157	
101+25.00			
-5	2.9	159	
E	2.2	166	
+15	2.6	162	
+22	2.7	161	
+27	5.0	138	
+30=W	6.0	128	
+5	6.1	127	
101+50			
-5	5.8	130	
W	5.8	130	
+5	5.4	134	
+10	3.2	156	
+15	3.4	154	
+25	2.8	160	
+30=E	2.1	167	
+5	2.8	160	
102+00			
-5	2.7	161	
E	3.3	155	
+15	3.6	152	
+19	3.6	152	
+21	4.6	144	

	188+2		
+26		5.4	134
+30 = W		5.5	133
+5		5.5	133
	102+50		
-5		5.3	135
W		5.2	136
+15		4.4	144
+21		3.6	152
+30 = E		3.2	156
+5		3.0	158
	103+00		
-5		3.3	155
E		3.3	155
+5		3.4	154
+15		4.4	144
+17		4.6	142
+30 = W		4.8	140
+5		5.1	137
	103+19		
-5		10.9	79
W		4.6	142
+15		4.1	147
+30 = E		3.3	155
+5		3.7	151
	103+25		
-5		3.9	149

E		3.6	152
+15		4.4	144
+26		4.7	141
+28		9.8	90
+30 = W		10.0	88
+5		11.5	73
+15		12.0	58
	103+27		
-15		13.0	58
-5		11.9	69
W		10.3	85
+2		9.9	89
+4		6.2	126
+8		4.6	142
+15		4.6	142
+24		4.4	144
+25		6.1	127
+30 = E		7.4	114
+5		7.1	117
	103+37		
-5		6.6	122
-4		6.2	126
E		6.6	122
+9		7.5	113
+10		6.1	127
+15		6.4	124

		18.82			
+20			7.0	11	8
+30± W			13.2	5	6
+10			12.4	6	4
+15			10.5	8	3
		103+41			
-15			10.2	8	6
-7			12.0	6	8
W			11.5	7	3
+4			11.8	7	0
+4.1			12.2	6	6
+9			13.0	5	8
+15			6.7	12	1
+NW			9.3	9	5
+30=E			8.4	10	4
+10			8.1	10	7
T.P.	3.22	14.49	4.55	16 27	
		103+45			
-10			8.6	10	9
E			8.7	10	7
+8			10.4	9	1
+13			9.4	10	1
+15			13.2	6	3
+21			13.6	5	9
+NN			12.2	7	3
+30=W			11.2	8	3
+5			11.1	8	4

+6	9.1	10	4
+10	9.9	9	6
103+49			
-10	9.2	10	3
-5	8.0	11	5
-4	10.8	9	0
W	10.9	8	6
+5	11.1	8	4
+6	9.1	10	4
+13	9.8	9	7
+15	14.3	5	2
+21	13.3	6	2
+21.1	10.5	9	0
+30=E	10.0	9	5
+8	8.9	10	6
103+52			
-8	9.0	10	5
E	10.0	9	5
+7	10.6	9	9
+7.1	13.7	5	8
+15	9.2	10	3
+16	7.9	11	6
+WW	8.2	11	3
+W6	10.2	9	3
+30=W	9.8	9	7
+1	6.9	12	7
+7	7.9	11	6

19.49

	103+64		
-10		8.6	109
-6		7.7	118
-3		5.8	137
W		5.3	142
+1		7.8	117
+6		7.1	124
+15		7.4	121
+30=E		11.4	81
+10		10.8	87
	103+68		
-10		9.5	100
E		10.1	94
+1		8.7	108
+8		5.6	139
+12		6.8	127
+15		6.8	127
+27		6.5	130
+30=W		5.1	144
+8		8.1	114
	103+85.82 = P.C.		
-8		6.8	127
W		5.0	145
+7		5.1	144
+15		4.4	151
+17		3.8	157
+21		3.8	157
+26		5.7	138
+30=E		10.0	95
+05		10.2	93
+10		8.5	110
	104+00		
-10		4.7	148
-4		8.8	107
E		5.2	143
+4		5.0	145
+8		3.8	167
+14		3.9	166
+15		4.7	148
+30=W		4.8	147
+5		5.7	138
	104+15		
-5		5.7	138
W		4.6	149
+15		4.5	150
+20		4.1	154
+30=E		4.9	146
+5		4.7	148
	104+50		
-5		4.8	147
E		4.9	146
+14.5		4.7	148

19.49

+15	4.2	153	
+30=W	4.7	148	
+5	5.5	140	
105+00			
-5	5.7	138	
-2	4.1	154	
W	4.0	155	
+15	4.0	155	
+30	4.5	151	
+30=E	4.3	152	
+5	4.3	152	
105+15			
-5	3.2	163	
E	3.5	161	
+15	3.8	157	
+30=W	3.9	156	
+2	4.2	153	
+5	5.9	136	
105+50			
-5	5.5	140	
-2	3.6	159	
W	3.5	160	
+15	3.1	164	
+17	2.9	171	
+20	3.2	173	
+27	3.0	165	

+30=E	3.0	165	
+5	2.9	166	
106+00			
-5	2.2	193	
E	2.2	173	
+6	1.6	179	
+10	1.6	179	
+15	2.5	171	
+30=W	2.7	168	
+2	2.9	166	
+5	4.8	147	
106+50			
-5	3.5	160	
-2	2.2	173	
W	1.8	177	
+15	1.5	181	
+25	0.8	187	
+30=E	0.8	187	
+5	0.7	188	
TP 9.33 28.61 ✓	0.21	19.28	cntrib 107+00.49
106+70			
-5	9.7	189	
E	9.6	190	
+15	10.1	185	
+30=W	10.8	178	
+5	10.9	187	
107+00			
-5	9.7	199	
-2	9.1	195	
-1.9	10.1	185	
W	10.1	185	
+15	9.8	188	

28.61

+26		9.4	192
+30=E		7.6	212
+5		7.0	216
	107+50		
-5		5.8	228
E		6.2	224
+2		6.4	222
+4		8.5	201
+7		9.1	195
+15		8.9	197
+30=W		9.6	192
+3		9.1	195
+5		7.6	210
	108+00		
-5		6.3	223
-3		6.6	222
-2		8.3	203
W		8.5	201
+15		8.2	204
+21		8.7	199
+24		8.0	206
+28		4.6	242
+30=E		4.1	245
+5		3.8	248
	108+50		
-5		2.9	257
E		3.3	253
+6		7.0	216
+9		7.9	207
+15		8.0	206
+30=W		7.7	209
+2.5		7.4	212
+3.5		5.7	229
+5		5.2	234
	109+00		
-5		4.9	237
-3		5.1	235
-2		6.8	218
W		7.1	215
+13		7.0	216
+15		7.3	213
+25		6.8	218
+30=E		3.3	253
+5		1.9	267
	109+50		
-5		1.8	268
E		2.6	264
+6		6.8	218
+9		7.1	215
+15		6.4	222
+19		6.2	224
+30=W		6.5	221
+4.5		6.2	224

28.61

+3		4.7	239
+5		4.8	238
	110+00		
-5		5.4	232
-3		5.9	227
W		5.9	227
+12		5.7	229
+15		6.4	222
+19		6.9	217
+25		6.0	226
+30=E		2.8	258
+5		2.6	260
	110+50		
-5		2.4	262
E		5.0	255
+3		5.5	231
+10		6.4	222
+15		5.6	230
+18		4.9	237
+30=W		4.7	239
+5		5.4	232
	111+00		
-5		5.3	233
-2		4.0	245
W		3.8	248
+12		3.9	247
+15		4.9	237
+20		5.8	228
+29		4.6	240
+30=E		3.6	250
+4		2.0	265
+5		1.7	269
	111+50		
-5		1.6	270
E		2.1	265
+2		4.3	243
+6		5.0	235
+12		4.8	238
+15		4.0	246
+19		3.4	252
+30=W		3.5	251
+5		5.4	232
	112+00		
-5		5.2	234
W		3.0	256
+13		2.6	260
+15		3.3	253
+18		4.1	245
+29		4.0	246
+30=E		2.5	261
+5		1.7	269

		28.61			
		112+50			
-5			2.0		26 6
-2			2.3		26 3
E			3.4		25 2
+13			3.3		25 3
+15			2.9		25 7
+17			2.1		26 5
+30=W			2.3		26 3
+2			2.8		25 8
+5			4.7		23 9
		113+00			
-5			5.7		22 9
W			2.0		26 6
+16			1.1		27 5
+15			1.7		26 9
+16			2.4		26 2
+30=E			2.3		26 3
+5			2.2		26 4
		113+50			
-5			0.8		27 8
E			1.3		27 3
+15			1.3		27 3
+16			0.5		28 1
+30=W			0.6		28 0
+5		✓	4.3	✓	24 3
T.P.	11.34	39.67	0.28	28.33	
		114+00			
-5			12.5		27 2
-3			11.1		28 6
W			10.6		29 1
+13			10.5		29 2
+15			11.7		28 0
+30=E			11.8		27 9
+5			9.7		30 0
		114+50			
-5			9.3		30 4
-2			10.9		28 8
E			10.8		28 9
+15			11.0		28 7
+17			9.8		29 9
+30=W			10.2		29 5
+5			12.9		26 8
		115+00			
-5			12.4		27 3
W			9.6		30 1
+14			9.0		30 7
+15			10.0		29 7
+30=E			9.5		30 2
+5			8.7		31 0

	39.67		Moreno
	115+50		
-5	8.5	31 2	
E	8.6	30 9	
+15	8.9	30 8	
+30=W	8.5	31 2	
+5	11.0	28 7	
	116+00		
-5	8.9	30 8	
W	7.8	31 9	
+13	7.6	32 1	
+15	7.0	32 7	
+24	7.4	32 3	
+27	5.7	34 0	
+30=E	5.4	34 3	
+5	5.0	34 7	
	116+50		
-5	2.8	36 9	
E	3.1	37 6	
+3	3.5	36 2	
+5	6.1	33 6	
+11	5.5	34 2	
+15	6.0	33 7	
+17	6.6	33 1	
+30=W	6.7	33 0	
+5	8.0	31 7	
	116+94		
-5	6.9	32.8	
-2	5.9	33 8	
W	5.9	33 8	
+12	5.6	34 1	
+15	5.0	34 7	
+17	4.4	35 3	
+21	4.9	34 8	
+24	4.6	35 1	
+30=E	2.1	37 6	
+5	0.7	39.0	
	117+10		
-5	+0.2	39.9	
E	0.1	39.6	
+2	0.4	39.3	
+5	4.0	35 7	
+8	4.6	35 1	
+12	3.9	35 8	
+15	4.6	35 1	
+18	5.2	34 5	
+30=W	5.3	34 4	
+5	5.8	33 9	
	117+35		
-5	5.5	34 2	
W	4.8	34 9	
+15	4.5	35 2	
+18	3.6	36 1	
+22	4.3	35 4	

		39.67			
+26			3.3	36 4	
+28			0.3	39.4	
+30=E			0.1	39 6	
+5			+0.6	40 3	
		117+57			
-5			1.2	38 5	
E			1.9	37 8	
+3			3.0	36 7	
+10			2.8	36 9	
+15			4.1	35 6	
+30=W			4.6	35 1	
+5			6.1	33 6	
B.M.			4.42	34.75	on E.C. hub
		118+07			
-5			4.3	35 4	
W			3.2	36.5	
+15			3.2	36 5	
+17			2.9	36 8	
+18			1.6	38 1	
+30=E			0.7	39 0	
+5		✓	0.3	✓ 39 4	
T.P.	12 38	51.68	0.37	39.30	
		118+50			
-5			10.1	41 6	
E			10.5	41 2	
+7			11.8	39 9	
+10			11.9	39 8	
+12.5			14.0	37 7	
+15			14.3	37 4	
+30=W			14.5	37 2	
+5			13.9	37 8	
		118+75			
-5			13.0	38 7	
W			14.2	37 5	
+15			13.6	38 1	
+18			12.9	38 8	
+20			11.2	40 5	
+30=E			10.2	41 5	
+5			9.4	42 3	
		119+00			
-5			8.0	43 7	
E			8.8	42 9	
+8			10.4	41 3	
+11			12.3	39 4	
+15			12.8	38 9	
+22			13.3	38 4	
+30=W			13.2	38 5	
+2			13.1	38 6	
+5			12.0	39 7	
		119+50			
-5			10.8	40 9	
-2			12.1	39 6	

		51.68		
W		12.2	39 5	
+11		12.0	39 7	
+15		11.3	40 4	
+19		10.7	41 0	
+21		9.5	42 3	
+29		7.5	43 2	
+30=E		7.8	43 9	
+5		6.7	45.0	
	120+00			
-5		5.3	46 4	
E		6.3	45 4	
+3		7.4	44 3	
+9		8.2	43 5	
+12		9.8	41 9	
+15		10.3	41 4	
+21		10.9	40.8	
+30=W		10.9	40.8	
+3		10.7	41.0	
+5		9.2	42 5	
	120+50			
-5		7.7	44 0	
-2		9.1	42 6	
W		9.1	42 6	
+7		9.2	42.5	
+15		8.9	42 8	
+21		6.9	44 8	
+25		6.5	45 2	
+30=E		4.6	47 2	
+5		3.9	47 8	
	120+70			
-5		3.0	48 7	
E		3.7	48 0	
+3		4.0	47 7	
+6		6.0	45 7	
+15		7.6	44 1	
+30=W		7.7	44 0	
+3		7.4	44 3	
+5		6.7	45 0	
	120+85			
-5		6.0	45 7	
W		5.6	46 1	
+11		5.6	46 1	
+15		6.4	45 3	
+24		5.6	45 1	
+27		3.8	47 9	
+30=E		5.1	48 6	
+5		2.7	49 0	
	121+50			
-5		+0.2	51.9	
E		1.0	50 7	
+4		3.4	48 3	
+15		4.4	47 3	

		51.68		
+21			3.2	48 5
+30=W			2.4	49 3
+5			2.3	49 4
		121+85		
-5			2.6	49 1
W			1.6	50 1
+8			2.0	49 7
+12			3.4	48 3
+15			3.6	48 1
+24			2.6	49 1
TP.	7.03	56.73	1.78	49.90
+27			4.4	52.5
+30=E			4.0	52 9
+5			3.4	53 5
		122+40		
-5			2.1	54 8
E			2.8	54 1
+5			6.3	50 6
+15			7.5	49 4
+30=W			6.7	50 2
+5			7.3	49 6
		122+80		
-5			7.6	49 3
W			6.4	50 5
+15			5.6	51 3
+23			5.4	51 5
+27			4.5	52 4
+30=E			2.9	54 0
+5			1.5	53 4
		123+00		
-5			3.4	53 5
E			4.2	52 7
+5			5.3	51 6
+10			5.0	51 9
+15			5.3	51 6
+18			5.9	51 6
+27			6.6	50 3
+30=W			7.7	49 2
+5			9.7	47 2
		123+40		
-5			7.6	49 3
W			6.2	50 6
+15			5.3	51 6
+30=E			4.0	52 9
+5			3.3	53 6
		123+85		
-5			7.7	54 2
E			3.9	53 0
+15			5.0	51 9
+30=W			6.1	50 8
+5			7.2	49 7

		56.93		
		124+00		
-5			7.0	49 9
W			6.1	50 8
+15			4.8	52 1
+26			4.1	52 8
+30=E			1.3	55 6
+5			0.2	56 7
		124+20		
-5			1.1	55 8
E			2.8	54 1
+5			4.5	52 4
+15			5.0	51 9
+30=W			5.9	51 0
+5			6.7	50 2
		124+65		
-5			6.8	50 1
W			5.6	51 3
+15			5.3	51 6
+25			4.6	52 4
+30=E			2.8	54 1
+5			2.3	54 6
		124+50		
-5			0.2	56 7
E			0.7	56 2
+3			1.4	55 5
+5			4.8	52 1
+15			5.3	51 6
+30=W			6.1	50 8
+5			7.4	49 5
		124+65		
-5			8.2	48 7
W			7.2	49 7
+5			6.0	50 9
+15			5.3	51 6
+24			4.7	52 2
+27			0.7	56 2
+30=E			0.3	56 6
+5			+0.2	57 1
TP.	9.07	60.73	5.27	51.66
		124+72		
-5			3.2	57 5
E			4.3	56 4
+12			4.6	56 1
+5			8.4	52 3
+11			8.9	51 8
+15			9.2	51 5
+25			9.6	51 1
+27			8.7	52 0
+30=W			8.9	51 9
+5			9.1	51 3
		125+00		
-5			9.3	51 4
W			8.2	52 2

+3		8.5	52	2
+5		9.3	51	4
+15		9.1	51	6
+23		8.5	52	2
+27		6.6	54	1
+30 = E		5.8	54	9
+5		5.2	55	7
	125+20			
-5		3.0	57	7
E		3.5	57	2
+2		4.0	56	7
+6		8.5	52	2
+15		9.0	51	7
+25		9.7	51	0
+27		8.1	52	6
+30 = W		8.3	52	4
+5		8.9	51	8
	125+55			
-5		7.9	52	8
W		7.3	53	4
+3		7.5	53	2
+4		9.5	51	2
+15		9.2	51	5
+27		8.5	52	2
+26		6.3	54	4
+30 = E		4.6	56	1
+5		4.0	56	7
	125+69			
-5		3.7	57	0
E		4.1	56	6
+4		4.5	56	2
+8		8.9	51	8
+15		9.4	51	3
+30 = W		9.6	51	1
+5		9.8	50	9
B.M.		9.38	51.35	PC hub 125+72.4
	126+00			
-5		12.0	48	7
W		10.8	49	9
+15		9.6	51	1
+24		9.4	51	3
+27		8.3	52	4
+30 = E		8.1	52	6
+5		7.4	53	3
	126+29 =	E of 1.5' x 2' wooden box		
-5		8.6	52	1
E		10.0	50.7	
+1	do not use for yardage.	(11.5)	49.2	end of culv.
+9		9.6	51	1
+15		9.8	50	9
+28		11.2	49	5
+30 = W		12.2	48	5
+5		14.5	46	2

16.3 W of ctr.	do not use for yardage.	(15.0)	45	7 = end of Culv.
	127+00			
-5		10.9	49	8
W		10.0	50	7
+5		9.5	51	2
+8		9.9	50	8
+15		9.6	51	1
+24		9.6	51	1
+30 = E		7.3	53	4
+5		6.5	54	2
	127+25.0			
-5		4.0	56	7
E		5.6	55	1
+6		9.5	51	1
+15		9.8	50	9
+24		10.2	50	5
+27		9.3	51	4
+30 = W		9.7	51	0
+5		11.0	49	7
	127+50			
-5		10.0	50	7
W		9.3	51	4
+4		9.1	51	6
+7		10.3	50	4
+15		9.9	50	8
+24		9.5	51	2
+28		6.6	54	1
+30 = E		6.0	54	7
+5		4.5	56	2
	128+00			
-5		4.0	56	7
E		4.9	55	8
+4		9.2	51	5
+15		10.4	50	3
+23		10.6	50	1
+30 = W		9.6	51	1
+5		10.8	50	9
	128+50			
-5		11.2	49	5
W		10.6	50	1
+5		10.4	50	3
+8		11.1	49	6
+15		10.8	49	9
+25		10.1	50	6
+28		6.1	54	6
+30 = E		5.7	55	0
+5		5.1	55	6
	128+95 =	Old broken culvert which is necessary		
W-5		21.6	39	1
W		19.0	(41	7) change

		60.73			
		129+00 ✓			
-5			8.8	51	9
E			10.2	50	5
+9			11.4	49	3
+15			11.7	49	0
+26			13.4	47	3
+30=W			15.7	45	0
+5			18.6	42	1
		129+50 ✓			
-5			11.5	49	2
W			11.2	49	5
+1			12.8	47	9
+15			12.4	48	3
+18			11.5	49	2
+25			10.6	50	1
TP	9.87	59.72 ✓	10.88	49.85 ✓	
E			4.6	55	1
+2			3.8	55	9
+5			3.4	56	3
		130+00			
-5			2.1	57	6
E			3.4	56	3
+3			7.7	52	0
+6			9.8	49	9
+12			10.3	49	4
+15			11.7	48	0
+20			12.2	47	5
+30=W			12.2	47	5
+5			10.7	49	0
		130+50			
-5			11.2	48	5
W			14.5	47	2
+10			12.6	47	1
+13			12.3	47	4
+15			10.8	48	9
+16			10.1	49	6
+26			9.6	50	2
+30=E			7.1	52	6
+5			4.9	54	8
		131+00 ✓			
-5			6.1	53	6
E			8.6	51	1
+5			10.5	49	2
+10			10.5	49	2
+15			11.4	48	3
+17			11.9	47	8
+30=W			12.2	47	5
+5			11.7	48	0
		131+30			
-5			12.8	46	9
W			12.2	47	5
+14			11.9	47	8
+15			11.4	48	3
+22			9.6	50	1
+28			9.5	50	2
+30=E			9.1	50	6
+5			6.7	53	0
		131+38			
-5			6.3	53	4
E			9.5	50	2
+5			10.5	49	2
+15			11.6	48	1
+30=W			12.4	47	3
+5			13.1	46	6
		131+75			
-5			13.9	45	8
-2			12.5	47	2
W			12.2	47	5
+15			11.8	47	9
+27			11.4	48	3
+30=E			7.9	51	8
+5			6.2	53	5
		132+00			
-5			7.0	52	7
E			9.6	50	1
+5			11.5	48	2
+15			11.5	47	9
+16			12.4	47	3
+30=W			12.6	47	1
+9			12.9	46	8
+5			14.5	45	2
		132+50			
-5			15.7	44	0
W			13.3	46	4
+14			12.6	47	1
+15			12.0	47	7
+30=E			11.5	48	2
+2			11.4	48	3
+5			9.6	50	1
TP	4.04	51.98 ✓	11.98 ✓	47.7W ✓	EC hub 132+85.12
		133+00 ✓	= 8" cement pipe on highway		
-5			1.5	50	3
E			2.5	49	3
+15			3.9	47	9
+30=W			5.8	46	0
+5		✓	9.2	42	6
		133+50			
-5			9.6	42	2
W			6.2	45	6
+10			4.9	46	9
+15			4.9	46	9
+16			4.6	47	2
+28			3.9	47	9

130 = E		1.5	50 3
+5	✓	1.0	50 8
	133+75		
-5		2.9	48 9
E		3.8	48 0
+13		4.7	47 1
+15		5.2	46 6
+30 = W		5.9	45 9
+5		8.2	43 6
	134+00		
-5		8.8	43 0
W		5.9	45 9
+15		5.3	46 5
+17		4.6	47 4
+26		4.0	47 8
+30 = E		2.2	49 6
+5		1.5	50 3
	134+50		
-5		0.5	51 3
E		1.3	50 5
+3		4.2	47 6
+13		4.8	47 0
+15		5.6	46 2
+30 = W		6.1	45 7
+5		8.2	43 6
	135+0		
-5		10.9	40 9
W		7.2	44 6
+1		6.7	45 1
+14		6.1	45 7
+15		5.6	46 2
+30 = E		5.4	46 4
+5		4.6	47 2
	135+32.8 = k 2' x 2' wooden box		
-5	✓	6.7	45 1
-3 do not use for yardage		(8.3)	43.5 x low line light
E		6.8	45 0
+4		5.5	46 3
+14		5.7	46 1
+15		6.5	45 6
+28		7.0	44 8
+30 = W		8.0	43 8
+4 do not use for yardage		(12.2)	39.6 x low line but lot
+5	✓	12.5	39 3
	135+75		
-5		11.1	40 7
W		7.5	44 3
+15		6.5	45 3
+17		5.6	46 2
+30 = E		4.8	47 0
+5		4.6	47 2

136+00			
136+10			
-5	5.5	46	3
E	5.5	46	3
+9	5.5	46	3
+15	6.5	45	3
+30 = W	7.5	44	3
+5	11.0	40	8
136+50			
-5	9.5	42	3
W	7.0	44	8
+10	6.9	44	9
+15	6.5	45	3
+22	5.7	46	1
+30 = E	6.2	45	6
+5	6.2	45	6
137+00			
-5	4.5	47	3
E	4.9	46	9
+6	6.0	45	8
+15	6.9	44	9
+30 = W	7.4	44	4
+5	9.2	42	6
137+50			
-5	8.0	43	8
W	7.4	44	4
+15	7.0	44	8
+17	6.2	45	6
+27	5.6	46	2
+30 = E	5.4	46	4
+5	4.3	47	5
138+00			
-5	2.9	48	9
E	3.3	48	5
+5	6.2	45	6
+12	6.6	45	2
+15	7.4	44	4
+30 = W	7.7	44	1
+5	6.9	44	9
138+50			
-5	7.8	44	0
W	8.0	43	8
+15	7.2	44	6
+26	6.2	45	6
+30 = E	3.5	48	0
+5 ✓	2.7	49	1
138+80			
-5	3.4	48	4
E	3.6	48	2
+4	6.0	45	8
+13	7.0	44	8
+15	7.5	44	3
+30 = W	8.2	43	6
+5	7.5	44	3

T.P.	- 6.79	51.18	7.39	44.39	on hub 1381823
		134+00			
-5			7.1	44 0	
-3			7.5	43 6	
W			7.6	43 5	
+15			6.9	44 2	
+30=E			5.1	46 0	
+5			4.1	47 0	
		134+50			
-5			1.8	49 3	
E			3.3	47 8	
+4			5.5	45 6	
+14			6.7	44 4	
+15			7.3	43 8	
+30=W			7.8	43 3	
+2			7.4	43 7	
+3			5.1	46 0	
+5			4.8	46 3	
		140+00			
-5			5.7	45 4	
-3			5.8	45 3	
-1			7.8	43 3	
W			8.0	43 1	
+15			7.1	44 0	
+24			5.6	45 3	
+30=E			3.9	47 3	
+5		✓	3.0	48 2	
		140+50			
-5			4.2	47 0	
-3			4.5	46 7	
E			3.7	47 5	
+13			7.1	44 1	
+15			7.6	43 6	
+30=W			8.4	42 8	
+2.5			7.9	43 3	
+3.5			6.5	44 7	
+5.0		✓	6.2	45 0	
		140+90			
-5			5.7	45 5	
-1			8.3	42 9	
W			8.5	42 7	
+15			8.0	43 2	
+17			7.2	44 0	
+30=E		✓	5.2	46 0	
+5			4.9	46 3	
		141+25			
-5			4.4	46 8	
E			3.7	47 5	
+11			7.1	44 1	
+15			7.8	43 4	
+24			8.6	42 6	
+30=W			8.7	42 5	

51.18

+2		8.4	42	8
+3		5.9	45	3
+5	✓	5.2	46	0
	141+70			
-5		6.3	44	9
-2		8.7	42	5
W		9.0	42	2
+15		8.2	43	0
+30=E		5.4	45	8
+4		4.9	46	3
+5		4.3	46	9
	142+00			
-5		4.7	46	5
-2		5.6	45	6
E		5.3	45	9
+13		7.7	43	5
+15		8.7	42	5
+22		9.5	41	7
+30=W		9.2	42	0
+15	✓	6.8	44	4
	142+35			
-5		8.4	42	8
-3		8.3	42	9
-2		9.7	41	5
W		10.3	40	9
+15		9.1	42	1
+25		6.4	44	8
+30=E		6.2	45	0
+5	✓	5.8	45	4
	142+50			
-5		5.9	45	3
E		6.8	44	4
+13		8.2	43	0
+15		9.2	42	0
+27		9.7	41	5
+30=W		12.8	38	4
+5	✓	12.6	38	4
	142+70			
-5		9.7	41	5
W		9.8	41	4
+16		9.3	41	9
+17		8.6	42	6
+30=E		7.4	43	8
+5		7.0	44	2
	143+00			
-5		7.5	43	7
E		8.0	43	2
+14		8.8	42	4
+15		10.0	41	2
+30=W		10.5	40	7
+4		10.7	40	5
+5		12.0	37	2

= washon
w. silo
need. culvert?

51.18

		143+35			
-5			12.8	38	4
-1			10.9	40	3
W			10.9	40	3
+15			10.5	40	7
+18			9.0	42	2
+30 = E			8.0	43	2
+5			7.6	43	6
		143+65			
-5			8.2	43	0
E			9.5	41	7
+5			10.2	41	0
+15			10.5	40	7
+30 = W			11.0	40	2
+2			11.0	40	2
+5			12.9	38	3
		144+00			
-5			13.2	37	8
-2			11.1	40	1
W			10.9	40	3
+15			10.2	41	0
+30 = E			9.8	41	4
+4			9.1	42	1
+5			8.0	43	2
		144+50			
-5			8.2	42	9
-2			9.7	41	5
E			10.0	41	2
+15			10.7	40	5
+27			10.7	40	5
+30 = W			11.2	39	8
+5			13.9	37	3
		145+00			
-5			13.1	38	1
W			11.1	40	1
+15			10.8	40	4
+30 = E			10.3	40	9
+5			8.5	42	7
T.P.	6.42	47.56	10.06	41.12	
		145+50			
-5			4.8	42	8
E			5.2	42	4
+4			6.6	41	0
+15			7.0	40	6
+30 = W			7.5	40	1
+5			8.8	38	8
		145+75			
-5			9.5	38	1
W			7.5	40	1
+15			6.9	40	7
+18			5.5	42	1
+30 = E			5.0	42	6
+5			4.9	41	7

47.56

	146+00			
-5		5.0	42	6
E		5.1	42	5
+12		5.2	42	2
+15		6.7	40	7
+30 = W		7.7	39	7
+5		9.2	38	2
	146+50			
-5		9.1	38	5
-2		7.0	40	6
W		7.0	40	6
+15		6.5	41	1
+18		5.6	42	0
+30 = E		4.9	42	7
+5		5.1	42	5

opp sta 146+55 = vitrified pipe on Highway

	146+80			
-5		4.8	42	8
E		4.9	42	7
+12		5.7	41	9
+15		6.8	40	8
+30 = W		7.3	40	3
+5		9.5	38	1
	147+15			
-5		6.7	40	9
W		7.3	40	3
+15		7.0	40	6
+18		5.2	42	2
+27		3.8	43	8
+30 = E		3.6	44	0
+5		3.7	43	9
	147+50			
-5		4.0	43	6
E		3.3	44	3
+12		5.2	42	4
+14		6.5	41	1
+15		7.0	40	6
+30 = W		7.1	40	5
+2		7.1	40	5
+5		6.3	41	3
	148+00			
-5		5.0	42	6
-4		5.1	42	5
-1		6.9	40	7
W		7.0	40	6
+15		6.2	40	4
+18		4.7	42	9
+28		2.5	45	1
+30 = E		2.2	45	4
+5		2.8	44	8
BM.		6.24	41	32 on pab 148+00

47.56

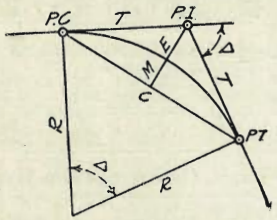
148+50

-5	1.2	46	4
-3	0.3	47	2
E	0.7	46	9
+3	1.2	46	4
+9	3.8	43	8
+13	5.0	42	6
+15	6.2	41	4
+30=W	6.2	41	2
+3	5.1	42	5
+3.5	3.5	43	8
+5	3.6	43	8
149+00			
-5	3.2	44	3
W	5.6	41	8
+1	6.2	41	4
+14	6.0	41	6
+15	5.6	42	0
+17	4.2	43	4
+23	1.9	45	7
+30=E	1.1	46	5
+5	1.3	46	3
149+25			
-5	0.7	46	9
-2	2.6	45	0
E	2.2	45	2
+4	2.2	45	4
+12	3.8	43	8
+15	5.6	42	0
+30=W	5.7	41	9
+3	4.6	43	0
+4	2.2	45	2
+5	2.2	45	2
149+60			
-5	1.9	45	7
W	5.2	42	2
+10	5.5	42	1
+15	5.0	42	6
+18	4.2	43	2
+44	1.1	46	5
+30=E	1.3	46	3
+5	0.2	47	4

FOR REMAINDER OF LINE

SEE BOOK 1049 page 57

DIETZGEN'S RAILROAD CURVE AND REDUCTION TABLES



CURVE FORMULAS

Radius=R=$\frac{50}{\text{sin. } D/2}$ (1) Degree of Curve=D and sin. $\frac{D}{2}=\frac{50}{R}$ (2)

Tangent=T=Rtan$\frac{\Delta}{2}$ (3) Length of Curve=L=100$\frac{\Delta}{D}$ (4)

Middle ordinate=M= R(1—cos. $\frac{\Delta}{2}$) (5) =Rvers $\frac{\Delta}{2}$ (6)

External=E=Ttan$\frac{\Delta}{4}$- (7) =Rcos$\frac{\Delta}{2}$(1-cos.$\frac{\Delta}{2}$) (8)=Rexsec$\frac{\Delta}{2}$ (9)

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

EXPLANATION AND USE OF TABLES

Stations.—Given P. I.=Sta. 161 +60.35 to find Sta. of P. C. and P. T. Δ=62° 10′ D=8° 20′. From Table IV for 1° curve T=3454.1 and ÷8⅓=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÷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 ÷ (2 x 688.26)=2.16 ft.

Deflections.—Deflection angle=½ D for 100 ft., ¼ D for 50 ft., etc. For c ft.=(in minutes) .3 x C x D° or=defl. for 1 ft. from Table III x C. For Sta. 158 of above curve=.3 x 54.5 x 8⅓=136.2′ or 2° 16.2′, or=2.50 x 54.5=136.2′ from Table III. For Sta. 159 deflection angle=2° 16.2′ +8° 20′ ÷2=6° 26.2′, etc.

Externals.—May be found in similar manner to tangents. Thus E for curve above is 91.37. For from Table IV for 1° curve E=960.6 for 8° 20′=960.6 ÷8⅓=91.27 and from Table V correction=.10 or E=91.37 ft. Or suppose Δ=32° and E is measured and found to be 42 ft. What is D? From Table IV E=230.9 and ÷42=5.5 or D=5° 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	8	716.78	1.746	6.976	2.40
1	5729.65	.218	.873	0.30	20	688.16	1.819	7.266	2.50
10	4911.15	.255	1.018	0.35	30	674.69	1.855	7.411	2.55
20	4297.28	.291	1.164	0.40	40	661.74	1.892	7.556	2.60
30	3819.83	.327	1.309	0.45	9	637.28	1.965	7.846	2.70
40	3437.87	.364	1.454	0.50	20	614.56	2.037	8.136	2.80
50	3125.36	.400	1.600	0.55	30	603.80	2.074	8.281	2.85
2	2864.93	.436	1.745	0.60	40	593.42	2.110	8.426	2.90
10	2644.58	.473	1.891	0.65	10	573.69	2.183	8.716	3.00
20	2455.70	.509	2.036	0.70	30	546.44	2.292	9.150	3.15
30	2292.01	.545	2.181	0.75	11	521.67	2.402	9.585	3.30
40	2148.79	.582	2.327	0.80	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	213.80

Table VIII.—Natural Trigonometrical Functions.

Angle	Sine.	Tan.	Cotg.	Cosin.		Angle	Sine.	Tan.	Cotg.	Cosin.	
° ′						° ′					
32	.5299	.6249	1.600	.84805	**58**	30	.6225	.7954	1.257	.78261	30
10	.5324	.6289	1.590	.84650	50	40	.6248	.8002	1.250	.78079	20
20	.5348	.6330	1.580	.84495	40	50	.6271	.8050	1.242	.77897	10
30	.5373	.6371	1.570	.84339	30						
40	.5393	.6412	1.560	.84182	20	**39**	.6293	.8098	1.235	.77715	**51**
50	.5422	.6453	1.550	.84025	10	10	.6316	.8146	1.228	.77531	50
						20	.6338	.8195	1.220	.77347	40
33	.5446	.6494	1.540	.83867	**57**	30	.6361	.8243	1.213	.77162	30
10	.5471	.6536	1.530	.83708	50	40	.6383	.8292	1.206	.76977	20
20	.5495	.6577	1.520	.83549	40	50	.6406	.8342	1.199	.76791	10
30	.5519	.6619	1.511	.83389	30						
40	.5544	.6661	1.501	.83228	20	**40**	.6428	.8391	1.192	.76604	**50**
50	.5568	.6703	1.492	.83066	10	10	.6450	.8441	1.185	.76417	50
						20	.6472	.8491	1.178	.76229	40
34	.5592	.6745	1.483	.82904	**56**	30	.6494	.8541	1.171	.76041	30
10	.5616	.6787	1.473	.82741	50	40	.6517	.8591	1.164	.75851	20
20	.5640	.6830	1.464	.82577	40	50	.6539	.8642	1.157	.75661	10
30	.5664	.6873	1.455	.82413	30						
40	.5688	.6916	1.446	.82248	20	**41**	.6561	.8693	1.150	.75471	**49**
50	.5712	.6959	1.437	.82082	10	10	.6583	.8744	1.144	.75280	50
						20	.6604	.8796	1.137	.75088	40
35	.5736	.7002	1.428	.81915	**55**	30	.6626	.8847	1.130	.74896	30
10	.5760	.7046	1.419	.81748	50	40	.6648	.8899	1.124	.74703	20
20	.5783	.7089	1.411	.81580	40	50	.6670	.8952	1.117	.74509	10
30	.5807	.7133	1.402	.81412	30						
40	.5831	.7177	1.393	.81242	20	**42**	.6691	.9004	1.111	.74314	**48**
50	.5854	.7221	1.385	.81072	10	10	.6713	.9057	1.104	.74120	50
						20	.6734	.9110	1.098	.73924	40
36	.5878	.7265	1.376	.80902	**54**	30	.6756	.9163	1.091	.73728	30
10	.5901	.7310	1.368	.80730	50	40	.6777	.9217	1.085	.73531	20
20	.5925	.7355	1.360	.80558	40	50	.6799	.9271	1.079	.73333	10
30	.5948	.7400	1.351	.80386	30						
40	.5972	.7445	1.343	.80212	20	**43**	.6820	.9325	1.072	.73135	**47**
50	.5995	.7490	1.335	.80038	10	10	.6841	.9380	1.066	.72937	50
						20	.6862	.9435	1.060	.72737	40
37	.6018	.7536	1.327	.79864	**53**	30	.6884	.9490	1.054	.72537	30
10	.6041	.7581	1.319	.79688	50	40	.6905	.9545	1.048	.72337	20
20	.6065	.7627	1.311	.79512	40	50	.6926	.9601	1.042	.72136	10
30	.6088	.7673	1.303	.79335	30						
40	.6111	.7720	1.295	.79158	20	**44**	.6947	.9657	1.036	.71934	**46**
50	.6134	.7766	1.288	.78980	10	10	.6967	.6713	1.030	.71732	50
						20	.6988	.9770	1.024	.71529	40
38	.6157	.7813	1.280	.78801	**52**	30	.7009	.9827	1.018	.71325	30
10	.6180	.7860	1.272	.78622	50	40	.7030	.9884	1.012	.71121	20
20	.6202	.7907	1.265	.78442	40	50	.7050	.9942	1.006	.70916	10
							.7071	1.	1.	.70711	**45**
											° ′
	Cosin.	Cotg.	Tan.	Sine.	Angle.		Cosin.	Cotg.	Tan.	Sine.	Angle.

1.26
210
640
128
216
269.440

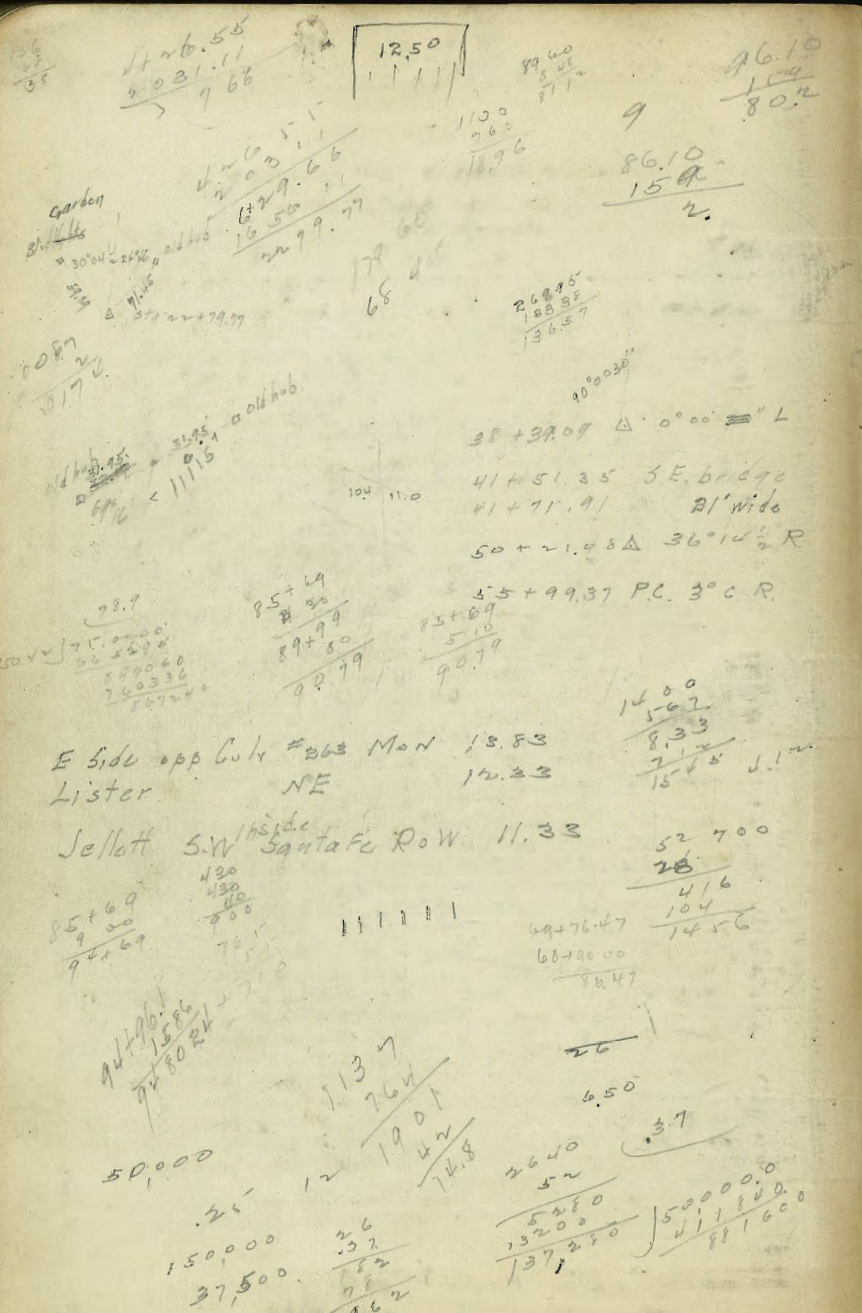
818
3494
468.6

Table IX.—Calculation of Earthwork.

Width	HEIGHT														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
1	.02	.04	.06	.07	.09	.11	.13	.15	.17	.18	.20	.22	.24	.26	.28
2	.04	.07	.11	.15	.18	.22	.26	.30	.33	.37	.41	.44	.48	.52	.56
3	.06	.11	.17	.22	.28	.33	.39	.44	.50	.56	.61	.67	.72	.78	.83
4	.07	.15	.22	.30	.37	.44	.52	.59	.67	.74	.81	.89	.96	1.04	1.11
5	.09	.19	.28	.37	.46	.56	.65	.74	.83	.93	1.02	1.11	1.20	1.30	1.39
6	.11	.22	.33	.44	.56	.67	.78	.89	1.00	1.11	1.22	1.33	1.44	1.55	1.67
7	.13	.26	.39	.52	.65	.78	.91	1.04	1.16	1.30	1.42	1.55	1.68	1.81	1.94
8	.15	.30	.44	.59	.74	.89	1.04	1.19	1.33	1.48	1.63	1.78	1.92	2.08	2.22
9	.17	.33	.50	.67	.83	1.00	1.17	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50
10	.18	.37	.56	.74	.93	1.11	1.30	1.48	1.67	1.85	2.04	2.22	2.41	2.59	2.78
11	.20	.41	.61	.82	1.02	1.22	1.43	1.63	1.83	2.04	2.24	2.44	2.65	2.85	3.06
12	.22	.44	.67	.89	1.11	1.33	1.56	1.78	2.00	2.22	2.44	2.67	2.89	3.11	3.33
13	.24	.48	.72	.96	1.20	1.44	1.68	1.92	2.16	2.41	2.65	2.89	3.13	3.37	3.61
14	.26	.52	.78	1.04	1.30	1.55	1.81	2.08	2.33	2.59	2.85	3.11	3.37	3.63	3.89
15	.28	.56	.83	1.11	1.39	1.67	1.94	2.22	2.50	2.78	3.06	3.33	3.61	3.89	4.17
16	.30	.59	.89	1.18	1.48	1.78	2.07	2.37	2.67	2.96	3.26	3.56	3.85	4.15	4.44
17	.31	.63	.94	1.26	1.57	1.89	2.20	2.52	2.83	3.15	3.46	3.78	4.09	4.41	4.72
18	.33	.67	1.00	1.33	1.67	2.00	2.33	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	5.33
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 ½ the roadbed =w, add the triangles formed by taking the distance out to each break in turn (=w's) by the difference between the cuts (or fills) on each side of it (=h's) always subtracting the outer from the inner.

75°



DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

Roadway 16 feet wide. Side Slopes 1 on 1½.

For Single Track Embankment.

H	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	H
0	8.0	8.2	8.3	8.5	8.6	8.8	8.9	9.1	9.2	9.4	0
1	9.5	9.7	9.8	10.0	10.1	10.3	10.4	10.6	10.7	10.9	1
2	11.0	11.2	11.3	11.5	11.6	11.8	11.9	12.1	12.2	12.4	2
3	12.5	12.7	12.8	13.0	13.1	13.3	13.4	13.6	13.7	13.9	3
4	14.0	14.2	14.3	14.5	14.6	14.8	14.9	15.1	15.2	15.4	4
5	15.5	15.7	15.8	16.0	16.1	16.3	16.4	16.6	16.7	16.9	5
6	17.0	17.2	17.3	17.5	17.6	17.8	17.9	18.1	18.2	18.4	6
7	18.5	18.7	18.8	19.0	19.1	19.3	19.4	19.6	19.7	19.9	7
8	20.0	20.2	20.3	20.5	20.6	20.8	20.9	21.1	21.2	21.4	8
9	21.5	21.7	21.8	22.0	22.1	22.3	22.4	22.6	22.7	22.9	9
10	23.0	23.2	23.3	23.5	23.6	23.8	23.9	24.1	24.2	24.4	10
11	24.5	24.7	24.8	25.0	25.1	25.3	25.4	25.6	25.7	25.9	11
12	26.0	25.2	26.3	26.5	26.6	26.8	26.9	27.1	27.2	27.4	12
13	27.5	27.7	27.8	28.0	28.1	28.3	28.4	28.6	28.7	28.9	13
14	29.0	29.2	29.3	29.5	29.6	29.8	29.9	30.1	30.2	30.4	14
15	30.5	30.7	30.8	31.0	31.1	31.3	31.4	31.6	31.7	31.9	15
16	32.0	32.2	32.3	32.5	32.6	32.8	32.9	33.1	33.2	33.4	16
17	33.5	33.7	33.8	34.0	34.1	34.3	34.4	34.6	34.7	34.9	17
18	35.0	35.2	35.3	35.5	35.6	35.8	35.9	36.1	36.2	36.4	18
19	36.5	36.7	36.8	37.0	37.1	37.3	37.4	37.6	37.7	37.9	19
20	38.0	38.2	38.3	38.5	38.6	38.8	38.9	39.1	39.2	39.4	20
21	39.5	39.7	39.8	40.0	40.1	40.3	40.4	40.6	40.7	40.9	21
22	41.0	41.2	41.3	41.5	41.6	41.8	41.9	42.1	42.2	42.4	22
23	42.5	42.7	42.8	43.0	43.1	43.3	43.4	43.6	43.7	43.9	23
24	44.0	44.2	44.3	44.5	44.6	44.8	44.9	45.1	45.2	45.4	24
25	45.5	45.7	45.8	46.0	46.1	46.3	46.4	46.6	46.7	46.9	25
26	47.0	47.2	47.3	47.5	47.6	47.8	47.9	48.1	48.2	48.4	26
27	48.5	48.7	48.8	49.0	49.1	49.3	49.4	49.6	49.7	49.9	27
28	50.0	50.2	50.3	50.5	50.6	50.8	50.9	51.1	51.2	51.4	28
29	51.5	51.7	51.8	52.0	52.1	52.3	52.4	52.6	52.7	52.9	29
30	53.0	53.2	53.3	53.5	53.6	53.8	53.9	54.1	54.2	54.4	30
31	54.5	54.7	54.8	55.0	55.1	55.3	55.4	55.6	55.7	55.9	31
32	56.0	56.2	56.3	56.5	56.6	56.8	56.9	57.1	57.2	57.4	32
33	57.5	57.7	57.8	58.0	58.1	58.3	58.4	58.6	58.7	58.9	33
34	59.0	59.2	59.3	59.5	59 6	59.8	59.9	60.1	60.2	60.4	34
35	60.5	60.7	60.8	61.0	61.1	61.3	61.4	61.6	61.7	61.9	35
36	62.0	62.2	62.3	62.5	62.6	62.8	62.9	63.1	63.2	63.4	36
37	63.5	63.7	63.8	64.0	64.1	64.3	64.4	64.6	64.7	64.9	37
38	65.0	65.2	65.3	65.5	65.6	65.8	65.9	66.1	66.2	66.4	38
39	66.5	66.7	66.8	67.0	67.1	67.3	67.4	67.6	67.7	67.9	39
40	68.0	68.2	68.3	68.5	68.6	68.8	68.9	69.1	69.2	69.4	40

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