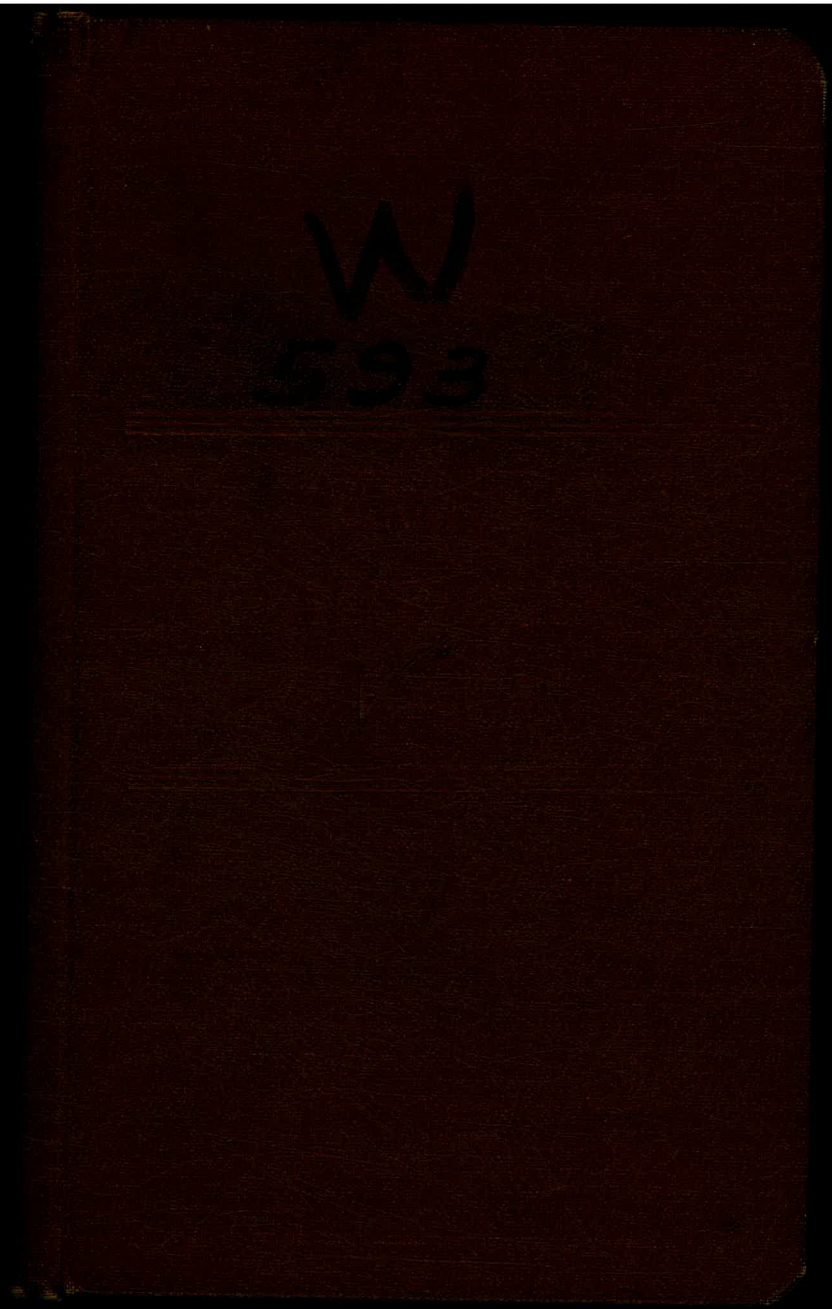
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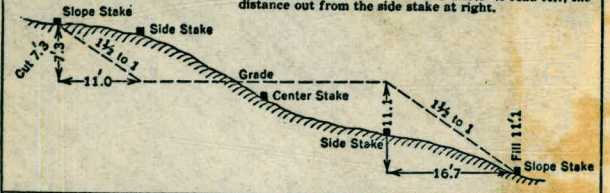
693

DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING

Roadway of any Width. Side Slopes 1½ to 1.

In the figure below: opposite 7 under "Cut or Fill" and under .3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	Cut or Fill
	Distance out from Side or Shoulder Stake										
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2 4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59 7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

KEUFFEL & ESSER CO., N. Y.

5 X 293

593

10,892-2. y, cc, ys. cM.

INDEX

PAGES

Unit No. 1 Sorrento Pipe Line

1 to 11 Level Notes - Item 1

1-11 T.Ps & ℄ Levels Stn 0+0 to 73+12.80

16 Resurvey of Pipe Line at Sorrento

17 Tie to Cassidy Tract

π Messersmith
ϕ Snyder
Oct. 29, 1941

STA	B.S.	HI	F.S.	ELEV.		
				2.03		
π 1	3.73	5.76				
TP 1			4.64	1.12		
π 2	5.32	6.44				
TP 2			5.19	1.25		
π 3	7.66	8.91				
TP 3			3.04	5.87		
π 4	4.25	10.12				
TP 4			5.75	4.37		
π 5	2.03	6.40				
TP 5			5.40	1.00		
π 6	4.10	5.10				
TP 6			3.38	1.72	2.54 "22	On Tel. Pole
π 7	4.98	6.70				
TP 7			3.33	3.37	3.73 - "21	On Tel. Pole
	2.03 32.07 34.10		30.73			
	30.73 3.37					

BM - City Brass Plug South end SW wing of concrete abutment on Sorrento RR bridge over old highway.

STA	B.S.	H.I.	F.S.	ELEV.		
⊼ 8	4.03	7.40		337 ✓		
TP 8			7.34	0.06		
⊼ 9	4.06	4.12				
TP 9			1.29	2.83 ✓	384 - #20	Nail in Tel. Pole No. 652
⊼ 10	12.18	15.01				
TP 10			0.36	14.65		
⊼ 11	12.86	27.51 ✓				
0+00 ℄			2.50	25.0		
+50 ℄			4.3	23.2		
1+00 ℄			6.1	21.4		
+50 ℄			7.3	20.2		
2+00 ℄			8.9	18.6		
+50 ℄			10.5	17.0		
TP #11 67 2+55 PI			10.67	16.84	2x2 Hub	2-2" Water Lines have to be moved
⊼ 12	1.82	18.66				
3+00 ℄			2.80	15.9		

STA	B.S.	HI	F.S.	ELEV.
BC 3+41 11 ℄		18.66	3.8	14.9
3+50 ℄			4.0	14.7
4+00 ℄			5.1	13.6
+50 ℄			6.3	12.4
5+00 ℄			7.3	11.4
+50 ℄			8.3	10.4
TP # 12			8.21	10.45
ℼ # 12	3.06	13.51		
6+00 ℄			4.1	9.4
+50 ℄			5.2	8.3
7+00 ℄			5.6	7.9
+50 ℄			6.6	6.9
+80 ℄			7.0	6.5
+90 ℄			8.0	5.5
8+00 ℄			8.2	5.3
{T.P. # 12 8+13			8.30	5.21

STA.	B.S.	H.I.	F.S.	ELEV.	
				5.21 ✓	
⊼ #13	3.78	8.99			
8+50 ℄			2.2	6.8	
9+00 ℄			4.6	4.4	
+50 ℄			4.9	4.1	
10+00 ℄			5.4	3.6	
10+00			10.6	-1.6	Water Surface
+50 ℄			5.8	3.2	
11+00 ℄			6.1	2.9	
11+17.92 E.C.			6.32	2.67	
⊼ #14	3.15	5.82			
11+50			3.4	2.4	
12+00			4.5	1.3	
12+50			6.4	-0.6	
12+84			6.90	-1.08	Top piling
13+25			8.10	-2.28	Water Surface

STA.	B.S.	H.I.	F.S.	ELEV.	
13+00		5.82 ✓	8.1	-2.3	
13+50			7.8	-2.0	
14+00			7.2	-1.4	
13+40			6.90	-1.08	Top piling
14+50			5.1	0.7	
15+00			4.3	1.5	
15+50			4.5	1.3	
16+00			4.5	1.3	
16+50			4.5	1.3	
T.P. #15			4.55	1.27	old. T.P. #18
⊼ #15	4.69	5.96			
17+00			4.8	0.2	
+50			4.8	0.2	
18+00			4.6	0.4	
+50			4.9	0.1	
19+00			7.0	-1.0	

Sta.	B.S.	HI	F.S.	Elev.	
		5.96 ✓			
19+50			8.2	−2.2	Water Surface
20+00			8.7	−2.7	
+50			8.4	−2.4	
21+00			7.8	−1.8	
+30			4.6	0.4	
+50			3.8	1.2	
T.P.#16			3.98	1.98	
⊼#16	4.04	6.02			
22+00			4.1	1.9	
+50			4.3	1.7	
23+00			4.3	1.7	
+50			4.5	1.5	
24+00			4.5	1.5	
+50			4.5	1.5	
25+00			4.7	1.3	
+50			4.4	1.6	

Sta	B.S.	HI	F.S.	Elev.	
				✓	
26+00		6.02 ✓	4.5	1.5	
+50			4.4	1.6	
27+00			4.9	1.1	
+50			4.6	1.4	
T.P.#17			4.35	1.67	27+54
⊼#17	3.92	5.59 ✓			
28+00			4.0	1.6	
+50			4.4	1.2	
29+00			4.3	1.3	
29+50.13			4.1	1.5	
30+00			4.3	1.3	
30+25			7.8	−2.2	Water Surface
+50			4.3	1.3	
31+00			4.1	1.5	
+50			4.2	1.4	
32+00			4.2	1.4	

Sta.	B.S.	H.I.	F.S.	Elev.	
		5.59 ✓		✓	
32+50			4.0	1.6	
33+00			4.0	1.6	
+50			3.8	1.8	
34+00			3.9	1.7	
T.P. #18			3.91	1.68	34+00
π #18	4.33	6.01			
34+50			4.2	1.8	
34+98.93			4.3	1.7	
35+50			4.2	1.8	
36+00			4.1	1.9	
Not ≙ 36+25			8.0	-2.0	Water Surface
+50			4.1	1.9	
37+00			4.0	2.0	
+50			4.2	1.8	
38+00			4.0	2.0	
+50			4.5	1.5	

Sta.	B.S.	H.I.	F.S.	Elev.	
		6.01 ✓		✓	
39+00			4.0	2.0	
T.P. #19			4.04	1.97	39+00
π #19	4.20	6.17 ✓			
39+50			4.2	2.0	
40+00			4.0	2.2	
40+50			4.1	2.1	
41+00			4.2	2.0	
+50			4.3	1.9	
42+00			4.4	1.8	
+50			4.6	1.6	
Not ≙ 42+75			8.5	-2.3	Water Surface
43+00			4.7	1.5	
+50			3.9	2.3	
44+00			4.0	2.2	
+50			3.7	2.5	

Sta	B.S.	H.I.	F.S.	Elev.	
		6.17 ✓		✓	
T.P. #20			4.20	1.97	45+00
℄ #20	4.82	6.79			
45+00			4.5	2.3	
+50			4.3	2.5	
46+00			4.3	2.5	
+50			4.3	2.5	
47+00			4.5	2.3	
+50			4.5	2.3	
Not ℄ 47+75			8.5	-1.7	Water Surface
48+00			4.4	2.4	
+50			4.4	2.4	
49+00			4.3	2.5	
+50			4.2	2.6	
50+00			3.8	3.0	
+50			3.8	3.0	
51+00			3.6	3.2	

Sta.	B.S.	H.I.	F.S.	Elev.
T.P. #21			3.63	3.16 ✓
℄ #21	4.80	7.96 ✓		
51+50			4.7	3.3
52+00			4.7	3.3
52+50			4.7	3.3
53+00			4.4	3.6
53+50			4.2	3.8
54+00			4.0	4.0
54+50			3.6	4.4
55+00			3.3	4.7
55+50			3.2	4.8 ✓
T.P. #22			2.40	5.56 ✓
℄ #22	7.32	12.88		
T.P. #23			3.51	9.37
℄ #23	3.78	13.15		
T.P. #24			4.85	8.30 ✓

Sta.	B.S.	H.I.	F.S.	Elev.	
					8.30
⊼ #24	4.26	12.56			
T.P. #25			4.56	~~8.06~~	8.00
⊼ #25	4.64	12.70			
T.P. #26			2.12	~~10.58~~	10.52
⊼ #26	2.35	12.93			
T.P. #27			4.51	~~8.42~~	8.36
⊼ #27	1.76	10.18			
T.P. #28			3.93	~~6.25~~	6.19
⊼ #28	2.08	8.33			
T.P. #29			3.70	~~4.63~~	4.57
⊼ #29	3.11	7.74			
T.P. #30			2.55	~~5.19~~	5.13
⊼ #30	2.48	7.67			
T.P. #31			2.86	~~4.82~~	4.76
⊼ #31	5.50	10.32			
T.P. #32			2.55	~~7.87~~	7.71

Sta.	B.S. +	H.I.	F.S. −	Elev.	
℄ #32	7.90	15.61 ~~13.67~~			
T.P. 33			8.09	~~7.52~~ 7.58	
℄ #33	3.16	10.68 ~~10.74~~			
T.P. 34			8.78	1.90 ~~1.96~~	
T.P. #22				5.56 ✓	T.B.M.
℄	7.52	13.08			
T.P. #1			3.26	9.82	
℄ 1	3.76	13.58 ✓			
56+13.30			8.5	5.1	5.1
56+50			8.6	5.0	
57+00			8.5	5.1 ✓	
+50			8.5	5.1 ✓	
58+00			8.5	5.1 ✓	

Sta.	B.S. +	H.I.	F.S.	Elev.	
		13.58 ✓			
58+50			7.9	5.7	
58+86.53			7.8	5.8	
59+00			10.4	3.2	
59+11			9.2	4.4	Toe Slope
59+21			4.5	9.1	Shoulder
59+29.50			2.6	11.0	Top of Rail
59+32			3.3	10.3	℄ of track
59+34.50			2.9	10.7	Top of Rail.
59+47			4.7	8.9	Shoulder
59+50			7.1	6.5	
59+55			10.2	3.4	Toe Slope
60+00			9.4	4.2	
+50			10.6	3.0	
61+00			9.5	4.1	
T.P. #2			9.19	4.09	61+00
℄ #2	4.20	8.29 ✓			

Sta	B.S.	H.I.	F.S.	Elev.	
		8.29 ✓			
61+50			4.0	4.3	
62+00			5.1	3.2	Shoulder
62+08			7.1	1.2	Bot. Cut
62+13			5.1	3.2	Shoulder
+50			4.9	3.4	
63+00			4.5	3.8	
+50			4.4	3.9	
64+00			4.6	3.7	
+50			4.5	3.8	
65+00			4.0	4.3	
+50			4.0	4.3	
66+00			4.4	3.9	
66+35			4.3	4.0	Shoulder
66+43			5.0	3.3	Bot. Cut
66+50			4.4	3.9	Shoulder
66+55			4.2	4.1	"

Sta	B.S.	H.I.	F.S.	Elev.	
		8.29 ✓			
66+57			5.0	3.3	Bot. Cut
66+62			4.1	4.2	Shoulder
67+00			4.5	3.8	
T.P.#3			3.89	4.40 ~~4.42~~	67+25
BM#3	12.02	16.42 ~~16.44~~			
67+50			12.7	3.7	
67+61			12.0	4.4	Shoulder
67+65			13.0	3.4	Bot. Cut
67+74			13.1	3.3	Bot. "
67+83			12.7	3.7	Shoulder
68+00			12.1	4.3	
68+50			12.2	4.2	
68+75			12.5	3.9	
68+95			9.5	6.9	
69+00			9.6	6.8	
+50			6.1	10.3	

Sta.	B.S.	H.I.	F.S.	Elev.		
		N.42 ~~+644~~				
70+00			1.5	~~14~~.9		
T.P.#4			0.32	16.10 ~~16.12~~		
⊼ #4	1255	28.65 ~~28.67~~				
70+50			9.6	19.1		
71+00			5.1	23.6		
71+50			1.4	27.3		
T.P.#5			0.21	28.44 ~~28.46~~		
⊼ #5	9.54	37.98 ~~38.00~~				
72+00			6.6	31.4		
72+13.05			5.1	32.9		
72+50			1.9	36.1		
73+00			1.3	36.7		
73+12.80			3.3	34.7	on pipe	Top Bell.

Note Grade Inside 18" C.I. Pipe should be -1.25 or 33.0

City Prop. acquired at Sorrento

Sketch of mon 6/19/48

June 8, 1948 Rainer - Baker West

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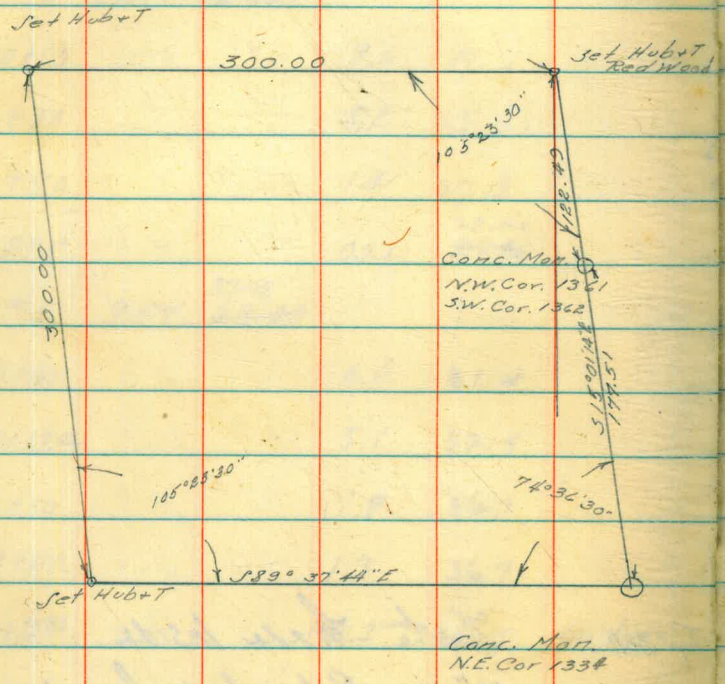
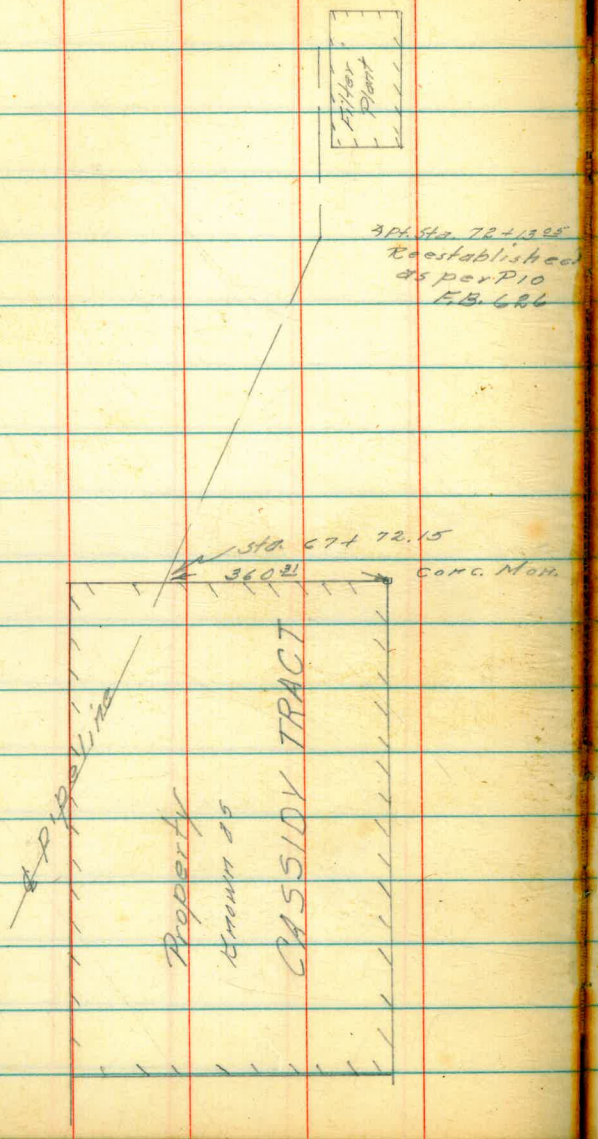


Resurvey of
Pipeline at Sorrento

Subject of letter mailed



Frederick
Earl Messersmith 549-12-2183

14+00 135.00

134.61

+50 134.233

133.85

15 133.466

133.09

+50 132.700

132.31

16+40 131.933

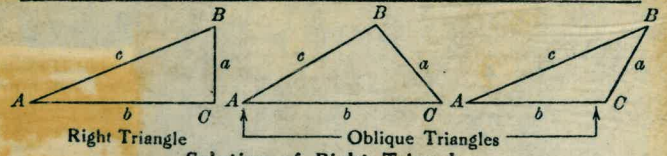
131.56

+56 131.166

130.78

17+40 130.4

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

Given	Required	
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B, c = \sqrt{a^2 + b^2} = a\sqrt{1 + \frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B, b = \sqrt{(c+a)(c-a)} = c\sqrt{1 - \frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90° - A, b = a \cot A, c = \frac{a}{\sin A}$
A, b	B, a, c	$B = 90° - A, a = b \tan A, c = \frac{b}{\cos A}$
A, c	B, a, b	$B = 90° - A, a = c \sin A, b = c \cos A$,

Solution of Oblique Triangles

Given	Required	
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A}, C = 180° - (A + B), c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a}, C = 180° - (A + B), c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180° - C, \tan \frac{1}{2}(A - B) = \frac{(a-b)\tan \frac{1}{2}(A+B)}{a+b}$, $c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a+b+c}{2}, \sin \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{bc}}$, $\sin \frac{1}{2}B = \sqrt{\frac{(s-a)(s-c)}{ac}}, C = 180° - (A+B)$
a, b, c	Area	$s = \frac{a+b+c}{2}$, area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{bc \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL

Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle = 5° 10′. From Table, Page IX. cos 5° 10′ = .9959. Horizontal distance = 319.4 × .9959 = 318.09 ft.

Horizontal distance also = Slope distance minus slope distance times (1 − cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained. Cosine 5° 10′ = .9959. 1 − .9959 = .0041. 319.4 × .0041 = 1.31. 319.4 − 1.31 = 318.09 ft.

When the rise is known, the horizontal distance is approximately:—the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft., slope distance = 302.6 ft. Horizontal distance $= 302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$ ft.