

W

387

No 567

MICROFILMED

50
6-224
4-276
197
79

235

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THE FREDERICK POST CO.
ENGINEERING and DRAFTING SUPPLIES
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Bench 61.6
+ 5.27 first H.I.

129
392
878

County 2709

Bonita Pipe Line at
Sweetwater Crossing

2-11-34
R.C.W - P.B.

	+ H.I. -		BM	
0+00	15.27	66.87	61.6	
0+00		11.1	55.8	
0+16		- 5.1	61.8	Fence edge of Road
	Floor of Bridge N End	4.5	62.4	
0+64		5.0	61.9	Pipe comes out northward existing road
T.P.		2.34	64.43	
0+	12.14	76.57		
0+84		700 6050	935	on Pipe
	New Pipe Road on Pipe (Sta 89.8)	7.68	68.89	
1+00				
T.P.		.47	76.10	
	18.96	85.06		
1+28		5.93	79.13	Lat top of H.I. on Pipe
1+64		2.89		
cut 15' (County)		9.94		
etc - cut crosses Pipe 170		9.04	cut 16(0)	
End of Contract	124.5			

El CAPITAN PL

Friction Coeff.

Sta	El.	El. of Gau.	Time	#/100 Pressure	Ft. Hd.
13+50	573.46	574.27	9:00	73.4	
			9:15		
			9:30	73.4	
			9:45	73.5	
			10:00	73.6	
426+50	401.57	402.69	10:30	94.2	
			:45	94.2	
			11:00	94.2	
			11:30	94.8	
			:45	94.8	
			12:00	94.8	
946+00	310.45	312.80	12:30	125.8	
			:45	126.0	
			1:00	126.1	
			1:45	126.8	
			2:00	126.8	
			2:15	126.9	
341+78	475.94	476.73	2:45	63.2	
			3:00	63.4	
			3:15	63.4	

9-29-39 2

PB.
W.H.S.
B.D.R.

El CAPITAN PL

Friction Coefficients

10-13-39 P/B

③

W. H. Simpson

B. D. Romero

El Capitan P.L

Friction Coeff

Bench. Elevation	El of Gauge	Time	#10" Pressure
13+50	573.40 26	9:30	73.0
		9:45	73.1
		10:00	73.1
426+50	401.57 1.14	10:30	88.9
		1:45	89.0
		11:00	89.2
		11:30	89.4
		1:45	89.3
		12:00	89.3
946+00	310.45 2.77	12:30	110.0
		45	110.2
		1:00	110.3
		1:30	110.5
		1:45	110.5
		2:00	110.6
426+50	401.57 1.18	2:15	88.9
		2:30	89.1
		2:45	89.2

10-17-39

P.B.
W.H.S.
S.D.R.

4

El Capitan Pipe Line Friction Coefficient Tests.

	B. M. Elev.	Elev. of Σ Gauge.	Time	#14" Pressure
13+50	573.40 +1.04	574.44	9:30	72.2
			9:45	72.2
			10:00	72.3
426+50	401.57 +1.16	402.73	10:30	83.9
			10:45	84.0
			11:00	83.9
			11:30	84.2
			11:45	84.3
			12:00	84.2
946+00	310.45 +2.37	312.82	12:30	89.8
			12:45	90.1
			1:00	90.1
			1:30	90.1
			1:45	90.2
			2:00	90.2
			341+78	475.94 +0.80
2:25	55.1			
2:30	55.3			
2:45	55.2			

11-3-39

PB

BR

⑤

E1 Capitan Pipe Line Friction Coefficient Tests

Test on #1 Gauge used
for all tests recorded in
this book. Apply correction
only to test made 11-3-39.

	E1. B.M.	E1. & Gauge	Time	#10" pr.	True Press. Corrected
13+50	573.40 90	574.30	9:35	72.1	71.9
			9:45	72.1	71.9
			10:00	72.1	71.9
426+50	401.57 1.10	402.71	10:30	54.2	53.8
			10:45	54.1	53.7
			11:00	54.1	53.7
			11:15		
			11:30	54.2	53.8
			11:45	54.2	53.8
			12:00	54.2	53.8
946+00	310.45 2.29 21284	312.84	12:30	73.0	72.8
			1:45	73.2	73.0
			1:00	73.2	73.0
			1:30	73.4	73.2
			1:45	73.4	73.2
			2:00	73.4	73.2
			2:15	54.4	54.0
426+50	401.57 1.14 402.71	402.71	2:30	54.2	53.8
			2:45	54.2	53.8

True Gauge
#10" Reading

0	1.0
5	5.5
15	15.5
20	20.5
25	25.5
55	55.4
65	65.2
85	85.2
105	105.0
125	125.0
145	145.1

6' offset cuts Ryan Field loc
Hand level from 4 elev.

7/30/44
30 ft
13 drops
Hedgeman

(6)

	Elev.	Grade	Cut
6+50	7.9	3.3	4.6
7+00	7.3	2.9	4.4
+50	6.8	2.6	4.2
8	6.2	2.2	4.0
+50	6.1	1.9	4.2
9	5.9	1.5	4.4
+50	5.8	1.2	4.6
10	5.4	0.9	4.5
+50	5.1	0.5	4.6
11	5.0	+0.2	4.8
+22	4.9	0.0	4.9

Profile	6' offsets				
B.M.	2.61	7.30	4.69		
35+00			4.8	2.5	-2.5 5.0
+50			4.9	2.4	-2.7 5.1
36			5.0	2.3	-2.9 5.2
+50			5.0	2.3	-3.1 5.4
+75			5.2	2.1	-3.2 5.3

Profile - 6' offsets Ryan Field				Grade	Cut
B.M.	10.22	8.92		-1.30	
11	4.82	8.10	5.70	3.22	
26+35 ⁴³	R.C.		4.8	3.3	-1.5 4.8
150			4.9	3.2	-1.5 4.7
27			4.9	3.2	-1.6 4.8
+50			4.8	3.3	-1.6 4.9
28			5.0	3.1	-1.6 4.7
+50			5.0	3.1	-1.7 4.8
29			4.9	3.2	-1.7 4.9
+50			4.7	3.4	-1.7 5.1
30			4.9	3.2	-1.8 5.0
+50			5.2	2.9	-1.8 4.7
31			5.5	2.6	-1.8 4.4
+50			5.5	2.6	-1.9 4.5
32			5.7	2.4	-1.9 4.3
11	4.97	7.36	5.71	2.39	
+50			4.9	2.5	-1.9 4.4
33			5.0	2.4	-2.0 4.4
+25 x			2.4		-2.0 4.4
+60 x			5.0	2.4	-3.0 5.4
170 ¹⁵	B.C.		5.0	2.4	2.8 5.2
					-2.0 4.4
34			5.0	2.4	-2.1 4.5
+50			4.9	2.5	-2.3 4.8
B.M.			2.67	4.69	Top F. Hyd 15' Rt 33+25

7/30/41
Super
Brooks
Hodges

Cont'd book 564
page 70

£

(T)

Line revision - Ryan Field loc

E

13458²⁰ - L. 23° 21' 14"

conc Pav.

100' strip (asphalt)

11453 edge conc

11427^E edge conc

104501 - 21° 32' RT

£

to Drive

to Drive curve
of N.P.R.

£

8+972 <

14+45 - intersection of gas electric and telephone conductors = (8+16.55 Harbor Survey



13+5820 < 230 21 44 = 7+29.75 I Survey Harbor Dept

6+940
12+635

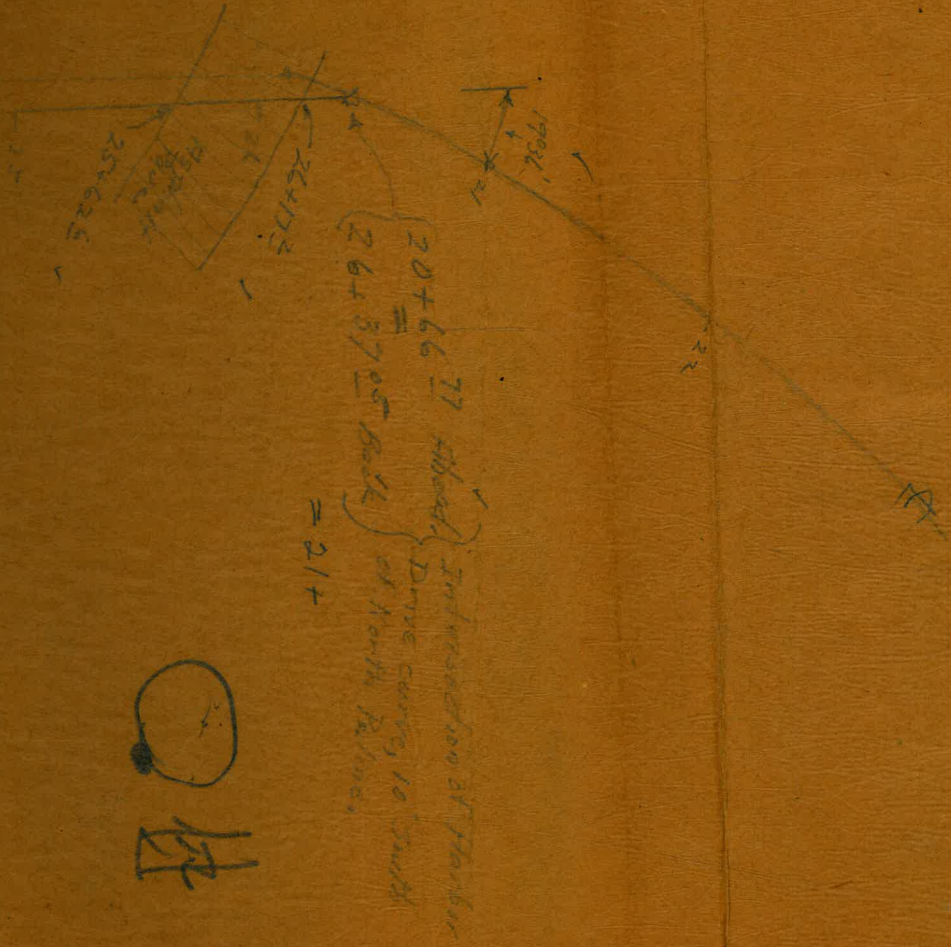
12+210
12+13

570.10+50 < 21.02 104 = 14+21.55 Harbor Dept

9100

by paper

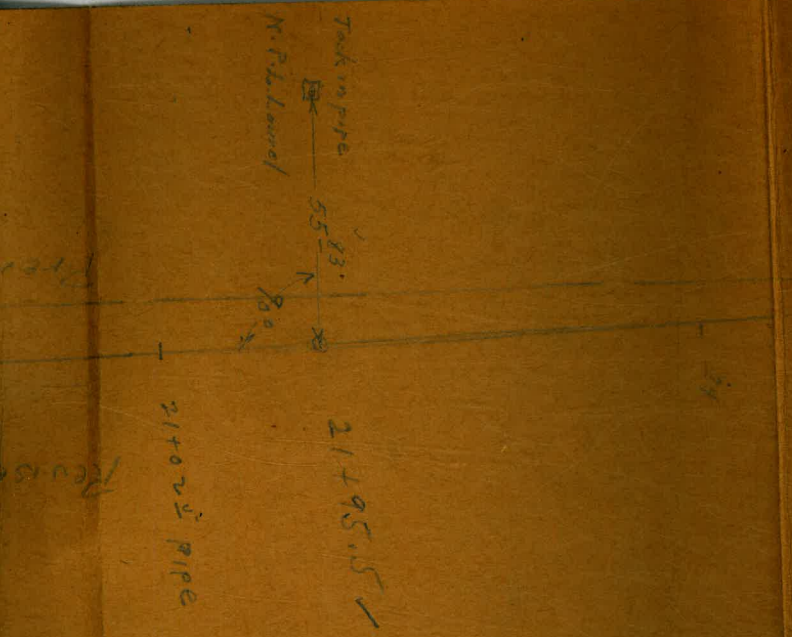
8



$20 + 66 = 77$ ahead } Indorsement of Harbor
 Drive survey, 10' south
 of North Palms.
 $26 + 3705 = 21+$



The revision, Harbor Drive, Palms
 Notes in Book 56



21 + 95.5

21 + 0.25 PIPE

Track in pipe
 N. Palms

7/30/41

Super
Brooks
Bridges

Trunk in Pipe
N.P.L. tunnel

55.83'

80°

21+95.5

Notes in

the revision, Harbor

Cont'd book 564
page 70

⊕

⑦

19°36'
+100' P.Ch. Harbor Drive
21+00 P.O.C.

20+66.77 ahead }
26+37.03 back } L. 19°36' RT

Intersec Harbor Drive curve
10° S. of N.P.L.

26+172
25+625
Asphalt

Pipe outlets
N.P.L. tunnel @ 55.83 → 21+95.5

21+02.5 pipe

20+00 P.O.T.

Telephone gas & collect conductors

14+45

⊕

7/31/41
Super
Boulgoses

Elev. Grade Cut

Profile, 6 offsets Ryan Field

B.M.	8.83	7.53	-1.30		
21400	X	5.1	2.4	-3.0	5.4
+50		5.2	2.3	-4.0	6.3
21441 (Top gas, tele. & light)		8.6	-1.1		
22400	X	4.9	2.6	-5.0	7.6
+25	X	5.0	2.5	-5.0	7.5
+50		4.9	2.6	-4.5	7.1
23		4.9	2.6	-3.5	6.1
+50		4.9	2.6	-2.5	5.1
+75	X	5.0	2.5	-2.0	4.5
24		4.8	2.7	-1.9	4.6
+50		4.9	2.6	-1.8	4.4
25		4.5	3.0	-1.7	4.7
+50		4.4	3.1	-1.6	4.7
26	X	4.4	3.1	-1.5	4.6
200262354		4.2	3.3		

Profile of 6' offsets; elevs to Rt are grade of landing field, which governs our grade.

			6' off. elev.	Grade	Cut.
B.M.	9.82	8.52	-1.30		
17+00 ♀		4.1			
6' off		3.7	4.8		
Rt		4.6	3.9		
17+50 ♀ x		3.4			
6' off		3.8	4.7	0.0	4.7
Rt		4.8	3.7		
17+72 Top of oil tank		8.8	-0.3		
18+00 ♀ x		4.2			
6' off		4.6	3.9	0.0	3.9
Rt		5.2	3.3		
18+50 ♀ x		5.0			
6' off		4.2	4.3	-0.5	4.8
Rt		5.0	3.5		
19+00 ♀		4.7			
6' off		3.7	4.8	-0.7	5.5
Rt		5.3	3.2		
19+50 ♀		4.9			
6' off		4.1	4.4	-1.0	5.4
Rt		5.4	3.1		
20+00 ♀ x		5.0			
6' off		4.8	3.7	-1.20	4.9
Rt		5.7	2.8		

8.52

20+50 €		5.0	3.5		
6'off		4.7	3.8	-1.3	5.1
RT		5.9	2.6		
21+00 €		4.9	3.6		
6'off		4.2	4.3	-1.5	5.8
RT		6.0	2.5		
21+50 €		5.2			
6'off		4.5	4.0	-1.6	5.6
RT		6.0	2.5		
22+00 €		5.1			
6'off		5.1	3.4	-1.7	5.1
RT		6.1	2.4		
22+50 €		5.2			
6'off		5.2	3.3	-1.9	5.2
RT		6.1	2.4		
23+00 €		5.3			
6'off		4.9	3.6	-2.0	5.6
RT		6.3	2.2		
23+50 €		5.5			
6'off		5.1	3.4	-2.1	5.5
RT		6.4	2.1		
24+00 €		5.4			
6'off		5.2	3.3	-2.3	5.6
RT		6.4	2.1		
TP	3.60	6.97	5.15	3.37	

6.97

24+50 ♀	4.0			
6' off	3.6	3.4	-2.4	5.8
Rt	4.9	2.1		
25+00 ♀	4.0			
6' off	4.0	3.0	-2.5	5.5
Rt	5.0	2.0		
25+50 ♀	4.1			
6' off	3.8	3.2	-2.7	5.9
Rt	5.0	2.0		
26+00 ♀	4.8			
6' off	4.8	2.2	-2.8	5.0
26+37 ¹⁵ Bole 20+66 ⁷³ ahead } offset	4.7	2.3	-2.9	5.2
ck, offset 2100	4.6	2.4	(Rec. 24)	

Ryan Field - profile of offsets, and δ where indicated.

12

B.M.	11.25	9.95		-1.30		
TP	1.68	8.83	2.80	7.15		
11400 offset			3.9	4.9	+0.4	4.5
+50 "			4.1	4.7	0.4	4.3
12 "			4.4	4.4	0.3	4.1
+50 "			4.6	4.2	0.2	4.0
13 "			4.6	4.2	0.1	4.1
+58 ² L'			4.7	4.1	0.1	4.0
14 "			4.9	3.9	0.0	3.9
+45 (top gas line)			7.4	1.4		
+50 offset			5.0	3.8	-1.0	4.8
15400 ϕ			4.1			
6' off x			3.8	5.0	0.0	5.0
Rt			4.8	4.0		
15750 ϕ			3.9			
6' off			3.8	5.0	0.0	5.0
Rt			4.6	4.2		
16400 ϕ			4.2			
6' off			3.7	5.1	0.0	5.1
Rt			4.7	4.1		
16750 ϕ			4.2			
6' off			4.1	4.7	0.0	4.7
Rt			4.8	4.0		
ok off 17200			4.1	4.7		

Embarcadero Pipeline - Harbor Drive from Pacific Highway to Laurel

7/9/42

Hill

Sooper

King

Davis

13

Revised
See page 31

0+00

255+27⁰⁰

8" curb

0+91³

Pacific Hwy. (Paving)

46⁰⁰

0+61⁹⁵

14⁰⁰

0+56⁵

8" Curb

11⁵

Palm tree

10⁵

Palm tree

State Hwy Loc

Pr. line Harbor Drive

0+00

39

conc. walk

10'

ff

1+71⁰² B.C.

Revised
see page 31

256+36⁰⁴
State B.C.

46⁰⁰

1+71⁰²

1+00

State Hwy

Oil Paving

1+30

36' Palm tree
1+24

32

34

16" piling
36' Palm tree
1+24

95

Tr. Line Harbor Drive

255+75⁹⁸

46⁰⁰

1+096

1+10

10' Concrete walk.

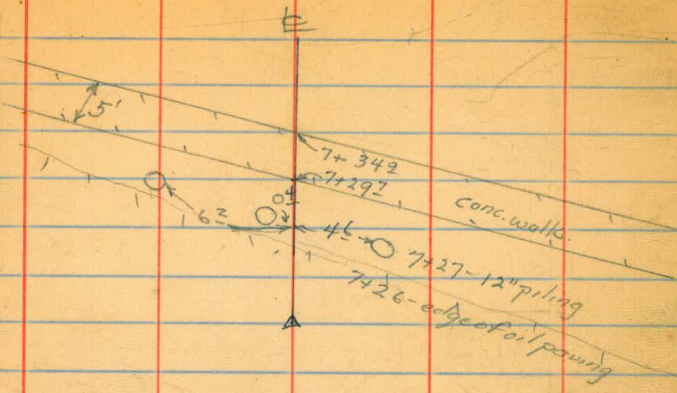
8" Carb

1+05

0+9955

S.D.E.I. Ry tracks

7+23.32 Δ 0°50'17" Lt. (Calc. by A.R.)



4+78⁴⁰ P.O.T.

260+02¹⁷ E.C. ← 5200 → 800 → 4+78⁴⁰

4+69⁸² E.C.

← 5200 ← 800 →

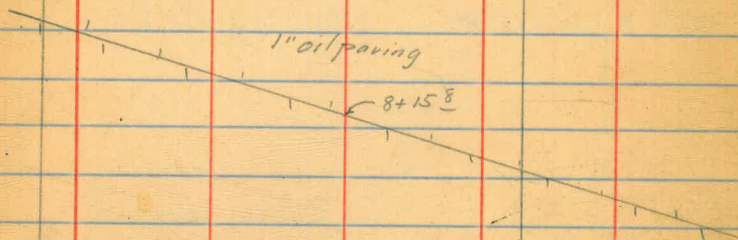
Δ = 69°55'30" Rt	by A.R.	by W.H.
R = 244 ⁸⁵	244. ⁸⁶	244.87
T = 171 ²¹	171. ²²	171.22
L = 298 ⁸¹	298. ⁸³	298.84

Revised see page 7-38

7/10/42
Hill
Soper
King
Davis

16

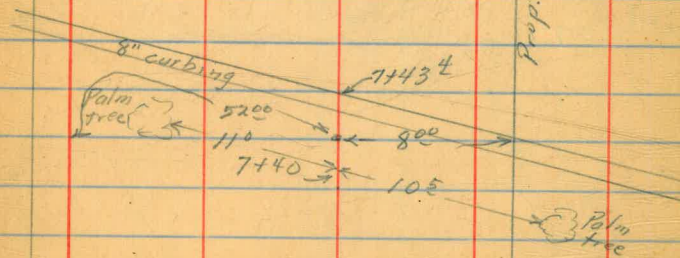
⊕



State Hwy &

Market St.
(Pavement)

Prop. line



7540⁷² P.O.T.

⊕

~~11+15³³ Δ 20°02' Rt~~

~~10+99.94~~

11+00.25 Δ 20°52'15" Rt.

(Calc. by A.R.)

9+59.59 P.O.T.

11+10.32

11+15³³ is an inter section with
with 8' from prop. line, back
and 32' from prop. line ahead.

Pavement. 10+94.7

10+32

oil paving

264+83⁶⁸ BC

5200

43

800

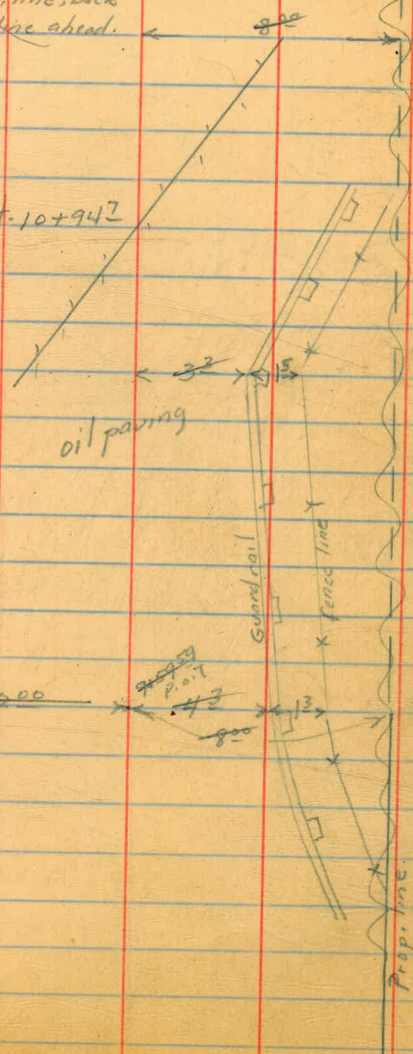
Guard rail

Fence line

Prop. line

←

⑪



⊕

Pave.

Conc. Pave.

13+90.4

13+74.2 24' gate

13+78.5

13+50.5

Prop. Line

32.00

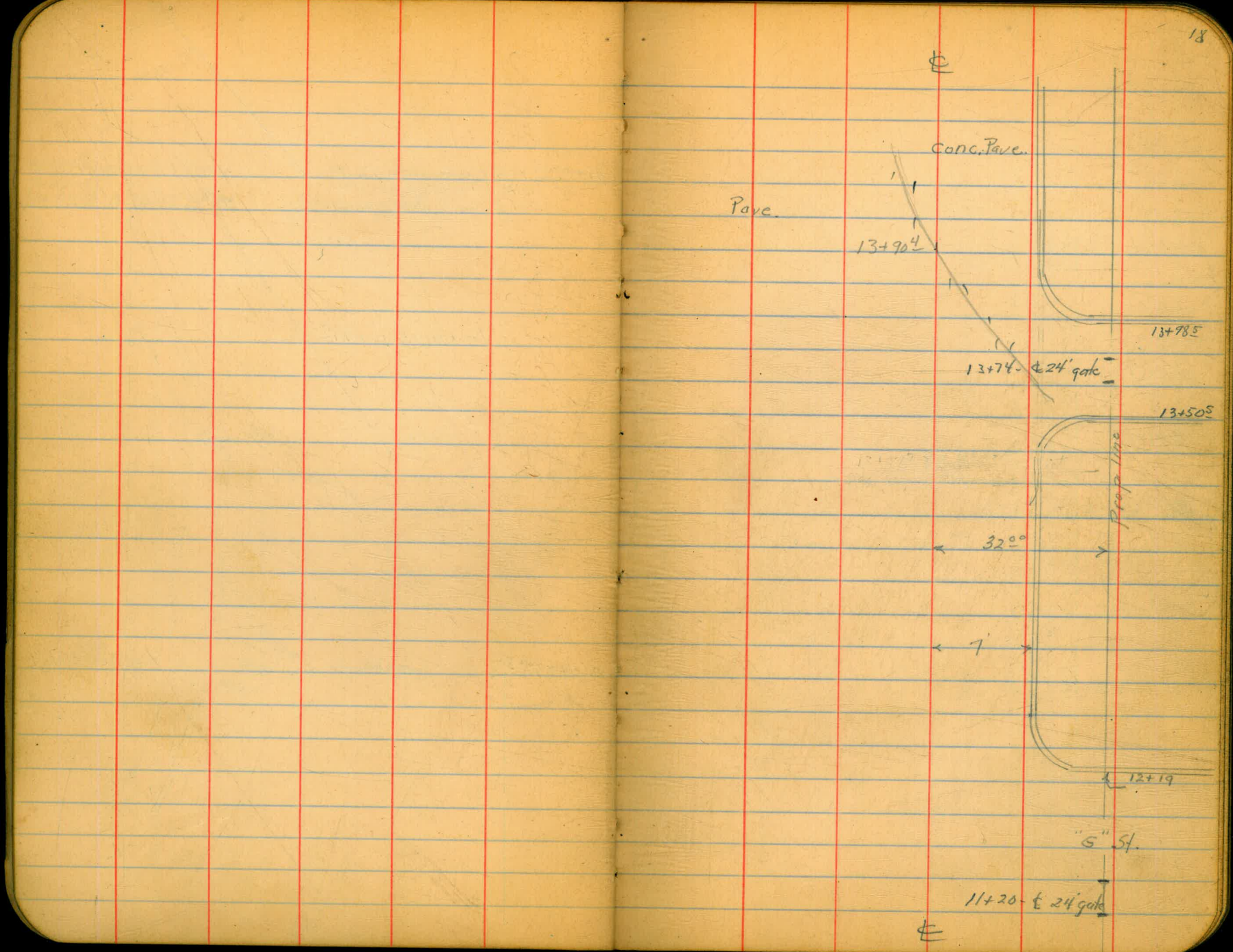
7'

12+19

"S" St.

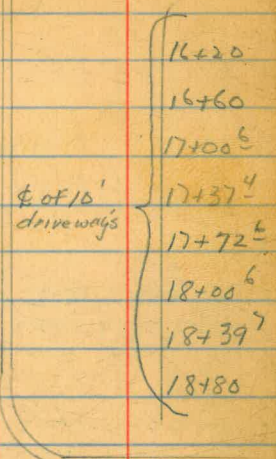
11+20.6 24' gate

⊕



⊕

Gunc Pave.



15+80 whatzit

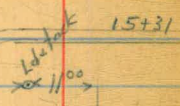
15+93.7

15+63 - sewer "F" St.

15+53 Water

15+24.97

< 21.00



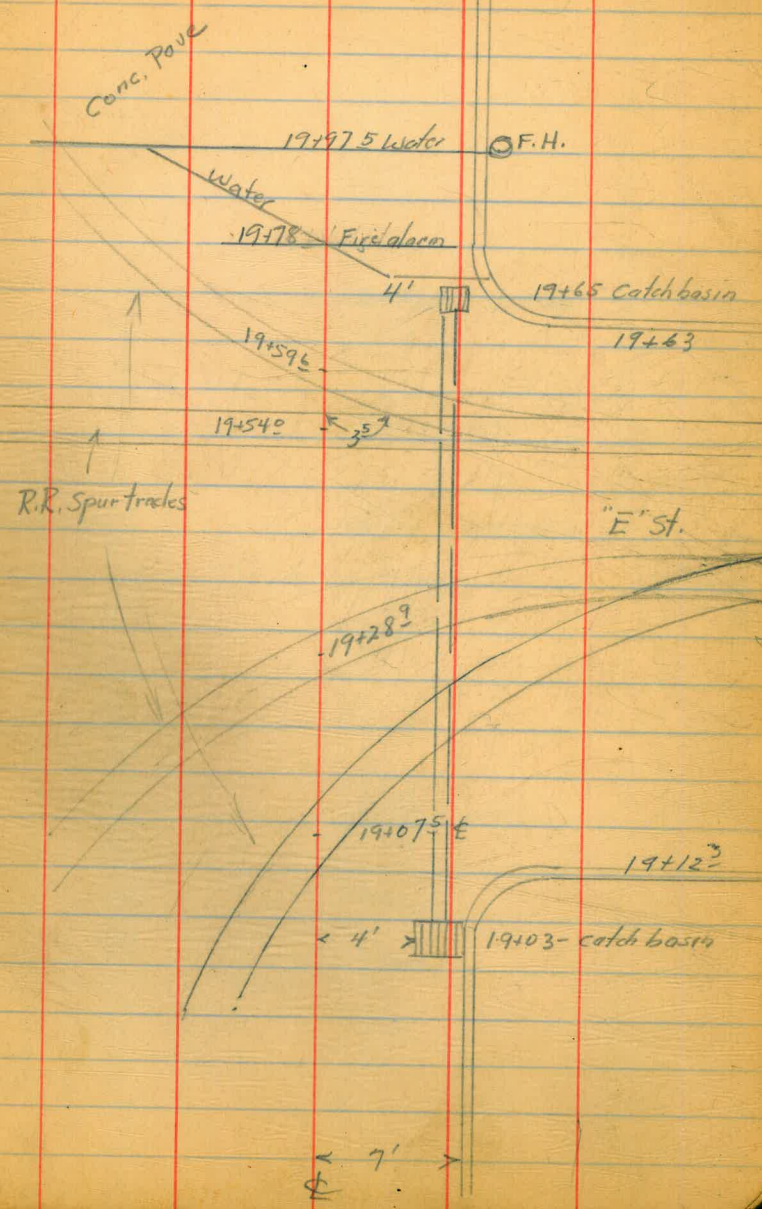
flow →

15+22 drain curb

< 7' >

⊕

Prop line



⊕

Conc Pave

Prop line

25425' viag

23498' ⚡ track

Broadway

23485' Bell system

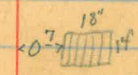
23478' maybe drain

23480'

278438' ⚡

State Hwy ⚡

68°



22498' catch basin

23497'

21°

⚡ to catch basin

22487°

22479' trench

22473' "

20437' " x-109

32°

7'

⚡

Prop line

⊕

23^d

Conc. Pav

26+47^d & Spur track

P.R. track

25+99^d P.O.T.

25+43 end of curbing

⊕ 7' ⊕

34457

58



Gas Co. Mt. Hole.

Conc. Pave.

27+96



Spur

R.R. Track

27+99



Spur

Conc. Pave.

48+03 ^{16'} driveway

44+17 ^{16'} driveway

Prop. line

294+41 ^{42'}

68°

38+89 ^{95'}

32°

38+76 ^{3'}

Ash St.

State Hwy &

38+24 ^{3'}

38+07 end track

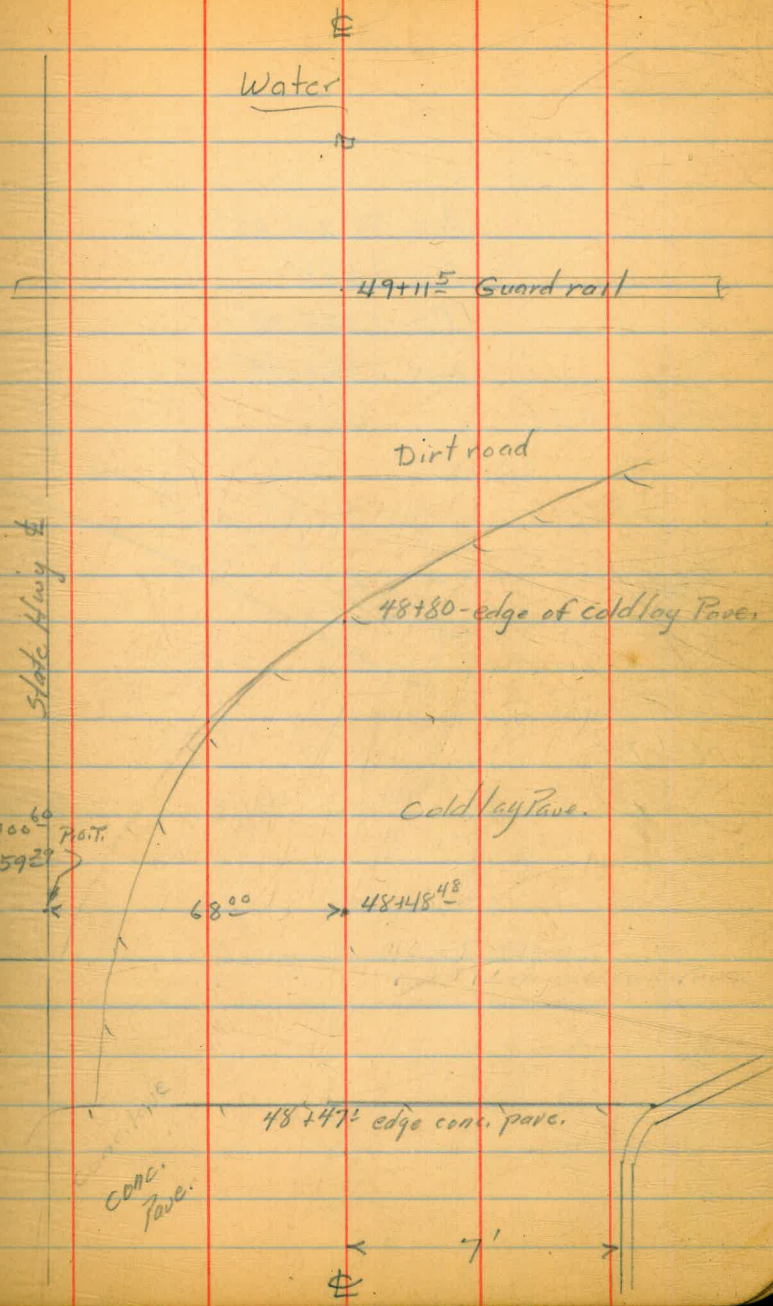


49+22.00 P.O.T.

Continued on
Page 39

48+48.48 P.O.T.

30+100.60 P.O.T.
30+545929



$$A = 70^{\circ}24'48''$$

$$R = 1,568'$$

$$T = 1,106.38'$$

$$L = 1,926.99'$$

57+00 P.O.C.

~~See Page 39~~

52+06.1 BC.

309+16.82 BC.

68.00

52+06.1

32.00

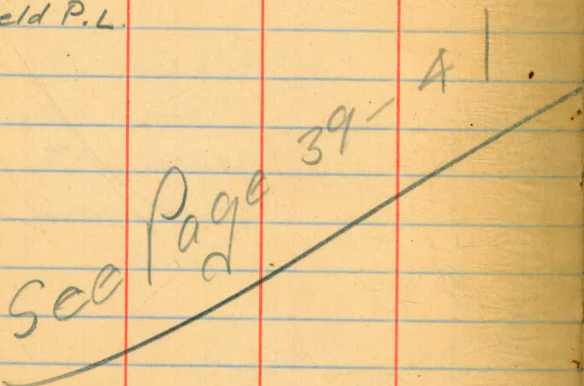
State Hwy 4

Pacific Harbor Drive

Line Revision
Calc. by A.R.

16+52.16 Ryan Field P.L.
= 76+26.32

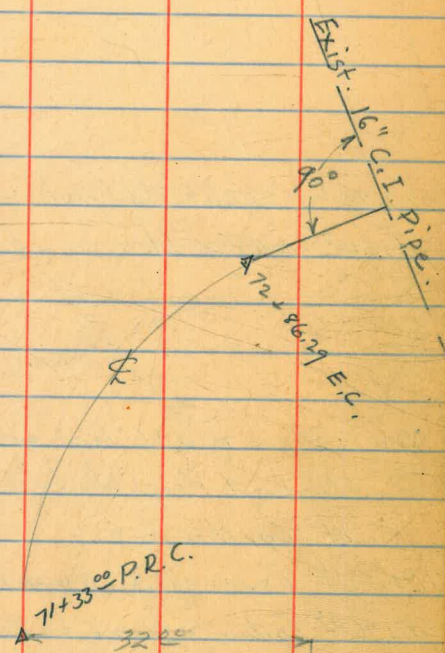
72+86.29 E.C.



$\Delta = 48^{\circ}15'30''$
 $R = 182'$
 $T = 81.52'$
 $L = 153.29'$

71+33.00 P.R.C.

Heavy E

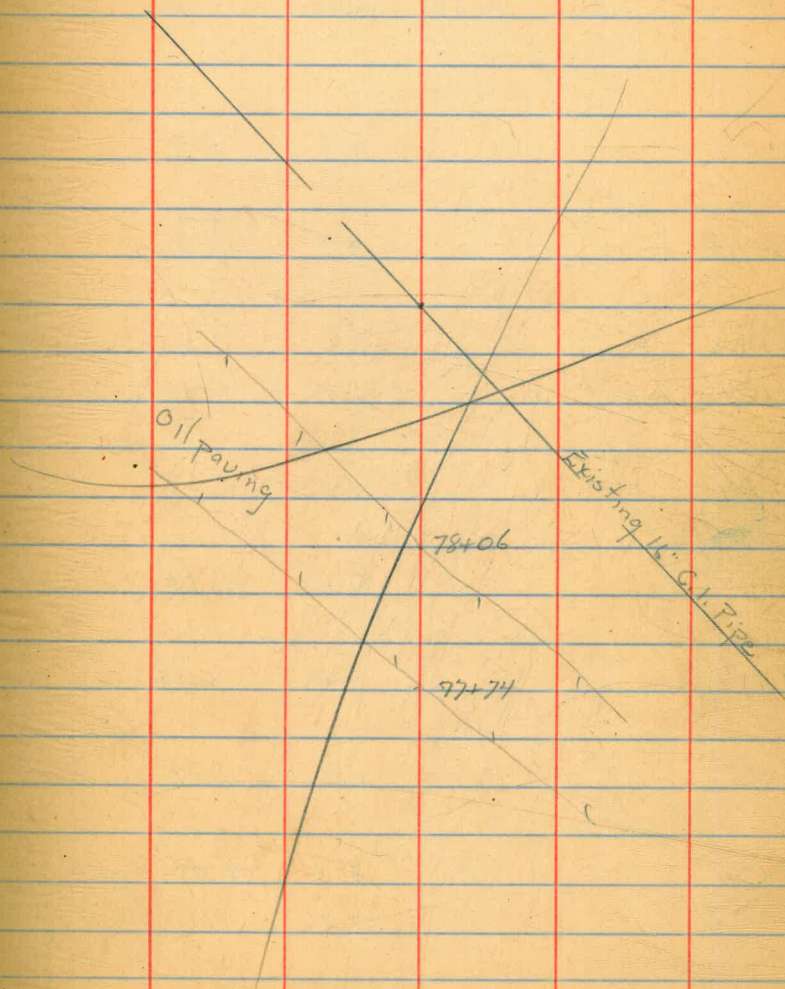


Pr. line Harbor Drive

~~20188⁷¹ Ryan Field Location~~
~~78126⁷⁶ Δ 45° 00' 60"~~

Note: there is a 16" G.V. on existing 16" line on
the East Property line of Pacific Hwy. No sign
of another G.V.

~~16452¹⁶ Existing 16" Ryan Field Pipe~~
~~76426³² Embarcadero P.L. Loc.~~



⊕

7/14/42
 Soper
 King
 Davis

29

Profile Embarcadero P.L. Low.

B.M.	3.90	6.17		2.27
TP	6.69	8.56	4.30	1.87
TP	4.31	9.67	3.20	5.36

B.P. in curb S.W. Cor Market and India. Painted, elev
 2.27. Recorded in City Engineers Office as 2.423

S.E. Cor. of Cond. walk 4 RT 0-10

0+00		4.9	4.8	
0+45		5.1	4.0 4.6	
0+56		4.2	5.5	ground
0+56 ^E		3.94	5.73	Top curb
0+57		4.52	5.15	Pave.
0+91		5.22	4.45	Pave.
0+91 ²		4.54	5.13	Top curb
0+93		5.8	3.9	ground
0+97 ²		5.25	4.42	Top of rail
1+01 ²		5.26	4.41	" " "
1+05		5.6	4.1	ground
1+05		4.53	5.14	Top curb

7.67

1410 4.45 5.22 ✓

1420 4.36 5.31 ✓

TP 4.82 10.37 ✓ 4.12 5.55 ✓

1471⁰² B.0 4.9 5.5 ✓

2400 5.4 5.0 ✓

TP 4.13 7.58 ✓ 6.92 3.45 ✓

3450 4.6 3.0 ✓

4400 5.0 2.6 ✓

450 5.3 2.3 ✓

+69⁸² EG. 5.3 2.3 ✓

5400 5.4 2.2 ✓

TP 6.95 8.10 ✓ 6.43 1.15 ✓

conc. walk

" "

8.10 ✓

6+00 6.0 2.1 ✓

7+00 5.7 2.4 ✓

7+292 } 5.1 3.0 ✓

Conc. walk.

7+43 5.18 2.92 ✓

Top curb

7+44 5.82 2.28 ✓

Pave.

8+00 5.7 2.4 ✓

9+00 5.4 2.7 ✓

10+00 5.3 2.8 ✓

TP 5.75 8.27 5.58 2.52 ✓

11+00 5.6 2.7 ✓

11+15³³ Δ 5.6 2.7 ✓

12+00 5.5 2.8 ✓

	8.27			
13+00			5.0	3.3 ✓
14			4.5	3.8 ✓
15			4.6	3.7 ✓
16			4.5	3.8 ✓
II	5.53	9.53 ✓	4.27	4.00 ✓
17+00			5.6	3.9 ✓
18+00			5.5	4.0 ✓
19+00			5.2	4.3 ✓
			5.7	3.8 ✓
19+38			5.1	4.4 ✓
			5.5	4.0 ✓
			1.96	7.57 ✓

Top of iron grate - catch basin 5' RT 19+03

Top iron grate - catch basin 5' RT 19+65

Top F.H. 9' RT 19+97

9.53[↑]

20400

5.1

4.4

21

4.8

4.7

22

4.7

4.8

TP

4.66

9.67

4.52

5.01

22+76

4.8

4.9

5.5

4.2

Top iron grate catch basin 15 Rt 22+98

23+00

5.4

4.3

+ 39

4.7

5.0

+ 77

5.4

4.3

24+00

4.8

4.9

25

4.0

5.7

26

4.0

5.7

		9.67		
27400			3.9	5.8
π	4.90	10.67	3.90	5.77
28			4.9	5.8
29			4.7	6.0
30			5.1	5.6
31			4.7	6.0
32			4.6	6.1
33			4.5	6.2
π	3.78	9.98	4.47	6.20
34			3.9	6.1
35			4.2	5.8
36			4.4	5.6
37			4.3	5.7

9.98

38

4.4 5.6 ✓

39

4.2 5.8 ✓

40

4.2 5.8 ✓

π

4.39 10.13 ✓

4.24 5.74 ✓

41

4.4 5.7 ✓

42

4.3 5.8 ✓

43

4.4 5.7 ✓

44

4.4 5.7 ✓

45

4.3 5.8 ✓

π

4.33 10.06 ✓

4.40 5.73 ✓

46

4.3 5.8 ✓

47

4.3 5.8 ✓

10.06

48			4.3	5.8 ✓	
B.M.			3.10	6.96	Rec. 6.97
49			4.9	5.2 ✓	State B.M. on N. end flood light base, 28' Rt 48+26
+22			5.9	4.2 ✓	
+32			7.7	2.4 ✓	
+38			14.1	-4.0 ✓	Water surface of pool (not affected by tides)
TP	4.04	10.90	3.20	6.86 ✓	
TP	3.93	10.52	4.31	6.59 ✓	
TP	3.72	11.10	3.14	7.38 ✓	
TP	4.64	10.54	5.20	5.90 ✓	
TP	7.03	8.88	8.69	1.85 ✓	
TP			8.46	0.42 ✓	On hub, Sta 81+97 ⁶⁹
TP	8.12	8.54		0.42 ✓	
77+18			14.3	-5.8 ✓	water surface - 7/15/42 9:40 A.M.
77+50			10.4	-1.9 ✓	(bay water, affected by tides)
+62			9.0	-0.5 ✓	
78+00			7.6	+0.9 ✓	
+08			7.2	+1.3 ✓	
+12			5.1	+3.4 ✓	
78+2096			5.0	+3.5 ✓	
20+882					

Line revision, unit #10 Harbor Front Pt.

$\Delta 69^{\circ}55'30'' R$

R. 250.19

T. 174.94

L. 305.36

Lch. 286.72

1+71.02 B.C.

Revised
see page b-1

0+00

Harbor

09. Narlinwalk R.P.

106.16

Pl.

Ref. for phot curve

palm
1+24

R.P.

Hill 1/19/43
King
Otton
Hyman

37

1+71.02 B.C.

palm 1+24

0+65 palm

0+00

concr. walk

N.P.L.

continued on page 15

10+99.94 ΔR 20°52'

RP nail in walk

10+99.94 ^{-90°} 31.65 nail in bull rail
R.P.

7+23.32 ΔL 0°50' - ahead

7+23.32 ^{-102°} 27.30 nail in top
R.P. of 12' post
nail in
pelan
R.P.

4+84.13 ahead EQUATION
= 4+76.38
EC.

Revised see page 51

RP nail in walk

24 REC. cont. ^{52°} 5+31 FL elev. -2.6
^{75°}

4+76.38 R.P. E.C.

^{75°} ^{105°} 40' nail
R.P.

Harbor Front Pl. Loc. (cont from page 25)

✓ Hill 1/26/43 39
King
Olsen
Hyman

$\Delta 70^{\circ} 24' 48''$

R 1568

T 110638

L 192699

52+06.01 BC

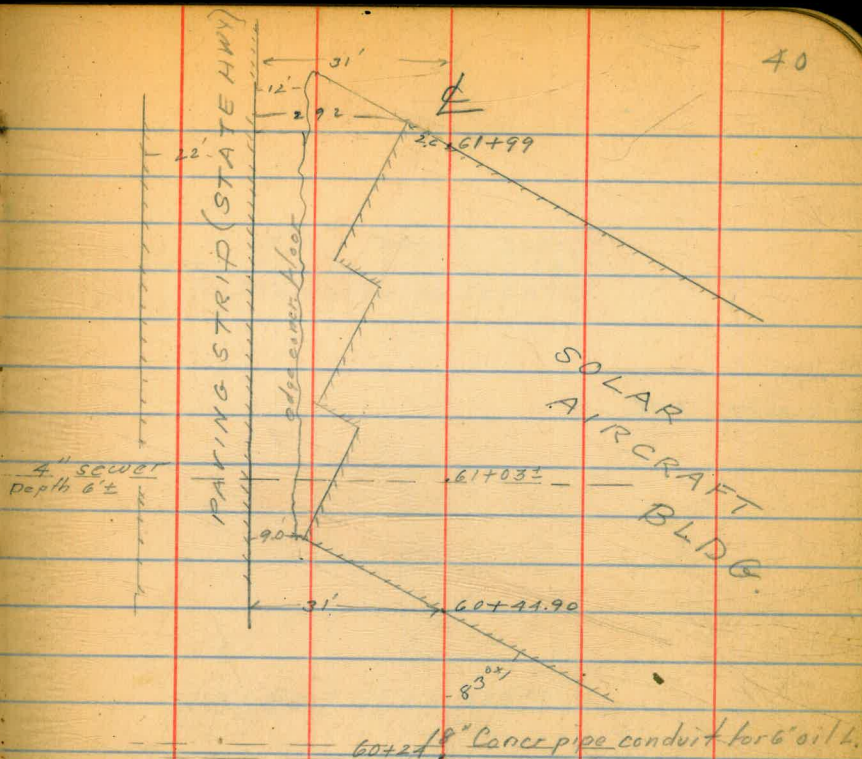
48+48.48 P.O.T.

54' Concr Drain 49+82

For alk. line to clear
Solar Bldg see page 48

59+75 P.O.C.

57+00 P.O.C.



4

41

~~2 1/2" Concr. Drain Pipe 69+74~~
~~1" wrapped pipe - gas 68+70~~
~~2 1/2" Concr. Drain Pipe 69+68~~

67+4451 P.O.C.

~~2 1/2" R.C. 10' 66+38~~

62+3441 P.O.C.

~~2 1/2" R.C. 10' 62+37~~

72+86.29	24°05'	EC.	
+75	22°21'		Δ 48°15'30"
+50	18°25'		R 182'
+25	14°29'		T 81.52
72	10°33'		L 153.29
+75	6°37'		
+50	2°41'		
71+33		PRC.	

⊕

Landing Field 16+51.68 on Ryan Field 72

76+27.1 ex 15" main

76+26.3 wire fence

Oil road 75+ sewer

75+87

75+32

72+21 guard camp

72+60

54" Concrete Drain

KING
OTTEN
HYMAN
1-29-43

Levels

43

E Profile - Highway Drive -		Unit #		
B.M. Pt.	48+26			6.97
48+48.48	3.08	10.05	4.3	5.8
48+97			4.3	5.8
49+00			6.4	3.7
49+08			8.7	1.4
49+50			9.0	1.1
50+00			8.0	2.1
50+50			8.7	1.4
51			8.2	1.9
51+50			8.7	1.4
52+00			8.8	1.3
52+06.01			8.4	1.7
52+50			7.9	2.2
53			9.1	1.0
53+50			9.0	1.1
54			7.7	2.4
54+50			7.3	2.8
55			6.9	3.2
55+50			7.9	2.7
T.P.	4.37	✓ 7.52	6.90	3.15
56			5.4	2.1
56+50			4.5	3.0
57			4.3	3.2
57+04			7.2	4" Sewer
57+12			8.9	-1.4

E Pav.

49+82 54" Con. Pipe

Elev

-1.6

Top pipe

F.H. Culvert 20' Lt.

# Profile	Unit 10	Harbor	Drive		
57+50		7.52	5.0	2.5	
58			5.0	2.5	
58+50			4.5	3.0	
59			4.5	3.0	
59+50			4.5	3.0	
Δ 59+75			4.5	3.0	
Δ 60+11 ⁹¹	} ALT. LINE		4.8	2.7	
60+50			4.9	2.6	
61			3.5	4.0	
61+50			3.2	4.3	
62+00			3.9	4.1	
Δ 62+15			4.0	3.5	
B.M.			2.36	5.16 ✓	
62+52.0 ALT.		2.91	8.07		
62+34.41 true line				4.7	3.4
62+30				4.8	
63			6.5		
63+50			6.9		
64			6.9		
64+50			6.1		
65			6.2		
65+50			6.8		
66			7.0		
66+30			8.8		
66+50			6.9		

See page 46

5.75

11.42

47.

7.52

True Line		
60+00	} true line	4.0
60+29		8.0
60+40		2.7
61+99		2.4
		3.5
		0.5 ^{-0.5} Top
		18" CONC. Pipe
		4.8 ^{5.2} Floor
		5.1

Lt. 62+5-11' = 14.6' from wall

62+52.0

F.L. culvert 8' ht.

	8.07			
67+00			6.2	
Edge Pav 67+00			5.04	
67+50			6.5	
68			6.3	
68+50			7.3	
69			7.5	
70	4.84	7.47	5.44	2.03
69+50			7.1	
69+81			7.9	
70			7.1	
70+50			6.9	
71			7.3	
71+33			7.4	
B.M. -			7.96	50.49
T.P.			4.	

Top - 2" Pipe

100' Lt. ^{Top} steel rail P. 1/166

72		7.37	8.5	-1.1	
+60			90.90	-3.5	
+50			9.3	-1.9	
E.C. + 86.29			8.7	-1.3	
73			8.8	-1.4	
+50			8.6	-1.2	
74			7.5	-0.1	
+50			7.9	-0.5	
75			7.2	0.2	
+32			7.3	0.1	
+50			7.9	-0.5	
76			5.9	1.5	
+18			5.2	2.2	
+20			2.2	5.2	
76 + 26 ³² offset			2.2	5.2	
B.M.			2.25	5.12	
T.P.	4.86	7.80 [✓]	4.93	2.94 [✓]	
T.P.	6.20	8.74 [✓]	5.26	2.54 [✓]	
B.M. Rt. 48 + 26			1.79	6.95 [✓]	6.97

Top - storm drain 54"

4' tile - 2' below ground

Top pipe - 4' deep sta. 76+27.1

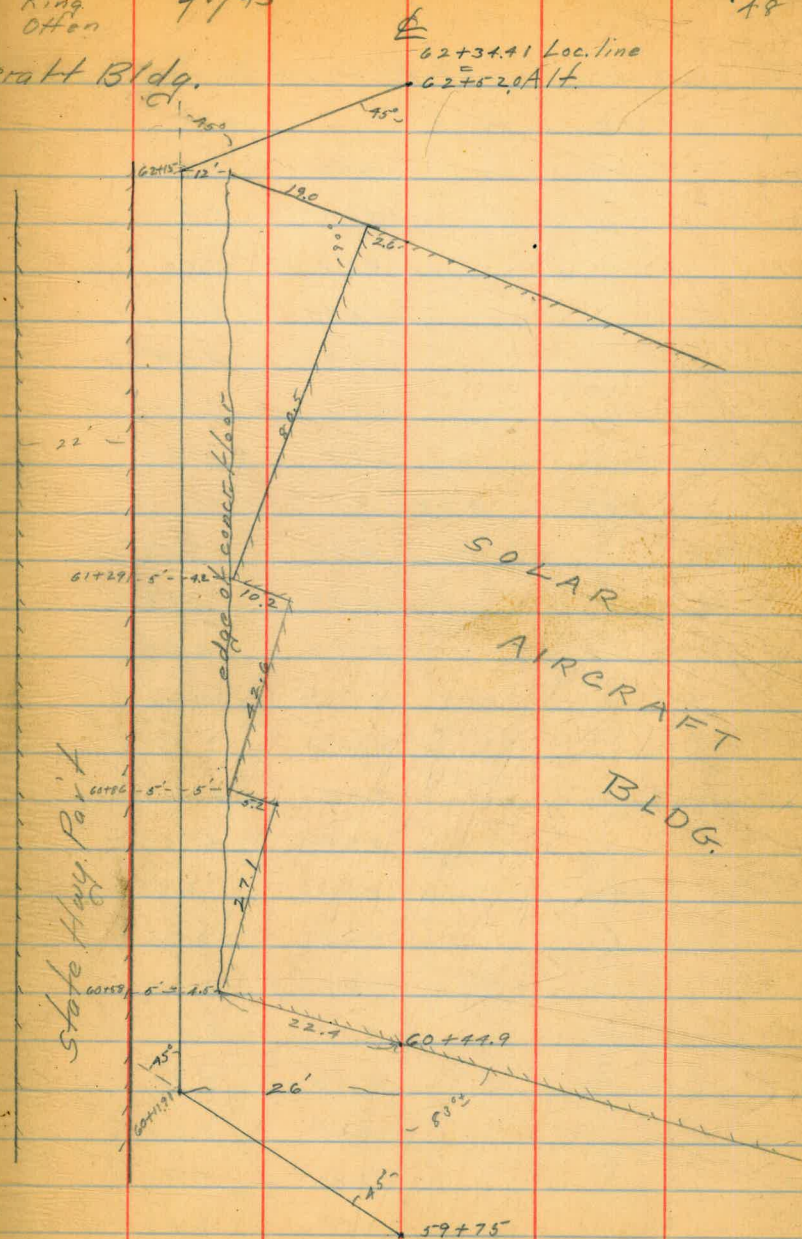
2x2 hub - 76+26³²

Hill
King
Office

2/1/43

18

Alternate line to clear Solar Aircraft Bldg.



3/6/43

49

Elev. of E. edge of E. Part Lane opp. Pipe Stas 31' distant.

B.M.	319	10.16	6.97	
49			4.70	5.46 ✓
50			4.75	5.41 ✓
51			4.80	5.26 ✓
52			5.24	4.92 ✓
53			5.77	4.39 ✓
54			6.26	3.90 ✓
55 + T.P.			6.68	3.48 ✓
	3.87	7.35		
56			4.32	3.03 ✓
57			4.58	2.77 ✓
58			4.70	2.65 ✓
59			4.72	2.63 ✓
60			4.58	2.77 ✓
61			4.52	2.83 ✓
62			4.42	2.93 ✓
T.P.	5.00	7.79	4.56	2.79 ✓
63			4.83	2.96 ✓
64			4.80	2.99 ✓
65			4.72	3.07 ✓
66			4.70	3.09 ✓
67			4.77	3.02 ✓
68			4.81	2.98 ✓
69			4.99	2.80 ✓
70			5.04	2.75 ✓

779 ✓

71			5.18	2.61 ✓
72			5.23	2.56 ✓
			7.9	-0.1 ✓
			8.2	-0.4 ✓
			7.36	0.43 ✓
			7.45	0.34 ✓
BM	137	6.99 ✓	5.17	2.62 ✓
BM.			1.88	5.11 ✓

sta 71 at Pipe of
 sta. 71+33 " " B.C.
 State Hwy grade point top fill - about sta. 71 Pk.
 " " " " " " " " 72 "
 E. edge at port on RP for P.I.
 Check on B.M. 2x2 hub at Laurel & P.H. of ⁵¹² elev

Revision of S. end unit "10"

4+89.13 head EQUATION
4+82.83 back

- 4+71.22 39°58' EC.
- +50 32°30'
- +25 29°35'
- 4 26°40'
- +75 23°46'
- +50 20°51'
- +25 17°56'
- 3 15°01'
- +75 12°07'
- +50 9°12'
- +25 6°17'
- 2 3°23'

1+71.02 BC.

0+00

MRP
point
walk
cont

169.00

1+43.02 P.I.

69°55'30" R
R 246.98
T 172.00
L 300.20

BC.

Exist 16' main 0+17

0+00
Concr. walk

-12'-

M.P.I.

KING
OTTEN
4-1-43

3/3/43

52

Levels over 1' offset hubs

B.M.	3.45	8.57	5.12	Grade	Cut
76		4.4	4.2	-0.6	4.8
⊕		4.1	4.5		
75+50		5.2	3.4	-1.0	4.4
⊕		5.2	3.4		
75		5.1	3.5	-1.6	5.1
⊕		5.3	3.3		
74+50		5.1	3.5	-1.7	5.2
⊕		5.1	3.5		
74		4.2	4.4	-1.8	6.2
⊕		4.4	4.2		
73+50		5.0	4.6 3.8	-1.9	6.5
⊕		5.1	3.5		
73		4.8	4.8 3.8	-2.0	6.8
⊕		4.9	3.7		
E.C. 72+86.29		4.9	4.7		
T.P. ⊕		4.8	3.8		

Hub & E.C.

B.M.	2.19	7.35	5.16		Sta 62+15 - 11' RI
59+50		4.3	3.1 ✓	-2.8	5.1 5.8
⊕		4.4	3.0 ✓	-	
59		4.4	3.0 ✓	-2.0	5.0 5.4
⊕		4.5	2.9 ✓	-	
58+50		4.3	3.1 ✓	-2.0	5.1 5.8
⊕		4.4	3.0 ✓	-	

7.35

58		4.8	2.6 ✓	-2.0 -2.7	4.6 5.3				
ℓ		4.7	2.7 ✓			57+75	2.0	-2.0	4.0
57+50		5.1	2.2	-2.6 -2.8	4.8 4.8		El.	gr	
ℓ		4.9	2.4 ⁵			57+25	2.0	-3.2	5.2
57		4.5	2.9	-2.0 -2.4 -3.2	4.9 5.5 6.1				
ℓ		4.7	2.7 ✓						
56+50		4.6	2.8	-1.5 -2.1	4.3 5.7				
ℓ		4.4	3.0 ✓						
56		4.0	3.4	-1.4 -2.6	4.8 5.9				
ℓ		4.3	3.1 ✓						
55+50		3.85 ^{off}	3.6	-1.2 -2.3	4.8 5.4				
ℓ		4.0	3.4 ✓						
T.P.		5.74	1.61			Top H/dwd	CHV. 57+15 - N.E.W.D		

B.M.	2.47	7.63		5.16	9	Rt 62+15	11' 60 top	Elev. gr	4.0	-3.2	C.72	± Same
60+44.9			2.4	5.2	-2.6 ✓	7.8 ✓	60+25		4.0	-3.2	C.72	"
T.P.	5.04	10.17	2.50	5.13								
60+70			5.0	5.2	-1.8 ✓	7.0 ✓						
60+82.4			5.0	5.2	-1.6 ✓	6.8 ✓						
61+00			5.0	5.2	-1.6 ✓	6.8 ✓						
61+18.4			4.9	5.3	-1.6 ✓	6.9 ✓						
61+43			4.9	5.3	-1.9	7.0 6.9						
61+61.6			4.7	5.5	-1.6 -1.8	7.3 7.1						
+74.6			4.7	5.5	-1.6 -1.9	7.4 7.1						
+98			4.7	5.5	-1.6 -2.0	7.5 7.1						
62+50			H-2 2.5		-1.6	4.1						

ELEVS. PIPE LINE - STA 68+00-72+86.3

Sta	H _i	-	I.S.	EI	Grade	Cut			
	7.71								
69+50			5.40	2.30	-1.1	3.4			
¢			5.50	2.20	-6.0	8.3			
69+00			5.70	2.00	-1.1	3.1	69+25	Elev	Grade
¢			5.70	2.00	-7.6	5.6	1.9	-1.1	3.0
68+50			5.00	2.00			68+75	1.5	-5.2
¢			5.30	2.40					7.1
68+00			4.40	3.30	-1.2	3.2			1.2
¢			4.40	3.30					2.7
TP		539		EI 232			Top of culvert head wall 4+35		

Sta	H _i	I.S.	EI	Grade	cut	
Sta. 55+00-49+00						
T.P	7.18	8.79	1.61			King OTTEN 4-643 P/ok
55+00		5.2	3.6	-1.0	4.6	Top Hdwall - 57+15
¢		5.3	3.5			
54+50		5.7	3.1	-0.80	3.9	
¢		5.6	3.2			
54+00		5.3	3.5	-0.70	4.2	
¢		5.3	3.5			
53+50		5.3	3.5	-0.50	4.0	
¢		5.1	3.7			
53+00		5.0	3.8	-0.30	4.1	
¢		4.7	4.1			
52+50		4.8	4.0	-0.20	4.2	
¢		4.9	3.9			

KING
OTTEN
Palak 4-6-43

56

Sta	Elevs	Sta	55+00 - 49+00	Grade	Cut
		H.I.	Elev		
B.C.		8.79			
52+00			5.0	3.8	0.00
⊗			4.9	3.9	
51+50			3.9	4.9	0.00
⊗			4.8	4.0	
51+00			3.9	5.4	+0.10
⊗			4.7	4.1	
50+50			3.9	5.4	+0.10
⊗			4.4	4.1	
50+00			3.6	5.2	+0.10
⊗			4.2	4.6	
49+50			3.2	5.6	+0.20
⊗			4.0	4.8	
49+00			3.5	5.3	+0.20
⊗			3.0	5.2	
			-1.83	6.96	

B.M. = 6.97

Elevs from Sta 63+00 - 67+50

B.M.	2.89	8.05	5.16		
63+00			6.5	1.6	-1.5
⊗			6.6	1.5	
63+50			6.7	1.4	-1.5
⊗			6.5	1.6	
64+00			6.6	1.5	-1.5
⊗			6.6	1.5	
64+50			6.7	1.4	-1.5
⊗			6.8	1.3	

KING
OTTEN
Palak

4-7-43

KING
OTTEN
Polak

4-7-43

57

Elevs. from Sta 63+00 - 67+50

Sta	HI 8.05	1.5	Elev	Grade	Cut
65+00		6.8	1.3	-1.5	2.8
6		7.0	1.1		
65+50		7.0	1.1	-1.5	2.6
6		6.4	1.7		
66+00		7.3	0.8	-1.5	2.3
6		6.8	1.3		
66+50		6.9	1.2	-1.5	2.7
6		6.9	1.2		
67+00		6.5	1.6	-1.5	3.1
6		6.3	1.8		
67+50		6.1	2.0	-1.3	3.3
6		6.2	1.9		
TP		-5.73	2.32		

B.M. Marked E/ 2.32

Elevs from Sta 48+48⁴⁸ - 39+00

B.M	3.26	1023	6.97		
48+48 ⁴⁸		4.6	5.6	0.20	5.4
48+00		4.6	5.6	0.4	5.2
47+50		4.5	5.7	0.6	5.1
47+00		4.5	5.7	0.8	4.9
46+50		4.5	5.7	0.8	4.9
46+00		4.5	5.7	0.8	4.9
45+50		4.5	5.7	0.7	5.0
45+00		4.5	5.7	0.7	5.0
44+50		4.5	5.7	0.7	5.0

4-8-43 KING
OTTEN
Polak

KING
OTTEN
POLAK

4.8.43

54

Sta	Elev from Sta + HI 10.23	48+48 ⁴⁸ 7.8	to 39+00 Elev	Grade	Cut
44+00		4.5	5.7	0.7	5.0
43+50		4.5	5.7	0.6	5.1
43+00		4.5	5.7	0.6	5.1
TP		-3.52	6.71		
	3.49	10.20			
42+50		4.5	5.7	0.6	5.1
42+00		4.5	5.7	0.5	5.2
41+50		4.5	5.7	0.5	5.2
41+00		4.5	5.7	0.5	5.2
40+50		4.5	5.7	0.5	5.2
40+00		4.5	5.7	0.4	5.3
39+50		4.5	5.7	0.4	5.3
39+00		4.5	5.7	0.4	5.3
TP		-3.50	6.70		

Sprinkler head Sta. 42+95±

38.26

Lead plug on sidewalk Sta. 38+86±

Levels over 4' offset hubs at S. end of job.

B.M.	2.31	6.69	4.38		Top east rail 0+14
B.C. 1+71.02		4.1	2.6	-1.3	-3.9
4		4.4	2.3		
2+06		4.1	2.6	-1.5	4.1
4		4.3	2.4		
+25		4.1	2.6	-1.7	4.3
4		4.3	2.4		
+50		4.6	2.1	-1.9	4.0
4		4.8	1.9		

2475		6.69	5.0	1.7	-2.1	3.8
Q			5.1	1.6		
3400			5.3	1.4	-2.3	3.7
Q			5.7	1.0		
+25			5.7	1.0	-2.5	3.5
Q			6.1	0.6		
+50			6.0	0.7	-2.6	3.3
Q			6.2	0.5		
+75			6.3	0.4	-2.8	3.2
Q			6.6	0.1		
4400			6.2	0.5	-3.0	3.5
Q			6.2	0.5		
+25			6.4	0.3	-3.0	3.3
Q			6.2	0.5		
+50			6.4	0.3	-3.0	3.3
Q			6.1	0.6		
EC			6.2	0.1		3.1
+77.22			6.2	0.5	-3.0	3.5
Q			4.6	2.1		
5700			6.4	0.3	-3.0	3.3
Q			4.5	2.2		
TR	6.80	7.57	5.92	0.77		8+5+35
+50			7.3	0.3	-3.0	3.3
Q			5.6	2.0		
6400			7.5	0.1	-3.0	3.1
Q			5.5	2.1		

S.W. Cor. Drop 1 det culv.

KING
POLAK
OTTEN
4-28-43

Profile 7' offsets Harbor Drive #10

6+50	7.57	7.2	0.4	-3.0	3.4
Q		5.3	2.3		
7+00		6.9	0.5	-3.1	3.6
E		5.0	2.6		
A 7+23.32		6.8	0.8	-3.1	3.9
Q		4.7	2.9		
T.P.		2.39	5.18		

Top 3rd PILING Rt 23' Sta 7+25

T.P.	3.31	10.01 ^v	6.70		Lead	Piling Rt 30+89
38+50			4.4	5.6	0.4	5.2
38+00			4.4	5.6	0.3	5.3
37+50			4.4	5.6	0.3	5.3
37			4.4	5.6	0.3	5.3
+50			4.4	5.6	0.3	5.3
36			4.4	5.6	0.2	5.4
+50			4.4	5.6	0.2	5.4
35			4.3	5.7	0.2	5.5
+50			4.1	5.9	-0.4	6.3
34			4.0	6.0	+0.4	5.6
+50			4.0	6.0	+1.2	4.8
33			4.0	6.0	1.2	4.8
+50			4.0	6.0	1.1	4.9
T.P.	5.17	10.70 +0.60	4.48	5.53 ^v		
32			4.7	6.0	1.1	4.84.9
+50			4.7	6.0	1.1	4.84.9

10.70
+0.60

31		4.8	5.9	1.1	4.8
+50		5.0	5.7	1.0	4.7
30		5.3	5.7	1.0	4.6 ^{4.7}
+50		4.9	5.8	1.0	4.3 4.4
29		4.8	5.9	0.9	4.8
+50		4.9	5.8	0.9	4.9 5.0
28		5.0	5.7	0.9	4.8 4.9
+50		5.0	5.7	0.8	4.7 4.8
27		5.0	5.7	0.8	4.8 4.9
+50		5.2	5.5	0.8	4.8 4.9
26		5.1	5.5	0.7	4.6 4.7
+50		5.2	5.5	0.7	4.8 4.9
25		5.2	5.5	0.7	4.7 4.8
T.P.	9.25	^{10.39} 10.29	4.56	^{6.14} 6.04	Top Curve 25+43
+50		4.9	5.5	0.3	5.2 24+75
24		5.6	4.8	-0.6	5.4 23+75
+50		5.6	4.8	-1.0	5.5 0.7 4.8
23		5.9	4.5	-1.0	5.8 -1.0 5.8
+50		5.9	5.0	-1.0	5.8
22		5.9	5.0	-1.0	6.0
+50		5.5	4.9	-1.0	6.0
21		5.6	4.8	-1.0	5.9
+50		5.7	4.7	-1.0	5.8
20		5.8	4.6	-1.0	5.7
+50		5.9	4.5	-1.0	5.6
					5.5

19+00		10.39	5.9	4.5	-1.6	6.1
T.P	1.65	9.22	2.85	7.54	7.57	Top F.H 19+97
+50			4.8	4.1	-2.20	6.4
18			4.9	4.3	-2.2	6.5
+50			5.0	4.2	-2.2	6.4
17			5.1	4.1	-2.2	6.3
+50			5.1	4.1	-2.3	6.4
16			5.2	4.0	-2.3	6.3
+50			5.5	3.7	-2.3	6.0
15			5.5	3.7	-2.4	6.1
+50			5.5	3.7	-2.4	6.1
T.P	1.75	7.86	3.11	6.11		
14			4.2	3.7	-2.5	6.2
+50			4.3	3.6	-2.5	6.1
13			4.6	3.3	-2.6	5.9
+50			5.0	2.9	-2.7	5.6
12+00			5.0	2.9	-2.7	5.6
+50			4.9	2.8	-2.8	5.6
90+9994			5.0	2.9	-2.8	5.7
T.P			5.03	2.83		N. & 2.83

7.860
4.0
-2.06

62

	F.S	H.I.	I.S.	Elev.	Grade	Cut
B.M.	152	6.70		5.18		Top 3rd P. Line R+7723
7+50			4.8	1.9	-3.1	5.0
⊕			4.3	2.4		
8			4.4	2.3	-3.1	5.4
⊕			4.3	2.4		
+25			4.9	1.8	-3.1	4.9
⊕			5.0	1.7		
+50			5.0	1.7	-3.1	4.8
⊕			4.2	2.5		
9			5.1	1.6	-3.0	4.6
⊕			4.0	2.7		
+50			5.1	1.6	-3.0	4.6
⊕			3.9	2.8		
10			5.1	1.6	-2.9	4.5
⊕			3.8	2.9		
+50			3.9	2.8	-2.9	5.7
⊕			3.2	3.5		
			4.0	2.7	2.7	2 11x15

H. D. Pipe Line 0+00 to 1+50

Sta	H.I.	I.S.	Elev.	Grade	Cut	
B.M.	3.00	7.38	4.38		5/25/43 Top of rail 0+97	
0+25			3.9	3.5	-1.6	5.1
⊕			3.9	3.5		
0+50			3.9	3.5	-1.5	5.0
⊕			3.9	3.5		

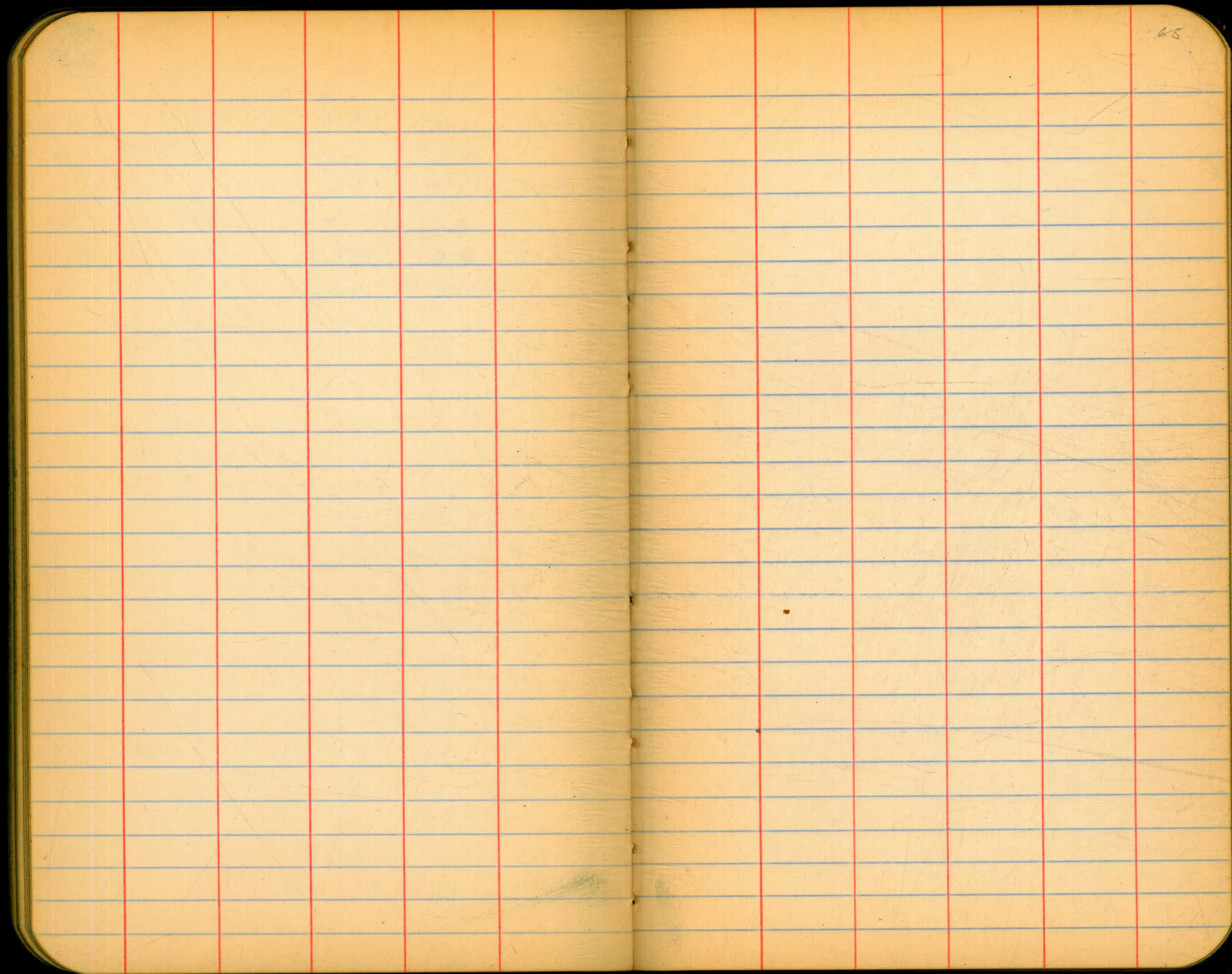
Hill
Pilot
Ottor

738

Gr

Cut

1400	3.4	4.0	-1.2	5.2
\$	3.5	3.9	-1.2	
1425	4.2	3.2	-1.0	4.2
\$	4.1	3.3		
1450	4.6	2.8	-1.1	3.9
\$	4.4	3.0		



Top Pipe - solar Bldg. south

	7.7	2.5	5.2		
60+43		9.6	-1.9	-3.4	8.6
60+30		10.3	-2.6	-4.1	
60+25		10.4	-2.7	-4.2	8.2
60+00		10.0	-2.3	-3.8	7.8
59+75		8.9	-1.2	-2.7	6.2

Cut

8.0

8.7

7.0

1.1

1.0

7

Top Pipe - Bldg. X-ING.

			El.	
B. M.	3.59	9.73	6.14	Bottom of Pipe
23+23		9.4	0.3	-1.2
23+06		8.1	1.6	+0.1
23+00		7.8	1.9	+0.4
	328	9.42	6.14	
22+85		8.1	1.3	-0.2
22+68		9.5	-0.1	-1.6
22+50		9.3	+0.1	-1.4
22+00		8.8	0.6	-0.9

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 roadway. The number in body

IMPROVED TABLES AND INFORMATION

TABLE No. 2

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.

7.71
 2.32
 3.39
 H. 8.79
 - 1.83
 + 6.96

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.

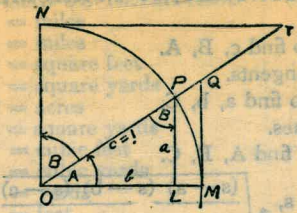
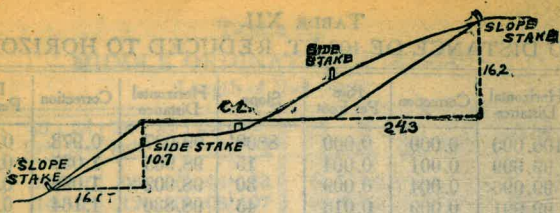


TABLE II
 TRIGONOMETRIC FORMULÆ.

$$\begin{aligned} \angle A &= \angle MOP & \angle B &= \angle PON = \angle OPL \\ R &= OB = c = 1 \\ \sin A &= \frac{a}{c} = \frac{a}{1} = a = \cos B = LP \\ \cos A &= \frac{b}{c} = \frac{b}{1} = b = \sin B = OL \\ \tan A &= \frac{a}{b} = \frac{MQ}{OM} = \frac{MQ}{1} = MQ = \cot B = MQ \\ \cot A &= \frac{NT}{ON} = \frac{NT}{1} = NT = \tan B = NT \\ \sec A &= \frac{OQ}{OM} = \frac{OQ}{1} = OQ = \csc B = OQ \\ \csc A &= \frac{OT}{ON} = \frac{OT}{1} = OT = \sec B = OT \\ \text{vers } A &= \frac{LM}{OP} = LM = \text{covers } B \# \end{aligned}$$

$$\begin{aligned} \text{covers } A &= \frac{OP - LP}{OP} = OP - LP = \text{vers } B \\ \text{exsec } A &= PQ = \text{coexsec } B \\ \text{coexsec } A &= PT = \text{exsec } B \\ \sin \frac{1}{2} A &= \sqrt{\frac{1 - \cos A}{2}} & \cos \frac{1}{2} A &= \sqrt{\frac{1 + \cos A}{2}} \\ \sin 2A &= 2 \sin A \cos A & \cos 2A &= \cos^2 A - \sin^2 A \\ \text{Law of Sines} & \frac{\sin A}{a} = \frac{\sin B}{B} = \frac{\sin C}{C} \\ \text{Law of Cosines} & c^2 = a^2 + b^2 - 2ab \cos C \\ \text{Law of Tangents} & \frac{a+b}{a-b} = \frac{\tan \frac{1}{2}(A+B)}{\tan \frac{1}{2}(A-B)} \end{aligned}$$

3.8 F.L. - 14



DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING.

SLOPE 1 1/2 TO 1. ROADWAY OF ANY WIDTH.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0 00	0 15	0 30	0 45	0 60	0 75	0 90	1 05	1 20	1 35	0
1	1 50	1 65	1 80	1 95	2 10	2 25	2 40	2 55	2 70	2 85	1
2	3 00	3 15	3 30	3 45	3 60	3 75	3 90	4 05	4 20	4 35	2
3	4 50	4 65	4 80	4 95	5 10	5 25	5 40	5 55	5 70	5 85	3
4	6 00	6 15	6 30	6 45	6 60	6 75	6 90	7 05	7 20	7 35	4
5	7 50	7 65	7 80	7 95	8 10	8 25	8 40	8 55	8 70	8 85	5
6	9 00	9 15	9 30	9 45	9 60	9 75	9 90	10 05	10 20	10 35	6
7	10 50	10 65	10 80	10 95	11 10	11 25	11 40	11 55	11 70	11 85	7
8	12 00	12 15	12 30	12 45	12 60	12 75	12 90	13 05	13 20	13 35	8
9	13 50	13 65	13 80	13 95	14 10	14 25	14 40	14 55	14 70	14 85	9
10	15 00	15 15	15 30	15 45	15 60	15 75	15 90	16 05	16 20	16 35	10
11	16 50	16 65	16 80	16 95	17 10	17 25	17 40	17 55	17 70	17 85	11
12	18 00	18 15	18 30	18 45	18 60	18 75	18 90	19 05	19 20	19 35	12
13	19 50	19 65	19 80	19 95	20 10	20 25	20 40	20 55	20 70	20 85	13
14	21 00	21 15	21 30	21 45	21 60	21 75	21 90	22 05	22 20	22 35	14
15	22 50	22 65	22 80	22 95	23 10	23 25	23 40	23 55	23 70	23 85	15
16	24 00	24 15	24 30	24 45	24 60	24 75	24 90	25 05	25 20	25 35	16
17	25 50	25 65	25 80	25 95	26 10	26 25	26 40	26 55	26 70	26 85	17
18	27 00	27 15	27 30	27 45	27 60	27 75	27 90	28 05	28 20	28 35	18
19	28 50	28 65	28 80	28 95	29 10	29 25	29 40	29 55	29 70	29 85	19
20	30 00	30 15	30 30	30 45	30 60	30 75	30 90	31 05	31 20	31 35	20
21	31 50	31 65	31 80	31 95	32 10	32 25	32 40	32 55	32 70	32 85	21
22	33 00	33 15	33 30	33 45	33 60	33 75	33 90	34 05	34 20	34 35	22
23	34 50	34 65	34 80	34 95	35 10	35 25	35 40	35 55	35 70	35 85	23
24	36 00	36 15	36 30	36 45	36 60	36 75	36 90	37 05	37 20	37 35	24
25	37 50	37 65	37 80	37 95	38 10	38 25	38 40	38 55	38 70	38 85	25
26	39 00	39 15	39 30	39 45	39 60	39 75	39 90	40 05	40 20	40 35	26
27	40 50	40 65	40 80	40 95	41 10	41 25	41 40	41 55	41 70	41 85	27
28	42 00	42 15	42 30	42 45	42 60	42 75	42 90	43 05	43 20	43 35	28
29	43 50	43 65	43 80	43 95	44 10	44 25	44 40	44 55	44 70	44 85	29
30	45 00	45 15	45 30	45 45	45 60	45 75	45 90	46 05	46 20	46 35	30
31	46 50	46 65	46 80	46 95	47 10	47 25	47 40	47 55	47 70	47 85	31
32	48 00	48 15	48 30	48 45	48 60	48 75	48 90	49 05	49 20	49 35	32
33	49 50	49 65	49 80	49 95	50 10	50 25	50 40	50 55	50 70	50 85	33
34	51 00	51 15	51 30	51 45	51 60	51 75	51 90	52 05	52 20	52 35	34
35	52 50	52 65	52 80	52 95	53 10	53 25	53 40	53 55	53 70	53 85	35
36	54 00	54 15	54 30	54 45	54 60	54 75	54 90	55 05	55 20	55 35	36
37	55 50	55 65	55 80	55 95	56 10	56 25	56 40	56 55	56 70	56 85	37
38	57 00	57 15	57 30	57 45	57 60	57 75	57 90	58 05	58 20	58 35	38
39	58 50	58 65	58 80	58 95	59 10	59 25	59 40	59 55	59 70	59 85	39
40	60 00	60 15	60 30	60 45	60 60	60 75	60 90	61 05	61 20	61 35	40
41	61 50	61 65	61 80	61 95	62 10	62 25	62 40	62 55	62 70	62 85	41
42	63 00	63 15	63 30	63 45	63 60	63 75	63 90	64 05	64 20	64 35	42
43	64 50	64 65	64 80	64 95	65 10	65 25	65 40	65 55	65 70	65 85	43
44	66 00	66 15	66 30	66 45	66 60	66 75	66 90	67 05	67 20	67 35	44
45	67 50	67 65	67 80	67 95	68 10	68 25	68 40	68 55	68 70	68 85	45
46	69 00	69 15	69 30	69 45	69 60	69 75	69 90	70 05	70 20	70 35	46
47	70 50	70 65	70 80	70 95	71 10	71 25	71 40	71 55	71 70	71 85	47
48	72 00	72 15	72 30	72 45	72 60	72 75	72 90	73 05	73 20	73 35	48
49	73 50	73 65	73 80	73 95	74 10	74 25	74 40	74 55	74 70	74 85	49
50	75 00	75 15	75 30	75 45	75 60	75 75	75 90	76 05	76 20	76 35	50

Computed by L. Leland Locke.

308+09.33 B.C. (H line)

312+39.5 P.C.C. = 312+39.5 P.O.C. H line

7+23.32
4+84.13

239.19

7+22.02
239.19

7+82.83

10
22
31
32
95

31
32
100

Top of 54" conc. drain 68 R + 306 + 99.3 = elev (-0.85)

Fl line 54" = -8.0
4.59
3.1% (level) By State Engr.

Top 24"

24" culv. not installed yet.

Oil lines to Associated Tube Lateral (Contract Assoc. Oil Co)

West gate to install 24" fishway to Pleasant
18" culv. for waste water.

7+40.72
359.22

10+99.94
1638

7+40.72
2332

17.40

11+00.24
740.72

359.53

10+99.94
1638

11+1632

9.24

48°15'30"

57+00

2.94

-1.2

81.52

4+69.82
1731

4+84.13
46.7

5+30.83

21475
24

10.1

81.8
19
9.9
5.6
4.9

697
511

186

319
387
5700

4.37
16.43
1312

231

668
456
1.88

13.12
51.7
18.29
16.43

1.86

-2.50 -2.80
4

-276.59
4

272+50
4

2.68-50

264+50

260-50

256-50

252-50

0.6
1.5

-1.6
-2.50
24

-2.20

0.6
1.5

8.8
2

5.0