

1597

HARBOR DRIVE

SEWER

ENGINEER

EDWARD

W. W. W.

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 1½ see inside of back cover.

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1597

ENGINEERING DEPARTMENT,
CITY OF SAN DIEGO,
CALIFORNIA.

The paper stock of this book is made of a high grade 50% rag paper having a water resisting surface and is sewed with Bing Special Enamel Waterproof Thread.

Made in U. S. A.

INTERCEPTING SEWER.

Pages

INDEX - Location

- Location 6" INTERCEPTING SEWER from
 21-21. { DISPOSAL PLANT TO BEARDSLEY ST. STA 0+112+^{77 55}
- 22-26 ^{Abandon.} Alternate Location Sta. 6+26 to 9+75. 86+34
- 40-42 Revise Alignment Sta 4+8+⁹⁰ to 6+55.
- 45-65 Location from Beardsley St to ^{Sta 0+115+} Pac. Lic Army. ST.
- 75- Revised Location C, ST.
- 76- " " Beech. ST.
66. Detail of Salt Water Intake at 9th + Harbor Drive

INDEX - LEVELS.

- 27-34 Levels over location (Pages 2-13) Sta 0-112+77
- 35 " " Alternate " (" 14-17) Sta 1+26 to 86+34
- 36 " " At Chollas Creek + Bridges.
- 38-39 Check Levels ³² ^{NO ST} to BEARDSLEY HARBOR DR. ^{ON}
- 43-44 " " BM Chollas Creek to 4th ST.
- 67-74 Levels over location (Pages 45-65) Sta 0 to 115+
- 77-78. " " Revised Locations.

Walker location Proposed 60" Interceptor Sewer
 Blies
 Isbell 117 Harbor Drive And Colton St.
 1-15-41 from Treatment Plant
 to Beardsley St.

Reference Books 1059 = Williams Doc Line
 872 = Harbor Drive Mgr.
 594 = Cross Section Blk 685 109
 1574 = Survey of Har. Co. 109

Station

Levels Page 27-34

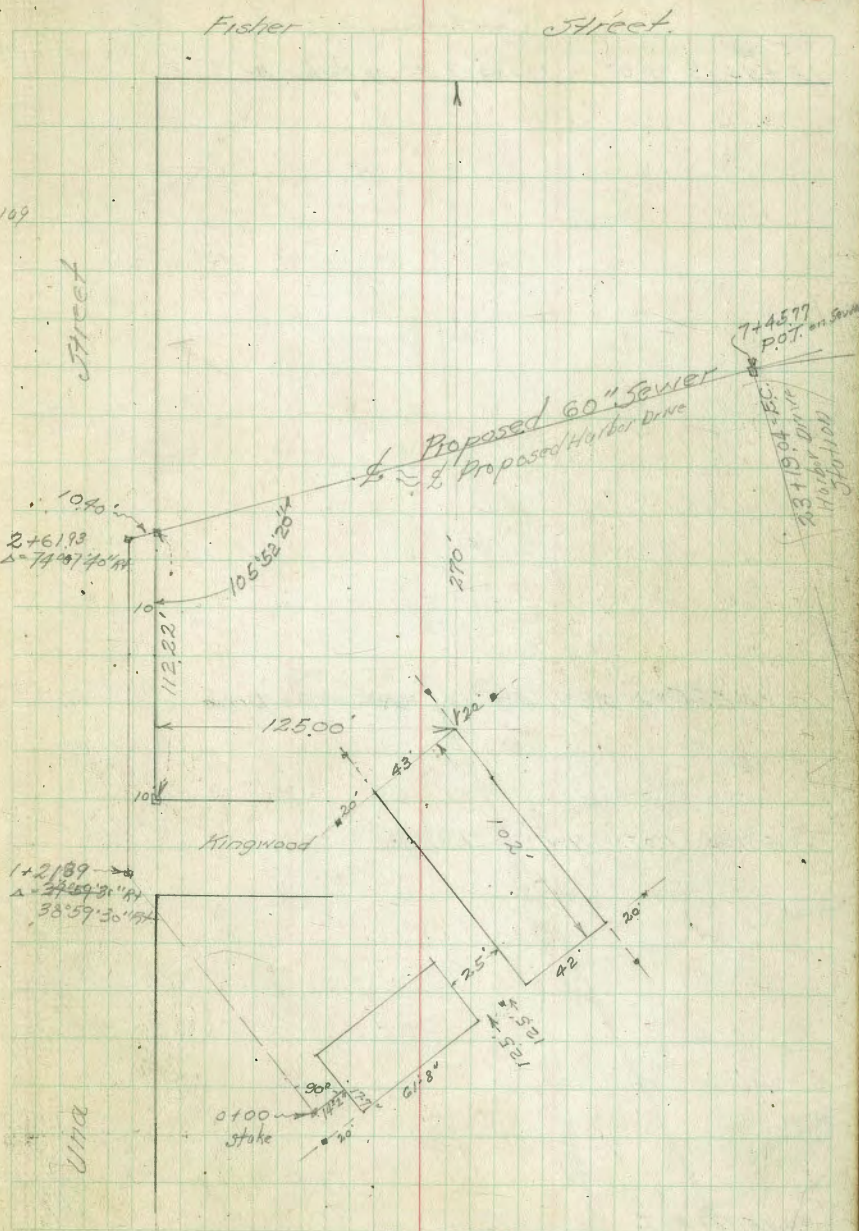
7+45.77 = P.O.T. = 23+19.04 E.C. on Harbor Drive

2+72.33 = P.O.T. = Wilme Unit St.

2+61.93 = $\Delta 74^{\circ}07'40''$ Rt.

$38^{\circ}59'30''$ Rt.
 1+21.89 = $\Delta 39^{\circ}59'30''$ Rt.

0+100 = 14'-2" East of E. Harve Blvd.



Location, Proposed 60" Interceptor Sewer

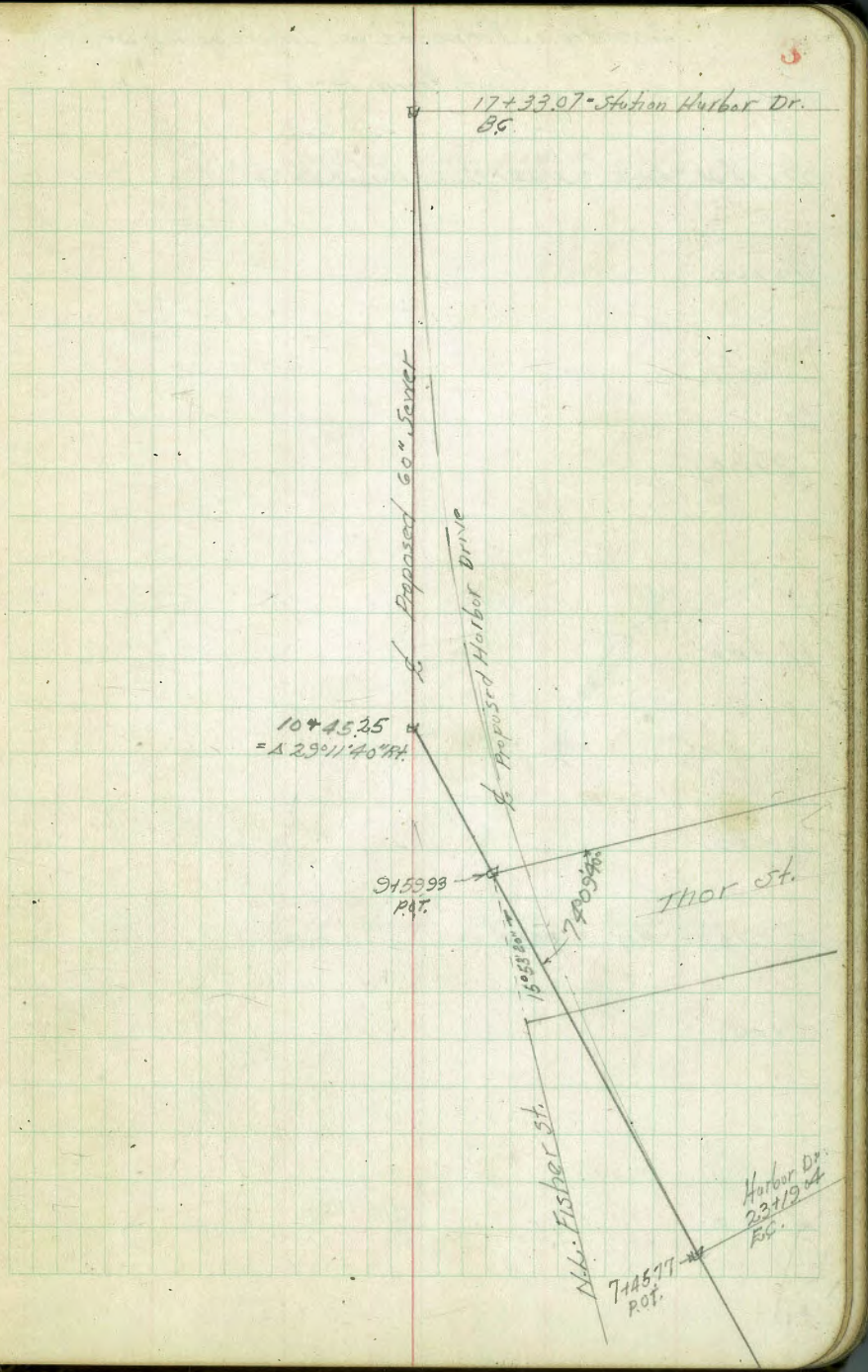
Cont. from P. 2

13+44.73 = P.O.T. = 17+33.07 B.C. on Harbor Dr

10+46.25 = $\Delta 29^{\circ}11'40''$ Rt. = RI. Harbor Drive

9+59.93 = P.O.T. = NW. Cor Thor St.

7+45.77 = P.O.T.



Location, Proposed 60" Interceptor Sewer.

Cont. from P-3

19+35.98 P.O.T. - 11+41.82 on Harbor Drive

19+00

18+00

17+00

16+00

15+40.84 = P.O.T. & 32nd

15+00

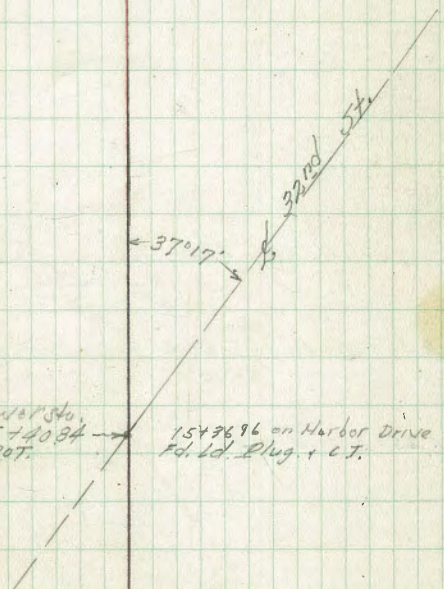
14+00

Sewer Sta
19+35.98
P.O.T.

11+41.82
E.S. on Harbor Drive

Sewer Sta
15+40.84
P.O.T.

15+36.96 on Harbor Drive
Ed. Id. Plug + C.T.



Location, Proposed 60" Interceptor Sewer.
Cont. from P. 4

23+43.8 - North end Hand Ball Court

23+23.4 - South end Hand Ball Court.

23+09.75 = North end fence to Tennis Court.

22+98.7 = North end Conc. Tennis Court.

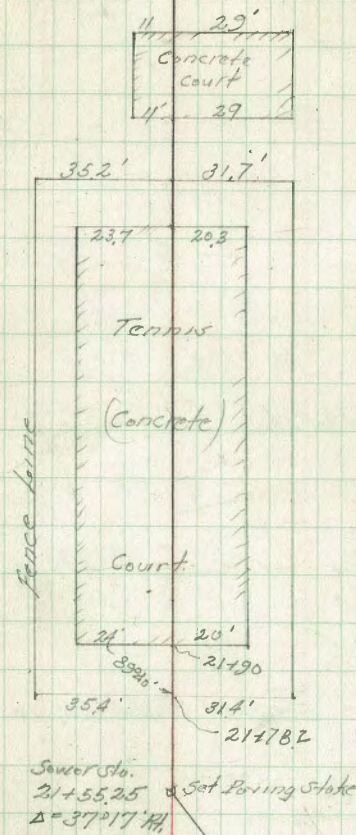
21+90 = South edge Conc. Tennis Court.

+78.2 = South ^{edge} fence to Tennis Court.

21+55.25 = $\Delta 37^{\circ}17'$ Bl. - P.I. on Harbor Drive

21+00

20+00



Location Proposed 60" Interceptor Sewer

$36+82.80 = \Delta 14^\circ 41' 05''$ (Cont. from P. 6) Equation
 $36+72.80$
 $36+74.76$ \checkmark Nail in tie 100' Ht.

$36+30 =$ West Bank Chollas Creek
 $35+71.76$ Fd. Mon 100' Ht. $38+61.9 = 38+61.7$ Book 1039-7

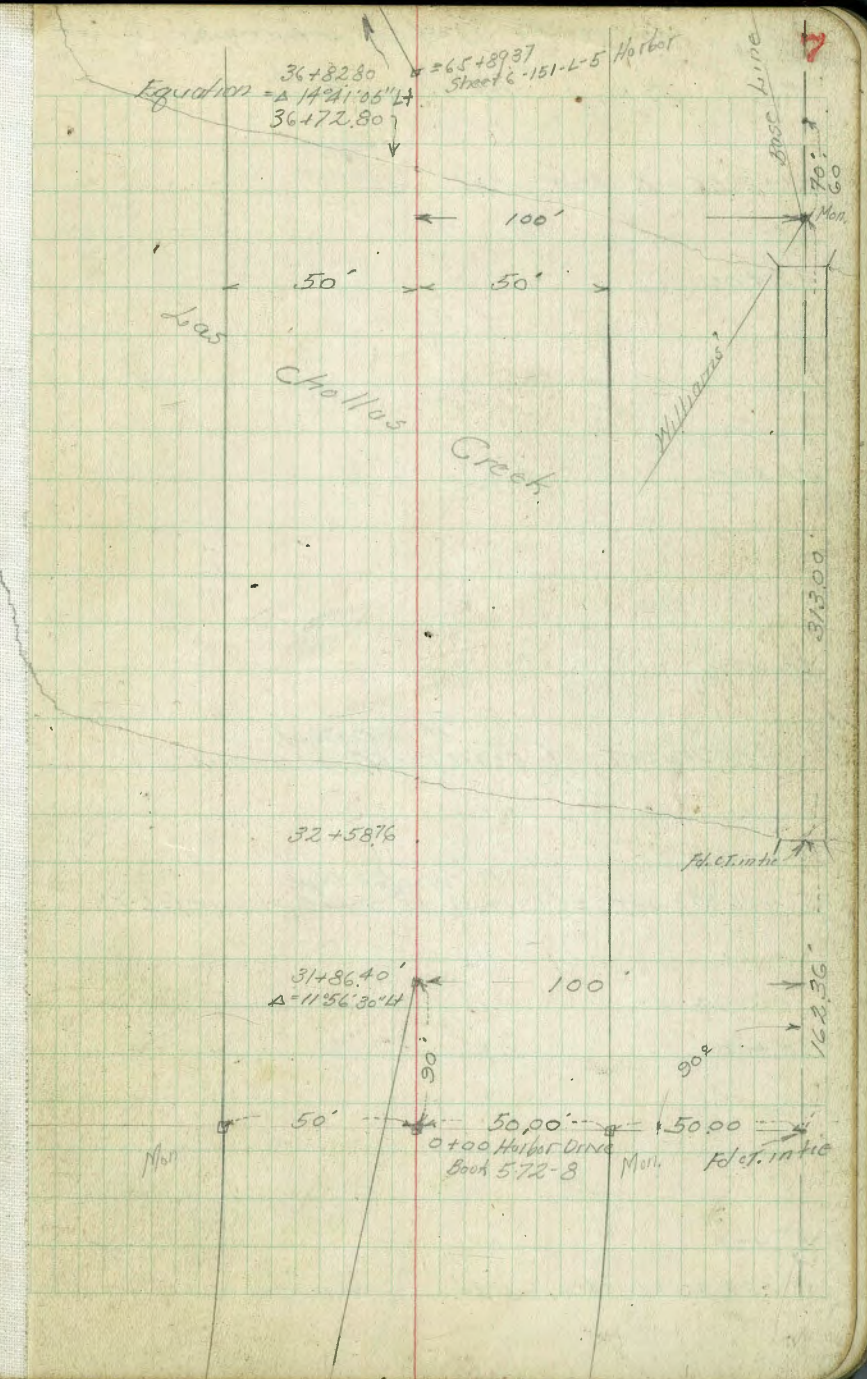
35+00

34+00

33+00

$32+84 =$ East Bank Chollas Creek
 $32+58.76$ Fd. CT. in tie East end RT 15E Bridge 100' Ht.

$31+86.40 = \Delta 11^\circ 56' 30''$ Lt.



Location, Proposed 60" Interceptor Sewer

Cont. from P-7

+39.95 = Δ 13°09'30" Rt.

42+00

41+00

40+00

+55.39 = P.O.T. = (Harbor Dept. 63+16.79 = E.C. Plan 151-L-5)

39+00

+76.29 = P.O.T. = (Harbor Dept. 63+96.99 E.C. Street 6 Plan 151-L-5)

38+00

37+00

36+82.80 = Δ 14°41'05" Lt.

50'

59+63.69
E.C.

42+39.95
Δ = 13°09'30" Rt.

RI Harbor

50'
39+55.39
P.O.T.

50'

63+16.79
E.C.

50'
63+96.99
E.C.

50'

38+76.29
P.O.T.

36+82.80
= Δ 14°41'05" Lt.

Location Proposed 60⁺ Series.

Cont. from P-8.

+75 = 6' cleanout 27' RT

48+00 = MH POT. = Angle Point in New Change P-40

47+00

46+00

45+00

44+00

+13.09 opposite BC Harbor

43+00

← 27' → □ cleanout
Starting Drain

← line change
See P. 40-42
from station
48+00 to 60+55.90

56+52.29
△ 10 Harbor Drive

TEMP BM

Elev = 3.18

P-30

c.T. 0.5' Bal. of cb face.
BC
59+63.69

42+39.95
△ 13°09'30" RT

Location Proposed 60" Sewer.
Cont. from P-9

54+00

53+00

52+90 = $\Delta 11^{\circ}01'30''$ Lt.

51+56.88 - P.O.T. = 51+19.83 Harbor Drive Station.

51+00

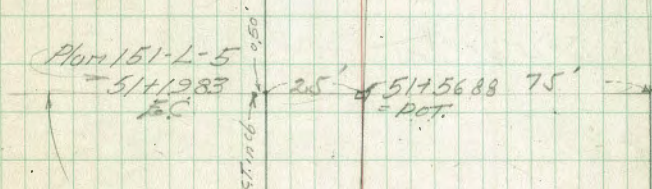
50+00

49+00

10

← line change
See P-40-42

52+90
= $\Delta 11^{\circ}01'30''$ Lt.



← line change
See P-40-42

cb line

cb line

Location Proposed 60" Interceptor Sewer
Cont. from P-10

59+00

58+00

57+00

56+65 = $\Delta 12^{\circ}14'45''$ Lt

56+00

55+00

54+56.24 = P.O.T. = Intersection of 4' x 10' Box Culvert

← Line change
See P. 40-42

56+65.0
 $\Delta 12^{\circ}14'45''$ Lt

Box Culvert 4' x 10'
38.2
54+56.24 - Intersection of Box Culverts
P.O.T.

← Line change
See P. 40-42

4' x 10' $\Delta 68^{\circ}42'$

Location Proposed 60" Interceptor Sewer.
Cont. from P. 11

65+00

64+00

63+00

+29 = 3' Cleanout 31.5' Rt.

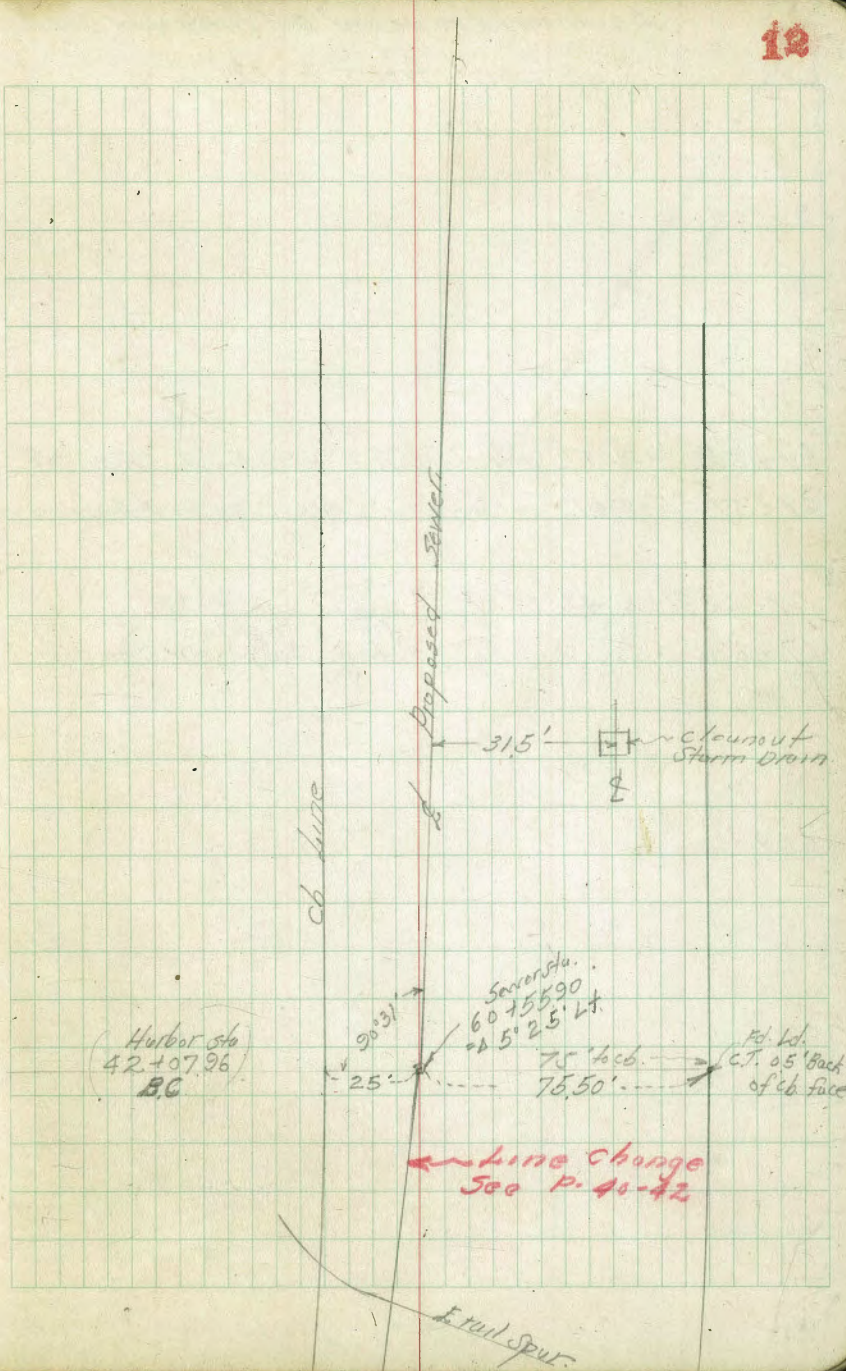
62+00

61+00

60+55.90 = Δ 5°25' Lt. changed see P. 42

60+00

59+29.4 = E. Rail Spur AT + SF F.R.



Location Proposed 60" Interceptor Sewer
Cont. from P-12

Aire Change
Sec Paper 22-26

69+52.74 = P.O.T. = intersection of Box Culvert Produced

69+51.55 = P.O.T. = intersection of Harbor Produced from East

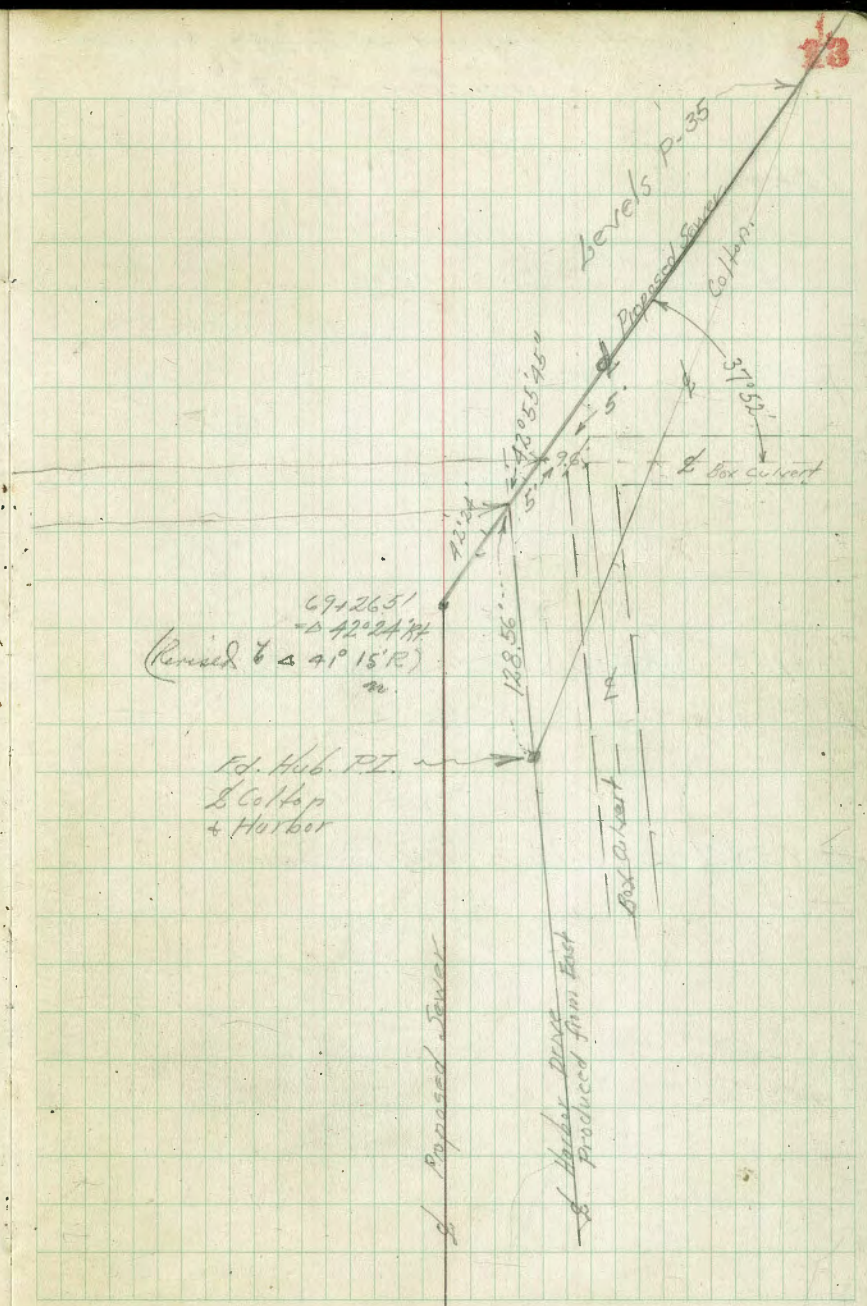
69+26.51 = Δ 42° 24' RT. (See change P-22)
from this station
to S. Sampson's Cotton Str.

69+00

68+00

67+00

66+00



Location Proposed 60" Interceptor Sewer
Cont. from P. 14

78+00

77+00

76+00

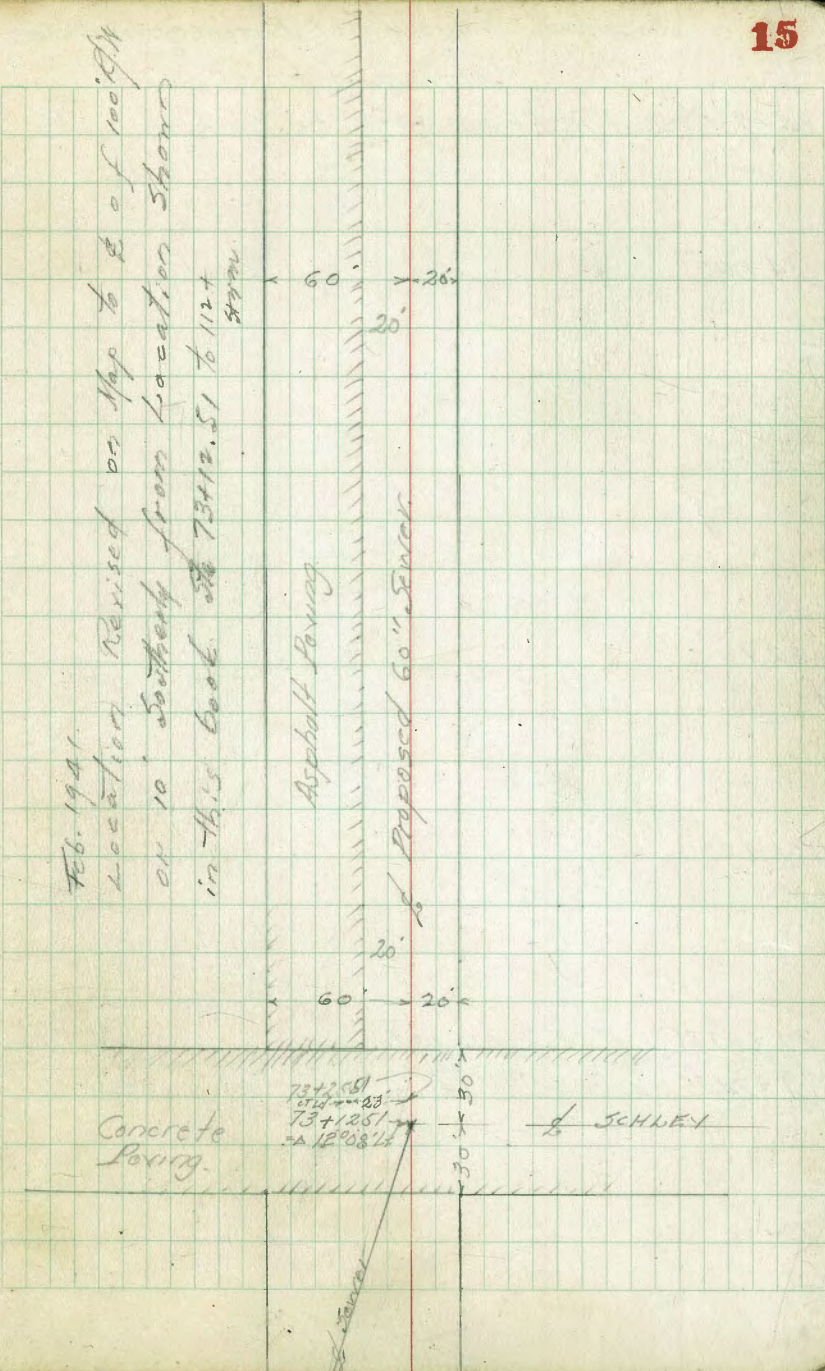
75+00

74+00

73+25.51 = C.T. & Id Plug 23' Lt.

73+12.51 = $\Delta 12^{\circ}08' Lt.$ = 1 Schlup + 20' N of S Cotton
(Revised to $\Delta 11^{\circ}00' Lt.$)

Feb. 1941
Location Revised on Map to E of 100' (11)
or 10' Southward from Location Shown
in this book at 73+12.51 to 112+
8899



Concrete Paving
73+25.51
73+12.51
 $\Delta 12^{\circ}08' Lt.$
SCHLEY

Location Proposed 60" Interceptor Sewer.

Cont. from P-15

84+90.38 - East Rail Spur S.D. & A. RR. Track.

84+00

83+00

82+00

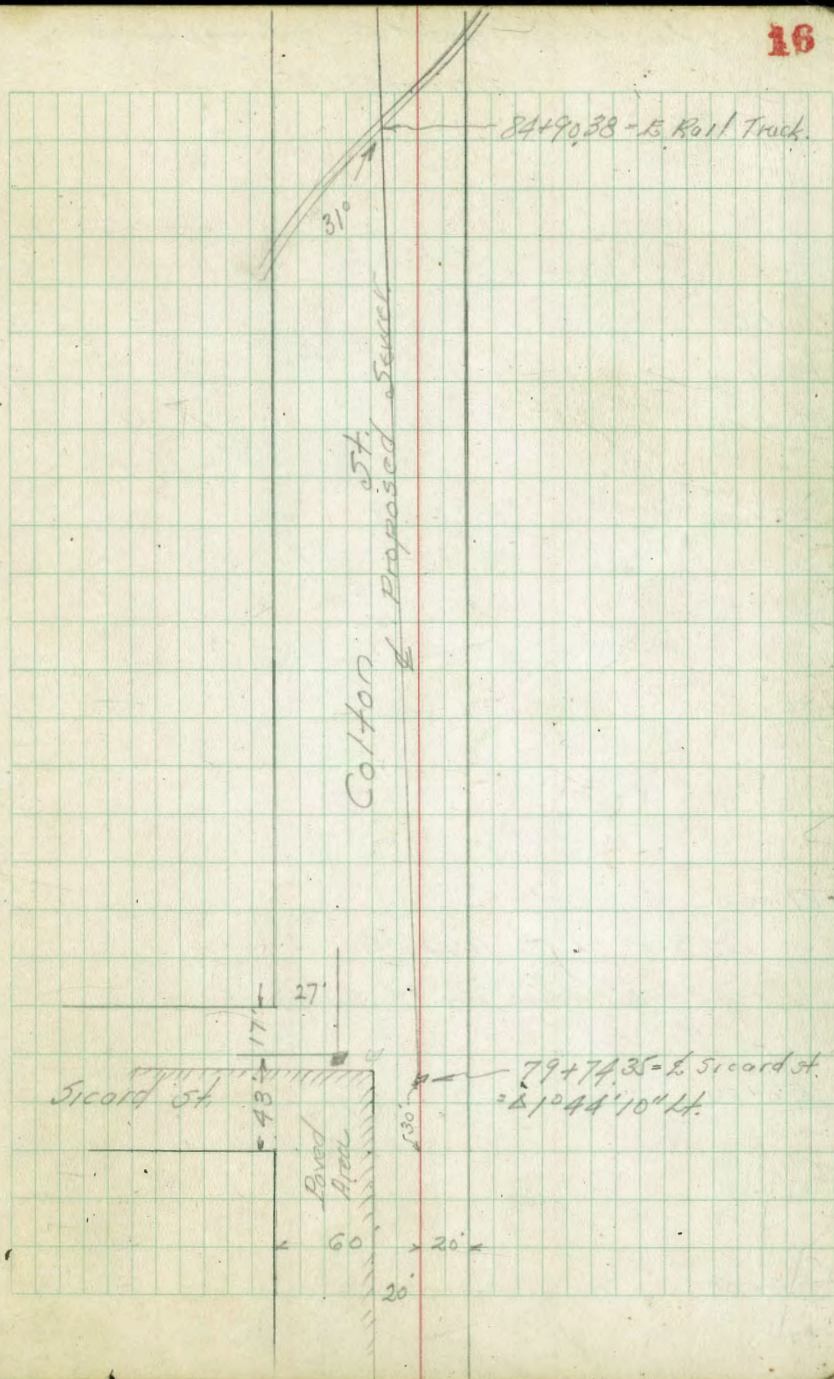
81+00

79+87.35 = 4" x 4" Post. 13' line

79+74.35 = Δ 10' 44" 90° Lt.

79+00

16



Location Proposed 60" Interceptor Sewer
Cont. from P-16

91+00

90+00

89+00

88+00

87+00

+147.58 = c.t. Ld Plug 13' Ld.

+34.58 = Δ 1'44" 10" RT = S. Sampson

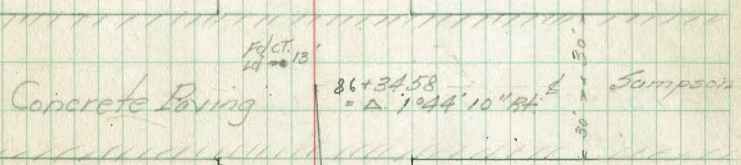
86+00

85+00

Proposed Sewer

40'

40'



Concrete Paving

86+34.58 = Δ 1'44" 10" RT

Sump Pool

Fict. 13' 13''

Location Proposed 60" Interceptor Sewer.
Cont. from P. 17

97+00

96+00

95+00

94+00

93+08.40 = Fd. Iron Pin 13' Lt. of L.

+95.40 = P.O.T. Stub

92+00

Fd. Iron Pin 13'

92+95.40
= P.O.T. Stub

18

Location Proposed 60" Interceptor Sewer
Cont. from P-18

103+00

102+00

101+00

100+00

+55.40 - P.O.T. Hub Nail

99+00

98+00

19

99+55.40
- P.O.T. ~~Hub~~ Nail

Location Proposed 60" Interceptor Sewer

Cont. from P-19

110+00

109+00

108+00

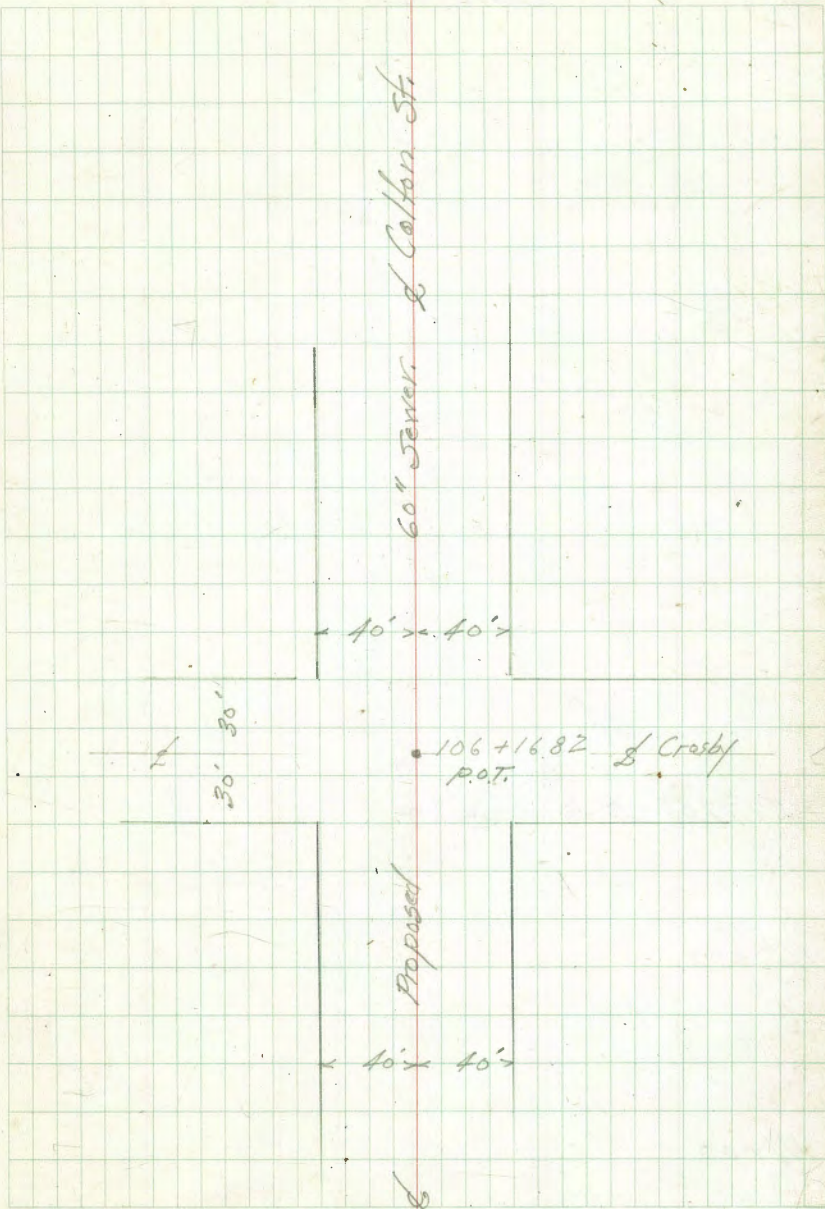
107+00

+16.82 = Crosby P.O.T.

106+00

105+00

104+00



60" Sewer & Colton St.

40' x 40'

50' 30"

106+16.82 Crosby P.O.T.

Proposed

40' x 40'

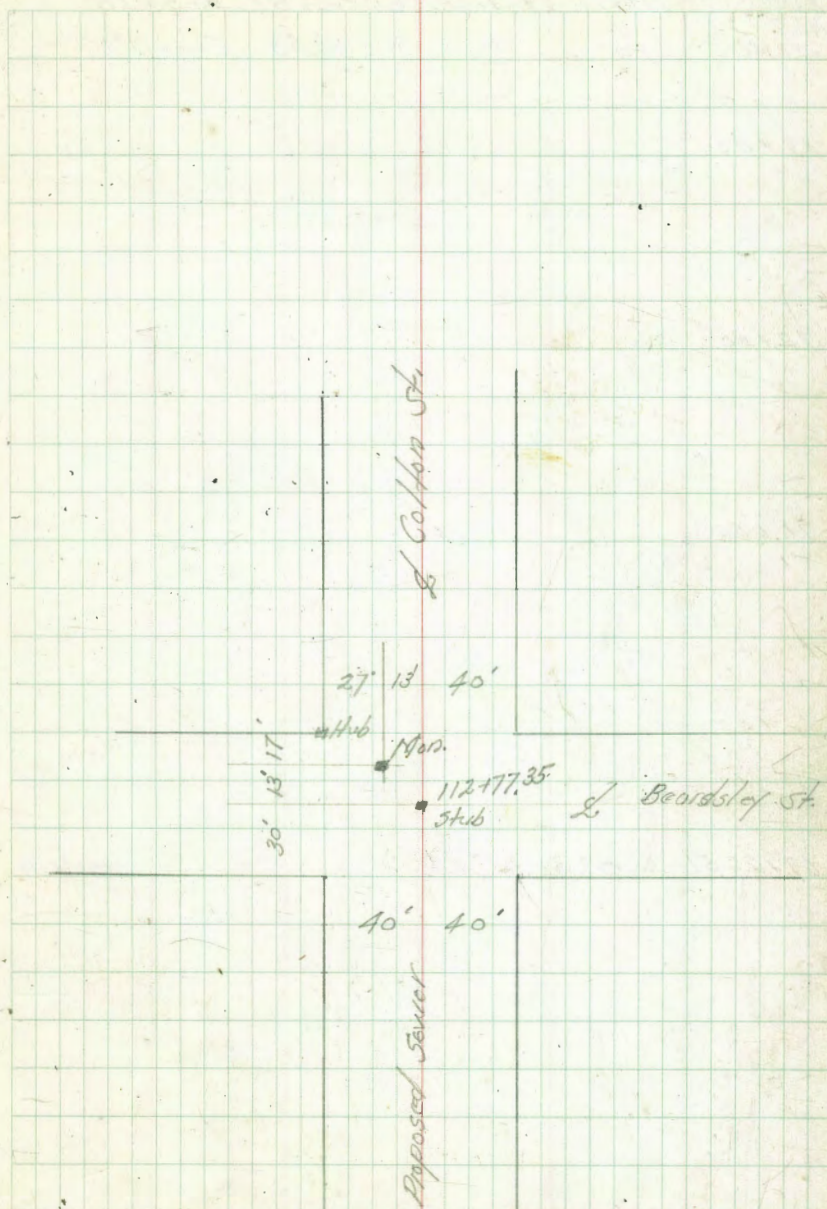
Location Proposed 60" Interceptor Sewer
Cont. from P. 20

21

112+77.35 - E Beardsley St.

112+00

111+00



Walker
Blair
Rebell
1-22-41

Change of location Proposed Sewer
from station 69+26.51 Page 13
to " 86+34.58 Page 17

73+00

72+00

71+00

70+00

69+26.51 = Δ $0^{\circ}31'30''$ Lt.

See page 13.

Some
line '05 shows
Page 2. 13

Level P-31-32

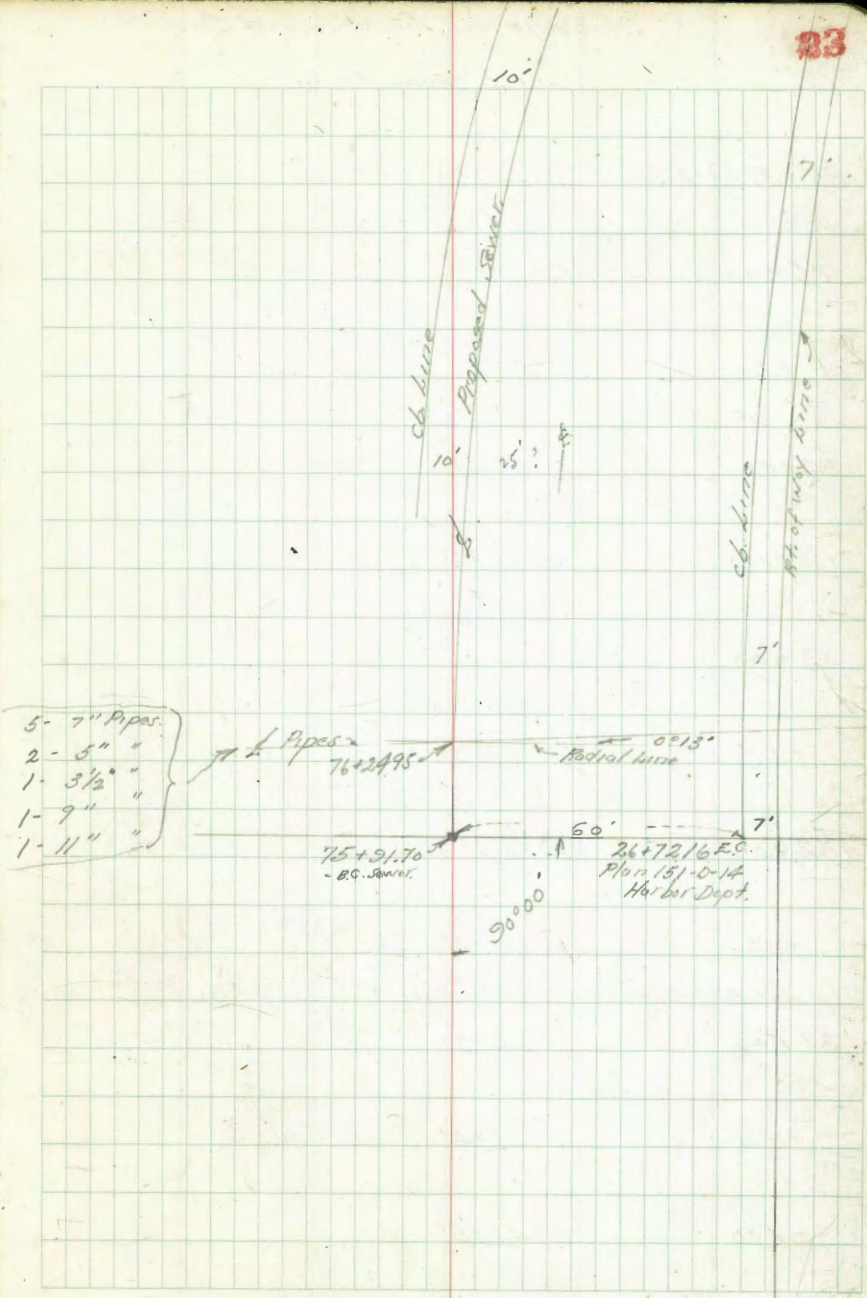
Proposed Sewer
Location P-14-21

69+26.51
 $\Delta = 0^{\circ}31'30''$ Lt.

Change in location 60" Sewer.

Cont. from P. 22

+50	4° 59.46'	
79+00	4° 17.67'	
+50	3° 35.88'	Data of Proposed Sewer $\Delta = 26^\circ 21' 2.0''$
78+00	2° 54.09'	$R = 2056.54'$ $L = 945.99'$
+50	2° 12.30'	long chd. Meas. 937.70' S.T. 481.54'
77+00	1° 30.51'	
+50	0° 48.72'	
+24.95	Group of (Std. Oil Co.) intersections of 10 oil line pipes	
76+00	0° 06.93'	
	+91.70 = B.C.	
75+00		
74+00		



- 5- 7" Pipes
- 2- 5" "
- 1- 3 1/2" "
- 1- 9" "
- 1- 11" "

76+24.95

75+91.70
- B.C. Sewer

26+7216 F.S.
Plan 151-D-14
Harbor Dept.

+

Change in Location of Sewer.

Cont. from P-23

85+37.69 = E.S. 13° 10.68'

85+00 12° 39.15'

+50 11° 57.36'

84+00 11° 15.57'

+50 10° 33.78'

83+00 9° 51.99'

+50 9° 10.20'

82+00 8° 28.41'

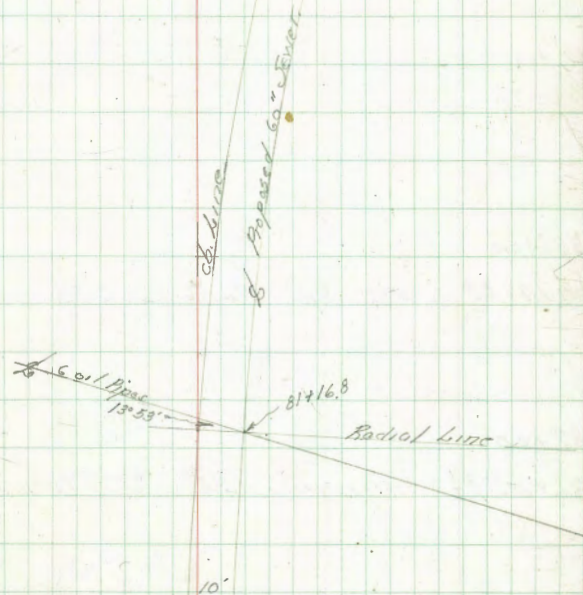
+50 7° 46.62'

+16.8 Intersection to 6 oil Pipes Richfield Oil Co.

81+00 7° 04.83'

+50 6° 23.04'

80+00 5° 41.25'



91+00

90+00

89+00

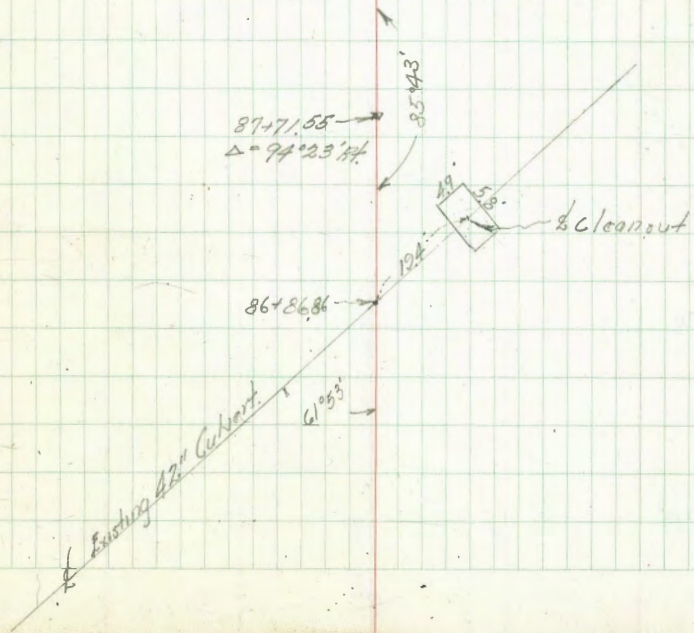
88+00

87+71.55 = Δ 94° 23' 37" = Intersection E. Simpson St.

87+00

86+86.86 = Intersection 42" Storm Drain.

86+00

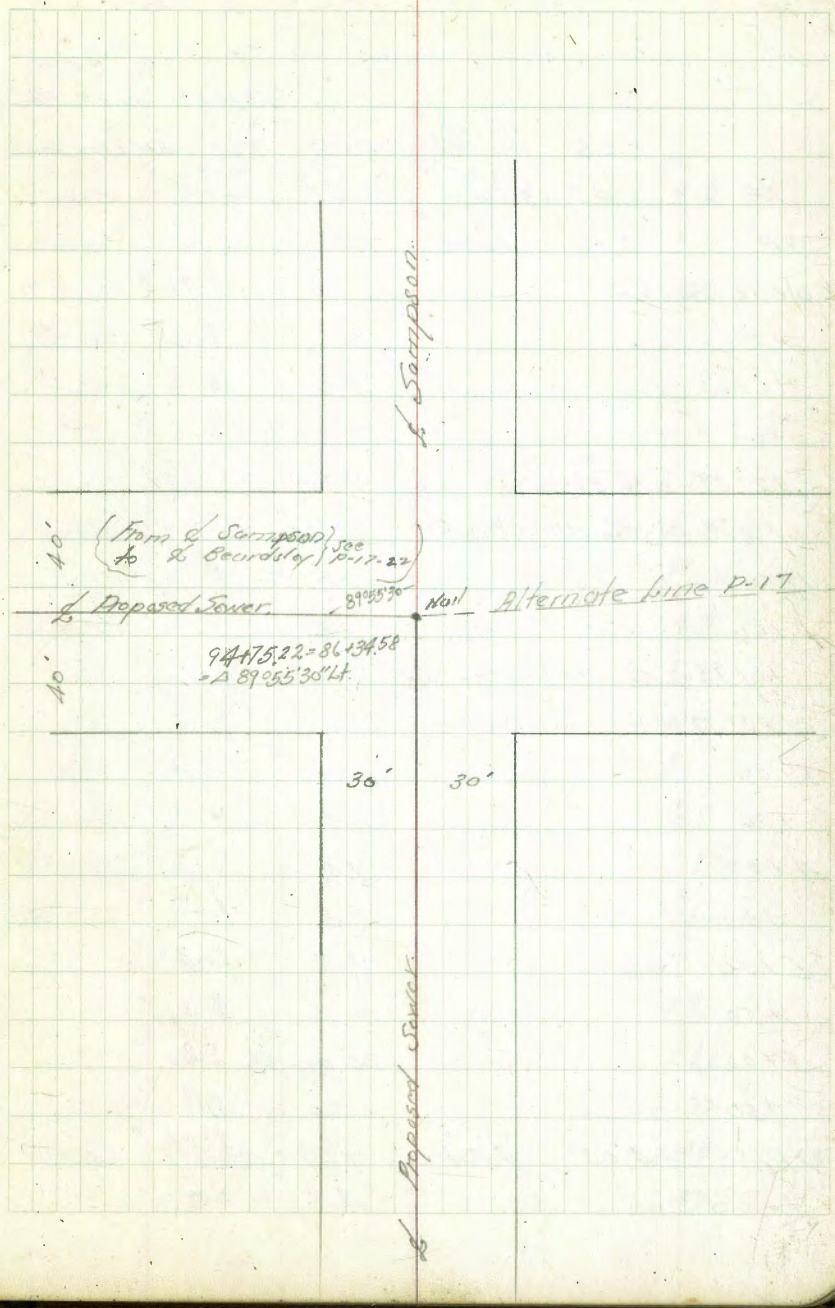


= Δ 89°55'30" Lt.
 94 + 75.22 = 86 + 34.58 Page 17 Equation

94 + 00

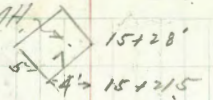
93 + 00

92 + 00



	11.96 ✓		
15+28 on Cor Box	10.08	1.88 ✓	
15+06 = 2-72" Culverts	12.36	-0.40	Flow line
15+44	12.04	1.92 ✓	
20' Lt. on Flow Culvert	12.96	-1.00	Flow line on W cb 32nd
15+40 84" 32nd	10.04	1.92 ✓	St. Ld. Plg.
+731 - W Gut. 32nd	10.12	1.84 ✓	
+731 - " top cb 32nd	9.58	2.40 ✓	
16+00	9.7	2.3 ✓	
+50	9.8	2.2 ✓	
17+00	9.9	2.1 ✓	
+50	10.2	1.8 ✓	
18+00	10.1	1.9 ✓	
+15	9.9	2.1 ✓	
8' Rt. on top Bank	3.2	8.8 ✓	
18+33	5.2	6.8 ✓	
10' Rt.	3.6	8.4 ✓	
4' Rt.	3.6	8.4 ✓	
7' Lt.	10.3	1.7 ✓	
20' Lt.	10.5	1.5 ✓	
18+50	5.8	6.2 ✓	
4' Rt.	3.6	8.4 ✓	
10' Rt.	3.6	8.4 ✓	
8' Lt.	10.1	1.9 ✓	
20' Lt.	10.2	1.8 ✓	
19+00	7.6	4.4 ✓	
7' Rt.	3.7	8.3 ✓	
20' Rt.	3.7	8.3 ✓	

28

Gas. MH. 

(19+00) 5' Lt.	10.3	1.7 ✓	
" 20' Lt.	10.3	1.7 ✓	
T.P.	10.2	6.35	8.22 ✓ 5.33
19+50	5.7	3.5 ✓	
3' Lt.	7.3	1.9 ✓	
20' Lt.	7.3	1.9 ✓	
8' Rt.	17	7.5 ✓	
25' Rt.	1.5	7.7 ✓	
20+00 toe slope	6.9	2.3 ✓	
10' Rt.	1.8	7.4 ✓	
20' Rt.	1.8	7.4 ✓	
30' Lt.	6.9	2.3 ✓	
20+40	7.1	2.1 ✓	
+80	4.1	5.1 ✓	
21+00	7.0	2.2 ✓	
+55.25 - Δ 37°17' Rt.	7.03	2.21 ✓	
+90 - South edge Conc. Terrain d.	7.09	2.15 ✓	
22+98.1 - N " " "	7.13	2.11 ✓	
T.P.	4.52	3.86	6.75 ✓ 2.23 ✓ -0.66
23+23.4 - South end Head ball st.	5.10	1.65	Conc.
143.8 - N " " "	5.09	1.66	"

23+92		3.86 6.75 ✓	4.7	2.0 ✓
24+00			3.5	3.2 ✓
+13			1.8	4.9 ✓
24+38.6 = Southedge Blvd.			1.8	4.9 ✓
7688 - N " "			2.0	4.7 ✓
25+00			3.4	3.3 ✓
+50			4.0	2.7 ✓
26+00			4.9	1.8 ✓
+29.08 = Gage W/ Fuel			4.24	2.51 ✓
+50			5.0	1.7 ✓
TP 6.93		10.85 ✓		3.92 ✓
26+95 = $\Delta 38^{\circ} 39' 30''$ Lt.		7.96	2.83	10.3 ✓
		13.54 ✓		7.48 ✓
TP 6.06		10.65	3.37	4.54 ✓
Gov. Hwy. Chk. starting BM			6.29	7.25 ✓
				4.36 7.29 start BM
				7.29
				4.40 BM
				0.04 Error
		13.58 ✓	7.29	
	6.29	10.69 Corrected	4.40 - BM	
TP	8.04	11.98 ✓	9.64	3.94 ✓
		9.59		1.55 ✓
27+50			6.6	5.4 ✓
28+00			6.2	5.8 ✓
+50			5.7	6.3 ✓
29+00			5.3	6.7 ✓
+50			5.0	7.0 ✓
30+00			5.2	6.8 ✓
+50			5.5	6.5 ✓
31+00			5.7	6.3 ✓
+50			6.2	5.8 ✓

31+86.40 = $\Delta 11^{\circ} 56' 30''$ Lt		9.59 11.98 ✓	6.40	5.58 ✓
32+00			6.7	5.3 ✓
+50			7.7	4.3 ✓
+85			10.0	2.0 ✓
TP 2.34		4.61 ✓	9.71	2.27 ✓
		4.72		0.62 ✓
32+92 in channel			7.6	-3.0 ✓
33+00			8.5	-3.9 ✓
+65			9.4	-4.8 ✓
+75			12.7	-8.1 ✓
34+00			13.3	-8.7 ✓
+20			10.0	-5.4 ✓
+50			8.9	-4.3 ✓
35+00			8.6	-4.0 ✓
+50			8.8	-4.2 ✓
36+25			8.3	-3.7 ✓
+32			5.0	-0.4 ✓
36+72.80		Equation	3.56	+1.05 Stake
$782.80 = \Delta$ Lt. $14^{\circ} 41' 05''$				
37+00			3.3	1.3 ✓
+50			2.4	2.2 ✓
38+00			2.7	1.9 ✓
+50			2.2	2.4 ✓
39+00			2.8	1.8 ✓
+50			2.9	1.7 ✓
40+00			3.5	1.1 ✓
TP 6.18		7.77	3.02	1.59 ✓
+50			6.4	1.4 ✓

41+00		6.4	1.4 ✓
750		5.8	2.0 ✓
42+00		6.0	1.8 ✓
+39.95 = Δ 13° 09' 30" Rt		5.59	2.18 ✓
43+13.09 on C.T. on S.cb.		4.59	3.18 ✓ <small>USCGS. 12.30 Harbor 0.11 diff</small>
43+00		5.1	2.7 ✓
44+00		5.1	2.7 ✓
750		5.0	2.8 ✓
45+00		5.1	2.7 ✓
750		5.2	2.6 ✓
46+00		5.2	2.6 ✓
750		5.2	2.6 ✓
47+00		5.3	2.5 ✓
750		5.3	2.5 ✓
48+00		5.6	2.2 ✓
T.P. 4.22	6.64	5.35	2.42 ✓
25' Lt. on cb.		4.22	2.42 ✓
49+00		4.9	1.7 ✓
25' Lt. on cb.		4.27	2.37 ✓
50+00		4.6	2.0 ✓
25' Lt. on cb.		4.05	2.59 ✓
51+00		4.6	2.0 ✓
25' Lt. on cb.		3.88	2.76 ✓
52+00		4.4	2.2 ✓
25' Lt. on cb.		3.79	2.85 ✓

52+90 = Δ 11° 01' 30" Lt.	4.63	2.01 ✓
30.3 Lt. on cb.	4.00	2.64 ✓
53+80 opposite B.C. Return ^{on South}	4.8	1.8 ✓
22.3 Lt. on BC "	4.17	2.47 ✓
54+00	4.9	1.7 ✓
56.24 on Box 38.2 Rt ^{downout}	5.73	0.91 ✓
" " Flow " "	11.43 ^{5.70}	-4.79 ✓ 4-10' Culvert
Ch. S.V. Top Hyd. 28th Harbor	2.17	+4.47 ✓
		9.01
		13.48
		USCGS = 13.58 Harbor
		0.10 diff.
55+74 opposite B.C. on South ^{cb. Return}	4.7	1.9 ✓
21' Lt. on cb. " " "	3.92	2.72 ✓
56+00	4.5	2.1 ✓
22.2 Lt. on cb.	3.80	2.84 ✓
56+65 = Δ 12° 44' 45" Lt.	4.48	2.16 ✓
T.P. 6.61	8.77	4.48 2.16 ✓
57+00	6.3	2.5 ✓
23.6 Lt. on cb.	5.41	3.36 ✓
58+00	5.8	3.0 ✓
16.7 on cb.	4.84	3.93 ✓
T.P. on North ^{3.61}	7.65	4.73 ✓ ^{See P. 38 → 4.04}
Ch. B.M. #9 Harbor	2.67	4.98 ✓
		19.01
		13.99
		14.11 Harbor
		0.12 difference

59+00			4.2	3.4 ✓
15.6' Lt. on cb.			3.27	4.38 ✓
60+00			3.7	3.9 ✓
+55.90 = A 5' 2.5' Lt.			3.90	3.7 ✓
T.P.	5.10	8.85	3.90	3.75 ✓ <small>on Above</small>
60+75 opp P.C. Ret.			5.1	3.7 ✓
25' Lt. on cb. Ret.			4.17	4.68 ✓
61+00			5.2	3.6 ✓
25.2' Lt. on cb.			4.20	4.65 ✓
62+00			5.2	3.6 ✓
26' Lt. on cb.			4.22	4.63 ✓
63+00			5.0	3.8 ✓
27.2' Lt. on cb.			4.02	4.83 ✓
64+00			4.7	4.1 ✓
65+00			4.0	4.8 ✓
25.9' Lt. on cb.			3.34	5.51 ✓
66+00			3.9	4.9 ✓
17.7' Lt. on cb.			2.93	5.92 ✓
67+00			3.4	5.4 ✓
10.1' Lt. on cb.			2.57	6.28 ✓
T.P.	5.13	10.68	3.30	5.55 ✓
68+00			5.0	5.7 ✓
8.6' Lt. on cb.			4.19	6.49 ✓
69+00			5.0	5.7 ✓
9.7' Lt. " "			4.39	6.31 ✓

Levels on changed line 9/20

69+26.5' = A 0° 31' 36" Lt.			5.10	5.58 ✓
10' Lt. on cb.			4.45	6.23 ✓
70+00			5.0	5.7 ✓
10' Lt. on cb.			4.36	6.32 ✓
71+00			4.9	5.8 ✓
10' Lt.			4.19	6.49 ✓
72+00			4.8	5.9 ✓
10' Lt. on cb.			3.95	6.73 ✓
73+00			4.6	6.1 ✓
10' Lt. on cb.			3.73	6.95 ✓
74+00			4.6	6.1 No cb on Lt.
75+00			4.5	6.2 No " "
T.P.	4.94	11.37	4.25	6.43 ✓
75+91.70 = B.C. 10' on Stake			4.46	6.91 ✓
76+24.85 = E. 8' oil Pipes.			5.82	5.55 ✓
48' Lt. Bottom Pipes. Std. oil Co.			9.94	1.43 ✓
77+00			4.4	7.0 ✓
78+00			4.4	7.0 ✓
79+04.5 = Beginning of cb. on South.			5.2	6.2 ✓
10' Lt. on cb.			4.67	6.70 ✓
80+00			5.3	6.1 ✓
10' Lt. on cb.			4.90	6.47 ✓
81+00			5.6	5.8 ✓
10' Lt. on cb.			5.03	6.34 ✓

82+00			5.7	5.7 ✓
10' Lt. on cb.				
(81+16.8)	Richfield oil Co.	90' Lt. Bottom oil Pipes	9.7	1.7 ✓
"	"	90' Lt. top " "	8.47	2.90 ✓
"	"	75' Lt. Bottom oil Pipes	8.59	2.78 ✓
"	"	95' Lt. top " "	7.32	4.05 ✓
chk. 81+ top Hyd 81+00			2.74	8.63 ✓ 9.01 17.64 17.50 - Harbor 0.16 d.f.f.
82+00 Williams Base Line				
chk. 81+ Pipe 17' Man.			3.74	7.63 ✓ 9.01 16.64 16.82 - Harbor 0.18 d.f.f.
83+00			5.7	5.7 ✓
10' Lt. on cb.			4.63	6.74 ✓
J.R.	4.17	11.11	4.43	6.94 ✓
84+00			4.9	6.2 ✓
10' Lt. on cb.			4.07	7.04 ✓
85+00			5.2	5.9 ✓
10' Lt. on cb.			4.33	6.78 ✓
85+37.69 - F.C.			5.18	5.93 ✓
10' Lt. on cb. West end.			4.42	6.69 ✓
86+00			4.9	6.2 ✓
87+00			5.8	5.3 ✓
(86+86.86)	19.4' Lt. on top Box		5.81	5.30 ✓ 7.54 3.57
"	19.4 on float level	42" cutout	13.35 - Floor	-2.24 ✓

87+30			1.3	4.8 ✓
87+71.55 - Δ 94° 23' Rt.			7.49	3.62 ✓ on strike
88+00			5.9	5.2 ✓
89+02.10 - South Rail A.T.H.S.F.R.R.			2.49	8.62 ✓
chk. Williams Base Line Man #9			3.05	8.06 ✓ 9.01 17.07 17.163 - Harbor 0.095 d.f.f.
Pipe 17' Man to side Simpson st.				
N.E. Cor. S.D. Marine Const. Co. lease				
H of Simpson st.				
89+09.1 - South end Parking.			2.56	8.55 ✓
89+16.2 - 2 - 12" Conc. Culverts			2.50	8.61 on Parking
20' Lt. on float Culvert			6.00	5.1 ✓
20' Rt. " " "			6.58	4.53 ✓
T.P. 11.55		20.48	2.18	8.93 ✓
90+00 on Parking.			10.43	10.05 ✓
91+00 " "			9.12	11.36 ✓
92+00 " "			6.80	13.68 ✓
93+00 " "			4.22	16.26 ✓
94+00 " "			1.50	18.98 ✓
94+75.22 = Δ 89° 55' 30" Lt.			0.00	20.48 Equat 1017
= 86+84.58				Location P-17-21
T.P. 5.00		24.82	0.66	19.82 ✓
chk. S.E. top Hyd. Colton			2.30	22.52 ✓ 9.01 31.53 31.58 - Harbor #25 0.05 d.f.f.
86+84.58 - W.Gut.			4.54	20.28 ✓
164.58 - W.L. Simpson			4.33	20.49 ✓ Wedge Pov.

2482 ✓

87+00			4.4	20.4	✓
88+00			4.8	20.0	✓
89+00			5.0	19.8	✓
90+00			5.3	19.5	✓
91+00			5.4	19.4	✓
92+00			5.9	18.9	✓
chk. NE Top Hydt.			3.55	21.27	✓
Evans + Colters				9.01	
				36.28	
				30.345 - Harbor #29	
				.065	
TP	170	2297	355	21.27	✓
92+9540 on POT. Sub.			4.10	18.87	✓
94+00			5.0	18.0	✓
95+00			5.7	17.3	✓
96+00			5.6	17.4	✓
97+00			6.1	16.9	✓
98+00			5.7	17.3	✓
99+00			6.3	16.7	✓
chk. NE Top Hydt.			2.61	20.36	✓
Darney + Colters				9.01	
				29.37	
				29.405 - Harbor #33	
				.035 diff.	
99+5540 on West					
TP	3.65	19.93	6.69	16.28	✓
100+00			4.3	15.6	✓
101+00			4.9	15.0	✓
102+00			5.4	14.5	✓

1993 ✓

33

103+00			5.3	14.6	✓
104+00			4.8	15.1	✓
105+00			4.7	15.2	✓
+86.82 = EL Crosby Quarry			5.67	14.26	✓
+96.82 = E. ch. " "			5.73	14.20	✓
106+1682 = % " "			5.46	14.47	✓
+36.82 = W. ch. " "			5.77	14.16	✓
+46.82 = W. " "			5.82	14.11	✓
chk. NE Top Hydt.			2.71	17.22	✓
Crosby + Colters				9.01	
				26.23	
				26.265 - Harbor #36	
chk. US. Gov. B.M. 15'E Crosby			2.27	17.66	✓
38'S. 500' RR Ticks				9.01	
Mark 959 - 1926				26.67	
				26.69 = Gov. Elms	
				.02 diff.	
				26.715 = Harbor #37	
				.045 diff.	
TP	174	18.96	2.71	17.22	Above Elm St.
107+00			4.0	15.0	✓
108+00			3.7	15.3	✓
109+00			5.3	13.7	✓
110+00			5.9	13.1	✓
111+00			6.5	12.5	✓
112+00			7.0	12.0	✓
110			7.3	11.7	✓
+177.35 = % Beardsley St.			6.45	12.51	on slope
Cont. P-34					

18.96

boards
chb. sta Top Hydt. + Coltan.

4.57

14.39

9.01

23.40

23.415 - Harbor ^{8.11} + 45

0.015 = diff.

Note: 26+95 to 89+00 = Hydraulic Fill (Cap Material)

2-1-41 Preliminary Levels for 60" Interceptor Sewer.

Milker
Bliss
Jobell

from Colton & Harbor Drive
to S. Sampson St.

Location P. 14-17

$\Delta 43^{\circ} 24' \text{ RT}$
69+26.51 10.93 16.51 ✓

+50 10.7 5.8 ✓

70+00 11.0 5.5 ✓

+38.0' = POT. Nail 10.39 6.12 ✓

70+70 11.1 5.4 ✓

70+94.7 = South Rail AT&SF 8.49 8.02 ✓

71+00 9.0 7.5 ✓

+12 10.1 6.4 ✓

+20 8.6 7.9 ✓

+50 8.0 8.5 ✓

+70 2.2 14.3 ✓

TR 9.05 25.31 0.25 16.26 ✓

71+75 4.4 20.9 ✓

72+00 4.3 21.0 ✓

+50 4.3 21.0 ✓

+81.8 on edge Paving Concrete 4.57 20.74 ✓

+92 4 Conc. Pav. = Gut 5.30 20.01 ✓

73+00 " " 4.95 20.36 ✓

+12.5' = $\Delta 12^{\circ} 08' \text{ Lt}$ 4.72 20.59 ✓ Cross in Paving S. Schley St

+22.5' 4.80 20.51 ✓

+32.5' 5.15 20.16 ✓

+42.5' = W.L. Schley on Pav 4.74 20.57 ✓

74+00 4.9 20.4 ✓

20' Lt. on Asphalt Pav 5.00 20.31 ✓

8M on E. Stake
69+26.51
P. 14-17

~~1607~~
14

25.31

2/3/41
m
85

75+00 5.1 20.2 ✓

20' Lt. on Paving 5.30 20.01 ✓

76+00 5.4 19.9 ✓

20' Lt. " " 5.64 19.67 ✓

77+00 5.9 19.4 ✓

20' " " " 6.00 19.31 ✓

78+00 5.8 19.5 ✓

20' " " " 6.33 18.98 ✓

TR 5.21 24.85 5.67 19.64 ✓

79+00 5.3 19.5 ✓

20' Lt. on Pav. 6.15 18.70 ✓

79+74.55 = $\Delta 1^{\circ} 44' 10" \text{ Lt}$ 5.74 19.11 ✓

20' Lt. on Paving 6.25 18.60 ✓

+84 5.7 19.1 ✓

Lt. on Pav. 6.27 18.58 ✓

80+00 5.7 19.1 ✓

81+00 6.1 18.7 ✓

82+00 5.3 19.5 ✓

83+00 4.7 20.1 ✓

84+00 4.3 20.5 ✓

+90.38 on S. Rail Spar 4.42 20.43 ✓

85+00 4.5 20.3 ✓

86+00 4.2 20.6 ✓

+04.6 = E. edge Conc Pav 4.19 20.66 ✓

+14.6 Gut. Conc. Pav. 4.55 20.30 ✓

+34.58 = $\Delta 1^{\circ} 44' 10" \text{ RT}$ 4.31 20.54 ✓

chk. 55 top Hydt. Sampson & Colton
Page 32

Cont P. 32-34

22.53 ✓
22.52
a.o.f. Error.

Levels to Determine Elev. of Track
and flow line of Chollas Creek Under
S.D. & A. & Santa Fe R.R. Bridges

	1.23	6.81	3.58	Elev. Sta. 6 A. 31751 20
32+58 ²⁶	S. Top Rail / S.F.	3.36	3.45	✓
	on Ground	9.2	- 2.4	✓
33+00	S. Top Rail	3.5	+ 3.3	✓
	Ground	11.8	- 5.0	✓
+38	Top Rail	3.7	+ 3.1	✓
	Ground	12.0	- 5.2	✓
+58	Top Rail	3.7	+ 3.1	✓
	Ground	15.5	- 8.7	✓
+90	Top Rail	3.9	+ 2.9	✓
	Ground	16.4	- 9.6	✓
34+00	Top Rail	3.9	+ 2.9	✓
	Ground	14.0	- 7.2	✓
+45	Top Rail	4.1	+ 2.7	✓
	Ground	10.8	- 4.0	✓
35+00	Top Rail	4.3	+ 2.5	✓
	Ground	10.9	- 4.1	✓
+52 ^E	W. end Bridge Top Rail	4.6	+ 2.2	✓
	Ground	10.7	- 3.9	✓
	S.D. & A. Bridge			
32+49	East End of Bridge Top Rail	3.20	+ 3.6	✓
+	on Ground	10.4	- 3.6	✓
+70	" "	11.2	- 4.4	✓

7
6.81

36

32+80	on Ground	15.7	- 8.9
33+00	" "	15.7	- 8.9
+36	" "	16.7	- 9.9
+53	Top Rail / Wind Bridge	3.90	+ 3.4
+53	Ground " " "	13.7	- 6.9
		+	

A table with 6 columns and 20 rows. The columns are defined by vertical red lines, and the rows are defined by horizontal blue lines. The table is currently empty.

A table with 10 columns and 20 rows. The columns are defined by vertical green lines, and the rows are defined by horizontal blue lines. The table is currently empty.

Check Levels - 60" Interceptor Sewer

BENCH MARKS - Harbor Drive

Walker
Bliss
15 ball Rod
3-31-41
from 32ND ST.
to Beardsley

Mean Elev of B.M.	11.650	13.735	2.145	Elev. Copper Disk Grid 128-26
			5.153	8.642 B.M. =
TR	3.410	10.025	7.180	6.615
			5.770	4.255 B.M. =
TR	2.940	9.985	2.980	7.045
			5.840	4.145 B.M. =
TR	6.42	6.860	2.545	0.440 B.M. =
chk			3.57	3.190 = Elev. Cop tack 3.180 = P-30 Elev.
				B.M.
TR	3.990	7.175	3.185	= Mean Elev
TR	4.430	6.965	4.700	2.475
chk. B.M. Harbor P-30			2.885	4.080
			P-30 = 4.040	0.94 Error.
chk B.M. #9 Harbor			1.950	5.015 ok see below 49 4.980 = P-30 0.035 = Error
Re run levels from ct in cb 43+13.09 to 28th				
			3.700	6.885
			3.185	Above ct. 43+13.09
TR	4.310	7.065	4.130	2.755
chk. Nail in Board			4.580	4.485
chk. B.M. #9			2.050	5.015
chk Conc. Man.			2.990	4.075
				4.080 = Above 0.005 Error.

Cont P-39

Copper Disk 13.57' North of 15+36.96 - Station Harbor Drive
Copper tack Conc. Man on N.W. Harbor Dr 11+41.82 = F.C.

over tack (Not on tack)
Conc Man. Bay Front + Harbor on East. <sup>2.04' from
line</sup>

Copper Disk Conc. Man. on N.W. Harbor ^{0.100}
= Bridge Spike, West end Santa Fe Bridge <sup>Mk'd Use N. B.M.
Elev. 2.42</sup>

in cb 43+13.09, Page 30 on s cb.

ct. 43+13.09 (Use this) on s cb.

Nail in Board Near South cb 51+00

Conc. Man. W. 1/2's Base Line 25' E. E.L. 28th <sup>Set Santa Fe
+ 5017</sup>

Note: Line levels between 43+13.09 & 28th as run
on P-30 are in error by 0.035.

25' E. E.L. 28th

Check Levels
Bench Marks
cont. from P-38

B.Ms.
Mean Elev

	3.00	8.015		5.015	
T.P.	2.32	9.505	0.830	7.185	
T.P.	8.77	17.400	0.875	8.630	
T.P.	11.680	25.180	3.900	13.500	
chk.		4.570	20.610	20.617	
			20.625		
		3.08	22.10	?	
T.P.	4.35	23.80	5.73	19.45	
T.P.	4.48	24.93	3.35	20.45	
T.P.	2.11				
chk. SE Top Hyd	24.68	2.36	22.57	22.565	
T.P.	2.11	23.42	3.37	21.31	21.31
T.P.	2.94	22.09	4.27	19.15	
		1.71	20.38	20.39	
chk. USCG B.M.	4.41	17.68		17.69	
Crosby & Colton			17.695		

Walker
Isbell
Easton
5-23-41

BENCH MARKS from CROSBY &
To INDIAN & F - streets

	3.74	21.43		17.69	B.M. #1
T.P. #1	4.04	19.82	5.65	15.78	
T.P. #2	7.02	20.29	6.55	13.27	B.M. #2
T.P. #3	0.53	15.75	5.07	15.22	
T.P. #4	5.29	12.19	8.85	6.90	B.M. #3
T.P. #5	3.23	8.19	7.23	4.96	RR Spike
T.P. #6	4.78	7.06	5.91	2.28	B.M. #4

Cont. P-43

Note: All check levels West of 28th to
Beardsley should be 0.035 higher than Prelim
Levels P-35

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B.M. Spike in Pole 3' E of W.M. Base Mon. 28th St
top Fire Hyd. South Side Harbor Drive First Hyd. W of 28th
Top Fire Hyd. South side Harbor & Colton
→ This B.M. Hyd. has been moved since
These levels were taken
Cross in P.W. 73+12.51 P-35 F.B. 1673-45

SW Top Hyd. Schley & Colton.
SE Top Hyd. Sicard " "
SE Top Hyd. Sicard " "
SE Top Hyd. STAMPSON & Colton.
NE Top Hyd. EVANS " "
NE Top " Dorsey " "
NE Top Hyd. Dorsey " "

COLTON

Crosby & Colton

Sketch P-45
Cork. Mon. 17' E of NW Beardsley and 20' N.N.W. Colton
20' N.N.W. Colton on E line Sigbee.
Copper Disk in Redwood Plug 2 1/2" Galv. Iron Pipe
on Galv. Cap 2" Iron Pipe
Near 16th

102

Change in Alignment of

60" Interceptor Sewer

Walker
Bliss
Isbell
4-12-41

in Harbor Drive
from Station 48+00 to 60+55.90

40

Station

52+00

51+00

50+00

49+00

48+00 $\Delta 2^{\circ}00' L$

original line
Page 9

48+00
 $\Delta 2^{\circ}00' L$

CHANGE IN ALIGNMENT
60" JENSEN
Cont from P. 40

Station

58+00

57+00

56+00

55+00

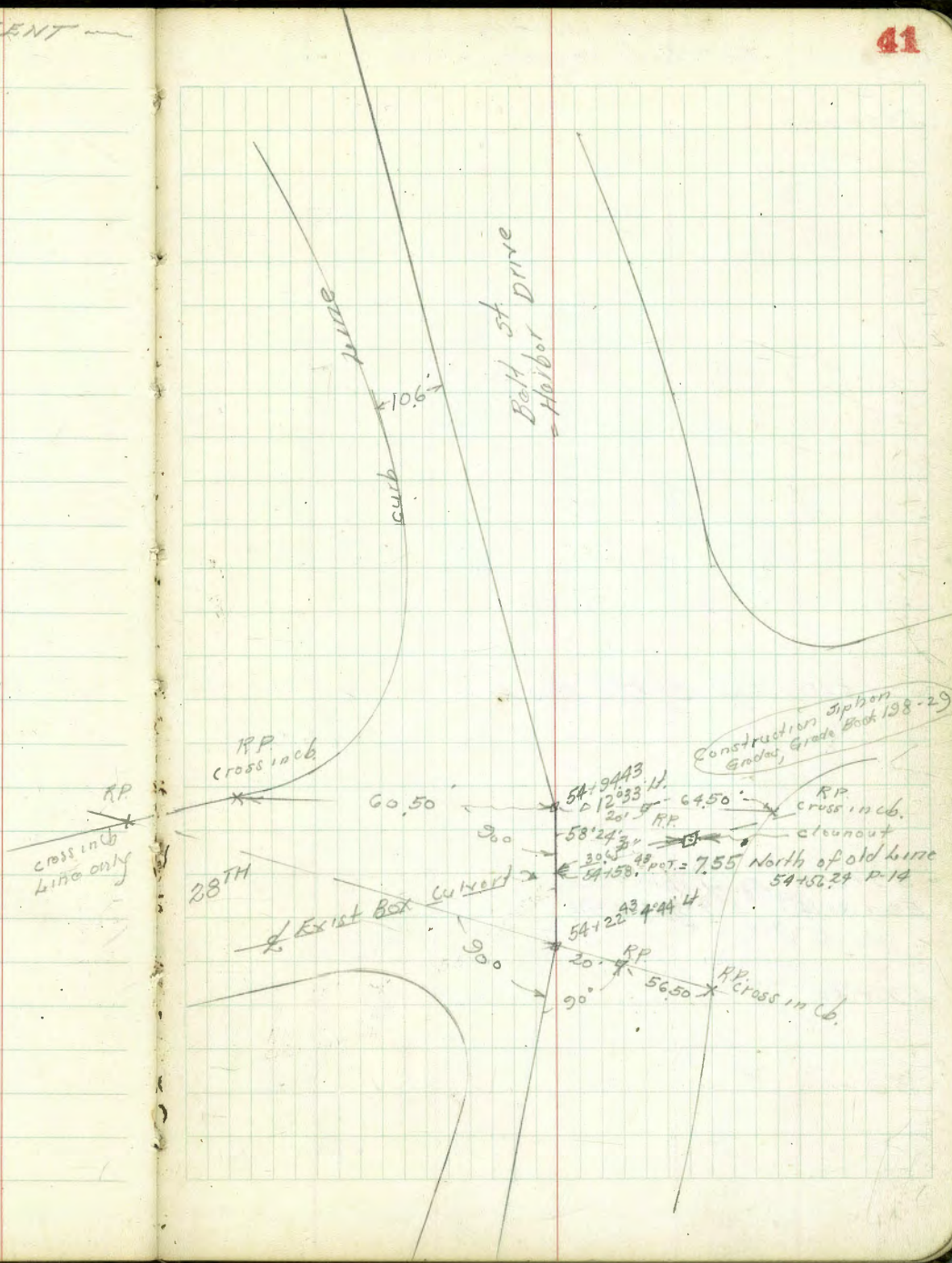
54+94.3 = 12°33' LT

54+58.43 Box Culvert

54+22.43 = 4°44' LT

54+00

53+00



Change in Alignment
60" Interceptor Line
Cont.

Station

60+55.20 Page 12 = P.O.T. this line

59+81.72 } Equation
59+80.14 } Δ 9°24'18" Lt.

59+50

59+00

60+55.90
= P.O.T.

74.18

59+81.72 } Equation
59+80.14 } Δ 9°24'20" Lt.
Construction notes
Srd Book 138-20

BENCH MARKS -
Cont. from P. 39

		7.06			
TP #7	4.63	6.85	4.84	2.22	
TP #8	5.87	5.47	7.25	-0.40	BM #5
TP #9	4.20	6.01	3.66	1.81	
TP #10	5.66	7.61	4.06	1.95	
TP #11	4.91	7.25	5.27	2.34	BM #6
TP #12	5.07	7.39	4.93	2.32	
TP #13	2.36	6.82	2.93	4.46	BM #7
TP #14	0.97	5.81	1.98	4.84	BM #8
TP #15	5.21	6.80	4.22	1.59	
TP #16	1.93	6.71	2.02	4.78	BM #9
TP #17	3.58	6.65	3.64	3.07	Spike
TP #18	2.87	6.60	2.92	3.73	"
TP #19	4.79	6.98	4.41	2.19	BM #10
TP #20	3.45	6.45	3.98	3.00	Spike
TP #21	4.60	7.16	3.89	2.56	BM #11
TP #22	4.85	7.06	4.95	2.21	
TP #23	4.91	7.45	4.52	2.54	BM #12
TP #24	4.35	7.09	4.71	2.74	
TP #25	4.46	7.30	4.25	2.84	
TP #26	6.59	8.86	5.03	2.27	BM #13
TP #27	6.72	12.53	3.05	5.81	BM #14
TP #28	4.55	15.28	1.80	10.73	BM #15
TP #29	7.70	20.15	2.83	12.45	BM #16
TP #30	7.61	23.52	4.24	15.91	

Cont. P. 44

Small RR Spike SW. Cor. S.D. & A. Bridge Near Sta 201

RR

Spike

Iron Pipe Set in Conc. Base - P.I. SANTA FE 148+46
46+46

B. of S.D. & A.

Top Fire Hydr. E. side 7th St. And Santa Fe RR

Top " " " " 6+9 " " " "

Set South of Santa Fe RR. Approx Sta 47
Brass Plug SE. Cor. Conc. Platform Lyon Storage Co.
in Pole S.D.G. & Elec Pole #117 South of Santa Fe.

Set " " " " #120 " " " "

Brass Plug in Conc. Foundation S.E. Cor. Gynn Bld.

in Guy Pole on Lt. at Navy Field.

Set Brass Plug in cb. Approx 40 ft. 63+00

Fast Bolt in Conc. Base Loading Crane Western Lumber
15 ft 69+55 P-56

SW. Brass Plug Market & India.

SW. " " G - India

SE. Top Fire Hydr. F - "

SW. Brass Plug F - Columbia

Bench Marks Cont from P 43

23.52

7.54 15.98 BM#17

chk. U.S.G.S. BM

0.00 23.52 BM#18

+6.12

U.S.G.S. Datum = 2964.

0.00 = Error.

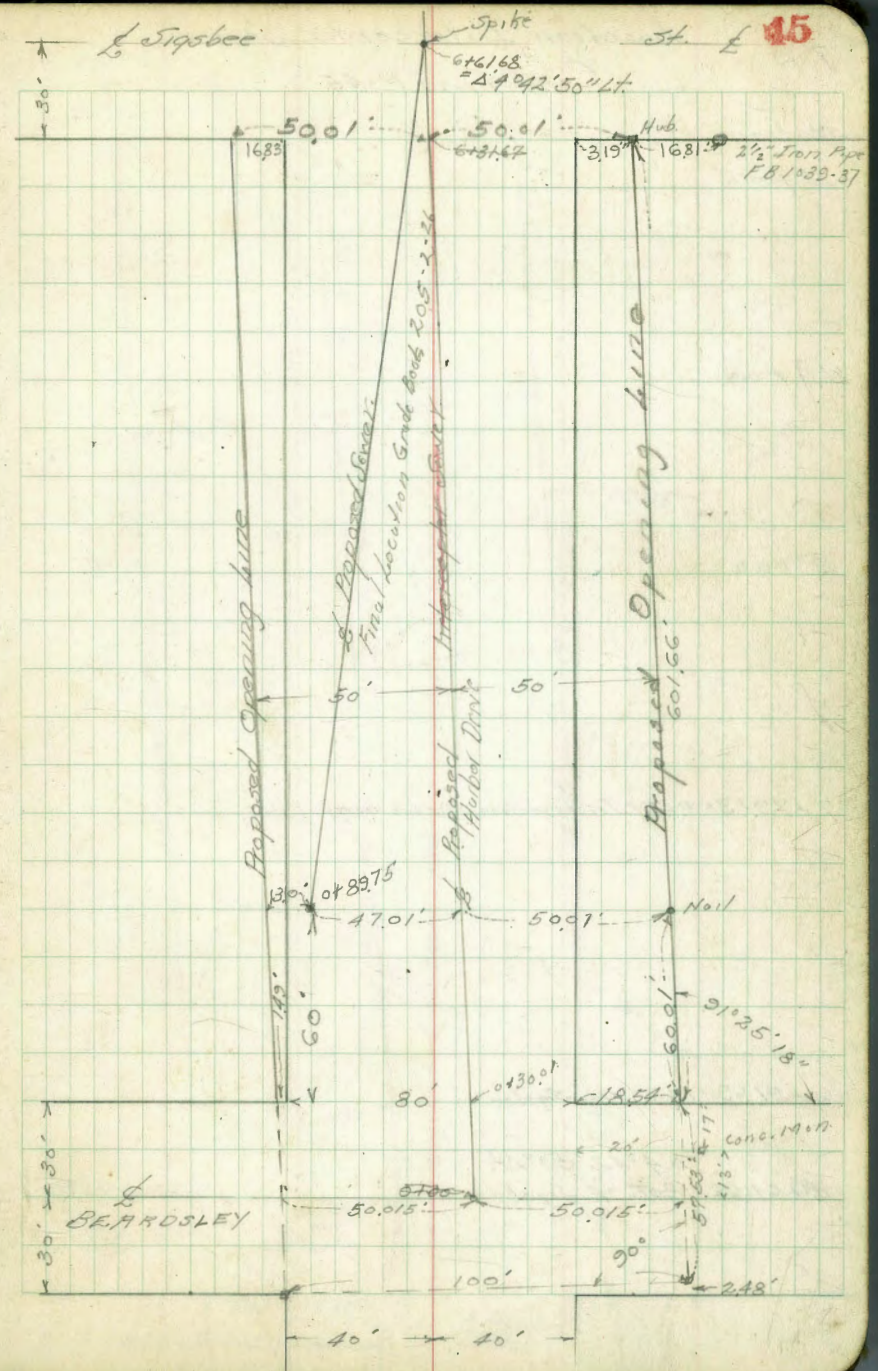
SW. Brass Plug F - State St.

NW. Cor. Federal Bld.

Walker
 Bliss 4.22-41
 Stations
 6+31.67 = P.P.T. E L Sigsbee St.

LOCATION PROPOSED INTERCEPTOR SEWER
 from BEARDSLEY STREET West
 To Pacific And Ash Streets.
 Δ 4'42"50" lit.
 Levels P-67-74
 Bench Marks P-39

5+00 " " P-43
 4+00
 3+00
 2+00
 1+00
 0+89.75 = A
 0+30.81 = P.P.T. = H.L. Beardsley St.
 0+100 = E Beardsley St.



Location Interceptor Sewer

Cont from P-45

Station

11+00

10+00

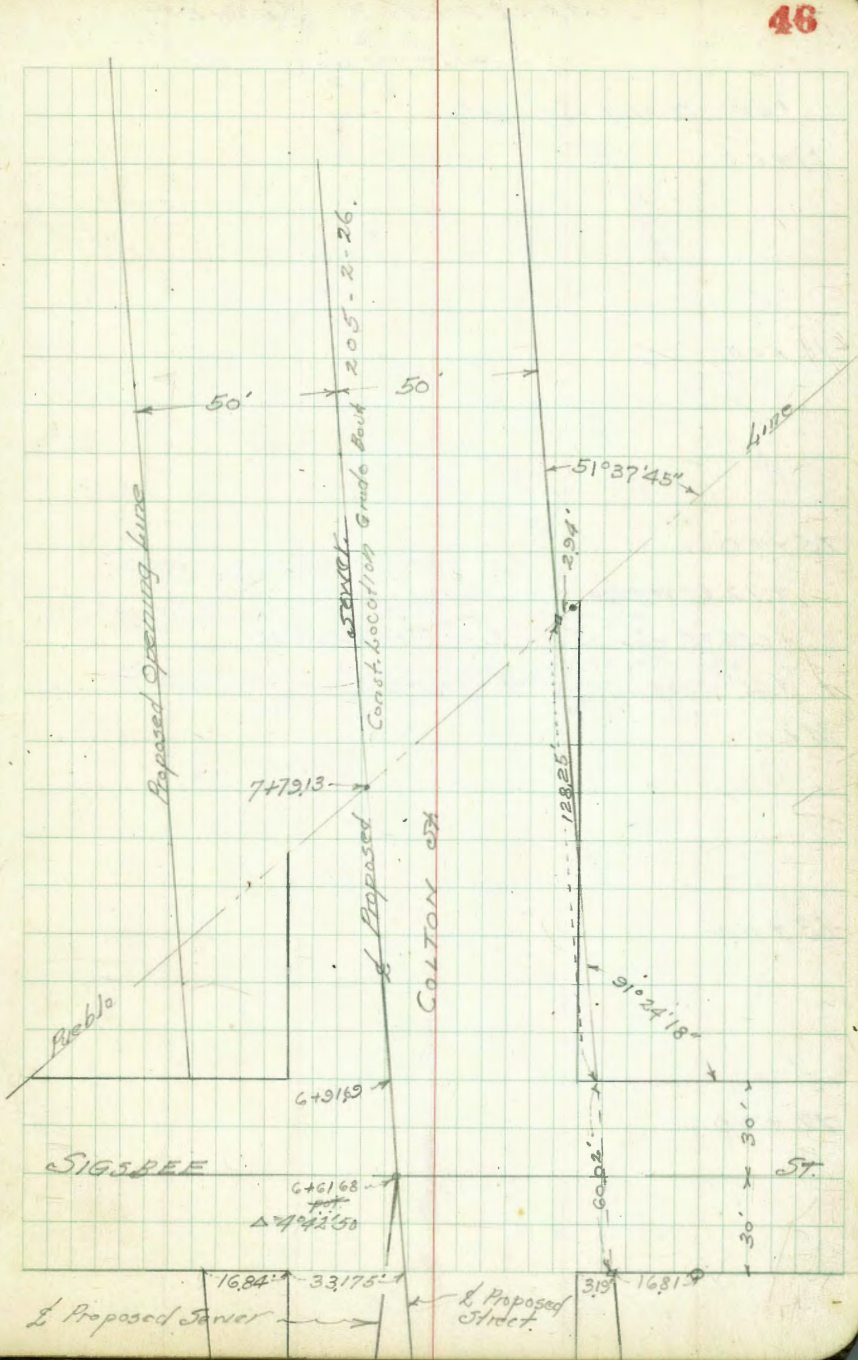
9+00

7+79.13 - P.O.T. - Intersection Pueblo line

6+91.69 - P.O.T. - W.H. Sigbee

$\Delta 4^{\circ}42'50''$ St.

6+61.68 - P.O.T. - E. Sigbee



INTERCEPTOR SEWER

Cont. from P 46

+35 = Head Slough.

17+00

16+00

15+00

+72.6 = W edge 5 oil lines

+64.6 = E edge 5 oil lines (on pier)

+35 = beginning slough proper

14+00

13+00

12+00

47

Rubbish Dump

Slough.

+ 910 ±
14+24

(under process of Removal)

UNION Oil Lines

14+62

New Location Pipes (Bottom Ditch = $\pm 1 = -1.8$)

14+52

S. Proposed Sewer

INTERCEPTOR SEWER

Cont. from P-47

22+99.97 = P.O.T. S.A.T. & S.F. RR.

22+00

21+00

20+44.43 = P.O.T. Spike

20+21.93 = Copper Disk Set in Bulkhead on N.W. St.

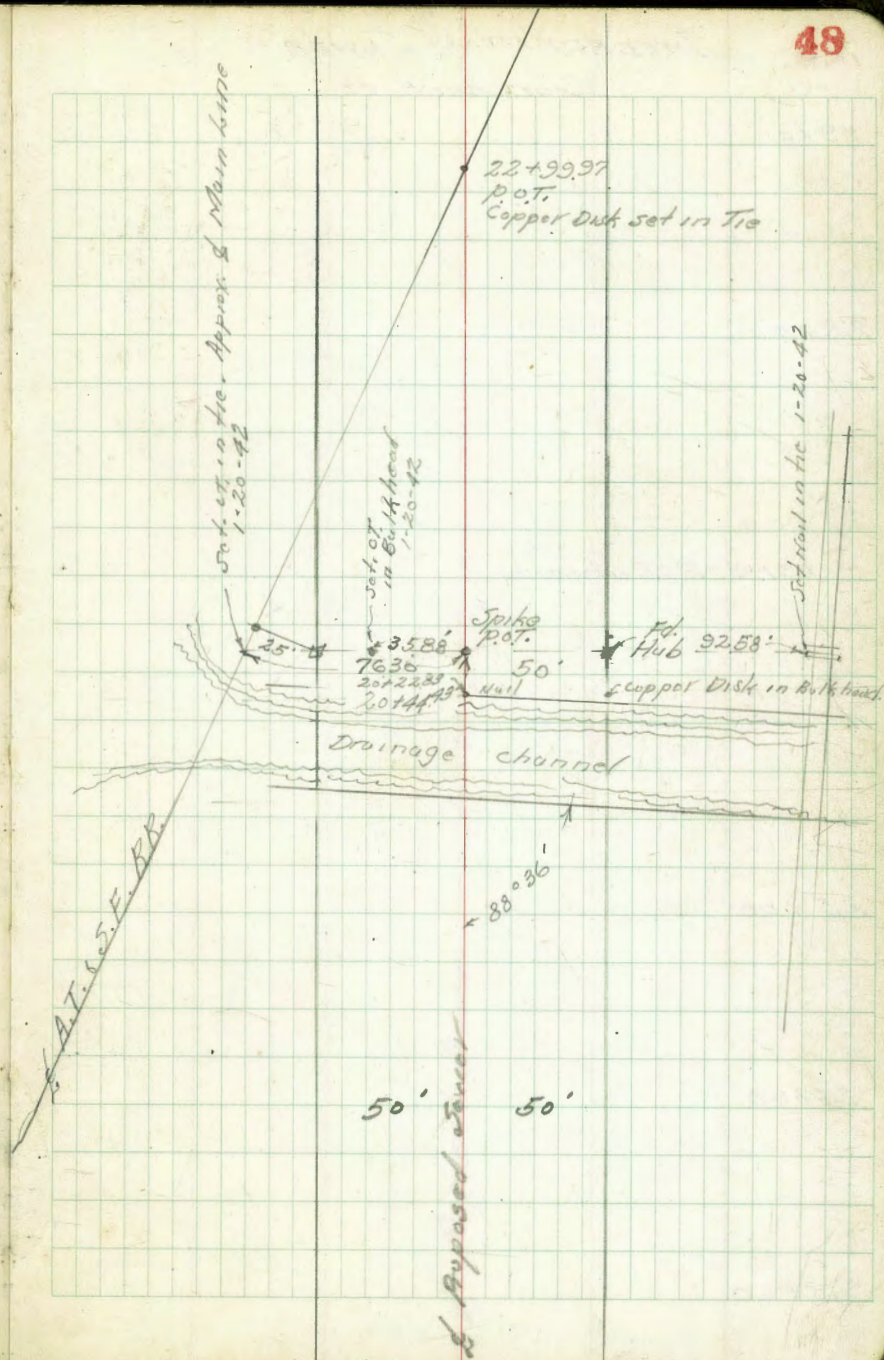
+21.24 = W. edge Drainage Channel

20+00

+80.24 = E. edge Drainage Channel

19+00

18+00



INTERCEPTOR SEWER

Cont. from P-48

29+00

28+00

27+00

+21.95 = P.O.T. Stake

26+00

25+00

24+00

23+00

□ 26+21.95
= P.O.T. Stake

Proposed Section

INTERCEPTOR SEWER
Cont from P. 50

Stations

41+00

40+00

39+00

38+06.24 = P.O.T. Hub

38+00

+20.8 = West edge Asphalt Pav.

37+00

36+98.3 = Intersection Existing 30" Conc. Pipe

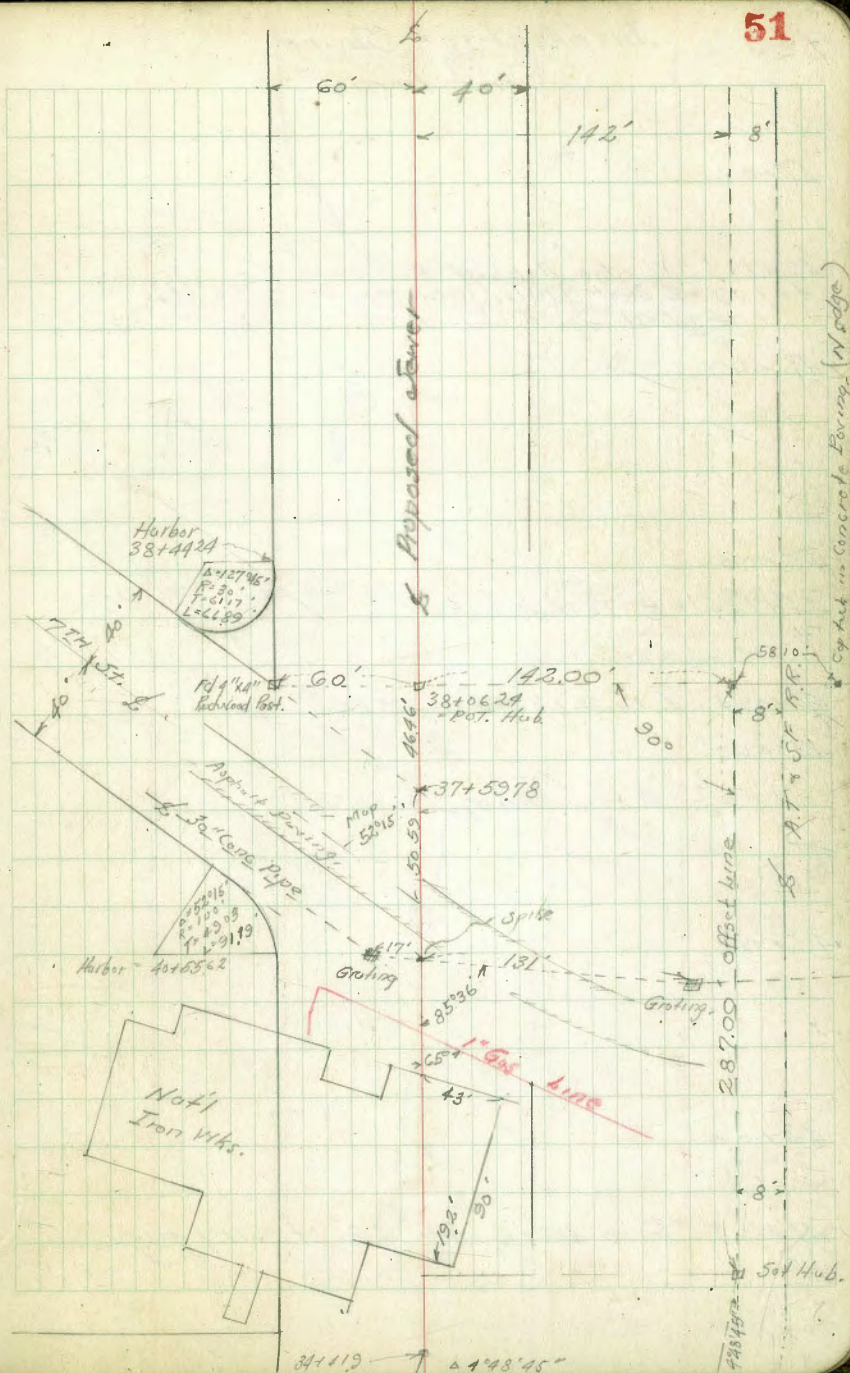
36+79.6 = Intersection East edge Asphalt Paving.

+62 = Intersection 1" Gas Line (Taken from Map)

36+35 = W. edge Nat'l Iron Works (2' Lt = 2 1/2" x 16" wood column)

35+38 = E edge Nat'l Iron Works.

51



INTERCEPTOR SEWER
Cont. from P. 52

Station

53+00

52+00 = P.O.T. Stake

51+00

50+00

49+00

48+00

53

← 60' → 40' →

4 52+00
P.O.T. Stake

Proposed Sewer

← 60' → 40' →

INTERCEPTOR SEWER

Cont. from P-53

Station

59+00

+68

58+00

+61.6 = East edge Gym Bld.

57+00

56+00

55+00

54+00

Harbor
18+08.30 E.C.

59+09.5 → 57.6'

41.9'

59+03.85
P.O.T.

Hand
Bull
ct.

+37.8 → 20.1' 61.9' →

Gym
Bld.

+38.3 → 61.9' →

← 60' → 40' →

Proposed Sewer

INTERCEPTOR JEWEL
Cont. from P-54

Station

66+02.2 = East edge Sawdust Hopper.

65+35 = Intersection 4" H.P. Gas

64+00

63+30 = Δ Lt. 17°47' Lt

63+01.3 = Int. Storm Drain Box = 12.5' Lt

+69.9 = W end Bld.

+37.4 = Jog in Bld.

+03.2 = E edge Bld.

62+00

61+04.7 = W. edge Bld.

60+68.72 = P.O.T. Hub

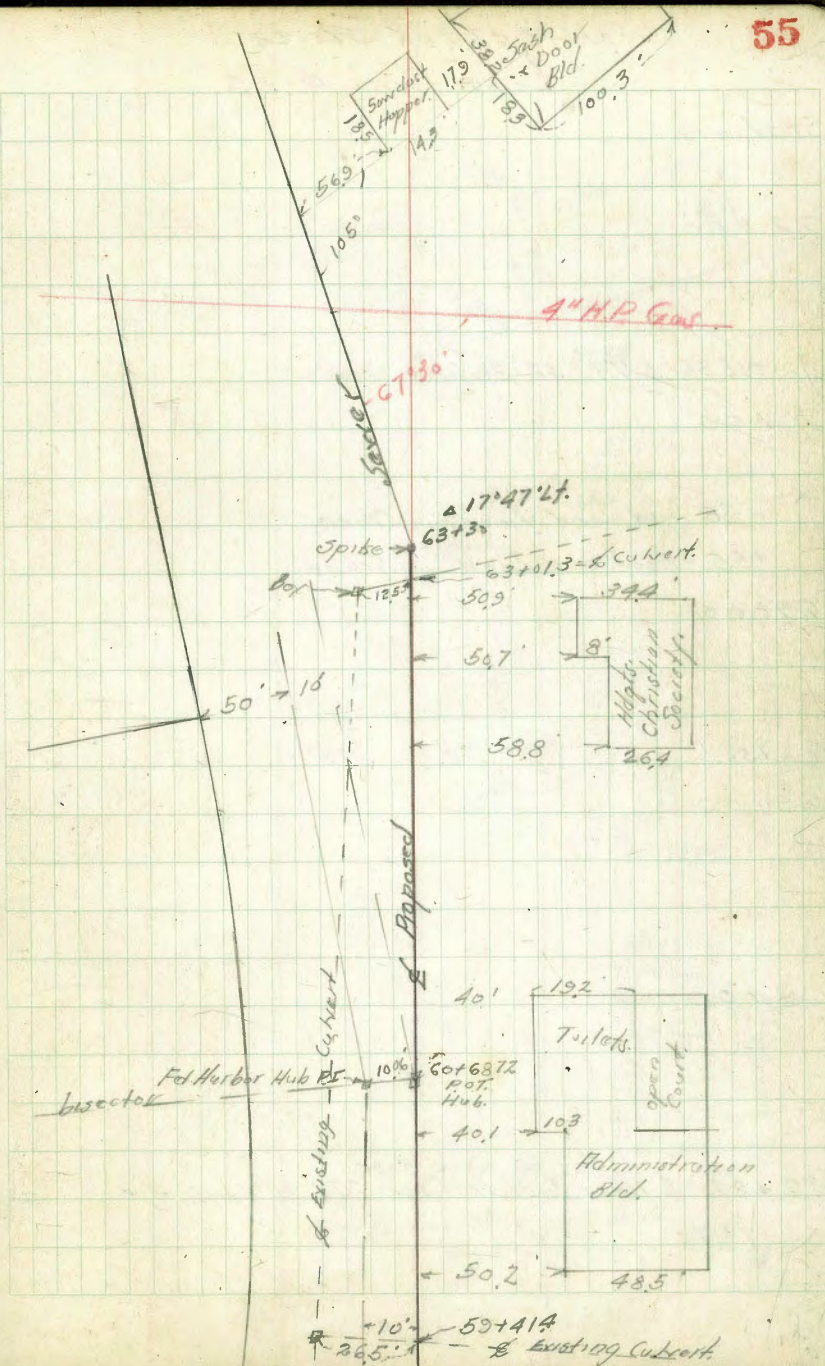
+32.7

60+00

59+48.7 = E. edge Bld.

59+41.4 = Intersection curvort.

55



INTERCEPTOR TOWER

Cont. from P-55

Station

72+00

+1586 = $\Delta 74^{\circ} 42' 30''$ Rt

71+00

+86 = W end Loading Crane

+55 = East end Loading Crane

69+00

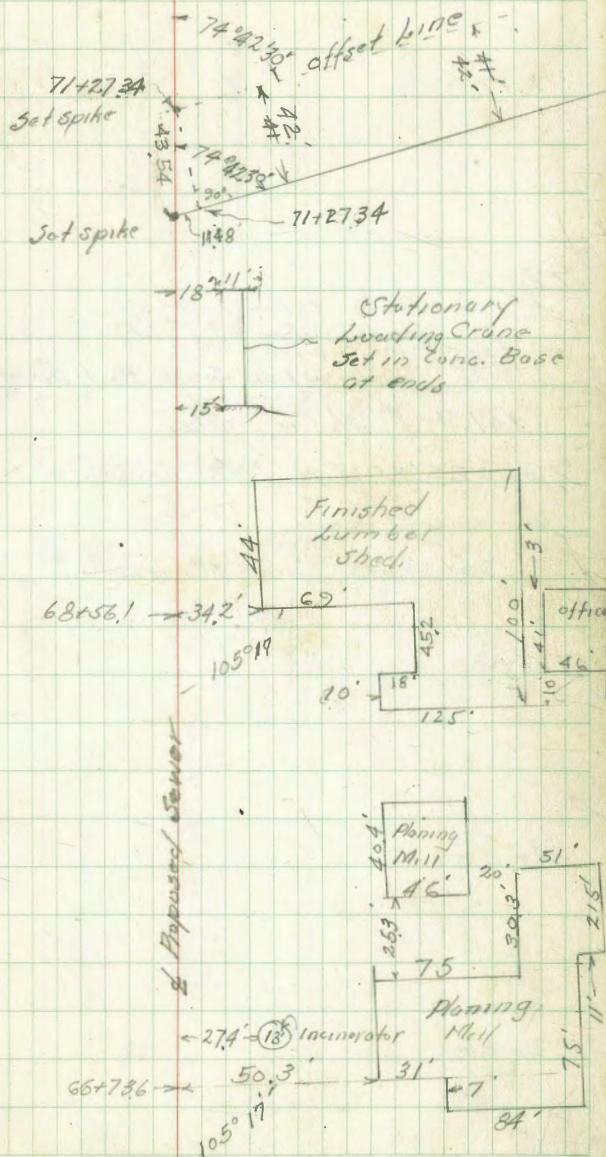
68+58.1

68+00

Set on Cone Base
66+82 = E New Incinerator 27.4' Rt = South edge

66+73.6

56



INTERCEPTOR SEWER
Cont. from P. 56

Station

78+00

77+00

+56. = Gate Valve 0.7' Lt.
+52. = Gate Valve 3.5' Lt.
+34.6 = Int. Culvert
+29.0 = Intersection South Rail SANTA FE.

+07.56 = St. Car Tracks.

76+02.61 = P.O.T. Nail = E Market St.

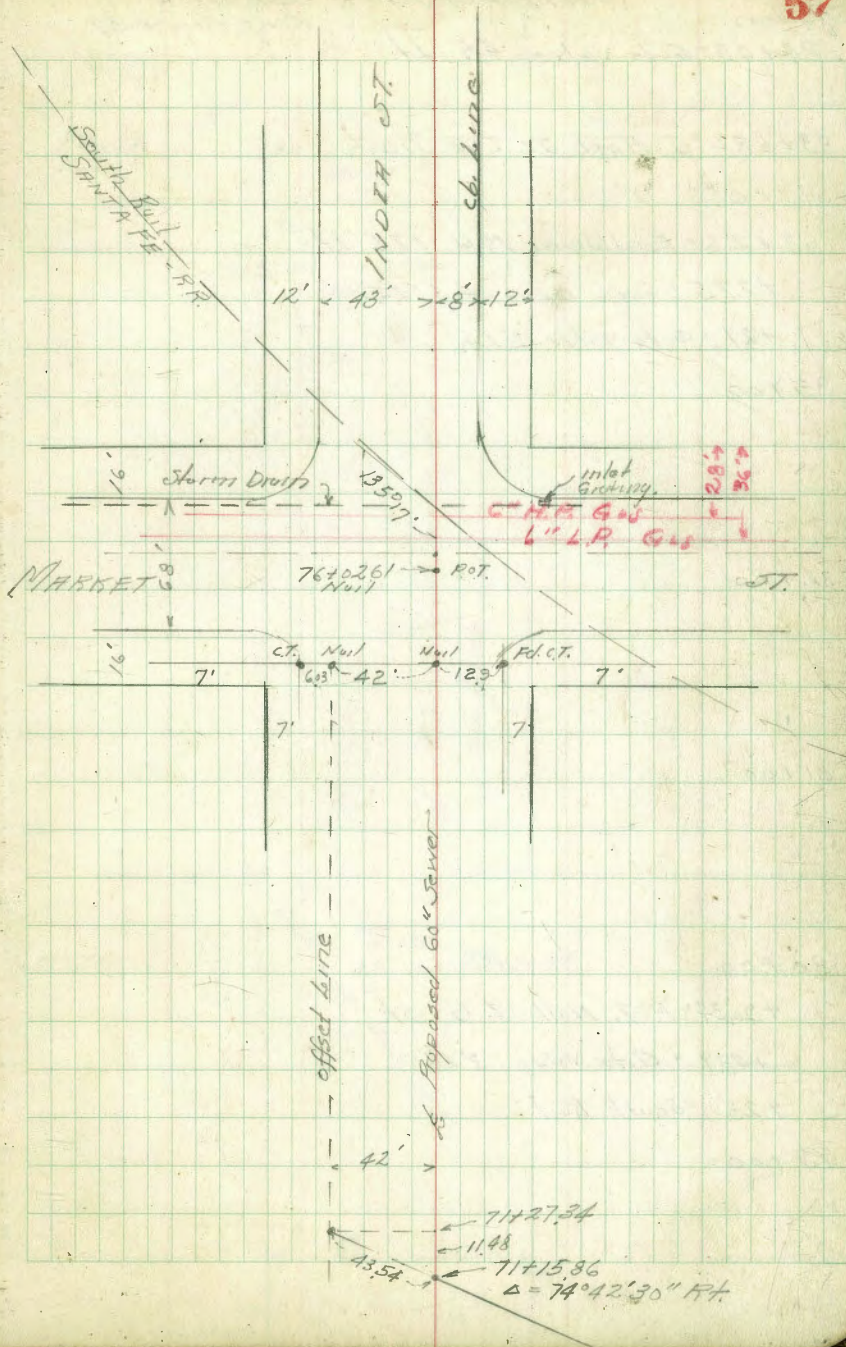
75+59.61 = South 7' line Market

75+00

74+00

73+00

57



JANUARY.

INTERCEPTOR. JEWEL
Cont. from p. 57

84+03 - Gate Valve 4.5' Lt.

83+68.2 - S. Rail St. Car Track.

83+26 = Exist. Sewer MH 17.5' Lt.

+27.5 = Gate Valve 4.5' Lt.

+21 = Gate Valve 1' Lt.

83+00

82+00

81+00

80+00

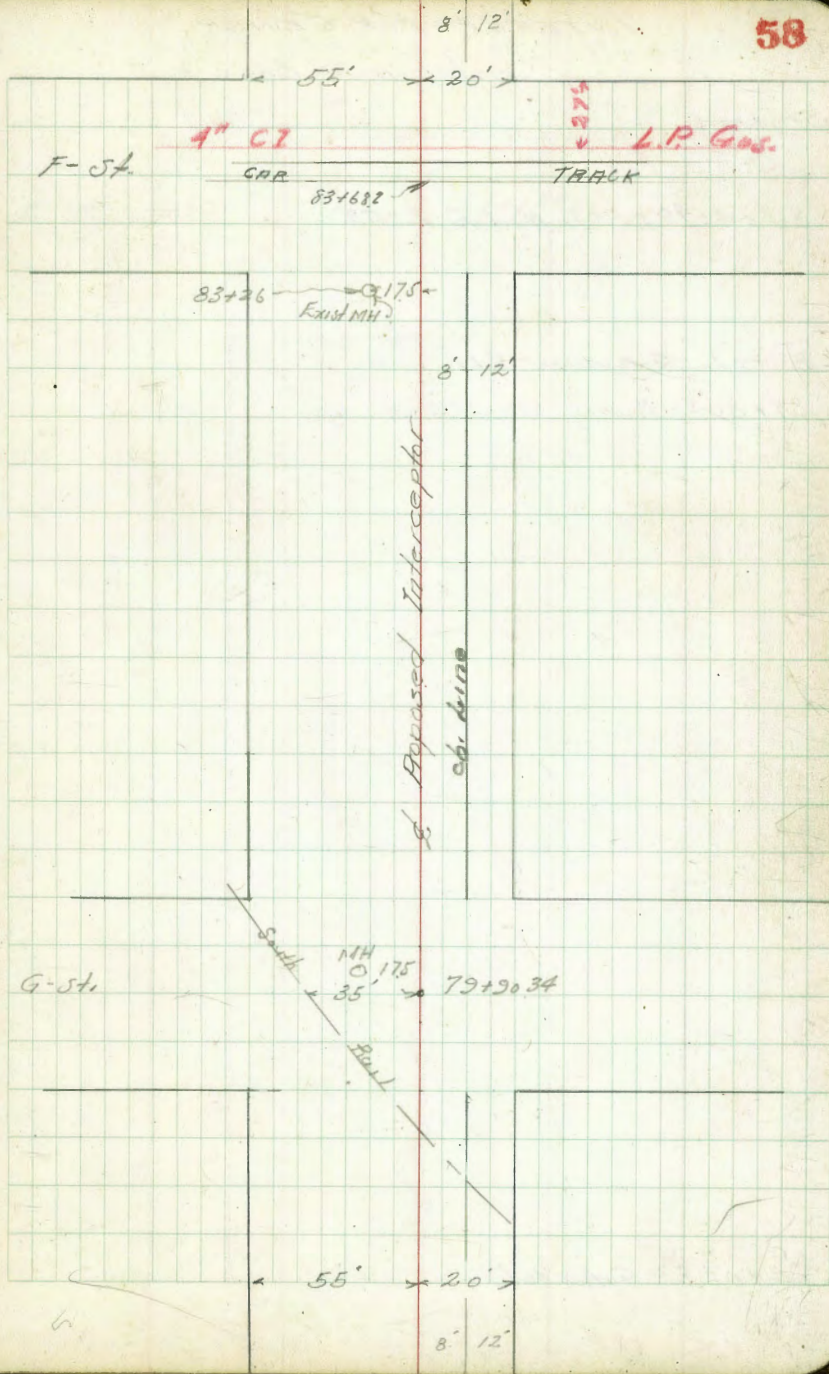
+20.34 - POT. Nail = to G-St.

+439 = Gate Valve 3' Lt.

+23 = South Rail

79+00

58



INTERCEPTOR SEWER

Cont. from P-58

Station

87+40.40 = P.O.T. Nail & E-ST.

87+02 = Gate Valve 3' Lt.

87+00.5 = Existing MH 17.3 Lt.

84+06.8 = Gate Valve 1' Lt.

F-ST.

87+40.40
P.O.T. Spike in Spring.

18"
27"
10" H.P. Gas
4" L.P. Gas

Gate 3'
MH 17.3'

55' 20'

8' 12'

cb. line

55' 20'

E. Proposed Sewer

F-ST.

INTERCEPTOR SEWER

Cont. from P-59

Station

148.3 = N Rail of N Track SDElec. RR

31+33.6 = S Rail " " " " "

90+76 = Sewer MH 17' Lt.

+78.7 = Gate Valve 34' Lt.

90+76 = Gate Valve 0.7' Lt.

BROADWAY

Steam Service
check Gas Co.

Steam

AVE.

8' 12"

INDIA Street

S. Proposed Sewer

cb. line

E-ST.

INTERCEPTOR
SEWER
Cont. from P60
Station

98+06 = Δ 89°59' Rt.

95+31.95 = Δ 90°01' Lt.

94+95 = Floc. Co. NH 35.8' Lt.

94+73 = Sewer NH

+ 97.7 = Steam Service

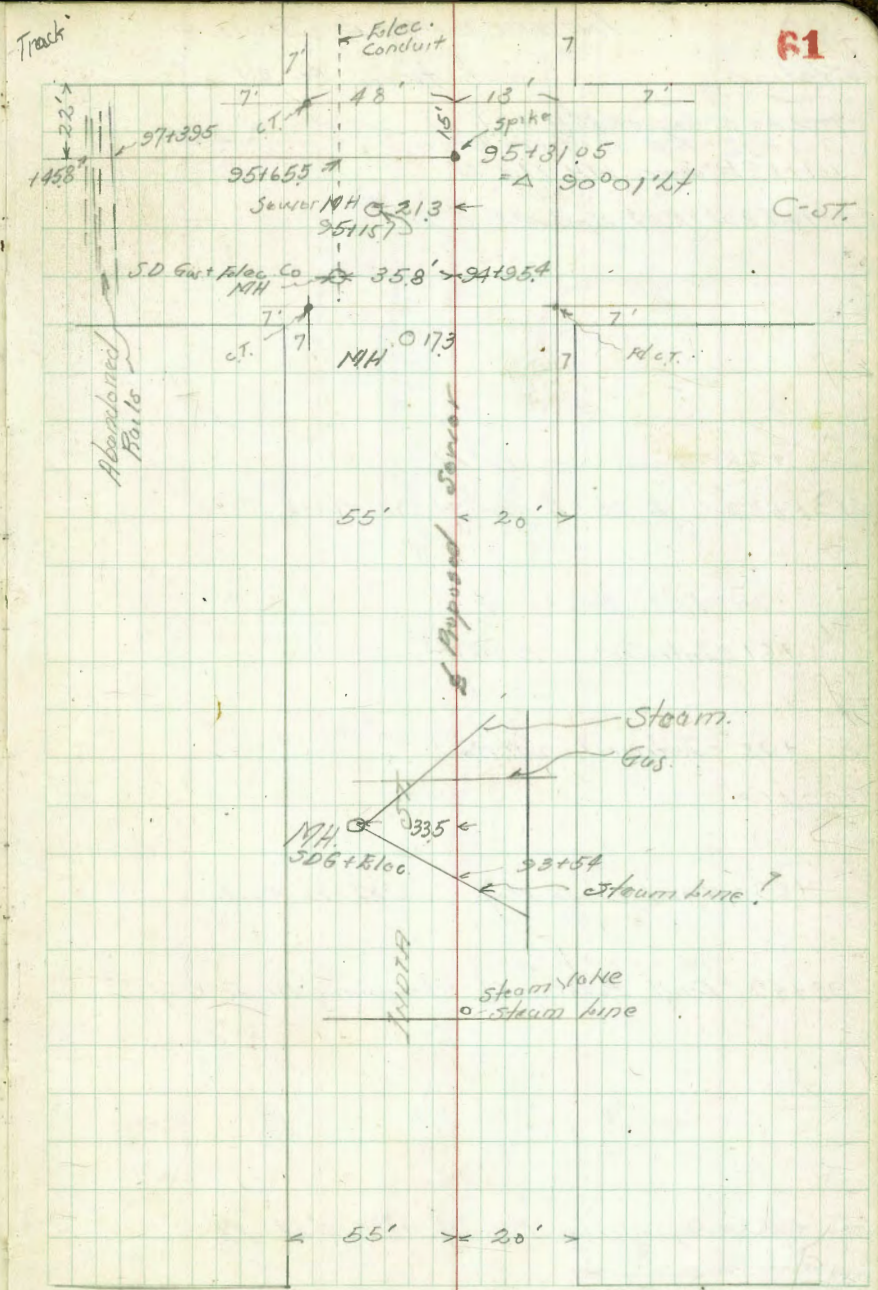
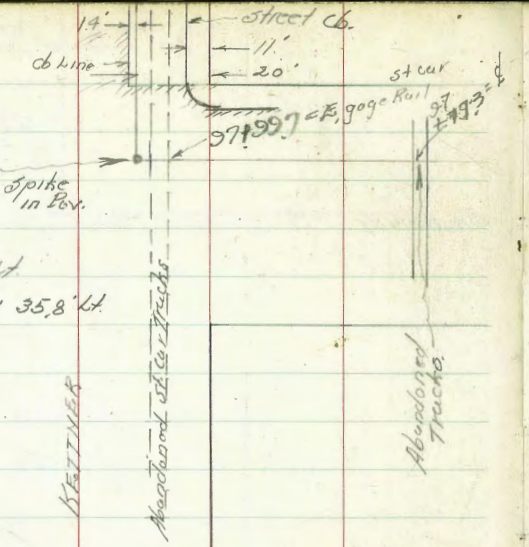
+ 87.6 = Gas Service

+ 74 = SDG & Elec. NH 33.5' Lt.

+ 54 = Intersection Steam line?

93+00 = Steam Valve 1' Rt.

92+99 = Intersection SDG & Elec. Steam Service



BROADWAY

Ave.

INTERCEPTOR SEWER

Station

Cont. from P-61

102+00 = Sewer MH 17.1' Lt
 101+92 = E 8-St. Storm Drain

101+68.6 = Sewer MH 17.1' Lt
 101+68.07 = POT, Spike = E 8-St.

+28 = Sewer MH 17' Lt

101+00 5' Lt = E gage St. Car Track

+70 = P.R.C. Tracks

+61 = Intersection E Rail

+15 = Intersection W Rail

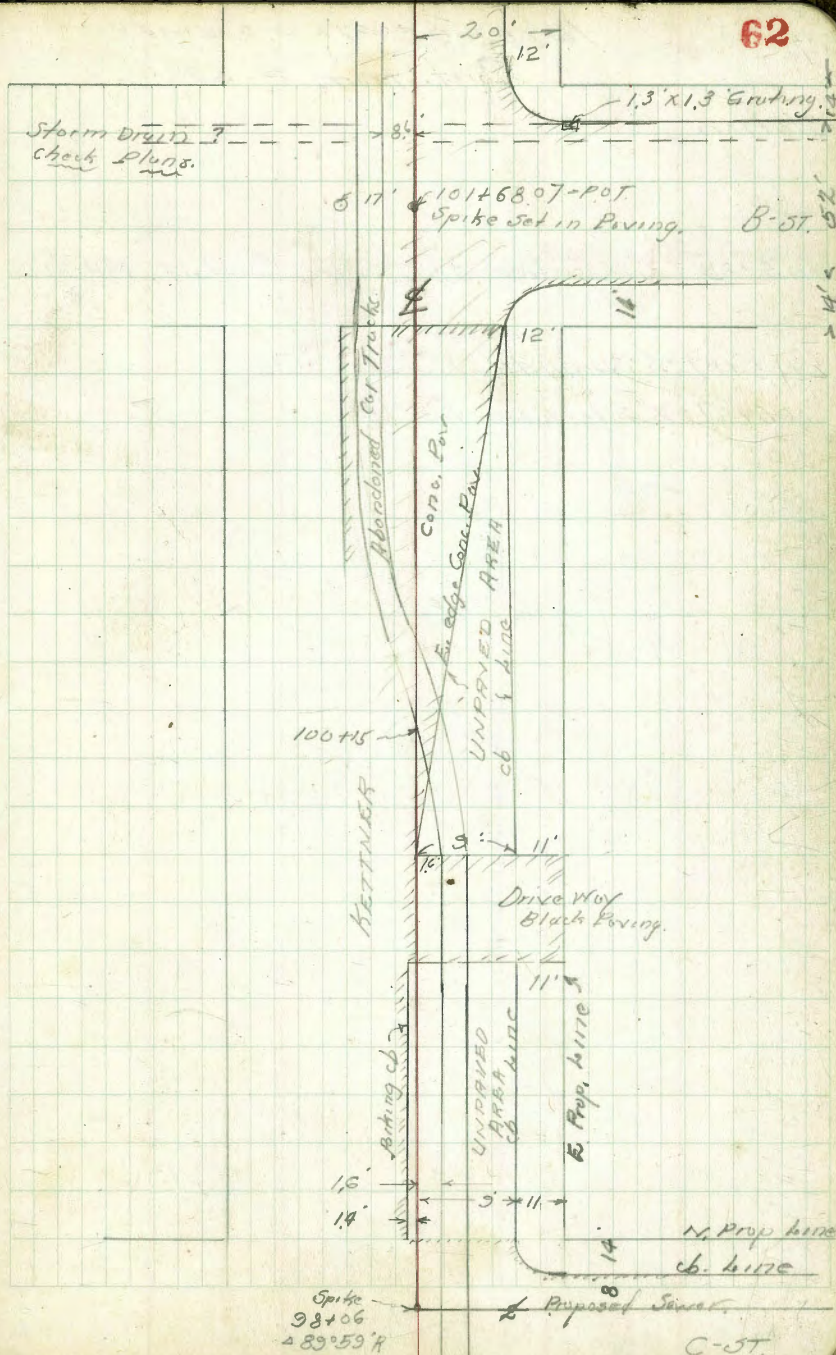
100+00

+69 = N end Drive Way 1.6' Rt = W Rail

29+49 ^N End Parking Cb. = beginning Drive Way

+28 = Beginning Parking Cb. 1.4' Lt. of Cb.

98+06 = A 89°59' Rt.



INTERCEPTOR SEWER

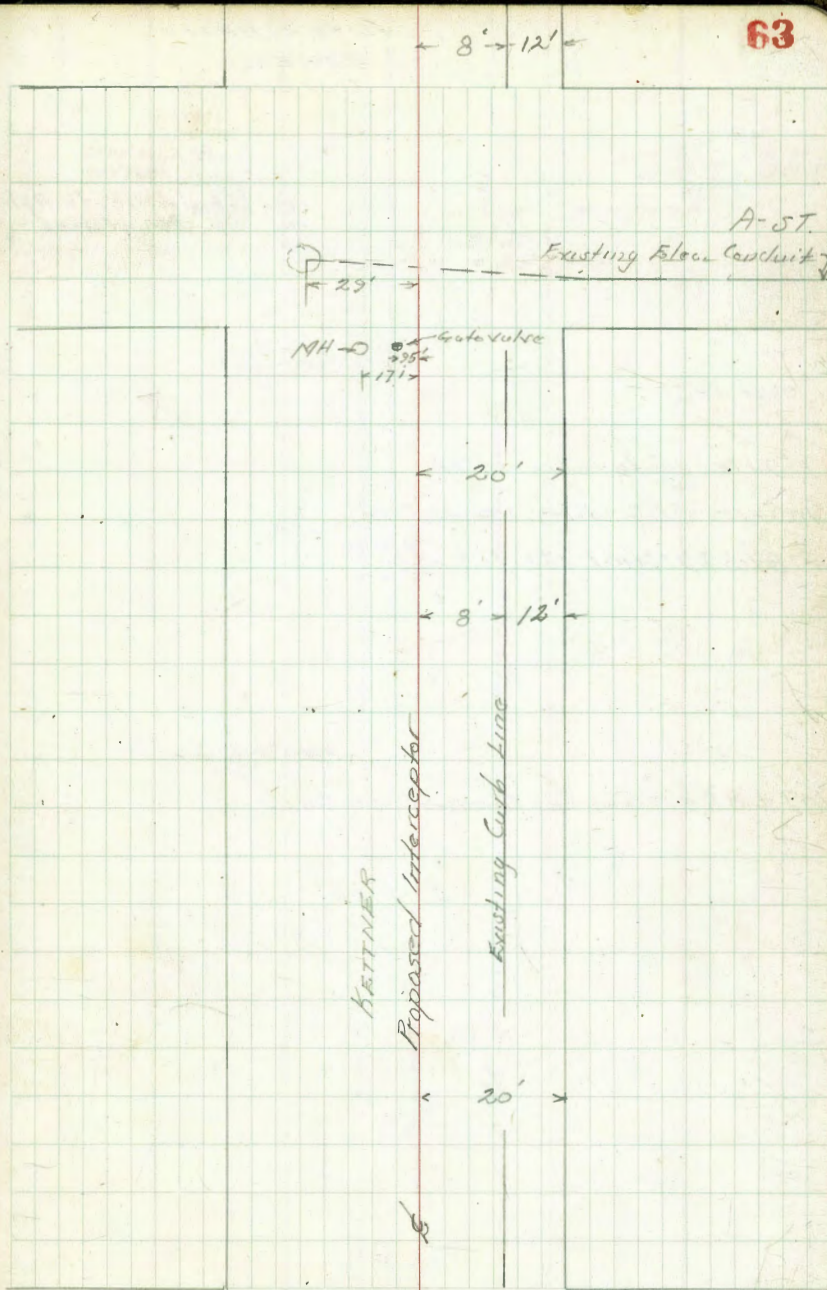
Cont. from P-62

Station

105+29 = Intersection SDG. & Elec. Conduit, MH 29' Lt.

105+07 = S Sewer MH 17.1' Lt.

105+07 = Gate Valve 25' Lt.



Pacific

INTERCEPTOR
SEWER
Cont from P. 63

CALIFORNIA

(This line to Ash st
Abandoned)

cont P. 65

109+16.5 = Gate Valve 10' Lt

109+10 = SDG & Elec. MH 31.5' Lt

108+88.9 = Sewer MH 16.8' Lt

107+88.8 = Gas Co. Conduit or Gas?

64

cleanout box
outlet

cleanout box
Surface Drain
across Street

109+45.85
Δ 89°59' Lt

Ash

506+E
MH 31.5'
109+10

Sewer MH
16.8'
8.8'

Gas Co MH

← St. Car Tracks
KETTNER
& Proposed Sewer

cb. line

← 8' → 12'

A-5T

INTERCEPTOR SEWER
Cont. from P-64

Station
= 0+00 Moore's Line
115+25.98 = P.O.T.
115+03.98 = Δ Rt. 90°00'

114+71 = Sewer MH 20.5 Lt

112+78.5 = Sewer MH 19 Lt

112+76.3 = W end Surface outlet Hd Wall

112+74.5 = Sewer MH 19 Lt

112+34.7 = Cleanout Box 6.5 Rt = E

112+27.7 = W Rail

112+14 = W Rail

112+03.7 = E. Rail Siding, Santa Fe RR

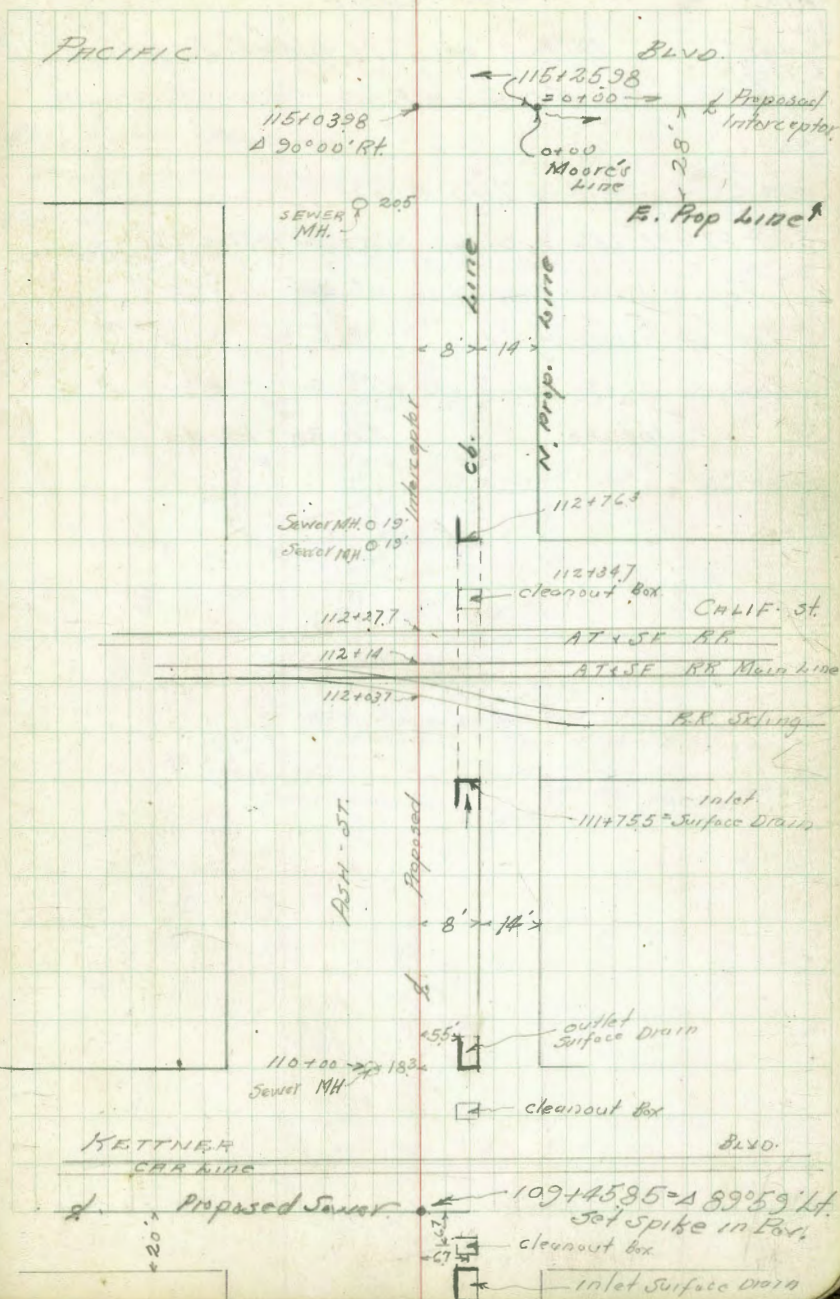
111+75.5 = East end

110+01 = West End Surface Drain outlet

110+00 = Sewer MH 18.3 Lt

109+89.2 = Cleanout Box 7 Rt

109+54.55 = E. Rail St. Car Track
109+45.85 = Δ 89°59' Lt



Walker
Isbell
Footley
5-27-41

Return LEVELS
for Interceptor Sewer
from Beardsley St. West
Benchmark P-39 and 43

6/21/41
x 176

Location P-45-65

BM #2
P-39

6.43	19.70	13.27	
0+29.75 = W.L. Beardsley	8.0	11.7	✓
+75	9.0	10.7	✓
+89.75 = on stake	9.06	10.64	✓
1+00	8.8	10.9	✓
+50	8.2	11.5	✓
2+00	8.8	10.9	✓
+25	8.1	11.6	✓
+50	8.3	11.4	✓
3+00	8.7	11.0	✓
+50	8.3	11.4	✓
+75	9.7	10.0	✓
4+00	9.7	10.0	✓
+35	10.8	8.9	✓
TP 2.86 12.29	10.27	9.43	✓
4+65	2.9	9.4	✓
5+00	4.2	8.1	✓
+20	3.7	8.6	✓
+60 = E. edge Paving.	4.9	7.4	✓
6+00 on "	4.7	7.6	✓
6+32 "	5.4	6.9	✓
+36.5 " Valley Gut.	5.9	6.4	✓
+42 "	5.8	6.5	✓

12.29

67

6+61.68 = 4' 4.3/50" Lt	6.53	5.76	✓
6481.88 7' 1/2 on 15m MH	6.50	5.79	✓
7700	8.8	3.5	✓
chk. 8M #3 P-39	5.33	6.90	✓
7+50	11.0	1.3	✓
+75	10.2	2.1	✓
7+79.13 on top existing sewer ck	8.87	3.42	✓
784 on old Slough Bottom	10.9	1.4	✓
TP 7.01 9.36 9.94	9.94	2.35	✓
8+00 on old Slough Bottom	9.3	+0.06	✓
+50 " " " "	9.8	-0.4	✓
9+00 " " " "	10.6	-1.2	✓
+50 " " " "	10.2	-0.8	✓
10+00 17 Fill, Wood Decomposed	9.0	+0.4	✓
+50 " " " "	9.1	+0.3	✓
11+00 " " " "	8.1	+1.3	✓
+50 " " " "	7.8	+1.6	✓
+50 " " " "	9.6	-0.2	✓
12+00 " " " "	7.5	+1.9	✓
+50 " " " "	7.4	+2.0	✓
13+00 on Slough Bottom	13.0	-3.6	✓
TP 7.10 6.34 10.12	10.12	-0.76	✓
14+00 on Slough Bottom	9.7	-3.4	✓
chk. 8M #4	4.09	2.25	✓
4.09	6.37	2.28	BM #4
14+58 = Bottom Ditch	8.2	-1.8	✓
17+35 Bottom Slough	11.0	-4.6	Toe Fill
+50 in Fill (Dump Heap)	6.1	+0.3	✓

18+00	in Fill	Cons etc.	6.8	-0.4	✓
+50	"	"	7.3	-0.9	✓
19+00	"	"	7.2	-0.8	✓
+63	"	"	6.2	+0.2	✓
T.P.	4.78	6.08	5.07	1.30	✓
19+80	24" = E edge channel		11.1	-5.0	✓ Floor line
20+21	24" = W "	"	11.1	-5.0	✓ " "
chk. B.M. #5	P-43		6.46	-0.38	✓
		^π correction	6.46	6.06	-0.40 = B.M. #5
20+22	in Fill	Brick etc.	6.3	-0.2	✓
+50	"	"	5.5	+0.6	✓
21+00			7.1	-1.0	✓
22+00			5.8	+0.3	✓
+21.5	= E Rail Lead Track		4.77	+1.29	✓
22+99	27" = Santa Fe Mainline		3.99	+2.07	✓
23+30	Top Fill	" " Brick etc.	5.2	+0.9	✓
+60	etc "	"	8.3	-2.2	✓
24+00	= NLY edge Slough		10.1	-4.0	✓
+40	in	"	11.0	-4.9	✓
+86	SLY "	"	9.1	-3.0	✓
25+60	in Fill	Rubbish Dump	5.1	+1.0	✓
T.P.	5.70	7.43	4.33	+1.73	✓
26+24	in Fill	Rubbish Dump	1.0	+6.4	✓
26+31.5	= P.O.T. Stake	"	2.07	+5.36	✓
27+40	in Dump	Rubbish	7.1	+0.3	✓

28+00	in Rubbish Dump		6.0	+1.4	✓
735	"	"	6.0	+1.4	✓
+60	"	"	8.3	-0.9	✓
29+00	"	"	7.7	-0.3	✓
+50	"	"	6.6	+0.8	✓
+84	"	"	6.8	+0.6	✓
30+04	= SLY edge Slough		11.4	-4.0	✓
chk. B.M. #6			5.06	+2.37	✓
		^π correction	5.06	7.40	2.34
30+30	= edge Slough at Trap		11.4	-4.0	✓
30+31	= E edge Water Trap		5.77	+1.63	✓
+37.5	on top 10" C.I. Pipe		7.07	+0.33	✓
30+45	= 6" 24" C.I. Pipe Bottom		10.4	-3.0	✓
T.P.	5.19	6.84	5.75	+1.65	✓
Note: See sketch P-66 for Detail of Box Culvert					
30+95.34	= P.O.T. Stake		5.19	+1.65	✓
31+00			4.9	+1.9	✓
+50			4.7	+2.1	✓
32+00			4.7	+2.1	✓
+50			4.7	+2.1	✓
+98.68	= Intersection Drain		5.0	+1.8	✓
147' Lt. on Top Box			5.50	+1.34	✓ sketch
147' " " Flow "			10.58	-3.74	✓ P-50
45' Rt. on Top Box			5.43	+1.41	✓
45' Rt. " Flow "			9.73	-2.89	✓

cc
139 Top
-3.97

Interceptor Lower levels

Cont. from P-68

6.84

33+82.38 = POT on stake	4.88	+ 1.96	
33+85.0 at Corrugated Iron fence	4.1	2.7	Notl. Iron Wicks Fence
TP 128 7.88	0.24	6.60	
33+86 = beginning	4.8	3.1	Approx 1"
34+41.90 = A 94845" Lt.	5.2	2.7	
+50	6.1	1.8	
(34+52) 17' Lt = 100' Derrick			
35+38 = E edge Notl. Iron Wicks	5.6	2.3	
TP 5.37 6.80	6.45	1.43	
36+35 = W. edge Notl. Iron	4.6	2.2	
36+57.3 = Intersection Corrugated Iron fence Parallel to 7th	4.6	2	
chk. BNI # 7 P-43	2.34	+ 4.46	
36+79.6 = E edge Pav.	5.95	+ 0.85	
36+98.3 = Intersection Drain	5.86	+ 0.94	
17' Lt. on Top Grating of Box	6.14	+ 0.66	
17' " " Flow of Drain	11.06	- 4.26	Sketch P-51
131' Rt. " Top " Grating of Box	5.59	+ 1.21	
" " " Flow of Drain	3.43	- 2.69	
37+20.8 = W. edge Pav.	5.81	+ 0.99	
TP 5.00 6.28	5.52	+ 1.28	
37+59.78 = W.L. 7th St.	5.3	+ 1.0	
38+06.24 = POT. on Hub	5.73	+ 0.55	
+60	5.4	+ 0.9	
39+00	5.5	+ 0.8	

628

69

39+50	5.3	+ 1.0	
TP 529 7.07	4.50	1.78	
40+00	5.7	1.4	
-145	4.7	2.4	
+65	5.6	1.5	
41+00	6.1	1.0	
+50	6.6	0.5	
42+00	6.4	0.7	
+50	6.5	0.6	
43+00	6.7	0.4	
+50	6.7	0.4	
TP 5.57 6.59	6.05	1.02	
43+86.2 = E. Edge Paving	5.26	+ 1.33	
44+09.4 = 42" Drain	5.04	+ 1.55	
39' Lt. on Top Box	4.96	+ 1.63	
39' Lt. " Flow Pipe	12.10	- 5.51	
57' Rt. " Top Box	4.98	+ 1.61	
57' " " Flow Pipe	12.06	- 5.47	
44+10.6 = W. edge Pav.	5.04	+ 1.55	
4.2' Lt. of E. Top			
41+16 = Storm Drain Box	5.52	+ 1.07	W. edge Box
" " Flow	10.66	- 4.07	
Note: Above Readings Not taken in Regular order			
44+176.51 = POT. on Hub	5.15	+ 1.44	
45+00	5.4	1.2	
45+50	5.8	0.8	

INTERCEPTOR SEWER LEVELS.

6.59 ✓

46+00		54	+ 1.2	✓
+04 - E edge Asphalt path		5.33	+ 1.26	✓
46+09 = Storm Drain Box	11.6 Lt.			
" Top Box.		5.84	+ 0.75	✓
" Flow "		11.36	- 4.77	✓
46+16.1 = W edge Asphalt Path		5.06	+ 1.53	✓
+50		4.4	+ 2.2	✓
47+00		4.7	+ 1.9	✓
+50		4.2	+ 2.4	✓
48+00		4.4	+ 2.2	✓
chk. 8.M.#9 P-43		1.83	+ 4.76	✓
	1.83	6.61	+ 4.78	8.M.
48+50		4.8	1.8	✓
49+00		5.1	1.5	✓
T.P	1.85	7.38	1.08	5.53
50+00		4.9	2.5	✓
51+00		4.8	2.6	✓
52+00 = POT. Gate		5.17	2.21	✓
53+00		5.4	2.0	✓
54+00		5.6	1.8	✓
55+00		5.7	1.7	✓
56+00		5.6	1.8	✓
+65 = beginning oiled Surface		5.6	1.8	✓
57+00 on oil Surface		5.7	1.7	✓
T.P	4.93	5.22	2.16	8.M.#10
	4.93	7.12	2.19	8.M.#10

7.12 ✓

70

58+00 on oiled Surface		5.5	+ 1.6	✓
59+00 " " "		5.3	+ 1.8	✓
+41.4 = Intersection of Culvert		5.3	+ 1.8	✓
26.5 Lt. on Top Box		5.77	+ 1.35	✓
" " " Flow Pipe		12.62	- 5.50	✓
60+00 on oiled Surface		5.3	+ 1.8	✓
61+00 " " "		5.3	+ 1.8	✓
62+00 " " "		5.6	+ 1.5	✓
chk. 8.M.#11		4.56	2.56	✓
63+01.3 = Int. Drain		5.8	+ 1.3	✓
12.5 Lt. on Box		5.93	+ 1.19	✓
" " " Flow		5.75	- 4.59	✓
T.P	4.65	7.21	4.56	+ 2.56
63+30 = Δ 17°47'4"		5.74	+ 1.47	on spike
64+00 on oiled Surface		5.4	+ 1.8	✓
65+00 " " "		5.2	+ 2.0	✓
66+00 " " "		5.5	+ 1.7	✓
67+00 " " "		5.7	+ 1.5	✓
T.P	5.37	7.43	5.15	+ 2.06
68+00 on oiled Surface		5.6	+ 1.8	✓
69+00		5.2	+ 2.2	✓
chk. 8.M.#12 P-43		4.89	+ 2.54	✓
70+00 on oiled Surface		5.2	+ 2.2	✓
71+00 " " "		4.6	+ 2.8	✓
71+15.86 = Δ 74°42'30" Rt.		4.72	+ 2.71	on spike

7P	4.12	7.17	4.38 + 3.05	✓	
72+00	on oiled Surface	4.9	2.3	✓	
73+00	" " "	4.9	2.3	✓	
74+00	" " "	5.0	2.2	✓	
75+00	" ^{1/2} Admired Pav	5.0	2.2	✓	
+52.61	= S.L. Market on Pav.	4.75	2.42	✓	
+68.61	= S.C. " " "	4.57	2.60	✓	
76+02.61	= P.O.T. ^{on Nail} 2' Market	4.20	2.97	✓	
76+05.2	= S. Rail Cur Line	4.14	3.03	✓	
76+29.2	= " Santa Fe	4.07	3.10	✓	
76+36.6	= N.C.B. line Market	4.11	3.06	✓	
76+34.6	= Int. Culvert N.C.B. Market				
18.5' Bt.	on Grating	4.80	+ 2.37	✓	
" " "	Flow	8.95	- 1.78	✓	
76+52	3.5' Lt. on Gate	4.49	+ 2.68	✓	
+53	07 " " "	4.66	2.51	✓	
77+00	on Paving	4.12	3.05	✓	
78+00	" " "	2.44	4.73	✓	
T.P.	6.00	11.41	1.76	5.41	✓
79+00	on Pav.	5.57	5.84	✓	
CHK 8M#14-43		5.58	5.83	✓	
		5.58	5.81	8M.	
79+44	= Gate 3' Lt. ^(Cover) on Valve	5.24	6.15	✓	
+64.8	= S.C. G-St. on Pav	5.30	6.09	✓	
+90.34	= S. G-St.	4.97	6.42	✓	
+92.5	= Sewer MH 17.5 Lt.	4.95	+ 6.44	✓	
" " " "		10.47	+ 0.92	✓	

Note: Pipe runs through MH

80+00	on Pav	4.86	+ 6.53	✓	
+14	= ^{Culvert} Intersection				
18.5' Bt.	on Grating	5.13	6.26	✓	
" " "	Flow	9.06	2.33	✓	
81+00	on Pav.	4.67	6.72	✓	
82+00	" "	4.34	7.05	✓	
83+00	" "	4.10	7.29	✓	
+21	= Gate 1' Lt.			✓	
T.P.	590	13.20	4.09	7.30	✓
+21	= Gate 1' Lt.	5.7	7.5	✓	
+26	= MH 17.5 Lt. on Rim	5.96	7.24	Note this MH. Not in use	
" " "	Flow	7.46	5.74		
+27.5	= Gate 4.5' Lt.	5.92	7.28	✓	
83+41	on Pav.	5.87	7.33	✓	
+68.2	= S. Rail. Car Truck	5.30	7.90	✓	
+91.5	on Pav	5.73	7.47	✓	
84+00	" "	5.55	7.65	✓	
+103	4.5' Lt. on Gate	5.57	7.63	✓	
+106.8	1' " " "	5.39	7.81	✓	
85+00		4.83	8.37	✓	
CHK. 8M#15	^{F & Indian} Top Hydt.	2.47	10.73	✓	
86+00		4.33	8.87	✓	
87+00.5		3.91	9.29	✓	
17.5' Lt.	on Rim MH	3.95	9.25	✓	
" " "	Flow	8.35	4.85	✓	

on Right
on Top of
Vitrified
Ppe

1320 INTERCEPTOR SEWER
Cont. from p-71

87+02	3' Lt. on Gate	3.90	9.30	✓
+15	on Pav.	4.13	9.07	✓
+40.4	2' E	3.52	9.68	✓
+65.9	4' Gut Pav.	4.03	9.17	✓
88+00	on "	3.48	9.72	✓
TP	6.73 16.44	3.49	9.71	✓
89+00	on Pav.	5.53	10.91	✓
90+00	" "	4.44	12.00	✓
+76		3.57	12.87	✓
17' Lt.	on Rim MH	3.21	13.23	✓
" " "	Top 6" Sewer	3.47	6.97	✓
0.7' Lt.	on Gate Valve	3.53	12.91	✓
90+78.7	3.4' Lt. on "	3.47	12.97	✓
91+00		3.78	13.26	✓
+33.6	5' Rail Track	2.34	14.10	✓
+48.3	" "	2.31	14.13	✓
+84	on Pav.	3.03	13.41	✓
92+00	" "	2.93	13.51	✓
TP	6.71 19.70	3.45	12.99	✓
SWB.P. Boundary	& India	6.88	12.82	✓
93+00	on Pav.	5.20	14.50	✓
94+00	" "	4.10	15.60	✓
+73		3.39	16.31	✓
17.3' Lt.	on Rim MH	3.24	16.46	✓ MH not in use
" " "	" Bottom "	5.9	13.8	✓

1970

72

95+00	on Pav.	3.34	16.36	✓
95+15	2.13' Lt. on Rim MH	3.50	16.20	✓
" " " "	Flow	3.74	9.96	✓
95+31.05	30' 00' Lt.	3.55	16.15	✓
TP	0.83 16.66	3.93	15.77	✓
96+00	on Pav.	1.11	15.49	✓
97+00		3.10	13.50	✓
+39.5	on Rail car Truck	3.81	12.79	✓
+45.8	" " "	3.85	12.75	✓
+77.3	Car Truck	4.25	12.35	✓
+99.7	on Car Truck	5.12	11.48	✓
98+06	89' 05" Rt	5.05	11.55	✓
+28	end Paving	5.07	11.53	✓
99+00	on ground	5.0	11.6	✓
1.4' Lt.	on Paving	4.83	11.77	✓
99+49	S edge Drive	4.81	11.79	on Pav
+69	" " "	4.80	11.80	" "
100+15	int. Truck	4.83	11.72	✓
+61	" " E Rail	4.77	11.83	✓
101+00	on Conc. Pav.	4.66	11.94	✓
TP	4.81 16.66	4.75	11.85	✓
(101+28)	17' Lt. on Rim MH	4.69	12.03	✓
" " " "	Flow	11.93	4.68	✓
101+68.07	POT Spike 2' 8" st.	4.63	11.97	✓
+68.6	MH 17.1 Lt.	4.83	11.83	on Rim
"	Flow	13.38	3.28	✓

102+00 on Pav.	4.67	11.99 ✓	
17.1' Lt. on Rim MH	4.87	11.79 ✓	
" " " Flow.	11.83	4.77 ✓	
T.P. 6.56 17.98	5.24	11.92 ✓	2d. 40x Tuck w/ 7' line Kettner →
101+92 = B-St. Storm Drain	Approx. station.		
20' Rt. on Flowline	12.6	5.4	9" inlet 13' x 13'
" " " Grating	5.8	12.2 ✓	
103+00 on Pav.	5.55	12.43 ✓	
104+00 " "	5.10	12.88 ✓	
105+00 " "	4.70	13.28 ✓	
105+07	4.70	13.28 ✓	
17.1' Lt. MH on Dist.	6.42	11.56	Not in Use
17.1' " " on Rim M.H.	4.51	13.47 ✓	
9.5' Lt. on Gate Valve	4.48	13.50 ✓	
106+00 on Pav.	3.61	14.37 ✓	
107+00 " "	2.98	15.00 ✓	
T.P. 5.20 20.20	2.98	15.00 ✓	
108+00 on Pav.	4.51	15.69 ✓	
+88.9 = Sewer MH 16.8' Lt.			
on Rim	3.93	16.25	Does not smell like sewer.
" Flow	10.27	9.93 ✓	
109+00 on Pav.	3.70	16.50 ✓	
109+45.85 = E Rail Ch. Car Track	2.99	17.21	on Spike of car line
+54.55 = E Rail Ch. Car Track	3.20	17.00	Abandoned
Ash & Kettner chk. MH Brass Plug	4.06	16.14	

110+00 on Paving.	4.10	16.10 ✓	
18.3' on Sewer MH Rim	4.17	16.03 ✓	
" " " " Flow	10.05	10.15 ✓	
T.P. 6.56 17.98	5.24	11.92 ✓	3' NNL B-St.
110+15 on Pav.	4.89	15.31 ✓	
111+00 " "	6.66	13.54 ✓	
160 " "	8.15	12.05 ✓	
+75.5 " "	8.18	12.02 ✓	
5.3 Rt. on Hd. Wall inlet	8.08	12.12 ✓	
" " " Flow	9.46	10.74 ✓	
112+00 on Paving.	8.43	11.72 ✓	
+037.5 Rail Santa Fe	8.43	17.77 ✓	
+14 W. " " "	8.54	11.66 ✓	
+27.7 " " " "	8.46	11.74 ✓	
+34.7	8.67	11.53 ✓	
6.5' Rt. on Cleanout Box	8.62	11.58 ✓	
112+74.5 on Pav.	9.69	10.51 ✓	
19' Lt. on Rim MH	9.97	+10.23 ✓	
" " " Flow?	21.88	-1.68 ✓	
(112+76.3) 5.3' Rt. on Hd. Wall	9.74	+10.46 ✓	outlet
" " " " Flow	11.06	9.14 ✓	
(112+78.5) 19' Lt. on Rim MH	10.02	10.18 ✓	Sewer
" " " " Flow?	21.83	-1.63 ✓	
T.P. 0.78	12.49	8.49	11.71 ✓
112+83	2.65	9.84 ✓	

Completed
May 29-1941

12.49

Interceptor Sewer
Cont. from P-73

74

113+00 on Poring.	3.27	9.22	✓
114+00 " "	6.32	6.17	✓
161 " "	8.16	4.33	✓
114+71 " "	8.50	3.99	✓
20.5' lat. on Run MH	8.34	4.15	✓
" " " Flow? "	15.16	- 2.67	✓
114+83 on Pav.	8.78	3.71	✓
115+00 " "	8.55	3.94	✓
115+03.98 = A 30'00' Rt.	8.49	4.00	✓
115+25.98 } = 0+00 } Equations	8.44	4.05	✓
Moore's line			
TP 4.86 3.79	7.56	4.93	✓
chk. Brass Plug.	4.76	5.03	✓

Nine Cop Dist

10 side with

Ash & Pacific Blvd.

S.E. Cor Beech and Pacific Blvd.

See Moore's
Notes on Interceptor
N. of Ash

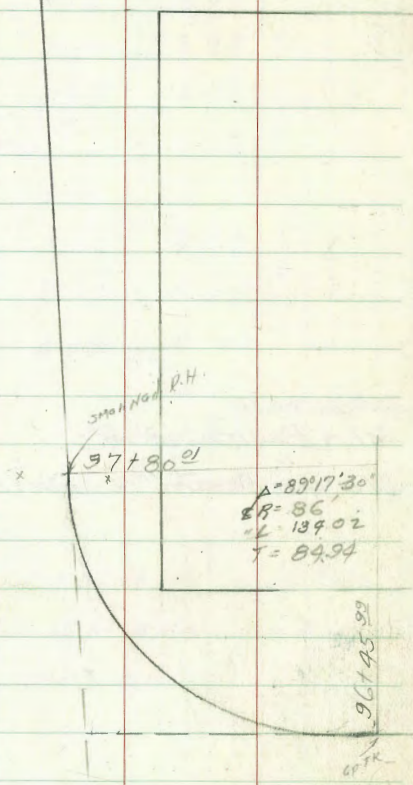
Note: from station 30+95.34 to south line
of Market St = 75+52.61 = Hydraulic Fill
with some surface material

L. Rt. equal to $100 + 0.2 \times 0.8' = 101.168'$
L. $0^\circ 42' 30''$

101.16807 p-62

BLVD.

KITTNER



3rd N. H. R.H.

57.80'

A = 89° 17' 30"
S = 86'
L = 139.02
T = 89.94

967.45.00

-33

B.

ST.

ST.

INDIA

C. 47

This line abandoned

95+31.05 Nail

ST.

2.5'

Long Nail set in Post

TOP TX

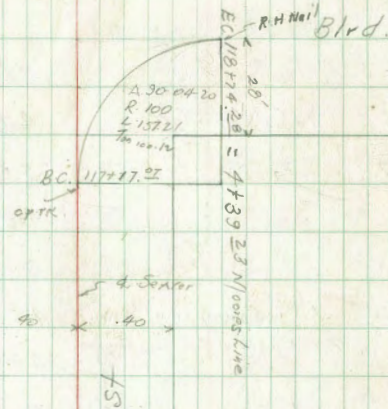
954.67 59

100.87

A = 90° 01'
S = 108'
L = 168.68
T = 108.68

93+98.01 Nail

Pacific

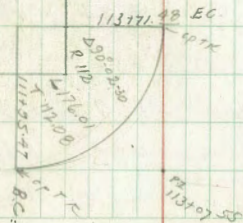


A.T.S.F. Tracks

Bech

Kattner

Bld



Bliss Notes
Summer 1941
G. Farlow Rd
6/26/41

Levels for Interceptor Sewer line change
from Sta 93+98rd Sol. Con India to ϕ of
B. on Kettner

BM.	4.85	<u>21.00</u>	16.15	^{72 to 800} _{95+31.95} L. of d. line
93+98 rd B.C.			5.90	15.6
" "	Top cb 7 th Rt		4.91	16.09
94+25			5.04	15.96
+50			4.81	16.19
+75			4.85	16.15
" "	9 th Rt. Sewer 11 th Rm		4.55	16.45
+95 95+00	7.2 Rt to E Side of amp stand		5.44	15.56
" "	2-7 Lt cb		5.06	15.94
" "	6-3 Rt Edge Elev. 11 th Rm		5.07	15.93
	12.511 cb		5.08	15.92
95+13	ϕ int condit/line approx			
+25			5.39	15.61
+67.69	E.C.		5.95	15.05
96+00			6.75	14.25
+45 rd	B.C.		7.80	13.20
+75			8.24	12.76
97+00			8.52	12.48
+23 rd	1st cb Gutter		8.86	12.14
" "	Top cb		8.56	12.44
+41.	Edge Walk on d		8.67	12.33
" "	6-8 Lt Radially cb.		8.77	12.23
+41.4 & T.P.	is 0.5 in 16" dia ch. pole 4.53	<u>16.89</u>	8.64	12.36

16.89

77

+50 th	Edge cb	4.68	12.21
" "	" Gutter	5.3	11.6
+69 th	Top Rail. Abandoned	5.37	11.52
+80 th	E.C. on Ground	5.4	11.5
" "	2.2 Lt W. Rail Cause	5.35	11.54
" "	4.4 Lt Top cb	4.66	12.23
" "	3.6 Rt Cause	5.35	11.54
" "	5.5 Rt Top East	4.74	12.15
98+00		5.4	11.5
+50		5.2	11.7
+62 th	Black Paved Drive way	5.24	11.65
" "	9.9 From cb to cb paved		
" "	8.1 2 nd L in paving. 4 th	5.01	11.88
+83	N Edge Black Paving	5.20	11.69
99+00		5.5	11.39
" "	0.9 Lt Top Rail	5.24	11.65
" "	2.1 Lt Paving	5.16	11.73
+31 th	int Paving on d.	5.15	11.74
+50	on Paving	5.09	11.80
+62	int East Rail	5.97	11.82
" "	2.1 Rt Edge Paving	5.09	11.80
100+00		5.02	11.87
+42 nd	End Concrete Paving Beginning Block "	4.86	12.03
E 100+82 rd - 101+68 rd		4.95	11.94
			11.97
			0.03 Error

Bliss notes
Sommermyer
G. Farrow

Levels for Interceptor Sewer Line Change

From 109+45⁸⁵ E. of Ash to E.C. North of

Beech St. on Pacific

BM	7.56	<u>24.77</u>	17.21	✓	Spire on 109+45 E. of Ash Pg 73
110+00			7.17	✓	
+50			6.63	✓	
111+00			6.02	✓	
+50			5.44	✓	
111+35 ⁴⁷	B.C. 11		4.92	✓	
112+25			4.59	✓	
+39	E. Rail Abandoned Track		4.57	✓	
+50 ²	" " " "		4.40	✓	
+67.6 ³	Rt to Edge M.H. Ring		4.30	✓	
+75			4.69	✓	
+93	6.1 Rt to Edge Gas M.H. Rim		4.64	✓	
"	5.5 " " Edge ch. 20 ^{Top}		5.30	✓	
113+00			5.39	✓	
T.P.	0.86	<u>20.89</u>	4.74	✓	
+25			1.70	✓	
+50			2.34	✓	
+71 ⁴⁸	E.C.		3.00	✓	
114+00			3.98	✓	
+50			5.5	✓	
1095			6.81	✓	
115+00			6.89	✓	
+95	Begin concrete paving		7.01	✓	
+95	E. Rail		7.01	✓	

T
20.89

+22 ⁹	E. Rail	7.01	13.88	✓
+30		6.95	13.94	✓
+36 ⁶	E. Rail	6.94	13.95	✓
+43		8.93	13.96	✓
+51 ⁹	E. Rail Scale Track	6.60	14.29	✓
+52 ²	" " " "	6.60	14.29	✓
+60	E. Rail Farming	6.67	14.22	✓
+74	E. Rail	8.52	12.37	✓
+81	Begin Black Farming End Concrete Farming	8.42	12.47	✓
116+00		9.26	11.63	✓
+50		11.28	9.81	✓
117+00		12.90	7.99	✓
T.P.	2.54	<u>10.58</u>	12.85	✓
+17 ⁹⁷	B.C.	3.22	7.36	✓
+25		3.49	7.09	✓
+50		4.46	6.12	✓
+75		5.37	5.21	✓
+98	Gutter	6.43	4.15	✓
+ "	Top ch	5.43	5.15	✓
118+00		5.42	5.15	✓
" " "	1' Lt Gutter	6.42	4.16	✓
+06		6.08	4.50	✓
+25		5.92	4.66	✓
+38	Mt Drain	5.62	4.96	✓
+50		5.46	5.12	✓
118+74 ²³	= 1139 ²³ Moore	5.44	5.14	✓
T.P.	4.70	<u>9.24</u>	6.04	✓
check BM	N.W. Cp. D. W.	4.34	4.54	✓
	Ash & Pacific Blvd		4.90	✓
	See page 74		<u>4.93</u>	✓
			0.03 error	

Walker
Wells
Furrow
11-29-41

Elevations Existing M.H.
Approx. L. Colton and 5'E of L. Beardstep

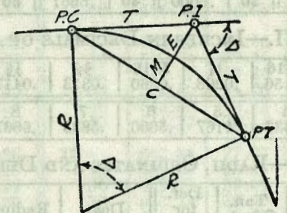
3.72	16.39	13.27	B.M. #2 P-39
on Rim M.H.	4.68 6.27	12.31	
" Flow 6" line from North	10.95	6.04	
" " 20" " from West	16.95	0.04	

Elev. High water station 20 - Drainage

SD+A	by Hand level		
6.8	6.9	-0.4	B.M. #2 of SD+A
		-8.4	-2.0 = High water
		-0.4	= Bottom Stringer SD+A Bridge.
	7.8	-1.4	High water on Piling. Near Santa Fe

DIETZGEN'S RAILROAD CURVE AND REDUCTION TABLES

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810210
8771.55
130.55

CURVE FORMULAS

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

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 $\div 8\frac{1}{2} = 414.49$ ft. From Table V correction = .36 or $T = 414.85$ ft. P. C. = Sta. P. I. - $T = 157 + 45.50$. Also from (4) $L = 746.00$ and P. T. = Sta. P. C. + $L = 164 + 91.50$.

Offsets.—Tangent offsets vary (approximately) directly with D and with square of the distance. Thus tangent offset for Sta. 158 on above curve is 2.16 ft. found as follows. From Table III tangent offset for 100 ft. = 7.27 ft. Distance = 158 - Sta. P. C. = 54.50, hence offset = $7.27 (54.50 + 100)^2 = 2.16$ ft. Also square of any distance divided by twice the radius equals (approximately) the distance from tangent to curve. Thus $(54.50)^2 \div (2 \times 688.26) = 2.16$ 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 = $.3 \times 54.5 \times 8\frac{1}{2} = 136.2'$ or $2^\circ 16.2'$, or = $2.50 \times 54.5 = 136.2'$ from Table III. For Sta. 159 deflection angle = $2^\circ 16.2' + 8^\circ 20' \div 2 = 6^\circ 28.2'$, etc.

Externals.—May be found in similar manner to tangents. Thus E for curve above is 91.37. For from Table IV for 1° curve $E = 960.6$ for $8^\circ 20' = 960.6 \div 8\frac{1}{2} = 91.27$ and from Table V correction = .10 or $E = 91.37$ 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 $D = 5^\circ 30'$.

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

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
31°	1589.0	216.3	41°	2142.2	387.4	51°	2732.9	618.4
10'	1598.0	218.7	10'	2151.7	390.7	10'	2743.1	622.8
20'	1606.9	221.1	20'	2161.2	394.1	20'	2753.4	627.2
30'	1615.9	223.5	30'	2170.8	397.4	30'	2763.7	631.7
40'	1624.9	226.0	40'	2180.3	400.8	40'	2773.9	636.2
50'	1633.9	228.4	50'	2189.9	404.2	50'	2784.2	640.7
32	1643.0	230.9	42	2199.4	407.6	52	2794.5	645.2
10	1652.0	233.4	10	2209.0	411.1	10	2804.9	649.7
20	1661.0	235.9	20	2218.6	414.5	20	2815.2	654.3
30	1670.0	238.4	30	2228.1	418.0	30	2825.6	658.8
40	1679.1	241.0	40	2237.7	421.4	40	2835.9	663.4
50	1688.1	243.5	50	2247.3	425.0	50	2846.3	668.0
33	1697.2	246.1	43	2257.0	428.5	53	2856.7	672.7
10	1706.3	248.7	10	2266.6	432.0	10	2867.1	677.3
20	1715.3	251.3	20	2276.2	435.6	20	2877.5	682.0
30	1724.4	253.9	30	2285.9	439.2	30	2888.0	686.7
40	1733.5	256.5	40	2295.6	442.8	40	2898.4	691.4
50	1742.6	259.1	50	2305.2	446.4	50	2908.9	696.1
34	1751.7	261.8	44	2314.9	450.0	54	2919.4	700.9
10	1760.8	264.5	10	2324.6	453.6	10	2929.9	705.7
20	1770.0	267.2	20	2334.3	457.3	20	2940.4	710.5
30	1779.1	269.9	30	2344.1	461.0	30	2951.0	715.3
40	1788.2	272.6	40	2353.8	464.6	40	2961.5	720.1
50	1797.4	275.3	50	2363.5	468.4	50	2972.1	725.0
35	1806.6	278.1	45	2373.3	472.1	55	2982.7	729.9
10	1815.7	280.8	10	2383.1	475.8	10	2993.3	734.8
20	1824.9	283.6	20	2392.8	479.6	20	3003.9	739.7
30	1834.1	286.4	30	2402.6	483.3	30	3014.5	744.6
40	1843.3	289.2	40	2412.4	487.2	40	3025.2	749.6
50	1852.5	292.0	50	2422.3	491.0	50	3035.8	754.6
36	1861.7	294.9	46	2432.1	494.8	56	3046.5	759.6
10	1870.9	297.7	10	2441.9	498.7	10	3057.2	764.6
20	1880.1	300.6	20	2451.8	502.5	20	3067.9	769.7
30	1889.4	303.5	30	2461.7	506.4	30	3078.7	774.7
40	1898.6	306.4	40	2471.5	510.3	40	3089.4	779.8
50	1907.9	309.3	50	2481.4	514.3	50	3100.2	784.9
37	1917.1	312.2	47	2491.3	518.2	57	3110.9	790.1
10	1926.4	315.2	10	2501.2	522.2	10	3121.7	795.2
20	1935.7	318.1	20	2511.2	526.1	20	3132.6	800.4
30	1945.0	321.1	30	2521.1	530.1	30	3143.4	805.6
40	1954.3	324.1	40	2531.1	534.2	40	3154.2	810.9
50	1963.6	327.1	50	2541.0	538.2	50	3165.1	816.1
38	1972.9	330.2	48	2551.0	542.2	58	3176.0	821.4
10	1982.2	333.2	10	2561.0	546.3	10	3186.9	826.7
20	1991.5	336.3	20	2571.0	550.4	20	3197.8	832.0
30	2000.9	339.3	30	2581.0	554.5	30	3208.8	837.3
40	2010.2	342.4	40	2591.0	558.6	40	3219.7	842.7
50	2019.6	345.5	50	2601.1	562.8	50	3230.7	848.1
39	2029.0	348.6	49	2611.2	566.9	59	3241.7	853.5
10	2038.4	351.8	10	2621.2	571.1	10	3252.7	858.9
20	2047.8	354.9	20	2631.3	575.3	20	3263.7	864.3
30	2057.2	358.1	30	2641.4	579.5	30	3274.8	869.8
40	2066.6	361.3	40	2651.5	583.8	40	3285.8	875.3
50	2076.0	364.5	50	2661.6	588.0	50	3296.9	880.8
40	2085.4	367.7	50	2671.8	592.3	60	3308.0	886.4
10	2094.9	371.0	10	2681.9	596.6	10	3319.1	892.0
20	2104.3	374.2	20	2692.1	600.9	20	3330.3	897.5
30	2113.8	377.5	30	2702.3	605.3	30	3341.4	903.2
40	2123.3	380.8	40	2712.5	609.6	40	3352.6	908.8
50	2132.7	384.1	50	2722.7	614.0	50	3363.8	914.5

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

Central Angle	Tangent	External	Central Angle	Tangent	External	Central Angle	Tangent	External
61°	3375.0	920.2	71°	4086.9	1308.2	81°	4893.6	1805.3
10'	3386.3	925.9	10'	4099.5	1315.6	10'	4908.0	1814.7
20'	3397.5	931.6	20'	4112.1	1322.9	20'	4922.5	1824.1
30'	3408.8	937.3	30'	4124.8	1330.3	30'	4937.0	1833.6
40'	3420.1	943.1	40'	4137.4	1337.7	40'	4951.5	1843.1
50'	3431.4	948.9	50'	4150.1	1345.1	50'	4966.1	1852.6
62	3442.7	954.8	72	4162.8	1352.6	82	4980.7	1862.2
10	3454.1	960.6	10	4175.6	1360.1	10	4995.4	1871.8
20	3465.4	966.5	20	4188.5	1367.6	20	5010.0	1881.5
30	3476.8	972.4	30	4201.2	1375.2	30	5024.8	1891.2
40	3488.3	978.3	40	4214.0	1382.8	40	5039.5	1900.9
50	3499.7	984.3	50	4226.8	1390.4	50	5054.3	1910.7
63	3511.1	990.2	73	4239.7	1398.0	83	5069.2	1920.5
10	3522.6	996.2	10	4252.6	1405.7	10	5084.0	1930.4
20	3534.1	1002.3	20	4265.6	1413.5	20	5099.0	1940.3
30	3545.6	1008.3	30	4278.5	1421.2	30	5113.9	1950.3
40	3557.2	1014.4	40	4291.5	1429.0	40	5128.9	1960.2
50	3568.7	1020.5	50	4304.6	1436.8	50	5143.9	1970.3
64	3580.3	1026.6	74	4317.6	1444.6	84	5159.0	1980.4
10	3591.9	1032.8	10	4330.7	1452.5	10	5174.1	1990.5
20	3603.5	1039.0	20	4343.8	1460.4	20	5189.3	2000.6
30	3615.1	1045.2	30	4356.9	1468.4	30	5204.4	2010.8
40	3626.8	1051.4	40	4370.1	1476.4	40	5219.7	2021.1
50	3638.5	1057.7	50	4383.3	1484.4	50	5234.9	2031.4
65	3650.2	1063.9	75	4396.5	1492.4	85	5250.3	2041.7
10	3661.9	1070.2	10	4409.8	1500.5	10	5265.6	2052.1
20	3673.7	1076.6	20	4423.1	1508.6	20	5281.0	2062.5
30	3685.4	1082.9	30	4436.4	1516.7	30	5296.4	2073.0
40	3697.2	1089.3	40	4449.7	1524.9	40	5311.9	2083.5
50	3709.0	1095.7	50	4463.1	1533.1	50	5327.4	2094.1
66	3720.9	1102.2	76	4476.5	1541.4	86	5343.0	2104.7
10	3732.7	1108.6	10	4489.9	1549.7	10	5358.6	2115.3
20	3744.6	1115.1	20	4503.4	1558.0	20	5374.2	2126.0
30	3756.5	1121.7	30	4516.9	1566.3	30	5389.9	2136.7
40	3768.5	1128.2	40	4530.4	1574.7	40	5405.6	2147.5
50	3780.4	1134.8	50	4544.0	1583.1	50	5421.4	2158.4
67	3792.4	1141.4	77	4557.6	1591.6	87	5437.2	2169.2
10	3804.4	1148.0	10	4571.2	1600.1	10	5453.1	2180.2
20	3816.4	1154.7	20	4584.8	1608.6	20	5469.0	2191.1
30	3828.4	1161.3	30	4598.5	1617.1	30	5484.9	2202.2
40	3840.5	1168.1	40	4612.2	1625.7	40	5500.9	2213.2
50	3852.6	1174.8	50	4626.0	1634.4	50	5517.0	2224.3
68	3864.7	1181.6	78	4639.8	1643.0	88	5533.1	2235.5
10	3876.8	1188.4	10	4653.6	1651.7	10	5549.2	2246.7
20	3889.0	1195.2	20	4667.4	1660.5	20	5565.4	2258.0
30	3901.2	1202.0	30	4681.3	1669.2	30	5581.6	2269.3
40	3913.4	1208.9	40	4695.2	1678.1	40	5597.8	2280.6
50	3925.6	1215.8	50	4709.2	1686.9	50	5614.2	2292.0
69	3937.9	1222.7	79	4723.2	1695.8	89	5630.5	2303.5
10	3950.2	1229.7	10	4737.2	1704.7	10	5646.9	2315.0
20	3962.5	1236.7	20	4751.2	1713.7	20	5663.4	2326.6
30	3974.8	1243.7	30	4765.3	1722.7	30	5679.9	2338.2
40	3987.2	1250.8	40	4779.4	1731.7	40	5696.4	2349.8
50	3999.5	1257.9	50	4793.6	1740.8	50	5713.0	2361.5
70	4011.9	1265.0	80	4807.7	1749.9	90	5729.7	2373.3
10	4024.4	1272.1	10	4822.0	1759.0	10	5746.3	2385.1
20	4036.8	1279.3	20	4836.2	1768.2	20	5763.1	2397.0
30	4049.3	1286.5	30	4850.5	1777.4	30	5779.9	2408.9

TABLE VI.—CORRECTIONS FOR SUB-CHORDS AND LONG CHORDS.

FOR SUB-CHORDS ADD										Excess of arc per 100 ft.	LONG CHORDS			
D	10	20	30	40	50	60	70	80	90		D	200	300	400
4°	.00	.00	.01	.01	.01	.01	.01	.01	.00	.02	1 199.99	299.97	399.02	499.85
6	.00	.01	.01	.02	.02	.02	.02	.01	.01	.05	2 199.97	299.88	399.70	499.89
8	.01	.02	.02	.03	.03	.03	.03	.02	.01	.08	3 199.93	299.73	399.32	498.63
10	.01	.02	.03	.04	.04	.05	.05	.04	.02	.13	4 199.88	299.51	398.78	497.57
12	.02	.04	.05	.06	.07	.07	.07	.05	.03	.18	5 199.81	299.24	398.10	496.20
14	.02	.05	.07	.08	.09	.10	.09	.07	.04	.25	6 199.73	298.90	397.26	494.53
16	.03	.06	.09	.11	.12	.12	.12	.09	.05	.33	7 199.63	298.51	396.28	492.57
18	.04	.08	.11	.14	.15	.16	.15	.12	.07	.41	8 199.51	298.05	395.14	490.31
20	.05	.10	.14	.17	.19	.20	.18	.15	.09	.51	9 199.38	297.54	393.86	487.75
22	.06	.12	.17	.21	.23	.24	.22	.18	.10	.62	10 199.24	296.96	392.42	484.90
24	.07	.14	.20	.25	.28	.28	.26	.21	.12	.74	12 198.90	295.63	389.12	478.34
26	.09	.17	.24	.29	.32	.33	.31	.25	.15	.86	14 198.51	294.06	385.22	470.65
28	.10	.19	.27	.34	.37	.38	.36	.29	.17	1.00	16 198.05	292.25	380.76	461.86
30	.11	.22	.31	.39	.43	.44	.41	.33	.19	1.15	18 197.54	290.21	375.74	452.02
32	.13	.25	.36	.44	.49	.50	.47	.38	.22	1.31	20 196.96	287.94	370.17	441.15
34	.15	.28	.40	.50	.55	.57	.53	.43	.25	1.48	22 196.32	285.44	364.06	429.30
36	.17	.32	.45	.56	.62	.64	.59	.48	.28	1.66	24 195.63	282.71	357.43	416.53
38	.18	.36	.51	.62	.70	.71	.66	.53	.31	1.86	26 194.87	279.76	350.30	402.89
40	.21	.40	.56	.69	.77	.79	.73	.59	.35	2.06	28 194.06	276.59	342.69	388.43
42	.23	.44	.62	.76	.85	.87	.81	.65	.38	2.28	30 193.18	273.20	334.61	373.20
44	.25	.48	.68	.84	.94	.96	.89	.72	.42	2.50	32 192.25	269.61	326.08	357.28
46	.27	.52	.75	.92	1.02	1.05	.98	.78	.46	2.74	34 191.26	265.81	317.12	340.73
48	.30	.57	.81	1.00	1.12	1.14	1.06	.86	.50	2.99	36 190.21	261.80	307.77	323.61
50	.32	.62	.89	1.09	1.21	1.24	1.15	.93	.55	3.24	38 189.10	257.60	298.03	305.99
52	.35	.67	.96	1.18	1.31	1.35	1.25	1.01	.59	3.52	40 187.94	253.21	287.94	287.94
54	.38	.73	1.04	1.28	1.42	1.46	1.35	1.09	.64	3.80	42 186.72	248.63	277.51	269.54
56	.41	.78	1.12	1.38	1.53	1.57	1.46	1.17	.69	4.09	44 185.44	243.87	266.78	250.85
58	.44	.84	1.20	1.48	1.65	1.69	1.57	1.26	.74	4.40	46 184.10	239.93	255.78	231.95
60	.47	.91	1.29	1.59	1.76	1.81	1.68	1.35	.80	4.72	48 182.71	233.83	244.51	212.92

NOTE.—When a chord of less than 100 ft. is used the corrections given in the above table should be added to the nominal length of chord to get the length which should be used in order that the 100 ft. points will check with those obtained by using the standard 100 ft. chord. Thus in locating a 14° curve by 25 ft. chords measure 25'.06 for each chord. Long chords are useful in passing obstacles.

TABLE VII.—MIDDLE ORDINATES FOR RAILS IN FEET.

Deg. of Curve	LENGTH OF RAILS							Deg. of Curve	LENGTH OF RAILS.						
	32	30	28	26	24	22	20		32	30	28	26	24	22	20
1°	.022	.020	.016	.013	.011	.009	.008	16°	.356	.313	.273	.236	.200	.170	.139
2	.045	.038	.034	.029	.025	.021	.017	17	.378	.333	.290	.252	.213	.180	.148
3	.067	.058	.051	.044	.037	.031	.026	18	.400	.351	.306	.265	.225	.190	.156
4	.089	.079	.069	.060	.050	.042	.035	19	.423	.371	.324	.280	.238	.201	.165
5	.112	.099	.086	.074	.063	.053	.044	20	.445	.392	.341	.296	.250	.212	.174
6	.134	.117	.102	.088	.076	.064	.052	21	.466	.410	.357	.309	.262	.222	.182
7	.156	.137	.120	.104	.088	.074	.061	22	.487	.430	.375	.325	.275	.233	.191
8	.179	.158	.137	.119	.100	.085	.070	23	.509	.450	.390	.338	.287	.243	.199
9	.201	.175	.153	.133	.112	.095	.078	24	.531	.469	.408	.354	.299	.253	.208
10	.223	.196	.171	.148	.125	.106	.087	25	.552	.486	.424	.367	.311	.263	.216
11	.245	.216	.188	.163	.139	.117	.096	26	.573	.506	.441	.382	.323	.274	.225
12	.268	.236	.206	.179	.151	.128	.105	27	.594	.524	.457	.396	.335	.284	.233
13	.290	.254	.222	.192	.163	.138	.113	28	.618	.545	.475	.411	.348	.294	.242
14	.312	.275	.239	.207	.175	.148	.122	29	.638	.564	.491	.424	.361	.303	.250
15	.334	.295	.257	.223	.188	.159	.131	30	.660	.583	.508	.438	.374	.313	.259

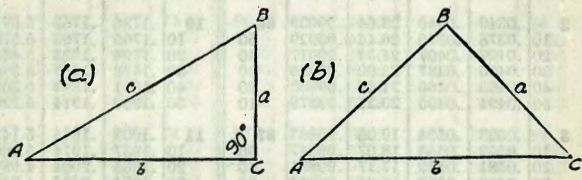
SLOPE REDUCTIONS.

When distances are measured on a slope they may be reduced to the equivalent horizontal distance by the following approximate rule—subtract from the slope distance the square of the rise divided by twice the slope distance. Thus for a slope distance of 250.3 ft. and a rise of 15 ft. correction= $15^2 \div 2 \times 250.3 = .45$ (by slide rule) or horizontal distance= $250.3 - .45 = 249.85$. When vertical angle= $V. A.$ is measured horizontal distance= $\text{slope distance} \times \cos V. A.$ Thus for slope distance of 248.7 ft. and $V. A.$ of $4^\circ 20'$ from Table VIII $\cos = .99714$ and correction= $1 - .99714 = .00286$ per foot or total of $.286 \times 2\frac{1}{2}$ (near enough) = .57 and horizontal distance= $248.7 - .57 = 248.13$ ft.

See fig. (a).

TRIGONOMETRICAL FORMULAS.

- sin. $A = \frac{a}{c}$
- cos. $A = \frac{b}{c}$
- tan. $A = \frac{a}{b}$
- cot. $A = \frac{b}{a}$
- sec. $A = \frac{c}{b}$
- cosec. $A = \frac{c}{a}$



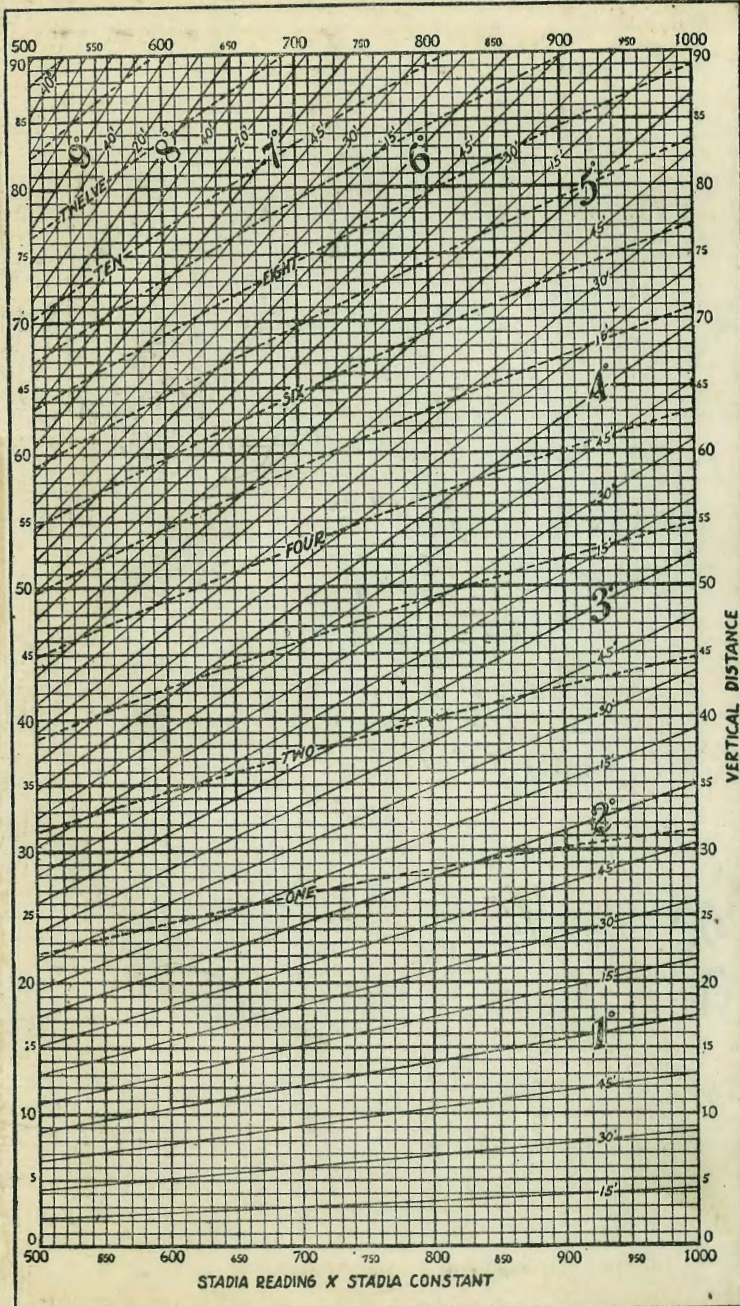
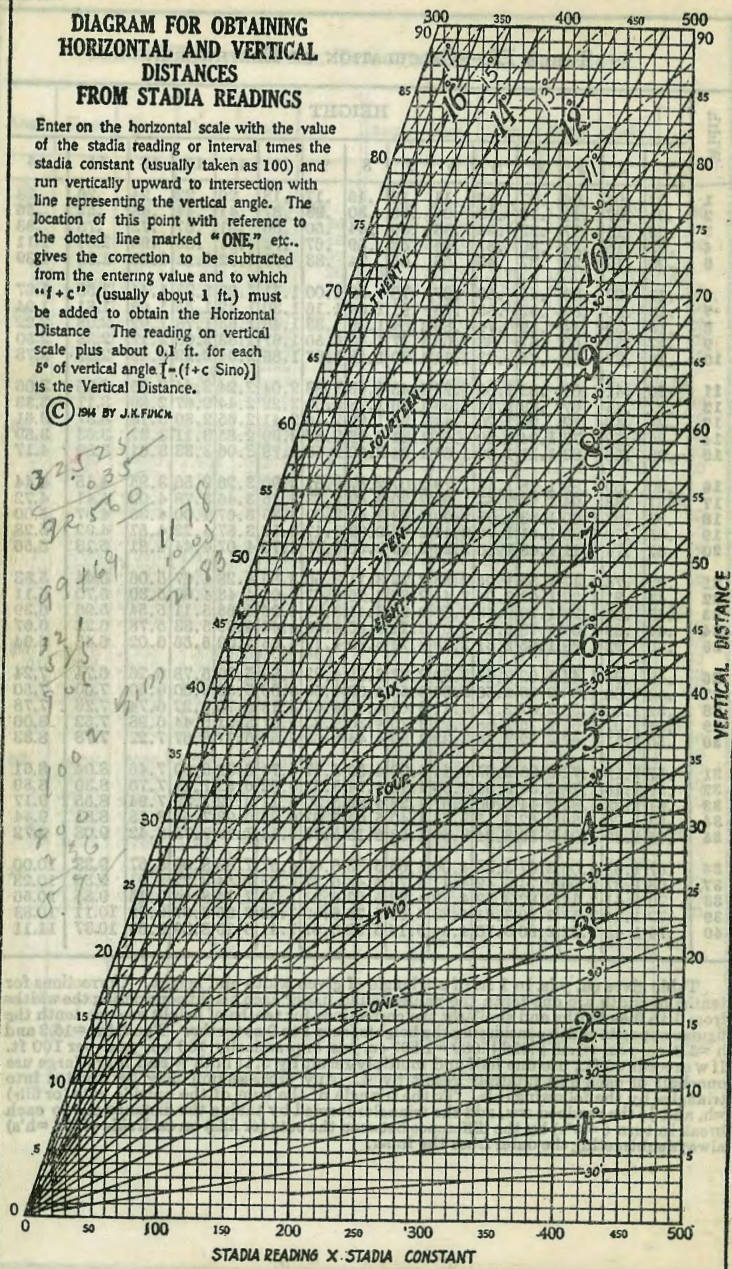
FORMULA FOR SOLVING TRIANGLES.

Given	Sought.	Right triangles. See fig. (a).
a, c	A, B, b	$\sin. A = \frac{a}{c}, \cos. B = \frac{b}{c}, b = \sqrt{(c+a)(c-a)}$
a, b	A, B, c	$\tan. A = \frac{a}{b}, \cot. B = \frac{b}{a}, c = \sqrt{a^2 + b^2}$
A, a	B, b, c	$B = 90^\circ - A, b = a \cot. A, c = \frac{a}{\sin. A}$
A, b	B, a, c	$B = 90^\circ - A, a = b \tan. A, c = \frac{b}{\cos. A}$
A, c	B, a, b	$B = 90^\circ - A, a = c \sin. A, b = c \cos. A$
Given	Sought.	Oblique triangles. See fig. (b).
A, B, a	b	$b = \frac{a \sin. B}{\sin. A}$
A, a, b	B	$\sin. B = \frac{b \sin. A}{a}$
a, b, C	A - B	$\tan. \frac{1}{2}(A-B) = \frac{(a-b) \tan. \frac{1}{2}(A+B)}{a+b}$
a, b, c	A	$\left\{ \begin{aligned} \text{If } s = \frac{1}{2}(a+b+c), \sin. \frac{1}{2} A &= \sqrt{\frac{(s-b)(s-c)}{bc}} \\ \cos. \frac{1}{2} A &= \sqrt{\frac{s(s-a)}{bc}}, \tan. \frac{1}{2} A = \sqrt{\frac{(s-b)(s-c)}{s(s-a)}} \\ \sin. A &= \frac{2\sqrt{(s-a)(s-b)(s-c)}}{bc} \end{aligned} \right.$
A, B, C, a	area	$\text{area} = \frac{a^2 \sin. B \sin. C}{2 \sin. A}$
A, b, c	area	$\text{area} = \frac{1}{2} bc \sin. A$
a, b, c	area	$s = \frac{1}{2}(a+b+c), \text{area} = \sqrt{s(s-a)(s-b)(s-c)}$

DIAGRAM FOR OBTAINING HORIZONTAL AND VERTICAL DISTANCES FROM STADIA READINGS

Enter on the horizontal scale with the value of the stadia reading or interval times the stadia constant (usually taken as 100) and run vertically upward to intersection with line representing the vertical angle. The location of this point with reference to the dotted line marked "ONE" etc., gives the correction to be subtracted from the entering value and to which "f+c" (usually about 1 ft.) must be added to obtain the Horizontal Distance. The reading on vertical scale plus about 0.1 ft. for each 5° of vertical angle [$= (f+c \text{ Sino})$] is the Vertical Distance.

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585	79
065	25
650	10V

29 =
28

13° 09' 30"	4739.95
12° 20' 11"	3682.8
79' 19"	557.15
	61434
	222860
	167145
	222860
	55715
	79895010

75.17
43.2
79.

2669
901
1768

88
32
56

135 / 54000
540
200
135
650

0.4

- 0.4 = 811.
69
15
11
- 70

62° 2V
27 36

10.6
58
16.0 = Top

14.7
10.6
4.1

470
3186
3660

32100
47
367

325876
31300
3571.76
60
3631.76
3682.8
51.1

5252.2
5290
166.2

5+10
27298
2137.67
2380
1625
7.55

37
137
477
298

269500
58293
327793

87 40 40
79+90 34
7500

97+997
4.72
98404.2
9806
1.58

457
6.01
16.58 = Flan
538
550 = Top

N Flan = 773
130
543

457
6.01
16.58 = Flan
538
550 = Top

32+7793 beginning Spher
6.28 6.72

20' 15" Rod. 9.05 - 2.33

77909
255
79648

52
32
4
1.8

78
52
26

423985
7312
431309

749
236
7726

664
173
171

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.