

1422

ATLANTIC ST EXT  
- via KURTZ -

FEB 2005

1422

ENGINEERING DEPARTMENT,  
CITY OF CHICAGO,  
CALIFORNIA.

MICROFILMED

DEC 23 1964

136-490

BM 12-70 S. W. Coy. Bridge  
Santiago S.O. No.

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- No. 384 MINING TRANSIT BOOK. Left Hand Page as in this Book, Right Hand Page 8x8 to the inch, Center Line Red.
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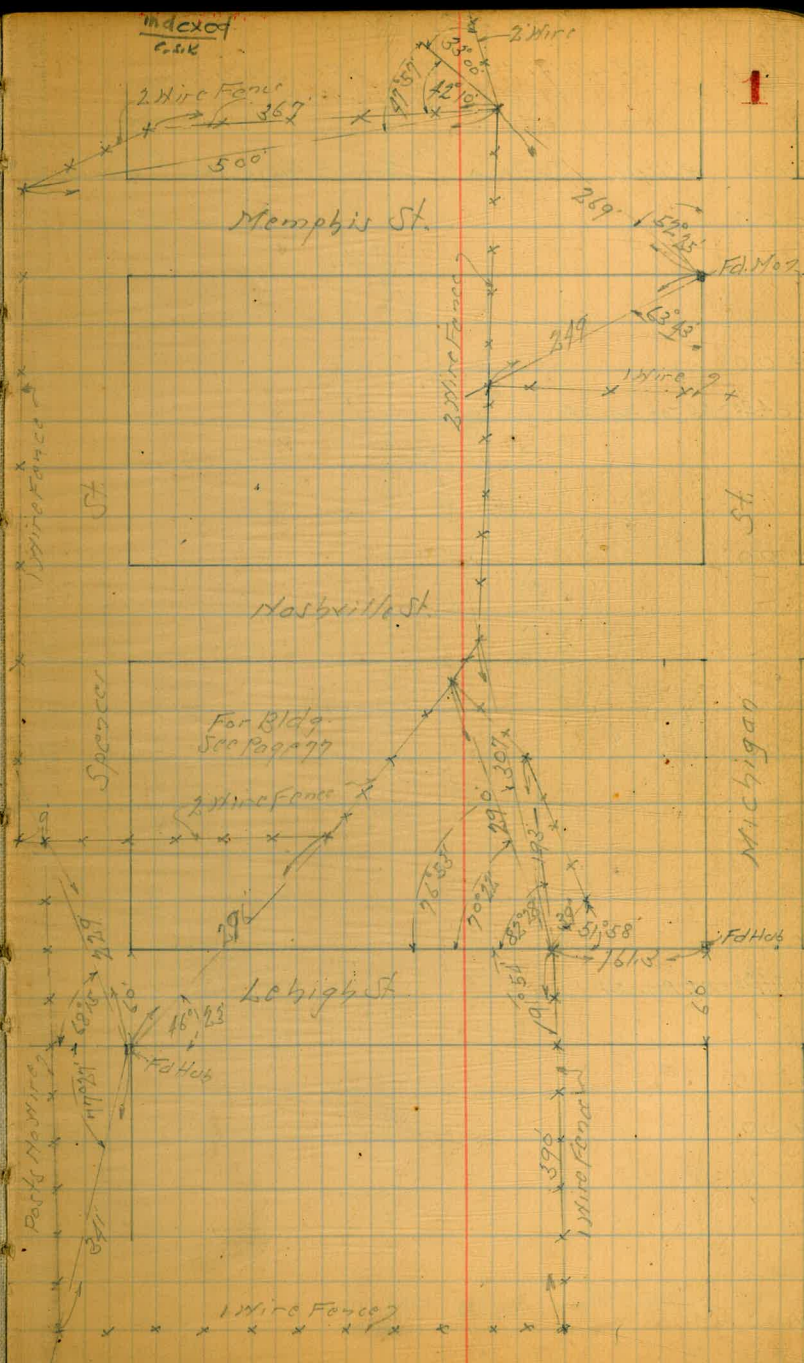
**THE FREDERICK POST CO.**  
*ENGINEERING and DRAFTING SUPPLIES*  
IRVING PARK STATION  
CHICAGO, ILL.

Location of Squatters Fences in  
Boyside Sub.

Squatter Mr. Tuttle

Oct. 2-47  
Sisson  
McCoy  
Hilleo

N.O. 60156



1

Walker  
Bliss  
Drebert  
1-8-31

"ALIGNMENT"  
ATLANTIC ST. Extension  
VIA - KURTZ ST.

Q

2

Station Align. Defln  $\Delta$  TRUE BEARING CURVE DATA MAGNETIC BEARING

6 + 00

5 + 00

+84.40 = E.C. on Page 24

4 + 00

3 + 00

2 + 00

+74.93 = P.I. Page 24

1 + 00

0 + 00

"ALIGNMENT"  
~~Abandoned~~  
See pages 24-46  
1-20-31

KURTZ ST. = ATLANTIC ST. EXTENSION  
Hub.  
Hub.

Conn. Mon.  $\frac{1}{2}$  TRIPS ST.

Station	Align.	Defln. $\Delta$	TRUE BEARING	CURVE DATA	MAG. BEARING
---------	--------	-----------------	--------------	------------	--------------

12 + 00

11 + 00

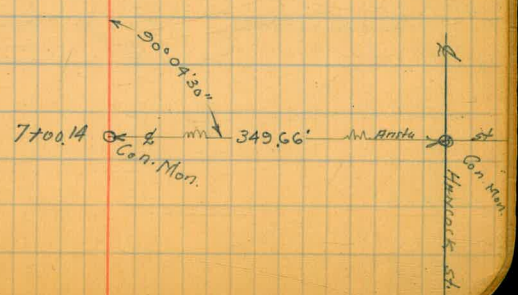
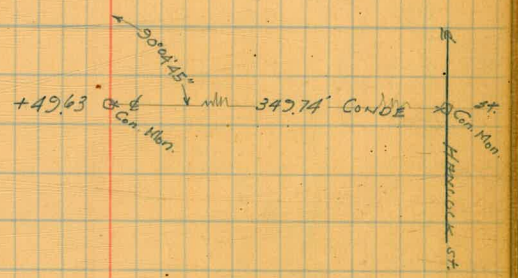
+49.63 = PQT. Cor. Mon.

10 + 00

9 + 00

8 + 00

7 + 00





Station	Align.	Defln. $\Delta$	TRUE BEARING	CURVE DATA
25+00		6°31.3'		
24+00		5°34.0'		
23+00		4°36.7'		
22+00		3°39.4'		
21+00		2°42.1'		
20+00		1°44.8'		
19+00		0°47.5'		

22+37.06 <sup>is</sup> Point  
Hub.

Station	Align.	Defln. $\Delta$	TRUE BEARING	CURVE DATA
---------	--------	-----------------	-----------------	---------------

31 + 00		12°15.1'		
---------	--	----------	--	--

30 + 00		11°17.8'		
---------	--	----------	--	--

29 + 00		10°20.5'		
---------	--	----------	--	--

+ 0.284				
28 + 00		9°23.2'		

27 + 00		8°25.9'		
---------	--	---------	--	--

26 + 00		7°28.6'		
---------	--	---------	--	--

+ 0.284  $\frac{PI}{100}$



station	Align.	Defln. $\Delta$	TRUE SERRING	CURVE DATA
+21.94 = B.C.		18° 11.42'		
37 + 00		17° 58.9'		
36 + 00		17° 01.6'		
35 + 00		16° 04.3'		
34 + 00		15° 07.0'		
33 + 00		14° 09.7'		
32 + 00		13° 12.4'		

Hub  $\square$  14.  $\square$  Paving stake

offset line

7

Station Align. Def'n. TRUE CURVE BEARING DATA

43+00

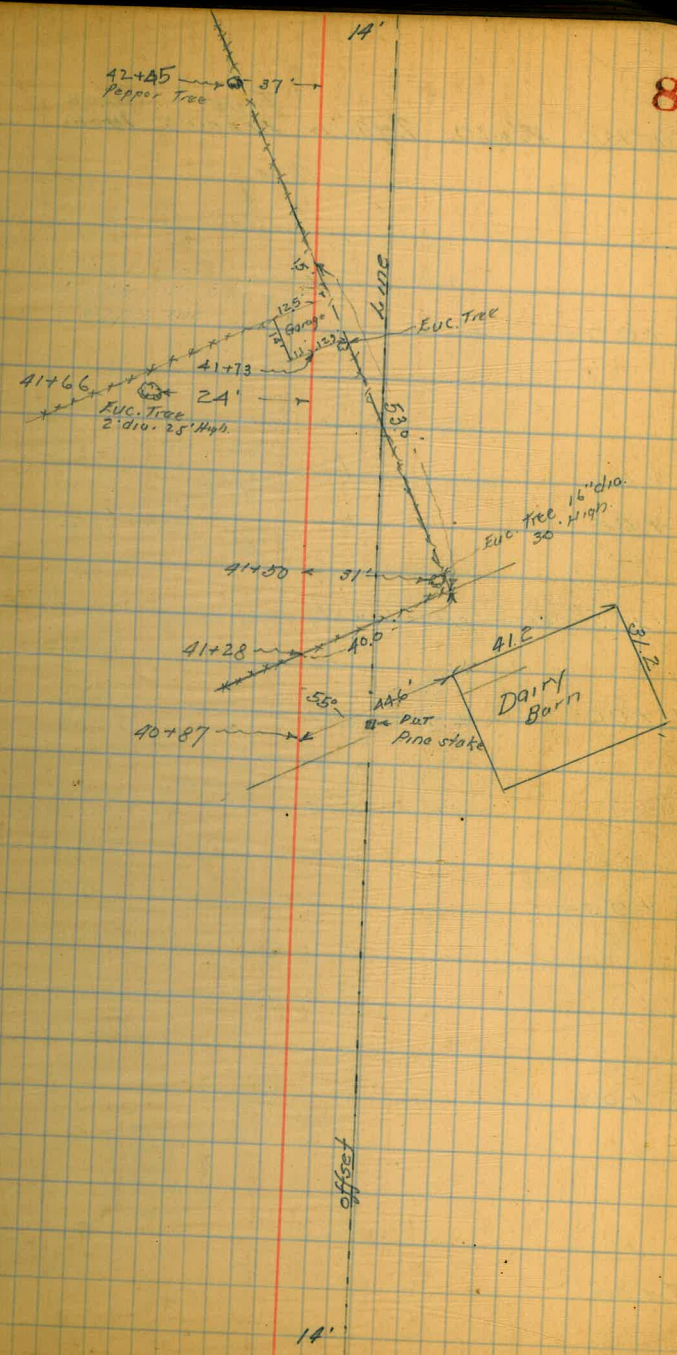
42+00

41+00  
+91.62

40+00

39+00

38+00



Station Align. Defln. P TRUE CURVE  
BEARING DATA

49 +00

48 +00

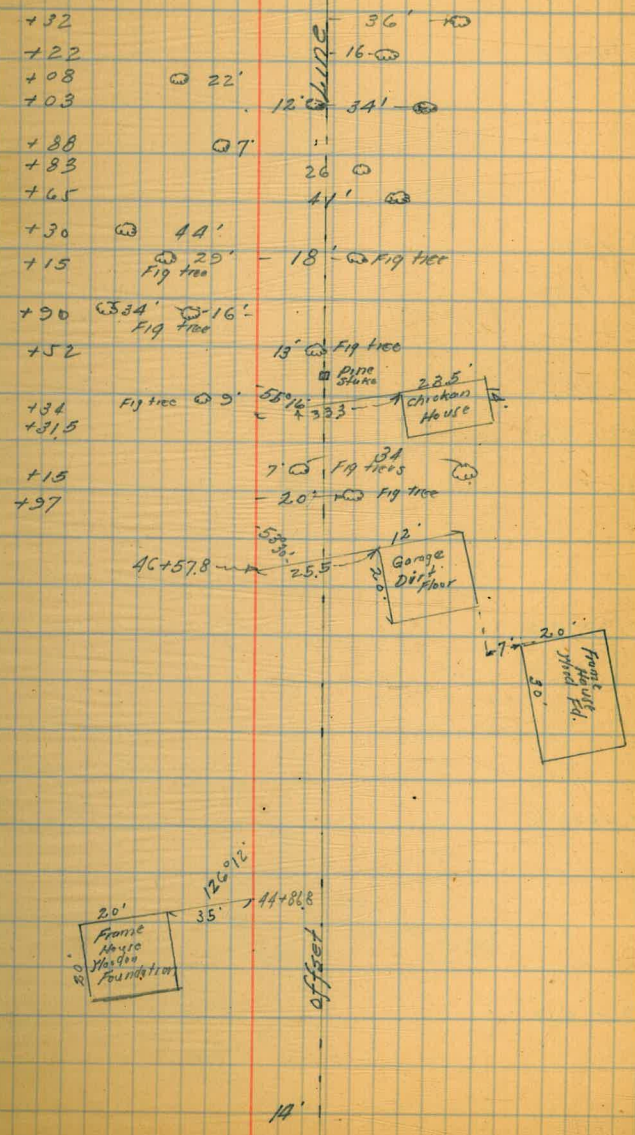
+42.52 DOT on offset line

47 +00

46 +00

45 +00

44 +00



Station	Align	Defl'd	TRUE BEARING	CURVE DATA
---------	-------	--------	--------------	------------

55+00

54+00

53+00

52+00

51+00

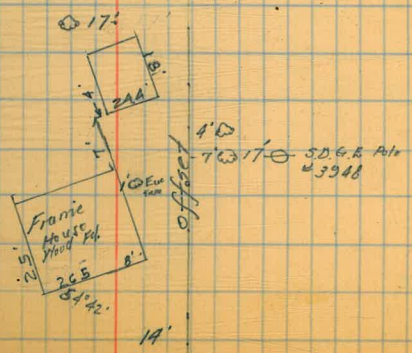
50+00

LINE

50+61 Pepper tree

+28 - Mango tree  
 +18 - Mango tree  
 +18

+923



Station Align. Defln.  $\Delta$  TRUE CURVE  
BEARING DATA

61+00

+74.60 - pot. on offset line

60+00

59+00

58+00

57+00

56+00

pepp. tree +21 @ 12-14'

Redwood Hub.  
on U.S. Gov't. Dyke on  
Approx. 2

offset line

14'

Station	Align	Defln A	True Bearing	Curve Data
---------	-------	---------	-----------------	---------------

68+00				
-------	--	--	--	--

67+00				
-------	--	--	--	--

66+00				
-------	--	--	--	--

65+00				
-------	--	--	--	--

64+00				
-------	--	--	--	--

63+00				
-------	--	--	--	--

62+00				
-------	--	--	--	--

Station	Align	Deflb. $\Delta$	True Bearing	Curve Data
74 + 00				
73 + 00				
72 + 00				
71 + 00				
70 + 00				
69 + 00				

74 + 00

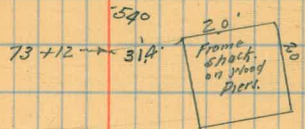
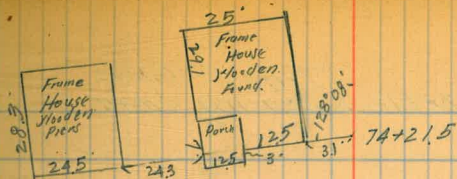
73 + 00

72 + 00

71 + 00

70 + 00

69 + 00







Station	Align.	Defln. $\Delta$	True Bearing	Curve Data.
---------	--------	-----------------	--------------	-------------

86+00

85+00

84+00  
+87.77-ROT.

83+00

82+00

81+00

99<sup>0</sup> Pine Paving stakes

→25←

→25←

Station	Align.	Defln. Δ	TRUE BEARING	CURVE DATA
---------	--------	----------	-----------------	---------------

92 + 00

91 + 00

90 + 00

89 + 00

88 + 00

87 + 00

Station	Align.	Defn. $\Delta$	TRUE BANKING	CURVE DATA
---------	--------	----------------	-----------------	---------------

99+00

98+00

97+00

96+00

95+00

94+00

+56.17 = P.O.T.

□ Paving Stake

93+00

Station	Align.	Defln. $\Delta$	True Bearing	Curve Data
105 + 00		$1^{\circ}59.85'$		$R=3000'$ $\Delta=26^{\circ}05'$ $ST=634.90'$
104 + 00		$1^{\circ}02.55'$		$L=1365.72'$
103 + 00		$-0^{\circ}05.25'$		
		$+30.82=86.$	$RT.$	
102 + 00				
101 + 00				
100 + 00				
		$+30.40=ROT.$		

105 + 00

 $1^{\circ}59.85'$  $R=3000'$  $\Delta=26^{\circ}05'$  $ST=634.90'$ 

104 + 00

 $1^{\circ}02.55'$  $L=1365.72'$ 

103 + 00

 $-0^{\circ}05.25'$  $+30.82=86.$  $RT.$ 

Hub.

102 + 00

101 + 00

100 + 00

 $+30.40=ROT.$

Station	Align.	Defln. $\Delta$	True Bearing	Curve Data
---------	--------	-----------------	-----------------	---------------

111 +00

7° 43.65'

110 +00

6° 46.35'

+85.72 = P.I.

+85.72 = P.I.

109 +00

5° 49.05'

108 +00

4° 51.75'

107 +00

3° 54.45'

106 +00

2° 57.15'

Station	Align	Defin <sup>Δ</sup>	True Bearing	Curve Data.
---------	-------	--------------------	--------------	-------------

117 +00

+56.54-ES. 13°02.5'

■ Hub

116 +00

12°30.15'

115 +00

11°32.85'

114 +00

10°35.55'

113 +00

9°38.25'

112 +00

8°40.25'

Station	Align	Defln. $\Delta$	True Bearing	Curve Data
124 + 00				
123 + 00				
122 + 00				
121 + 00				
120 + 00				
119 + 00				
118 + 00				

Station	Align.	Defln. $\Delta$	True Bearing	Curve Data.
---------	--------	-----------------	--------------	-------------

130 +00

129 +00

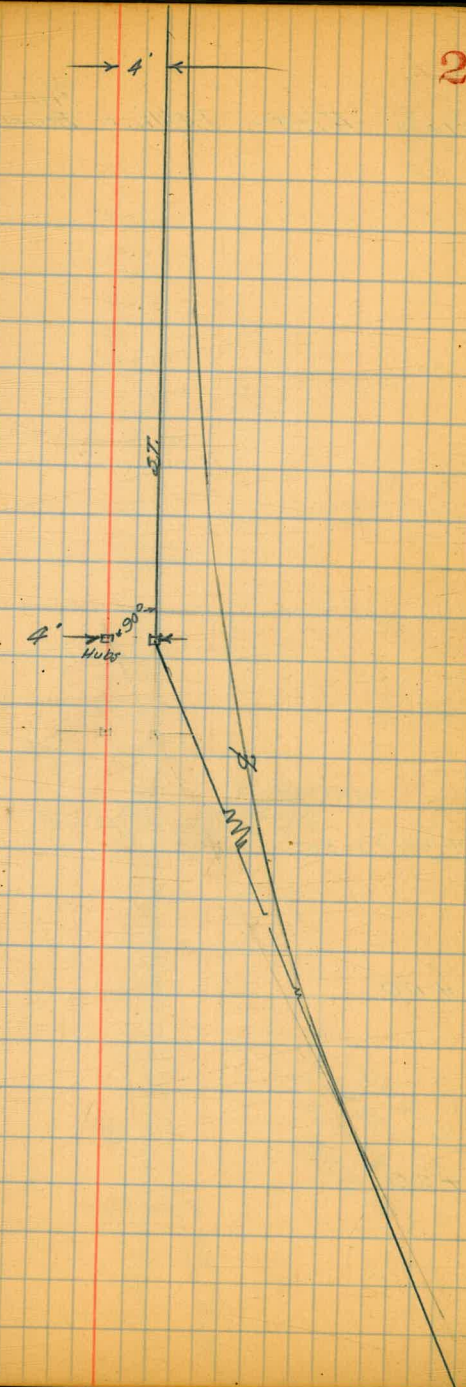
128 +00

+81.93 = P.C.T

127 +00

126 +00

125 +00







Walker  
 8155  
 1-18-31

Alignment "1550 West of E Santa Fe RR. Rth of Hwy.  
 Atlantic St. Extension  
 Detail of ties to Alignment as located in  
 17 Book 1380-8 and with Alignment as located in  
 this Book-2

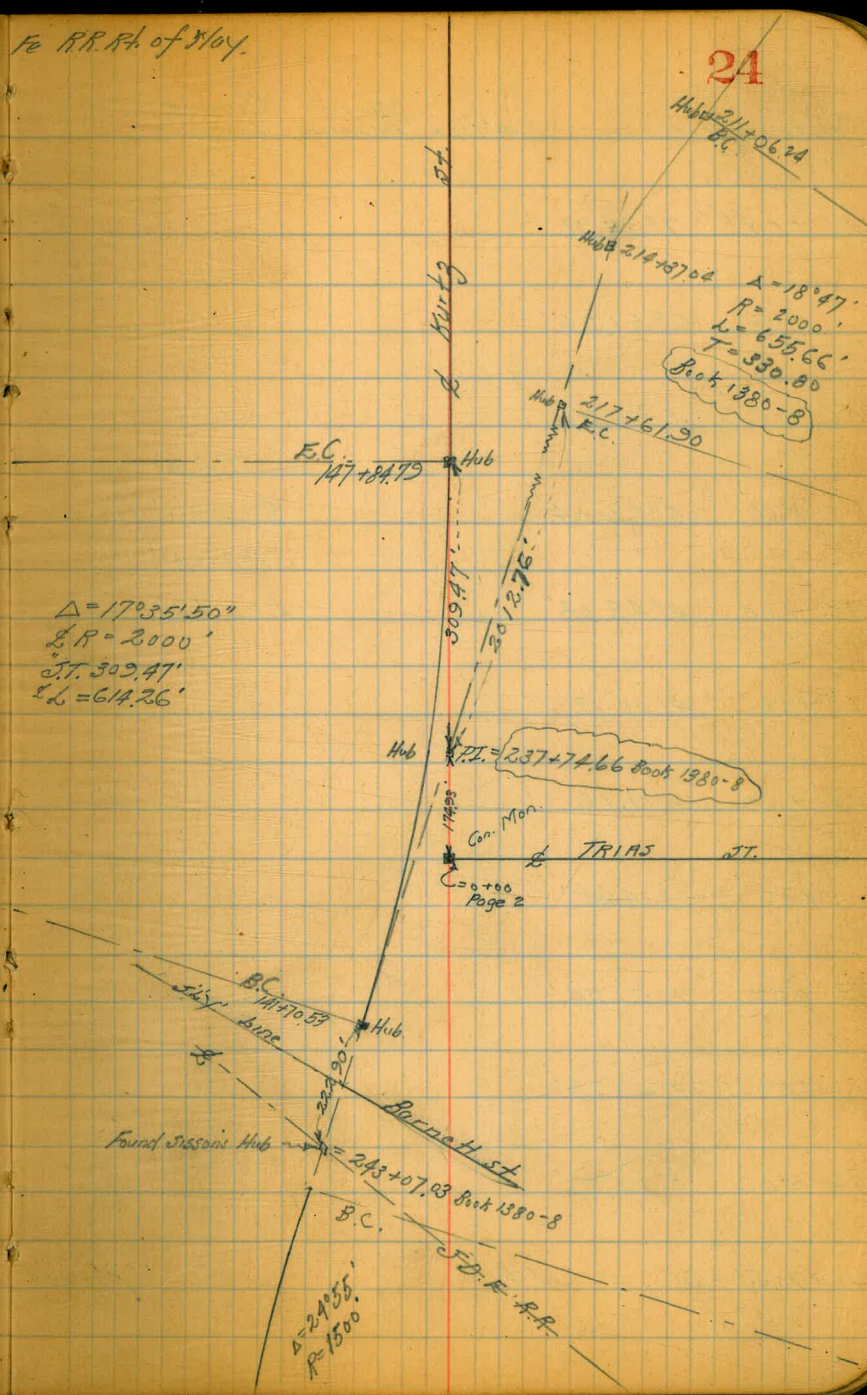
Note: stationing from Nth. of  
 Broadway = 382 + 54.66 See Book 1380-20  
 Above station = 0 + 00 this Alignment.

Stations	Align.	Defln. $\Delta$	True Bearing	Curve Data
----------	--------	-----------------	--------------	------------

147 + 84.79 = E.C.

141 + 70.53 = B.C.      L.T.

$\Delta = 17^{\circ}35'50''$   
 $R = 2000'$   
 $J.T. = 309.47'$   
 $L = 614.26'$



Station	Align.	Defln. A	TRUE BEARING	CURVE DATA
147 + 00		7°34.92'		
+50		6°51.96'		
146 + 00		6°09.0'		
+50		5°26.04'		A = 17°35'50" R = 2000' S.T. 309.47' L = 614.26'
145 + 00		4°43.08'		
+50		4°00.12'		
144 + 00		3°17.16'		
+50		2°34.20'		
143 + 00		1°51.24'		
+50		1°08.28'		
142 + 00		0°25.32'		
141 + 70.53 = B.C.				Lt.

Station	Align.	Defln. $\Delta$	True Bearing	Curve Data
---------	--------	-----------------	--------------	------------

153 + 00

152 + 00

151 + 00

150 + 00

149 + 00

148 + 00

147 + 84.79 - EC.  $8^{\circ}47.9$ +50  $8^{\circ}17.88$ 

+00.53

Con. Mon

-3000.30"

349.66' Hmsta

HENCOCK ST.



Station Align. Def'n  $\Delta$  True Curve  
Bearing Data

+27.45

+27.45

POT  
Hub.

165+00

164+00

163+00

162+00

+17.45

161+00

+17.45

POT  
Hub.

160+00

1612.54

Station    Align.    Defln.  $\Delta$     True Bearing    Curve Data

172+00    3°05.6'

+50    2°36.26'

171+00    2°08.3'

$\Delta = 36^{\circ}22'50''$

$R = 3000'$

+50    1°32.66'

$ST = 985.78'$

$L = 1909.88'$

170+00    1°11.0'

+50    0°42.36'

169+00    0°13.71'

+76.07 = BC.    RT.

168+00

167+00

166+00

103.23

POST = PI Hub on Page C

Con. Mon.

KURTZ

Hub.

⊘

Semi Tangent

3000'

JACKSON 349.98'

↑

Con. Mon.

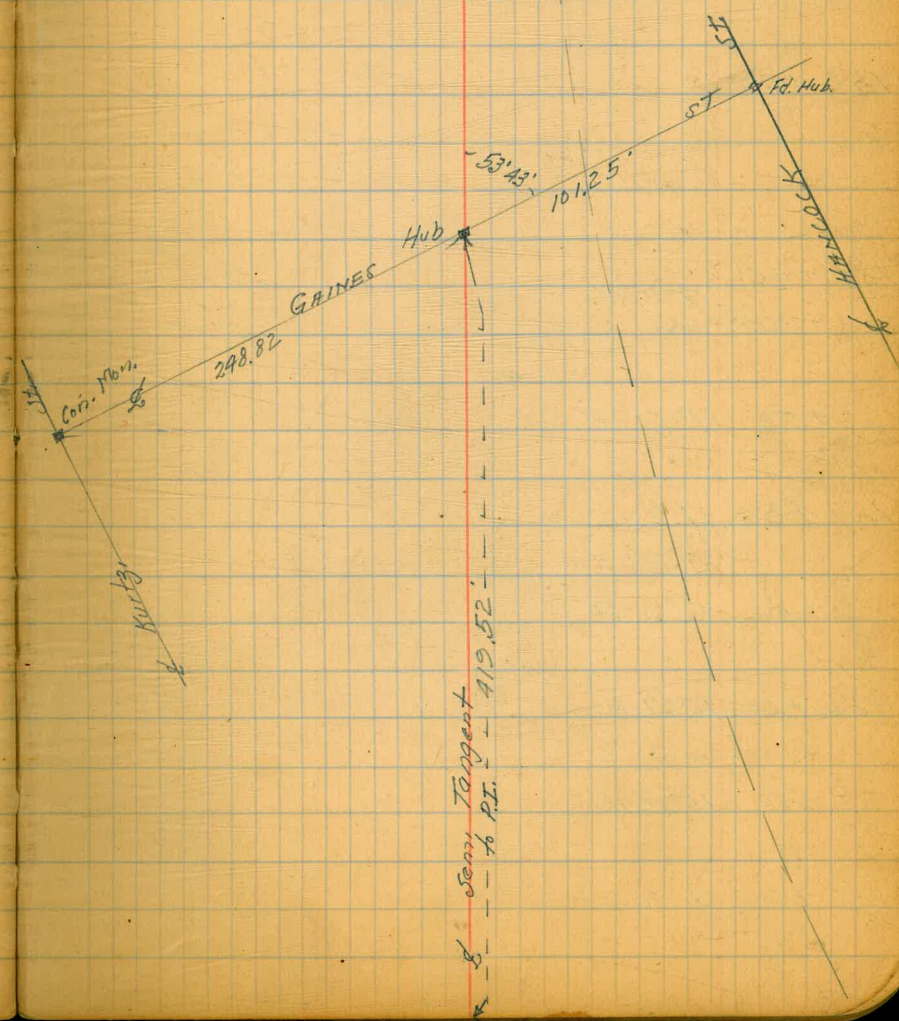
HARCOCK ST

↓





Station	Align.	Def. No.	TRUE BEARING	Curve DATA.
+50	15°01.86'			
184 +00	14°33.2'			
+50	14°04.56'			
183 +00	13°35.9'			
+50	13°07.26'			
182 +00	12°38.6'			
+50	12°09.26'			
181 +00	11°41.3'			
+50	11°12.66'			
180 +00	10°44.0'			
+50	10°15.36'			
179 +00	9°46.7'			
+50	9°18.06'			







Station    Align    Defl'n    True    Curve  
 203+00                    Bearing    Data.

202+00

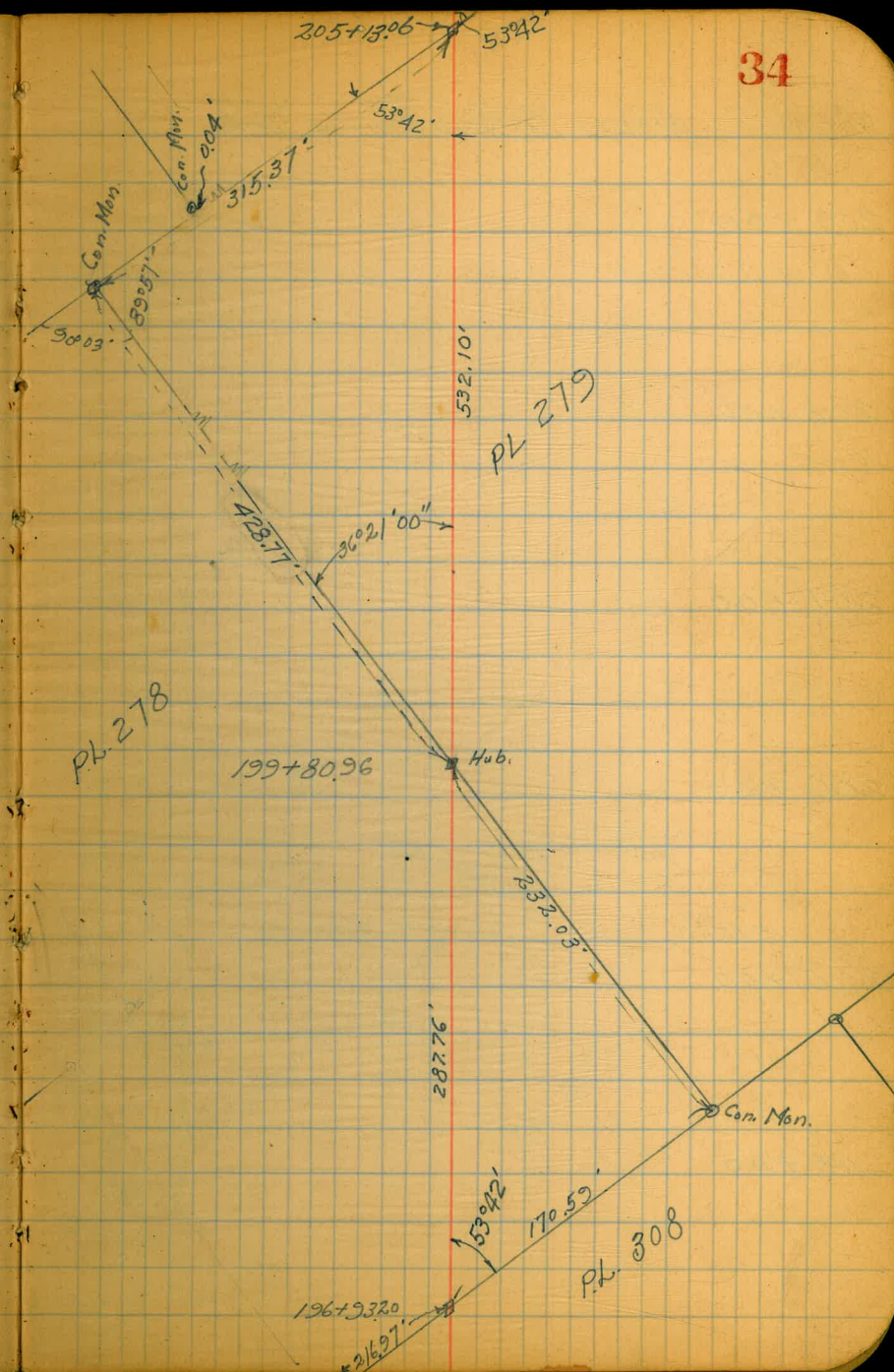
201+00

200+00

199+00

198+00

197+00





Station	Align.	Deflitz	True Bearing	Curve Data
---------	--------	---------	-----------------	---------------

215+00

+14.93

P.T. Hub.

214+00

213+00

212+00

211+00

210+00

Station	Align.	Defl'n	True Bearing	Curve Data
---------	--------	--------	-----------------	---------------

221+00				
--------	--	--	--	--

220+00				
--------	--	--	--	--

219+00				
--------	--	--	--	--

218+00				
--------	--	--	--	--

217+00				
--------	--	--	--	--

216+00				
--------	--	--	--	--

Station	Align.	Deflns	Type Bearing	Curve Data
---------	--------	--------	-----------------	---------------

228+00				
--------	--	--	--	--

227+00				
--------	--	--	--	--

226+00				
--------	--	--	--	--

225+00				
--------	--	--	--	--

224+00				
--------	--	--	--	--

223+00				
--------	--	--	--	--

222+00				
--------	--	--	--	--





Station	Align.	Deflna	True Bearing	Curve Data
+50	2°11.83'			
240+00	1°43.18'			$\Delta = 26^{\circ}05'$
				$R = 3000'$
+50	1°14.53'			$ST = 694.90'$
				$L = 1365.72'$
239+00	0°45.88'			
+50	0°17.23'			
+19.92	= B.C.			Lt.
238+00				
237+00				
236+00				
235+00				

Station Align. Defln. True Curve  
Bearing Data.

+50 7°55.66'

246+00 7°27'

+50 6°58.36'

+1482=PI

245+00 6°29.71'

+50 6°01.06'

244+00 5°32.41'

+50 5°03.76'

243+00 4°35.11'

+50 4°06.46'

242+00 3°37.81'

+50 3°09.13'

241+00 2°40.48'

PI ■

Station	Align.	Def'n. $\Delta$	True Curve Bearing Data
---------	--------	-----------------	----------------------------

253+00

252+00

13°02.5'

+85.64 = E.C.

+50 12°42.06'

251+00 12°13.91'

+50 11°44.86'

250+00 11°16.21'

+50 10°47.56'

249+00 10°18.91'

+50 9°50.26'

248+00 9°21.61'

+50 8°52.96'

247+00 8°24.31'

Station	Align.	Defln. $\Delta$	True Bearing	Curve Data.
---------	--------	-----------------	--------------	-------------

259+00

258+00

257+00

256+00

+14.29 = P.O.T.

255+00

254+00

+14.29

Station Align. Def'n. <sup>True</sup> Bearing

265+00

264+00

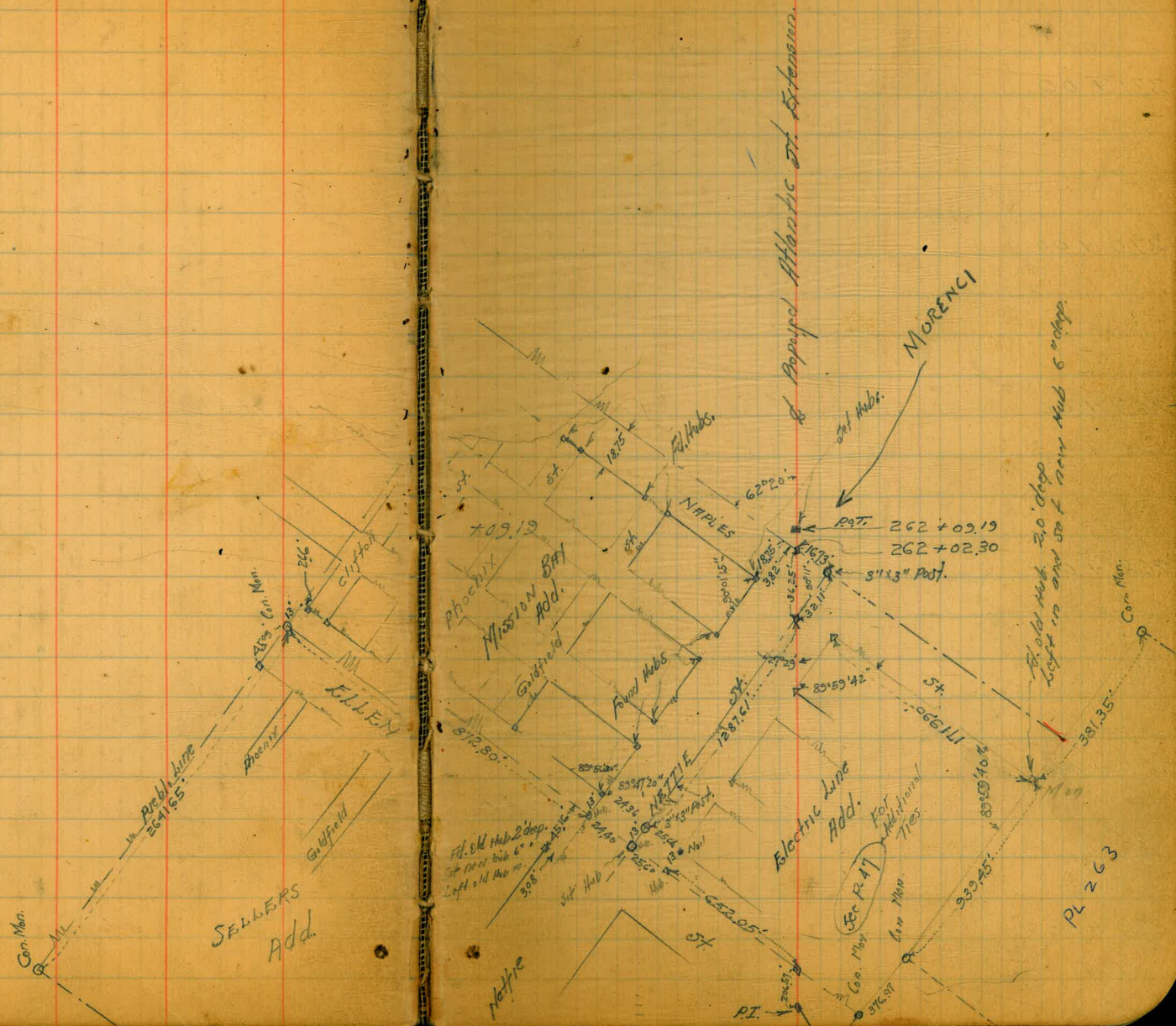
263+00

709.19 P.O.T.

262+00

261+00

260+00



PL 263

Station	Align.	Defl'n.	True Bearing	Curve Data
---------	--------	---------	-----------------	---------------

271 + 00				
----------	--	--	--	--

270 + 00				
----------	--	--	--	--

269 + 00				
----------	--	--	--	--

268 + 00				
----------	--	--	--	--

267 + 00				
----------	--	--	--	--

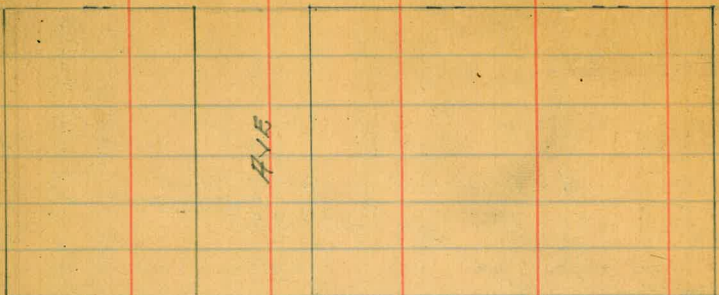
266 + 00				
----------	--	--	--	--







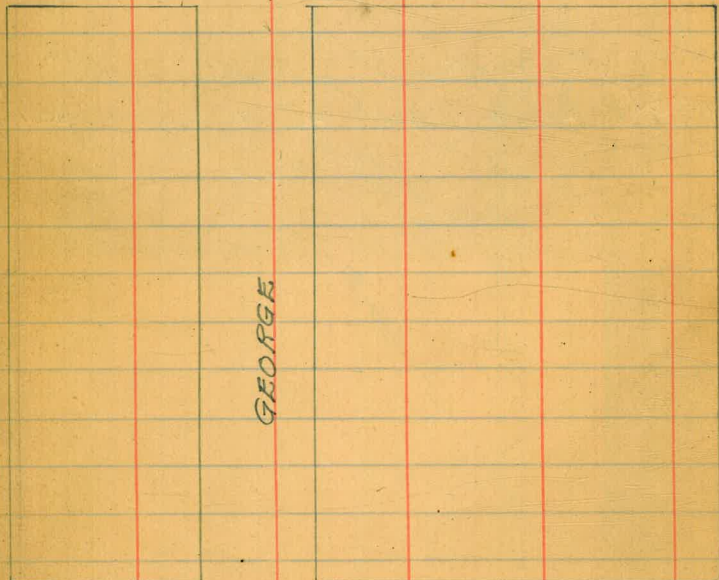
Con. Mon.



AVE.

AVE.

PHOENIX



GEORGE

SPENCER

GOLDFIELD



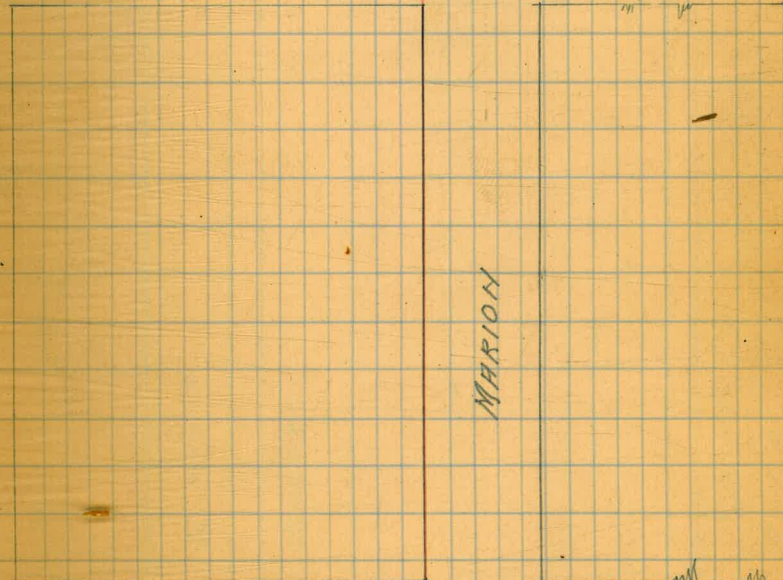
Cont. see P-53



AVE.

AVE.

ST.



MARION

JENNIE

ST.

see page 49



Cont. see P-53

Sec Page 48

Ave.

PHOENIX

JENNIE

GOLDFIELD

Cont sec p 54

Ave.

MICHIGAN

Ave.

St.

MARGARET

St.

Cont sec p 54

Ave.

Sec Page 50

ANNA

Ave.

Ave.

Ave.

Ave.

PHOENIX

ST.

See Page 49

ANNA

ISABEL

DE LAHUNT

ELLEN

See Page 51

GOLDFIELD

ST.

Cont. see P. 55

Cont. see P. 55

ST.

ST.

Fd. Com. Map. p. 47

45° 03'

Old Hob Rd

CLIFTON

ST.

AVE.

PHOENIX

See Page 50

PHOENIX

ST.

ELLEN

BISBEE

See Page 52

TEMPE

GOLDFIELD

ST.

Cont. Page 56

Cont P-56

ST.

CLIFTON

ST.

PHOENIX

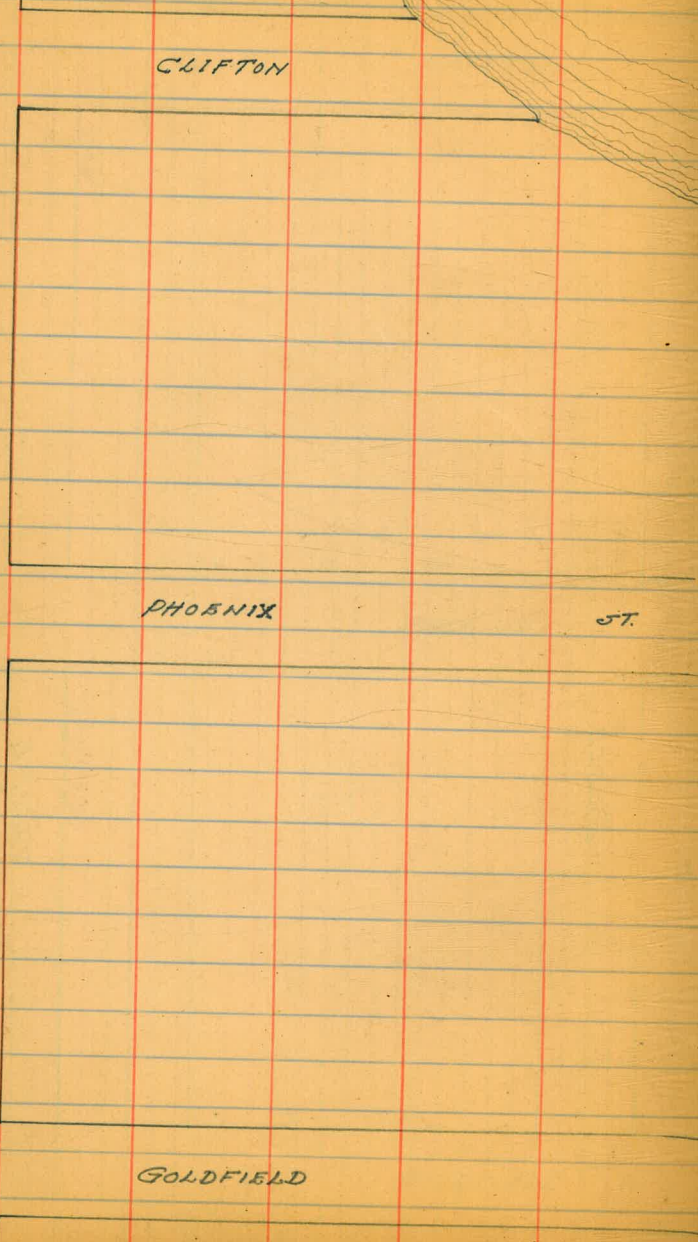
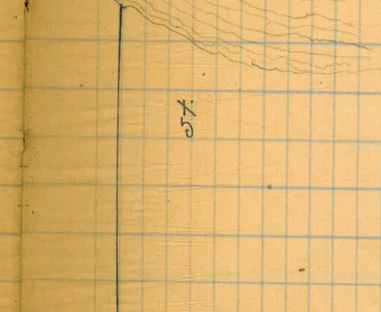
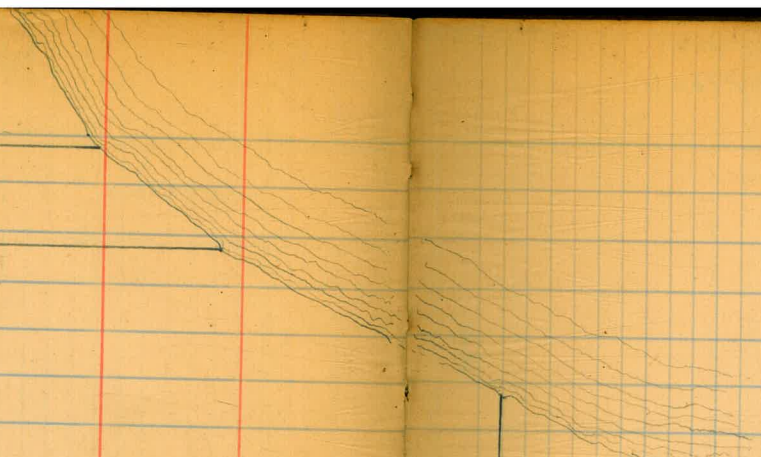
ST.

MAPLES

GOLDFIELD

TEMP.

See Page 51



Cont. See Page 48

GOLDFIELD

Cont. see P. 48

ST. 53

AVE.

AVE.

AVE.

AVE.

NETTIE

ST.

GEORGE

SPENCER

MARION

JENNIE Cont. Page 54

LIEA

ST.

Cont. Page 57

Cont. Page 57

GOLDFIELD

Cont. See P. 49

ST.

54

AVE.

AVE.

AVE.

AVE.

NETTIE

ST.

Cont. Page 53

JENNIE

MICHIGAN

MARGARET

Cont. Page 55

ANNA

LIETH

ST.

Cont. Page 58

Cont. Page 58



Sec P-50  
GOLDFIELD

Cont. Sec P-50

57.

55

Ave

Ave.

Ave.

Ave.

NETTIE

57

60'

Cont. Page 54

ANNA

ISABEL

DELAHUNT

Cont. Page 56

ELLEN

Fd. old hole 3' deep  
set in and set new trap  
25' deep

300.00'

LIETA

57.

Cont. Page 53

Cont. Page 59

AVE.

57

130

NETTIE

LIETA

SIBBE

MORENCI

ELLEN

1875

57

1875

20.55

1319.72'  
See P. 44

found 1 "triangular stake  
apparently the kind used in this  
subdivision. Not located

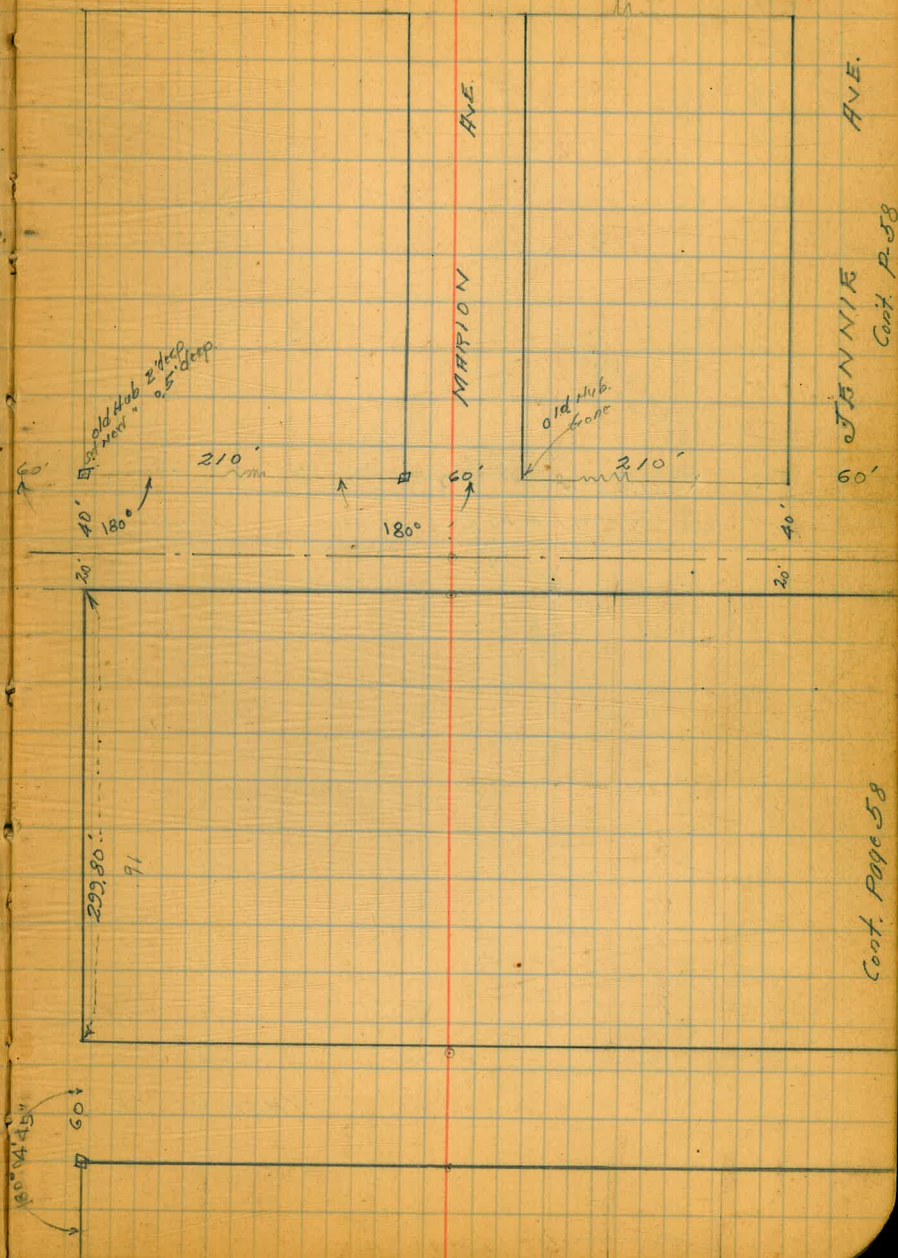
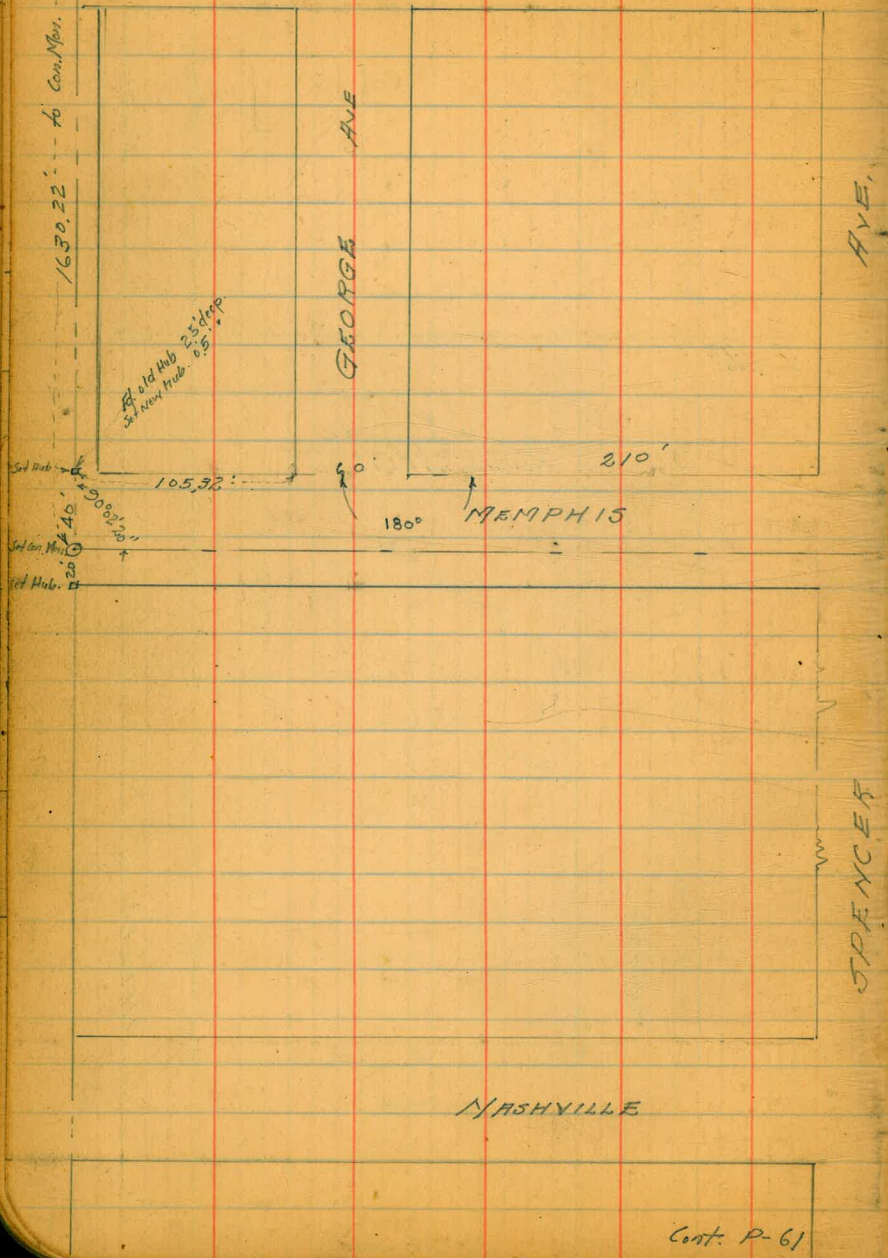
found 1 x 1/4" stake no tack.

1/2 stake off base

TEMPE

NAPLES

1875



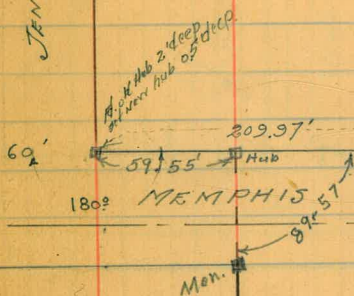
Cont. Page 54  
LINTH

Ave

Cont Page 57

JENNIE AVE.

JENNIE



MICHIGAN

90°

180°

209.92'

Ave

Cont. Page 54  
54

58

Ave.

Cont Page 59

MARGARET

old hub 1' deep  
and new hub near  
left 0.5' deep

60°

180°

210.08'

57'

130°

40'

80°

60°

90° 00' 30"

ANNA

299.87'  
Cont. Page 59

60'

299.89'

Cont. P-61

NASHVILLE

LIETA

ST.

59

Cont. see P-58

AVE.

AVE.

AVE.

AVE.

Cont. on P-60

Feb. 17<sup>th</sup> 12-2-46  
Set Hub 12-2-46

MEMPHIS

Set old Hub 2' deep  
Set new Hub 0.5' deep

ST.

Cont. see Page 58

ANNA

ISABEL

DE LAHUNT

ELLEN

Cont. on P-60

Set Hub 12-2-46

NASHVILLE

Set old Hub 2' deep  
Set new Hub 0.5' deep

ST.

Feb. 17<sup>th</sup> 12-2-46

Cont. on P-63

See P-63

304.00  
57

Cont Page 56  
MORRIS

Cont P. 56

80

Memphis

299.81'

PAUL

NASHVILLE

NASHVILLE

Cont. on P. 59  
299.83

5.665N

LEHIGH

LEHIGH

370.02'

12

BISBEE

11

TEMPE

90°01'15"  
45.78'

376.07'  
KNOXVILLE 179°31'30"

Fd Cen. Mon.

st.

339.45  
Sec P. 47

89°59'40"  
BASELINE

1712.90

1749.90' to N.E. Co. Artific. wh.

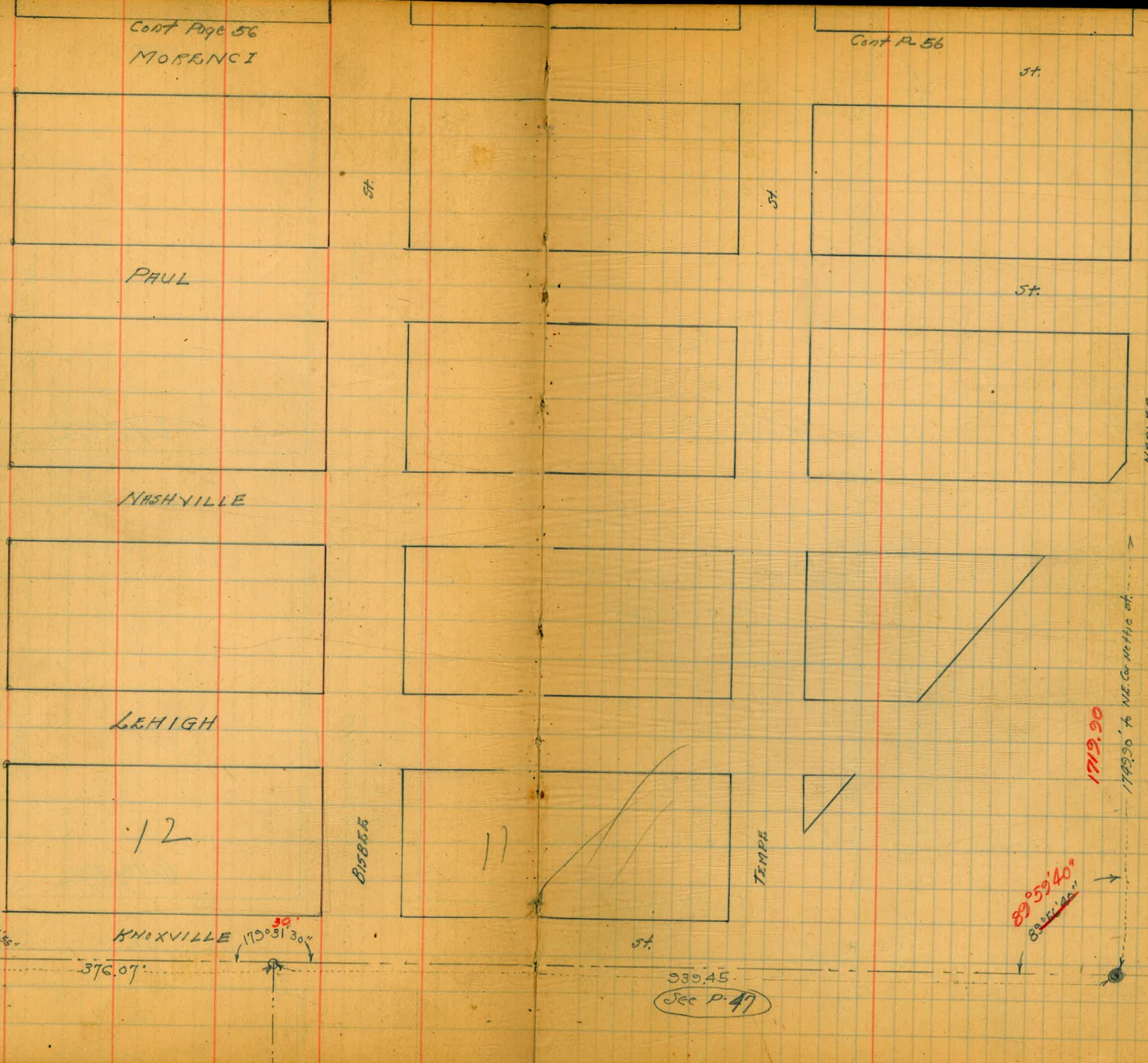
MEMPHIS

st.

st.

st.

st.

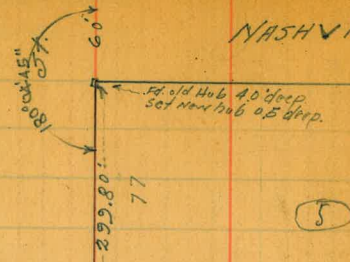


Cont. on P. 57

Cont. p. 58

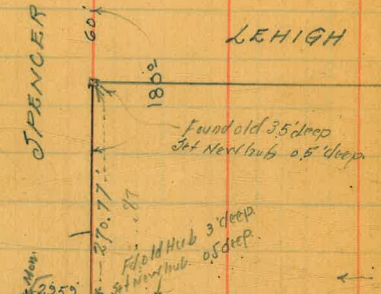
30'

NASHVILLE



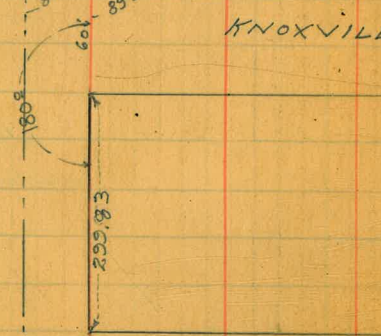
Fd. old Hub  
299.85  
Ft. old Hub  
Set New Hub

LEHIGH



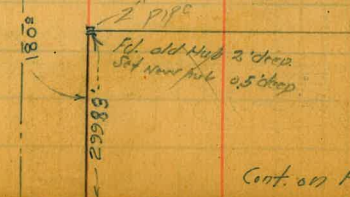
299.83  
Ft. old Hub  
Set New Hub  
60.  
89.57  
60.

KNOXVILLE



299.78  
Ft. old Hub  
Set New Hub  
60.  
60.

FILLMOORE



299.80

Cont. on P. 62

Cont. P. 62

ANNA AVE

61

See Page 63

Note: all new hubs  
set in 2x4 iron pipe  
10" inside dia. in 24" dia.  
copper pipe 1/2" dia.  
Hubs set in 2x4 iron pipe  
old hubs set in 2x4 iron  
wood

P. 261

P. 62  
299.80  
299.80

Feb. 1931

Cont. P. 61

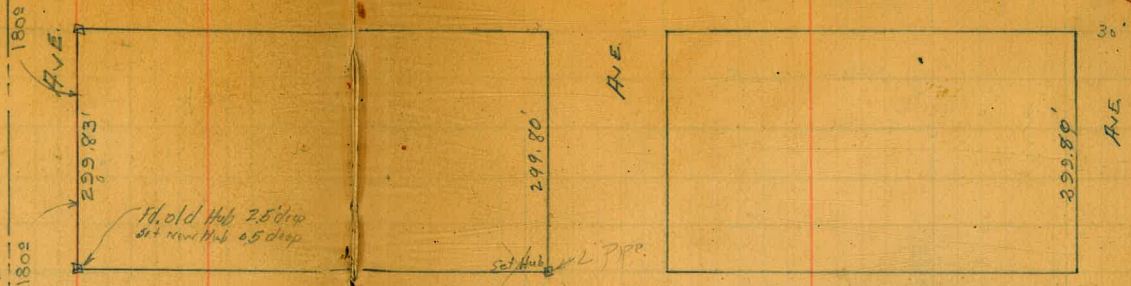
F. old Hub. Set Hub.

Cont. P. 61

62

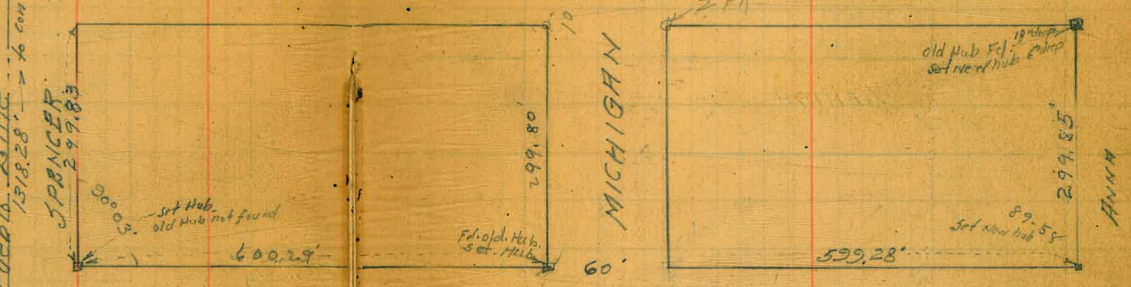
FILLMORE

ST



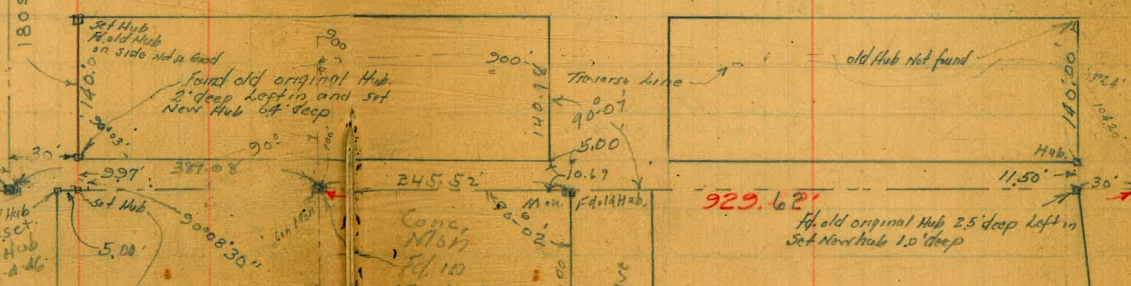
JOLIET

ST



RAUSTON

ST

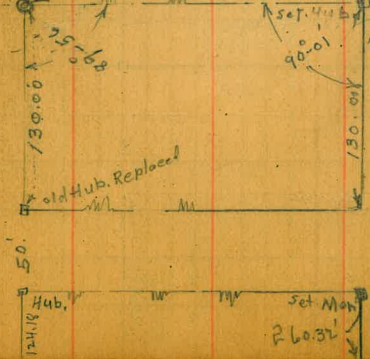


STEWART

ST

set. Con Man (This Mon Fd on side 12-4-46 4.5 ft)

Con. Man found 4.0' deep left in and set Mon. 0.3' deep.



Page 657

COMMONS

ST

Set Hub. Con Man. Fd in Mon. 10.00 to 0.06 to far West



ANNA AVE

Set Hub 10-2-46

30' 50"

NASHVILLE

299.83'

LEHIGH

30' 30"

270.25'

Set Hub

209.90'

ISABEL

209.82'

DE LAHUNT

209.20'

270.02'

ALLEN

45.78'

Con. Mon.

Ed. old Hub 2' deep  
Set new hub 0.5' deep

Set New hub

Note: All hubs set on 890's straight line  
& read line nearest

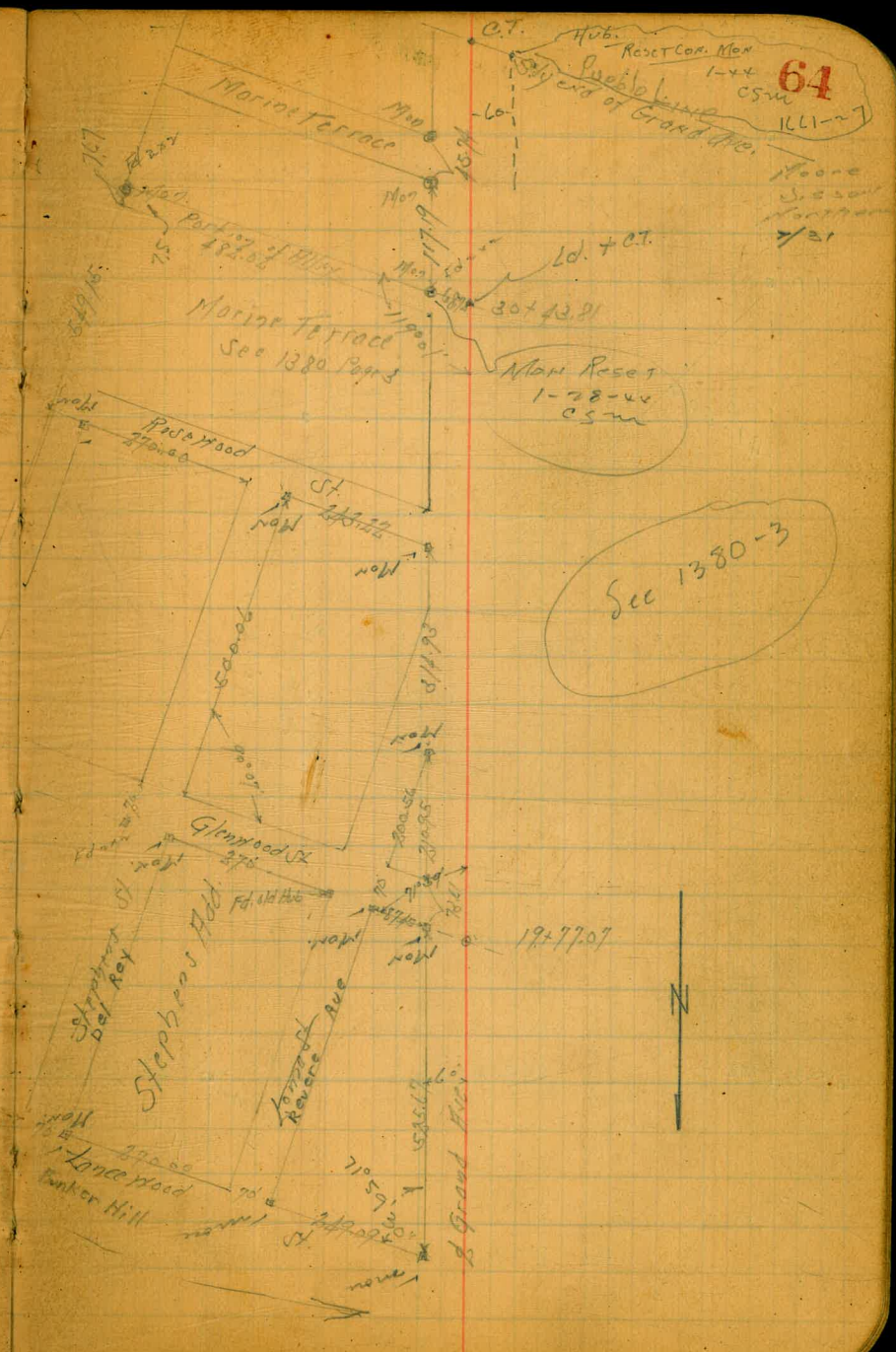
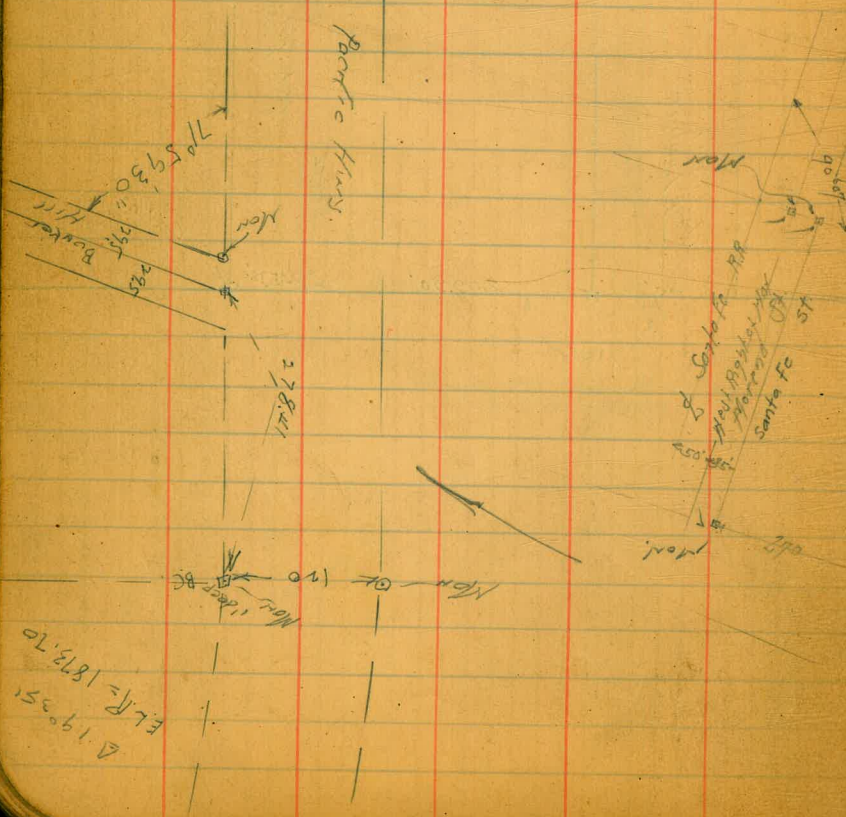
Above old Hubs Ed. 2' deep  
Set new hubs 0.5' deep.

←  
see pg 61

269.90  
209.82  
579.72

ANNA

Proposed Atlantic St. Extension





Proposed Atlantic St  
100' West of Santa Fe Rail Road

← 100' → 200 →

June 22, 31  
**66**  
Moore  
Survey  
Not Pinned

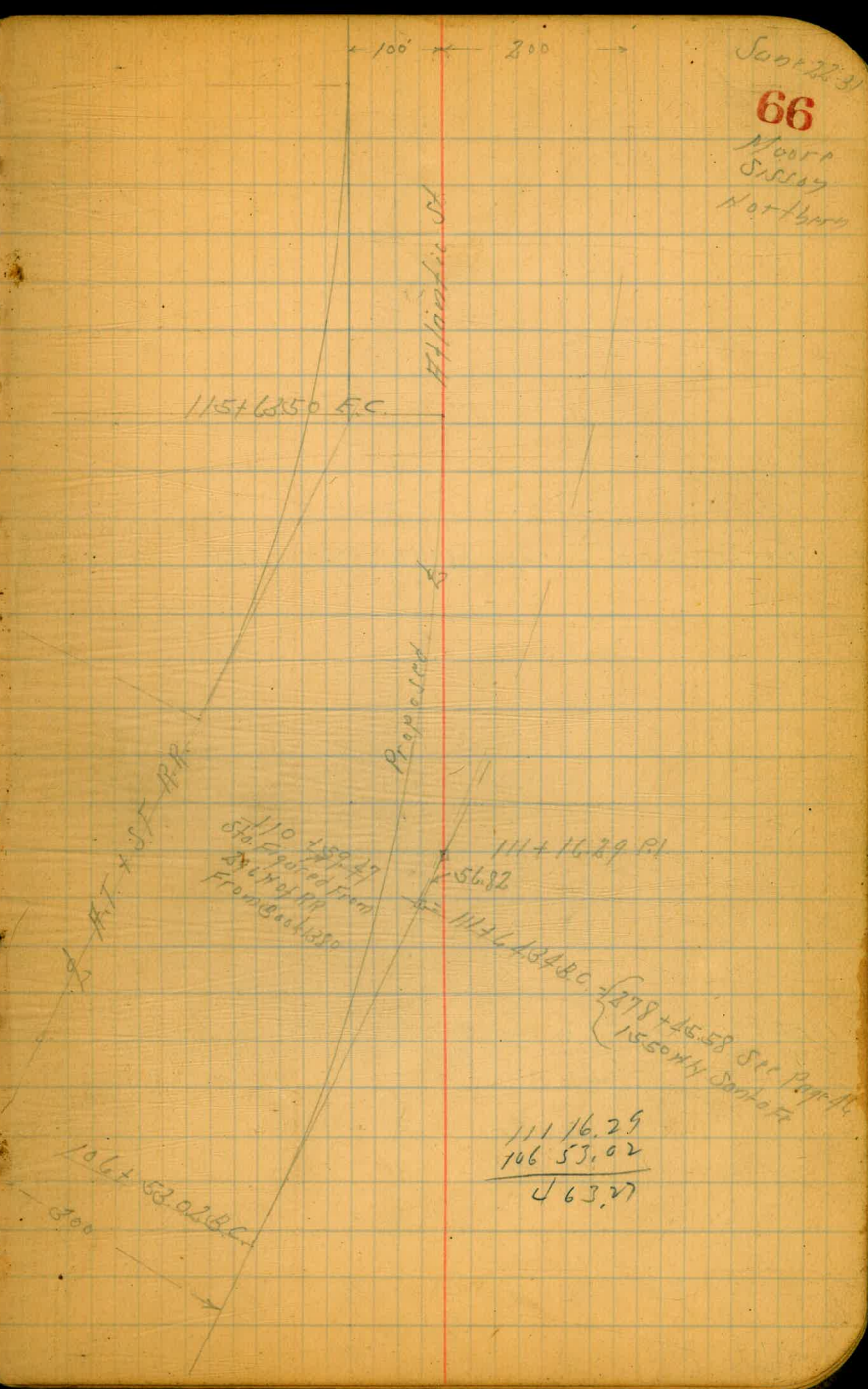
115 + 63.50 EC

115 + 63.50 EC

Note: For Additional  
Time to Ashburn Close  
Leaf Terrace  
See Page 79

A = 26° 05'  
R = 2000.0  
L = 910.48  
T = 463.27

106 + 53.02 B.C. St.



111 16.29  
106 53.02  
217 69.31

1550' by Santa Fe

130+5237 P.O.T. - opp. 13240 296' N of RR

120+2097 P.O.T. - opp. 130+6550 EC 300' N of RR -  
 " 131+6840 EC 396' N of RR

100

100

161 + 8163 P.O.T. = opp 163 + 2926 157

151 + 5207 P.O.T.

107

141 + 5237 P.O.T. = opp 14370

07511

< 100 >

□

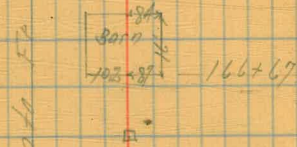
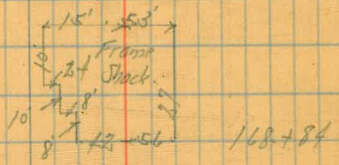
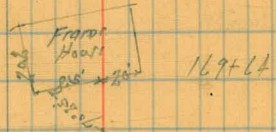
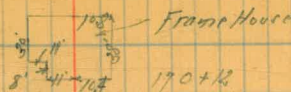
□

F.T. x Jando E.

2

□

< 100 >



H. F. & Sons

166 + 50.74 POT

151

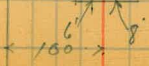


2 South Fe



172+38

170  
Finner Boat

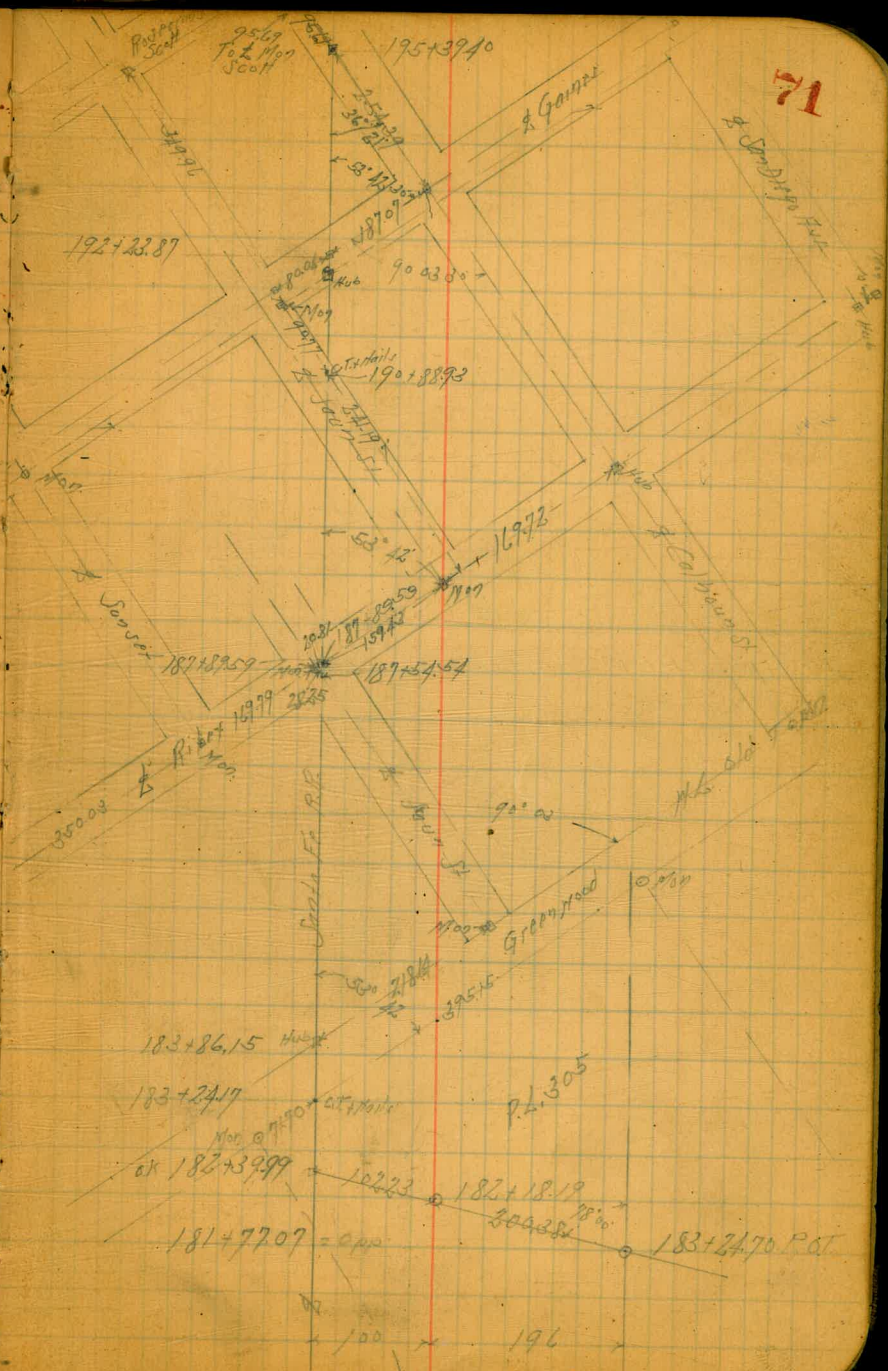


171+270



Proposed A. H. & C. St. 1850

71

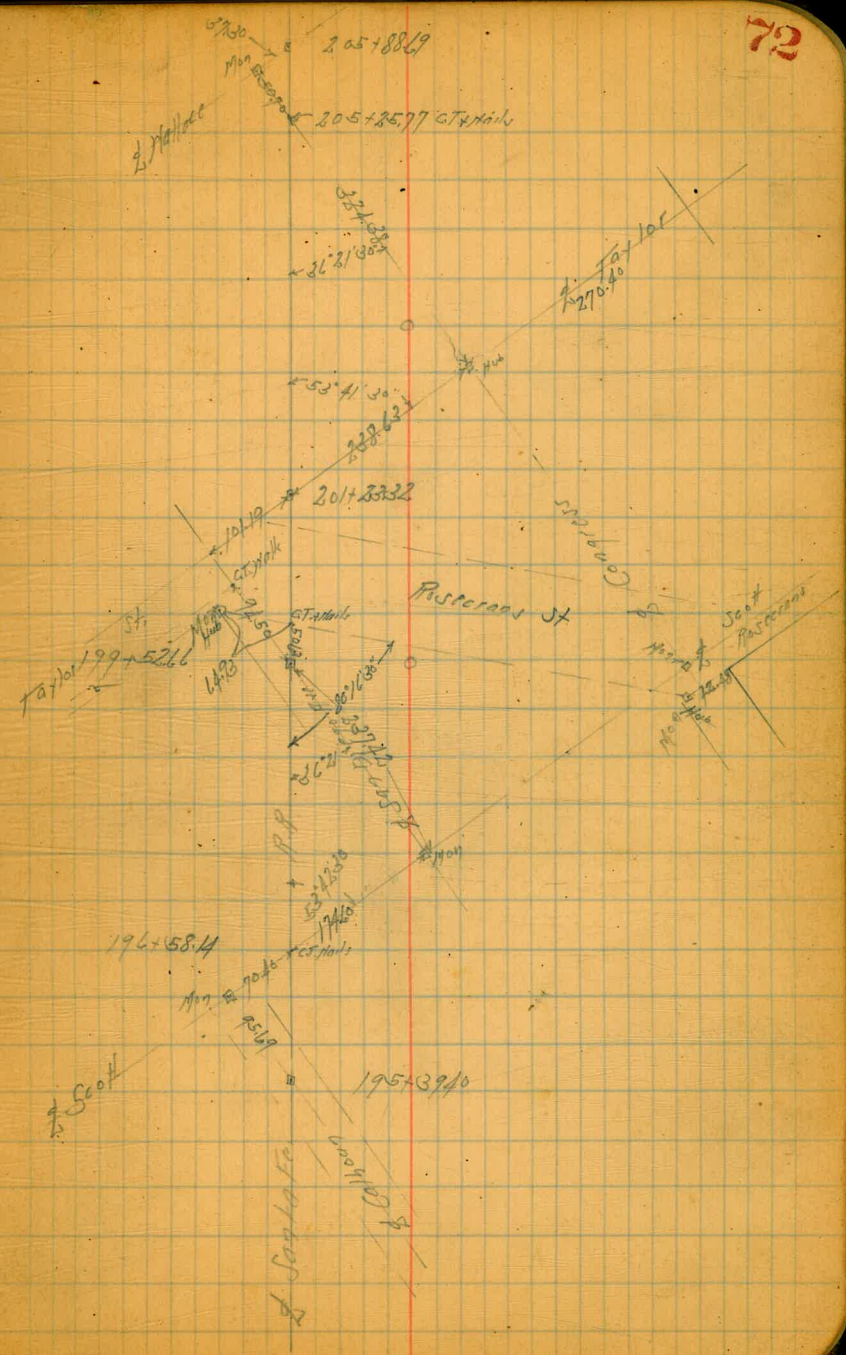


182+1819 P.O.T. or Dyke

183+86.15 H.W.P.  
 183+2417  
 No. 07170 or 07170  
 ex 182+3999  
 181+7707 = opp  
 182+23  
 182+1819  
 183+2170 P.O.T.  
 196

20175219 P.O.T. = opp 20340

1984900 P.O.T. C.T.T.P

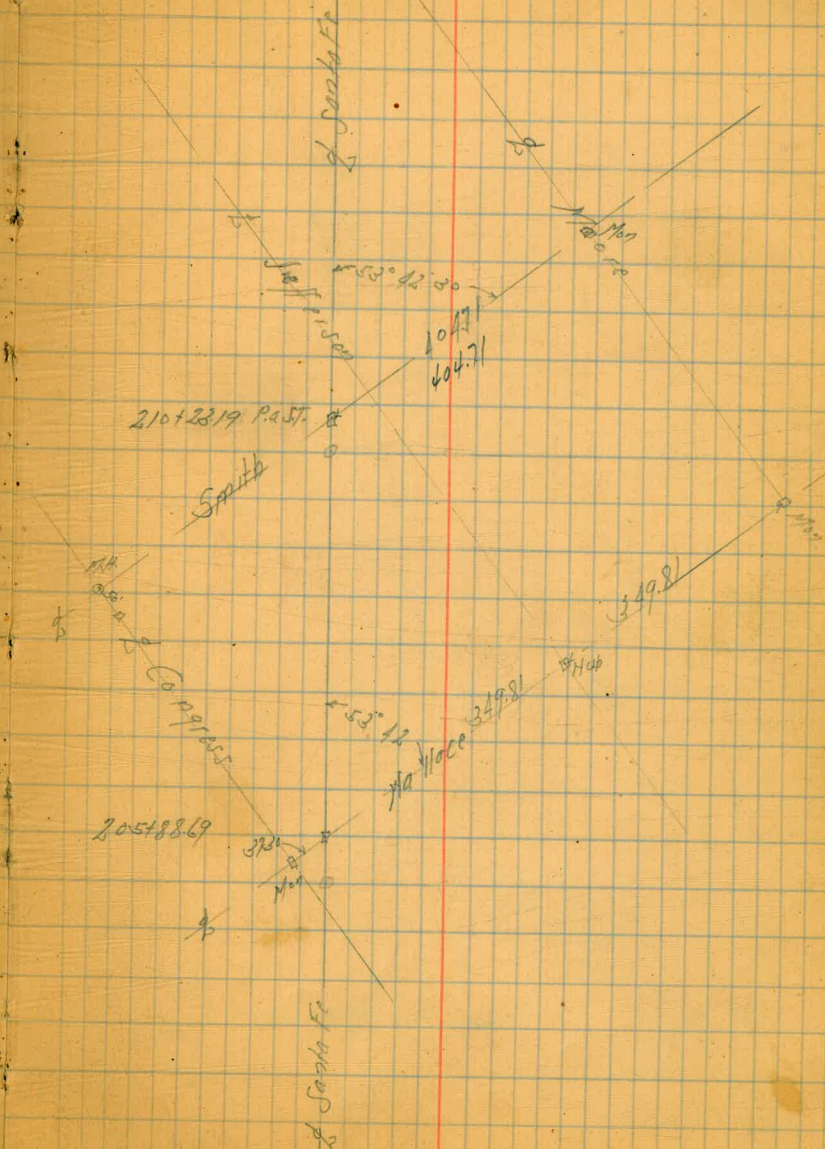


June 26-31

73

209+58.39 P.O.T. - opp 211+06.24 BC 296 N.1 P.R.

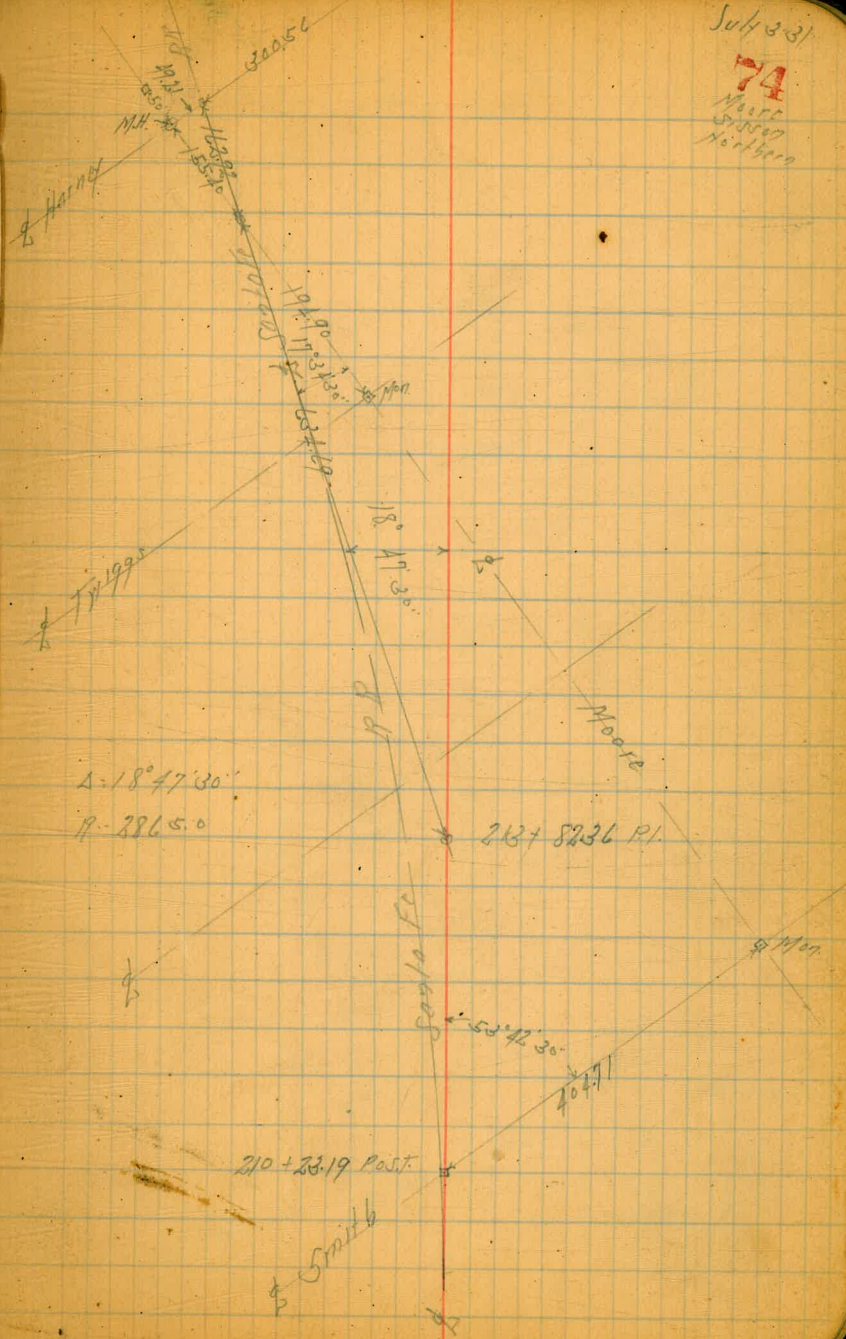
205+01.06 P.O.T.



July 31

74

North  
Street  
Northern



A = 18° 47' 30"

P = 236.50

2137.5236 P1

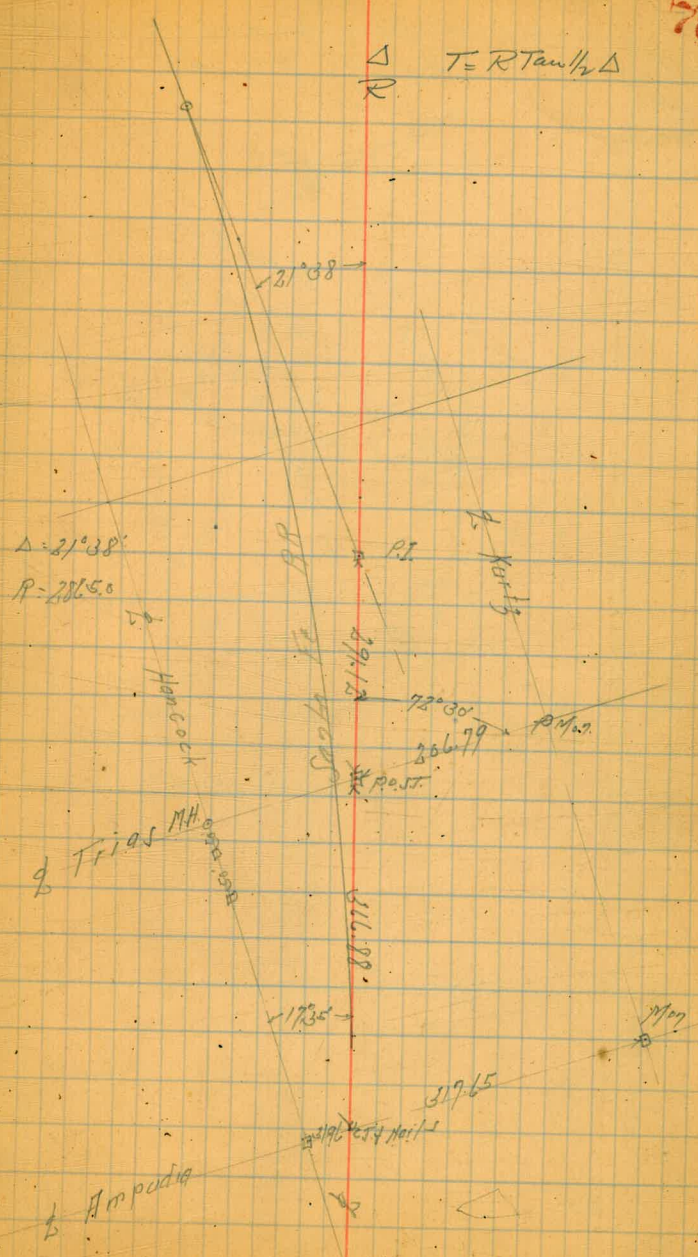
53° 42' 30"

210 + 23.19 Post

Smith



$\frac{\Delta}{R} = \frac{T \tan \frac{1}{2} \Delta}{R}$



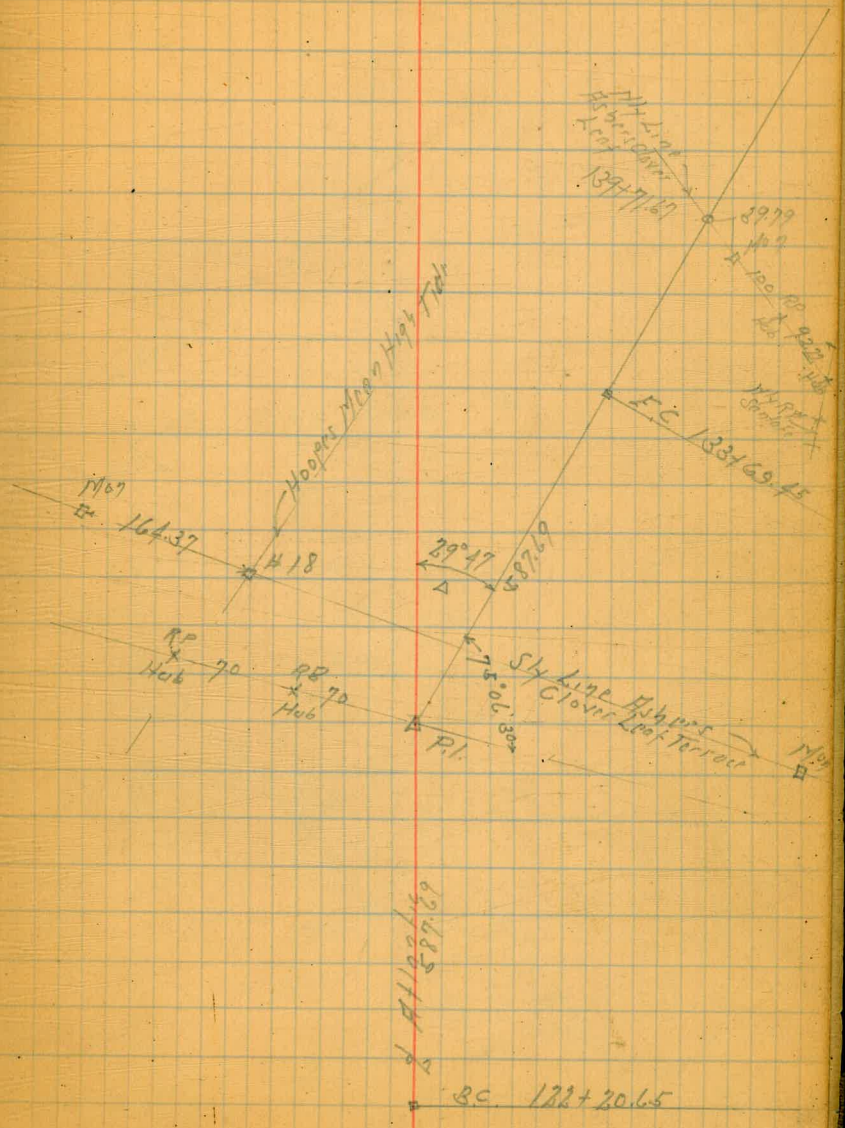


Ties Atlantic St Ext  
Ashers Cloverleaf Terrace

F.B. 1422

78

3-18-33  
Moore







DIRECTIONS FOR USE OF TABLES

TABLE No. 1.

Distance of slope stake from side or shoulder stake for any width roadway, slope 1 1/2 to 1. If ground is nearly level, the cut or fill at side stake is located by the double entry method in left column and top row. The number in body

of table in same row and column gives distance from side stake to slope stake. If ground is not level, the distance from side stake to slope stake, lower target by this amount if cut, elevate if fill. Add this amount to cut or fill and find distance in table. Set up rod at this point and line of sight should cut target.

IMPROVED TABLES  
AND  
INFORMATION

To find tangent and external for curve of any other degree, divide by degree of curve and add correction found in column of correction. Degree of curve with a given  $L$  may be found by dividing tangent (or external), opposite  $L$  by given tangent (or external). The distance from a point on the tangent to the curve is very nearly the square of the tangent length divided by twice the radius.

3680  
18001

## DIRECTIONS FOR USE OF TABLES

TABLE No. 1.

Distance of slope stake from side or shoulder stake for any width roadway, slope  $1\frac{1}{2}$  to 1. If ground is nearly level, the cut or fill at side stake is located by the double entry method in left column and top row. The number in body of table in same row and column gives distance from side stake to slope stake. If ground is not level estimate the difference in elevation between the side stake and slope stake, lower target by this amount if cut, elevate if fill. Add this amount to cut or fill and find distance in table. Set up rod at this point, and line of sight should cut target. If it does not make the slight adjustment necessary.

TABLE No. 9.

To find Tangent and External for curve of any other degree, divide by degree of curve and add correction found in column of corrections.

Degree of curve with a given I may be found by dividing tangent, (or external), opposite I by given tangent, (or external).

The distance from a point on the tangent to the curve is very nearly the square of the tangent length divided by twice the radius.

105156  
(base 1000)

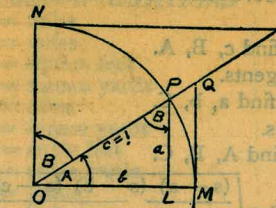


TABLE II.  
TRIGONOMETRIC FORMULÆ.

$\angle A = \angle MOP$      $\angle B = \angle PON = \angle OPL$   
 $R = OB = c = 1$

$\sin A = \frac{a}{c} = \frac{a}{1} = a = \cos B = LP$

$\cos A = \frac{b}{c} = \frac{b}{1} = b = \sin B = OL$

$\tan A = \frac{a}{b} = \frac{MQ}{OM} = \frac{MQ}{1} = MQ = \cot B = MQ$

$\cot A = \frac{NT}{ON} = \frac{NT}{1} = NT = \tan B = NT$

$\sec A = \frac{OQ}{OM} = \frac{OQ}{1} = OQ = \csc B = OQ$

$\csc A = \frac{OT}{ON} = \frac{OT}{1} = OT = \sec B = OT$

$\text{vers } A = \frac{LM}{OP} = LM = \text{covers } B \#$

$\text{covers } A = \frac{OP - LP}{OP} = OP - LP = \text{vers } B$

$\text{exsec } A = PQ = \text{coexsec } B$

$\text{coexsec } A = PT = \text{exsec } B$

$\sin \frac{1}{2} A = \sqrt{\frac{1 - \cos A}{2}}$      $\cos \frac{1}{2} A = \sqrt{\frac{1 + \cos A}{2}}$

$\sin 2A = 2 \sin A \cos A$      $\cos 2A = \cos^2 A - \sin^2 A$

Law of Sines     $\frac{\sin A}{a} = \frac{\sin B}{B} = \frac{\sin C}{C}$

Law of Cosines     $c^2 = a^2 + b^2 - 2 ab \cos C$

Law of Tangents     $\frac{a+b}{a-b} = \frac{\tan \frac{1}{2} (A+B)}{\tan \frac{1}{2} (A-B)}$

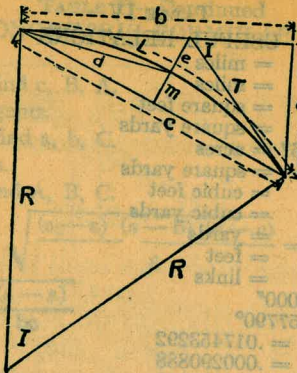


TABLE V  
CURVE FORMULAE FOR SIMPLE CURVES  
COMPILED BY J. CALVIN LOCKE, C.E.

- (1)  $c = \sqrt{2Ra}$  (2)  $c = \sqrt{a^2 + b^2}$   
 (3)  $c = \sqrt{2R(R - \sqrt{(R+b)(R-b)})} = \sqrt{2R(R - \sqrt{R^2 - b^2})}$   
 (4)  $c = 2\sqrt{m(2R - m)}$   
 (5)  $c = 2R \sin \frac{1}{2} I$  (6)  $c = 2T \cos \frac{1}{2} I$   
 (7)  $e = R \operatorname{exsec} \frac{1}{2} I$   
 (8)  $e = R \tan \frac{1}{2} I \tan \frac{1}{4} I$  (9)  $e = T \tan \frac{1}{4} I$   
 (10)  $b = \sqrt{a(2R - a)}$   
 (11)  $b = \sqrt{\left(c + \frac{c^2}{2R}\right)\left(c - \frac{c^2}{2R}\right)} = \sqrt{c^2 - \frac{c^4}{4R^2}}$   
 (12)  $b = R \sin I$  (13)  $b = a \cot \frac{1}{2} I$   
 (14)  $R = \frac{a^2 + b^2}{2a}$  (15)  $R = \frac{d^2}{2m} = \frac{c^2 + 4m^2}{8m}$   
 (16)  $d = \sqrt{R(2R - \sqrt{(2R+c)(2R-c)})} = \sqrt{R(2R - \sqrt{4R^2 - c^2})}$   
 (17)  $d = \sqrt{2Rm}$  (18)  $d = 2R \sin \frac{1}{4} I$  (19)  $m = \frac{d^2}{2R}$   
 (20)  $m = R \mp \sqrt{\left(R + \frac{c}{2}\right)\left(R - \frac{c}{2}\right)} = R \mp \sqrt{R^2 - \frac{c^2}{4}}$   
 (21)  $m = R \operatorname{vers} \frac{1}{2} I$  (22)  $m = R \sin \frac{1}{2} I \tan \frac{1}{4} I$  (23)  $m = \frac{1}{2} c \tan \frac{1}{4} I$   
 (24)  $a = \frac{c^2}{2R}$  (25)  $a = R - \sqrt{(R+b)(R-b)} = R - \sqrt{R^2 - b^2}$   
 (26)  $a = 2R(\sin^2 \frac{1}{2} I)^2$  (27)  $a = R \operatorname{vers} I$  (28)  $a = R \sin I \tan \frac{1}{2} I$   
 (29)  $a = b \tan \frac{1}{2} I$  (30)  $a = T \sin I$  (31)  $T = R \tan \frac{1}{2} I$   
 (32)  $I = \frac{L}{R} \times 57.295780$  (33)  $R = \frac{L}{I} \times 57.295780$   
 (34)  $L = IR \times 0.01745329$  (35)  $L = \frac{8d - c}{3}$   
 (36)  $\text{Area Seg.} = \frac{LR - R^2 \sin I}{2} = \frac{LR - Rb}{2}$

TABLE VI  
SINES, COSINES, TANGENTS, COTANGENTS

deg	sin 0'	tan 0'	sin 10'	tan 10'	sin 20'	tan 20'	sin 30'	tan 30'	sin 40'	tan 40'	sin 50'	tan 50'	sec 0'
0	0000	0000	0029	0029	0058	0058	0087	0087	0116	0116	0145	0145	89
1	175	0175	0204	0204	0233	0233	0262	262	291	291	320	320	88
2	349	349	378	378	407	407	436	436	465	465	494	494	87
3	523	524	552	553	581	582	610	612	640	641	669	669	86
4	698	699	727	729	756	758	785	787	814	816	843	843	85
5	872	875	901	904	929	934	958	963	987	992	1016	1016	84
6	1045	1051	1074	1080	1103	1110	1132	1139	1161	1169	1190	1190	83
7	219	228	248	257	279	287	305	317	334	346	363	363	82
8	392	405	421	435	449	465	478	495	507	524	536	536	81
9	564	584	593	614	622	644	650	673	679	703	708	708	80
10	736	763	765	793	794	823	822	853	851	883	880	880	79
11	908	944	937	974	965	2004	994	2035	2022	2065	2051	2051	78
12	2079	2126	2108	2156	2136	186	2164	217	193	247	221	221	77
13	2590	309	278	339	306	370	334	401	363	432	391	391	76
14	419	493	447	524	476	555	504	586	532	617	560	560	75
15	588	679	616	711	644	742	672	773	700	805	728	728	74
16	756	867	784	899	812	931	840	962	868	994	896	896	73
17	924	3057	952	3089	939	3121	3007	3153	3035	3185	3062	3062	72
18	3090	249	3118	281	3145	314	173	346	201	378	228	228	71
19	256	443	283	476	311	508	338	541	365	574	393	393	70
20	420	640	448	673	475	706	502	739	529	772	557	557	69
21	584	839	611	872	638	906	665	939	692	973	719	719	68
22	746	4040	773	4074	800	4108	827	4142	854	4176	881	881	67
23	907	245	934	279	961	314	987	348	4014	383	4041	4041	66
24	4067	452	4094	487	4120	522	4147	557	173	592	200	200	65
25	226	663	253	699	279	734	305	770	331	806	358	358	64
26	384	877	410	913	436	950	462	986	488	5022	514	5059	63
27	540	5095	566	5132	592	5169	617	5206	643	243	669	280	62
28	695	317	720	354	746	392	772	430	797	467	823	505	61
29	848	543	874	581	899	619	924	658	950	696	975	735	60
30	5000	774	5025	5812	5050	851	5075	890	5100	930	5125	969	59
31	150	6009	175	6048	200	6088	225	6128	250	6168	275	6208	58
32	299	249	324	289	348	330	5373	371	398	412	422	453	57
33	446	494	471	536	495	577	519	619	544	661	568	703	56
34	592	745	616	787	640	830	664	873	688	916	712	959	55
35	736	7002	760	7046	783	7089	807	7133	831	7177	854	7221	54
36	878	265	901	310	925	355	948	400	972	445	995	490	53
37	6018	536	6041	581	6065	627	6088	673	6111	720	6134	766	52
38	157	813	180	860	202	907	225	954	248	8002	271	8050	51
39	293	8098	316	8146	338	8195	361	8243	383	292	406	342	50
40	428	391	450	441	472	491	494	541	517	591	539	642	49
41	561	693	583	744	604	796	626	847	648	899	670	952	48
42	691	9004	713	9057	734	9110	756	9163	777	9217	799	9271	47
43	820	325	841	380	862	435	884	490	905	545	926	601	46
44	947	657	967	713	988	770	7009	827	7030	884	7050	942	45
45	7071	1.0000	7092	1.0058	7112	1.0117	133	1.0176	153	1.0235	173	1.0295	44
60'	cos	cot	cos	cot	cos	cot	cos	cot	cos	cot	cos	cot	cos

12876/  
3211  
1319.72

TABLE VI (continued)  
SINES, COSINES, TANGENTS, COTANGENTS (continued)

deg	sin 0'	tan 0'	sin 10'	tan 10'	sin 20'	tan 20'	sin 30'	tan 30'	sin 40'	tan 40'	sin 50'	tan 50'	deg
46	7193	1.0355	7214	1.0416	7234	1.0477	7254	1.0533	7274	1.0599	7294	1.0661	43
47	314	.0724	333	.0786	353	.0850	373	.0913	392	.0977	412	.1041	42
48	431	.1106	451	.1171	470	.1237	490	.1303	509	.1369	528	.1436	41
49	547	.1504	566	.1571	585	.1640	604	.1708	623	.1778	642	.1847	40
50	660	1.1918	7679	1.1988	7698	1.2059	7716	1.2131	7735	1.2203	7753	1.2276	39
51	771	2349	790	.2423	808	.2497	826	.2572	844	.2647	862	.2723	38
52	880	2799	898	.2876	916	.2954	934	.3032	951	.3111	969	.3190	37
53	986	3270	8004	.3351	8021	.3452	8039	.3514	8056	.3597	8073	.3680	36
54	8090	.3764	107	.3848	124	.3934	141	.4019	158	.4106	175	.4193	35
55	192	.4281	208	.4370	225	.4460	241	.4550	258	.4641	274	.4733	34
56	290	.4826	307	.4919	323	.5013	339	.5108	355	.5204	371	.5301	33
57	387	.5399	403	.5497	418	.5597	434	.5697	450	.5798	465	.5900	32
58	480	.6003	496	.6107	511	.6212	526	.6319	542	.6426	557	.6534	31
59	572	.6643	587	.6753	601	.6864	616	.6977	631	.7090	646	.7205	30
60	660	1.7321	8675	1.7437	8689	1.7556	8704	1.7675	8718	1.7797	8732	1.7917	29
61	746	.8040	760	.8165	774	.8291	788	.8418	802	.8546	816	.8676	28
62	829	.8807	843	.8940	857	.9074	870	.9210	884	.9347	897	.9486	27
63	910	.9626	923	.9768	936	.9912	949	2.0057	962	2.0204	975	2.0353	26
64	988	2.0503	9001	2.0655	9013	2.0809	9026	.0965	9038	.1123	9051	.1283	25
65	9063	.1445	075	.1609	088	.1775	100	.1943	112	.2113	124	.2286	24
66	135	.2460	147	.2637	159	.2817	171	.2998	182	.3183	194	.3369	23
67	205	.3559	216	.3750	228	.3945	239	.4142	250	.4342	261	.4545	22
68	272	.4751	283	.4960	293	.5172	304	.5386	315	.5605	325	.5826	21
69	336	.6051	346	.6279	356	.6511	367	.6746	377	.6985	387	.7228	20
70	397	2.7475	9407	2.7725	9417	2.7980	9426	2.8239	9436	2.8502	9446	2.8770	19
71	455	.9042	465	.9319	474	.9600	483	.9887	492	3.0178	502	3.0475	18
72	511	3.0777	520	3.1084	528	3.1397	537	3.1716	546	.2041	555	.2371	17
73	563	.2709	572	.3052	580	.3402	588	.3759	596	.4124	605	.4495	16
74	613	.4874	621	.5261	628	.5656	636	.6059	644	.6470	652	.6891	15
75	659	.7321	667	.7760	674	.8208	681	.8657	689	.9136	696	.9617	14
76	703	4.0108	710	4.0611	717	4.1126	724	4.1653	730	4.2193	737	4.2747	13
77	744	.3315	750	.3897	757	.4494	763	.5107	769	.5736	775	.6382	12
78	781	.7046	787	.7729	793	.8430	799	.9152	805	.9894	811	5.0658	11
79	816	.1446	822	5.2257	827	5.3093	833	5.3955	838	5.4845	843	.5764	10
80	9348	5.6713	9353	5.7694	9358	5.8708	9363	5.9758	9368	6.0844	9372	6.1970	9
81	877	6.3138	881	6.4348	886	6.5606	890	6.6912	894	.8269	899	.9682	8
82	903	7.1154	907	7.2687	911	7.4287	914	7.5958	918	7.7704	922	7.9530	7
83	925	8.1443	929	8.3450	932	8.5555	936	8.7769	939	9.0098	942	9.2553	6
84	945	9.5144	948	9.7882	951	10.078	954	10.385	957	10.711	959	11.059	5
85	962	11.430	964	11.826	967	12.250	969	12.706	971	13.197	974	13.727	4
86	976	14.300	978	14.924	980	15.605	981	16.350	983	17.169	985	18.075	3
87	986	19.081	988	20.206	989	21.470	990	22.903	992	24.542	993	26.432	2
88	994	28.636	995	31.242	996	34.368	997	38.189	997	42.964	998	49.104	1
89	999	57.290	999	68.750	999	85.940	999	114.58	1.000	171.88	1.000	343.77	0
deg	60'	60'	50'	50'	40'	40'	30'	30'	20'	20'	10'	10'	deg
cos	cos	cot	cos	cot	cos	cot	cos	cot	cos	cot	cos	cot	deg

TABLE VII  
RODS IN FEET AND INCHES

Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches	Rods	Feet Inches
1	16-6	21	346-6	41	676-6	61	1006-6	81	1336-6
2	33-0	22	363-0	42	693-0	62	1023-0	82	1353-0
3	49-6	23	379-6	43	709-6	63	1039-6	83	1369-6
4	66-0	24	396-0	44	726-0	64	1056-0	84	1386-0
5	82-6	25	412-6	45	742-6	65	1072-6	85	1402-6
6	99-0	26	429-0	46	759-0	66	1089-0	86	1419-0
7	115-6	27	445-6	47	775-6	67	1105-6	87	1435-6
8	132-0	28	462-0	48	792-0	68	1122-0	88	1452-0
9	148-6	29	478-6	49	808-6	69	1138-6	89	1468-6
10	165-0	30	495-0	50	825-0	70	1155-0	90	1485-0
11	181-6	31	511-6	51	841-6	71	1171-6	91	1501-6
12	198-0	32	528-0	52	858-0	72	1188-0	92	1518-0
13	214-6	33	544-6	53	874-6	73	1204-6	93	1534-6
14	231-0	34	561-0	54	891-0	74	1221-0	94	1551-0
15	247-6	35	577-6	55	907-6	75	1237-6	95	1567-6
16	264-0	36	594-0	56	924-0	76	1254-0	96	1584-0
17	280-6	37	610-6	57	940-6	77	1270-6	97	1600-6
18	297-0	38	627-0	58	957-0	78	1287-0	98	1617-0
19	313-6	39	643-6	59	973-6	79	1303-6	99	1633-6
20	330-0	40	660-0	60	990-0	80	1320-0	100	1650-0

TABLE VIII  
LINKS IN FEET AND INCHES

Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches	Links	Feet Inches
1	0-7.92	18	11-10.56	35	23-1.20	52	34-3.84	69	45-6.48	86	56-9.12
2	1-3.84	19	12-6.48	36	23-9.12	53	34-11.76	70	46-2.40	87	57-5.04
3	1-11.76	20	13-2.40	37	24-5.04	54	35-7.68	71	46-10.32	88	58-0.96
4	2-7.68	21	13-10.32	38	25-0.96	55	36-3.60	72	47-6.24	89	58-8.88
5	3-3.60	22	14-6.24	39	25-8.88	56	36-11.52	73	48-2.16	90	59-4.80
6	3-11.52	23	15-2.16	40	26-4.80	57	37-7.44	74	48-10.08	91	60-0.72
7	4-7.44	24	15-10.08	41	27-0.72	58	38-3.36	75	49-6.00	92	60-8.64
8	5-3.36	25	16-6.00	42	27-8.64	59	38-11.28	76	50-1.92	93	61-4.56
9	5-11.28	26	17-1.92	43	28-4.56	60	39-7.20	77	50-9.84	94	62-0.48
10	6-7.20	27	17-9.84	44	29-0.48	61	40-3.12	78	51-5.76	95	62-8.40
11	7-3.12	28	18-5.76	45	29-8.40	62	40-11.04	79	52-1.68	96	63-4.32
12	7-11.04	29	19-1.68	46	30-4.32	63	41-6.96	80	52-9.60	97	64-0.24
13	8-6.96	30	19-9.60	47	31-0.24	64	42-2.88	81	53-5.52	98	64-8.16
14	9-2.88	31	20-5.52	48	31-8.16	65	42-10.80	82	54-1.44	99	65-4.08
15	9-10.80	32	21-1.44	49	32-4.08	66	43-6.72	83	54-9.36	100	66-.000
16	10-6.72	33	21-9.36	50	33-0.00	67	44-2.64	84	55-5.28	101	66-7.92
17	11-2.64	34	22-5.28	51	33-7.92	68	44-10.56	85	56-1.20	102	67-3.84

14 47 36  
28 11  
13 99 21  
10 49 63  
5 29 58

189 30  
9°  
180 09 30  
90 04 45

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=10°	I	T	E	I=20°	I	T	E	I=30°
1°	50.00	.218	+	11°	551.70	26.500	+	21°	1061.9	97.577	+
10'	58.34	.297		10'	560.11	27.313		10'	1070.6	98.155	
20'	66.67	.388	5° C.	20'	568.53	28.137	5° C.	20'	1079.2	100.75	5° C.
30'	75.01	.491	T	30'	576.95	28.974	T	30'	1087.8	102.35	T
40'	83.34	.606	.03	40'	585.36	29.824	.06	40'	1096.4	103.97	.10
50'	91.68	.733	E	50'	593.79	30.686	E	50'	1105.1	105.60	E
2°	100.01	.878	.001	12°	602.21	31.561	.006	22°	1113.7	107.24	.013
10'	108.35	1.024		10'	610.64	32.447		10'	1122.4	108.90	
20'	116.68	1.188		20'	619.07	33.347		20'	1131.0	110.57	
30'	125.02	1.364		30'	627.50	34.259		30'	1139.7	112.25	
40'	133.36	1.552		40'	635.93	35.183		40'	1148.4	113.95	
50'	141.70	1.752		50'	644.37	36.120		50'	1157.0	115.66	
3°	150.04	1.964	10° C.	13°	652.81	37.070	10° C.	23°	1165.7	117.38	10° C.
10'	158.38	2.188	T	10'	661.25	38.031	T	10'	1174.4	119.12	T
20'	166.72	2.425	.06	20'	669.70	39.006	.13	20'	1183.1	120.87	.19
30'	175.06	2.674	E	30'	678.15	39.993	E	30'	1191.8	122.63	E
40'	183.40	2.934	.003	40'	686.60	40.992	.011	40'	1200.5	124.41	.025
50'	191.74	3.207	T	50'	695.06	42.004	T	50'	1209.2	126.20	T
4°	200.08	3.492		14°	703.51	43.029		24°	1217.9	128.00	
10'	208.43	3.790		10'	711.97	44.066		10'	1226.6	129.82	
20'	216.77	4.099		20'	720.44	45.116		20'	1235.3	131.65	
30'	225.12	4.421		30'	728.90	46.178		30'	1244.0	133.50	
40'	233.47	4.755		40'	737.37	47.253		40'	1252.8	135.35	
50'	241.81	5.100	15° C.	50'	745.85	48.341	15° C.	50'	1261.5	137.23	15° C.
5°	250.16	5.459	T	15°	754.32	49.441	T	25°	1270.2	139.11	T
10'	258.51	5.829	.09	10'	762.80	50.554	.19	10'	1278.9	141.01	.29
20'	266.86	6.211	E	20'	771.29	51.679	E	20'	1287.7	142.93	E
30'	275.21	6.606	.004	30'	779.77	52.818	.017	30'	1296.5	144.85	.038
40'	283.57	7.013	T	40'	788.26	53.969	T	40'	1305.3	146.79	T
50'	291.92	7.432	E	50'	796.75	55.132	E	50'	1314.0	148.75	E
6°	300.28	7.863		16°	805.25	56.309		26°	1322.8	150.71	
10'	308.64	8.307		10'	813.75	57.498		10'	1331.6	152.69	
20'	316.99	8.762		20'	822.25	58.699		20'	1340.4	154.69	
30'	325.35	9.230		30'	830.76	59.914		30'	1349.2	156.70	
40'	333.71	9.710	20° C.	40'	839.27	61.141	20° C.	40'	1358.0	158.72	20° C.
50'	342.08	10.202	T	50'	847.78	62.381	T	50'	1366.8	160.76	T
7°	350.44	10.707	.13	17°	856.30	63.634	.26	27°	1375.6	162.81	.39
10'	358.81	11.224	E	10'	864.82	64.900	E	10'	1384.4	164.86	E
20'	367.17	11.753	.006	20'	873.35	66.178	.022	20'	1393.2	166.95	.051
30'	375.54	12.294		30'	881.88	67.470		30'	1402.0	169.04	
40'	383.91	12.847		40'	890.41	68.774		40'	1410.9	171.15	
50'	392.28	13.413	15° C.	50'	898.95	70.091	15° C.	50'	1419.7	173.27	15° C.
8°	400.66	13.991		18°	907.49	71.421		28°	1428.6	175.41	
10'	409.03	14.582		10'	916.03	72.764		10'	1437.4	177.55	
20'	417.41	15.184	25° C.	20'	924.58	74.119	25° C.	20'	1446.3	179.72	25° C.
30'	425.79	15.799	T	30'	933.13	75.488	T	30'	1455.1	181.89	T
40'	434.17	16.426	.16	40'	941.69	76.869	.32	40'	1464.0	184.08	.49
50'	442.55	17.065	E	50'	950.25	78.264	E	50'	1472.9	186.29	E
9°	450.93	17.717	.007	19°	958.81	79.671	.028	29°	1481.8	188.51	.065
10'	459.32	18.381		10'	967.38	81.092		10'	1490.7	190.74	
20'	467.71	19.058		20'	975.96	82.525		20'	1499.6	192.99	
30'	476.10	19.746		30'	984.53	83.972		30'	1508.5	195.25	
40'	484.49	20.447		40'	993.12	85.431		40'	1517.4	197.53	
50'	492.88	21.161	30° C.	50'	1001.7	86.904	30° C.	50'	1526.3	199.82	30° C.
10°	501.28	21.887	T	20°	1010.3	88.389	T	30°	1535.3	202.12	T
10'	509.68	22.624	.19	10'	1018.9	89.888	.39	10'	1544.2	204.44	.59
20'	518.08	23.375	E	20'	1027.5	91.399	E	20'	1553.1	206.77	E
30'	526.48	24.138	.008	30'	1036.1	92.924	.034	30'	1562.1	209.12	.078
40'	534.89	24.913		40'	1044.7	94.462		40'	1571.0	211.48	
50'	543.29	25.700		50'	1053.3	96.013		50'	1580.0	213.86	

T = R tan ½ I      E = R exsec ½ I

TABLE IX. TANGENTS AND EXTERNALS TO A 1° CURVE

I	T	E	I=40°	I	T	E	I=50°	I	T	E	I=60°
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	5° C.	20'	2161.2	394.1	5° C.	20'	2753.4	627.2	5° C.
30'	1615.9	223.5	T	30'	2170.8	397.4	T	30'	2763.7	631.7	T
40'	1624.9	226.0	.13	40'	2180.3	400.8	.17	40'	2773.9	636.2	.21
50'	1633.9	228.4	E	50'	2189.9	404.2	E	50'	2784.2	640.7	E
32°	1643.0	230.9	.023	42°	2199.4	407.6	.037	52°	2794.5	645.2	.056
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	10° C.	43°	2257.0	428.5	10° C.	53°	2856.7	672.7	10° C.
10'	1706.3	248.7	T	10'	2266.6	432.0	T	10'	2867.1	677.3	T
20'	1715.3	251.3	.26	20'	2276.2	435.6	.34	20'	2877.5	682.0	.42
30'	1724.4	253.9	E	30'	2285.9	439.2	E	30'	2888.0	686.7	E
40'	1733.5	256.5	.046	40'	2295.6	442.8	.075	40'	2898.4	691.4	.112
50'	1742.6	259.1	T	50'	2305.2	446.4	T	50'	2908.9	696.1	T
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	15° C.	50'	2363.5	468.4	15° C.	50'	2972.1	725.0	15° C.
35°	1806.6	278.1	T	45°	2373.3	472.1	T	55°	2982.7	729.9	T
10'	1815.7	280.8	.40	10'	2383.1	475.8	.51	10'	2993.3	734.8	.63
20'	1824.9	283.6	E	20'	2392.8	479.6	E	20'	3003.9	739.7	E
30'	1834.1	286.4	.070	30'	2402.6	483.4	.116	30'	3014.5	744.6	.168
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	20° C.	30'	2461.7	506.4	20° C.	30'	3078.7	774.7	20° C.
40'	1898.6	306.4	T	40'	2471.5	510.3	T	40'	3089.4	779.8	T
50'	1907.9	309.3	.53	50'	2481.4	514.3	.68	50'	3100.2	784.9	.84
37°	1917.1	312.2	E	47°	2491.3	518.2	E	57°	3110.9	790.1	E
10'	1926.4	315.2	.093	10'	2501.2	522.2	.151	10'	3121.7	795.2	.225
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	25° C.	10'	2561.0	546.3	25° C.	10'	3186.9	826.7	25° C.
20'	1991.5	336.3	T	20'	2571.0	550.4	T	20'	3197.8	832.0	T
30'	2000.9	339.3	.67	30'	2581.0	554.5	.85	30'	3208.8	837.3	.105
40'	2010.2	342.4	E	40'	2591.0	558.6	E	40'	3		

TABLE X.  
MIDDLE ORDINATES OF RAILS  
Length of Rail (feet)

C	R	30	28	26	24	22	20	C	R	30	28	26	24	22	20
o /	Feet	Inch	Inch	Inch	Inch	Inch	Inch	o	Feet	Inch	Inch	Inch	Inch	Inch	Inch
0-20	17189	.08	.07	.06	.05	.04	.03	8	716.8	1.88	1.64	1.42	1.20	1.01	.84
0-40	8594	.16	.14	.12	.10	.08	.07	9	637.3	2.12	1.84	1.60	1.35	1.14	.94
1-0	5730	.24	.20	.18	.15	.13	.10	10	573.7	2.36	2.05	1.78	1.50	1.27	1.04
1-20	4297	.31	.27	.23	.20	.17	.13	11	521.7	2.59	2.26	1.95	1.65	1.39	1.15
1-40	3438	.39	.34	.29	.25	.21	.17	12	478.3	2.83	2.47	2.15	1.81	1.54	1.26
2-0	2865	.47	.41	.35	.30	.25	.20	13	441.7	3.05	2.66	2.30	1.96	1.66	1.36
2-20	2456	.55	.48	.41	.35	.29	.23	14	410.3	3.30	2.87	2.48	2.10	1.78	1.46
2-40	2149	.63	.55	.47	.40	.33	.27	15	383.1	3.54	3.08	2.68	2.26	1.91	1.57
3-0	1910	.71	.62	.53	.45	.38	.31	16	359.3	3.76	3.28	2.83	2.40	2.04	1.67
3-20	1719	.78	.68	.59	.50	.42	.35	17	338.3	4.00	3.48	3.02	2.57	2.16	1.78
3-40	1563	.86	.75	.65	.55	.46	.38	18	319.6	4.21	3.67	3.18	2.70	2.28	1.87
4-0	1433	.94	.82	.71	.60	.50	.42	19	302.9	4.45	3.89	3.36	2.86	2.41	1.98
4-20	1323	1.02	.89	.77	.65	.55	.45	20	287.9	4.70	4.09	3.55	3.00	2.54	2.09
4-40	1228	1.10	.96	.83	.70	.59	.48	22	262.0	5.16	4.44	3.84	3.30	2.80	2.29
5	1146	1.18	1.03	.89	.75	.63	.52	24	240.5	5.64	4.92	4.20	3.59	3.04	2.50
6	955.3	1.41	1.23	1.06	.90	.76	.62	26	222.3	6.07	5.29	4.58	3.88	3.29	2.70
7	819.0	1.65	1.44	1.24	1.05	.89	.73								

TABLE XI.  
SHORT RADIUS CURVES

Radius Feet	Chord Feet	Central Angle	Deflection Angle	Deflection for 1 Foot
35	10	16-26	8-13	49.3
45	10	12-46	6-23	38.3
50	15	17-16	8-38	34.5
60	15	14-22	7-11	28.8
75	15	11-30	5-45	23.0
100	20	11-30	5-45	17.3
120	20	9-34	4-47	14.3
150	20	7-39	3-49	11.5
190	25	7-32	3-46	9.15
200	25	7-10	3-35	8.6
225	25	6-25	3-12	7.7
240	25	5-58	2-59	7.2
250	25	5-44	2-52	6.9
275	25	5-12	2-36	6.2
288	50	9-58	4-59	6.0
300	50	9-32	4-46	5.7
350	50	8-12	4-06	4.9
376	50	7-40	3-50	4.6
400	50	7-10	3-35	4.3
410	50	7-00	3-30	4.2

To find length of curve divide angle from P. C. to P. T. by central angle of chord, and multiply by length of chord.

TABLE XII.  
INCLINED DISTANCE OF 100 FT. REDUCED TO HORIZONTAL

Slope	Horizontal Distance	Correction	Rise Per Foot	Slope	Horizontal Distance	Correction	Rise Per Foot
0°00'	100.000	0.000	0.000	8°00'	99.027	0.973	0.139
15'	99.999	0.001	0.004	15'	98.965	1.035	0.143
30'	99.996	0.004	0.009	30'	98.902	1.098	0.148
45'	99.991	0.009	0.013	45'	98.836	1.164	0.152
1 00	99.985	0.015	0.017	9 00	98.769	1.231	0.156
15	99.976	0.024	0.022	15	98.700	1.300	0.161
30	99.966	0.034	0.026	30	98.629	1.371	0.165
45	99.953	0.047	0.031	45	98.556	1.444	0.169
2 00	99.939	0.061	0.035	10 00	98.481	1.519	0.174
15	99.923	0.077	0.039	15	98.404	1.596	0.178
30	99.905	0.095	0.044	30	98.325	1.675	0.182
45	99.885	0.115	0.048	45	98.245	1.755	0.187
3 00	99.863	0.137	0.052	11 00	98.163	1.837	0.191
15	99.839	0.161	0.057	15	98.079	1.921	0.195
30	99.813	0.187	0.061	30	97.992	2.008	0.199
45	99.786	0.214	0.065	45	97.905	2.095	0.204
4 00	99.756	0.244	0.070	12 00	97.815	2.185	0.208
15	99.725	0.275	0.074	15	97.723	2.277	0.212
30	99.692	0.308	0.078	30	97.630	2.370	0.216
45	99.657	0.343	0.083	45	97.534	2.466	0.221
5 00	99.619	0.381	0.087	13 00	97.437	2.563	0.225
15	99.580	0.420	0.092	15	97.338	2.662	0.229
30	99.540	0.460	0.096	30	97.237	2.763	0.233
45	99.497	0.503	0.100	45	97.134	2.866	0.238
6 00	99.452	0.548	0.105	14 00	97.030	2.970	0.242
15	99.406	0.594	0.109	15	96.923	3.077	0.246
30	99.357	0.643	0.113	30	96.815	3.185	0.250
45	99.307	0.693	0.118	45	96.705	3.295	0.255
7 00	99.255	0.745	0.122	15 00	96.593	3.407	0.259
15	99.200	0.800	0.126	15	96.479	3.521	0.263
30	99.144	0.856	0.131	30	96.363	3.637	0.267
45	99.087	0.913	0.135	45	96.246	3.754	0.271

TABLE XIII.  
MINUTES IN DECIMALS OF A DEGREE.

0 30"	.00833	10' 30"	.17500	20' 30"	.34167	30' 10"	.50833	40' 30"	.67500	50' 10"	.84167
1 00	.01667	11 00	.18333	21 00	.35000	31 00	.51667	41 00	.68333	51 00	.85000
30	.02500	30	.19167	30	.35833	30	.52500	30	.69167	30	.85833
2 00	.03333	12 30	.20000	22 00	.36667	32 00	.53333	42 00	.70000	52 00	.86667
30	.04167	30	.20833	30	.37500	30	.54167	30	.70833	30	.87500
3 00	.05000	13 00	.21667	23 00	.38333	33 00	.55000	43 00	.71667	53 00	.88333
30	.05833	30	.22500	30	.39167	30	.55833	30	.72500	30	.89167
4 00	.06667	14 00	.23333	24 00	.40000	34 00	.56667	44 00	.73333	54 00	.90000
30	.07500	30	.24167	30	.40833	30	.57500	30	.74167	30	.90833
5 00	.08333	15 00	.25000	25 00	.41667	35 00	.58333	45 00	.75000	55 00	.91667
30	.09167	30	.25833	30	.42500	30	.59167	30	.75833	30	.92500
6 00	.10000	16 00	.26667	26 00	.43333	36 00	.60000	46 00	.76667	56 00	.93333
30	.10833	30	.27500	30	.44167	30	.60833	30	.77500	30	.94167
7 00	.11667	17 00	.28333	27 00	.45000	37 00	.61667	47 00	.78333	57 00	.95000
30	.12500	30	.29167	30	.45833	30	.62500	30	.79167	30	.95833
8 00	.13333	18 00	.30000	28 00	.46667	38 00	.63333	48 00	.80000	58 00	.96667
30	.14167	30	.30833	30	.47500	30	.64167	30	.80833	30	.97500
9 00	.15000	19 00	.31667	29 00	.48333	39 00	.65000	49 00	.81667	59 00	.98333
30	.15833	30	.32500	30	.49167	30	.65833	30	.82500	30	.99167
10 00	.16667	20 00	.33333	30 00	.50000	40 00	.66667	50 00	.83333	60 00	1.00000





32.79  
1318.78

CYCLE W. CALIFORNIA

90° 07' 30"

243.22  
11.38  

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231.84

4109.28  
109.61  
17861.85 - pt  
11.91  
17889.87 - Max. Records  
375.12  
17474.75  
16876.07  
398.68  
17074.75  
275.03  
17099.72

4109.28  
109.61  
17861.85  
11.91  
17889.87

ENGINEERING DEPARTMENT,  
CITY OF SAN DIEGO,  
CALIFORNIA.