

W 495

695

EUGENE DIETZGEN CO.

DRAWING MATERIALS, MATHEMATICAL and
SURVEYING INSTRUMENTS

Chicago New York San Francisco New Orleans Pittsburg Toronto

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

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

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

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Indexed to p. 56-2/7/46 m. P.D.
 " " 59-3/11/46 m. P.D.
 60/10/1/46 m. P.D.
 70/1/2/47 m. P.D.
 74/1/22/47 m. P.D.
 79/5/1/47 m. P.D.

Chicago

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Example
30.6 = 3

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Chice

H

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40E
to be
of road
examined
30.6 =

Tapped Pines

Profile over Lockwood Mesa P.h. - sta 175+31 to sta 200

See BK 539

B.M. 1.85 140.87 139.02

175+31 4.5 136.4

175+50 4.4 136.5

Top Pipe 5.9 135.0

176 5.3 135.6

Top Pipe 6.3 134.6

+50 5.8 135.1

177 6.3 134.6

Top Pipe 9.3 131.6

+50 7.2 133.7

178 8.8 132.1

Top Pipe 11.2 129.7

T.P. 2.25 133.78 ✓ 9.34 131.53 ✓

+50 2.1 131.7

KING - Leonard 12-27-45
Klinger - WardTap Air Valve sta 175+31 BK 539 Page 39

Ground Lat air Valve

Note sta 175+31 for air
valve was taken from
field book "539". Sta.
from drawing, File #2559
would be 177+97

133.78

179 1.1 132.7

No Pipe shot

+50 3.1 130.7

180 6.4 127.4

Top Pipe 7.8 126.00

+50 8.3 125.5

181 8.8 125.00

Top Pipe 9.8 124.00

+50 9.7 124.1

182 9.5 124.3

Top Pipe 10.9 122.9

+50 9.6 124.2

T.A 3.59 126.70 ✓ 10.67 123.11 ✓

183 5.2 121.5

Top Pipe 6.2 120.5

	126.70		
183+50		6.5	120.2
184		6.9	119.8
Top Pipe		7.9	118.8
+ 31		6.8	119.9
+ 50		4.6	122.1
185		5.1	121.6
Top Pipe		6.0	120.7
+ 50		6.0	120.7
186		6.1	120.6
Top Pipe		9.1	117.6
+ 50		9.5	117.2
187		10.4	116.3
Top Pipe		12.1	114.6
+ 50		11.5	115.2

	126.70		
188		12.2	114.5
Top Pipe		14.2	112.5
T.P.	0.46	114.76	12.40
			114.30
+50		1.4	113.4
189		3.5	111.3
Top Pipe		4.5	110.3
+50		3.6	111.2
190		4.2	110.6
Top Pipe		5.7	109.1
+50		5.3	109.5
191		6.6	108.2
Top Pipe		7.6	107.2
+50		6.8	108.00
192		7.9	106.9
Top Pipe		9.0	105.8

	114.76			
+50			8.8	106.00
193			9.7	105.1
Top Pipe			10.8	104.00
+50			10.6	104.2
T.P.	0.00	104.62	10.14	104.62
194			1.2	103.4
Top Pipe			2.3	102.3
+50			1.9	102.7
195			3.1	101.5
Top Pipe			4.1	100.5
+50			3.9	100.7
196			4.4	100.2
Top Pipe			5.6	99.00
+50			5.9	98.7

	104.62			
197		6.9	97.7	
Top Pipe		7.7	96.9	
+50		7.6	97.00	
198		8.2	96.4	
Top Pipe		9.6	95.00	
+50		9.0	95.6	
199		10.2	94.4	
Top Pipe		11.1	93.5	
+50		11.1	93.5	
200		11.9	92.7	
Top Pipe		13.6	91.6	
T.B.M.		8.80	95.82	
T.P.	10.24	114.86	0.00	104.62
T.P.	12.66	126.67	0.85	110.01
T.P.	11.27	136.84	1.10	125.57
T.P.	6.42	140.97	2.29	134.55
B.M.		192	139.05	139.02

REDUCED BY MRR
12/28/45

Top water 7' Rt. Sta. 199 + 10

Top Air Valve Sta. 175 + 31 - See Page 1

King 1-2-46
 Lockwood
 Klinger

7

Levels on ginnerys Lockwood Mesa Ft Torrey

B.M.	2.24	541.26		139.02
175+50			4.6	36.7 137.3
176			5.2	36.1 132.3
+50			6.3	35.0 131.4
177			6.9	34.4 130.0
+50			7.6	33.7 128.9
178			8.9	32.4 127.8
T.P.	4.71	137.06	8.91	32.35
+50			4.7	32.4 127.0
179			5.0	32.1 126.2
+50			7.1	30.0 125.3
180			9.9	27.2 123.3

Top air valve sp 175+31

C 3.4

3.8

3.6

4.4

4.8

4.6

5.4

5.9

4.7

3.9

		137.06			
180 + 50			10.8	26.3	121.4
T.P.	3.76	128.83	11.99	125.07	
181			3.8	25.0	121.0
+50			5.1	23.7	120.7
182			4.5	24.3	120.4
+50			5.0	23.8	120.0
183			7.8	21.0	118.3
+50			9.3	19.5	116.5
184			9.8	19.0	116.0
+50			7.8	21.0	115.5
185			6.2	22.6	115.0
T.P.	1.85	124.50	6.18	122.65	
+50			3.5	21.0	114.5

4.9

4.0

3.0

3.9

3.8

2.7

3.0

3.0

5.5

7.6

6.5

	124.50				
186		4.2	20.3	114.0	
+50		6.2	18.5	113.5	
187		8.5	16.0	112.6	
+50		9.7	14.8	111.6	
188		10.4	14.1	110.7	
+50		11.7	12.8	109.7	
T.P.	0.10	112.87	11.73	112.77	
189		1.9	11.0	107.8	
+50		2.1	10.8	107.3	
190		3.0	09.9	106.8	
+50		3.8	09.1	105.9	
191		4.8	08.1	105.0	
+50		5.2	07.7	104.1	

6.3

4.8

3.4

3.2

3.4

3.1

3.2

3.5

3.1

3.2

3.1

3.6

112.87

10

192	6.3	06.6	103.2	0.3.4
+50	7.2	05.7	102.4	3.3
193	8.0	04.9	101.5	3.4
+50	9.0	03.9	100.6	3.3
194	9.7	03.2	99.7	3.5
+50	10.5	02.4	99.2	3.2
195	11.5	01.4	98.8	2.6
± 195	11.5	101.4	100.5	101.5 - see page 5

Torrey Pines
 Alignment - Lockwood-Mesa P.L. Near De / Mar

Sta 63+24 To 83+41.16

67+00

E.C. 66+24.99

8° 22' 30"

66

7° 29'

Δ 16° 45' Lt

+50

5° 42'

R 800'

65

3° 54'

S.T. 117.78'

+50

2° 07'

L.C. 233.97'

Defl 2.149

+64

0° 19'

B.C. 63+91.13

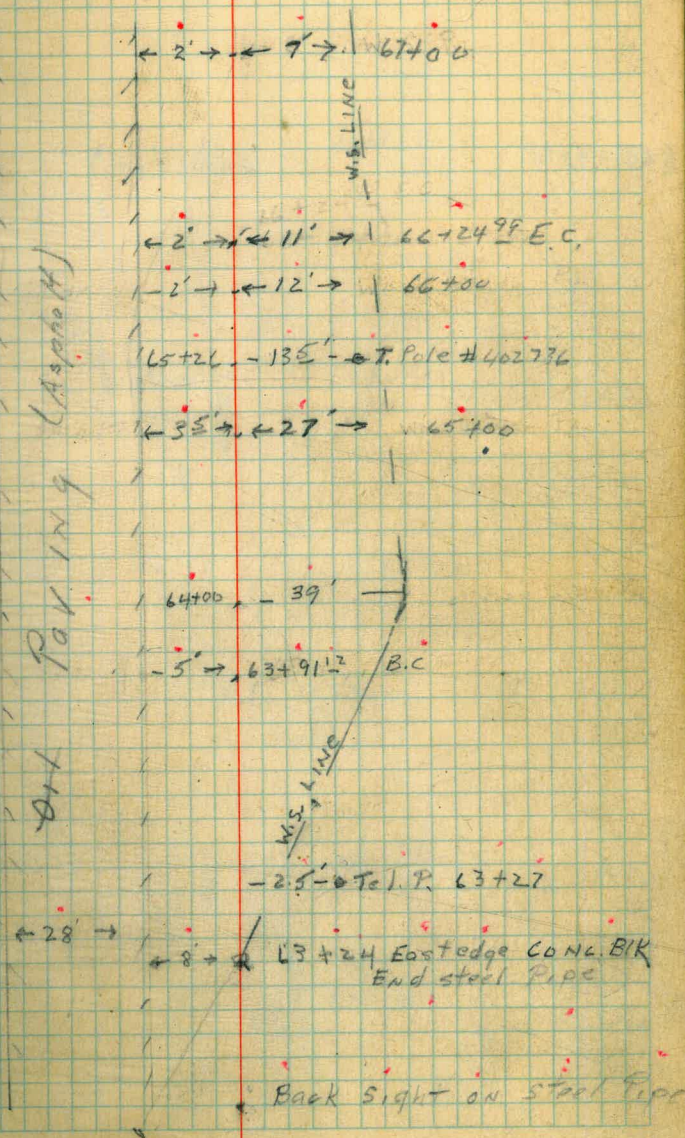
Note sta. from file
 drawing "2554"

63+24

Note exact loc. of end of steel
 could not be determined as steel
 & wood stake pipes are encased in
 concrete block

King - Leonard 1-8-46
 Ward - Klinger

11



Δ 68+92.03

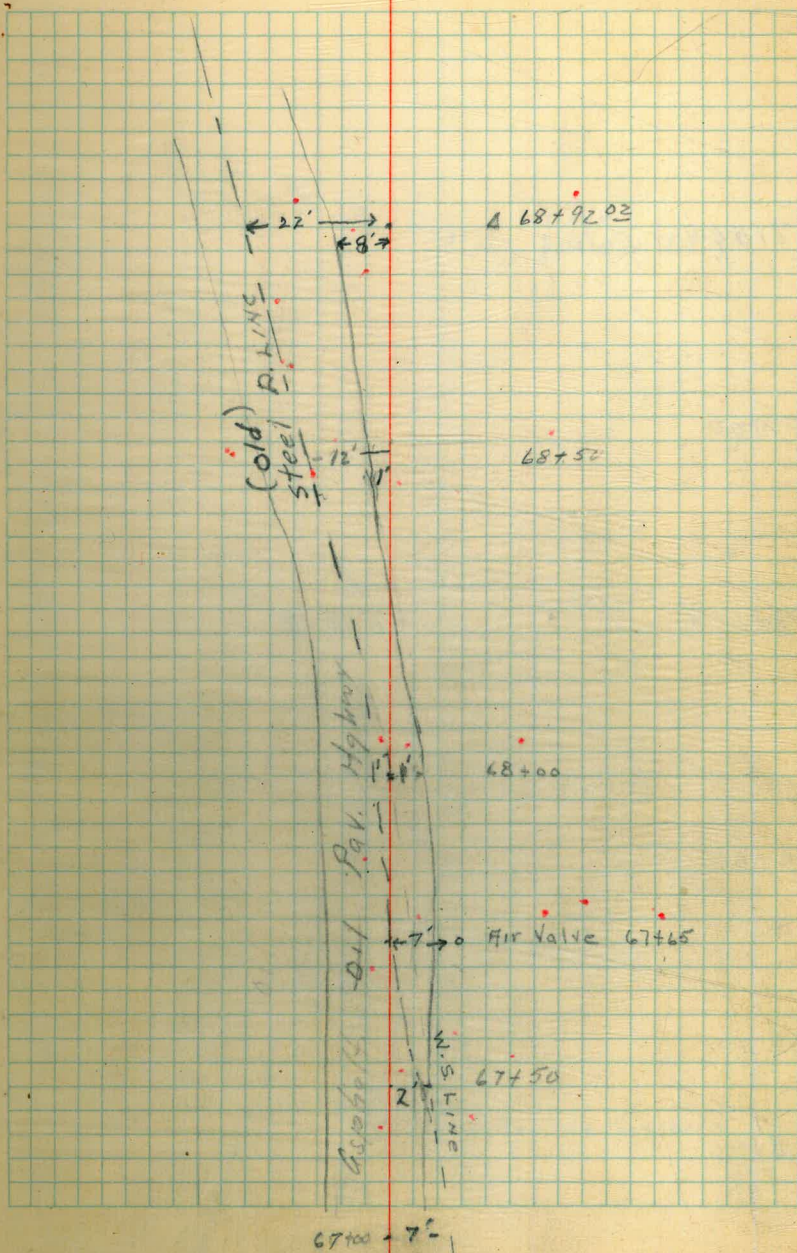
Δ 17° 03' Lt.

68+50

68+00

67+65

67+50



71+64 Culvert

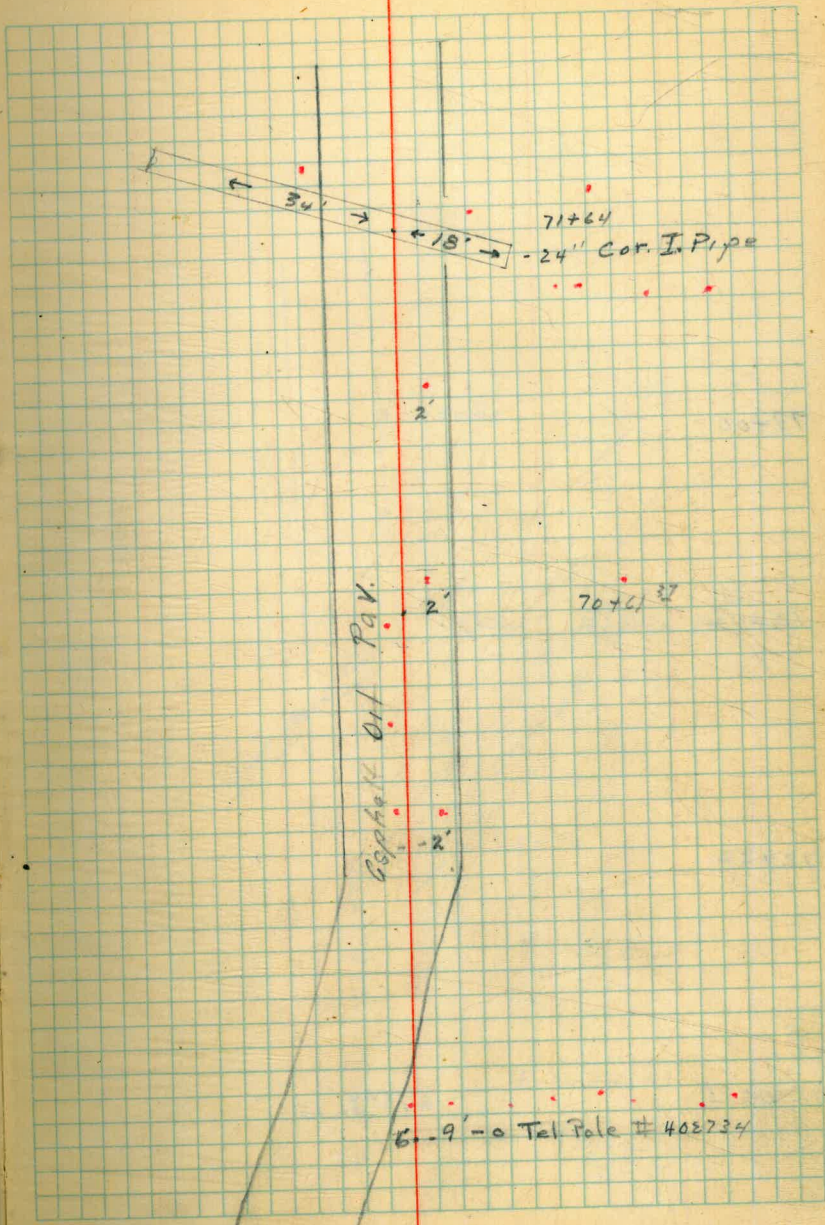
71+00

A 70+61.37

A 2° 18' LT

70+00

68+96



B 9'-0" Tel Pole # 403234

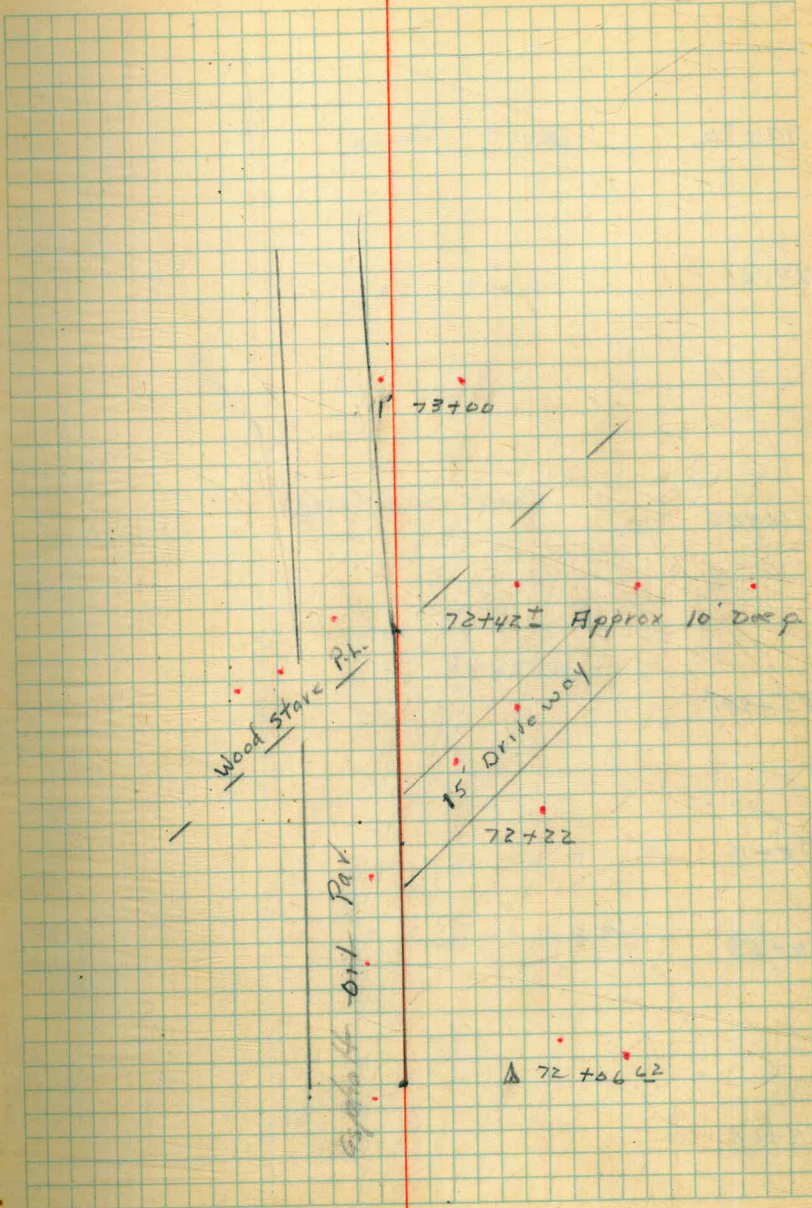
73+00

72+42

72+22

△ 72+06.42

△ 15° 31' Lt.



77+30

77+00

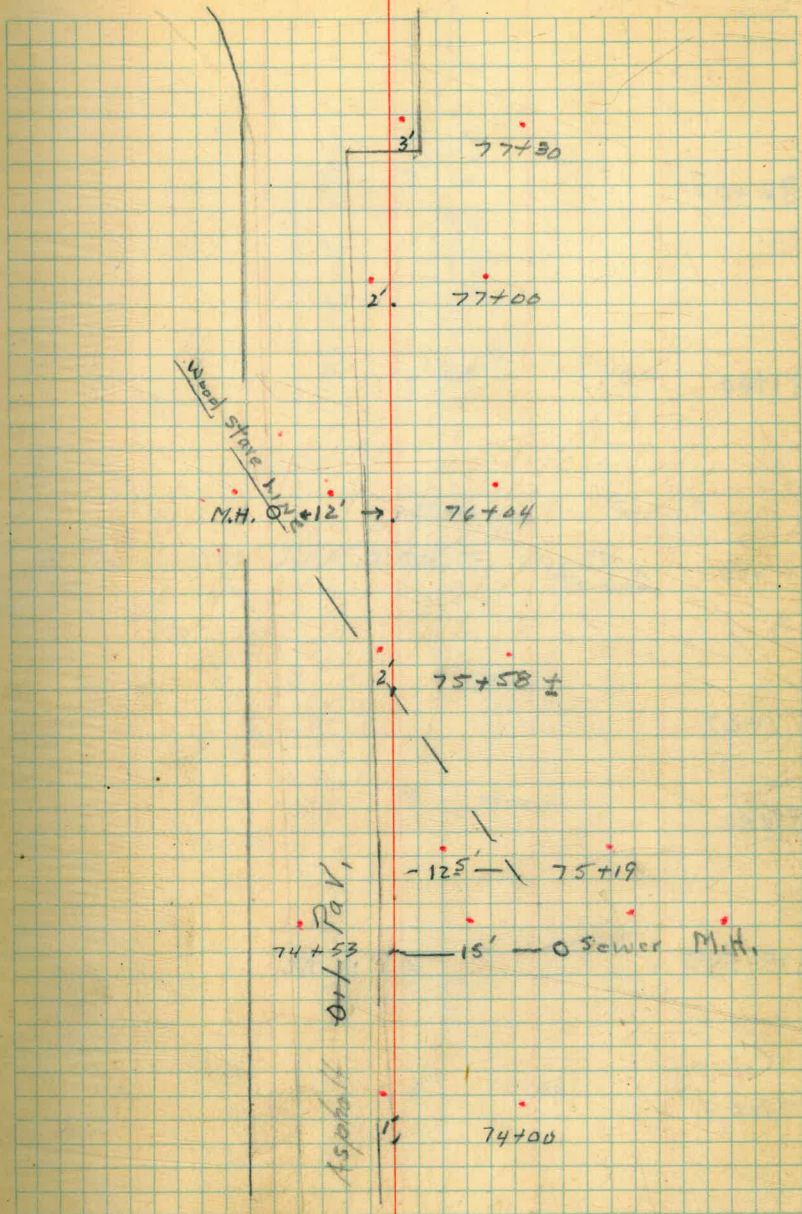
76+04

75+58±

75+19

74+53

74+00



82+00

81+00

80+50 Culvert

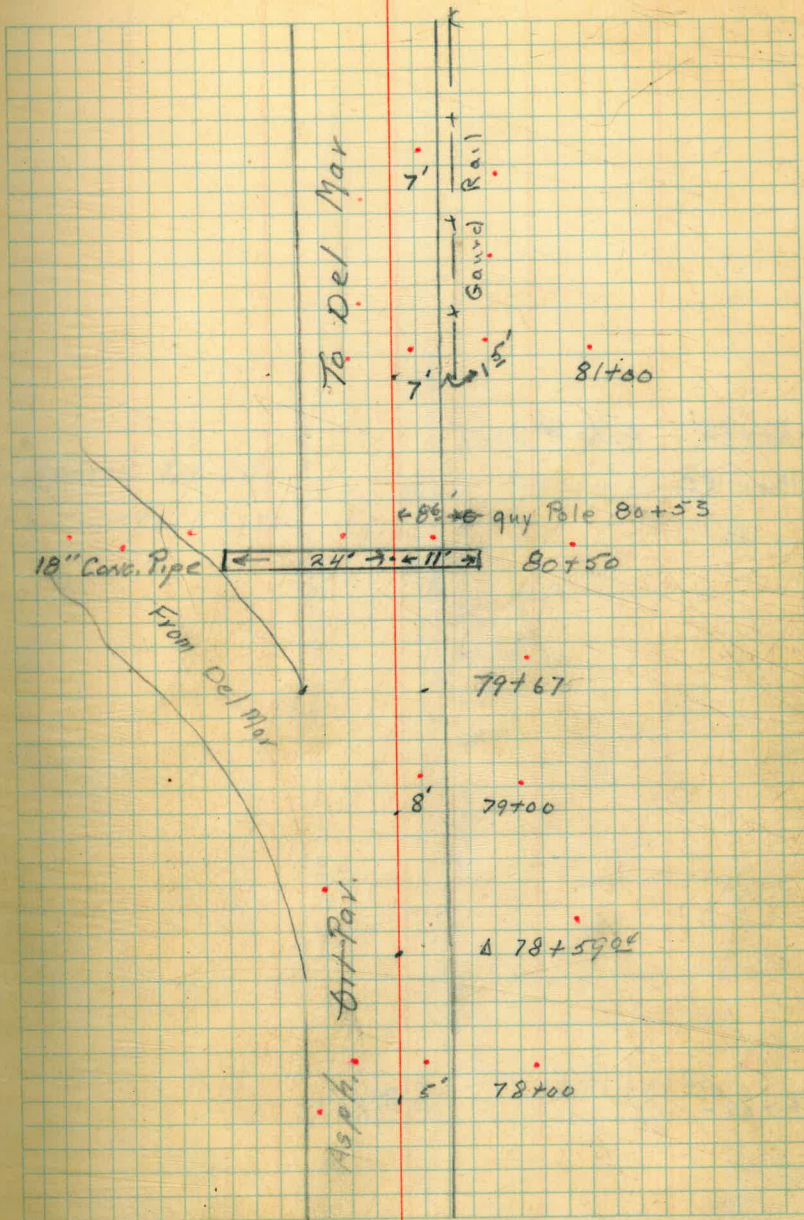
79+67

79+00

Δ 78+59.04

Δ 2° 12' Rt.

78+00

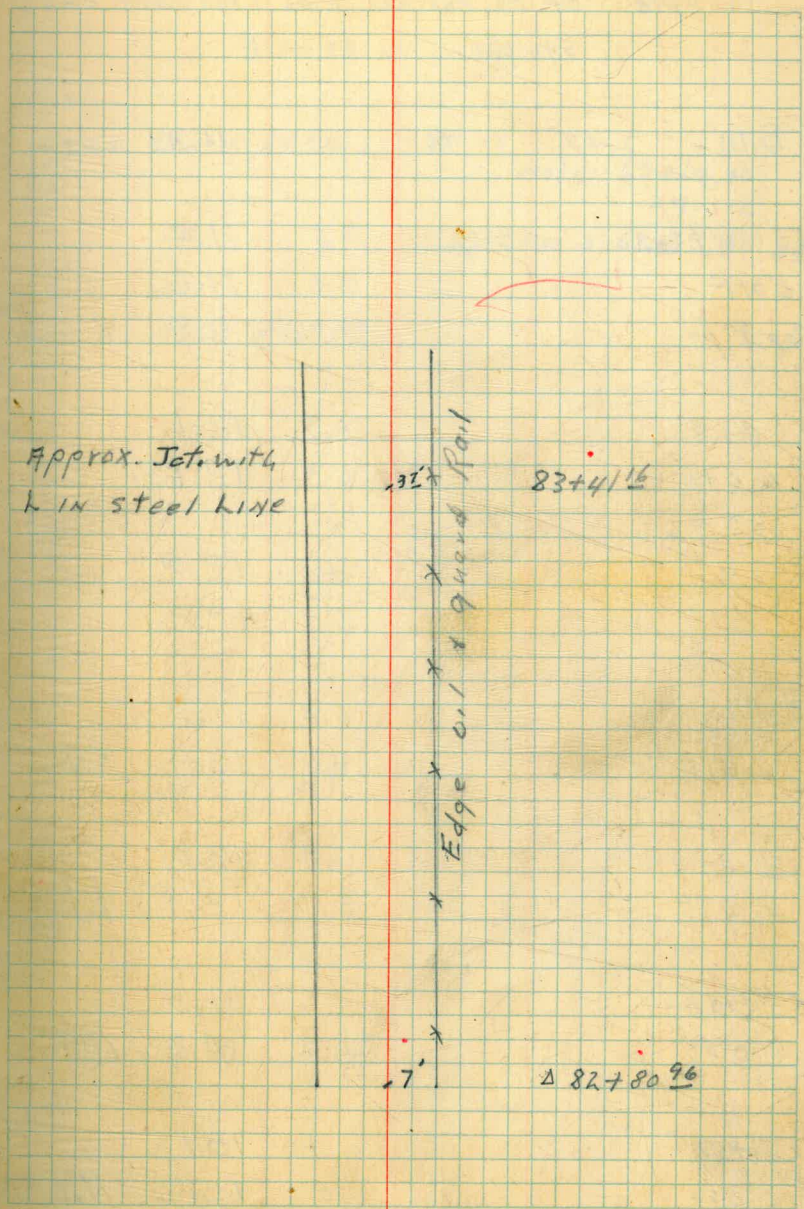


Δ 81+15 File # 3031

83+41'6"

Δ 82+80'96"

Δ 30° Rt.



Approx. Jct. with
h in steel line

32'

Edge of Guard Rail

83+41'6"

7'

Δ 82+80'96"

Profile of P.A. For New Pipe Hack Wood Mesa
Sta. 63+24 to 83+41.6

B.M.	2.43	18.96	16.53	U.S.G.S
63+24		7.6	11.4	
6' OFF		7.4	11.6	
Top Pipe		9.7	9.3	
63+50		6.9	12.1	
6' OFF		6.9	12.1	
BC 63+91 ¹²		6.8	12.2	
6' OFF		6.7	12.3	
64+00		6.8	12.2	
6' OFF		6.6	12.4	8.2
450		6.0	13.0	
6' OFF		5.9	13.1	9.1
65+00		4.7	14.3	
6' OFF		4.7	14.3	10.1
1 +50		3.9	15.1	
6' OFF		3.8	15.2	11.1

Spike in Pole 15' Pt Sta 65+25

NOTE: 63+24.00
- 90.12

63+24.00 = 62+33.88 BE.

Top Existing Steel P.A.

4.7

4.0

4.2

4.1

18.96

66+00	3.0	16.0	
6' off	2.9	16.1	12.0

4.1

66+24 ⁹⁹ F.C.	2.5	16.5	
6' off	2.4	16.6	12.4

4.2

66+50	2.3	16.7	
6' off	2.0	17.0	12.7

4.3

67+00	1.4	17.6	
6' off	1.5	17.5	13.5

4.0

67+50	0.8	18.2	
6' off	1.0	18.0	14.2

3.8

T.P.	3.40	21.45	0.91	18.05 ^v
------	------	-------	------	--------------------

67+65	3.2	18.3	
	5.4	16.1	

68+00	3.1	18.4	
6' off	3.2	18.3	14.2

4.1

Ground
Top Wood Stake Pipe

21.45

68+50

3.2 18.3'

6' off

3.5 18.0 14.2' 3.5'

GA 68+92⁰²

3.9 17.6'

6' off

4.0 17.5 13.7' 3.8'

6 69+00

3.6 17.9'

6' off

4.2 17.3 13.6' 3.7'

6 69+50

4.8 16.7'

6' off

4.7 16.8 12.9' 3.9'

6 70+00

5.3 16.2'

6' off

5.5 16.0 12.3' 3.7'

70+50

6.0 15.5'

6' off

6.1 15.4 11.6' 3.8'

A 70+141³⁷

6.2 15.3'

6.2 15.3 11.6' 3.7'

71+00

6.3 15.2'

6' off

6.4 15.1 11.6' 3.5'

	21.45				
71+50		6.1	15.4		
6' off		6.3	15.2	11.6	
T.P.	5.96	19.72	7.69	13.76	✓
71+64		12.9	6.8		Fl. Line
		11.9	7.8		No. End Fl. Line 50. End
72+00		4.0	15.7		
6' off		4.1	15.6	11.6	
Δ 72+06 ⁶³		4.0	15.7		
6' off		4.0	15.7	11.6	
72+42+		4.1	15.6		
72+50		4.1	15.6		
6' off		4.1	15.6	11.6	
73+00		4.1	15.6		
6' off		4.1	15.6	11.9	
73+50		3.6	16.1		
6' off		3.6	16.1	12.1	

3.6

Nail in Pole # 60739 see BK 539

24' Cor. I. Culvert

4.0

4.1

4.0

3.7

4.0

Ground Above Wood Flare 10' deep according to
landerbeck

19.72

74+00 3.2 16.5

6' off 3.3 16.4 12.4

4.0

74+50 3.1 16.6

6' off 3.1 16.6 12.7

3.9

75+00 2.7 17.0

6' off 2.7 17.0 12.9

4.1

75+50 2.6 17.1

6' off 2.6 17.1 13.2

3.9

75+58± 2.6 17.1 Grounds

7.0 12.7 Top Pipe

Wood Stake Crossing

76+00 2.5 17.2

6' off 2.4 17.3 13.5

3.8

T.P. 12.34 29.67 2.39 17.33 ✓

76+50 12.1 17.6

6' off 12.1 17.6 13.7

3.9

	29.67				
77+00		11.8	17.9		
6' off		11.7	18.0	14.0	4.0
77+50		11.0	18.7		
6' off		11.0	18.7	14.7	4.0
78+00		10.3	19.4		
6' off		10.1	19.6	15.4	4.2
78+50		8.9	20.8		
6' off		8.8	20.9	16.9	4.0
78+59 ¹⁴		8.6	21.1		
6' off		8.6	21.1	17.2	3.9
79+00		7.2	22.5		
6' off		7.2	22.5	18.4	4.1
79+50		5.4	24.3		
6' off		5.2	24.5	19.9	4.6
80+00		3.7	26.0		
6' off		3.7	26.0	21.4	4.6

29.67

80+50		2.9	26.8	
6' off		2.9	26.8	21.4
80+50		5.5	24.2	Fl. Line
		6.2	23.5	So. End
				Fl. Line
				No. End
81+00		2.6	27.1	
6' off		2.6	27.1	23.0
81+50		2.4	27.3	
6' off		2.4	27.3	23.1
82+00		2.3	27.4	
6' off		2.2	27.5	23.1
82+50		2.1	27.6	
6' off		2.0	27.7	23.2
82+80 ^{9/16}		1.9	27.8	
6' off		1.9	27.8	23.2
83+00		1.9	27.8	
6' off		1.9	27.8	23.3

5.4
18" Conc. Pipe 80+50

80+55 26.8 21.4
80+85 27.1 23.0

4.1

4.1

4.4

4.5

4.6

4.5

	29.67		
83+41 1/2	1.8	27.9	
6' off	1.8	27.9	19.9
	4.67	25.00	Top Pipe Steel Line
	8.58	21.09	21.09 ✓

(Ground Line only, contd. pg. 75) EE.

$$83+41 \frac{1}{2} = 82+51.04 \text{ EE.}$$

4.6

Approx. Set with steel line under Pass.

Check into B.M. USC465 V-131 ^{Brass Plate} 17 Hwy. D.P.
See BK. 559 Page 44

REDUCED BY MRR
1/10/46

Torrey Pines

Profile over Lockwood-Mesa W.S. Line - So. Del Mar

Sta 159 to 168⁺

T.B.M. 5.80' 164.19' 158.39 ✓

159+00 10.8 153.4 ✓

+50 10.2 154.0 ✓

160+00 9.8 154.4 ✓

+50 155.2 EE.
9.0 152.2 ✓

161+00 8.2 156.0 ✓

+50 156.7 EE.
7.5 156.9 ✓

162 6.7 157.5 ✓

+50 6.4 157.8 ✓

163 6.1 158.1 ✓

+50 5.2 159.0 ✓

164 3.4 160.8 ✓

KING - Ward
Klinger - Leonard

1-9-46

26

Top Stake Lt. Sta. 167+85 - See back of BK.

Note stationing from
file drawing #2554.

164.19 ✓

164+26

2.6 161.6 ✓

7.5 156.7 ✓

+50

2.3 161.9 ✓

165

4.0 160.2 ✓

+50

5.5 158.7 ✓

8.6 155.6 ✓
To Top
Wd. Stave

166

6.1 158.1 ✓

+50

6.8 157.4 ✓

167

7.1 157.1 ✓

+50

8.4 155.8 ✓

11.0 153.2 ✓
Top of
Wd. Stave

168

9.8 154.4 ✓

T.P.

3.56 ✓

161.95 ✓

5.80 ✓

158.39 ✓

27.

Ground Above Surge Tee.

165+50

166.95

Δ 168+13⁺

7.4 154.6 ✓

10.3 151.7 ✓

168+37

4.6 157.4 ✓

168+51⁴

4.6 157.4 ✓

169+06

5.7 156.3 ✓

T.B.M.

3.56 138.39 ✓

28

Δ IN Steel Pipe 30° ± Lt.
Top Steel Pipe at angle Pt.

Shoulder Edge Pav.

Edge CONC. Pav. Highway 101 West side

" " " " " East side

Top Stake Lt. 167+85

Use only to go ahd.

Station at Div. Valve - 175+31 = 177+97 over Sta.

NOTES REDUCED BY MRR
1/14/46

Torrey Pines
Levels on 8' offsets - Lockwood-Mesa, P.A.
B.M. 5.05 ✓ 163.44 ✓ 158.39 ✓

161+00 6.7 156.7 ✓ 150.3 ✓

+50 6.1 157.3 ✓ 150.3 ✓

162 5.2 158.2 ✓ 150.3 ✓

+50 5.1 158.3 ✓ 150.3 ✓

163 5.0 158.4 ✓ 150.3 ✓

+50 2.7 160.7 ✓ 150.3 ✓

164 1.7 161.7 ✓ 150.3 ✓

+20 2.4 161.0 ✓ 150.4 ✓

+50 2.5 160.9 ✓ 150.3 ✓

165 3.0 160.4 ✓ 150.3 ✓

+50 4.0 159.4 ✓ 150.3 ✓

KING
Leonard
Ward 1-17-46

29

C 6.4 ✓

7.0 ✓

7.9 ✓

8.0 ✓

8.1 ✓

10.4 ✓

11.4 ✓

10.6 ✓

10.6 ✓

10.1 ✓

9.1 ✓

163.44

166 4.5 158.9 - 150.2 - 8.7'

+50 5.9 157.5 - 150.2 - 7.3'

167 5.9 157.5 - 150.1 - 7.4'

+50 6.0 157.4 - 150.1 - 7.3'

B.M. 5.06 158.38 - 158.29 Top stake

+50

Torrey Pines
Profile E Lockwood - Mesa Pk
B.M. 5.05 163.44 - 158.39 ✓
T.P. 1.29 155.21 - 9.52 153.92 ✓

160+50 0.00 155.2 ✓

160 0.30 154.9 ✓

159+50 1.3 153.9 ✓

159 1.8 153.4 ✓

158+50 3.3 151.9 ✓

158 4.6 150.6 ✓

157+50 5.8 149.4 ✓

157 7.1 148.1 ✓

156+50 7.5 147.7 ✓

156 8.4 146.8 ✓

155+50 9.5 145.7 ✓

37
Gimny Sta. 159+00

155.21

155 10.3 144.9 ✓

154+50 11.4 143.8 ✓

T.P. 0.01 ✓ 145.29 ✓ 9.93 145.28 ✓

154 2.4 142.9 ✓

+50 3.1 142.2 ✓

153 3.7 141.6 ✓

+50 5.4 139.9 ✓

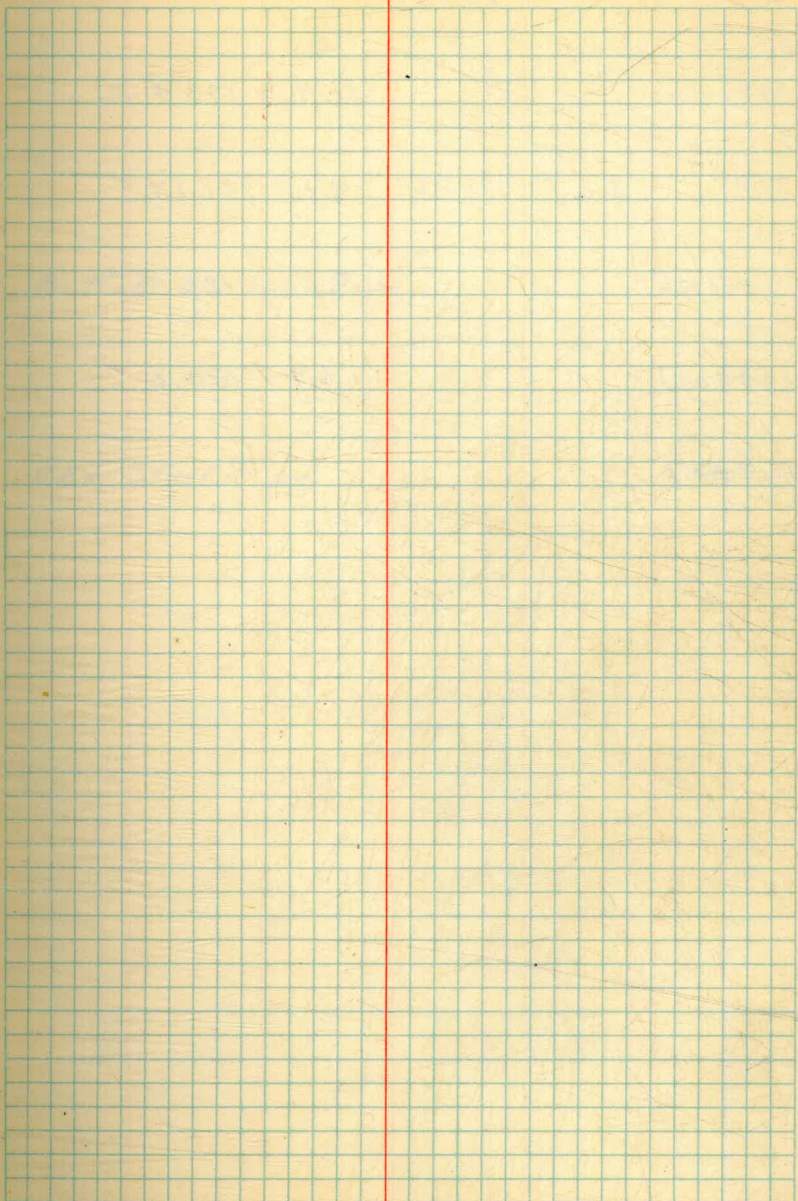
152 6.4 138.9 ✓

+50 7.5 137.8 ✓

151 8.6 136.7 ✓

+50 9.6 135.7 ✓

150 10.8 134.5 ✓



145.29

149+50

11.9 - 133.4 -

T.P.

2.67

138.86

9.10

136.19 ✓

149+135

9.4

129.5 ✓

149+00

6.9

132.0 -

149+00.7

End Steel Pipe

Bottom of W.S. Pipe

168+13
149+00.7
19.123

Levels and 8" offsets Lockwood Mesa - Turrells King Leonard Ward 1-18-46

B.M.	3.46	^{157.4} 157.38	153.92
160+50		1.6	155.8 152.2
160		2.2	155.2 150.0
159+50		2.9	154.5 149.9
159		3.5	153.9 149.7
158+50		5.5	151.9 148.3
158		7.5	149.9 147.2
157+50		8.6	148.8 145.7
157		9.4	148.0 144.4
156+50		9.8	147.6 143.6
156		10.3	147.1 142.8
155+50		11.6	145.8 142.0

Ginny Sta. 159+00
5.6
5.2
4.6
4.2
3.6
2.9
3.1
3.6
4.0
4.3
3.8

		157.38			
155			11.7	145.7	141.2
T.P	2.15	147.01	12.52	144.86	
154+50			2.9	144.1	140.4
154			3.0	144.0	139.6
153+50			4.5	142.5	138.7
153			5.1	141.9	137.9
152+50			6.7	140.3	136.7
152			7.8	139.2	135.5
151+50			8.8	138.2	134.4
T.P	3.56	141.78	8.79	138.22	
151			4.6	137.2	133.2
150+50			5.7	136.1	132.0

4.5

3.7

4.4

3.8

4.0

3.6

3.7

3.8

4.0

4.1

141.78

150 6.9 134.9 130.0

149+50 8.0 133.8 130.0

T.B.M. 5.59 136.19 136.19

36

4.1

3.9

See page 33

Torrey Pines
Lockwood Mesa P.L. Sta. 175+31-195+00

B.M. 3.79 142.81 139.02

offset
stakes

176+00 10' RT 4.0 138.8 132.3

+50 14' RT 3.8 139.0 131.7

177 12' RT 5.0 137.8 130.0

+50 12' 7.1 135.7 128.9

178 12 6.9 135.9 127.8

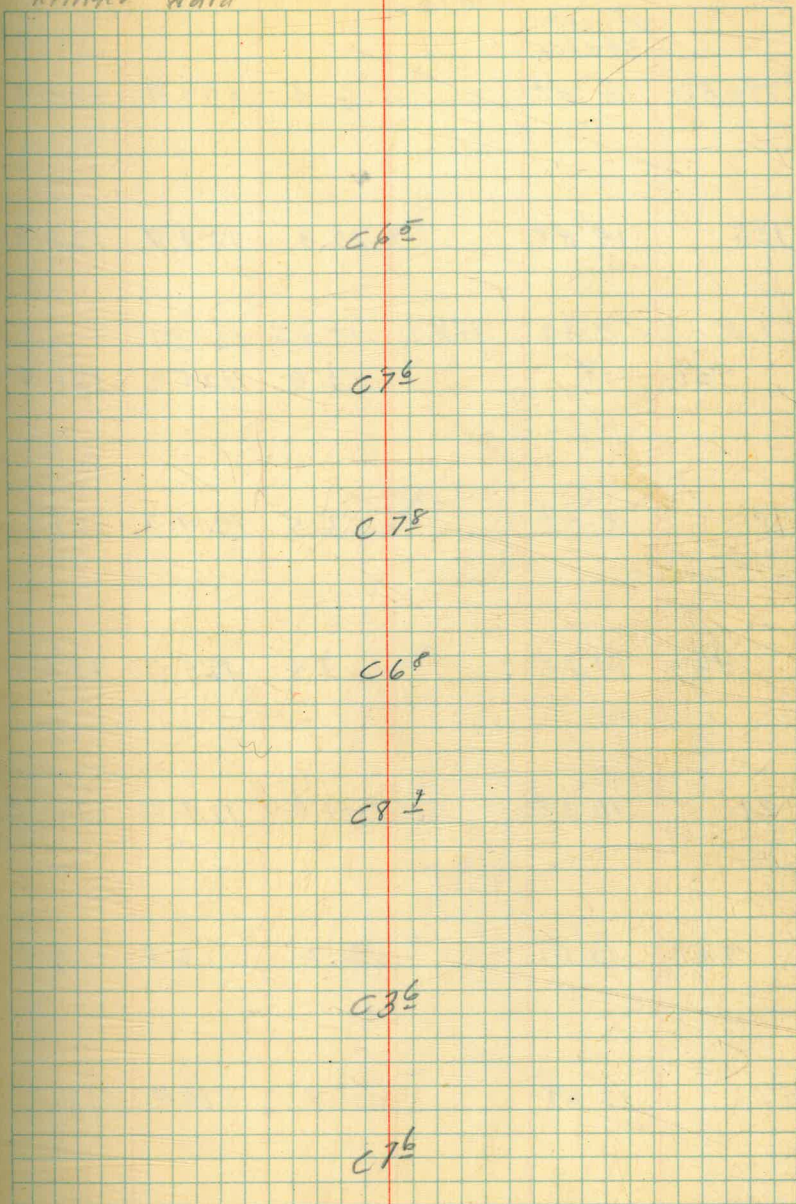
T.P. 3.56 138.16 8.21 134.60

+50 12' RT. 7.6 130.6 127.0

179 15' RT 4.4 133.8 126.2

Hing 1-21-46
Kearney
Klinger Ward

37



	offset stakes	138.16			
179+50	13' RT		6.3	131.9	125.3
180	14' RT		10.3	127.9	123.3
T.P	0.30	128.21	10.25	127.91	
+50	?		3.0	125.2	121.4
181	8' RT		3.5	124.7	121.0
+50	14' LT		2.6	125.6	120.7
182	16' LT		+1.0	129.2	120.4
+50	13' RT		2.2	126.0	120.0
183	12' RT		7.8	120.4	118.3

C6⁶C4⁶C3⁸C3³C4⁸C8⁸C6⁸C2¹

	Offset Stakes	128.21			
183+50	9' RT.		8.8	119.4	116.5
T.P.	8.26	126.41	10.06	118.75	
184	7' RT.		7.5	118.9	116.0
+50	12' RT.		5.4	121.0	115.5
185	12 RT.		0.4	126.00	115.0
+50	13' RT.		0.9	125.5	114.5
T.P.	3.25	128.77	0.89	125.52	
186	12' RT.		4.3	124.5	114.0
+50	10' RT.		8.4	120.4	113.5
187	8' RT.		12.7	116.1	112.6
T.P.	6.27	122.27	12.77	116.00	

C2⁹C2⁹C5⁵C11⁰C11⁰

Gimny 185+50

C10⁵C6⁹C3⁵

	offset stakes	122.27			
187 +50	11' RT.		5.5	116.8	111.6
188	13' RT.		6.3	116.0	110.7
+50	10' RT.		8.4	113.9	109.7
189	10' RT.		11.4	110.9	107.8
+50	9' RT.		11.2	111.1	107.3
T.P	0.27	112.61	9.93	112.94	
190	11' RT.		4.0	108.6	106.8
+50	9' RT.		3.6	109.0	105.9
191	10' RT.		4.2	108.4	105.0

C5²

C5³

C4²

C3⁴

C3⁸

C1⁹

C3¹

C3⁴

	Offset stakes	112.61			
191+50	14' RT.	6.7	105.9	104.1	
192	14' RT.	8.5	104.1	103.2	
+50	18' RT.	3.2	109.4	102.9	
193	17' RT.	5.7	106.9	101.5	
+50	8' RT.	7.8	104.8	100.6	
194	10' RT.	8.0	104.6	99.7	
+50	10' RT.	10.8	101.8	99.2	
195	Tie to exist pipe			98.8	
T.B.M.		6.83	105.78		

ck. Ginny 192+50 6' offset.

C18

C09

C72

C54

C42

C49

C26

Replace Offset Hubs

Lockwood Mesa PL sta 175+31-195

B.M.	0.59	139.61		139.02
T.P.	3.22	135.93	6.90	132.71
180			7.7	128.2 123.3
T.P.	1.20	129.65	7.48	128.45
+50			4.6	125.1 121.4
181			4.9	124.8 121.0
+50			6.1	123.6 120.7
182			6.3	123.4 120.4
+50			7.4	122.3 120.0
183			8.1	121.6 118.3
T.P.	4.93	128.26	6.32	123.33

1-23-46

42

C4²

C3⁷

C3⁸

C2³

C3⁰

C2³

C3³

128.26

183+50

9.2 119.1 116.5

TBM

9.35 118.91

43
C2⁶
Ck into Ginny G' offset 184+00

E Profile over W.S. - Hack wood - mesa P.L.

From sta. 86+31.70 to sta 99+21.70

B.M. 9.98 31.07 21.09

86+31.70 Grd. 7.3 29.8

Top Pipe 9.1 22.0

+50 Grd. 6.5 24.6

Top Pipe 8.8 22.3

87 Grd. 5.4 25.7

Top Pipe 8.8 22.3

+50 Grd. 5.1 26.0

Top Pipe 6.2 24.9

T.P. 6.41 33.33 4.15 26.92

88 Grd. 4.9 28.4

Top Pipe 6.9 26.4

+50 Grd. 4.0 29.3

Top Pipe 6.1 27.2

King - Leonard - Ward - Klinger
1-23-46

44

Began steel P.2 Sta. 86+31.70

usc + 9.5 North side Underpass V-131

For ground line see pg. 75-77

NOTE:

Use this data for top pipe

Surface only, for reference only.

See page 49 for bottom

Steel pipe grade only.

EE.

8-4-47

89	Grd.	2.0	31.3
	Top Pipe	5.9	27.4

+50	Grd.	3.2	30.1
-----	------	-----	------

	Top Pipe	6.6	26.7
--	----------	-----	------

+90	at Air Valve	5.7	27.6
-----	--------------	-----	------

90	Grd.	3.7	29.6
----	------	-----	------

	Top Pipe	5.7	27.6
--	----------	-----	------

+50	Grd.	3.3	30.0
-----	------	-----	------

	Top Pipe	5.9	27.4
--	----------	-----	------

91	Grd.	3.6	29.7
----	------	-----	------

	Top Pipe	6.4	26.9
--	----------	-----	------

+50	Grd.	4.1	29.2
-----	------	-----	------

	Top Pipe	6.7	26.6 27.0
--	----------	-----	-------------------------

92	Grd.	5.0	28.3
----	------	-----	------

	Top Pipe	7.4	25.9
--	----------	-----	------

T.P.	2.03	30.94	4.42	28.91
------	------	-------	------	-------

Top Pipe at old Air Valve

30.94

92+50	Grd.	2.6	28.3
	Top Pipe	4.6	26.3

93	Grd.	2.2	28.7
	Top Pipe	4.9	26.0

+50	Grd.	3.0	27.9
	Top Pipe	6.0	24.9

94	Grd.	4.6	26.3
	Top Pipe	7.3	23.6

+50	Grd.	7.7	23.2
	Top Pipe	10.5	20.4

95	Grd.	11.1	19.8
	Top Pipe	14.2	16.7

+22	Top Pipe 6" Sewer	13.9	17.0
-----	----------------------	------	------

+22	Top Pipe	14.9	16.0
-----	----------	------	------

T.P.	8.70	29.70	9.94	21.00
------	------	-------	------	-------

95 +50	Grd.	9.5	20.2
	Top Pipe	12.5	17.2

46

Top Pipe at B.O

96	Grd.		7.3	22.4	✓
	Top Pipe		10.6	19.1	✓
+50	Grd.		5.2	24.5	✓
	Top Pipe		8.9	20.8	✓
97	Grd		3.4	26.3	✓
	Top Pipe		6.9	22.8	✓
97+34.					
T.P	11.68	39.20	2.18	27.52	
+50	Grd		6.9	32.3	✓
	Top Flowline		13.1	26.1	✓
+59	Ditch		9.1	30.1	✓
98	Grd.		5.3	33.9	✓
	Top pipe		10.1	29.1	✓
+50	Grd		4.6	34.6	✓
	Top pipe		7.2	32.0	✓
+61	Top pipe exposed.		6.8	32.4	✓
+61			6.8	32.4	✓

Junct. W.S. & Steel P. 2

R.R. Cross Drain Ditch

39-20

99 Grd.

3.1 36.1 ✓

No Pipe shot.

+21⁷⁰

2.7 36.5

B.M.

1.48

39.65

~~38.65~~

1.03

38.17

~~37.17~~

T.P.

1.79

32.71

~~31.71~~

8.73

30.92

~~29.92~~

T.P.

2.16

26.95

~~25.95~~

7.92

24.79

~~23.79~~

T.R

5.86

21.09

21.09

Began Oil Pav. around depot

Approx. End Pipe

In pole 5' Lt. of P.L. 99+21

U.S.C. 69.5

48

Levels on offset ginnys - Lockwood Mesa - Torrey Pines Pl.
 P.h. Sta 86+31.70 to 99+21.70 Steel Pipe

B.M.	5.60	26.69	21.09	Grade
86+50 25' out New Sta. 85+66.4 EWE -83.60	5.0	21.7	20.3	
87 28' out	4.1	22.4	20.5	
+50 33'	6.8	25.9	22.4	
T.P	7.92	32.94	1.67	25.02
88 33'	6.6	26.3	24.7	
+50 38'	5.0	27.9	25.2	
89 40'	4.9	28.0	25.7	
+50 43' 8+31.70 EWE	5.0	27.9	25.8	
90 45'	5.2	27.7	25.9	
+50 40'	4.0	28.9	25.5	
91 35' 90+16.4 EWE	4.8	28.1	25.2	

1-24-46

49

U.S.C. & G.S. - V. 131 No. 5 side Overhead Pass

1.4

Note: Use this data for bottom
steel pipe only.

See page 44 for ground

surface only. EE. 8-4-47

2.1

3.3

1.6

2.7

2.3

2.1

1.8

H.V.

3.4

2.9

32.94

91+50₃₆ 4.9 28.0 25.0 3.0

92₃₈ 5.6 27.3 24.8 2.5

+50₃₈ 5.8 27.1 24.5 2.6

T.P. 1.48 28.61 5.81 27.13

93 = 92+16.40 EWE
17' 1.4 27.2 24.3 2.9

+50 = 92+66.40 EWE
27' 2.9 25.7 23.1 2.6

94₂₁ 2.9 25.7 21.9 3.8

+50₂₂ 5.6 23.0 18.4 4.6

95₂₅ 9.0 19.6 15.0 4.6

+22₂₆ 10.9 17.7 B.O. 14.3 3.4

+50₂₃ 8.2 20.4 15.4 5.0

96₂₀ 1.8 26.8 17.4 9.4

T.P. 10.93 39.04 0.50 28.11

96+50₂₀ 10.5 28.5 19.2 9.3

B.O.

39.04

97 9.9 29.1 21.1

+39.18' Pipe laid to Here

+50.17' 5.6 33.4 24.2

98 4.3 34.7 27.4

20'

+50.12.5 ← 97+66.4 EE 4.1 34.9 30.3

99 3.0 36.0

6

T.B.M. 0.90 38.14 38.17

Contd. F.B. 561 - pg. 74

8.0

9.2

7.3

4.6

Nail in T.P. left Sta. 99+20

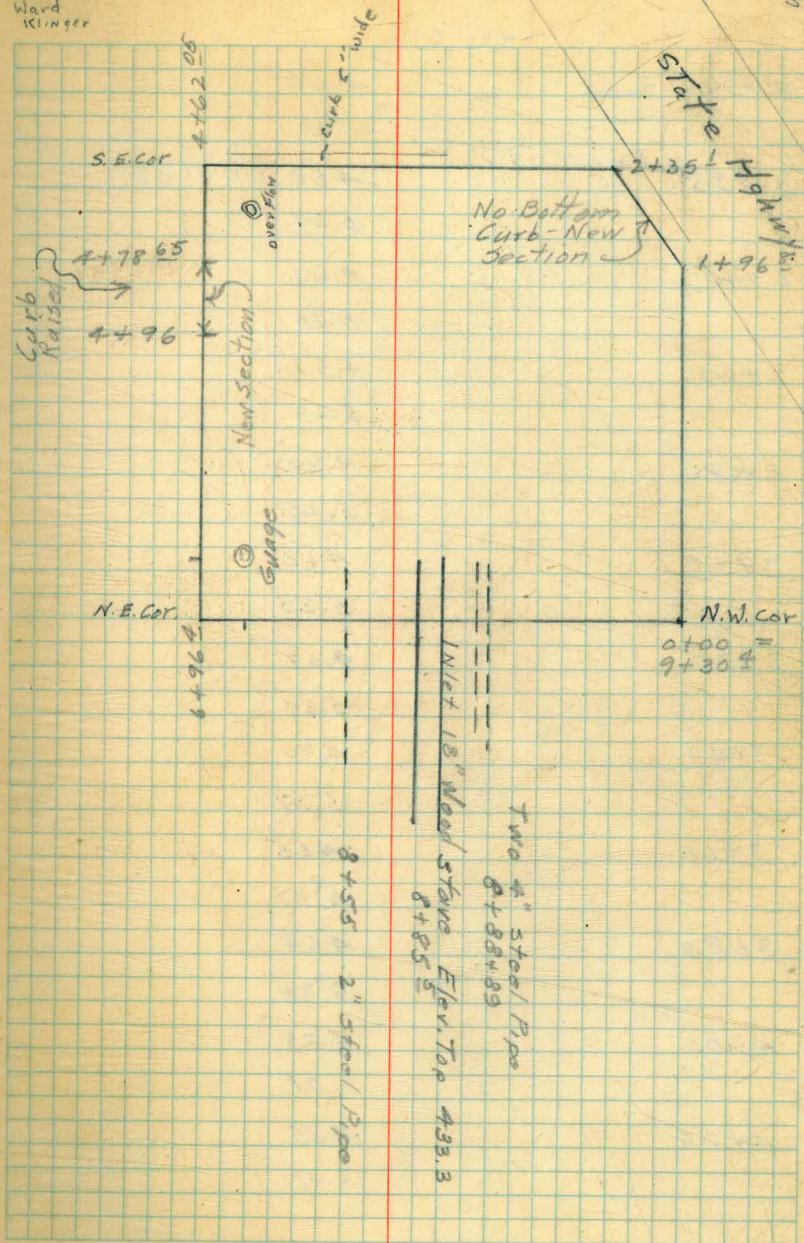
Levels on Top & Bottom Curb - Torrey Pines Res.

0+00 = N.W. Cor. Stations going So.

See Book #538 Page 33

B.M.	4.67	435.67	431.0
0+00 Top curb	4.61	431.06	
Bottom "	5.21		
+20	4.62	5.29	
+40	4.60	5.30	
+60	4.65	5.31	
+80	4.60	5.32	
1+00	4.56	5.24	
1+20	4.56	5.27	
1+40	4.56	5.23	
1+60	4.54	5.25	
1+80	4.58	5.22	
1+96 ⁸ Angle Point	4.54	5.25	
2+00	4.52	5.27	

KING
Leonard
Ward
Klinger 1-24-46

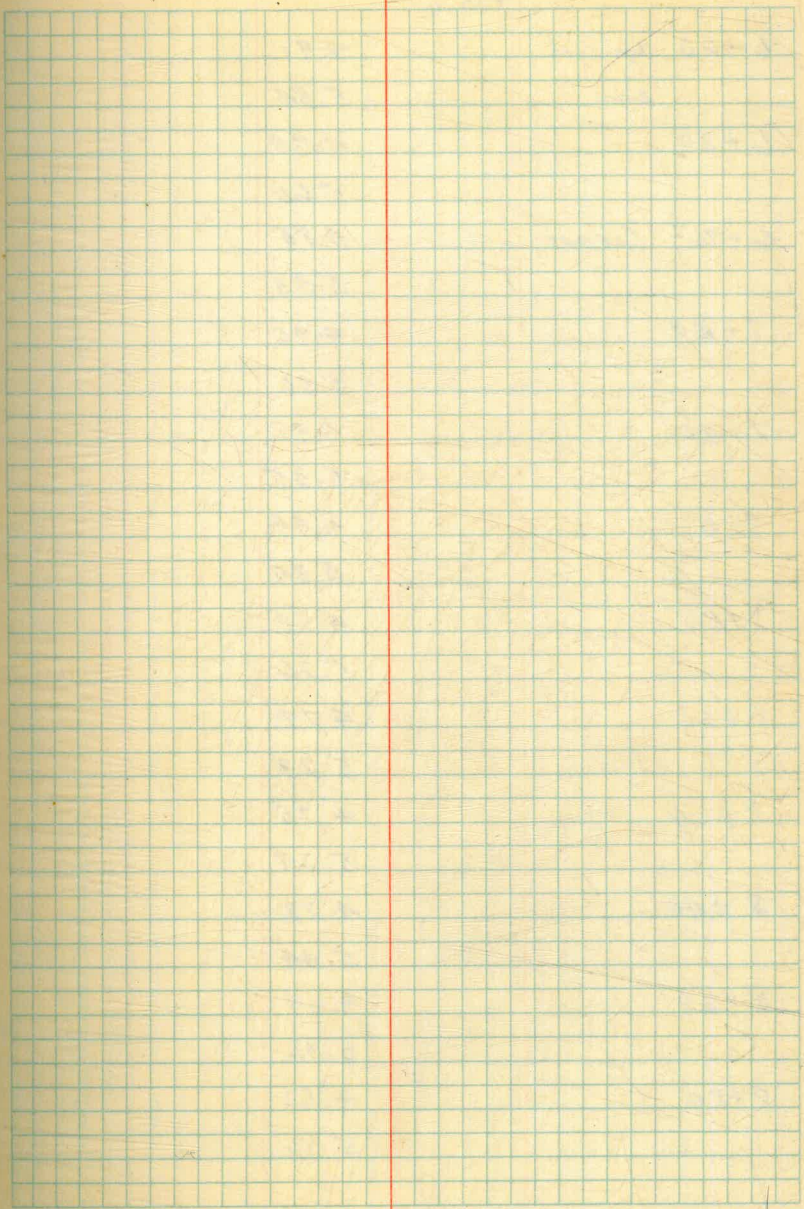


435.67

2+20	Top Carb	4.60	
		No Bottom	
2+35	Corner	4.60	431.07
		5.27	
2+40		4.60	
		5.25	
2+60		4.57	
		5.23	
2+80		4.60	
		5.25	
3+00		4.60	
		5.25	
3+20		4.61	
		5.29	
3+40		4.60	
		5.27	
3+60		4.65	
		5.32	
3+80		4.64	
		5.30	
4+00		4.73	
		5.37	
4+20		4.85	
		5.47	

435.67

4+40	Top curb	4.84
	Bottom	5.54
4+62 ⁰⁵	Corner	4.82
		5.52
4+78 ⁶⁵	Begin New Concrete	4.75
		5.41
4+96		4.74
		5.43
5+00	old concrete	4.89
		5.55
5+20		4.86
		5.50
5+40		4.84
		5.50
5+60		4.92
		5.56
5+80		4.96
		5.62
6+00		4.96
		5.64
6+20		5.02
		5.66
6+40		4.92
		5.56



435.67

6+60	Top curb	4.91
	Bottom "	5.54
6+80		4.94
		5.60
6+96 ⁴	Corner	4.85
		5.55
7+20		4.96
		5.36
7+40		4.98
		5.35
7+60		4.94
		5.34
7+80		4.88
		5.26
8+00		4.74
		5.23
8+20		4.75
		5.24
8+40		4.72
		5.44
8+60		4.64
		5.32
8+80		4.62
		5.32

55

435.67

9+00 Top curb

4.60

Bottom "

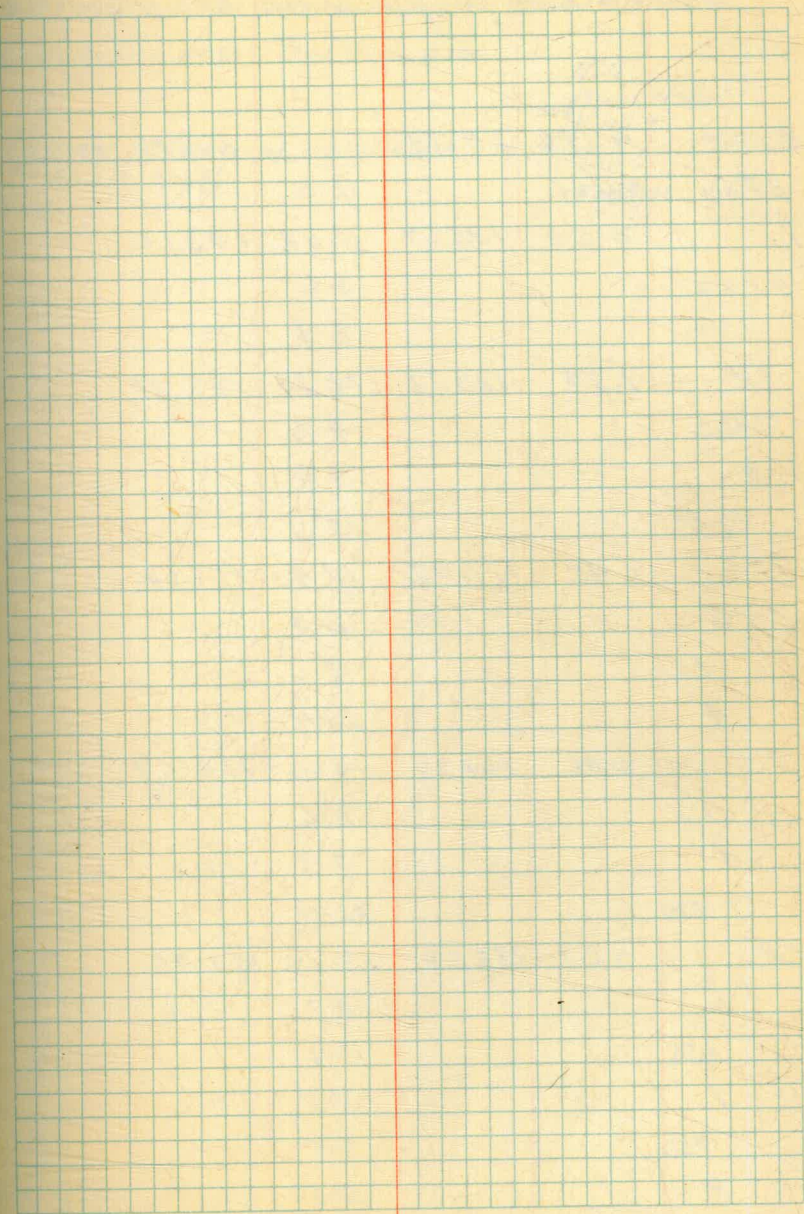
5.34

+20

4.61

5.30

54



Ground line profile Levels Lockwood Mesa

B.M.	4.76 ⁹⁴	211.13		206.19
0+00	Ground		12.0	199.1
TP.	0.52	199.67	11.98	199.15
0+50			3.6	
1+00			8.3	191.4
TP	1.74	189.11	12.30	187.37
1+50			4.8	
2			9.4	179.7
+50			12.5	
TP.	0.95	177.07	12.49	176.62
3			2.9	174.2
+50			5.0	
4			10.0	167.1
TP.	0.46	164.53	13.00	164.07
+50			2.6	
5			7.8	156.7
+50			12.0	
TP.	0.63	152.38	12.78	151.75
6			2.7	149.7
+50			4.1	
7			5.5	146.9
+50			7.5	
8			9.5	142.9

Torrey Pines Pipe Line - from Lockwood Mesa Reservoir to Connection with Steel Pipe Line

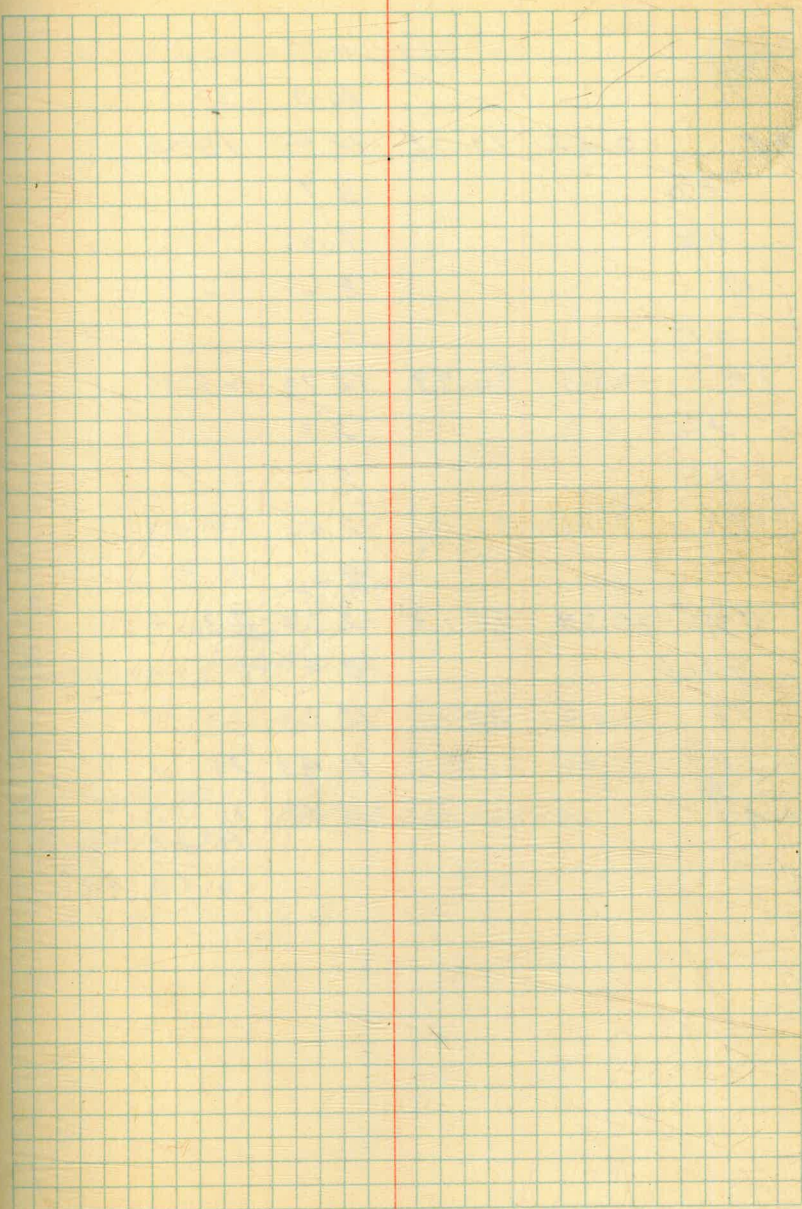
Top and SE Corner of well at 0+00
See PB 539 page 27.

Hill
Bliss Notes
King & Davis
Phillips
March 9
1946
Clearwood

T
152.38

8.50			11.3	
9.0			12.9	139.4
T.P.	0.85	140.30	12.93	139.45
+50			2.4	135.7
10			4.6	131.1
+50			6.6	
11			10.0	130.3
+50			13.1	
T.P.	0.58	128.56	12.32	127.98
12			5.1	123.5
+50			7.7	
13			11.2	117.4
T.P.	0.20	116.14	12.62	115.94
+50			2.3	
14			6.9	109.2
+04			9.4	
+17			11.8	
T.P.	0.12	103.70	12.56	103.58
+25			1.2	
+50			2.8	
15			9.9	93.80
+33			12.2	
T.P.	0.20	91.29	12.61	91.09
+53			5.6	
+74			6.7	

58



7
9/29

151.86 ³⁰			11.10	
16			10.9	80.3
T.P.	0.22	79.07	12.44	78.85
+50			3.7	
+92			7.0	
17			8.6	70.5
+15			11.6	
T.P.	0.65	66.99	12.73	66.34
+50			2.8	
+65			5.6	
T.P.	0.92	55.91	12.00	54.99
18			4.0	51.9
T.P.	0.59	44.13	12.37	43.54
+26.4			3.4	
T.P.	0.08	32.10	12.09	32.04
T.P.	0.72	21.33	11.49	20.61
County BM			5.41	15.92
				16.01 Record
				0.09 diff

59

Top of Meter at Gas Co. Substation

Beginning of (C.I.) steel connect ~~W.A.~~

Gapenay Spike in
PP # P18230 See FB 539. Page 29

Location of 18" Gate Valve
Lockwood Mesa Pipe Line

Old Sta. (EE for Bliss)
New Sta. 151+52.60 EE.

152+07. Lockwood Mesa Pipe Line

E. Pipe

60

Bliss Notes
King
Davis
Sept 30, 46



4th St
Del Mar



18" Gate Valve

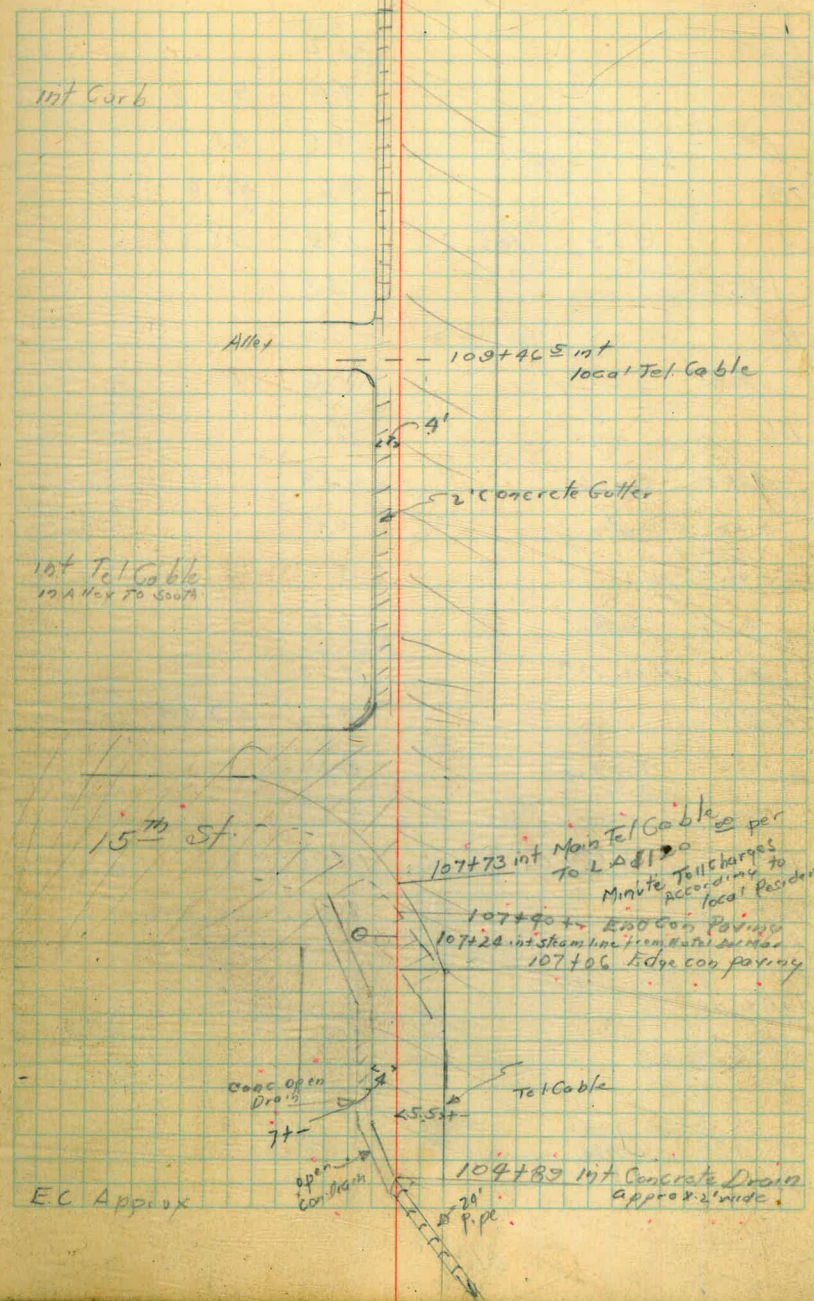
Ground Line Profile Lookwood Mesa

105			6.3	
+89	Top Ground		6.8	
+89	Flow Line		9.50	
+75			6.5	
+50			9.2	
+21 ⁹¹			11.0	
+16 ⁷⁹			11.3	
109			12.2	
T.P.	12.82	54.49	2.56	41.67
+50			2.8	
103			3.3	
+40 ⁶			4.5	
102			5.9	
+88.30			5.5	
+50			5.7	
+ int steam line			5.8	38.4
101			6.1	35.2 Elev Bottom steel pipe
+87 ⁵² BC			6.2	
+50			6.4	
100			6.7	
+50			7.1	
99	seepage 51			
BM	6.06	44.23		38.17

Torrey Pines Pipe Line From Sta 99+00 South 61

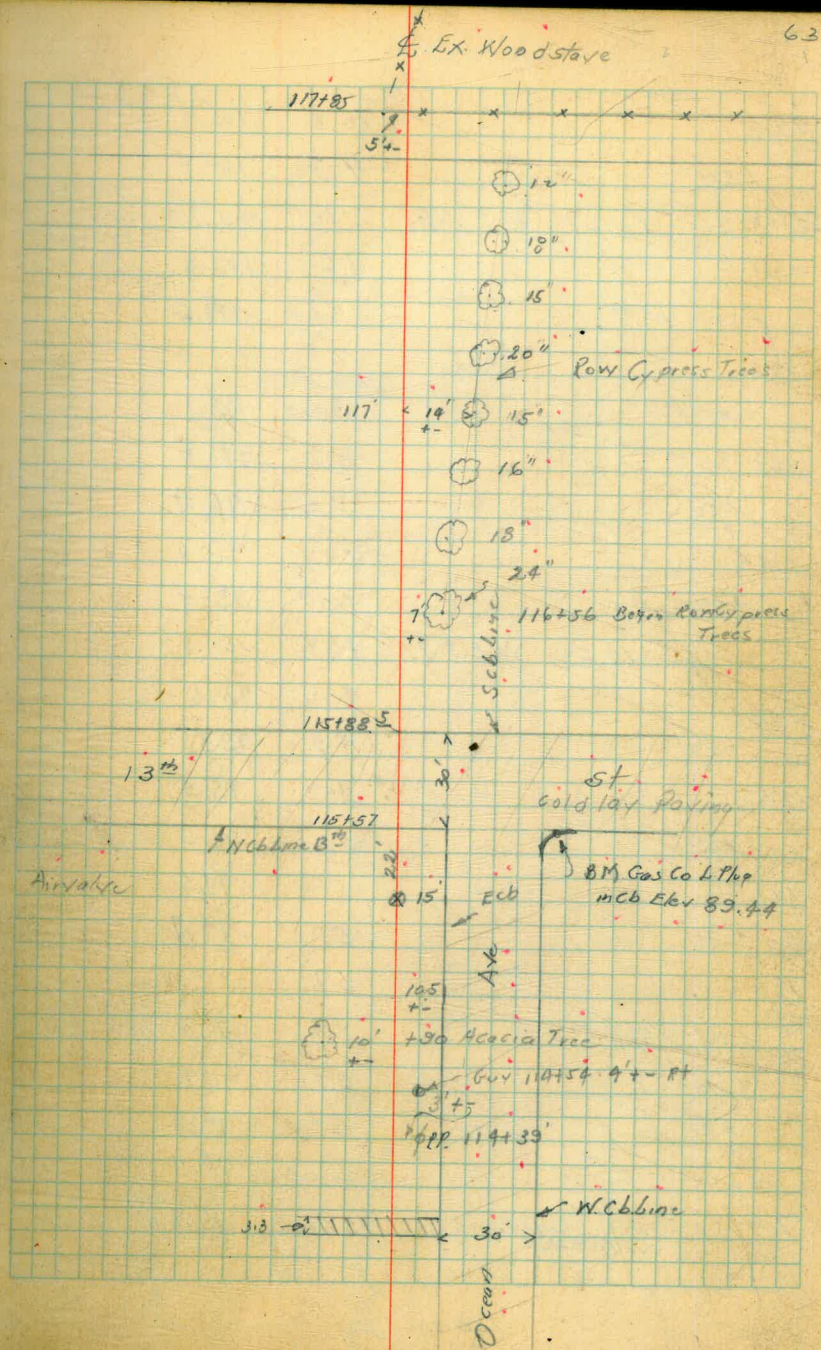
	Bliss Notes
	King T
	Phillips
	Davis Dec 17/146
	last day for Davis
	BC approx
	EC
	BC approx
	EO approx Edge of paving. Note: Present wood stove is under asphaltic concrete from here back to 99+00
	Note: Joint 0-1. Note: Floor of Tunnel 6' below to 5' elev
	Load through steam tunnel 2' 8" above floor bottom ex 41" pipe
	55.5' - 10' + 15' int steam line from Hotel Del Mar
	Approx BC
	100+30 int 4" drain from depot
	Edge of paving
	99+00 Begin This Profile
	Nail in Lute Pole 5' at 99+21 See Page 48 this book

+30	Topc6		67		
+90	Gutter		7.2		
+50			9.0		
113			11.0		
T.P.	12.27	91.51	0.47	79.24	
+50			0.7		
112			1.8		
+50			2.0		
111			2.3		
+50			2.6		
110			3.3		
+46 ^s			4.1		
109			4.9		
+50			7.4		
108			10.3		
+73			11.6		2nd Tel. Cable
+50			12.2		
T.P.	12.95	79.71	0.38	66.76	Approx End Con. Charge
+40			0.30		
+06			3.1		Begin Con. Charge
107			3.7		
+86	107 4" main		4.7	62.4	58.9 1/2
+50			7.8		
106			11.4		
T.P.	12.83	67.14	0.18	54.31	
105 43			2.6		
		59.49			



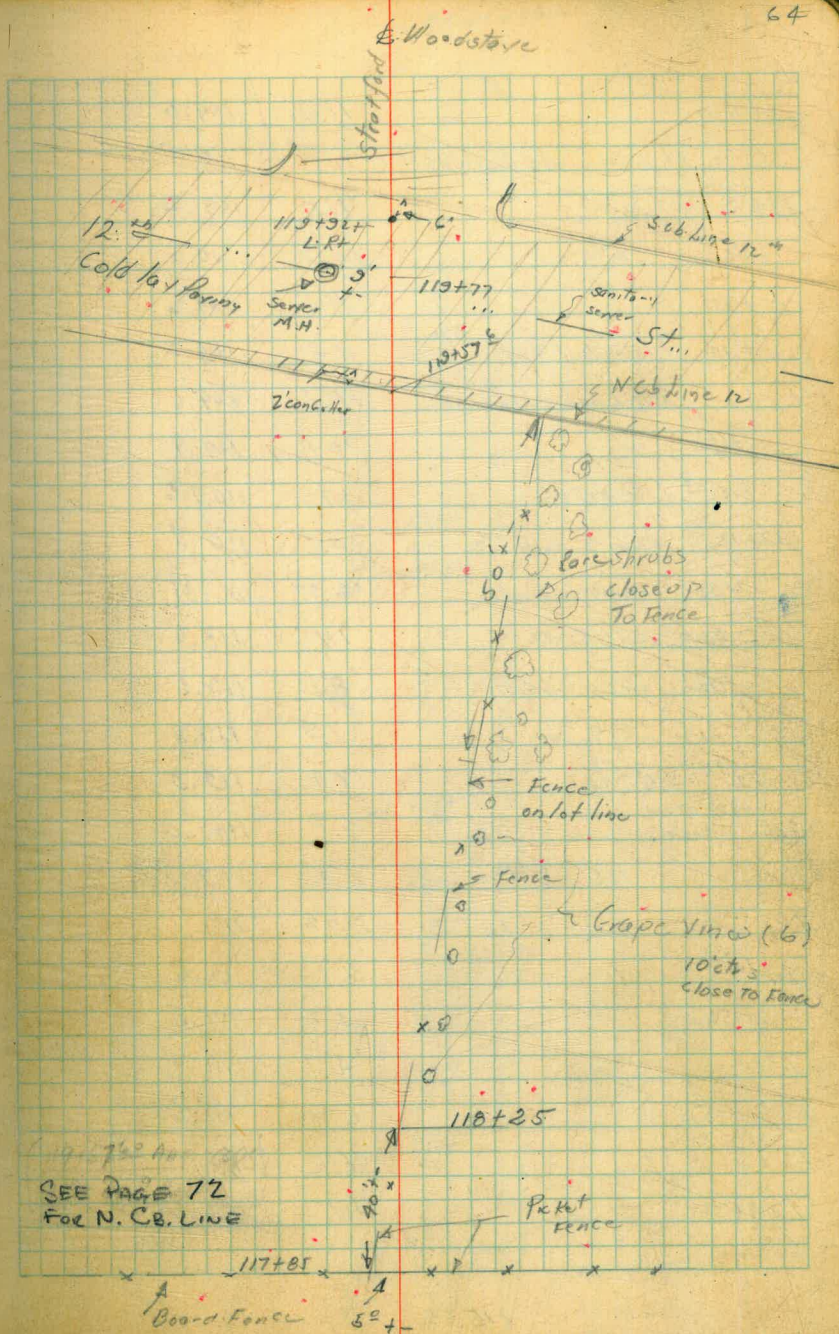
+50			5.2	
119			4.4	95.8
+50			4.5	95.7
118			4.6	95.6
T.P.	3.53	100.20	1.39	96.67
+50			2.8	
117			3.2	
+50			3.6	
116			5.1	
188.5	Top cb		5.54	
+88.5	Gutter		6.2	
+72.5	St		5.6	
+57	Gutter		6.6	
+57	N cb. 13 th		5.94	
Set BM			8.62	89.44
+36	Top Pipe		8.30	
+36	Ground		6.5	
T.P.	8.50	98.06	1.95	89.56
115			0.7	
114+50			3.0	
+31	N Edge Sidewalk		3.90	
114+00	3.3 wide		6.0	

91.51



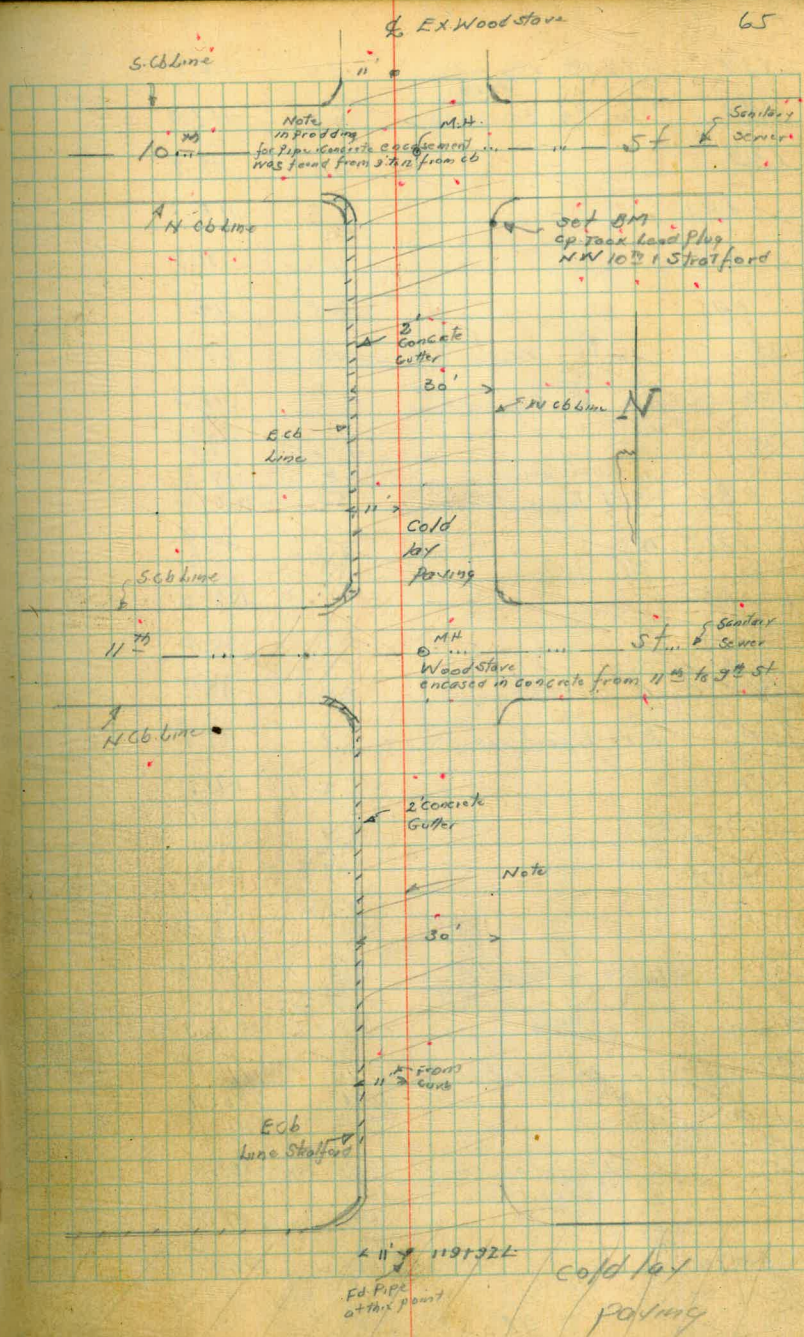
128			10.3	105.4	
+50			11.3	104.4	
S.F. BM	12.27	115.66	2.70	103.39	N.W. C.P.M. L.P. in curb 10' to Stafford
127			3.6	102.5	
+50			5.0	100.5	
126			7.1	99.0	
+50			8.0	98.1	
125			8.7	97.4	
+50			9.2	96.9	
124			10.3	95.8	
+50			10.7	95.4	
79.	10.52	106.09	4.63	95.57	
123			4.6	95.6	
+50			4.9	95.3	
122			4.9	95.3	
+50			5.2	95.0	
121			5.0	94.8	
+50			5.5	94.7	
120			5.7	94.5	
+50	Top Pipe		7.9	92.3	
+92+	L		5.5	94.7	
+77			5.4	94.8	
119+57	Cutter		6.09	94.1	
119+57	N.C.B. Line Top of Stafford 12'		5.40	95.8	

100.20



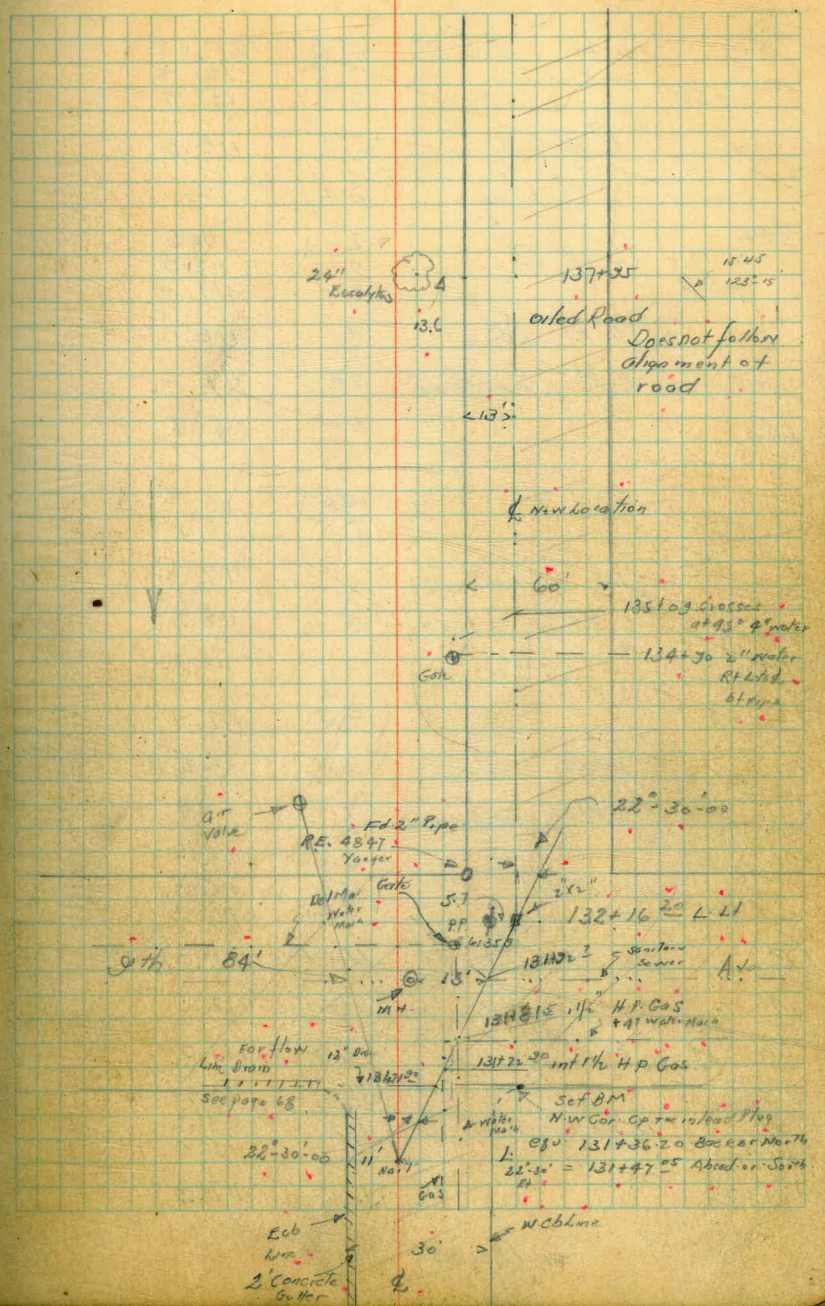
+50		11.7	109.0
139	2' Rt Edge Graded Road on oil	12.7	108.0
134		11.5	109.2
+65		10.7	110.0
+50		11.1	109.6
+10	Flow Dirt Gutter	11.5	109.7
133	on Edge oiled Road	11.1	109.6
+50		10.8	109.9
+16 ²⁰	L. Lt 22°30'00	9.72	110.96
132+13	Flow 2' R. Gutter	10.3	110.4
+92.2	Flowline Sewer	14.37	106.31
+92.2	132 Lt Rm. M.H.	7.1	113.6
+92.3	1st Sanitary Sewer	8.1	112.6
+81.5	1st 14" Gas	7.9	112.8
131+72 ⁹⁰	int 14" Gas	7.9	113.3
= 131+47 ⁹⁰	ahead	6.7	114.0
131+36.20	Back		
8M	115 120.68	2.22	119.53
7P	8.15 121.75	2.06	113.60
131		2.1	113.6
+50		3.2	114.5
130		4.7	111.0
+50		6.2	109.5
129		7.7	108.0
128+50		9.1	106.6

115.66



139	16' RT Edge oil rd	90	114.9
139	10' RT Edge cut bank	60	117.9
139		50	118.9
+83		68	117.1
+68		22	121.7
+45		45	119.3
138	16' RT Edge oil surface	68	117.1
138	10' RT Top cut bank	54	118.5
138		42	119.7
+84	12' RT oil surface	68	117.1
+84	5' RT Top cut bank	37	120.2
+84	16' RT	2.0	121.9
+50	8' RT	6.7	117.2
		2.0	121.9
		1.7	122.2
135		37	120.2
137	15' RT oil surface	82	115.7
137	8' RT Top cut bank	62	117.7
137		62	117.7
+70	12' RT oil	79	116.0
+55	7' RT cut bank	10.2	113.7
		20.8	113.9
		9.8	114.1
+25	12' RT oil	10.7	113.7
	4' cut bank	11.4	114.8
		8.7	115.2
136	12' RT Edge oil Road	119	117.0
136	4' Top cut bank	10.5	113.4
TP	12.27 123.85	910	111.58
+50	10' RT enail	10.1	100.7
		89	111.8
135	6' RT edge oil road	12.3	108.4
135	2' Top cut bank	10.9	109.8
134+70		12.2	108.5

120.68



24" Escalator
 137+25
 15' 45" 123' 15"
 oil road
 Does not follow alignment of road

new location

185' Log. crossed at 95' 45" water
 134+70 2" water RT side
 61' 1/2"

22°-30'-00"
 2x" 132+16 20' L-L1
 131+15 1 1/2" H.P. Gas + 1/2" water main
 131+72 30' int 1 1/2" H.P. Gas
 Set B.M. New Cor. of the road plus
 131+36 20' Back cor. North
 22°-30' = 131+47' 05" ahead on South
 30'
 w.c. line
 2' concrete gutter
 30'

TP.	12.44	133.49	150	121.05
+50	10' RT oil		1.4	121.2
			0.8	121.7
	11' RT oil		3.1	119.5
	5' RT cut Bank		2.2	120.4
144			2.0	120.6
+50	11' RT oil		4.1	118.5
			3.2	119.4
	11' RT Edge oil		4.5	118.1
	5' RT Topcut Bank		3.4	119.2
143			2.8	119.8
+50	12' RT oil		4.4	118.2
			2.5	120.1
	12' Edge oil Surface		5.4	117.2
	6' RT Topcut Bank		4.6	118.0
142			3.7	118.9
+50	13' RT oil		6.6	116.0
			4.9	117.7
	13' RT Edge oil		8.1	114.5
	6' RT Topcut Bank		6.7	115.9
141			6.0	116.6
+50	14' RT oil		8.2	113.4
			7.2	115.4
TP.	16.34	122.55	11.64	112.21
140	15' RT Edge oil Surface		11.4	112.5
140	10' RT		10.9	113.0
140			10.0	113.9
+50	15' RT oil Surface		10.7	113.2
			8.9	115.0
139+38			6.6	117.3

123.85

197+41.65 L: Lt 19° 45' 00"

0.7 RT & Begin curve
 145+37 15' cutvert
 Across oil/d
 Road to West
 < 13' >

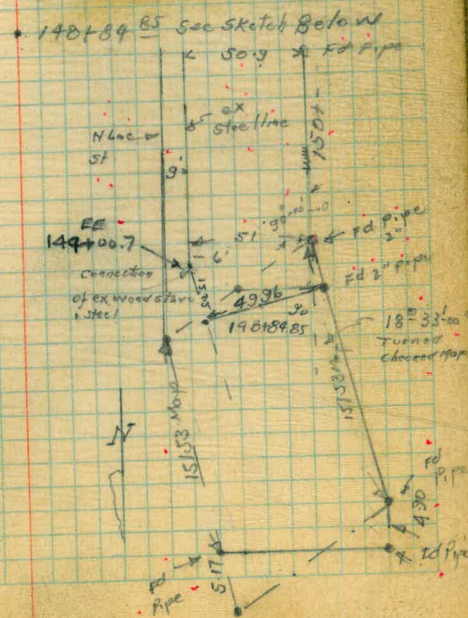
E. End 12" culvert on 30' Lt		9.30		
W. End 12" culvert on 30' Rt		11.90		
Set BM		9.95	112.64	✓
	3.06	122.59	119.53	
Check BM		3.06	119.46	119.53 Rec'd 0.07 error
TR	2.98	122.52	7.52	120.64
T.P.	0.48	127.56	6.41	127.08
+00 ²	Top 18" sleeve	1.90	131.59	
149		0.5	133.0	
+50		3.6	129.9	
+06		6.0	127.5	
148		8.1	125.4	
+35	1st Edge oil	7.8	125.7	
	3' Rt Edge oil	9.6	123.9	
+44 ⁶⁵	L. Lt	9.9	123.6	
	1.5 Lt Edge oil	11.3	122.7	
147		11.3	122.2	
+85	1st Edge oil Surface	11.9	121.6	
+74		12.7	120.8	
+50		11.5	122.0	
	8' Rt Edge oil	12.8	120.7	
	3' Rt Top of Bank	11.5	122.0	
146		11.5	122.0	
+50		11.5	122.0	
145+06		10.5	123.0	
	3' Rt oil	12.3	121.7	
+97	Flow line 15' culvert	15.0	118.5	
+85		9.8	123.1	

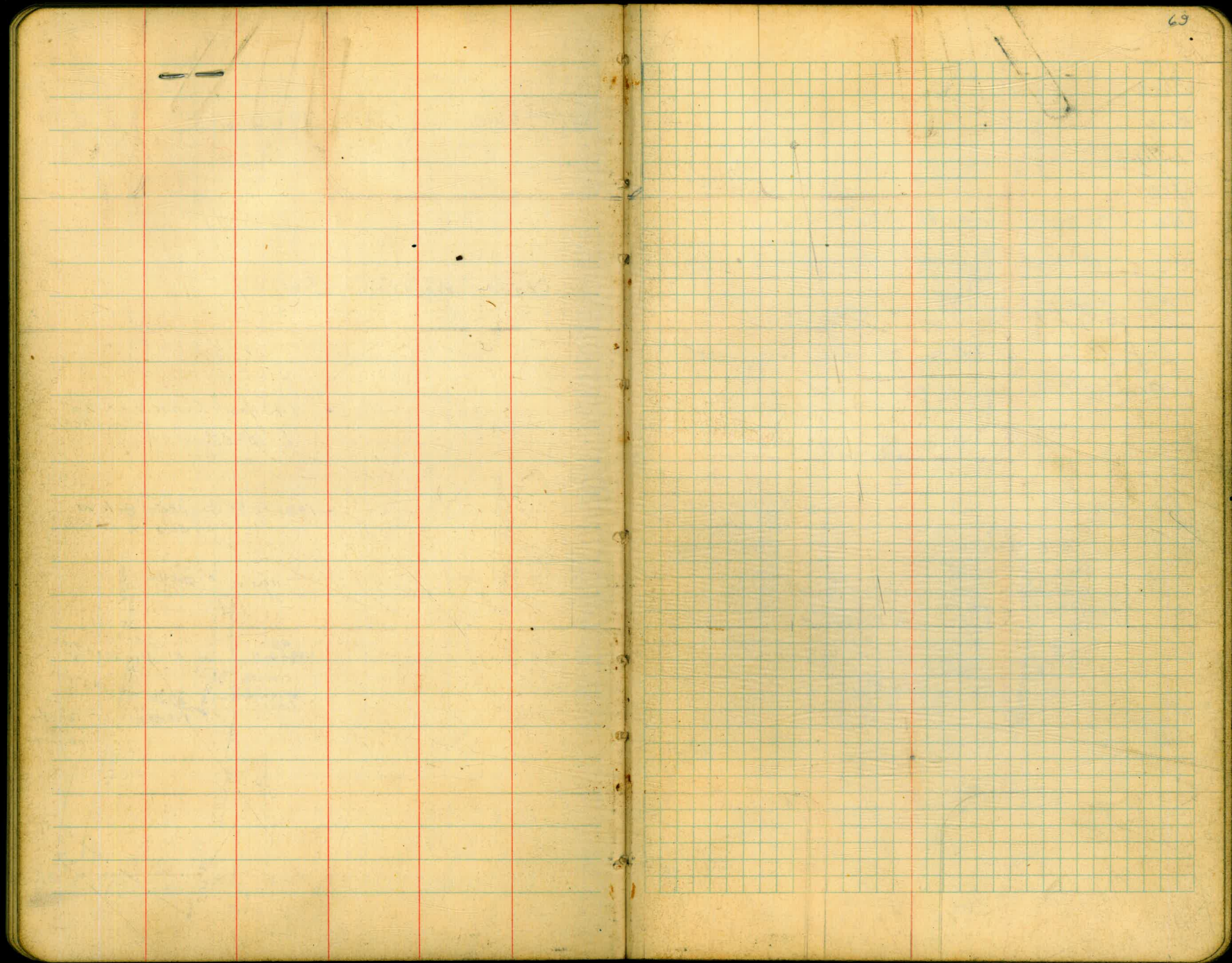
133149

Set BM NW Cp Toek in Lead Plug 2nd + Stratford

Connect Woodstave + steel

• 149+00.7 Connect ex 20" steel line
L: 13° 48' 00" Rt





Bliss
King
Phillips
12/20/46
clear

Ocean Ave



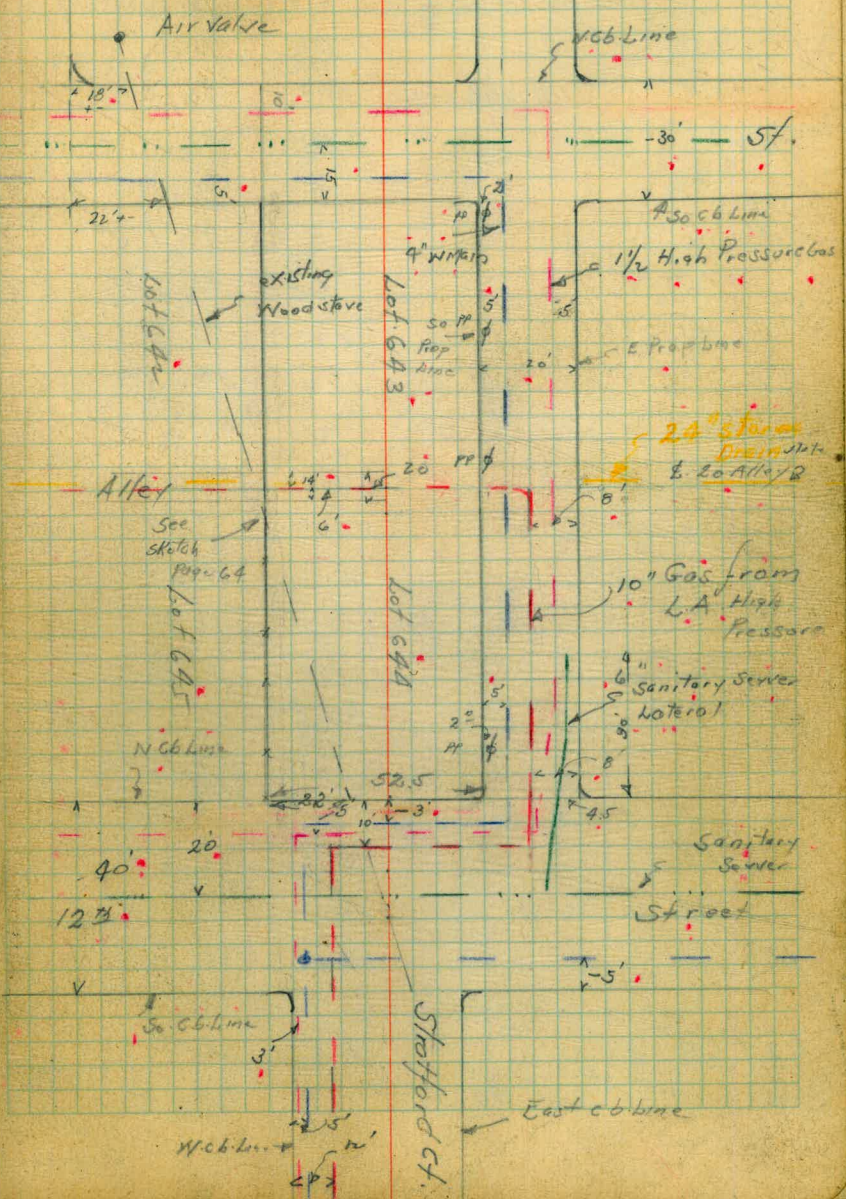
Sketch Showing Intersections
of 12th + 13th Ave at Stratford Court
and Ocean Ave's Del Mar

Legend

- — = 4" Water Main
- — = 1 1/2" H. Pressure Gas
- — = Sanitary Sewer
- — = 10" H. Pressure Gas

Note There is
Some question just
where 10" Gas Main
Runs in Alley check with Gas
Co.

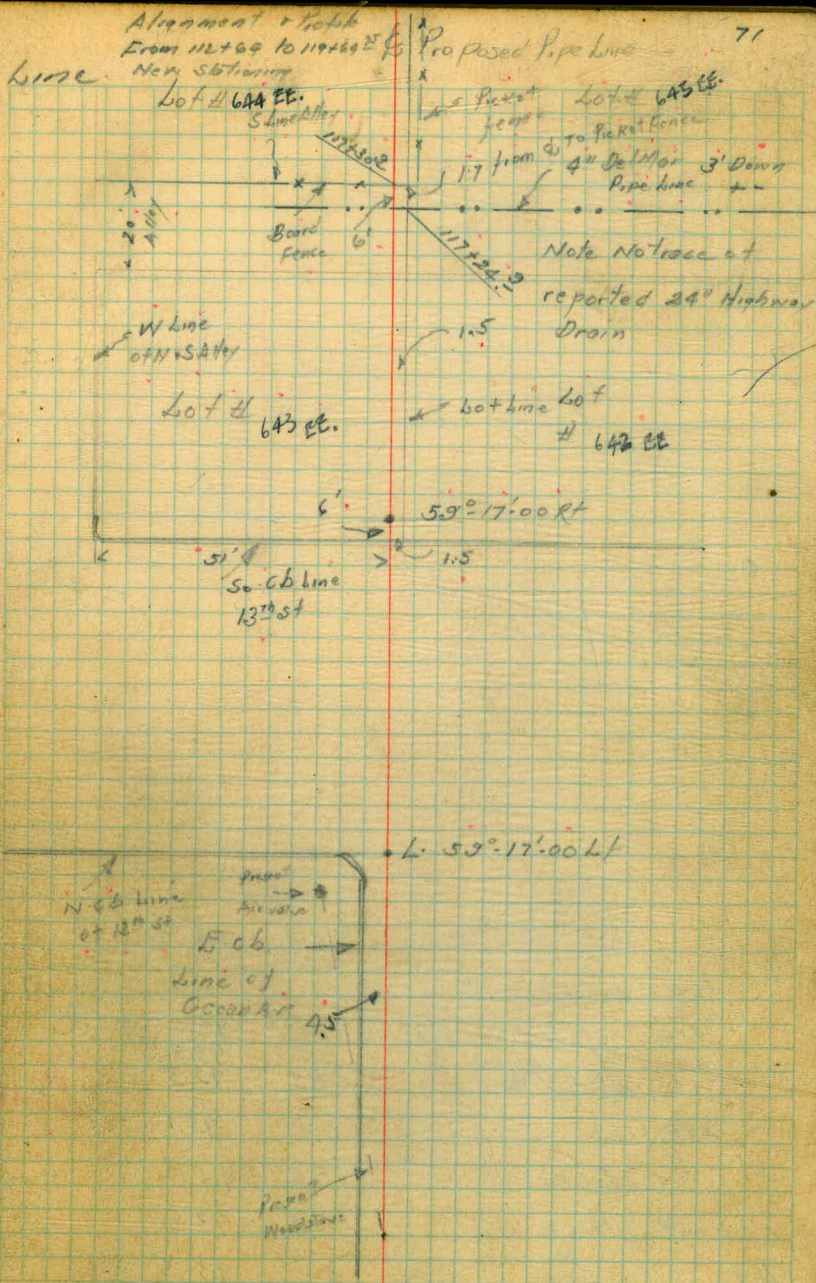
Note Measurements to
Woodstave + -
φ Pole line on So. line alley
is 8' from E



Bliss Notes
King &
Phillips # share
N. Gary R.
114/147 +50

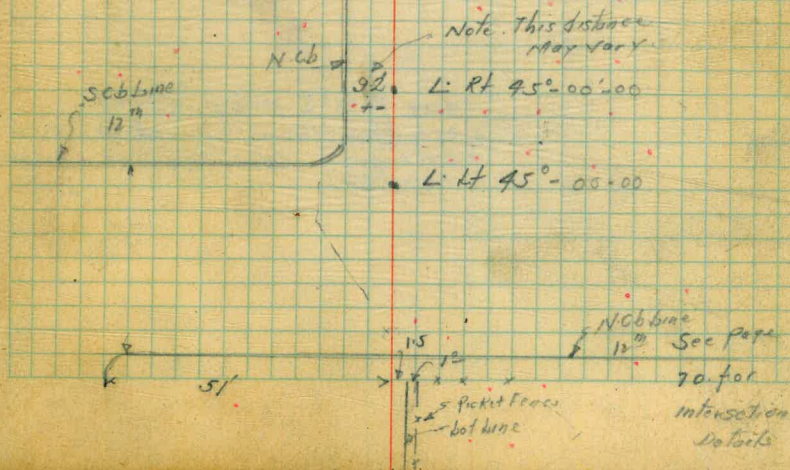
Lockwood Mesa Torrey Pines Pipe

Station	Description	Station	Elevation	Notes
118	Note This	6.8	95.0 ✓	
118	line was constructed	6.4	95.4 ✓ ✓	
+50		6.2	95.6 ✓ ✓	
+24	int Water Main	5.7	96.1 ✓ ✓	
117		5.5	96.3 ✓ ✓	
+50		5.5	96.3 ✓ ✓	
116		5.9	95.9 ✓ ✓	
+50		6.3	95.5 ✓ ✓	
+41.75	L. pt	6.2	95.6 ✓ ✓	
TP.	7.62 ✓ 101.75 ✓	0.21	94.13 ✓	
+30 [±]	Top cb. S. Cb 13 th St	0.01	94.3 ✓ ✓	
+30 [±]	Gutter	0.6	93.7 ✓ ✓	
+20	int 4" water 3' down	0.8	93.5 ✓ ✓	
115	int Sewer	1.8	92.5 ✓ ✓	
+89 [±]	int 1 1/2 Gas 2.5 down	2.5	91.8 ✓ ✓	
+70 [±]	L.	3.6	90.7 ✓ ✓	
+50		4.3	90.0 ✓ ✓	
114		6.0	88.3 ✓ ✓	
+29	int Service Service	6.1	88.2 ✓ ✓	
+50		7.7	86.6 ✓ ✓	
+38	int Sewer Service	8.6	85.7 ✓ ✓	
113		10.1	84.2 ✓ ✓	
112 + 64	Amended at NW corner to be tied in old Woodline	11.8	82.5 ✓	
BM	4.90 ✓ 94.34 ✓	89.94	Lead Plus Occas 12" NW corner See page 63	



Check		7.28	94.47	
164.2 L.				REDUCED 15 Jan 47
+54 int 10" Gas	^{5'} down	7.8	94.0	- GRS
+45 " 4" water		8.0	93.8	
+43 int 1 1/2" Gas		8.5	93.3	- CHKO. EE. 4-15-47
+33 L. Lt		8.7	93.1	
Gutter		8.6	93.2	
+00.9 N.C.B.		8.0	93.8	
119		8.0	93.8	

101.75



Bliss
King
Phillips
Nienow
1/22/47

Line Change Lookwood Mesa

(132+47.63 EE)

132+40.82 L Lt 30°-00'-00"

(132+21.63 EE)

132+14.82 1st East line Stafford Court

(131+58.41 EE)

131+51.60 1st South line 9th Ave

equator (131+52.97 EE)

131+46.16 head L Rt 38°-00'-00" + -

= 131+52.97 Back

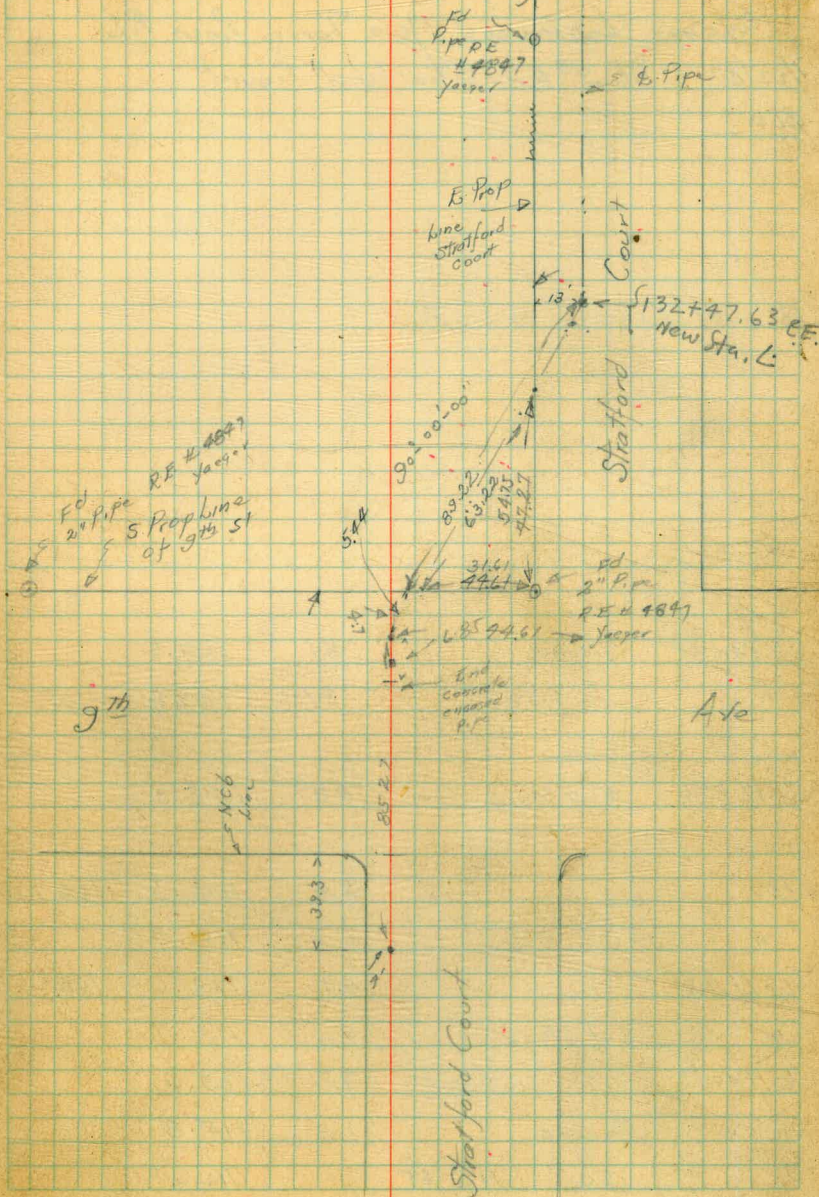
131+51.70 Air valve in place South Side of 9th

130+67.70

7° 38' Lt

{ make 7038' ± per Hill 6-7-47
orig. plan shows curved W.S. pipe
encased in conc. around curbing
corner. E.W.E.

73
Torrey Pines Pl. at 9th + Stafford Court Del Mar



Ground Profile and Cuts for Line

Change Lockwood Mesa Torrey Pines P.L.

1/22/47 at 9th Ave. Stratford Court

Bliss

136+27 Air valve in place

140 ⁸²	Ground	8.1	109.6	
"	Cut stake	8.1	109.6	105.6

132+06	4" w. Main Fluv	8.8	108.9	
--------	-----------------	-----	-------	--

132		5.4	112.3	106.75
-----	--	-----	-------	--------

"	Cut stake	6.8	116.9	
---	-----------	-----	-------	--

131+75		4.1	113.6	108.2
--------	--	-----	-------	-------

"	Cut stake	4.0	113.7	
---	-----------	-----	-------	--

131+44		7.8	109.9	
--------	--	-----	-------	--

"	Ground	1.9	115.8	
---	--------	-----	-------	--

5.01	117.65	112.64		
------	--------	--------	--	--

Cuts

4.0

5.5 Brk

5.4

Flux-line Woodstore

Reprofile Lockwood Mesa - Torrey Pines
From Sta. 82+51.04 To Sta. 97+50

Sta Elev
B.M. USC & G.S. N. Side Underpass V. 131-21.09
11.55 - 32.64

82+51.04	Junc. W/ conc. Pipe	4.7	27.9	.
83+00		4.4	28.2	.
83+47		3.0	29.6	.
83+62		2.8	29.8	.
84+00		4.3	28.3	.
84+30		6.0	26.6	.
84+50		6.2	26.4	.
85+00		8.1	24.5	.
85+09		8.4	24.2	.
85+28'	L.P.F.	9.3	23.3	.
85+31		8.7	23.9	.
85+46'	L.P.F.	8.6	24.0	.
86+00		8.3	24.3	.
86+50		6.7	25.9	.
TP #1		6.62	26.02	.
		7.75 - 33.77		
87+00		7.7	26.1	.
87+50		4.8	29.0	.
88+00		4.3	29.5	.
88+45		3.7	30.1	.
88+55		2.7	31.1	.
88+71		3.8	30.0	.

Clear. Warm
Apr. 30, 1947

Rainey
King
Nichol
Watts

75

(Cont'd. from pg. 25)
EE

USE For Ground Surface only }
82+51.04 = { 81+15 = our File #3031 } EWE
 { 83+41.16 = our File #2554 }

NOTE: For Bot. Pipe ONLY - see pg. 49

Reprofile Lockwood Mesa - Torrey Pines
From Sta 82+51⁰⁴ to Sta. 97+50

76

33.77

89+00	3.4	30.4	.
89+01	3.5	30.3	.
89+03	4.3	29.5	.
89+05	4.2	29.6	.
89+06	3.0	30.8	.
89+50	3.3	30.5	.
90+00	3.5	30.3	.
90+50	3.7	30.1	.

T.P.#2

3.64 30.13

2.58 32.71

91+00	3.5	29.2	.
91+41	4.8	27.9	.
91+50	4.6	28.1	.
92+00	4.2	28.5	.
92+50	4.7	28.0	.
92+76	5.5	27.2	.
93+00	6.1	26.6	.
93+50	7.9	24.8	.
94+00	11.4	21.31	.

T.P.#3

11.23 21.48

9.31 30.79

94+29	10.2	20.6	.
94+25	9.2	21.6	.

Reprofile hookwood Mass. Torrey Pines
From Sta. 82+51.0 to Sta 97+50

77

30.79

94+29	BO.	12.2	18.6	.
94+42		12.4	18.4	.
94+46		11.1	19.7	.
94+50		10.9	19.9	.
95+00		9.2	21.6	.
95+50		7.0	23.8	.
96+00		4.8	26.0	.
96+33		2.4	28.4	.
T.P.		1.54	29.25	-

9.95 - 39.20

96+34		10.1	29.1	.
96+40		9.4	29.8	.
96+42		10.0	29.2	.
96+55		8.7	30.5	.
96+56		7.7	31.5	.
96+96		6.2	33.0	.
96+98		5.8	33.4	.
97+00		6.1	33.1	.
97+08		5.5	33.7	.
97+21		6.0	33.2	.
97+31		5.1	34.1	.
97+50		4.8	34.4	.

B.M. on T.Pole opp 1.02 - 38.18 ^{corr} 38.17

Sta 98+20±

contd. P.B. 561 - pp. 74

Terry Pines

Levels Lockwood Mesa P.A. To End Surge Line

BM	3.93	122.65 121.87		118.72 117.44
TP	9.34	130.21 128.93	1.78	120.87 119.59
TP	11.70	141.31 140.03	0.60	129.61 128.33
TP	11.32	152.36 151.08	0.27	141.09 139.76
TP	11.57	163.00 161.72	0.93	151.43 150.15
TP	4.06	161.31 160.03	5.75	157.25 155.97
			8.96	152.35 151.07
T.B.M.			2.92	158.39 157.11

Top Air Valve 130 + 0.5 See BK. 539

Note Elev 117.44 was for petcock
on air valve assembly. Top
of air valve was 1.28' higher.

W.H.

Top Pipe End Surge Line

Top Post 10' Lt. Surge Line

Bliss Notes
King T
Philadelphia
11/18/46

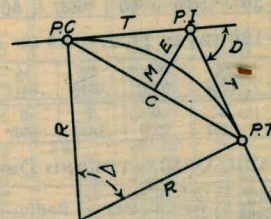
Levels to Verify BM on Air Valve
9th Stratford, Del Mar

BM	0.15	158.20		158.05	L plus 55 3 3 + 100.710
T.P.	112	146.79	12.53	145.67	Stak. H. Way BM # 26
T.P.	0.26	130.72	12.33	134.46	
T.P.	0.56	124.81	10.47	124.25	
			23 528	119.58	Note this checks levels from Depot See page
			1850	106.31	Flow Survey

12048
105 37 1437
1230 106.31

DIETZGEN'S RAILROAD CURVE AND REDUCTION TABLES

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CURVE FORMULAS

$$\begin{aligned} \text{Radius} &= R = \frac{50}{\sin D/2} (1) \text{ Degree of Curve} = D \text{ and } \sin \frac{D}{2} = \frac{50}{R} (2) \\ \text{Tangent} &= T = R \tan \frac{\Delta}{2} (3) \text{ Length of Curve} = L = 100 \frac{\Delta}{D} (4) \\ \text{Middle ordinate} &= M = R(1 - \cos \frac{\Delta}{2}) (5) = R \text{vers } \frac{\Delta}{2} (6) \\ \text{External} &= E = T \tan \frac{\Delta}{4} (7) = R \div \cos \frac{\Delta}{2} - R (8) = R \text{exsec } \frac{\Delta}{2} (9) \\ \text{Long Chord} &= C = 2 R \sin \frac{\Delta}{2} (10) \Delta = \text{Central Angle} \end{aligned}$$

EXPLANATION AND USE OF TABLES

Stations.—Given P. I.—Sta. 161+60.35 to find Sta. of P. C. and P. T. $\Delta = 62^\circ 10'$ $D = 8^\circ 20'$. From Table IV for 1° curve $T = 3454.1$ and $\div 8\frac{1}{3} = 414.49$ ft. From Table V correction = .36 or $T = 414.85$ ft. P. C. = Sta. P. I. — $T = 157 + 45.50$. Also from (4) $L = 746.00$ and P. T. = Sta. P. C. + $L = 164 + 91.50$.

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

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

Externals.—May be found in similar manner to tangents. Thus E for curve above is 115.37. For from Table IV for 1° curve $E = 960.6$ for $8^\circ 20' = 960.6 \div 8\frac{1}{3} = 115.27$ and from Table V correction = .10 or $E = 115.37$ ft. Or suppose $\Delta = 32^\circ$ and E is measured and found to be 42 ft. What is D ? From Table IV $E = 230.9$ and $\div 42 = 5.5$ or $D = 5^\circ 30'$.

1220
630
19.50
102 40.57
101+88.30
52.27

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.

$\frac{1}{16}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
.0625	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	.8750
1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

TABLE III.—RADI, 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	0.051	7°	819.02	1.528	6.105	2.107
20	17188.8	.073	.291	0.10	20	781.84	1.600	6.395	2.200
30	11459.2	.109	.436	0.15	30	764.49	1.637	6.540	2.255
40	8594.42	.145	.582	0.20	40	747.89	1.673	6.685	2.300
50	6875.55	.182	.727	0.25	50	731.92	1.708	6.830	2.345
1 10	5729.65	.218	.873	0.30	8 20	716.78	1.746	6.976	2.400
20	4911.15	.255	1.018	0.35	30	688.16	1.819	7.266	2.500
30	4297.28	.291	1.164	0.40	40	674.69	1.855	7.411	2.555
40	3819.83	.327	1.309	0.45	50	661.74	1.892	7.556	2.600
50	3437.87	.364	1.454	0.50	6 20	649.28	1.928	7.701	2.655
1 10	3125.36	.400	1.600	0.55	30	637.28	1.965	7.846	2.700
20	2864.93	.436	1.745	0.60	40	625.80	1.998	7.991	2.755
30	2644.58	.473	1.891	0.65	50	614.56	2.037	8.136	2.800
40	2455.70	.509	2.036	0.70	6 30	603.80	2.074	8.281	2.855
50	2292.01	.545	2.181	0.75	40	593.42	2.110	8.426	2.900
1 10	2148.79	.582	2.327	0.80	7 20	573.69	2.183	8.716	3.000
20	2022.41	.618	2.472	0.85	30	546.44	2.292	9.150	3.155
30	1910.08	.655	2.618	0.90	40	521.67	2.402	9.585	3.300
40	1809.57	.691	2.763	0.95	50	499.06	2.511	10.02	3.455
50	1719.12	.727	2.908	1.00	6 30	478.34	2.620	10.45	3.600
1 10	1637.28	.764	3.054	1.05	40	459.28	2.730	10.89	3.755
20	1562.88	.800	3.199	1.10	50	441.68	2.839	11.32	3.900
30	1494.95	.836	3.345	1.15	6 40	425.40	2.949	11.75	4.055
40	1432.69	.873	3.490	1.20	7 50	410.28	3.058	12.18	4.200
50	1375.40	.909	3.635	1.25	8 10	396.20	3.168	12.62	4.355
1 10	1322.53	.945	3.718	1.30	9 20	383.07	3.277	13.05	4.500
20	1273.57	.982	3.926	1.35	30	370.78	3.387	13.49	4.655
30	1228.11	1.018	4.071	1.40	40	359.27	3.496	13.92	4.800
40	1185.78	1.055	4.217	1.45	50	348.45	3.606	14.35	4.955
50	1146.28	1.091	4.362	1.50	6 30	338.27	3.716	14.78	5.100
1 10	1109.33	1.127	4.507	1.55	40	319.62	3.935	15.64	5.400
20	1074.68	1.164	4.653	1.60	50	302.94	4.155	16.51	5.700
30	1042.14	1.200	4.798	1.65	7 20	287.94	4.374	17.37	6.000
40	1011.51	1.237	4.943	1.70	30	274.37	4.594	18.22	6.300
50	982.64	1.273	5.088	1.75	40	262.04	4.814	19.08	6.600
6 20	955.37	1.309	5.234	1.80	50	250.79	5.035	19.94	6.900
10	929.57	1.346	5.379	1.85	6 30	240.49	5.255	20.79	7.200
20	905.13	1.382	5.524	1.90	7 40	231.01	5.476	21.64	7.500
30	881.95	1.418	5.669	1.95	8 50	222.27	5.697	22.50	7.800
40	859.92	1.455	5.814	2.00	9 10	214.18	5.918	23.35	8.100
					20	206.68	6.139	24.19	8.400
					30	199.70	6.360	25.04	8.700
					40	193.18	6.583	25.88	9.000

NOTE. Chord Deflection=2 times tangent deflection.

131447
7754
2282

131432 2423
7754
2282

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

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

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

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

TABLE V.—CORRECTIONS FOR TANGENTS AND EXTERNALS.

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

FOR TANGENTS ADD

Central Angle	DEGREE OF CURVE													
	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°	.03	.06	.09	.13	.16	.19	.22	.25	.28	.31	.34	.38	.42	.46
15°	.04	.10	.14	.19	.24	.29	.34	.39	.45	.51	.53	.58	.63	.68
20°	.06	.13	.19	.26	.32	.39	.45	.51	.58	.65	.72	.79	.84	.90
25°	.08	.16	.24	.33	.40	.49	.58	.67	.75	.83	.90	.99	1.06	1.14
30°	.10	.19	.29	.39	.49	.59	.69	.79	.89	.99	1.09	1.20	1.29	1.39
35°	.11	.22	.34	.47	.58	.69	.79	.81	.92	1.04	1.29	1.42	1.54	1.66
40°	.13	.26	.40	.53	.67	.80	.93	1.06	1.20	1.34	1.49	1.64	1.79	1.94
45°	.15	.30	.44	.60	.76	.91	1.06	1.21	1.37	1.52	1.70	1.87	2.04	2.21
50°	.17	.34	.51	.68	.85	1.02	1.19	1.36	1.54	1.72	1.91	2.10	2.29	2.48
55°	.19	.38	.57	.76	.95	1.14	1.32	1.52	1.72	1.92	2.14	2.35	2.56	2.77
60°	.21	.42	.63	.84	1.05	1.27	1.49	1.71	1.94	2.17	2.38	2.60	2.83	3.07
65°	.23	.46	.69	.93	1.16	1.40	1.64	1.88	2.13	2.38	2.63	2.88	3.13	3.39
70°	.25	.51	.76	1.02	1.28	1.54	1.80	2.06	2.33	2.60	2.88	3.16	3.44	3.72
75°	.27	.56	.83	1.12	1.40	1.69	1.98	2.27	2.57	2.87	3.16	3.47	3.78	4.09
80°	.30	.61	.91	1.22	1.53	1.84	2.15	2.46	2.78	3.10	3.44	3.78	4.12	4.46
85°	.33	.66	1.00	1.33	1.68	2.02	2.36	2.70	3.05	3.40	3.77	4.14	4.55	4.89
90°	.36	.72	1.09	1.45	1.83	2.20	2.57	2.94	3.32	3.70	4.10	4.50	4.91	5.32
95°	.39	.79	1.19	1.55	2.00	2.40	2.80	3.20	3.61	4.02	4.40	4.98	5.38	5.83
100°	.43	.86	1.30	1.74	2.18	2.62	3.06	3.50	3.95	4.40	4.88	5.37	5.85	6.34
110°	.51	1.03	1.56	2.08	2.61	3.14	3.67	4.21	4.76	5.31	5.86	6.43	7.01	7.60
120°	.62	1.25	1.93	2.52	3.16	3.81	4.45	5.11	5.77	6.44	7.12	7.80	8.50	9.22

FOR EXTERNALS ADD

Central Angle	DEGREE OF CURVE													
	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°	.001	.003	.004	.006	.007	.008	.009	.011	.012	.014	.015	.017	.018	.020
15°	.003	.007	.010	.014	.018	.023	.027	.029	.032	.035	.039	.043	.047	.051
20°	.006	.011	.017	.022	.028	.034	.038	.045	.051	.057	.063	.070	.076	.083
25°	.009	.018	.027	.036	.046	.056	.065	.074	.083	.093	.106	.120	.127	.135
30°	.013	.025	.038	.051	.065	.078	.090	.103	.116	.129	.149	.170	.179	.188
35°	.018	.035	.054	.072	.086	.109	.131	.153	.175	.197	.213	.230	.247	.264
40°	.023	.046	.070	.093	.117	.141	.172	.203	.234	.265	.277	.290	.315	.341
45°	.030	.060	.093	.119	.153	.184	.216	.254	.289	.325	.351	.378	.411	.445
50°	.037	.075	.116	.151	.189	.227	.266	.305	.345	.384	.425	.467	.508	.550
55°	.046	.093	.142	.188	.236	.283	.332	.381	.420	.479	.530	.582	.641	.700
60°	.056	.112	.168	.225	.283	.340	.398	.457	.516	.575	.636	.697	.774	.851
65°	.067	.135	.204	.273	.343	.412	.483	.554	.625	.697	.771	.845	.922	1.01
70°	.080	.159	.240	.321	.403	.485	.568	.652	.735	.819	.906	.994	1.08	1.17
75°	.095	.182	.266	.353	.440	.528	.617	.707	.797	.877	.977	1.07	1.18	1.29
80°	.110	.220	.332	.445	.558	.671	.787	.903	1.02	1.13	1.25	1.38	1.50	1.62
85°	.128	.259	.391	.524	.657	.790	.926	1.06	1.20	1.34	1.47	1.62	1.76	1.91
90°	.149	.299	.450	.603	.756	.910	1.07	1.22	1.38	1.54	1.70	1.87	2.03	2.20
95°	.174	.350	.522	.706	.885	1.06	1.25	1.43	1.62	1.80	1.99	2.18	2.38	2.53
100°	.200	.401	.604	.809	1.01	1.22	1.43	1.64	1.85	2.06	2.28	2.50	2.73	2.96
110°	.268	.536	.806	1.08	1.35	1.63	1.91	2.20	2.48	2.76	3.05	3.35	3.66	3.96
120°	.360	.721	1.08	1.45	1.82	2.19	2.57	2.95	3.33	3.72	4.11	4.50	4.91	5.32

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	
10	.5324	.6289	1.590	.84650	50	40	.6248	.8062	1.250	.78079	
20	.5348	.6330	1.580	.84495	40	50	.6271	.8050	1.242	.77897	
30	.5373	.6371	1.570	.84339	30						
40	.5398	.6412	1.560	.84182	20	39	.6293	.8098	1.235	.77715	
50	.5422	.6453	1.550	.84025	10	10	.6316	.8146	1.228	.77531	
33	.5446	.6494	1.540	.83867	20	20	.6338	.8195	1.220	.77347	
10	.5471	.6536	1.530	.83708	50	30	.6361	.8243	1.213	.77162	
20	.5495	.6577	1.520	.83549	40	40	.6383	.8292	1.206	.76977	
30	.5519	.6619	1.511	.83389	30	50	.6406	.8342	1.199	.76791	
40	.5544	.6661	1.501	.83228	20	40	.6428	.8391	1.192	.76604	
50	.5568	.6703	1.492	.83066	10	10	.6450	.8441	1.185	.76417	
34	.5592	.6745	1.483	.82904	20	20	.6472	.8491	1.178	.76229	
10	.5616	.6787	1.473	.82741	50	30	.6494	.8541	1.171	.76041	
20	.5640	.6830	1.464	.82577	40	40	.6517	.8591	1.164	.75851	
30	.5664	.6873	1.455	.82413	30	50	.6539	.8642	1.157	.75661	
40	.5688	.6916	1.446	.82248	20	41	.6561	.8693	1.150	.75471	
50	.5712	.6959	1.437	.82082	10	10	.6583	.8744	1.144	.75280	
35	.5736	.7002	1.428	.81915	20	20	.6604	.8796	1.137	.75088	
10	.5760	.7046	1.419	.81748	50	30	.6626	.8847	1.130	.74896	
20	.5783	.7089	1.411	.81580	40	40	.6648	.8899	1.124	.74703	
30	.5807	.7133	1.402	.81412	30	50	.6670	.8952	1.117	.74509	
40	.5831	.7177	1.393	.81242	20	42	.6691	.9004	1.111	.74314	
50	.5854	.7221	1.385	.81072	10	10	.6713	.9057	1.104	.74120	
36	.5878	.7265	1.376	.80902	20	20	.6734	.9110	1.098	.73924	
10	.5901	.7310	1.368	.80730	50	30	.6756	.9163	1.091	.73728	
20	.5925	.7355	1.360	.80558	40	40	.6777	.9217	1.085	.73531	
30	.5948	.7400	1.351	.80386	30	50	.6799	.9271	1.079	.73333	
40	.5972	.7445	1.343	.80212	20	43	.6820	.9325	1.072	.73135	
50	.5995	.7490	1.335	.80038	10	10	.6841	.9380	1.066	.72937	
37	.6018	.7536	1.327	.79864	20	20	.6862	.9435	1.060	.72737	
10	.6041	.7581	1.319	.79688	50	30	.6884	.9490	1.054	.72537	
20	.6065	.7627	1.311	.79512	40	40	.6905	.9545	1.048	.72337	
30	.6088	.7673	1.303	.79335	30	50	.6926	.9601	1.042	.72136	
40	.6111	.7720	1.295	.79158	20	44	.6947	.9657	1.036	.71934	
50	.6134	.7766	1.288	.78980	10	10	.6967	.9713	1.030	.71732	
38	.6157	.7813	1.280	.78801	20	20	.6988	.9770	1.024	.71529	
10	.6180	.7860	1.272	.78622	50	30	.7009	.9827	1.018	.71325	
20	.6202	.7907	1.265	.78442	40	40	.7030	.9884	1.012	.71121	
					30	50	.7050	.9942	1.006	.70916	
							.7071	.1	1.	.70711	
										45	
										or	
	Cosin.	Cotg.	Tan.	Sine.	Angle		Cosin.	Cotg.	Tan.	Sine.	Angle

2040
6324
85 + 64
8344/16

20

83 + 4116
272.00
86 + 13.16 - 86 + 0770
43
20
1290
8607.70
92 + 97.70

Begin 86 + 31.70
272.
83 + 6970

4.7

86+32 - 1230

1.28 P.F.F.

142-81
821

2559 4.60

195
175 146
1954

49
26
7.5

152+40 2595
584

5009

64.2
7.5

Please Return to
City of San Diego Water Dept.
Room 268 Civic Center
Telephone Main 5161

20/10

147.01

8.79

138.22

885

115+87

2315

1575

7275

98
155
80

1494 135

83+16
63+24

20-92

149+00

DISTANCES FROM CENTER OF ROADWAY FOR
CROSS-SECTIONING.

Roadway 16 feet wide. Side Slopes 1 on 1 1/2
For Single Track Embankment.

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

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

MADE IN U.S.A.